UNIVERSIDADE ESTADUAL PAULISTA - UNESP
CÂMPUS DE JABOTICABAL

TAXONOMIC STUDIES OF LAELAPID MITES (ACARI: MESOSTIGMATA: LAELAPIDAE) AND THEIR USE IN COMBINATION WITH ENTOMOPATHOGENIC NEMATODES (RHABDITIDA: STEINERNEMATIDAE, HETERORHABDITIDAE) TO CONTROL *Frankliniella occidentalis* (THYSANOPTERA: THRIPIDAE)

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Biologist

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TAXONOMIC STUDIES OF LAELAPID MITES (ACARI: MESOSTIGMATA: LAELAPIDAE) AND THEIR USE IN COMBINATION WITH ENTOMOPATHOGENIC NEMATODES (RHABDITIDA: STEINERNEMATIDAE, HETERORHABDITIDAE) TO CONTROL *Frankliniella occidentalis* (THYSANOPTERA: THRIPIDAE)

ABSTRACT - The cosmopolitan Dermanyssoidea mite family Laelapidae Berlese occupies a diversity of habitats, where their habits vary from free-living to arthropod, mammal and bird associates. Some species of this family as well the entomopathogenic nematodes (EPN) have shown good potential as biological control agents. *Frankliniella occidentalis* (Pergande), one of the most important thrips pests, causes major damage to several cultivated plants, acting as pest or vector of pathogens. The aims of the study reported in this document were the preparation of a taxonomic catalog of the free-living and arthropod associated laelapid mites, the taxonomic study of the laelapid species collected in Brazil, the preparation of a key for the South American free-living and arthropod associated genera, and evaluations of the effect of different laelapid and EPN species as control agents of *F. occidentalis*. A total of 828 species of 41 genera are reported in the catalog. Nine new species were described and a key for the separation of genera reported in South America genus was prepared. In laboratory tests, *Cosmolaelaps jaboticabalensis* Moreira, Klompen and Moraes and *Stratiolaelaps scimitus* (Womersley) preyed upon about 2.5 and 3.9 pre-pupae/pupae of *F. occidentalis* and laid about 2.2 and 1.4 eggs per day, respectively. *Heterorhabditis amazonensis* GL Andaló, Nguyen and Moino Jr. was the most virulent nematode, producing mortality of about 87.5% of exposed pre-pupae/pupae. None of the evaluated predators showed preference for that nematode as prey and none of the evaluated nematodes interfered in the survivorship of the predators. For *C. jaboticabalensis*, total immature development (egg-adult) was completed in 12.3 ± 5, 6.6 ± 0.6 and 7.1 ± 0.6 on *F. occidentalis*, *Protorhabditis* sp. and *T. putrescentiae*, respectively. Fecundity and intrinsic rate of increase were higher on *Protorhabditis* sp. (71.6 ± 9.1 eggs/female; 0.28 female/female/day) than on *F. occidentalis* (63.8 ± 14.8; 0.23) and *T. putrescentiae* (43.1 ± 8.9; 0.23). *Cosmolaelaps jaboticabalensis* reproduces by thelytokous parthenogenesis and its larval stage can be completed without feeding. Protonymphs and deutonymphs of this species can survive in the absence of food for about a month, and adults, for almost two months. These results suggest that *C. jaboticabalensis* and *S. scimitus* could be used in isolation or together with the nematode *H. amazonensis* GL for the control of *F. occidentalis*.

Key words: biological control, catalog, *Cosmolaelaps*, *Heterorhabditis*, *Steinernema*, *Stratiolaelaps*

ESTUDOS TAXONÔMICOS DE LELAPÍDEOS (ACARI: MESOSTIGMATA: LAELAPIDAE) E SUA UTILIZAÇÃO CONJUNTA COM NEMATOIDES ENTOMOPATOGÊNICOS (RHABDITIDA: STEINERNEMATIDAE, HETERORHABDITIDAE) PARA O CONTROLE DE *Frankliniella occidentalis* (THYSANOPTERA: THRIPIDAE)

RESUMO – A família Laelapidae Berlese (Mesostigmata: Dermanyssoidea) é cosmopolita e ocupa uma diversidade de habitats, onde seus hábitos podem variar de espécies de vida-livre a espécies associadas a artrópodes, mamíferos e pássaros. Algumas espécies dessa família, bem como os nematoides entomopatogênicos (NEP) têm demonstrado bom potencial como agentes de controle biológico. *Frankliniella occidentalis* (Pergande), uma das espécies mais importantes de tripes-praga, causa danos a várias plantas cultivadas, atuando como praga ou vetor de patógenos. Os objetivos desse estudo foram a preparação de um catálogo taxonômico para lelapídeos de vida-livre e associados a artrópodes, o estudo taxonômico de espécies de Laelapidae coletados no Brasil, a preparação de uma chave para gêneros de Laelapidae de vida livre e associados a artrópodes até o momento conhecidos da América do Sul, e avaliar os efeitos de diferentes espécies de lelapídeos e NEP como agentes de controle de *F. occidentalis*. Um total de 828 espécies pertencentes a 41 gêneros são relatados no catálogo. Nove espécies novas foram descritas e uma chave para gêneros de ocorrência na América do Sul de Laelapidae foi elaborada. Em testes de laboratório, *Cosmolaelaps jaboticabalensis* Moreira, Klompen & Moraes e *Stratiolaelaps scimitus* (Womersley) predaram aproximadamente 2,5 e 3,9 pré-pupa/pupa de *F. occidentalis* e ovipositaram aproximadamente 2,2 e 1,4 ovos por dia, respectivamente. *Heterorhabditis amazonensis* GL Andaló, Nguyen & Moino Jr. foi o nematoide mais virulento, causando a mortalidade de aproximadamente 87,5% das pre-pupas/pupas oferecidas. Nenhum dos predadores avaliados mostrou preferência por este nematoide como presa e nenhum dos NEP avaliados interferiram na sobrevivência dos predadores. Para *C. jaboticabalensis*, a fase imatura (ovo-adulto) foi completada em 12,3 ± 5; 6,6 ± 0,6 e 7,1 ± 0,6 em *F. occidentalis*, *Protorhabditis* sp. e *T. putrescentiae*, respectivamente. A fecundidade e a razão intrínseca de aumento populacional foram maiores em *Protorhabditis* sp. (71,6 ± 9,1 ovos/fêmea; 0,28 fêmea/fêmea/dia) do que em *F. occidentalis* (63,8 ± 14,8; 0,23) and *T. putrescentiae* (43,1 ± 8,9; 0,23). *Cosmolaelaps jaboticabalensis* se reproduz por partenogênese telítoca e seu estágio larval pode ser completado na ausência de alimento. Protoninfas e deutoninfas desta espécie podem sobreviver na ausência de alimento por aproximadamente um mês, e adultos, por quase dois meses. Estes resultados sugerem que *C. jaboticabalensis* e *S. scimitus* podem ser usados isoladamente ou em conjunto com o NEP *H. amazonensis* GL para o controle de *F. occidentalis*.

Palavras-chave: controle biológico, catálogo, *Cosmolaelaps*, *Heterorhabditis*, *Steinernema*, *Stratiolaelaps*

CHAPTER 1 – General considerations

1 Introduction

The family Laelapidae Berlese (Acari: Mesostigmata) has been mentioned to include a large number of species showing a wide range of feeding habits. They are mostly found in the soil, and many of these are predators. The free-living species have received considerable attention as potential control agents of insect and mite pests that spend at least part of their lives on the soil surface, where those mites are found. They have been commercialized in different countries, including Brazil, for the control of different pest organisms. Still, relatively little is known about these mites worldwide, compared with what is known for some of the other mite groups of agricultural and medical veterinarian importance.

Entomopathogenic nematodes (Nematoda: Rhabditida) are organisms with a combination of attribute, as the mutualistic association with entomopathogenic bacteria, that make them good alternatives as biological control agents of pests.

Frankliniella occidentalis (Pergande) (Thysanoptera: Thripidae) is one of the most important pests in greenhouse worldwide. Its generalist habit and the potential to transmit pathogens make it target of several studies about its control. The discovery of new biological control agents of this pest can improve its management and reduce the use of pesticides, the most common mean of thrips control.

2 Literature review

Mites are arthropods of the subphylum Chelicerata, constituting the subclass Acari of the class Arachnida. They correspond to the second major group of arthropods, after the insects. It has been estimated that the total number of taxonomically known mites amounts to 55214 species, which occupy a wide diversity

of ecosystems (ZHANG, 2013). They are currently divided in the superorders Acariformes and Parasitiformes (LINDQUIST et al., 2009).

The Acariformes include the orders Trombidiformes and Sarcoptiformes. Within the former, the suborder Prostigmata constitutes a major group containing the main plant pest groups, including the Eriophyoidea (Eriophyidae and others), Tetranychoidea (Tenuipalpidae, Tetranychidae and others) and Tarsonemoidea (Tarsonemidae and others), as well as important groups of predatory mites (Cheyletidae, Stigmaeidae and others) and mites of diverse feeding habits (Tydeidae and others). Within the Sarcoptiformes, the suborder Oribatida is the most important group, containing the species involved in the decomposition of organic matter, as well as a well delimited group known as Astigmatina, living on different organisms as parasite as well as in storage facilities (MORAES and FLECHTMANN, 2008; KRANTZ, 2009).

The Parasitiformes include two small orders, Opilioacarida and Holothyrida, as well as two major orders, the Ixodida and the Mesostigmata. All Ixodida, or ticks, are parasites of vertebrates, feeding almost exclusively on their blood and often acting as a carrier of pathogenic organisms that are transmitted from diseased to healthy organisms, including man. The Mesostigmata have diverse feeding habits, ranging from predation to true parasitism (LINDQUIST et al., 2009).

The Mesostigmata constituted the main group of organisms studied in the work reported in this document. Many of these are free-living organisms that live on the soil or in the litter layer covering the soil, as for example the Ascoidea (Ascidae and others), Dermanyssoidea (Dermanyssidae, Laelapidae and others), Parasitoidea (Parasidae and others), Phytoseioidea (Phytoseiidae and others), Rhodacaroidea (Rhodacaridae and others) and Uropodoidea (Uropodidae and others) (LINDQUIST et al., 2009).

The cosmopolitan Dermanyssoidea mite family Laelapidae Berlese occupies a diversity of habits, including free-living and arthropod, mammal and bird associates. This family includes about 1300 species classified in slightly over 90 genera (BEAULIEU et al., 2011). Its classification has changed considerably since its original

description by Berlese (1892). Some species in this group have shown good potential as biological control agents of pests that live their whole life or part of their lifes on the soil surface. *Gaeolaelps aculeifer* (Canestrini), *Stratiolaelaps miles* (Berlese) and *Stratiolaelaps scimitus* (Womersley), for example, have been commercially produced for this propose.

More than 30 nematodes families are known to be associated with invertebrates as insects, mites and molluscs. These associations range from casual (e.g. phoretic, commensal) to obligate parasitism and pathogenesis. Seven families of the order Rhabditida have been frequently studied because of their potential as biological control agents, namely Mermithidae, Allantonematidae, Neotylenchidae, Sphaerularidae, Rhabditidae, Steinernematidae and Heterorhabditidae (STOCK and HUNT, 2005).

Steinernematidae and Heterorhabditidae are unique among the rhabdtids for their mutualistic association with entomopathogenic bacteria; these are referred to as entomopathogenic nematodes (EPN). Steinernematidae is represented by the genera *Neosteinernema* and *Steinernema*, while Heterorhabditidae is represented by a single genus, *Heterorhabditis*. Species of each of these families are associated with entomopathogenic bacteria of the genus *Xenorhabdus* and *Photorhabdus*, respectively (BURNELL and STOCK, 2000).

Inside a host insect, the EPN release the bacteria, which then develop within the host killing it within 24-48 hours; the nematodes then feed on the bacterial cells as well as on the host tissue, to complete their development (BURNELL and STOCK, 2000; HAZIR et al., 2003). Some EPN species have been used in different countries to control pests on the soil surface, as for example thrips (Thysanoptera).

The Thysanoptera are divided in Terebrantia and Tubulifera. Thrips are small insects (0.5 to 13 mm in length), with diverse feeding habits, consuming sap, fungi spores, algae and consuming mites, aphids, mealybug and other thrips species. Among the Terebrantia, more than 95% of the species are associated with plants, including *Frankliniella* and *Thrips*, genera of world distribution and that contain most

pest species in different crops. Thrips are also important as vectors of several plant pathogens (GALLO et al., 2002).

In Brazil, six *Frankliniella* species [*F. brevicaulis* Hood, *F. condei* John, *F. occidentalis* (Pergande), *F. schultzei* (Trybom), *F. willliams* Hood and *F. zucchini* Nakahara & Monteiro) and three *Thrips* species [*T. australis* (Bagnall), *T. palmi* Karny and *T. tabaci* Lindeman)] are considered pests of different crops (MONTEIRO, 2001a; 2001b).

Frankliniella occidentalis, one of the most important thrips pests, causes major damage to several cultivated plants, acting as pest or vector of pathogens (REITZ, 2009). It is controlled usually with the use of insecticides (CLOYD, 2009).

According to Van Lenteren (2000), even though a large number of predators, entomopathogens and parasitoid have been know as thrips natural enemies, biological control programs using these organisms were still few by the end of the last century. However, this has changed since then. Some phytoseiid species, as *Amblyseius swirskii* Athias-Henriot, *Neoseiulus barkeri* Hughes and *Neoseiulus cucumeris* (Oudemans) have been used to control thrips in greenhouses in some countries. Given that thrips spend about a third of their life cycle on the soil surface (EBSSA et al., 2001), edaphic natural enemies as the laelapids *G. aculeifer*, *S. miles* and *S. scimitus* and some EPN, as *Heterorhabditis bacteriophora* Poinar and *Steirnernema feltiae* Filipjev have been used for the same purpose.

In Brazil, thrips biological control programs are still rare. However, the successful examples observed in other countries warrant consistent efforts in this regard in this country. Within this context, the adequate knowledge about the faunistic constitution of the laelapid species naturally found in Brazil is considered a priority at this early stage. Yet, the inadequate status of the taxonomic knowledge of the laelapid mites requires and justifies efforts to benefit not only Brazil but the whole international community interested on this mite group, starting by the establishment of basis for the taxonomic knowledge of this family at a worldwide level. Perspective use laelapid mites in isolation, or combined with the use of EPN in Brazil would also

benefit from the conduction of case studies that could serve as examples for future works along this line.

The aims of the study reported in this document were the preparation of a taxonomic catalog for the free-living and arthropod associate laelapid mites, the taxonomic study of the laelapid species collected in Brazil, the preparation of a key for the South American free-living and arthropod associated Laelapidae genera, and evaluations of the effect of different laelapid and EPN species as control agents of *F. occidentalis*.

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CHAPTER 2 - REDEFINITION OF *Cosmolaelaps* BERLESE (ACARI: LAELAPIDAE) AND DESCRIPTION OF FIVE NEW SPECIES FROM BRAZIL

Abstract - *Cosmolaelaps* Berlese, 1903 was originally described as a subgenus of *Laelaps* Koch. More recently, this group has been treated at the generic level or as a subgenus of *Hypoaspis* Canestrini, 1885. One of the objectives of the present paper is to provide a detailed characterisation of *Cosmolaelaps*, here considered at the generic level, a group that was poorly characterised in its original description as well as in subsequent publications. It is most closely related to *Stratiolaelaps* Berlese, from which it can usually be distinguished by the presence of extra paired and unpaired setae on the opisthonotal region of the dorsal shield, as well as by not having hypertrophied chelicerae or corniculi. A total of 108 species belong to *Cosmolaelaps*, including the new species described here. Five other species may also belong to this genus, but the available published information does not allow their conclusive placement. The Brazilian fauna of Hypoaspidinae is poorly known, but *Cosmolaelaps* seems to be well represented in Brazil. Thus, the second objective of this paper is to describe five new species of *Cosmolaelaps* from that country, namely *C. barbatus* sp. nov., *C. busolii* sp. nov., *C. confinisetarum* sp. nov., *C. jaboticabalensis* sp. nov. and *C. oliveirai* sp. nov.

Key words: Taxonomy, Mesostigmata, *Stratiolaelaps*

Introduction

Cosmolaelaps was described by Berlese (1903) as a subgenus of *Laelaps* Koch, and was raised to generic level by Berlese (1920). More recently, *Cosmolaelaps* has been treated in the literature either as a genus or as a subgenus of *Hypoaspis* Canestrini, 1885 (e.g. Karg 1978, 1981, 1987, 1988, 1993a, 1994, 1997, 2003, 2006; Xu & Liang, 1996; Faraji & Halliday, 2009). In the most recent

revision of Laelapidae, Casanueva (1993) raised most of the groups considered as subgenera of *Hypoaspis* by different authors to the generic level, including *Cosmolaelaps* and *Stratiolaelaps* Berlese, 1916, listing them in Hypoaspidinae. *Stratiolaelaps* was considered a junior synonym of *Cosmolaelaps* by Karg (1979, 1993a). This required an expanded concept of *Cosmolaelaps* to include species with a dorsal shield that gradually to sharply tapered posteriorly, with 15 pairs of setae on the opisthonotal region of the dorsal shield (no *px* or unpaired setae) and with hypertrophied corniculi and cheliceral digits. Walter & Campbell (2003) rejected the concept of Karg (1979, 1993a), considering *Cosmolaelaps* and *Stratiolaelaps* as separate genera. Karg & Schorlemmer (2013) also considered both of these taxa at the genus level, and that concept is followed here.

Comprehensive recent efforts to resolve the taxonomy of Laelapidae genera include revisions of *Gaeolaelaps* by Beaulieu (2009), *Hypoaspis* and *Coleolaelaps* by Joharchi & Halliday (2011), *Gymnolaelaps* and *Pseudoparasitus* by Joharchi et al. (2011), *Laelaspis* by Joharchi et al. (2012) and *Myrmozercon* by Joharchi & Moradi (2013). One of the objectives of the present paper is to do the same for *Cosmolaelaps*, a genus that has been poorly characterised in its original description as well as in subsequent publications.

The Brazilian fauna of Hypoaspidinae is poorly known, but the limited available information suggests that *Cosmolaelaps* is well represented in Brazil. Until recently, five *Cosmolaelaps* species were known from Brazil, all described as *Hypoaspis* — *H. weeversi* Oudemans, 1926, *H.* (*Cosmolaelaps*) *cassoidea* Karg, 1981, *H.* (*C.*) *furcatoides* Karg, 1981, *H.* (*C.*) *pannicula* Karg, 1981 and *H.* (*C.*) *pugiocuspis* Karg, 1981. Some undescribed laelapid species were found in surveys conducted in the Brazilian state of São Paulo, including six *Cosmolaelaps* species, one of which was recently described as *Cosmolaelaps paulista* Freire & Moraes, 2007. The second objective of this paper is to describe the other five species found in São Paulo state.

Material and methods

Our updated diagnosis of *Cosmolaelaps* is based on (a) the characteristics reported for this genus by Berlese (1903) and Evans & Till (1979) as well as for the related *Stratiolaelaps* by Walter & Campbell (2003); (b) a literature review of the characteristics of species considered in this publication to belong to Hypoaspidinae sensu Casanueva (1993); (c) the redescription of the type species of the genus, *C. claviger* (Berlese) by Evans & Till (1966); (d) an evaluation of the holotypes of *Hypoaspis* (*C.*) *brevistilis* Karg, 1978, *C. bregetovae* Fonseca, 1959, *C. paulista* Freire & Moraes, 2007 and of the new species here described. This work led to the establishment of new combinations, the removal of species previously placed in *Cosmolaelaps*, and the inclusion of species previously placed in other genera. An effort was made to summarise the characteristics shared by all species considered to belong in *Cosmolaelaps*, while pointing out observed intra-generic variation for each characteristic.

Differences were observed between the number of dorsal shield setae mentioned in the text of the description and shown in the illustrations of the following species: *Hypoaspis burdwanensis* Bhattacharyya, 1972, 37 pairs in the text and 38 in the illustration; *C. multisetosus* Domrow, 1957, 40 and 39; *H. sorecis* Li, Zheng & Yang, 1996, 39 and 36; *H. vanmoli* Loots, 1980, 39 and 38; *C. mabilogus* Rosario, 1981, 37 and 38. *C. rectangularis* Sheals, 1962, 38 and 39; *C. reticulatus* (Xu & Liang, 1996), 39 and 41; and *C. malakutsilyus* Rosario, 1981, no unpaired setae and two unpaired setae between *J* series. The highest number is used in this study, irrespective of whether it was the one mentioned in the text or the one shown in the illustration.

Specimens used in the description of the new species were mounted in Hoyer's medium on microscope slides. They were examined under phase and interference contrast microscopy. Illustrations were done with the help of a digital camera connected to a phase contrast microscope; photos were then processed with a digital tablet, using the Adobe Illustrator program. Measurements were done with the software package NIS vs. 3.2, which processes images obtained with the digital camera. For each character, the average measurement followed (in parentheses) by the minimum and the maximum measurements are given in µm. Setal nomenclature is that of Evans (1963), Evans & Till (1965) and Lindquist (1994) for legs, dorsal

idiosoma and opistogastric region, and poroidotaxy is based on Johnston & Moraza (1991) with some adjustments.

Abbreviations used for type depositories are: ESALQ-USP, for the mite reference collection of Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, São Paulo state, Brazil; OSAL, for Acarology Laboratory, Ohio State University, Columbus, Ohio, United States of America.

Results

Cosmolaelaps Berlese

Laelaps (*Cosmolaelaps*) Berlese, 1903: 13.

Cosmolaelaps.—Berlese, 1920: 157; Vitzthum, 1929: 22; Bregetova, 1956: 71; Sheals, 1962: 107; Casanueva, 1993: 40; Hunter, 1993: 23; Botelho et al., 2002: 54.

Hypoaspis (*Cosmolaelaps*).—Vitzthum, 1941: 762; Schweizer, 1961: 149; Evans & Till, 1966: 160; Bregetova, 1977: 511; Karg, 1979: 71 (in part); Karg, 1981: 213 (in part); Karg, 1988: 509 (in part); Hafez et al., 1982: 3; Karg, 1982: 234; Fouly et al., 1997: 33; Huhta & Karg, 2010: 330 (in part).

Type species. *Laelaps claviger* Berlese, 1883: 2.

The most detailed diagnosis of *Cosmolaelaps* was provided by Evans & Till (1979) in a key to genera of Laelapidae. According to that key, species of this genus have the dorsal shield setae spatulate, cuneiform or scimitar-shaped; opisthonotal region of dorsal shield with one or two pairs of *px* (referred to as *Zx*) setae and a totalof at least 16 pairs of setae; corniculi relatively short; female genital and anal shields not fused with other shields; palp apotele 2-tined; genu IV typically with nine setae (*pl2* absent); chelicerae chelate-dentate and cheliceral digits of similar lengths; metasternal setae not inserted on sternal shield and spermatodactyl free.

The following species are considered in this publication to belong to *Cosmolaelaps*, and have been considered in the updated diagnosis of the genus to

be presented below: *C. aciphilus* (Karg, 1987) n. comb. [described as *Hypoaspis* (*C.*) *aciphila*]; *C. acutiscutus* Teng, 1982; *C. alexandrini* (Fox, 1946) [described as *Ischnolaelaps alexandrini*, transferred to *Cosmolaelaps* by Freire & Moraes (2007)]; *C. anserinus* (Karg, 1981) [described as *H.* (*C.*) *anserina*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. barbatus* n.sp.; *C. bengalensis* (Bhattacharyya, 1968) n. comb. [described as *H. bengalensis*]; *C. bicuspisetosus* Willmann, 1953; *C. bipennatus* (Karg, 2003) n. comb. [described as *H.* (*C.*) *bipennata*]; *C. bispinosus* (Karg, 1997) n. comb. [described as *H.* (*C.*) *bispinosa*]; *C. brevilingua* (Karg, 2006) n. comb. [described as *H.* (*C.*) *brevilingua*]; *C. brevipedestrus* (Karg, 1985) [described as *H.* (*C.*) *brevipedestra*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. brevistilis* (Karg, 1978) n. comb. [described as *H.* (*C.*) *brevistilis*]; *C. burdwanensis* (Bhattacharyya, 1972) n. comb. [described as *H. burdwanensis*]; *C. busolii* n.sp.; *C. calamitus* (Faraji & Halliday, 2009) n. comb. [described as *H.* (*C.*) *calamitus*]; *C. carvalhoi* (Aswegen & Loots, 1970) n. comb. [described as *H.* (*H.*) *carvalhoi*]; *C. cassoidea* (Karg, 1981) [described as *H.* (*C.*) *cassoidea*, transferred to *Cosmolaelaps* by Freire & Moraes (2007)]; *C. chenchuanhoi* (Samšiňák, 1964) n. comb. [described as *Stratiolaelaps chenchuanhoi*]; *C. chianensis* (Gu, 1990) n. comb. [described as *H. chianensis*; senior synonym of *H.* (*C.*) *hefeiensis* Xu & Liang, 1996, according to Ma (2006)]; *C. chini* Bai & Gu, 1993; *C. claviger* (Berlese, 1883) [described as *Laelaps claviger*, transferred to *Cosmolaelaps* by Hull (1918); senior synonym of *C. bregetovae* Piryanik, 1959, according to Bregetova (1977); of *H.* (*H.*) *auris* Karg, 1965, according to Costa (1968); of *H.* (*C.*) *macroanalis* Bernhard in Hirschmann et al., 1969, according to Karg (1981)]; *C. communis* Trägårdh, 1931; *C. confinisetarum* n.sp.; *C. crossocauda* (Karg, 2006) n. comb. [described as *H.* (*C.*) *crossocauda*]; *C. cubaensis* (Karg, 1981) [described as *H.* (*C.*) *cubaensis*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. cuneifer* (Michael, 1891) [described as *L. cuneifer*, transferred to *Cosmolaelaps* by Hull (1918)]; *C. cursorius* (Karg, 1988) [described as *H.* (*C.*) *cursoria*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. dendrophilus* Davydova, 1977; *C. diversichaetatus* Grochovskaya & Huan-Hoe, 1961; *C. diversus* (Karg, 1994) n. comb. [described as *H.* (*C.*) *diversa*]; *C. euarmatus* (Karg, 1996) n. comb. [described as *H.* (*C.*) *euarmata*]; *C. eucapillatus* (Karg, 2003)

n. comb. [described as *H.* (*C.*) *eucapillata*]; *C. euventricosus* (Karg, 1995) n. comb. [described as *H.* (*C.*) *euventricosa*]; *C. furcatoides* (Karg, 1981) n. comb. [described as *H.* (*C.*) *furcatoides*]; *C. gladii* (Karg, 1993b) n. comb. [described as *H.* (*C.*) *gladii*]; *C. guoi* (Bai & Ma, 2012) n. comb. [described as *H.* (*C.*) *guoi*]; *C. guttulatus* (Karg, 1978) n. comb. [described as *H.* (*C.*) *guttulata*]; *C. hortensis* (Ishikawa, 1986) n. comb. [described as *H.* (*C.*) *hortensis*]; *C. hrdyi* (Samšiňák, 1961) {described as *H.* (*C.*) *hrdýi* [sic], transferred to *Cosmolaelaps* by Ma (2005a); senior synonym of *H.* (*C.*) *shenyangensis* Bei, Shi & Yin, 2003, according to Ma (2006)}; *C. inarmatus* (Karg, 1997) n. comb. [described as *H.* (*C.*) *inarmata*]; *C. indicus* Bhattacharyya, 1966 [= *H. calcuttaensis* Bhattacharyya, 1971, unjustified replacement name]; *C. jaboticabalensis* n.sp.; *C. kassaii* (Aswegen & Loots, 1970) n. comb. [described as *H.* (*H.*) *kassai*]; *C. keni* (Hafez, ElBadry & Nasr, 1982) [described as *H.* (*C.*) *keni*, transferred to *Cosmolaelaps* by Zaher, 1986]; *C. leeae* (Tseng, 1977) n. comb. [described as *H. leeae*]; *C. leptochaetes* Ma & Lin, 2009; *C. lepoauris* (Karg, 1981) n. comb. [described as *H.* (*C.*) *lepoauris*]; *C. leptolingua* (Karg, 1994) n. comb. [described as *H.* (*C.*) *leptolingua*]; *C. liae* Bai & Gu, 1993; *C. lingua* (Karg, 1987) n. comb. [described as *H.* (*C.*) *lingua*]; *C. lisimilis* Ma, 2007; *C. longanalis* (Karg, 2003) n. comb. [described as *H.* (*C.*) *longanalis*]; *C. longocrinitus* (Karg, 2006) n. comb. [described as *H.* (*C.*) *longocrinita*]; *C. longodigiti* (Karg, 1979) n. comb. [described as *H.* (*C.*) *longodigiti*]; *C. longogenitalis* (Karg, 1978) n. comb. [described as *H.* (*C.*) *longogenitalis*]; *C. longus* (Hafez, ElBadry& Nasr, 1882) [described as *H.* (*C.*) *longus*, transferred to *Cosmolaelaps* by Zaher, 1986]; *C. lutegiensis* Shcherbak, 1971a; *C. mabilogus* Rosario, 1981; *C. machadoi* (Aswegen & Loots, 1970) n. comb. [described as *H.* (*H.*) *machadoi*]; *C. machaeratus* (Domrow, 1957) [described as *Haemolaelaps machaeratus*]; *C. macrochaetus* (Karg, 1988) [described as *H.* (*C.*) *macrochaeta*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. mahuncai* (Karg, 1988) [described as *H.* (*C.*) *mahuncai*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. malakutsilyus* Rosario, 1981; *C. masculinus* (Karg, 1988) [described as *H.* (*C.*) *masculina*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. mediocuspis* (Karg, 1981) n. comb. [described as *H.* (*C.*) *mediocuspis*]; *C. michaeli* (Huhta & Karg, 2010) n. comb. [described as *H.* (*C.*) *michaeli*]; *C. mixta* (Shcherbak, 1971b) n. comb. [described as *H. mixta*]; *C.*

multidentatus (Aswegen & Loots, 1970) n. comb. [described as *H.* (*H.*) *multidentatus*]; *C. multisetosus* Domrow, 1957; *C. nasosetus* (Karg, 1981) [described as *H.* (*C.*) *nasoseta*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. neocuneifer* (Evans & Till, 1966) n. comb. [described as *H.* (*C.*) *neocuneifer*]; *C. ningxiaensis* Bai & Gu, 1993; *C. oliveirai* n.sp.; *C. ornatus* (Berlese, 1903) [described as *L*. (*C.*) *ornatus*, transferred to *Cosmolaelaps* by Hull (1918)]; *C. pahabaeus* Rosario, 1981; *C. panniculus* (Karg, 1981) n. comb. [described as *H.* (*C.*) *pannicula*]; *C. paracuneifer* (Gu & Bai, 1992) n. comb. [described as *H. paracuneifer*]; *C. paravacua* Nasr & Nawar, 1989; *C. parvidentis* (Karg & Schorlemmer, 2009) n. comb. [described as *H.* (*C.*) *parvidentis*]; *C. paulista* Freire & Moraes, 2007; *C. penicillatus* (Karg, 1979) n. comb. [described as *H.* (*C.*) *penicillata*]; *C. pugiocuspis* (Karg, 1981) n. comb. [described as *H.* (*C.*) *pugiocuspis*]; *C. pumili* (Karg, 1988) [described as *H.* (*C.*) *pumili*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. punyalus* Rosario, 1981; *C. qinghaiensis* (Li, Yang & Yue, 1997) n. comb. [described as *H. qinghaiensis*]; *C. quasiclaviger* Ma & Lin, 2009; *C. rectangularis* Sheals, 1962; *C. reticulatus* (Xu & Liang, 1996) [described as *H.* (*C.*) *reticulatus*, transferred to *Cosmolaelaps* by Ma (2005b)]; *C. retirugi* Ma, Yang & Zhang, 2004; *C. robustochaetes* Ma & Lin, 2009; *C. robustoventralis* Ma, 2011; *C. robustus* (Berlese, 1905) [described as *L*. (*C.*) *robustus*, transferred to *Cosmolaelaps* by Bregetova (1956)]; *C. serratus* Trägårdh, 1952; *C. simplex* Berlese, 1920; *C. sorecis* (Li, Zheng & Yang, 1996) n. comb. [described as *H. sorecis*]; *C. subacutiscutus* Bai & Wang, 2005; *C. subpictus* (Gu & Bai, 1992) n. comb. [described as *H.* (*C.*) *subpictus*]; *C. sungaris* (Ma, 1996) [described as *H. sungaris*, transferred to *Cosmolaelaps* by Ma (2005)]; *C. tetraspinae* (Karg, 1995) n. comb. [described as *H.* (*C.*) *tetraspinae*]; *C. thysanifer* Zeman, 1982; *C. transvaalensis* Ryke, 1963; *C. trifidus* (Pearse, Patterson, Rankin & Wharton, 1936) [described as *Seiodes trifidus*, transferred to *Cosmolaelaps* by Delfinado & Baker (1975); senior synonym of *C. passali* Hunter & Mollin, 1964, according to Delfinado & Baker (1975)]; *C. tuberculatus* (Mašán, 1992) n. comb. [described as *H.* (*C.*) *tuberculata*]; *C. ungeri* (Karg, 1985) [described as *H.* (*C.*) *ungeri*, transferred to *Cosmolaelaps* by Farrier & Hennessey (1993)]; *C. vacuus* (Michael, 1891) [described as *L. vacua*, transferred to *Cosmolaelaps* by Hull (1918); senior synonym of *H. militiformis* Oudemans, 1902, according to Bregetova (1977); of

Laeleps [sic] (*C.*) *styliferus* Halbert, 1915, according to Luxton (1998); of *H.* (*C.*) *serratosimilis* Bernhard in Hirschmann et al., 1969, according to Bregetova (1977)]; *C. vanmoli* (Loots, 1980) n. comb. [described as *H. vanmoli*]; *C. wangae* Bai & Gu, 1993; *C. weeversi* (Oudemans, 1926) [described as *H. weeversi*, transferred to *Cosmolaelaps* by Strandtmann (1963)].

For the characterisation of the following species, the reported references were used for complementary information, in addition to the original descriptions: Wang & Wang (1991) for *C. acutiscutus*; Evans & Till (1966) for *C. claviger* and *C. cuneifer*; Aswegen & Loots (1970) for *C. digrediens*; Schweizer (1961) for *C. ornatus*; Fouly et al. (1997) for *C. simplex*; Evans & Till (1966) for *C. vacua* and Strandtmann (1963) for *C. weeversi*.

The following taxa may belong to *Cosmolaelaps*, but were not considered in the updated generic diagnosis because of the insufficient morphological information available: *C. cuneifer* var. *americanus* Berlese, 1904 [described as *Laelaps* (*C.*) *cuneifer* var. *americanus*], *C. reconditus* Berlese, 1905 [described as *L.* (*C.*) *reconditus*], *C. vacuus* var. *ensiger* Berlese, 1904 [described as *L.* (*C.*) *vacuus* var. *ensiger*], *C. vacuus* var. *hastiger* Berlese, 1920 and *C. vacuus* var. *scalpiger* (Berlese, 1904) [described as *L.* (*C.*) *vacuus* var. *scalpiger*].

Updated diagnosis

- Dorsal shield entire, usually reticulate, totally or almost totally covering dorsum of idiosoma (although in mounted specimens most *r-R* as well as the *UR* setae visible dorsally on unsclerotised cuticle), with posterior end rounded; posterior end narrow and pointed, leaving considerable part of the opisthonotum uncovered, in *C. acutiscutus*, *C. bengalensis*, *C. penicillatus* and *C. subacutiscutus*.
- Dorsal shield usually bearing 39 pairs of setae [22 pairs on podonotal and 17 pairs on opisthonotal regions including two pairs of extra setae (*px2* and *px3*) between *J* and *Z* series of each side, as well as 1–5 unpaired setae (*Jx*) between *J* series (*r2* on the lateral soft cuticle in *C. leeae*)]. Podonotal region of dorsal shield missing 1–4 pairs of setae in *C. acutiscutus*, *C. anserinus*, *C. bispinosus*, *C. digrediens*, *C. gladii*, *C. lingua*, *C. longocrinitus*, *C. longogenitalis*, *C. mabilogus*, *C.*

macrochaetus, *C. mahuncai*, *C. malakutsilyus*, *C. mediocuspis*, *C. nasosetus*, *C. panniculus*, *C. penicillatus*, *C. simplex*, *C. ungeri* and *C. weeversi*. Podonotal region of dorsal shield with one extra pair of setae in *C. euventricosus*, *C. longanalis*, *C. paracuneifer* and *C. reticulatus*; with two extra pairs of setae in *C. pugiocuspis* and *C. robustochaetes*; and with one unpaired seta between *j4* and *j5* in *C. cursoria*. Opisthonotal region of dorsal shield missing a pair of *px* setae in *C. machaeratus*, *C. nasosetus*, *C. simplex*, *C. tetraspinae*, *C. wangae* and *C. weeversi*; missing a pair of *Z* setae in *C. indicus*, *C. machaeratus* and *C. panniculus*; missing a pair of *S* setae in *C. longogenitalis* and *C. machaeratus*; missing all unpaired setae in *C. anserinus*, *C. bengalensis*, *C. communis*, *C. cubaensis*, *C. kassaii*, *C. lepoauris*, *C. longogenitalis*, *C. machaeratus*, *C. ornatus* and *C. penicillatus*. Opisthonotal region of dorsal shield with 1–3 extra pairs of setae in *C. anserinus*, *C. brevipedestra*, *C. carvalhoi*, *C. communis*, *C. crossocauda*, *C. cursoria*, *C. euarmata*, *C. euventricosus*, *C. keni*, *C. leptolingua*, *C. lingua*, *C. longodigiti*, *C. mahuncai*, *C. paracuneifer*, *C. penicillatus*, *C. reticulatus*, *C. robustochaetes* and *C. trifidus*; with about 9–20 setae in addition to *J*, *Z* and *S* setae in *C. cuneifer*, *C. neocuneifer* and *C. pugiocuspis*.

- Unsclerotised lateral idiosomal cuticle with 1–7 pairs of setae (*r6*, *R* setae) and 0–5 pairs of *UR* setae; posterior-most *R* and *UR* setae occasionally visible ventrally in mounted specimens.
- Seta of dorsal shield or of unsclerotised lateral cuticle scimitar-shaped, spatulate, spatulate-mucronate, cuneiform, leaf-shaped or setiform but usually bearing a basal asymmetric protuberance.
- Peritrematic shield only fused to dorsal shield near *z1*, free posteriorly and not extending behind coxa IV. Peritreme extending anteriorly usually up to level between *s1* and *z1*; fused with exopodal plates in *C. claviger* and *C. kassai*.
- Sternal shield from lightly to well sclerotised, with three pairs of setae and two pairs of lyrifissures, anterior lobes of sternal shield uniformily sclerotised, unsclerotised basally (constituting a pair of presternal plates) or totally unsclerotised; seta *st1* on presternal area in *C. cuneifer*, *C. paracuneifer* and *C. subpictus*.

- Anterior section of endopodal plate fused with sternal shield, not conspicuously extensive between coxae I and II; section behind sternal shield usually boomerang-shaped, between coxae III and IV.
- Seta *st4* usually inserted on unsclerotised cuticle; inserted in fragment of endopodal plate behind sternal shield in *C. crossocauda*, *C. diversichaetatus*, *C. keni*, *C. longogenitalis*, *C. multidentatus*, *C. rectangularis*, *C. robustoventralis*, *C. sorecis* and *C. weeversi*; inserted on minute metasternal plates in *C. brevilingua*.
- Genital shield not fused with other shields, flask-shaped, usually with one pair of setae and not fused with anal shield, flanked by a pair of rod-shaped platelets posterolaterad of *st5* (often, partially or totally fused with genital shield); genital shield occasionally broader, encompassing one (*C. longogenitalis*), two (*C. robustus*) or three (*C. calamitus*, *C. euventricosus*, *C. multisetosus* and *C. tetraspinae*) *Jv–Zv* setae.
- Opisthogastric region usually with 4–10 pairs of *Jv* and *Zv* setae; with several extra pairs of setae between opisthogastric, *R* and *UR* setae in *C. multidentatus*.
- Exopodal plate indistinct, fragmented or as a continuous strip.
- Usually with two pairs of metapodal plates; occasionally one or three pairs of metapodal plates; without metapodal plates in *C. alexandrini*.
- Anal shield subtriangular to pear-shaped, wider section anterior, bearing only circumanal setae and a pair of lateromarginal pores; cribum restricted to region behind post-anal seta.
- Epistome usually convex (occasionally acuminate) with anterior margin provided with denticles of similar lengths (median denticle, often much longer, spine-shaped).
- Deutosternum moderately wide, with delimiting lateral lines, usually with six transverse lines of 2–50 denticles each of similar sizes; with five lines in *C. pahabaeus*, *C. penicillatus* and *C. transvaalensis* and seven in *C. paravacua*, *C. simplex* and *C. vanmoli*; first three rows of denticles about twice as long as posterior three rows in *C. calamitus* and *C. multidentatus*; apparently not adequately illustrated in *C. chini*, *C. dendrophilus*, *C. guoi* and *C. hrdyi*.
- Corniculi horn-shaped, usually parallel to each other, reaching about middle of palp-femur; about four times as long as basal width.

- Palp apotele 2-tined.
- Cheliceral digits in female of similar lengths; movable digit bidentate, fixed digit with 2–14 teeth and setiform *pilus dentilis*.
- Males with holoventral shield.
- Cheliceral digits in male of similar lengths; spermatodactyl usually finger-shaped, slightly arched upward, and up to 1.5 times as long as movable digit; fused movable digit-spermatodactyl about twice as long as fixed digit in *C. chianensis*, *C. hortensis*, *C. hrydi* and *C. lingua*; about four times as long in *C. malakutsilyus*. Movable digit unidentate or bidentate; fixed digit with 1–15 teeth; fixed digit edentate in *C. reticulatus*.
- Leg setal counts usually as reported by Evans & Till, 1965 for Laelapidae: coxae (I–IV) 2, 2, 2, 1; trochanters *6*, 5, 5, 5; femora 13, 11, 6, 6; genua 13, 11, 9, 9; tibiae 13, 10, 8, 10; tarsi (II–IV) 18, 18, 18; genu IV with eight setae (2-2/1, 2/0-1) in *C. keni* and *C. longus* or ten setae (2-2/1, 3/0-2) in *Cosmolaelaps cuneifer*, instead of 2- 2/1, 3/0-1; reportedly with very different setal counts on coxa II (3 instead of 2) and IV (2 instead of 1), trochanter I (5 instead of 6) and II (6 instead of 5), femur II (10 instead of 11) and tibia III (7 instead of 8) in *C. leeae*.

Remarks. The following species, mentioned in the literature as *Cosmolaelaps* or *Hypoaspis* (*Cosmolaelaps*), are here considered to belong to *Stratiolaelaps*: *S. bregetovae* (Fonseca, 1959) n. comb. (described as *C. bregetovae*); *S. cardiophorus* (Berlese, 1916) n. comb. [described as *H.* (*S.*) *cardiophorus*; reported as *H.* (*C.*) *cardiophora* by Karg (1981)]; *S. dani* (Grokhovskaya & Huan-Hoe, 1969) n. comb. (described as *C. dani*); *S. fuscus* (Berlese, 1916) n. comb. [described as *H.* (*S.*) *fuscus* reported as *H.* (*C.*) *fusca* by Karg (1981)]; *S. longicostalis* Karg, 1978 n. comb. [described as *H.* (*C.*) *longicostalis*]; *S. miles* (Berlese, 1892) [described as *Laelaps* (*Iphis*) *miles*; reported as *H.* (*S.*) *miles* by Berlese (1916), as *H.* (*C.*) *miles* by Karg (1971), as *S. miles* by Domrow (1974); senior synonym of *C. gurabensis* Fox, 1946, according to Evans & Till (1966), reported as *S. gurabensis* by Hughes (1961)]; *S. ornatissima* (Aswegen & Loots, 1970) [described as *H.* (*S.*) *ornatissima*, reported as *H.* (*C.*) *ornatissima* by Karg (1981)]; *S. scimitus* (Womersley, 1956) [described as *C. scimitus*; reported as *S. scimitus* by Walter & Campbell (2003); senior synonym of *H.*

(*S.*) *miles elsi* Aswegen & Loots, 1970, according to Walter & Campbell (2003), reported as *H.* (*C.*) *elsi* by Karg (1981); senior synonym of *H.* (*S.*) *antennata* Karg, 1993b, according to Walter & Campbell (2003), reported as *H.* (*C.*) *antennata* by Huhta & Karg (2010)]; *S. xiajiangensis* (Liu & Ma, in Liu, Ma & Ding, 2000) n. comb. (described as *C. xiajiangensis*) and *S. yeruiyuae* (Ma, 1995a) n. comb. (described as *C. yeruiyuae*). All of these have only 15 pairs of setae in the opisthonotal region of the dorsal shield (*px* setae absent) as well as hypertrophied chelicerae and corniculi. In addition, the dorsal shield tapers gradually to sharply posteriorly, presternal region usually with three to four pairs of anastomosing, transverse and slender plates, the anterior end of the endopodal plate extends conspicuously between coxae I and II and cribrum usually prolongs anteriorly as a pair of parallel, slender arms.

The species described as *Cosmolaelaps retirugi* Ma, Yang & Zhang, 2004 fits the usual characteristics of *Stratiolaelaps*, except for having a pair of *px* setae [absent in most *Stratiolaelaps*, but with two pairs of *px* setae in *S. lamington* Walter & Campbell, 2003 and *S. ornatissima* (Aswegen & Loots, 1970)]. Walter & Campbell (2003) suggested that the presence of *px* setae is plesiomorphic because it is also found in other genera of Laelapidae. Irrespective of the validity of that argument, the possession of these setae places these species in a position between *Cosmolaelaps* and *Stratiolaelaps*, leaving only the hypertrophied chelicerae and corniculi as characteristics to justify their placement in *Stratiolaelaps*. For reasons of consistency, *C. retirugi* is officially transferred to *Stratiolaelaps* (*S. retirugi* n. comb.).

The following species have also been placed in *Cosmolaelaps* by various authors, but their incomplete descriptions do not allow a conclusive generic placement: *Laelaps* (*Cosmolaelaps*) *androgynus* Berlese, 1905; *Laelaps* (*Hypoaspis*) *canestrinii* Berlese, 1903; *Cosmolaelaps hastatus* Wang & Liao, 2000; *Cosmolaelaps ?novus* Lombardini, 1960, *Laelaps* (*Cosmolaelaps*) *onustus* Berlese, 1904 and *Cosmolaelaps obtusisetosus* Wang & Liao, 2000. *Lasioseius ometes* (Oudemans, 1903) (Mesostigmata: Blattisociidae) was mentioned as *Cosmolaelaps ometes* by Buitendijk (1945), without any explanation. The species described as *Hypoaspis zachvatkinae* Shereef & Afifi, 1980 could also belong to *Cosmolaelaps*, given its similarity with *C. brevipedestrus*. However, details given in the original description are insufficient for a definitive conclusion.

Description of new species found in this study

Cosmolaelaps barbatus n. sp.

Material examined: holotype female, nine paratype females and 11 paratype males from a laboratory colony initiated with specimens collected on 28 November 2011 by G.F. Moreira from litter under *Capsicum chinense* Jacq. (Solanaceae), at Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, São Paulo state, Brazil; holotype, eight paratype females and ten paratype males deposited at ESALQ-USP; other type specimens deposited at OSAL. Other specimens examined: 25 females and 25 males, same data as holotype; one female collected on 10 February 1978 by D. E. Johnston, from cut grass litter at same locality as holotype (OSAL 009565); two females and one male collected on 01 March 1978 by D. E. Johnston, from stable muck at same locality as holotype (OSAL 009572; OSAL 0031104; OSAL 0031105); one female collected on 21 March 1978 by D. E. Johnston, from piled leaf litter at same locality as holotype (OSAL 009577); nine females and five males collected on 4 January 1999 by J.L. de C. Mineiro, from litter under *Hevea brasiliensis* L. (Euphorbiaceae) at same locality as holotype; one female collected on 28 June 1999 by J. L. de *C.* Mineiro, from litter under *H. brasiliensis* at same locality as holotype; two females collected on 11 November 2000 and one female and two males collected on 17 May 2000 by A. R. Oliveira, from soil under *Acrocomia aculeata* (Jacq) (Arecaceae) at Estação Ecológica de Ibicatu, Piracicaba; one female collected on 27 July 2000 by A. R. Oliveira, from litter under *Myrcia venulosa* D*C.* (Myrtaceae) at Universidade de São Paulo campus, Pirassununga, São Paulo state, Brazil (21°56'20"S, 47°28'26"W); one female collected on 11 November 2000 by A. *C.* Pereira, from litter under *A. aculeata* at Rodovia Piracicaba—Anhembi, Piracicaba.

Diagnosis: female dorsal shield reticulate, with 39 pairs of setae and three unpaired setae, all spatulate-mucronate and with a discernable basal asymmetric protuberance, except *z1*, setiform. Setae *J5* and *Z5* barbed; *J3*, *J4*, *Jx*2 and *Jx*3 occasionally barbed. Unsclerotised lateroventral cuticle with eight pairs of stout and setiform setae. Presternal plates sclerotised. Genital shield bearing only *st5*. Two

pairs of metapodal plates. Nine pairs of opisthogastric setae (*Jv1–Jv5*; *Zv1–Zv4*). Epistome convex, with anterior margin bearing denticles of similar sizes, distally truncate to slightly depressed. Fixed cheliceral digit with 9–11 teeth.

Female (Figure 1, Figure 2 A–E)

Dorsal idiosoma (Fig. 1): dorsal shield 632 (590–692) long and 440 (394–478) wide (at level of *r6*), reticulate, with 39 pairs of setae, including two pairs of extra setae, and three unpaired setae [*j1–j6*, *z1*–z6, *s1–s6*, *r2–r5* on podonotal region of dorsal shield; *J1–J5*, *Z1–Z5*, *S1–S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolaterad of *J3*) and three unpaired *Jx* (in transverse line with *J2*, between *J3* and *J4* and in transverse line with *J4*) on opisthonotal region of dorsal shield]. All setae spatulate-mucronate, usually with a discernable basal protuberance, except *z1*, setiform. Setal length shown in Table 1. Seta *J5* and *Z5* barbed; *J3*, *J4*, *Jx*2 and *Jx*3 occasionally barbed. Dorsal shield with 17 and six pairs of distinguishable lyrifissures and pores respectively. Unsclerotised lateroventral cuticle with eight pairs of stout setae (*r6*, *R1*, *R2*, *R4–R6*, two *UR* setae); *r6*, *R1*, *R2* and *UR1* setiform; others flattened and ridged.

Peritreme (Fig. 2E): peritrematic shield only fused with dorsal shield, near *z1*, with a pair of lyrifissures and a pore behind each stigma; with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme extending anteriorly to level of *z1*.

Ventral idiosoma (Fig. 2A): with a pair of presternal plates; sternal shield about as long as wide, reticulate anterolaterally, with three pairs of setae (*st1–st3*) and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin concave; distances between *st1* and posterior margin of sternal shield 114 (110–120), *st1–st1* 78 (70–82), *st2–st2* 96 (94–99), *st3–st3* 121 (116–126). Length of setae shown in Table 2. Seta *st4* on unsclerotised, unstriated cuticle, posterolaterad of *iv3* also on cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate [length 286 (266–311), width 149 (139–157)], with a pair of setae (*st5*); distance *st5–st5* 120 (117–130). Genital lyrifissure (*iv5*) on unsclerotised cuticle, posterolaterad of *st5*. With pair of anteriad minute, rod-shaped platelets next to edge or (occasionally) fused with genital shield,

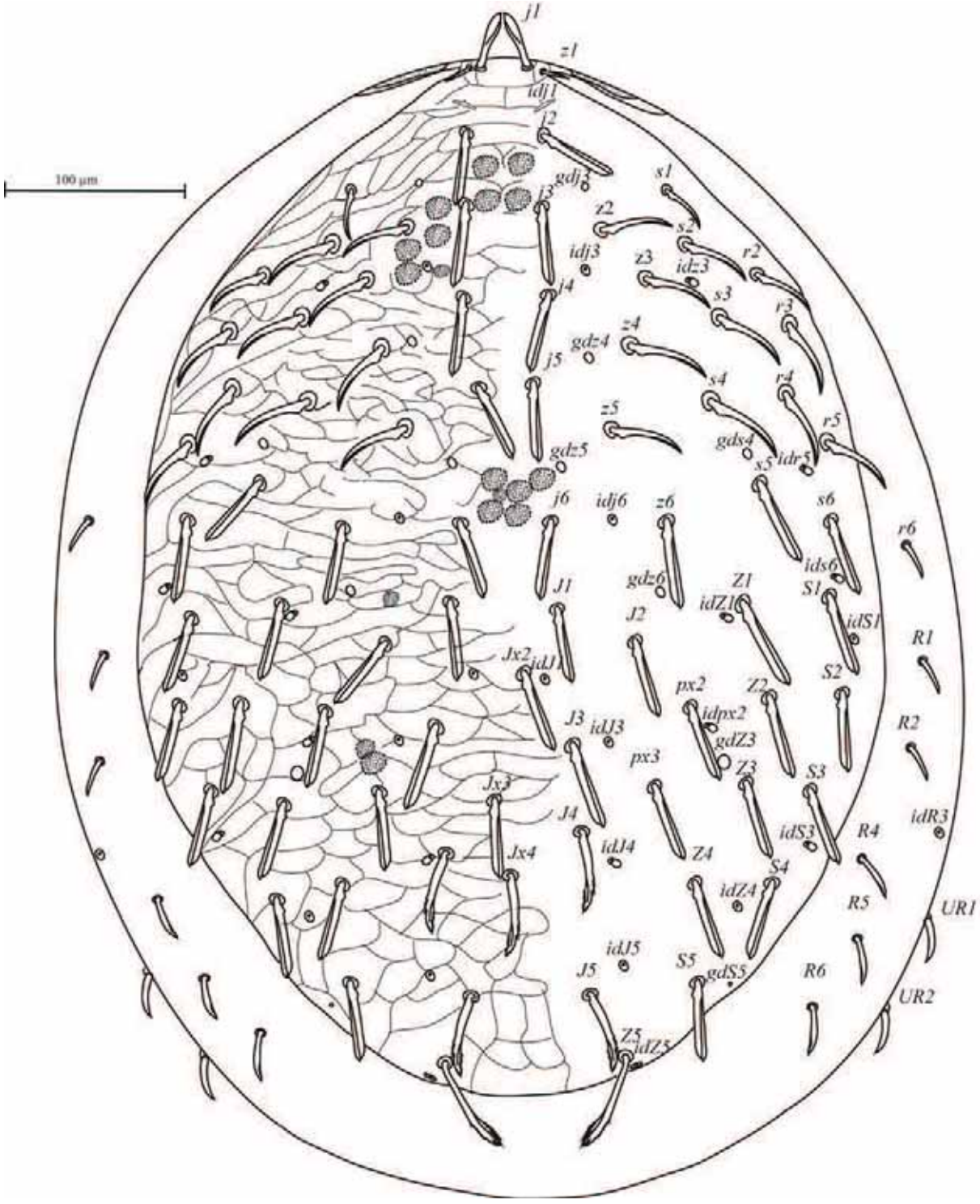

FIGURE 1. *Cosmolaelaps barbatus*. Female. Dorsal idiosoma.

posteriad of *iv5*. With two pairs of metapodal plates. Anterior section of endopodal shield fused with sternal shield; section behind sternal shield fragmented into a boomerang-shaped section between coxae III and IV and a smaller rod-shaped posterior section. Exopodal shield represented by a tri-radiate fragment between coxae II and III and an arched fragment partially surrounding external margin of coxa IV. Anal shield subtriangular (wider section anterior), reticulate [97 (88–106) long and 101 (92–110) wide], with a pair of marginal pores about in transverse line with anterior margin of anal opening. With 9 pairs of setiform opisthogastric setae: *Jv1–Jv5*, *Zv1–Zv4*. All ventral setae setiform, except *Zv5*, tricarinate; *gv2* distinct.

Gnathosoma: epistome convex, with anterior margin bearing denticles of similar sizes, distally truncate to slightly depressed (Fig. 2C). Deutosternum with a smooth, transverse distal line followed by six transverse lines of 18–30 denticles each (Fig. 2B). Corniculi parallel to each other, 51 (47–63) long and 12 (10–13) wide basally, almost reaching middle of palp femur. Internal malae adjacent to each other and ventrally fimbriate, laterad by a pair of curved structures with internal surface and distal end coarsely frimbiate. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal setae *h2* laterad and slightly anteriad of *h3*. Palp length 172 (162–179), apotele 2-tined; inner palp trochanter seta about 1.8 times as long as outer seta. Cheliceral digits of similar lengths(Fig. 2D); movable digit 61 (48–65), with two teeth in addition to distal tooth; fixed digit 67 (59–77), with a subterminal paraxial notch, setiform *pilus dentilis* and 9–11 teeth in addition to distal tooth, of which the closest to *pilus dentilis* and the most proximal distinctively larger than others. Stout and tapering dorsal cheliceral seta and dorsal and antiaxial lyrifissures distinguishable. Cheliceral arthrodial process as a coronet-like fringe.

Legs (Fig. 3): lengths, not including ambulacra—I, 680 (646–716); II, 489 (479–518); III, 488 (463–501); IV, 750 (724–807); chaetotaxy: I—coxa 0-0/2, 0/0-0, trochanter 1-0/1, 1/2-1, femur 2-2/1, 3/3-2, genu 2-3/2, 3/1-2, tibia 2-3/2, 3/1-2; II-coxa 0-0/1, 0/1-0, trochanter 1-0/1, 1/1-1, femur 2-3/1, 2/2-1, genu 2-3/1, 2/1-2, tibia 2-2/1, 2/ 1-2; III-coxa 0-0/1, 0/1-0, trochanter 1-1/1, 0/1-1, femur 1-2/1, 1/0-1, genu 2-2/1, 2/1-1, tibia 2-1/1, 2/1-1; IV-coxa 0-0/1, 0/0-0, trochanter 2-1/1, 0/1-0, femur 1-2/1, 1/0-1, genu 2-2/1, 3/0-1, tibia 2-1/1, 3/1-2; tarsi II-IV: 18 setae each. Pre-tarsi with short claws,

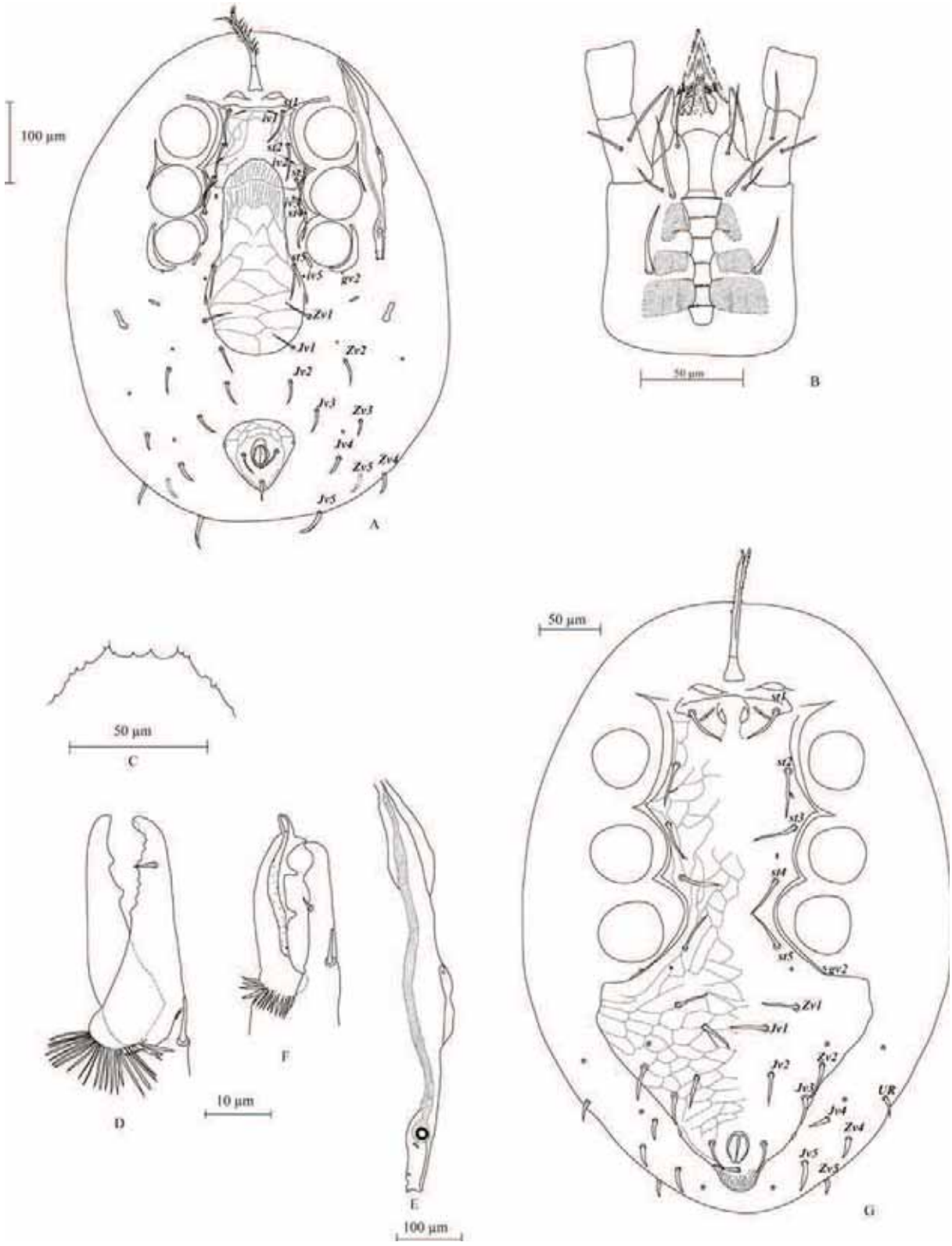

FIGURE 2. *Cosmolaelaps barbatus*. Female. A. Ventral idiosoma; B. Ventral gnathosoma; C. Epistome; D. Chelicera; E. Peritreme. Male. F. Chelicera; G. Ventral idiosoma.

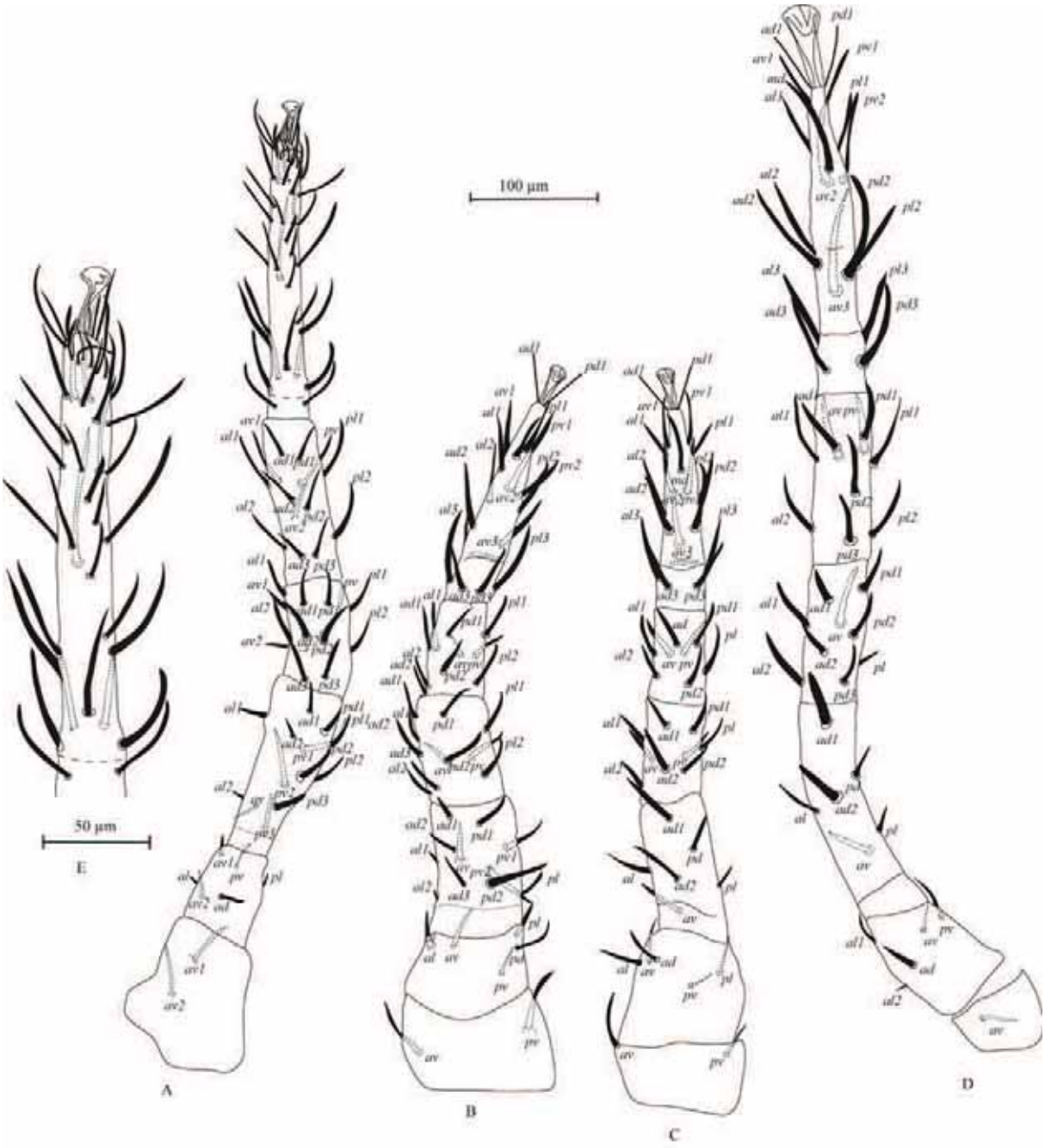

FIGURE 3. *Cosmolaelaps barbatus*. Female. A. Leg I; B. Leg II; C. Leg III; D. Leg IV; E. Tarsus.

pulvillus distally rounded. Setae uniform in shape, no macrosetae; femur IV with *ad1* and *ad2* stout, the former flattened and ridged.

Male (Figure 2 F–G)

Dorsal idiosoma: dorsal shield [430 (423–437) long and 306 (293–307) wide (at level of *r6*)], similar in reticulation and setation to female. Dorsal setal lengh about 70% of that in female (Table 3). Unsclerotised lateral cuticle with eight pairs of setae (*r6*, *R1*, *R2*, *R4–R6*, one *UR*).

Peritreme: as in female.

Ventral idiosoma (Fig. 2G): holoventral shield [357 (346–370) long and 204 (195–207) wide (behind coxae IV)] with ten pairs of setae (*st1–st5*, *Jv1–Jv3*, *Zv1* and *Zv2*) in addition to circumanal setae, five pairs of distinguishable lyrifissures and a pair of marginal pores about in transverse line with anterior margin of anal opening. Holoventral setal length about 70% of that in female, except *Zv5* (50% of length in female) (Table 4).

Unsclerotised cuticle posterolaterad of ventrianal region with three pairs of setae (*Jv4*, *Jv5*, *Zv4* and *Zv5*) and three pairs of distinguishable lyrifissures; *gv2* distinct.

Gnathosoma: epistome, deutosternum and corniculi similar to female. Cheliceral digits of similar lengths (Fig. 2F); movable cheliceral digit 42 (39–46) with two teeth in addition to distal tooth; spermatodactyl 49 (47–52), slightly sinuate, seemingly almost totally fused with movable digit and with a seemingly open canal of uniform width along most of its extent, narrowing slightly near tip; fixed digit 39 (37–43) with one tooth in addition todistal tooth, distal of setiform *pilus dentilis*. Dorsal and lateral cheliceral lyrifissures indistinguishable; dorsal seta hardly distinguishable, stout, tapering distally.

Legs: as in female.

Etymology. the name barbatus refers to the barbed *Z5* setae.

Remarks. *Cosmolaelaps barbatus* is closely related to *C. brevistilis* (Karg), *C. bipennatus* (Karg) and *C. parvidentis* (Karg & Schorlemmer), described from respectively, Chile, Ecuador and Venezuela. These species have *Z5* and

occasionally *J5* distally barbed and epistome overall convex but distally truncate to slightly depressed. They differ from *C. barbatus* by the shape of the dorsal shield setae (most dorsal shield setae dagger-shaped in *C. brevistilis* and *C. bipennatus* and setiform with an asymmetric basal protuberance in *C. parvidentis*). In addition, *C. bipennatus* differs by having two spatulate setae on femur IV (possibly *ad1* and *ad2*), while *C. parvidentis* differs by having reduced endopodal remnants between coxae III–IV and a single, enlarged metapodal plate.

***Cosmolaelaps busolii* n. sp.**

Material examined: holotype female and one paratype female collected on 19 April 2000 by A.R. Oliveira from soil under *Syagrus romanzoffiana* (Cham) (Arecaceae) at Rodovia 226 (Parquera-Açu-Cananéia), km 16, Cananéia, São Paulo state, Brazil; one paratype male collected on 12 October 2000 by A.R. Oliveira from litter under *Astrocaryum aculeatissimum* (Schott) (Arecaceae) at Estação Experimental do IAC, Pariqueraçu, São Paulo state, Brazil; holotype and paratypes deposited at ESALQ-USP.

Diagnosis: female dorsal shield with 39 pairs of setae and two unpaired setae, all scimitar-shaped, except *j1*, setiform. Unsclerotised lateroventral cuticle with eight pairs of setae. Anterior lobes of sternal shield not distinguishable, sternal shield lightly sclerotised, with indistinct anterior margin. Genital shield bearing only *st5*. Two pairs of metapodal plates. Ten pairs of setiform opisthogastric setae (*Jv1–Jv5*; *Zv1–Zv5*). Epistome convex, denticulate. Fixed cheliceral digit with five teeth in addition to apical tooth.

Female (Figure 4 A–F)

Dorsal idiosoma (Fig. 4A): dorsal shield 413 (399–427) long and 263 (255–271) wide (at level of *r6*), reticulate, with most reticules transversely elongate, with 39 pairs of setae, including two pairs of extra setae, and two unpaired setae [*j1–j6*, *z1–*z6, *s1–s6*, *r2–r5* on podonotal region of dorsal shield and *J1–J5*, *Z1–Z5*, *S1–S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolad of *J3*) and two unpaired *Jx* setae (in

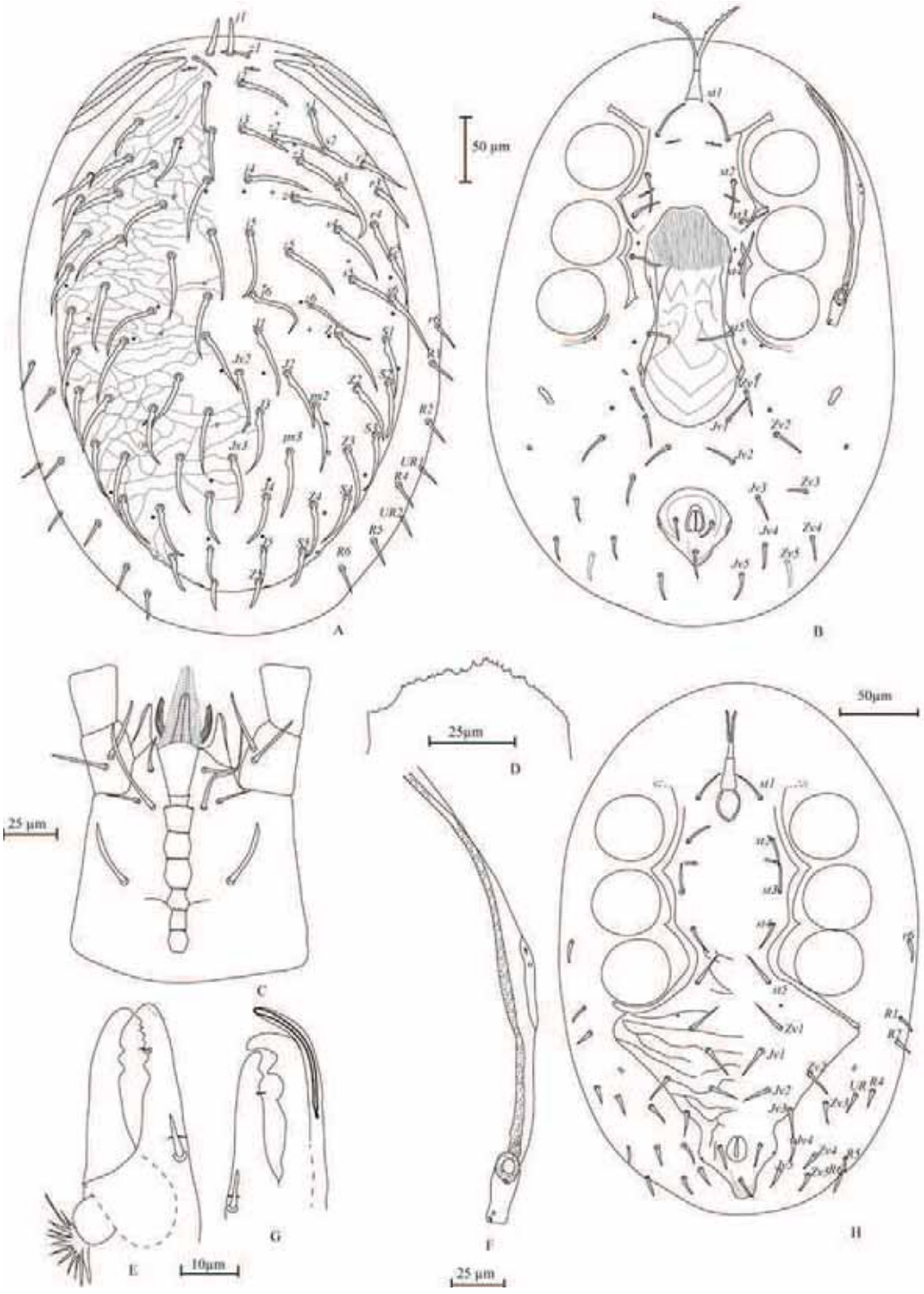

FIGURE 4. *Cosmolaelaps busolii*. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D.Epistome; E. Chelicera; F. Peritreme. Male. G. Chelicera; H. Ventral idiosoma.

transverse line with *J2* and in transverse line with *px3*) on opisthonotal region of dorsal shield]. Setae scimitar-shaped (with basal protuberance facing axis of the idiosoma), except *j1*, setiform. Length of setae shown in Table 1. Dorsal shield with 17 and six pairs of distinguishable lyrifissures and pores respectively. Unsclerotised lateroventral cuticle with eight pairs of setae (*r6*, *R1*, *R2*, *R4–R6*, two *UR* setae).

Peritreme (Fig. 4F): peritrematic shield only fused to dorsal shield, near *z1*, with a pair of lyrifissures and a pore behind stigma; with a pore and a lyrifissure dorsad of peritreme between coxae II and III. Peritreme extending anteriorly to level between *s1* and *z1*.

Ventral idiosoma (Fig. 4B): anterior lobes of sternal shield not distinguishable; sternal shield lightly sclerotised, smooth, with indistinct anterior margin; posterior margin only distinguishable near *st3*; about as long as wide, with three pairs of setae (*st1–st3*) and two pairs of lyrifissures (*iv1*, *iv2*); distance between *st1* and the posterior margin of sternal shield 80 (79–81), *st1–st1* 58 (58–59), *st2–st2* 70 (69–71), *st3–st3* 87 (87–87). Length of setae shown in Table 2. Seta *st4* on unsclerotised cuticle, posterolaterad of *iv3* which is also on cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate [length 190 (190–190), width 84 (82–87)], with one pair of setae (*st5*); distance *st5–st5* 98 (89–107). Genital lyrifissure (*iv5*) on unsclerotised cuticle, posterolatered of *st5*. Rod-shaped plate fused with genital shield by anterior end and with acute posterior end free. Two pairs of metapodal plates, the anterior smaller. Anterior section of endopodal shield distinctly more sclerotised than sternal shield, fused with it, with anterior end distinctly prolonged between coxae I and II; section behind sternal shield fragmented into a boomerang-shaped fragment between coxae III and IV and a smaller rod-shaped posterior fragment surrounding part of postero-mesad region of coxa IV. Exopodal shield indistinct. Anal shield subtriangular (wider section anterior), with scanty striae [65 (63–66) long and 63 (61–65) wide], with a pair of marginal pores about in transverse line with anterior margin of anal opening. With 10 pair of setiform opisthogastric setae: *Jv1–Jv5*, *Zv1–Zv5*; with a minute plate anterolaterad of *Zv1*.

Gnathosoma: epistome convex, denticulate (Fig. 4D). Deutosternum with a smooth, transverse distal line followed by six transverse lines of denticles; number of teeth decreasing from distal (26) to proximal row (8); with a pair of smooth,

transverse and curved lines external to deutosternum, between second and third most proximal lines of denticles (Fig. 4C). Corniculi parallel to each other, 27 (25–28) long and 7 (6–7) wide basally, almost reaching middle of palp femur. Internal malae adjacent to each other, smooth, laterad by a pair of structures subdivided distally into about five coarse tines. Lengths of setae on venter of gnathosoma shown in Table 2. Hypostomal seta *h2* laterad and slightly anteriad of *h3*. Palp length 115 (113–118), apotele 2-tined; inner palp trochanter seta about 1.6 times as long as outer seta. Cheliceral digits of similar lengths (Fig. 4E); movable cheliceral digit 36 (36–37) with two teeth in addition to distal tooth; fixed digit 41 (40–42) with five teeth in addition to apical tooth and minute setiform *pilus dentilis*. Stout dorsal cheliceral seta and dorsal lyrifissure distinguishable; antiaxial lyrifissure indistinguishable. Cheliceral arthrodial process as a coronet-like fringe.

Legs: lengths, not including ambulacra—I, 412 (411–413); II, 320 (318–321); III, 310 (308–312); IV, 436 (425–448); chaetotaxy: I—coxa 0-0/2, 0/0-0, trochanter 1-0/1, 1/2-1, femur 2-2/1, 3/3-2, genu 2-3/2, 3/1-2, tibia 2- 3/2, 3/1-2; II—coxa 0-0/1, 0/1-0, trochanter 1-0/1, 1/1-1, femur 2-3/1, 2/2-1, genu 2-3/1, 2/1-2, tibia 2-2/1, 2/1-2; III—coxa 0-0/1, 0/1-0, trochanter 1-1/1, 0/1-1, femur 1-2/1, 1/0-1, genu 2-2/1, 2/1-1, tibia 2-1/1, 2/1-1; IV- coxa 0- 0/1, 0/0-0, trochanter 2-1/1, 0/1-0, femur 1-2/1, 1/0-1, genu 2-2/1, 3/0-1, tibia 2-1/1, 3/1-2; tarsi II–IV: 18 setae each. Pre-tarsi with short claws, pulvillus distally rounded. Setae uniform in shape, no macrosetae.

Male (Figure 4 G–H)

Dorsal idiosoma: dorsal shield [318 long and 196 wide (at level of *r6*)], similar in reticulation and setation to female. Dorsal setal length about 65% of that in female (Table 3). Unsclerotised lateral cuticle with seven pairs of setae (*r6*, *R1*, *R2*, *R4-R6*, one *UR*).

Peritreme: as in female.

Ventral idiosoma (Fig. 4H): holoventral shield [259 long and 150 of wide (behind coxae IV)], with ten pairs of setae (*st1–st5*, *Jv1–Jv3*, *Zv1* and *Zv2*) in addition to circumanal setae, a single pair of barely distinguishable lyrifissures (*iv2*) and a pair of marginal pores about in transverse line with posterior margin of anal opening.

Holoventral setae about 60% as long as in female (Table 4). Unsclerotised cuticle posterolaterad of ventrianal region with five pairs of setae (*Jv4*, *Jv5*, *Zv3*–*Zv5*) and no distinguishable lyrifissures.

Gnathosoma: epistome, deutosternum and corniculi similar to female. Cheliceral digits of similar lengths (Fig. 4G); movable digit 29 with two teeth in addition to distal tooth; fixed digit 33, with one tooth distal to minute setiform *pilus dentilis*; spermatodactyl 37, curved upward, apparently widely fused basally with movable digit. Dorsal cheliceral seta and lyrifissure distinguishable; antiaxial lyrifissure indistinct.

Legs: as in female.

Etymology. the name busolii is a homage to Antonio Carlos Busoli, for his contribution to Brazilian entomology.

Remarks. *Cosmolaelaps busolii* is closely related to *C. panniculus* (Karg) and *C. paulista* (Freire & Moraes), both described from Brazil. They have dorsal shield setae scimitar-shaped, *Z5* shorter than other dorsal shield setae, epistome convex, bearing denticles of similar lengths. *Cosmolaelaps panniculus* differs from *C. busolii* by having only 35 pairs of dorsal shield setae, and the sternal shield normally sclerotised, reticulate. *Cosmolaelaps paulista* differs by having setae of the podonotal region of the dorsal shield usually distinctly longer than the distance to the subsequent setae in the same series, especially *j5*, *j6* and *z2*; sternal shield normally sclerotised, reticulate; genital shield smooth near its posterior end, and the exopodal shield behind the sternal shield consisting of a single fragment extending from the region between coxae III–IV to the region behind coxa IV.

***Cosmolaelaps confinisetarum* n. sp.**

Material examined: holotype female and one paratype male collected on 10 August 2000 by A.R. Oliveira from litter under *Syagrus oleracea* (Mart.) (Arecaceae) at Rodovia Geraldo de Barros, km 204, São Pedro, São Paulo state, Brazil; one paratype female collected on 16 May 2000 by A.R. Oliveira from soil under *Geonoma brevispata* Barb. Rod. (Arecaceae) at same locality as holotype; two paratype females collected on 17 May 2000 by A. R. Oliveira from soil under *Acrocomia*

aculeata (Jacq) (Arecacea) at Estação Ecológica de Ibicatu, Piracicaba, São Paulo state, Brazil; one paratype male collected on 11 August 2000 by A. R. Oliveira from litter under *Euterpeedulis martius* (Arecaceae) litter at Estação Ecológica de Ibicatu, Piracicaba; one paratype female collected on 02 March 1978 by D. E. Johnston from litter and humus in second growth forest at Piracicaba (OSAL 009569); one paratype female collected on 12 October 2000 by A.*C.* Pereira from litter under *Attalea dubia* (Mart.) (Arecaceae) at Estação Experimental do IAC, Pariquera-Açu, São Paulo state, Brazil; one paratype female collected on 11 October 2000 by A. *C.* Pereira from litter under *Bactris setosa* Mart. (Arecaceae) at Rodovia Pariquera-Açu-Cananéia, São Paulo state, Brazil; one paratype male collected on 18 April 2000 by A.R. Oliveira from litter under *Astrocaryum aculeatissimum* (Schott) (Arecaceae) at Núcleo Agrícola Vale Ribeira, IAC, Pariquera-Açu; one paratype male collected on 18 April 2000 by A.R. Oliveira from soil under B. setosa at Núcleo Agrícola Vale Ribeira, IAC, Pariquera-Açu; one paratype male collected on 18 January 2000 by A. R. Oliveira from soil under *Syagrus romanzoffiana* (Cham) (Arecaceae) at Rodovia Pariquera-Açu-Cananéia, Cananéia; two paratype females collected on 16 February 1978 by D.E. Johnston from litter and humus in moist primary forest at Hotel Pouso do Nhambu, Estrada Rio Santos, km 93, São Paulo, São Paulo state, Brazil (OSAL 009563, 009564); holotype, five paratype females and four paratype males deposited at ESALQ-USP; other type specimens deposited at OSAL.

Diagnosis: Female dorsal shield reticulate, with 39 pairs of setae and two unpaired setae, all scimitar-shaped, except *j1* and *z1*, setiform; *Z5* lightly serrate. Unsclerotised lateroventral cuticle with eight pairs of setiform setae visible ventrally in mounted specimens. Two anterior lobes of sternal shield uniformly as sclerotised as remaining of the shield. Genital shield bearing only *st5*. Three pairs of elongate metapodal plates, the two anterior subequal and much smaller than the posterior; rod-shaped platelets posterolatered of *st5* apparently totally fused with genital shield, discernible as a pair of slight protuberances of genital shield. Ten pairs of setiform opisthogastric setae (*Jv1–Jv5*; *Zv1–Zv5*) closely positioned, in parallel with the reduced extension of the unsclerotised opisthogastric cuticle and expanded genital shield. Epistome acuminate, superficially covered by radiating lines, with anterior

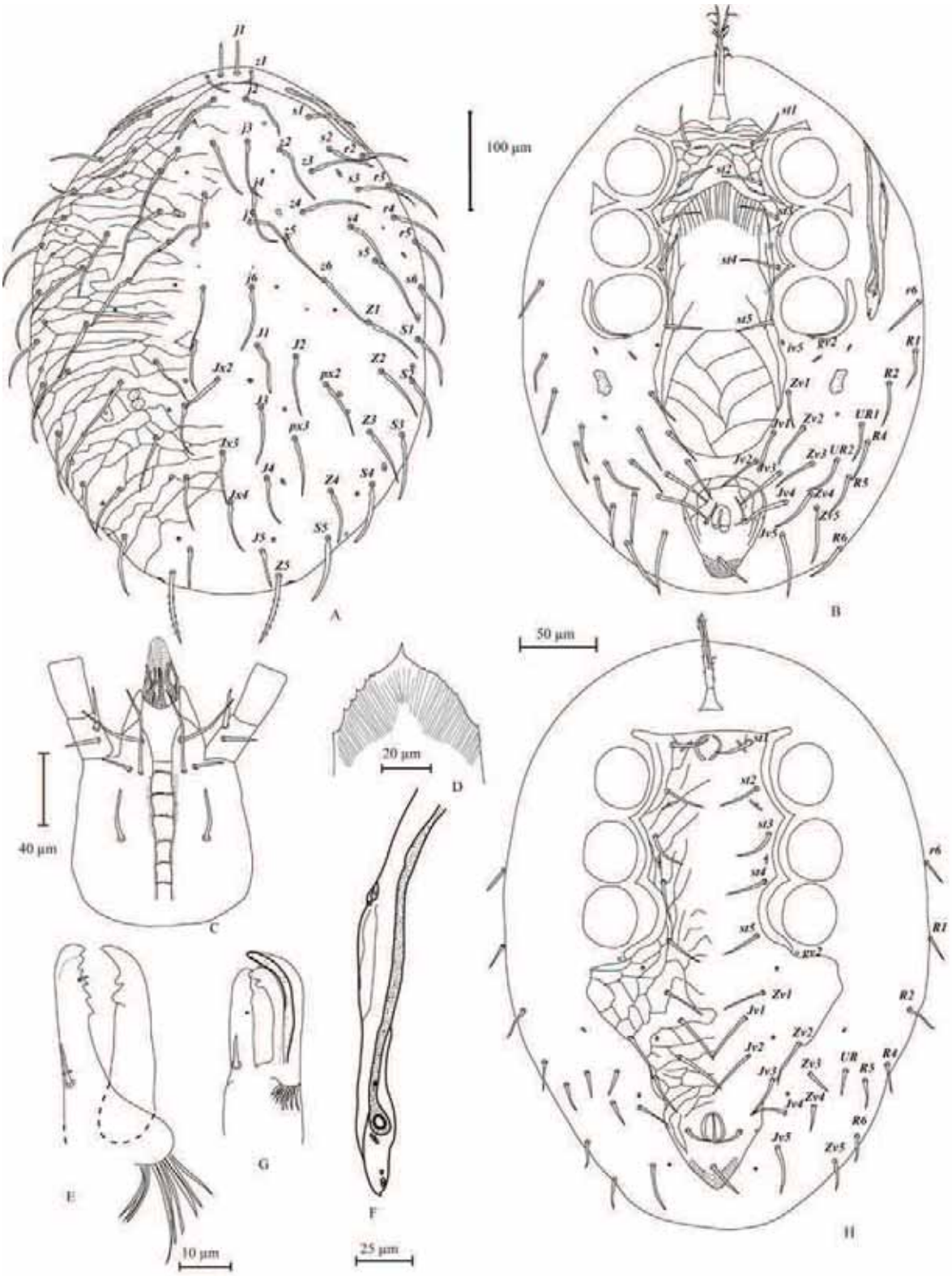

FIGURE 5. *Cosmolaelaps confinisetarum*. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D.Epistome; E. Chelicerae; F. Peritreme. Male. G. Chelicerae; H. Ventral idiosoma.

margin denticulate and slightly convex. Fixed cheliceral digit with five teeth in addition to distal tooth.

Female (Figure 5 A–F)

Dorsal idiosoma (Fig. 5A): dorsal shield 463 (419–535) long and 359 (314–406) wide (at level of *r6*), mostly with transversely elongate reticules, with 39 pairs of setae, including two pairs of extra setae, and three unpaired setae [*j1–j6*, *z1*–z6, *s1–s6*, *r2–r5* on podonotal region of dorsal shield, and *J1–J5*, *Z1–Z5*, *S1–S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolaterad of *J3*) and unpaired *Jx* setae (between *J1* and *J3*, between *J3* and *J4*, and between *J4* and *J5* respectively) on opisthonotal region of dorsal shield]. All setae scimitar-shaped, except *j1* and *z1* setiform; *Z5* lightly serrate. Length of setae shown in Table 1. Dorsal shield with 17 and six pairs of distinguishable lyrifissures and pores respectively. Unsclerotised lateroventral cuticle with eight pairs of setiform setae (*r6*, *R1*, *R2*, *R4–R6*, two *UR* setae), visible ventrally in mounted specimens.

Peritreme (Fig. 5F): peritrematic shield only fused to dorsal shield near *z1*, with a pair of lyrifissures and a pore behind each stigma, with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme extending anteriorly to level between *s1* and *z1*.

Ventral idiosoma (Fig. 5B): two anterior lobes of sternal shield as sclerotised as remainder of the shield, so that free presternal plates are not distinct; sternal shield about as long as wide, reticulate (except for posterior-central region), with three pairs of setae (*st1–st3*) and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin concave; distances between *st1* and the posterior margin of sternal shield 80 (76–87), *st1–st1* 59 (55–63), *st2–st2* 70 (66–74), *st3–st3* 101 (101–106). Lengths of setae shown in Table 2. Seta *st4* on unsclerotised, unstriated cuticle, posterolaterad of *iv3* also on cuticle. Genital shield broad, not fused with anal shield, flask-shaped, reticulate [length 227 (207–249) and width 122 (109–141)], with one pair of setae (*st5*); distance *st5–st5* 97 (85–106). Genital lyrifissure (*iv5*) on unsclerotised cuticle, posterolaterad of *st5*. Three pairs of elongate metapodal plates, the two anterior subequal and much smaller than the posterior; rod-shaped platelet posterolatered of

st5 apparently totally fused with genital shield, discernible as a pair of slight protuberances of genital shield. Anterior section of endopodal shield fused with sternal shield, often with anterior end distinctly prolonged between coxae I and II; section behind sternal shield narrowly separated from it, boomerang-shaped extending beside coxae III and IV. Exopodal shield represented by a triangular fragment between coxae II and III and an arched fragment partially surrounding external and posterior margin of coxa IV. Anal shield subtriangular (wider section anterior), reticulate [83 (70–95) long and 71 (66–77) wide], with a pair of marginal pores about in transverse line with para-anal setae. With ten pairs of opisthogastric setae (*Jv1–Jv5*, *Zv1–Zv5*), closely positioned, in parallel with the reduced extension of the unsclerotised opisthogastric cuticle and expanded genital shield. All setae setiform; *gv2* distinct.

Gnathosoma: epistome acuminate, superficially covered by radiating lines, with anterior margin denticulate and slightly convex (Fig. 5D). Deutosternum with a smooth, transverse line follow by six transverse lines of 12–18 denticles each (Fig. 5C). Corniculi parallel to each other, 29 (27–32) long and 8 (8–10) wide basally, almost reaching middle of palp femur. Internal malae adjacent to each other and ventrally fimbriate, laterad by a pair of structures subdivided distally into about five coarse tines. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal setae *h2* laterad and slightly anteriad of *h3*. Palp length 109 (95–120), apotele 2-tined; inner palp trochanter seta about 1.5 times as long as outer seta. Cheliceral digits of similar lengths (Fig. 5C); movable cheliceral digit 38 (29–41), with two teeth in addition to distal tooth; fixed digit 36 (29–41), with five teeth in addition to distal tooth and minute setiform *pilus dentilis*. Stout dorsal cheliceral seta and dorsal lyrifissures distinguishable; antiaxial lyrifissure not distinguishable because of position of chelicera. Cheliceral arthrodial process as a coronet-like fringe.

Legs: lengths, not including ambulacra—I, 597 (584–623); II, 426 (403–456); III, 400 (385–438); IV, 605 (585–635); chaetotaxy: I—coxa 0-0/2, 0/0-0, trochanter 1-0/1, 1/2-1, femur 2-2/1, 3/3-2, genu 2-3/2, 3/1-2, tibia 2- 3/2, 3/1-2; II-coxa 0-0/1, 0/1-0, trochanter 1-0/1, 1/1-1, femur 2-3/1, 2/2-1, genu 2-3/1, 2/1-2, tibia 2-2/1, 2/1-2; III-coxa 0-0/1, 0/1-0, trochanter 1-1/1, 0/1-1, femur 1-2/1, 1/0-1, genu 2-2/1, 2/1-1, tibia 2-1/1, 2/1-1; IV-coxa 0-0/1, 0/ 0-0, trochanter 2-1/1, 0/1-0, femur 1-2/1, 1/0-1, genu 2-

2/1, 3/0-1, tibia 2-1/1, 3/1-2; tarsi II–IV: 18 setae each. Pre-tarsi with short claws, pulvillus distally rounded. Setae uniform in shape, no macrosetae.

Male (Figure 5 G–H)

Dorsal idiosoma: dorsal shield [340 (314–384) long and 251 (231–280) wide (at level of *r6*)], similar in reticulation and setation to female. Dorsal setal length about 40% of that in female (Table 3). Unsclerotised lateral cuticle with seven pairs of setae (*r6*, *R1*, *R2*, *R4-R6*, one *UR*).

Peritreme: as in female.

Ventral idiosoma (Fig. 5H): holoventral shield [275 (257–302) long and 159 (146–170) wide (behind coxae IV)], with ten pairs of setae (*st1–st5*, *Jv1–Jv3*, *Zv1* and *Zv2*) in addition to circumanal setae, five pairs of distinguishable lyrifissures and a pair of marginal pores about in transverse line with para-anal setae. Holoventral setal length about 60% of that in female (Table 4). Unsclerotised cuticle posterolaterad of ventrianal region with five pairs of setae (*Jv4*, *Jv5*, *Zv3*, *Zv5*) and three pairs of distinguishable lyrifissures; *gv2* distinct.

Gnathosoma: epistome similar to female but with median denticle only slightly larger than lateral denticles; deutosternum and corniculi similar to female. Cheliceral digits of similar lengths (Fig. 5G); movable cheliceral digit 26 (23–29) apparently with one or two teeth in addition to apical tooth; spermatodactyl 31 (29–32), distally curved apparently attached to fixed digit only basally; fixed digit 23 (21–24) apparently with a short tooth distal to minute setiform *pilus dentilis*. Dorsal cheliceral seta and lyrifissure distinguishable; antiaxial lyrifissure indistinct because of position of chelicera.

Legs: as in female.

Etymology. The name confinisetarum is a contraction of confini (Latin for confines) and setarum (Latin for seta), referring to the closeness of the opisthogastric setae in adult females.

Remarks. *Cosmolaelaps confinisetarum* is closely related to *C. brevipedestra* (Karg) and *C. guttulata* (Karg), described from Cuba and Chile respectively. These species have broad dorsal shields, totally covering the dorsum of idiosoma,

opisthogastric setae closely positioned, in parallel with the reduced extension of the unsclerotised opisthogastric cuticle and expanded genital shield, and *R* and *UR* setae ventrally positioned in mounted specimens. *Cosmolaelaps brevipedestra* differs from *C. confinisetarum* by having two more pairs of dorsal shield setae (total of 41 pairs) and only two unpaired setae on the opisthonotal region of the dorsal shield. *Cosmolaelaps guttulata* differs by having the dorsal shield smooth, only two unpaired setae on the opisthonotal region of the dorsal shield and *j5* setae distinctly closer together than *j4* setae.

***Cosmolaelaps jaboticabalensis* n. sp.**

Material examined: holotype female and 22 paratype females from a laboratory colony initiated with specimens collected on 4 December 2011 by G.F. Moreira from litter under *Eriobotrya japonica* (Thunb.) (Rosaceae) at Jaboticabal, São Paulo state, Brazil; holotype, 19 paratype females deposited at ESALQ-USP; other type specimens deposited at OSAL. Other specimens examined: two females collected on 21 March 1978 by D. E.Johnston from piled leaf litter, Piracicaba, São Paulo, Brazil (OSAL 009556, 009571); one female collected on 24 March 1978 by D. E. Johnston from piled grass clippings, Piracicaba (OSAL 009587).

Diagnosis: Female dorsal shield reticulate, with 39 pairs of setae and two unpaired setae, all scimitar-shaped, except *j1* and *z1*, setiform, and *Z5*, spatulate. Unsclerotised lateroventral cuticle with nine pairs of scimitar-shaped setae. Base of the two anterior lobes of the sternal shield much less sclerotised than remainder of the shield, delineating two presternal plates. Genital shield bearing only *st5*. Two pairs of elongate metapodal plates. Nine pairs of opisthogastric setae (*Jv1*–*Jv5*; *Zv1*, *Zv2*, *Zv4* and *Zv5*). Epistome convex, with anterior margin bearing denticles of similar sizes, except median denticle, distinctly more elongate. Fixed cheliceral digit with ten teeth.

Female (Figure 6 A–F)

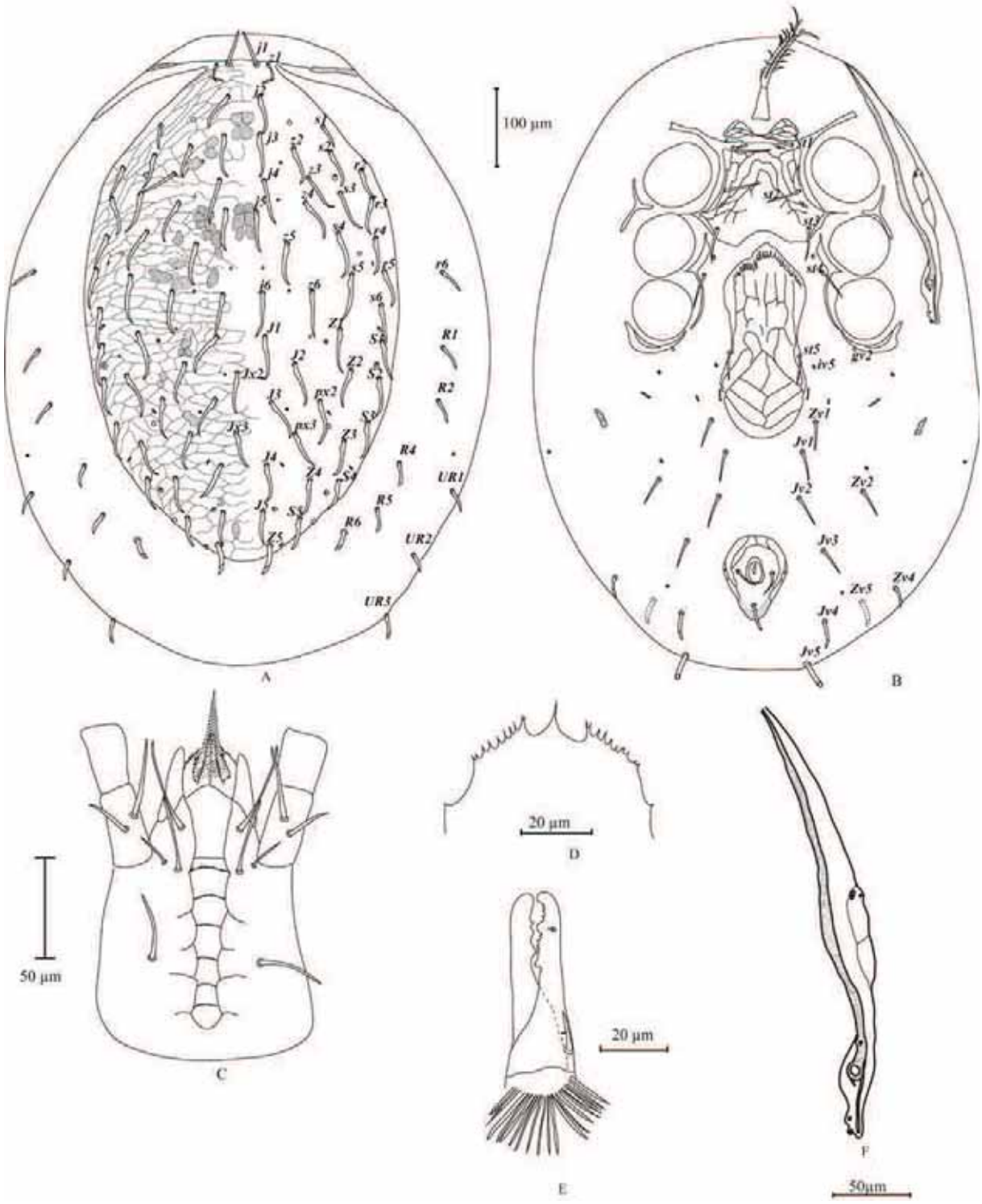

FIGURE 6. *Cosmolaelaps jaboticabalensis*. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D.Epistome; E. Chelicera; F. Peritreme.

Dorsal idiosoma (Fig. 6A): dorsal shield 551 (505–590) long and 350 (334–368) wide (at level of *r6*), reticulate, with 39 pairs of setae, including two pairs of extra setae, and two unpaired setae [*j1–j6*, *z1*–z6, *s1–s6*, *r2– r5* on podonotal region of dorsal shield, and *J1–J5*, *Z1–Z5*, *S1–S5*, *px2* and *px3* (between *J* and *Z* series) and unpaired *Jx* setae (in transverse line with *J2* and between *J3* and *J4* respectively) on opisthonotal region of dorsal shield]. All setae scimitar-shaped, except *j1* and *z1*, setiform, and *Z5* spatulate. Length of setae shown in Table 1. Dorsal shield with 17 and six pairs of distinguishable lyrifissures and pores respectively. Unsclerotised lateral cuticle with nine pairs of setae (*r6*, *R1*, *R2*, *R4–R6*, three *UR* setae), scimitar-shaped.

Peritreme (Fig. 6F): peritrematic shield only fused to dorsal shield near *z1*, with pair of lyrifissures and a pore behind each stigma, with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme extending anteriorly to level of *z1*.

Ventral idiosoma (Fig. 6B): base of the two anterior lobes of sternal shield much less sclerotised than remaining of the shield, delineating two presternal plates. Sternal shield about as long as wide, reticulate, with three pairs of setae (*st1–st3*) and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin concave; distances between *st1* and the posterior margin of sternal shield 110 (104–114), *st1–st1* 65 (61–67), *st2–st2* 86 (83–88), *st3–st3* 103 (100– 105). Lengths of setae shown in Table 2. Seta *st4* on unsclerotised, unstriated cuticle, posterolaterad of iv3 also on cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate [length 225 (218–230), width 98 (96– 101)], with a pair of setae (*st5*); distance *st5–st5* 82 (77–87). Genital lyrifissure (*iv5*) on unsclerotised cuticle, posterolaterad of *st5*. With a pair of rod-shaped platelets next to edge of genital shield, posteriad of *iv5*, and a pair of minute roundish to elongate plates laterad to them. Two pairs of elongate metapodal plates, the anterior smaller. Anterior section of endopodal shield fused with sternal shield, often with anterior end distinctly prolonged between coxae II and III; posterior section often corresponding to a boomerang-shaped fragment between coxae III and IV. Exopodal shield represented by a tri-radiate fragment between coxae I and II and an arched fragment partially surrounding external and posterior margin of coxa IV. Anal shield pear-shaped (wider section anterior), reticulate [93 (88–97) long and 70 (64–

73) wide], with a pair of marginal pores about in transverse line with anterior margin of para-anal seta. With nine pair of opisthogastric setae: *Jv1–Jv5*, *Zv1*, *Zv2*, *Zv4* and *Zv5*. Ventral idiosomal setae setiform, except *Jv4*, *Jv5*, *Zv5* and post-anal, spatulate; *gv2* distinct.

Gnathosoma: epistome convex, with anterior margin bearing denticles of similar sizes, except median denticle, distinctly more elongate (Fig. 6D). Deutosternum with a smooth, transverse distal line followed by six transverse lines with 15–24 denticles each (Fig. 6C). Corniculi parallel to each other, 41 (39–43) long and 9 (8–9) wide basally, almost reaching middle of palp femur. Internal malae adjacent to each other and ventrally fimbriate, laterad by a pair of curved structures with internal surface and distal end coarsely frimbiate. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal setae *h2* laterad and slightly anteriad of *h3*. Palp length 149 (142–157), apotele 2-tined; inner palp trochanter seta about 1.8 times as long as outer seta. Cheliceral digits of similar lengths (Fig. 6E); movable cheliceral digit 51 (49–53) with two or three teeth in addition to distal tooth; fixed digit 56 (50–60) with 10 teeth in addition to apical tooth, the most basal of which and the one closest to tiny setiform *pilus dentilis* distinctly larger than others. Stout and tapering dorsal cheliceral seta and dorsal and antiaxial lyrifissures distinguishable. Cheliceral arthrodial process as a coronet-like fringe.

Legs: lengths, not including ambulacra—I, 597 (584–623); II, 426 (403–456); III, 400 (385–438); IV, 605 (585–635); chaetotaxy: I—coxa 0-0/2, 0/0-0, trochanter 1-0/1, 1/2-1, femur 2-2/1, 3/3-2, genu 2-3/2, 3/1-2, tibia 2-3/2, 3/1-2; II-coxa 0- 0/1, 0/1-0, trochanter 1-0/1, 1/1-1, femur 2-3/1, 2/2-1, genu 2-3/1, 2/1-2, tibia 2-2/1, 2/1-2; III-coxa 0-0/1, 0/1-0, trochanter 1-1/1, 0/1-1, femur 1-2/1, 1/0-1, genu 2-2/1, 2/1-1, tibia 2-1/1, 2/1-1; IV-coxa 0-0/1, 0/0-0, trochanter 2-1/1, 0/1-0, femur 1- 2/1, 1/0-1, genu 2-2/1, 3/0-1, tibia 2-1/1, 3/1-2; tarsi II–IV: 18 setae each. Pre-tarsi with short claws, pulvillus distally rounded. Setae uniform in shape, no macrosetae; femur IV with *ad1* and *ad2* stout, the former spatulate.

Male: Unknown.

Etymology. The name jaboticabalensis refers to the place where the holotype specimen was collected, Jaboticabal, São Paulo state. FIGURE 6.

Remarks. *Cosmolaelaps jaboticabalensis* is closely related to *C. mediocuspis* (Karg) and *C. weeversi* (Oudemans), described from Ecuador and Rio de Janeiro, Brazil respectively. These species have most setae scimitar-shaped and some setae spatulate on the dorsal shield and the surrounding unsclerotised membrane. They differ from *C. jaboticabalensis* by having only 37 pairs of setae on dorsal shield. In addition, *C. mediocuspis* differs by having three unpaired setae on the dorsal shield and epistome acuminate, while *C. weeversi* differs by having *Z5* scimitar-shaped, similar to most other dorsal shield setae, and *st4* inserted on a fragment of the endopodal plate between coxae III–IV.

***Cosmolaelaps oliveirai* n. sp.**

Material examined: holotype female, four paratype females and three paratype males collected on 11 July 2000 by A.R. Oliveira from soil under *Astrocaryum aculeatissimum* (Schott) (Arecaceae) at Núcleo Agrícola Vale do Ribeira, IAC, Pariquera-Açu, São Paulo state, Brazil; holotype, three paratype females and three paratype males deposited at ESALQ-USP; other type specimens deposited at OSAL.

Diagnosis: Female dorsal shield reticulate, with 39 pairs and two unpaired setae, all setiform, occasionally with a slight basal asymmetric protuberance and with hardly distinguishable serration. Unsclerotised lateroventral cuticle with eight pairs of setiform setae visible ventrally in mounted specimens. Two anterior lobes of sternal shield as sclerotised as the remainder of the shield. Genital shield bearing only *st5*. Two pairs of metapodal plates. Ten pairs of opisthogastric setae (*Jv1–Jv5*; *Zv1–Zv5*) closely positioned, in parallel with the reduced extension of the unsclerotised opisthogastric cuticle and expanded genital shield; *Jv5* and *Zv5* lightly serrate. Epistome triangular, with lateral margins denticulate, except near tip. Fixed cheliceral digit with six teeth in addition to apical tooth.

Female (Figure 7 A–F)

Dorsal idiosoma (Fig. 7A): dorsal shield 560 (536–578) long and 393 (374–421) wide (at level of *r6*), reticulate, with most reticules not distinctly transversely

elongate, with 39 pairs of setae (including two pairs of extra setae) and two or three unpaired setae [*j1–j6*, *z1–*z6, *s1–s6*, *r2–r5* on podonotal region of dorsal shield and *J1–J5*, *Z1–Z5*, *S1–S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolatered of *J3*) and unpaired *Jx* setae (between *J1* and *J2*, between *J3* and *J4*, and between *J4* and *J5* respectively) on opisthonotal region of dorsal shield]. All setae setiform, occasionally with slight basal asymmetric protuberance and with hardly distinguishable serration. Length of setae shown in Table 1. Dorsal shield with 17 and six pairs of distinguishable lyrifissures and pores respectively. Unsclerotised lateroventral cuticle with eight pairs of setiform setae (*r6*, *R1*, *R2*, *R4–R6*, two *UR* setae).

Peritreme (Fig. 7F): peritrematic shield only fused to dorsal shield near *z1*; with a pair of lyrifissures and a pore behind each stigma, with a pore and a lyrifissure dorsad of peritreme between coxae II and III. Peritreme extending anteriorly to level between *s1* and *z1*.

Ventral idiosoma (Fig. 7B): two anterior lobes of sternal shield as sclerotised as the remainder of the shield, so that free presternal plates are not distinct; about as long as wide, reticulate, with three pairs of setae (*st1–st3*) and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin concave; distances between *st1* and and posterior margin of sternal shield 95 (90–100), *st1–st1* 72 (70–74), *st2–st2* 79 (77–82), *st3–st3* 110 (108–113). Seta *st4* on unsclerotised cuticle, posterolaterad of iv3 also on cuticle. Genital shield separated from the anal shield, flask-shaped, reticulate [length 261 (247–277) and width 133 (124–141)], with one pair of setae *st5*; distance *st5–st5* 110 (102–116). Genital lyrifissure (*iv5*) on unsclerotised cuticle, postero-laterad of *st5*. With pair of rod-shaped platelets almost totally fused with genital shield. Two pairs of metapodal plates, the anterior narrow and smaller; the posterior subrectangular to oval. Anterior section of endopodal shield fused with sternal shield, with anterior end distinctly prolonged between coxae I and II; section behind sternal shield narrowly separated or fused with it, boomerang-shaped and slim, extending beside coxae III and IV. Exopodal shield seemingly a continuous narrow strip along coxae II to IV, partially encircling coxa IV. Anal shield pear-shaped (wider section anterior), reticulate [102 (94–111) long and 81 (74–88) wide], with a pair of marginal pores about in transverse line with para-anal setae. With ten pairs of opisthogastric setae with hardly distinguishable serration (*Jv1–Jv5*, *Zv1–Zv5*), closely positioned, in

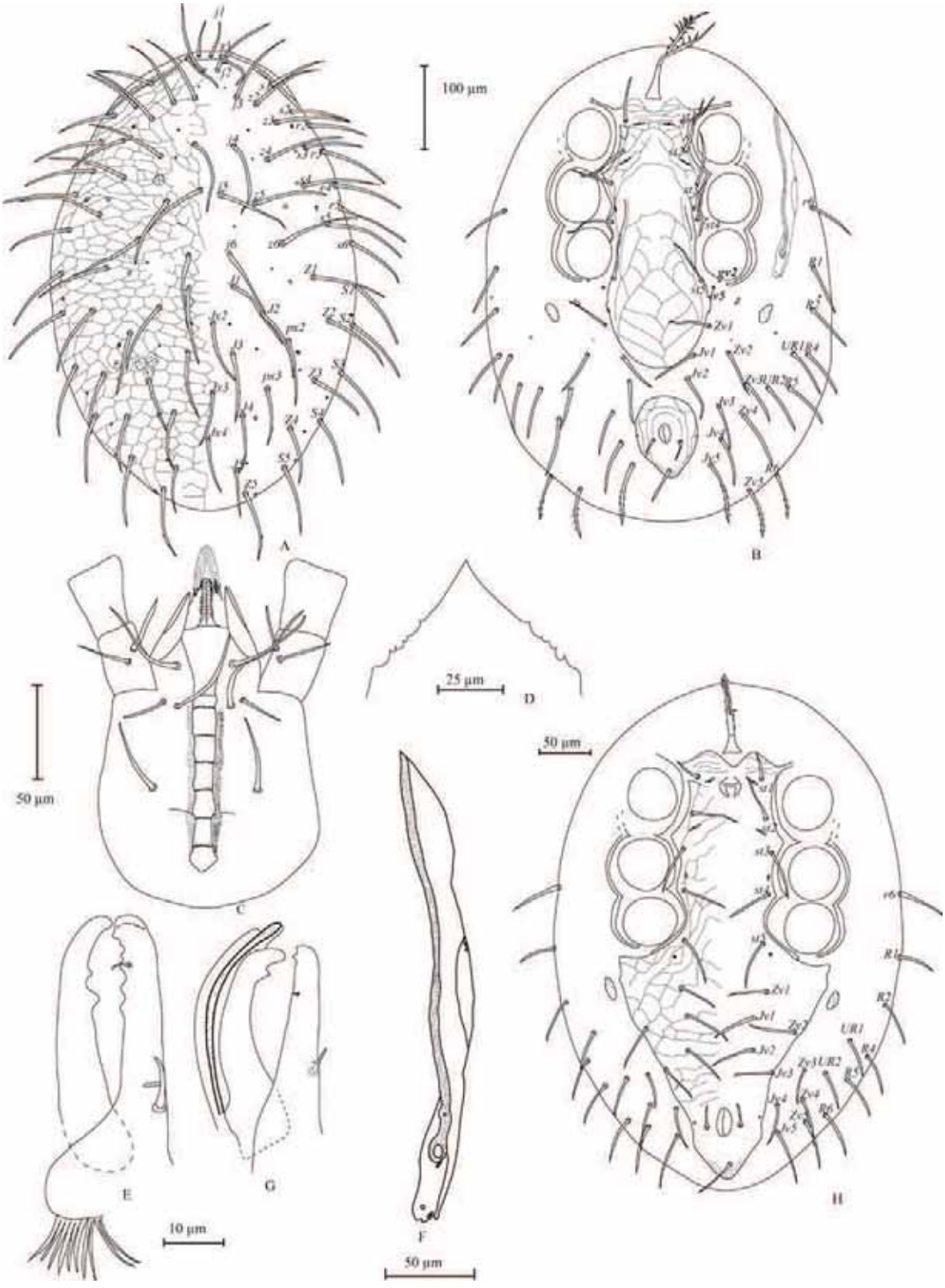

FIGURE 7. *Cosmolaelaps oliveirai*. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D.Epistome; E. Chelicera; F. Peritreme. Male. G. Chelicera; H. Ventral idiosoma.

parallel with the reduced extension of the unsclerotised opisthogastric cuticle and the expanded genital shield; *gv2* distinct.

Gnathosoma: epistome triangular, with anterior lateral margins denticulate, except near tip (Fig. 7D). Deutosternum with a smooth, transverse line followed by six transverse lines of 12–13 denticles each (Fig. 7C). Corniculi slightly convergent distally, 37 (36–37) long and 9 (8–10) wide basally, reaching middle of palp femur. Internal malae adjacent to each other and ventrally fimbriate, laterad by a pair of curved structures with internal surface and distal end coarsely frimbiate. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal seta *h2* laterad and slightly anteriad of *h3*. Palp length 137 (134–140), apotele 2-tined; inner palp trochanter seta about 1.3 times as long as outer seta. Cheliceral digits of similar lengths (Fig. 7E); movable digit 47 (42–49) with two teeth in addition to distal tooth, fixed digit 42 (38–48) with six teeth and setiform *pilus dentilis*. Stout dorsal cheliceral seta and lyrifissure distinguishable; antiaxial lyrifissure not distinguishable because of position of chelicera. Cheliceral arthrodial process as a coronet-like fringe.

Legs: lengths, not including ambulacra—I, 551 (534–558); II, 402 (383–411); III, 396 (391–404); IV, 535 (516–551); chaetotaxy: I—coxa 0-0/2, 0/0-0, trochanter 1-0/1,1/2-1, femur 2-2/1, 3/3-2, genu 2-3/2, 3/1-2, tibia 2- 3/2, 3/1-2; II-coxa 0-0/1, 0/1-0, trochanter 1-0/3-1, femur 2-3/1, 2/2-1, genu 2-3/1, 2/1-2, tibia 2-2/1, 2/1-2; III-coxa 0-0/1, 0/1-0, trochanter 1-1/1, 0/1-1, femur 1-2/1, 1/0-1, genu 2-2/1, 2/1-1, tibia 2-1/1, 2/1-1; IV-coxa 0-0/1, 0/0-0, trochanter 2-1/1, 0/1-0, femur 1-2/1, 1/0-1, genu 2-2/1, 3/0-1, tibia 2-1/1, 3/1-2; tarsi II–IV: 18 setae each. Pre-tarsi with short claws, pulvillus distally rounded. Setae uniform in shape, no macrosetae.

Male (Figure 7 G–H)

Dorsal idiosoma: dorsal shield [442 (412–464) long and 393 (266–304) wide (at level of *r6*)], similar in reticulation and setation to female. Dorsal setal length about 75% of that in female (Table 3). Unsclerotised lateral cuticle with eight pairs of setae (*r6*, *R1*, *R2*, *R4–R6*, two *UR* setae).

Peritreme: as in female.

Table 1. Lenght of dorsal idiosomal setae of *Cosmolaelaps* species females described in this publication; for each seta, the mean value is followed (in parentheses) by the respective minimum maximum, in µm.

Setae	*Cosmolaelaps barbatus* (n= 13)	*Cosmolaelaps busolii* (n= 2)	*Cosmolaelaps confinisetarum* (n- 9)	*Cosmolaelaps jaboticabalensis* (n= 8)	*Cosmolaelaps oliveirai* (n= 5)
j1	35 (29-39)	27 (26-27)	27 (18-32)	37 (33-40)	43 (42-45)
j2	43 (39-44)	37 (34-41)	44 (34-50)	42 (39-44)	87 (85-90)
j3	52 (48-55)	41 (38-44)	56 (50-59)	48 (45-50)	93 (86-97)
j4	52 (49-56)	53 (50-56)	59 (50-64)	50 (48-53)	98 (97-99)
j5	49 (46-51)	54 (53-55)	62 (56-69)	47 (45-51)	94 (91-100)
j6	49 (46-53)	50 (48-53)	60 (50-69)	49 (46-52)	98 (97-98)
z1	19 (17-23)	21 (20-22)	24 (20-32)	18 (17-20)	54 (53-55)
z2	46 (41-50)	43 (42-44)	58 (50-63)	40 (38-43)	92 (90-93)
z3	46(44-49)	47 (46-48)	58 (50-63)	44 (42-47)	90 (85-93)
z4	52 (52-55)	46 (46-46)	63 (59-67)	48 (46-53)	95 (87-99)
z5	49 (42-53)	47 (47-47)	63 (55-71)	51 (49-53)	91 (87-93)
z6	54 (51-57)	51 (50-53)	65 (60-74)	51 (49-55)	101 (96-104)
s1	31 (23-35)	33 (32-33)	41 (29-46)	30 (27-32)	78 (73-81)
s2	43 (39-46)	35 (33-37)	47 (39-53)	38 (34-40)	79 (74-84)
s3	50 (47-57)	46 (44-47)	56 (48-64)	45 (41-48)	88 (79-81)
s4	55 (53-59)	51 (49-53)	62 (56-70)	50 (46-55)	96 (90-102)
s5	57 (53-61)	50 (49-51)	66 (59-73)	51 (48-54)	99 (92-106)
s6	51 (48-54)	47 (47-48)	60 (50-66)	46 (44-48)	91 (87-94)
r2	41 (40-46)	39 (37-41)	41 (38-45)	36 (29-40)	74 (72-77)
r3	47 (45-50)	40 (38-42)	54 (50-62)	42 (39-46)	90 (87-93)
r4	49 (44-53)	38 (37-39)	58 (52-69)	42 (36-47)	91 (87-93)
r5	47 (46-50)	43 (44-46)	56 (46-63)	44 (42-47)	92 (88-96)
r6	21 (18-23)	27 (27-27)	30 (27-31)	29 (24-31)	71 (69-76)
J1	48 (44-52)	53 (51-56)	58 (52-64)	49 (48-52)	98 (95-103)
J2	51 (45-55)	49 (45-53)	56 (46-63)	48 (46-51)	94 (91-97)
J3	51 (47-54)	51 (49-53)	57 (46-64)	47 (45-49)	87 (85-89)
J4	54 (50-58)	43 (43-44)	50 (45-57)	43 (41-46)	74 (68-78)
J5	44 (40-48)	31 (30-31)	36 (32-41)	36 (35-37)	59 (53-61)
Jx2	47 (43-53)	49 (47-52)	57 (50-63)	46 (45-48)	87 (85-95)
Jx3	48 (43-52)	50 (49-50)	48 (46-60)	44 (41-46)	71 (67-73)
Jx4	50 (44-54)	-	49 (41-57)	-	68 (66-70)
px2	47 (43-52)	49 (51-52)	58 (52-66)	48 (47-49)	82 (76-86)
px3	47 (43-50)	49 (46-51)	55 (52-63)	45 (42-47)	71 (66-75)
Z1	55 (51-60)	50 (48-52)	61 (57-66)	51 (48-54)	98 (95-101)
Z2	55 (50-59)	50 (47-53)	57 (48-64)	48 (46-51)	91 (87-95)
Z3	53 (48-56)	47 (44-49)	54 (48-60)	43 (41-45)	80 (76-84)
Z4	54 (50-56)	43 (41-45)	48 (39-55)	41 (39-43)	75 (72-78)

Z5	58 (53-59)	24 (22-26)	60 (53-64)	32 (30-33)	87 (86-89)
S1	48 (45-51)	48 (45-51)	53 (49-59)	47 (45-49)	87 (86-90)
S2	51 (47-57)	49 (46-52)	53 (43-62)	44 (40-48)	89 (84-91)
S3	52 (49-56)	45 (43-47)	56 (42-63)	43 (38-45)	89 (87-90)
S4	51 (45-53)	42 (40-43)	56 (45-63)	36 (33-41)	86 (83-91)
S5	51 (47-55)	34 (33-34)	55 (48-62)	35 (33-37)	85 (83-86)
R1	22 (20-23)	23 (21-24)	32 (29-34)	29 (27-31)	73 (69-77)
R2	22 (20-23)	23 (21-24)	34 (28-43)	27 (24-29)	69 (66-74)
R4	27 (25-28)	20 (20-20)	32 (27-41)	26 (25-27)	71 (68-75)
R5	27 (25-28)	22 (21-23)	33 (27-43)	26 (23-28)	72 (66-79)
R6	30 (28-30)	21 (21-22)	36 (33-40)	30 (28-39)	73 (70-75)
UR1	22 (16-25)	18 (20-22)	30 (25-39)	23 (22-24)	68 (64-73)
UR2	23 (19-25)	18 (19-20)	31 (25-45)	26 (22-24)	70 (65-75)
UR3	-	-	-	28 (23-26)	-

(-) seta absent

Ventral idiosoma (Fig. 7H): holoventral shield [349 (332–366) long and 190 (176–205) wide (behind coxae IV)], with 10 pairs of setae (*st1–st5*, *Jv1–Jv3*, *Zv1* and *Zv2*) in addition to circumanal setae, four pairs of distinguishable lyrifissures and a pair of marginal pores about in transverse line with para-anal setae. Holoventral setal length about 55% of that in female (Table 4). A pair of ellipsoidal metapodal plates. Unsclerotised cuticle posterolaterad of ventrianal region with five pairs of setae (*Jv4*, *Jv5*, *Zv3– Zv5*) and three pairs of distinguishable lyrifissures.

Gnathosoma: epistome subtriangular, with denticles scattered along lateral margins; deutosternum and corniculi similar to female. Cheliceral digits of similar lengths (Fig. 7G); movable digit 31 (28–34) with one tooth in addition to terminal tooth; spermatodactyl 41 (40–42), curved upward, parallel to movable digit, apparently consisting of a furrowed structure and a slightly shorter accompanying ventral structure; fixed digit 27 (24–29), with a subterminal tooth an addition to the minute setiform *pilus dentilis*. Dorsal cheliceral seta and lyrifissure distinguishable, positioned more distally than usual for species of this genus (almost mid-length of fixed digit); antiaxial lyrifissure indistinct because of position of chelicera.

Legs: as in female.

Etymology. The name oliveirai is a homage to Anibal Ramadan Oliveira, for his dedication to the knowledge of the Brazilian edaphic mite fauna.

Table 2. Lenghts of ventral idiosomal setae and ventral gnathosomal setae of *Cosmolaelaps* species females described in this publication; for each seta, the mean value is followed (in parentheses) by the respective minimum maximum, in µm.

Setae	*Cosmolaelaps barbatus* (n= 13)	*Cosmolaelaps busolii* (n= 2)	*Cosmolaelaps confinisetarum* (n= 9)	*Cosmolaelaps jaboticabalensis* (n= 8)	*Cosmolaelaps oliveirai* (n= 5)
h1	41 (39-43)	35 (35-35)	27 (18-29)	51 (47-55)	42 (39-47)
h2	18 (17-19)	13 (13-13)	13 (8-15)	23 (20-29)	20 (19-22)
h3	50 (48-52)	25 (24-27)	37 (29-45)	45 (37-55)	52 (51-53)
pc	34 (32-35)	27 (27-27)	24 (21-27)	34 (33-34)	36 (34-39)
st1	51 (47-55)	34 (34-35)	38 (34-43)	43 (40-45)	53 (51-56)
st2	50 (46-55)	30 (29-32)	37 (32-42)	42 (40-44)	67 (65-71)
st3	43 (37-46)	25 (25-25)	38 (34-41)	38 (36-40)	68 (67-70)
st4	48 (44-50)	30 (29-39)	36 (29-39)	36 (34-37)	63 (62-67)
st5	49 (45-52)	28 (28-28)	36 (29-39)	33 (31-36)	61 (58-62)
Jv1	36 (31-39)	25 (25-26)	37 (31-41)	35 (34-38)	60 (56-65)
Jv2	34 (30-37)	27 (26-29)	40 (36-43)	38 (36-40)	60 (56-64)
Jv3	33 (27-36)	25 (24-27)	40 (35-49)	35 (34-36)	61 (60-62)
Jv4	28 (24-33)	22 (22-22)	44 (32-53)	31 (25-37)	74 (72-79)
Jv5	43 (39-47)	24 (23-25)	54 (45-63)	33 (28-37)	82 (77-84)
Zv1	38 (34-41)	24 (22-26)	37 (31-41)	33 (30-35)	56 (55-58)
Zv2	37 (35-40)	26 (27-28)	37 (32-43)	35 (34-36)	64 (59-68)
Zv3	23 (19-27)	18 (18-18)	30 (25-41)	-	60 (59-62)
Zv4	28 (25-28)	22 (21-23)	34 (27-48)	23 (21-25)	80 (74-83)
Zv5	39 (38-43)	24 (23-24)	44 (36-56)	30 (28-39	79 (76-83)
paranal	28 (26-31)	19 (19-19)	23 (20-24)	25 (22-27)	29 (35-32)
post-anal	26 (21-31)	24 (23-25)	35 (32-38)	31 (26-33)	51 (47-53)

(-) seta absent

Table 3. Lenghts of dorsal idiosomal setae of *Cosmolaelaps* species males described in this publication; for each seta, the mean value is followed (in parentheses) by the respective minimum maximum, in µm.

Setae	*Cosmolaelaps barbatus* (n= 5)	*Cosmolaelaps busolii* (n= 1)	*Cosmolaelaps confinisetarum* (n= 5)	*Cosmolaelaps oliveirai* (n= 3)
j1	21 (16-24)	14	19 (18-21)	30 (29-30)
j2	28 (25-29)	29	32 (31-32)	70 (64-73)
j3	37 (36-38)	32	32 (37-44)	71 (70-72)
j4	36 (34-38)	34	43 (38-50)	76 (68-83)

j5	34 (33-36)	35	45 (41-48)	74 (73-75)
j6	33 (31-36)	36	43 (40-46)	75 (72-78)
z1	16 (15-17)	14	18 (16-20)	42 (39-44)
z2	30 (26-32)	29	37 (29-44)	76 (75-77)
z3	32 (28-36)	31	42 (37-45)	68 (64-72)
z4	35 (34-36)	35	43 (40-47)	73 (65-78)
z5	33 (30-38)	36	43 (40-47)	71 (66-76)
z6	34 (32-36)	34	44 (40-48)	79 (74-83)
s1	20 (15-23)	26	33 (30-36)	58 (54-60)
s2	27 (25-30)	26	34 (27-38)	57 (51-61)
s3	34 (32-35)	31	39 (36-45)	76 (75-77)
s4	38 (36-41)	33	45 (43-51)	75 (73-77)
s5	38 (36-41)	37	47 (44-49)	81 (77-84)
s6	31 (29-33)	33	38 (37-39)	68 (63-73)
r2	26 (24-29)	27	30 (27-35)	55 (49-61)
r3	30 (28-31)	27	37 (35-38)	73 (72-73)
r4	29 (28-30)	27	37 (36-38)	67 (62-71)
r5	30 (28-32)	28	40 (39-41)	73 (70-76)
r6	15 (14-18)	14	18 (17-19)	44 (43-45)
J1	31 (29-33)	35	41 (39-45)	72 (69-73)
J2	32 (31-32)	30	40 (38-43)	68 (63-74)
J3	33 (31-34)	34	36 (35-38)	63 (60-66)
J4	36 (33-38)	25	33 (30-37)	52 (50-54)
J5	28 (26-31)	19	24 (21-29)	43 (41-46)
Jx1	30 (28-31)	32	36 (32-39)	65 (63-68)
Jx2	31 (29-34)	29	34 (32-40)	49 (46-51)
Jx3	29 (21-33)		31 (28-35)	49 (43-52)
px2	28 (27-29)	33	39 (34-47)	59 (55-61)
px3	29 (27-30)	29	36 (34-38)	50 (48-52)
Z1	34 (33-36)	38	42 (39-46)	75 (74-77)
Z2	33 (30-36)	35	41 (38-46)	68 (66-71)
Z3	34 (32-36)	31	38 (34-42)	61 (58-64)
Z4	33 (32-35)	27	34 (31-39)	56 (53-58)
Z5	33 (30-35)	12	40 (37-42)	59 (56-65)
S1	30 (27-32)	32	34 (32-36)	66 (62-69)
S2	30 (28-33)	32	37 (34-41)	67 (61-73)
S3	30 (29-33)	30	37 (36-38)	64 (58-68)
S4	30 (28-34)	26	34 (32-36)	63 (59-67)
S5	30 (27-33)	23	33 (30-37)	60 (57-62)
R1	11 (10-13)	13	18 (17-19)	41 (39-44)
R2	11 (10-13)	10	19 (18-19)	39 (35-41)
R4	14 (13-15)	10	17 (17-17)	38 (37-40)
R5	14 (10-15)	10	17 (16-17)	40 (39-40)
R6	16 (15-18)	10	-	36 (35-38)

UR1	-	-	18 (17-19)	36 (35-36)
UR2	-	-	-	35 (33-38)

(-) seta absent

Table 4. Lenghts of ventral idiosomal setae and ventral gnathosomal setae of *Cosmolaelaps* species males described in this publication; for each seta, the mean value is followed (in parentheses) by the respective minimum maximum, in µm.

Setae	*Cosmolaelaps barbatus* (n= 5)	*Cosmolaelaps busolii* (n= 1)	*Cosmolaelaps confinisetarum* (n= 5)	*Cosmolaelaps oliveirai* (n= 3)
h1	29 (28-30)	18	21 (20-23)	27 (25-30)
h2	13 (10-15)	10	11 (10-13)	13 (13-15)
h3	29 (25-33)	20	24 (23-25)	28 (28-30)
pc	22 (20-23)	20	15 (15-18)	21 (18-25)
st1	35 (34-36)	18	26 (25-27)	35 (34-36)
st2	33 (31-34)	19	25 (23-28)	46 (42-51)
st3	28 (24-31)	16	24 (22-26)	45 (41-47)
st4	29 (27-30)	17	24 (22-28)	45 (42-47)
st5	32 (29-37)	17	23 (21-25)	40 (38-44)
Jv1	25 (24-26)	18	31 (25-34)	40 (35-47)
Jv2	24 (23-26)	17	33 (28-38)	49 (47-51)
Jv3	21 (19-23)	19	26 (22-31)	40 (38-42)
Jv4	15 (15-15)	12	20 (18-22)	39 (35-44)
Jv5	28 (25-33)	12	25 (22-27)	49 (44-51)
Zv1	24 (23-25)	17	27 (23-32)	37 (32-42)
Zv2	24 (22-25)	19	29 (25-36)	43 (39-46)
Zv3	-	14	17 (17-18)	34 (30-36)
Zv4	16 (15-17)	12	18 (16-20)	43 (42-45)
Zv5	17 (15-20)	13	18 (17-19)	43 (41-44)
paranal	20 (16-22)	15	16 (13-19)	16 (13-19)
post-anal	20 (18-21)	14	22 (19-24)	22 (19-24)

(-) seta absent

Remarks. *Cosmolaelaps oliveirai* is closely related to *C. guttulatus* (Karg) described from Chile and *C. confinisetarum* n. sp.. *Cosmolaelaps guttulatus* differs from this new species by having only two pairs of unpaired setae on the opisthonotal region, the smooth dorsal shield, *J1* shorter than distance between its base and the base of *J3*, and *J4* slightly shorter than distance between its base and the base of *J5*.

Cosmolaelaps confinisetarum n.sp. differs from this new species by having *j3* setae slightly closer together than *j4* setae, *j5* distinctly more widely separated than *j3* setae or *j4* setae, *J1*, *J3* and *J4* not reaching bases of *J3*, *J4* and *J5* respectively, and most reticules of dorsal shield pattern distinctly transversely elongate.

Discussion

Casanueva (1993) defined as apomorphies for the genus *Cosmolaelaps* the presence of unpaired accessory setae between setae of the *J* series and the peritrematic shield fused to exopodal IV. We concluded that the former character is usually consistently observed for species of this group, but that the latter is not. This discrepancy is probably related to the fact that the type species of this genus (*C. claviger*) has been mentioned in the literature tohave the peritrematic shield fused with exopodal shield near coxa IV; however, *C. kassai* is the only other species of this genus reported to show this characteristic. The incomplete description of many *Cosmolaelaps* species makes it difficult to separate them in species groups, despite some attempts in this sense (e.g. Karg, 1993a; 2003).

The finding of five new species of *Cosmolaelaps* in a relatively restricted area of Brazil indicates a high diversity of this group in that country. Considering the economic important of species of this group as biological control agents (Afifi & Van der Geest, 1984, Al Rehiayani & Fouly, 2005), efforts for a better understanding of these mites in Brazil are justified.

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CHAPTER 3 - DESCRIPTION OF FOUR NEW LAELAPID SPECIES (ACARI: MESOSTIGMATA: LAELAPIDAE) FROM BRAZIL AND A KEY FOR SOUTH AMERICAN FREE-LIVING AND ARTHROPOD ASSOCIATED GENERA

Abstract

The South American fauna of Laelapidae is still inadequately known, despite the fact that many free-living and arthropod associated laelapid species have been recorded from Argentina, Brazil, Chile, Colombia, Ecuador and Venezuela. Three new species of *Gaeolaelaps* and one of *Ololaelaps* are described here and a pictorial key to the South America free-living and arthropod associated genera is provided.

Key words: *Gaeolaelaps*, *Ololaelaps,* Predatory mites

Introduction

The family Laelapidae has a diversity of habits, including free-living and arthropod, bird and mammal associates. The family includes about 1300 species classified in slightly over 90 genera (Beaulieu et al., 2011).

Some free-living species [e.g. *Gaeolaelps aculeifer* (Canestrini), *Stratiolaelaps miles* (Berlese) and *Stratiolaelaps scimitus* (Womersley)] have been commercially produced in several countries including Brazil, as biological control agents of edaphic pests. Association with arthropods seem to refer to phoresy, although some species of the Coleoptera-associated genus *Hypoaspis* Canestrini have been mentioned to feed on eggs and larvae (Costa, 1971 and Khanjani et al., 2013, respectively) of some scarabeid pests.

The South American Laelapidae fauna is still adequately known, despite the several papers dealing with free-living and arthropod associated laelapid species

from Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador and Venezuela (Berlese, 1904, 1914, 1916, 1918, 1920, Oudemans, 1926, Vitzthum, 1930, Lombardini, 1940, 1960, Fonseca, 1959, Sheals, 1962, Hyatt, 1964, Hirschmann, 1966, Karg, 1978a, 1978b, 1979, 1981a, 1981b, 1982, 1997, 2000, 2003a, 2003b, 2006, Costa, 1980, Baker et al., 1984, Delfinado-Baker, 1984, Hunter et al., 1988, Fletchmann, 2005, Freire & Moraes, 2007, Karg & Schorlemmer, 2009, Moreira et al., 2014). Seven genera of essentially free-living species and 13 genera containing species found in association with arthropod have been recorded from South America.

The aim of this work were to described three species of *Gaeolaelaps* Evans & Till and one species of *Ololaelaps* Berlese and provide a key for South America free-living and arthropod associated genera.

Material and methods

Specimens used in the description of the new species, collected during the Biota's project (FAPESP 1998/7099-0), were mounted in Hoyer's medium on microscope slides. They were examined under phase and interference contrast microscopy. Illustrations were done with the help of a digital camera connected to a phase and interference contrast microscope; photos were then processed with a digital tablet, using the Adobe Illustrator® program. Measurements were taken with the software package NIS vs. 3.2, that processes images obtained with digital camera. For each character, the average measurement followed (in parentheses) by the minimum and the maximum measurements are given in µm. Setal nomenclature is that of Evans (1963), Evans & Till (1965) and Lindquist (1994) for legs, dorsal idiosoma and opistogastric region, respectively. Poroidotaxy is based on Johnston & Moraza (1991) and Moreira et al. (2014).

Updated diagnose of all free-living and arthropod associated laelapid genera recorded from South America were done based on a literature review of the characteristics of genera considered following the original descriptions of *Bisternalis*

by Hunter (1963); *Blaberolaelaps* by Costa (1980); *Hunteria* by Delfinado-Baker et al. (1984); *Suracarus* by Flechtmann (2005) and *Oloopticus* by Karg (1978a) and the recent revisions of *Alloparasitus* by Huhta & Karg (2010); *Androlaelaps* by Till (1963); *Cosmolaelaps* by Moreira et al. (2014); *Coleolaelaps* and *Hypoaspis* by Joharchi & Halliday (2011); *Gaeolaelaps* by Beaulieu (2009); *Gymnolaelaps* and *Pseudoparasitus* by Joharchi et al. (2011); *Holostaspis* by Evans & Till (1966); *Laelaspis* by Joharchi et al. (2012); *Myrmozercon* by Joharchi & Moradi (2013); *Ololaelaps* by Ryke (1962); *Pneumolaelaps* by Evans & Till (1966) and *Stratiolaelaps* by Walter & Campbell (2003). The genus *Androlaelaps* Berlese, usually mammal associated, was included in the key because many species of this genus have been reported as free-living, for example, *Androlaelaps casalis* (Berlese) mentioned as potential predator to control poultry red mites, *Dermanyssus gallinae* (De Geer) (Lesna et al., 2012). The software package vSysLab from Ohio State University was used to construct the pictorial key.

Abbreviation used for type depositories is: ESALQ-USP, for the mite reference collection of Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, São Paulo state, Brazil.

Results

Description of new species

Gaeolaelaps n. sp. 1

Material examined: Holotype female and one paratype female collected on 26/VII/2000 by A. R. Oliveira, from soil under *Myrcia bella* Cambess (Myrtaceae) at Estação Ecológica Jataí, Luís Antônio, São Paulo state, Brazil (21°36’13”S, 47°47’17”W); one paratype female collected on 25/VII/2000, by A. R. Oliveira, from soil under the same plant species at Fazenda Canchim, São Carlos, São Paulo state, Brazil (21°54’50”S, 47°49’21”W); holotype and paratypes deposited at ESALQ-USP.

Diagnosis. Female dorsal shield reticulate, with 39 pairs of setae, all aciculate. Unsclerotized lateroventral cuticle with four pairs of aciculate setae. Anterior region of sternal shield lightly sclerotized, with distinctly punctuate-striate region bearing *st1* setae. Genital shield with a pronounced constriction next to *Zv1*. One pair of metapodal plates. Ten pairs of aciculate opisthogastric setae. Epistome convex, denticulate. Fixed cheliceral digit with eight teeth in addition to distal tooth. Some ventral setae of genu and tibia, and some disto-dorsal and disto-ventral setae of tarsus of legs II-IV thorn-like.

Female (Figure 1)

Dorsal idiosoma (Fig. 1A): dorsal shield 465 (457-471) long and 283 (193-267) wide (at level of *r6*), reticulate, with 39 pairs of setae, including two pairs of extra setae [*j1-j6*, *z1-z6*, *s1-s6*, *r2-r5* on podonotal region of dorsal shield; *J1-J5*, *Z1-Z5*, *S1-S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolaterad of *J3*) on opisthonotal region of dorsal shield]. All setae aciculate. Setal lengths shown in Table 1. Unsclerotised lateroventral cuticle with four pairs of setae [*r6*, *R1*, *R4* (present in two specimens and absent in one specimen) and *UR*].

Ventral idiosoma (Fig. 1B): anterior region of sternal shield lightly sclerotized, with distinctly punctuate-striate region; sternal shield longer than wider, reticulate, with three pairs of setae *st1- st3* (*st1* on punctuate-striate anterior region of the shield); and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin truncate; distances between *st1* and posterior margin of sternal shield 105 (102-107), *st1-st1* 56 (55-56), *st2-st2* 77 (76-78), *st3-st3* 80 (79-82). Setal lengths shown in Table 2. Setae *st4* on unsclerotized, unstriated cuticle, posterolaterad of *iv3*, also in cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate, with a pronounced constriction next to *Zv1* [length 177 (176-178), widht 73 (70-76)], with a pair of setae (*st5*); distance *st5-st5* 67 (64-68). Genital lyrifissure (*iv5*) on unsclerotized cuticle, posterolaterad of *st*5. One pair of metapodal plates. Anterior section of endopodal shield fused with sternal shield; section behind sternal shield represented into a

boomerang-shaped fragment between coxae III and IV. Anal shield subtriangular (wider section anterior), reticulate [59 (56-63) long and 64 (61-71) wide], with a pair of marginal pores about in transverse line with anterior margin of anal opening. Expodal plates reduced to narrows sclerites, between coxae II and II and around coxa IV. With 10 pairs of setiform opisthogastric setae: *Jv1*-*Jv5*, *Zv1*-*Zv5*.

Gnathosoma: epistome convex, denticulate (Fig 1E). Deutosternum with a smooth, transverse distal line followed by six transverse lines of denticles; number of teeth decreasing from distal (12) to proximal row (3); with three smooth, transverse and curved lines external to deutosternum, on three first most proximal lines of denticles (Fig. 1C). Corniculi parallel to each other, 40 (37-44) long and 11 (9-12) wide basally, almost reaching middle region of palp femur. Internal malae fused to each other, barbed. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal setae *h2* laterad and slightly posteriad of *h3*. Palp length 142 (141-142); apotele 2-tined; inner palp trochanter seta about 1.5 times as long as outer seta. Cheliceral digits of similar lengths (Fig. 1F); movable digit 53 (51-55) with two teeth in addition to distal tooth; fixed digit 47 (44-49), with a subterminal paraxial notch, setiform *pilus dentilis* and eight teeth in addition to distal tooth. Stout dorsal cheliceral seta, dorsal lyrifissure and antiaxial lyrifissure distinguishable.

Peritreme (Fig. 1D): peritrematic shield only fused with dorsal shield, near *z1*, with a pair of lyrifissures and a pore behind each stigma; with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme extending anteriorly almost to level of *s1*.

Legs: lengths, not including ambulacra – I, 410 (398-417); II, 344 (327-364); III, 304 (296-313); IV, 475 (465-485); chaetotaxy: I - coxa 0 - 0/2, 0/0 - 0, trochanter 1 - 0/1,

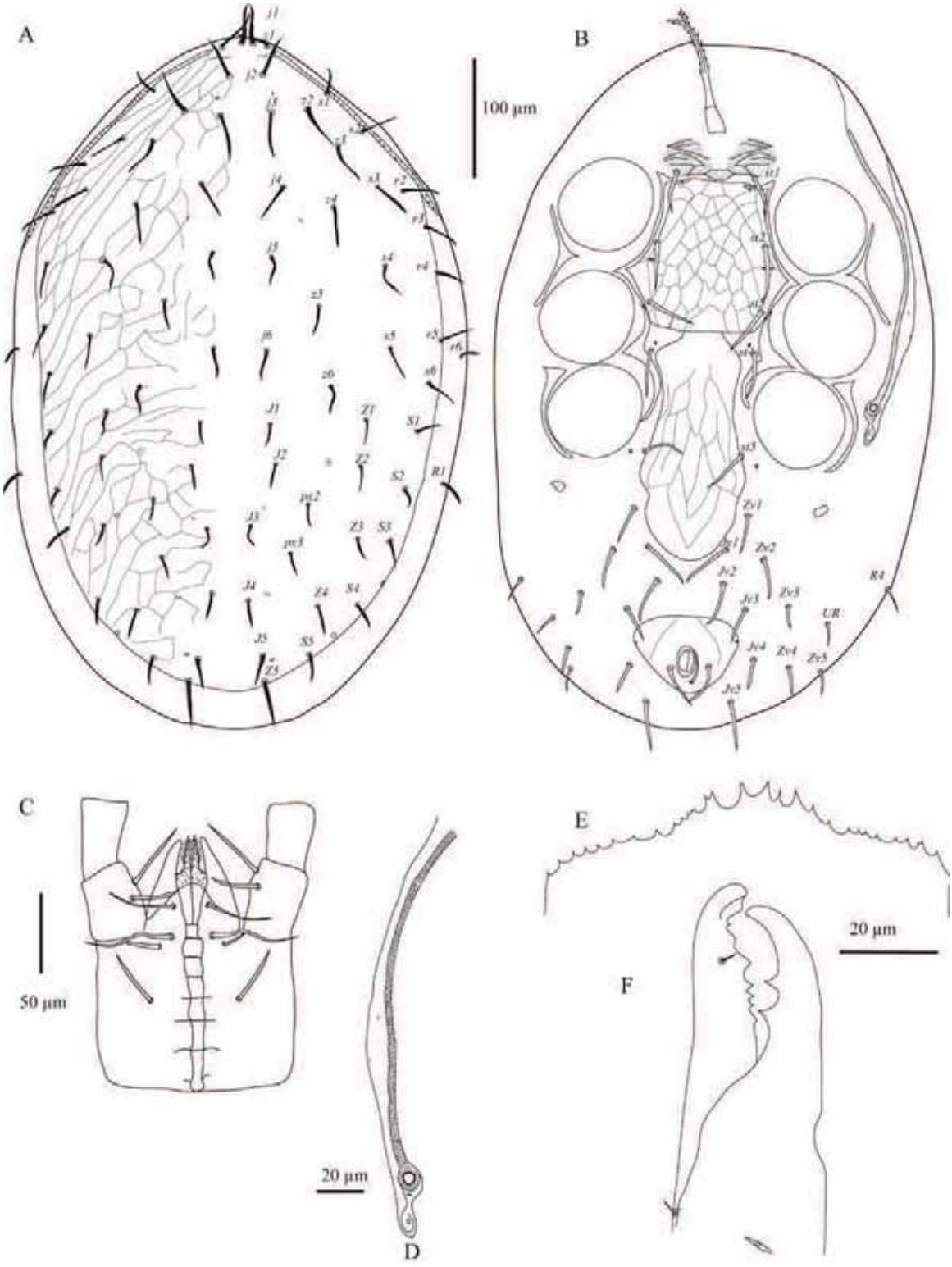

FIGURE 1. *Gaeolaelaps* n. sp.1. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D. Peritreme; E. Epistome; F. Chelicera.

1/2 - 1, femur 2 - 2/1, 3/3 - 2, genu 2 - 3/2, 3/1 - 2, tibia 2 - 3/2, 3/1 - 2; II - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 0/1, 1/1 - 1, femur 2 - 3/1, 2/2 - 1, genu 2 - 3/1, 2/1 - 2, tibia 2 - 2/1, 2/1 - 2; III - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 1/1, 0/1 - 1, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 2/1 - 1, tibia 2 - 1/1, 2/1 - 1; IV - coxa 0 - 0/1, 0/0 - 0, trochanter 2 - 1/1, 0/1 - 0, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 3/0 - 1, tibia 2 - 1/1, 3/1 - 2; tarsi II-IV: 18 setae each. Pre-tarsi with short claws, central lobe of pulvillus rounded. No macrosetae; most setae aciculate; some ventral setae of genu and tibia, and some disto-dorsal and disto-ventral setae of tarsus of legs II-IV thorn-like.

Male: unknown.

Gaeolaelaps n. sp. 2

Material examined: Holotype female collected on 25/VII/2000, by A. R. Oliveira from soil under *Psidium australe* Cambess (Myrtaceae), at Fazenda Canchim, São Carlos, São Paulo, Brazil (21°54'50"S, 47°49'21"W); one paratype female, collected on 26/VII/2000, by A. R. Oliveira from soil under *Myrcia guianensis* (Aubletet) (Myrtaceae), at Estação Ecológica Jataí, Luís Antônio, São Paulo, Brazil (21°36'13"S, 47°47'17"W); holotype and paratype deposited at ESALQ-USP.

Diagnosis. Female dorsal shield reticulate, with 38 pairs of minute (except *j1* and *Z5*) and aciculate setae, *z2* absent. Unsclerotized lateroventral cuticle with two pairs of aciculate setae. Peritreme short, extending anteriorly almost to level of *s3*. Presternal plates present, sclerotized; sternal shield lightly reticulate. Three pairs of small metapodal plates. Nine pairs of aciculate opisthogastric setae. Epistome convex, denticulate. Fixed cheliceral digit with four teeth in addition to distal tooth.

Female (Figure 2)

Dorsal idiosoma (Fig. 2A): dorsal shield 386 (383-389) long and 252 (249-254) wide (at level of *r6*), reticulate, with 38 pairs of setae, including two pairs of extra

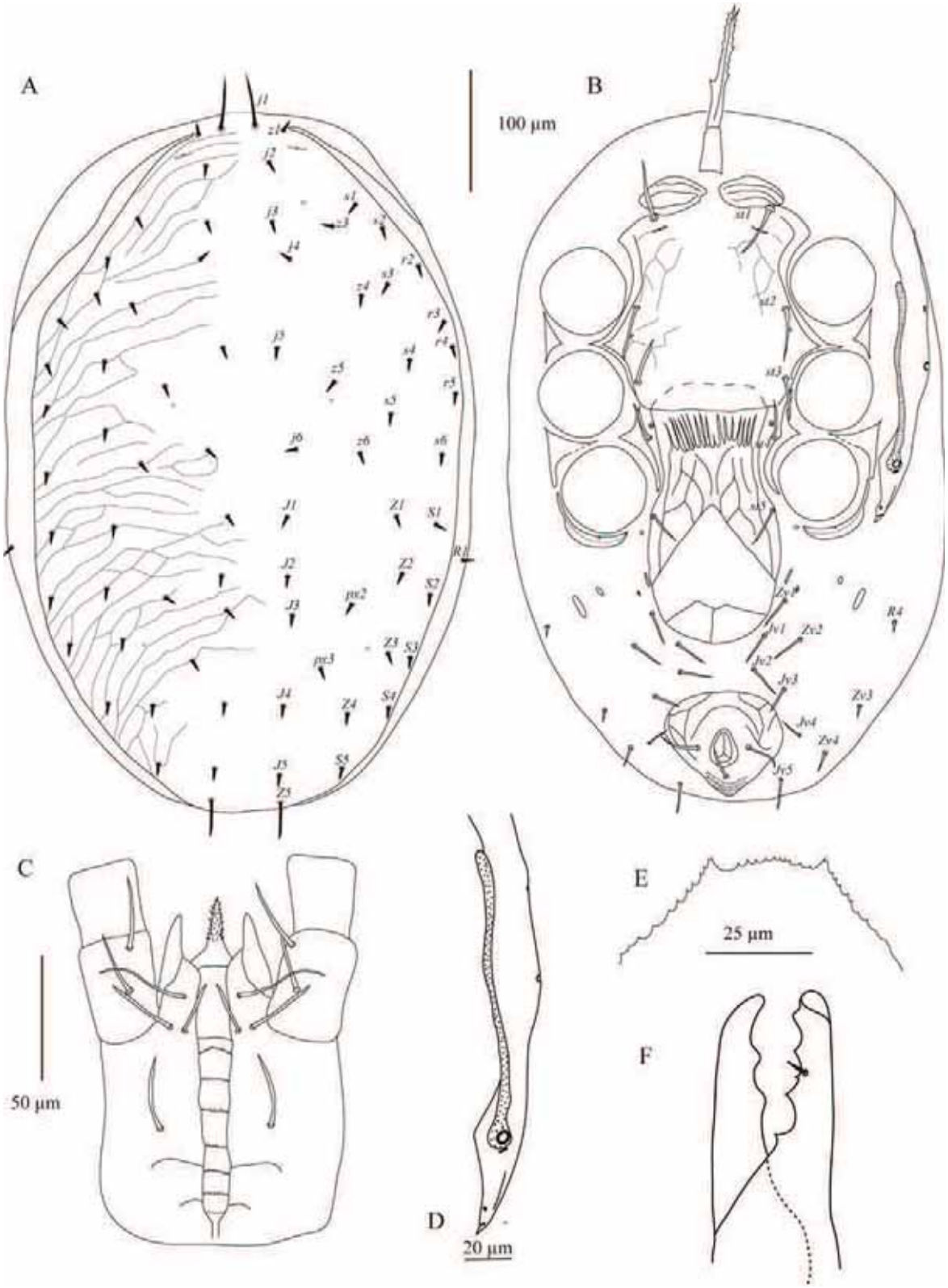

FIGURE 2. *Gaeolaelaps* n. sp.2. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D. Peritreme; E. Epistome; F. Chelicera.

setae [*j1-j6*, *z1-z6*, *s1*, *s3-s6*, *r2-r5* on podonotal region of dorsal shield; *J1-J5*, *Z1-Z5*, *S1-S5*, *px2* (posterolaterad of *J2*) and *px3* (posterolaterad of *J3*) on opisthonotal region of dorsal shield; *z2* absent]. Setal lengths shown in Table 1. All dorsal setae minute (except *j1* and *Z5*) and aciculate. Unsclerotized lateroventral cuticle with two pairs of setae (*R1* and *R4*).

Ventral idiosoma (Fig. 2B): presternal plates present, sclerotized, transversaly striate; sternal shield lightly reticulate, with three pairs of setae *st1- st3* and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin truncate; distances between *st1* and posterior margin of sternal shield 111 (110-112), *st1-st1* 65 (65-66), *st2-st2* 84 (83-85), *st3-st3* 83 (83-84). Setal lengths shown in Table 2. Setae *st4* on unsclerotized, unstriated cuticle, posterolaterad of *iv3*, also in cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate [length 149 (149-149), maximum widht 76 (75-77)], with a pair of setae (*st5*); distance *st5-st5* 67 (65-68). Genital lyrifissure (*iv5*) on unsclerotized cuticle, posterolaterad of *st*5. Three pairs of small metapodal plates. Anterior section of endopodal shield fused with sternal shield; section behind sternal shield represented by a boomerang-shaped fragment between coxae III and IV. Anal shield subtriangular (wider section anterior), reticulate [58 (58-58) long and 63 (62-65) wide], with a pair of marginal pores about in transverse line with anterior margin of anal opening. Exopodal plates reduced to two triangular sclerites between coxae II and II, and III and IV, and a narrow sclaerite sround coxa IV. With nine pairs of setiform opisthogastric setae: *Jv1-Jv5*, *Zv1-Zv4*.

Gnathosoma: epistome convex, denticulate (Fig. 2E). Deutosternum with a smooth, transverse distal line follow by 6 transverse lines of 7-13 denticles each and a proximal smooth line. Corniculi parallel to each other, 43 (40-46) long and 12 (11-15) wide basally, almost reaching middle region of palp femur. Internal malae fused to each other, barbed. Hypostomal setae *h2* laterad and slightly posteriad of *h3*. Palp length 160 (156-164); apotele 2-tined; inner palp trochanter seta about 1.2 times as long as outer seta (Fig. 2C). Cheliceral digits of similar lengths (Fig. 2D); movable digit 53 (52-54) with two teeth in addition to distal tooth; fixed digit 54 (53-55) with a subterminal paraxial notch, setiform *pilus dentilis* and apparently four teeth in addition

to distal tooth. Dorsal cheliceral seta not clearly distinguishable, apparently small. Dorsal lyrifissures and antiaxial lyrifissure not distinguishable because of position of chelicerae.

Peritreme (Fig. 2D): peritrematic shield only fused with dorsal shield, near *z1*, with a pair of lyrifissures and a pore behind each stigma; with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme short, extending anteriorly almost to level of *s3*.

Legs: lengths, not including ambulacra – I, 477 (454-500); II, 378 (372-385); III, 349 (340-357); IV, 552 (521-583); chaetotaxy: I - coxa 0 - 0/2, 0/0 - 0, trochanter 1 - 0/1, 1/2 - 1, femur 2 - 2/1, 3/3 - 2, genu 2 - 3/2, 3/1 - 2, tibia 2 - 3/2, 3/1 - 2; II - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 0/1, 1/1 - 1, femur 2 - 3/1, 2/2 - 1, genu 2 - 3/1, 2/1 - 2, tibia 2 - 2/1, 2/1 - 2; III - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 1/1, 0/1 - 1, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 2/1 - 1, tibia 2 - 1/1, 2/1 - 1; IV - coxa 0 - 0/1, 0/0 - 0, trochanter 2 - 1/1, 0/1 - 0, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 3/0 - 1, tibia 2 - 1/1, 3/1 - 2; tarsi II-IV: 18 setae each. Pre-tarsi with short claws, central lobe of pulvillus rounded. Setae uniform in shape; no macrosetae.

Male: unknown.

Gaeolaelaps n. sp. 3

Material examined: Holotype female and one paratype female collected on 16/V/2000, by A. R. Oliveira, from soil under *Syagrus romanzoffiana* (Cham) (Arecaceae), at Estação Ecológica de Ibicatu, Piracicaba, São Paulo, Brazil; holotype and paratypes deposited at ESALQ-USP.

Diagnosis. Female dorsal shield tapering gradually after level of *r6*, reticulate, with 37 pairs of aciculate setae; *z2* absent; *px3* unpaired, posterolaterad of right *J3*, in both specimens. Unsclerotized lateroventral cuticle with four pairs of aciculate setae.

Peritrematic shield narrow for most of its extension Peritreme short, extending anteriorly to level of *r2*. Presternal plates present, punctuate, transversally striate. Three pairs of small metapodal plates. Eight pairs of aciculate opisthogastric setae. Epistome convex, denticulate. Fixed cheliceral digit with six teeth in addition to distal tooth.

Female (Fig. 3)

Dorsal idiosoma (Fig. 3A): dorsal shield 400 (400-400) long and 184 (183-184) wide (at level of *r6*), tapering gradually after level of *r6*, reticulate, with a punctuate band anteriad of *j1-z1* extending laterally to fused peritrematic shield, with 37 pairs of setae, including two pairs of extra setae [*j1-j6*, *z1*, *z3-z6*, *s1-s6*, *r2-r5* on podonotal region of dorsal shield; *J1-J5*, *Z1-Z5*, *S1-S5* and *px2* (posterolaterad of *J2*) on opisthonotal region of dorsal shield; *z2* absent; *px3* unpaired, posterolaterad of right *J3*, in both specimens]. Setal lengths shown in Table 1. All dorsal setae aciculate; *J4*, *J5* and *Z5* slightly pectinated. Unsclerotised lateroventral cuticle with four pairs of setae (*r6*, *R2*, *R4* and *R6*).

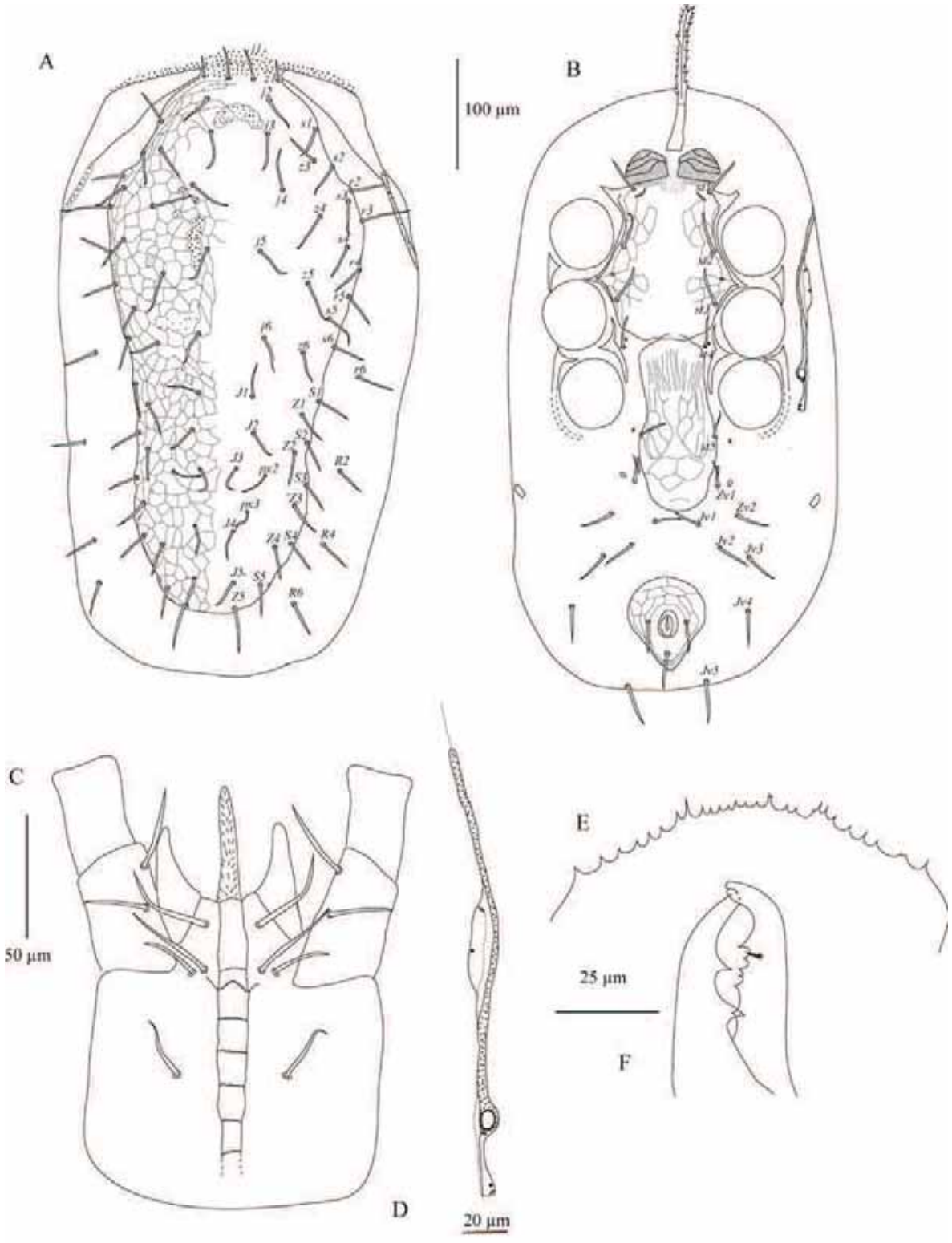

FIGURE 3. *Gaeolaelaps* n. sp.3. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D. Peritreme; E. Epistome; F. Chelicera.

Ventral idiosoma (Fig. 3B): presternal plates present, punctuate, transversally striate; sternal shield reticulate laterally, smooth centrally, with three pairs of setae *st1- st3* and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin concave; distances between *st1* and posterior margin of sternal shield 125 (122-128); *st1-st1* 61 (60-62), *st2-st2* 75 (73-76), *st3-st3* 80 (79-80). Setal lengths shown in Table 2. Setae *st4* on unsclerotized, unstriated cuticle, posterolaterad of *iv3*, also in cuticle. Genital shield not fused with anal shield, flask-shaped, reticulate [length 141 (139-142), maximum widht 61 (61-61)] with a pair of setae (*st5*); distance *st5-st5* 23 (22-24). Genital lyrifissure (*iv5*) on unsclerotized cuticle, posterolaterad of *st*5. Three pairs of small metapodal plates. Anterior section of endopodal shield fused with sternal shield, section behind sternal shield represented by a boomerang-shaped fragment between coxae III and IV. Anal shield pear-shapped (wider section anterior), reticulate [71 (67-74) long and 61 (61-62) wide], with a pair of marginal pores about in transverse line with para-anal setae. Exopodal plates reduced to triangular sclerites, between coxae II and III and a narrow sclerite around coxa IV. With eight pairs of aciculate opisthogastric setae: *Jv1-Jv5*, *Zv1-Zv3*.

Gnathosoma: epistome convex, denticulate (Fig. 3E). Deutosternum with a smooth, transverse distal line follow by 6 transverse lines of 8-15 denticles each. Corniculi parallel to each other, 43 (40-46) long and 13 wide basally, almost reaching middle region of palp femur. Internal malae fused to each other, barbed. Hypostomal setae *h2* laterad and slightly posteriad of *h3*. Palp length 156 (150-162); apotele 2-tined; inner palp trochanter seta about 1.3 times as long as outer seta (Fig. 3C). Cheliceral digits of similar lengths (Fig. 3F); movable digit 62 (62-62) with two teeth in addition to distal tooth; fixed digit 65 (64-66) with a subterminal paraxial notch, setiform *pilus dentilis* and six teeth in addition to distal tooth. Dorsal cheliceral seta not clearly distinguishable, apparently small. Dorsal lyrifissures and antiaxial lyrifissure not distinguishable because of position of chelicerae.

Peritreme (Fig. 3D): peritrematic shield narrow for most of its extension; slightly enlarging in region between coxae II and III, where a pore and a lyrifissure are located, and anteriorly to distal end of peritreme, where enlarges into a subtriangular

structure to fused with dorsal shield near *z1*; with a pair of lyrifissures and a pore behind each stigma. Peritreme short, extending anteriorly to level of *r2*.

Legs: lengths, not including ambulacra – I, 473 (462-483); II, 341 (326-357); III, 321 (317-325); IV, 471 (463-479); chaetotaxy: I - coxa 0 - 0/2, 0/0 - 0, trochanter 1 - 0/1, 1/2 - 1, femur 2 - 2/1, 3/3 - 2, genu 2 - 3/2, 3/1 - 2, tibia 2 - 3/2, 3/1 - 2; II - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 0/1, 1/1 - 1, femur 2 - 3/1, 2/2 - 1, genu 2 - 3/1, 2/1 - 2, tibia 2 - 2/1, 2/1 - 2; III - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 1/1, 0/1 - 1, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 2/1 - 1, tibia 2 - 1/1, 2/1 - 1; IV - coxa 0 - 0/1, 0/0 - 0, trochanter 2 - 1/1, 0/1 - 0, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 3/0 - 1, tibia 2 - 1/1, 3/1 - 2; tarsi II-IV: 18 setae each. Pre-tarsi with short claws, central lobe of pulvillus rounded. No macrosetae; most setae aciculate; some ventral setae of genu and tibia, and some disto-dorsal and disto-ventral setae of tarsus of legs II-IV stout.

Male: unknown.

***Ololaelaps* n. sp.**

Material examined: Holotype female and one paratype female collected in 18/IV/2000, by A. R. Oliveira, from soil under *Bactris setosa* Mart. (Arecaceae), at Núcleo Agrícola Vale Ribeira, IAC, Pariquera-Açu, São Paulo, Brazil; holotype and paratypes deposited at ESALQ-USP.

Diagnosis. Female dorsal shield ample, covering the whole dorsum of idiosoma and extending to ventral side, so that *z1* and unsclerotized cuticle along lateral margins are visible in ventral view, transversally striate, with scanty diagonal connections between transverse strial, with 37 pairs of aciculate setae; *S5* absent. Unsclerotized cuticle along margins of dorsal shield with five pairs of aciculate setae. Peritrematic shield large, peritreme extending anteriorly to level of *z1*. Pre-sternal area slighty sclerotized; sternal shield smooth. Setae *st4* and the associated lyrifissure (*iv3*) on a small and ovoid metasternal plate. Genital shield fused with anal shield with six pairs

of pre-anal setae. One pair of rounded metapodal plate. Ten pair of setiform opisthogastric setae. Epistome slightly convex, denticulate. Fixed cheliceral digit with four teeth in addition to distal tooth.

Female (Fig. 4)

Dorsal idiosoma (Fig. 4A): dorsal shield ample, covering the whole dorsum of idiosoma and extending to ventral side, so that *z1* and unsclerotized cuticle along lateral margins are visible in ventral view; 769 (699-838) long and 574 (540-607) wide (at level of *s6*), transversally striate over most of the shield, with scanty diagonal connections between transverse striae; smooth central area of podonotal region; with 37 pairs of setae [*j1-j6*, *z1-z6*, *s1-s6*, *r2-r6* on podonotal region of dorsal shield; *J1-J5*, *Z1-Z5*, *S1-S4* on opisthonotal region of dorsal shield; *S5* missing]. Setal lengths shown in Table 1. Unsclerotized cuticle along margins of dorsal shield with five pairs of aciculate setae (*R1-R5*). Setae aciculate, with sparse serration visible under interference contrast microscopy (difficult to see under phase contrast microscopy), except for smaller *R* setae visible in ventral view.

Ventral idiosoma (Fig. 4B): pre-sternal area lightly sclerotized; sternal shield smooth, with three pairs of setae (*st1-st3*) and two pairs of lyrifissures (*iv1*, *iv2*); posterior margin truncate; distances between s*t1* and the posterior margin of sternal shield 135 (134-135), *st1-st1* 75 (74-77), *st2-st2* 110 (108-111), *st3-st3* 95 (94-96). Setal length shown in Table 2. Setae *st4* and the associated lyrifissure (*iv3*) on a small and ovoid metasternal plate. Genital shield fused with anal shield; reticulate [length 421 (418-423), widht 307 (304-311)], with six pairs of pre-anal setae (*st5*, *Jv1-Jv3*, *Zv1* and *Zv2*). Genital lyrifissure (*iv5*) on the edge of the genital shield, posterolaterad of *st5*. One pair of rounded metapodal plate. Anterior section of endopodal shield fused with sternal shield and fused with section behind sternal

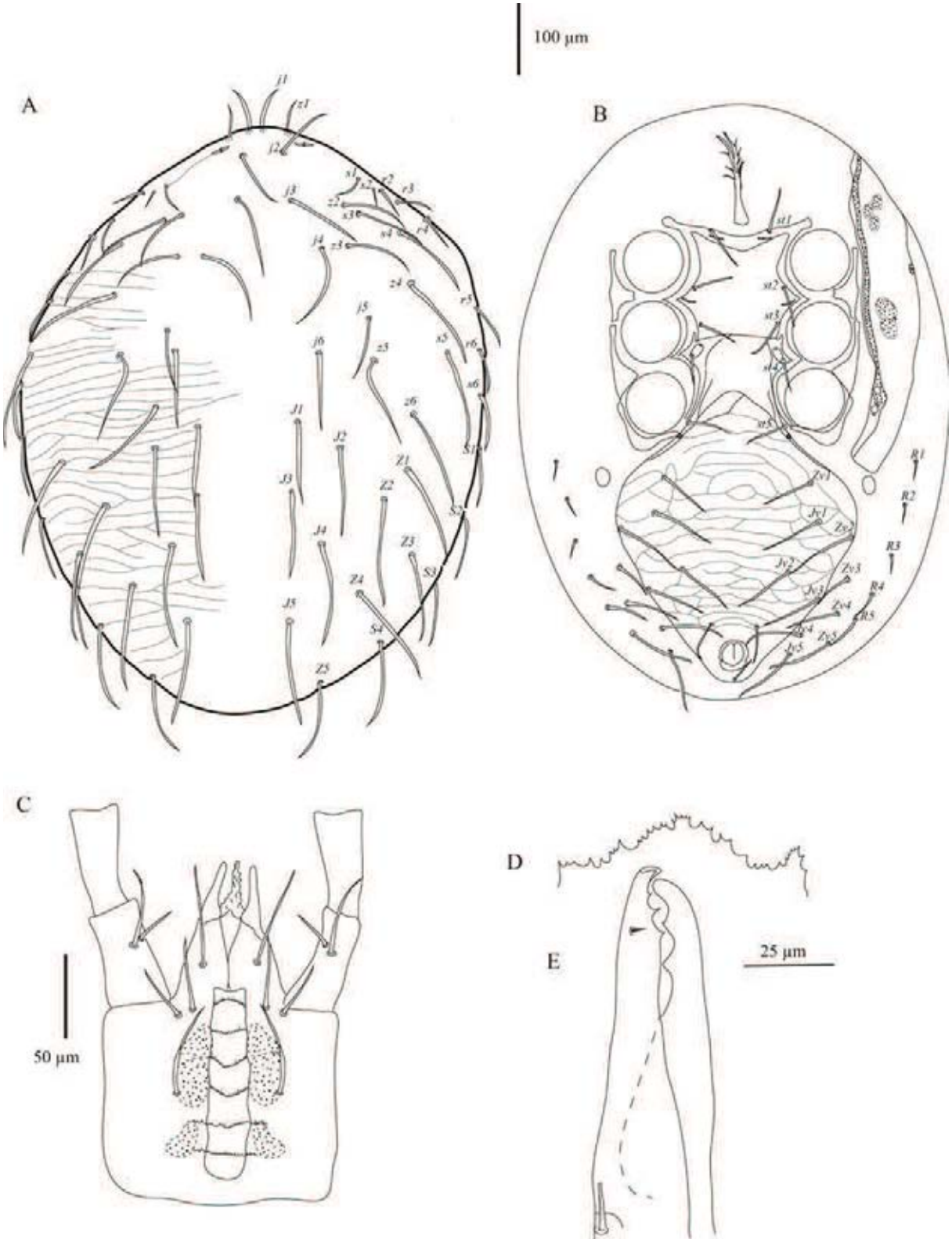

FIGURE 4. *Ololaelaps* n. sp.1. Female. A. Dorsal idiosoma; B. Ventral idiosoma; C. Ventral gnathosoma; D. Epistome; E. Chelicera.

Table 1. Lenght of dorsal idiosomal setae of the new species; mean (minimum-maximum).

Setae	*Gaeolaelaps* n.sp.1 (n= 3)	*Gaeolaelaps* n.sp.2 (n= 2)	*Gaeolaelaps* n.sp.3 (n= 2)	*Ololaelaps* n.sp. (n= 2)
j1	26 (24-28)	30 (28-32)	24 (24-24)	43 (43-43)
j2	31 (30-32)	5 (5-5)	23 (22-23)	73 (73-73)
j3	30 (26-32)	7 (6-9)	28 (28-28)	114 (114-114)
j4	26 (24-27)	7 (6-8)	28 (28-28)	115 (115-115)
j5	23 (21-25)	6 (5-6)	27 (27-28)	89 (90-91)
j6	19 (15-20)	5 (5-5)	26 (25-27)	99 (98-99)
z1	26 (24-27)	7 (7-7)	16 (16-16)	37 (40-42)
z2	28 (24-31)	-	-	57 (54-55)
z3	29 (28-30)	6 (6-5)	28 (28-28)	90 (89-91)
z4	29 (27-31)	7 (6-7)	29 (29-29)	123 (123-123)
z5	20 (20-22)	6 (5-6)	27 (26-28)	120 (124-127)
z6	21 (19-24)	5 (5-5)	22 (22-23)	120 (119-120)
s1	26 (25-27)	6 (5-7)	25 (24-26)	46 (46-47)
s2	26 (24-28)	6 (6-7)	23 (23-24)	28 (29-31)
s3	29 (27-32)	6 (5-6)	26 (25-28)	97 (91-94)
s4	26 (25-26)	7 (5-8)	28 (27-28)	115 (111-113)
s5	24 (23-24)	6 (6-7)	26 (25-27)	131 (131-131)
s6	22 (21-23)	7 (6-8)	24 (24-24)	62 (97-131)
r2	24 (22-26)	6 (5-6)	23 (23-24)	47 (48-50)
r3	24 (24-24)	6 (5-7)	34 (33-35)	56 (52-54)
r4	23 (21-25)	5 (4-6)	24 (22-25)	64 (59-62)
r5	25 (23-26)	6 (6-7)	26 (25-27)	60 (54-57)
r6	18 (16-20)	5 (5-6)	26 (25-27)	15 (20-25)
J1	17 (16-17)	6 (6-7)	22 (20-24)	109 (102-106)
J2	17 (14-18)	6 (6-6)	19 (19-19)	117 (110-113)
J3	17 (16-17)	5 (5-5)	19 (19-19)	115 (112-114)
J4	22 (21-23)	5 (5-5)	21 (21-21)	141 (133-137)
J5	21 (19-22)	5 (4-5)	20 (20-21)	141 (133-137)
px2	16 (16-17)	5 (4-5)	18 (18-18)	-
px3	18 (17-19)	5 (4-5)	18 (17-19)	-
Z1	19 (18-20)	6 (5-6)	23 (23-24)	131 (130-132))
Z2	18 (17-19)	5 (5-6)	22 (21-23)	132 (123-127)
Z3	18 (17-19)	5 (5-6)	22 (22-22)	143 (140-142)
Z4	19 (16-20)	5 (5-5)	21 (20-22)	149 (142-145)
Z5	34 (34-35)	21 (20-23)	33 (32-33)	123 (116-119)
S1	23 (20-25)	5 (5-5)	24 (23-24)	77 (67-72)
S2	20 (19-21)	5 (5-6)	20 (19-22)	80 (67-74)
S3	19 (18-20)	5 (5-5)	22 (22-23)	89 (87-90)

S4	18 (18-19)	5 (5-6)	22 (21-22)	134 (130-91)
S5	19 (18-20)	7 (7-7)	24 (24-25)	-
R1	15 (13-18)	5 (5-6)	-	20 (15-25)
R2	-	-	23 (23-23)	22 (21-23)
R3	-	-	-	21 (18-24)
R4	16 (16-17)	5 (5-6)	22 (22-22)	35 (35-36)
R5	-	-	-	49 (47-52)
R6	-	-	25 (25-25)	-
UR	15 (15-16)	-	-	-

(-) seta absent

Table 2. Lenght of ventral idiosomal and ventral gnathosomal setae of the new species; mean (minimum-maximum).

Setae	*Gaeolaelaps* n.sp.1 (n= 3)	*Gaeolaelaps* n.sp.2 (n= 2)	*Gaeolaelaps* n.sp.3 (n= 2)	*Ololaelaps* n.sp. (n= 2)
h1	26 (21-30)	31 (31-31)	31 (29-33)	56 (54-58)
h2	16 (15-17)	14 (14-14)	20 (20-20)	30 (30-31)
h3	37 (34-41)	13 (12-13)	27 (27-27)	40 (36-44)
pc	27 (27-28)	24 (23-25)	20 (19-21)	46 (45-47)
st1	29 (28-31)	34 (33-36)	28 (27-29)	59 (58-60)
st2	37 (36-37)	30 (29-30)	31 (30-32)	50 (49-52)
st3	34 (34-34)	25 (22-27)	28 (27-28)	50 (48-51)
st4	35 (35-35)	20 (20-20)	25 (25-26)	51 (51-52)
st5	30 (29-32)	22 (22-22)	23 (22-24)	52 (52-53)
Jv1	29 (28-31)	19 (18-21)	20 (19-21)	87 (85-89)
Jv2	28 (27-29)	18 (18-18)	24 (24-24)	74 (73-76)
Jv3	26 (25-27)	17 (16-18)	26 (26-27)	79 (79-79)
Jv4	22 (22-23)	9 (8-9)	27 (27-28)	80 (79-81)
Jv5	34 (31-36)	18 (18-18)	31 (31-31)	88 (86-91)
Zv1	23 (21-24)	17 (16-17)	20 (20-20)	69 (66-72)
Zv2	26 (24-28)	19 (18-20)	25 (24-26)	87 (86-87)
Zv3	16 (14-17)	7 (7-8)	-	58 (57-59)
Zv4	18 (16-19)	10 (10-10)	-	65 (64-65)
Zv5	19 (19-19)	-	-	85 (84-85)
paranal	32 (28-35)	22 (21-22)	21 (21-21)	54 (51-56)
post-anal	17 (16-18)	18 (17-19)	26 (26-26)	38 (38-38)

(-) seta absent

shield, boomerang-shaped, between coxae III and IV. Exopodal shield distinct along coxae II to IV, interrupted near middles of coxae III and IV. With ten pair of setiform opisthogastric setae (*Jv1-Jv5*, *Zv1-Zv5*).

Gnathosoma: epistome slightly convex, denticulate (Fig. 4D). Deutosternum with a smooth, transverse distal line follow by 6 transverse lines of 19-14 denticles each. Corniculi parallel to each other, 62 (58-67) long, almost reaching the middle region of the palp femur. Internal malae fused to each other, barbed. Length of setae on venter of gnathosoma shown in Table 2. Hypostomal setae *h2* laterad and slightly posteriad of *h3*. Palp length 156 (150-162), apotele 2-tined. Cheliceral digits of similar lengths (Fig. 4E); movable digit 84 (79-88) with two teeth in addition to distal tooth; fixed digit 81 (81-82), with a subterminal paraxial notch, setiform *pilus dentilis* and four teeth in addition to distal tooth. Stout and tapering dorsal cheliceral seta and dorsal and antiaxial lyrifissures distinguishable.

Peritreme: peritrematic shield large, with a pair of lyrifissures and a pore behind each stigma; with a pore and a lyrifissure dorsad of peritreme and between coxae II and III. Peritreme extending anteriorly to level of *z1*.

Legs: lengths, not including ambulacra – I, 819 (794-844); II, 624 (597-652); III, 589 (574-604); IV, 781 (766-797); chaetotaxy: I - coxa 0 - 0/2, 0/0 - 0, trochanter 1 - 0/1, 1/2 - 1, femur 2 - 2/1, 3/3 - 2, genu 2 - 3/2, 3/1 - 2, tibia 2 - 3/2, 3/1 - 2; II - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 0/1, 1/1 - 1, femur 2 - 3/1, 2/2 - 1, genu 2 - 3/1, 2/1 - 2, tibia 2 - 2/1, 2/1 - 2; III - coxa 0 - 0/1, 0/1 - 0, trochanter 1 - 1/1, 0/1 - 1, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 2/1 - 1, tibia 2 - 1/1, 2/1 - 1; IV - coxa 0 - 0/1, 0/0 - 0, trochanter 2 - 1/1, 0/1 - 0, femur 1 - 2/1, 1/0 - 1, genu 2 - 2/1, 3/0 - 1, tibia 2 - 1/1, 3/1 - 2; tarsi II-IV: 18 setae each. Pre-tarsi with short claws, central lobe of pulvillus rounded. Setae uniform in shape; no macrosetae.

Male: unknow.

Pictorial key for South American free-living and arthropod associated genera of Laelapidae

Details about the morphology of a generalized laelapid mite are shown in Figure 5, indicating the structures mentioned in the subsequent key.

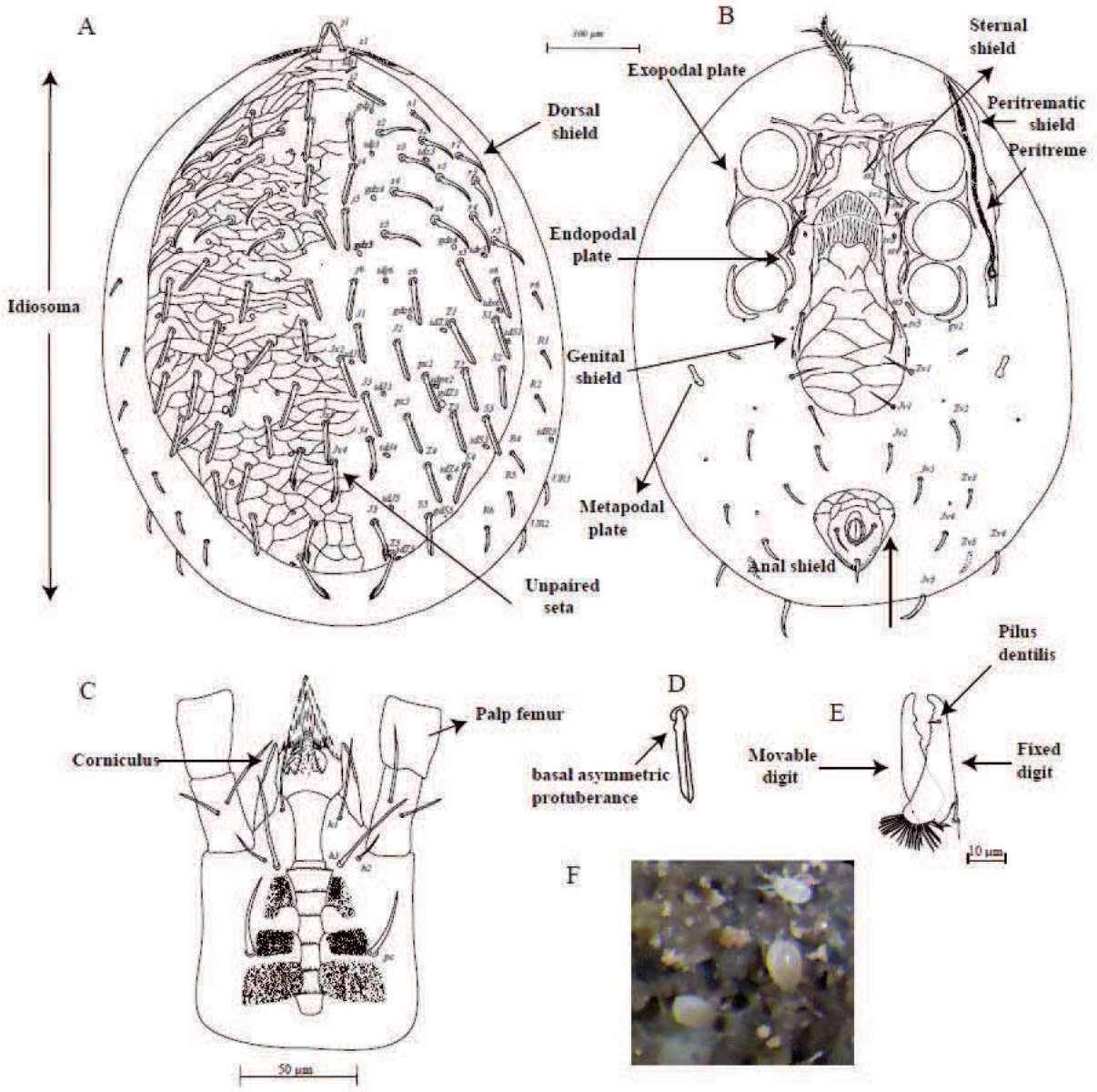

Figure 5. Generalized Laelapidae. A. Dorso. B. Venter. C. Gnathosoma. D. Dorsal seta. E. Chelicerae. F. Adults of Laelapidae.

1. Leg segments hypertrichous (more than 18 setae); stingless bee associate... *Suracarus* Flechtmann

Leg segments not hypertrichous …….…….. 2

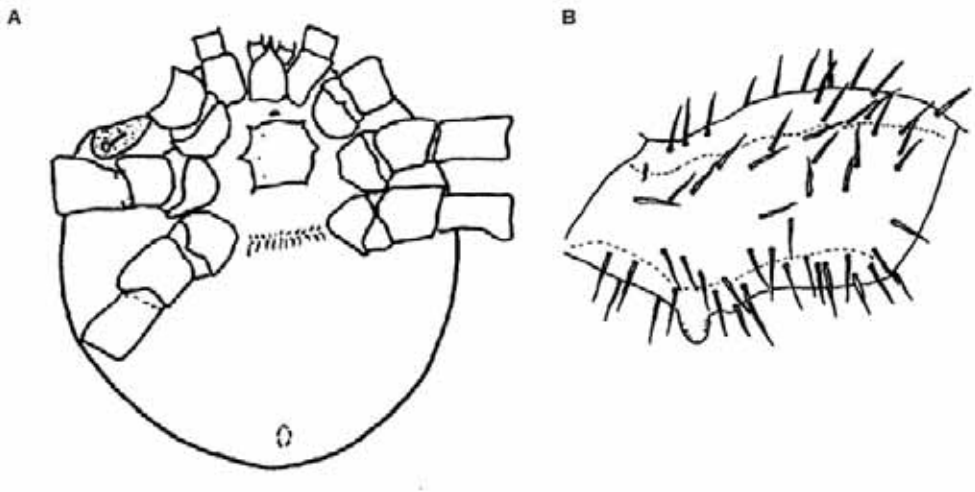

Figure 6. *Suracarus*. A. Ventral view. B. Femur II (modified of Flechtmann, 2005).

2. Genital, ventral and anal shields fused ……..... 3

Genital shield separated from ventrianal shield ...…….. 4

3. Seta *st4* present ……..……..... *Ololaelaps* Berlese

Seta *st4* absent ……..…….. *Oloopticus* Karg

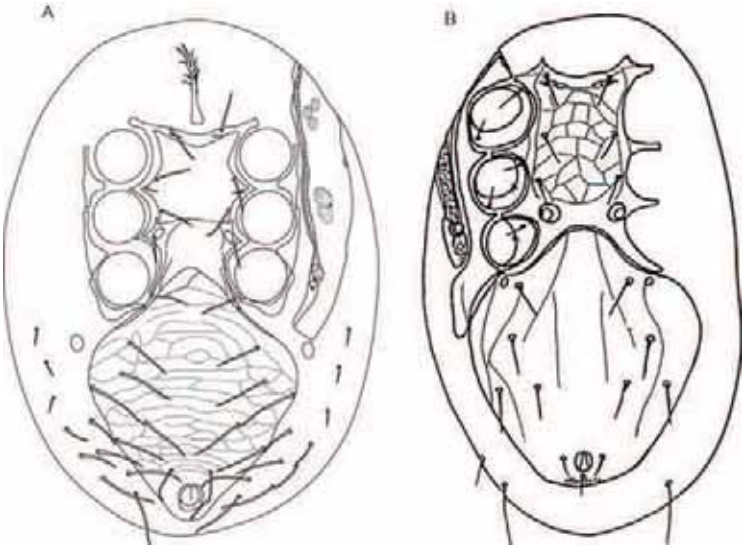

Figure 7. A. *Ololaelaps*. B. *Oloopticus* (modified of Karg, 2003a).

4. *Pilus dentilis* inflated ……..……..... *Androlaelaps* Berlese

Pilus dentilis setiform ……..…….. 5

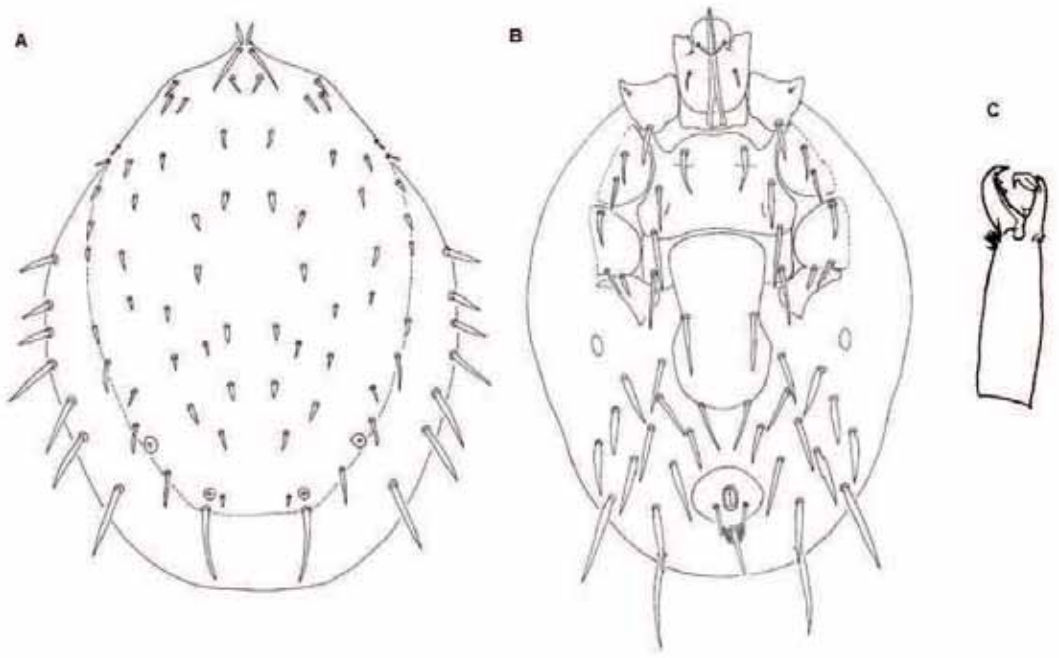

Figure 8. *Androlaelaps*. A. Dorsal view. B. Ventral view. C. Chelicerae (modified of Lareschi & Gettinger, 2009).

5. Anal shield crescent-shaped; gnathosoma located ventrally; stingless bee associated ……... *Bisternalis* Hunter

Anal shield triangular; gnathosoma not ventrally located ……..……..…….. 6

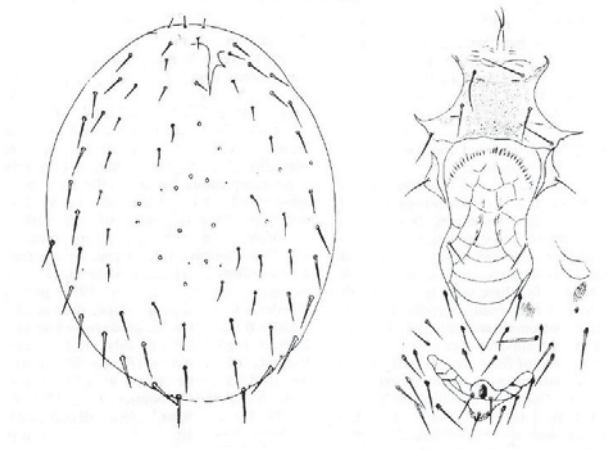

Figure 9. *Bisternalis*. A. Dorsal view. B. Ventral view (modified of Baker et al., 1984)

6. Genital shield expanded behind coxa IV, abutting the anal shield; with more than one pair of setae ……..... 7
   Genital shield not distinctly expanded behind coxa IV, usually flask-shaped (if expanded, not abutting anal shield)……. 9
7. Genital shield with 4-5 pairs of setae, including two to three pairs not on the edge ……..... *Pseudoparasitus* Oudemans
   Genital shield with 1-4 pairs of setae, all of which on the edge of genital shield ……... 9

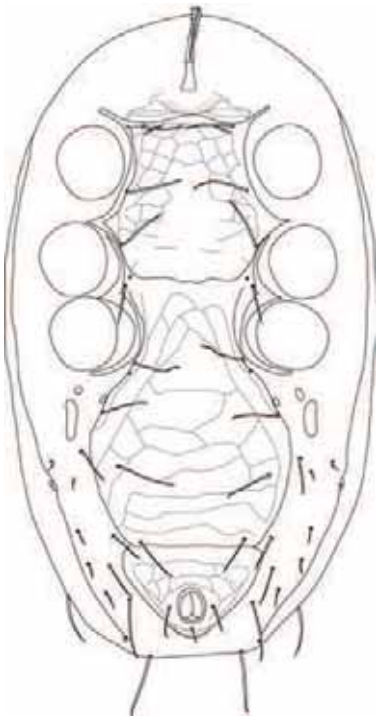

Figure 10. *Pseudoparasitus*. Ventral view.

5. Palp-tarsal claw two-tined; with two distinct V-shaped lines on genital shield; tectum smooth…… ……. *Laelaspis* Berlese
   Palp-tarsal claw three-tined; without distinct V-shaped ornamentation on genital shield; tectum denticulate …. *Gymnolaelaps* Berlese

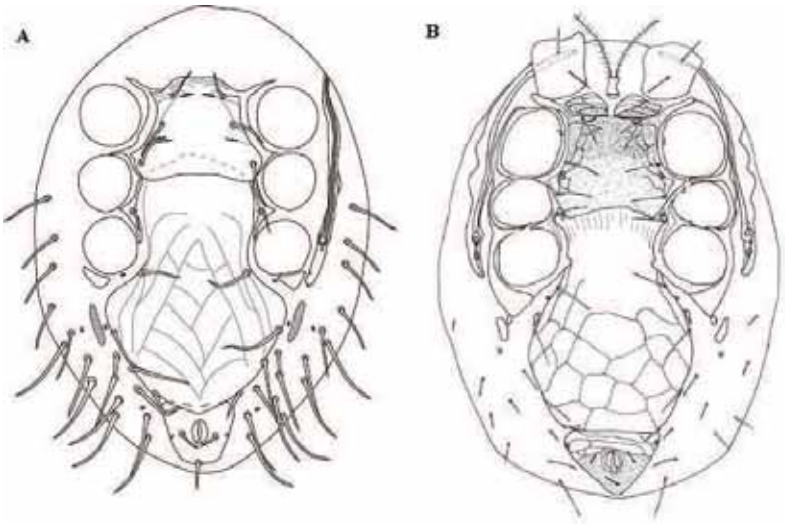

Figure 11. A. *Laelaspis* **B.** *Gymnolaelaps* (modified of Joharchi et al., 2011). Ventral view

9. Genu IV with 8 setae; peritrematic shield usually extending posteriorly beyond coxa IV …….. *Alloparasitus* Berlese
   Genu IV with 9 setae; peritrematic shield not extending posteriorly beyond coxa IV……..…….. 10

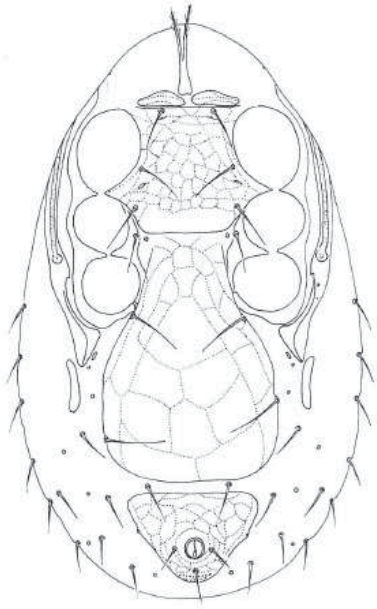

Figure 12. *Alloparasitus*. Ventral view (modified of Evans & Till, 1966).

10. Dorsal shield setae scimitar-shaped, spatulate, spatulate-mucronate, cuneiform, leaf-shaped or setiform (in this case bearing a basal asymmetric protuberance)……. 11

    Dorsal shield setae setiform, without basal asymmetric protuberance …….. 12

11. Unpaired setae between J series usually present, if absent with two pair of *px* setae between J and Z series, corniculi not reaching beyond the middle of the palp-femur ……. *Cosmolaelaps* Berlese

    Without unpaired setae between *J* series; hypertrofied chelicerae and corniculi, the latter extending to distal end of palp femur ..…….. *Stratiolaelaps* Berlese

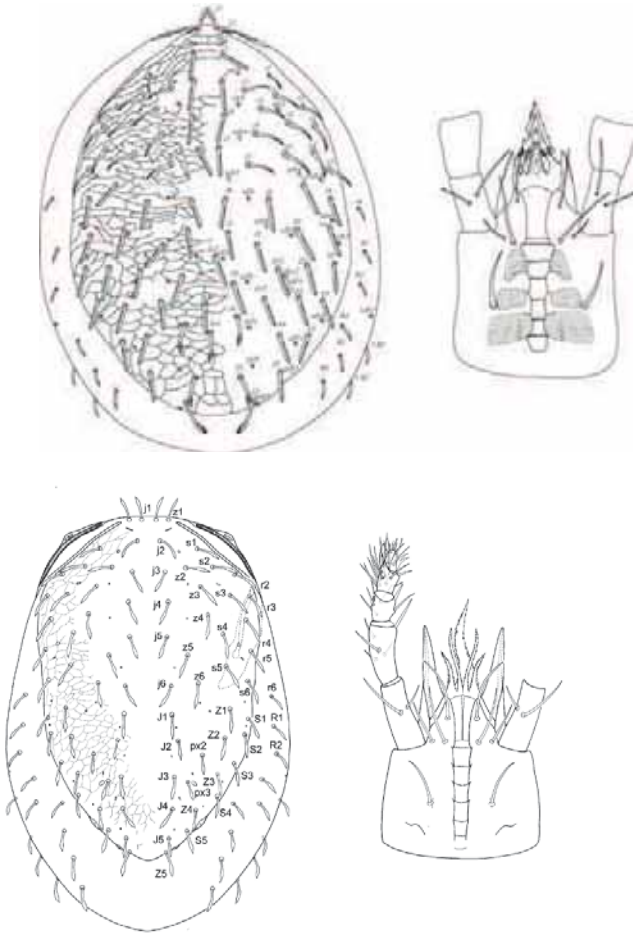

Figure 13. A. *Cosmolaelaps* (modified of Moreira et al., 2014). **B.** *Stratiolaelaps* (modified of Walter & Campbell, 2003).

12. Long setae of dorsal shield corkscrew-shaped in slide-mounted specimens; insects associates ..……. 13
Dorsal shield setae not corkscrew-shaped ……. 15
13. No elongate setae on legs; genu IV with 10 setae; cockroach associates ……..…… *Blaberolaelaps* Costa
Elongate and wavy setae on legs; genu IV with 9 setae; scarabaeoid beetle associates …….……. 14

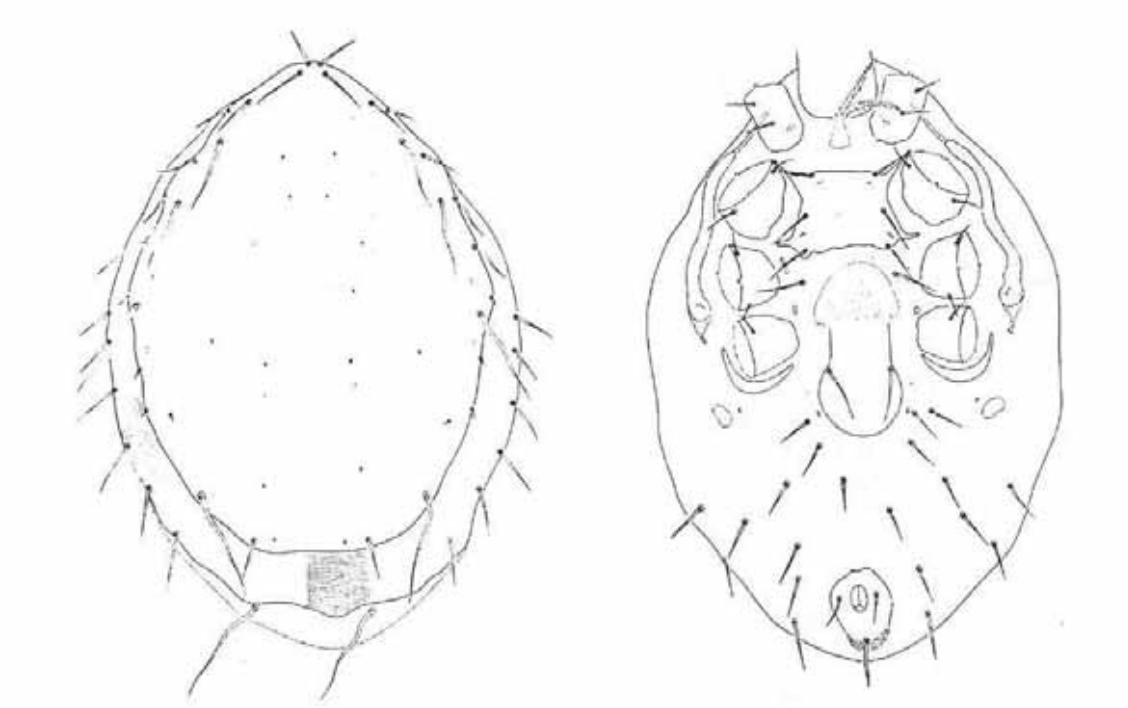

Figure 14. *Blaberolaelaps* (modified of Costa, 1980).

14. Dorsal shield with lateral incision near *S1*; and with at most 28 pairs of setae; *px* setae absent; associated with scarabaeid genera *Anoxia* or *Polyphylla* …… *Coleolaelaps* Berlese
Dorsal shield without lateral incision and with at least 36 pairs of setae; *px* setae (between *J* and *S* series) present; wide variety of scarabaeoid beetle …….. *Hypoaspis* Canestrini

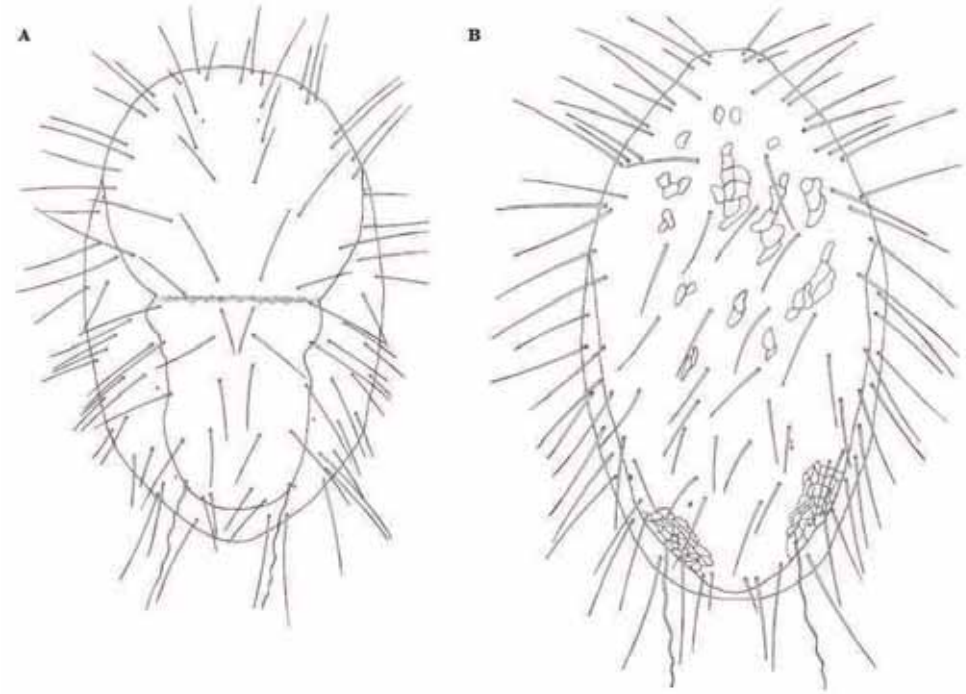

Figure 15. A. *Coleolaelaps*. **B.** *Hypoaspis*. (modified of Joharchi & Halliday, 2011).

15. Peritreme short (extending to region between coxae I and II); female arthrodial process setiform; stingless bee associates ……..……	*Hunteria* Delfinado-Baker, Baker & Flechtmann
Peritreme elongate or short; female cheliceral arthrodial process brush-shaped ……...……..…..	16

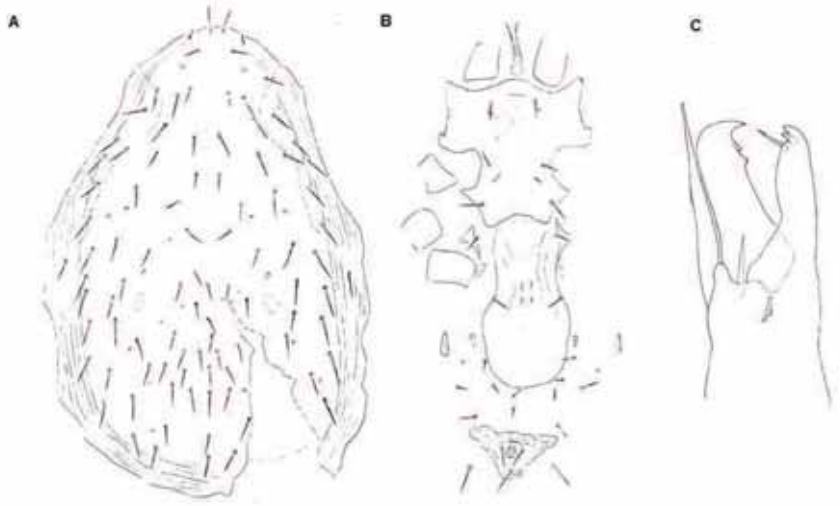

Figure 16. *Hunteria* A. Dorsal view. B. Ventral view. C. Chelicerae (modified of Delfinado-Baker et al., 1984)

16. Tectum denticulate; lateral unsclerotized cuticle never hypertrichous ……..…… *Gaeolaelaps* Evans & Till
    Tectum smooth; lateral unsclerotized cuticle hypertrichous or not ……..……..…….. 17

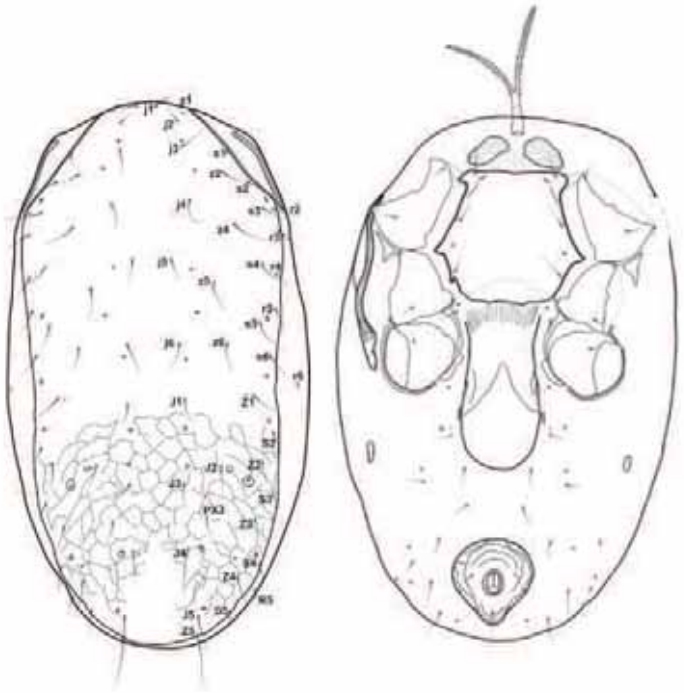

Figure 17. *Gaeolaelaps*. Dorsal and ventral view (modified of Kavianpour & Nemati, 2013)

17. Cheliceral digits short (about 20 µm), stumpy and edentate or with few weak teeth; peritreme narrow; ant associates…...……..…….. *Holostaspis* Kolenati
    Cheliceral digits not short (longer than 20 µm), dentate; peritreme usually broad; ant and bee associates ……..……..…….. *Pneumolaelaps* Berlese

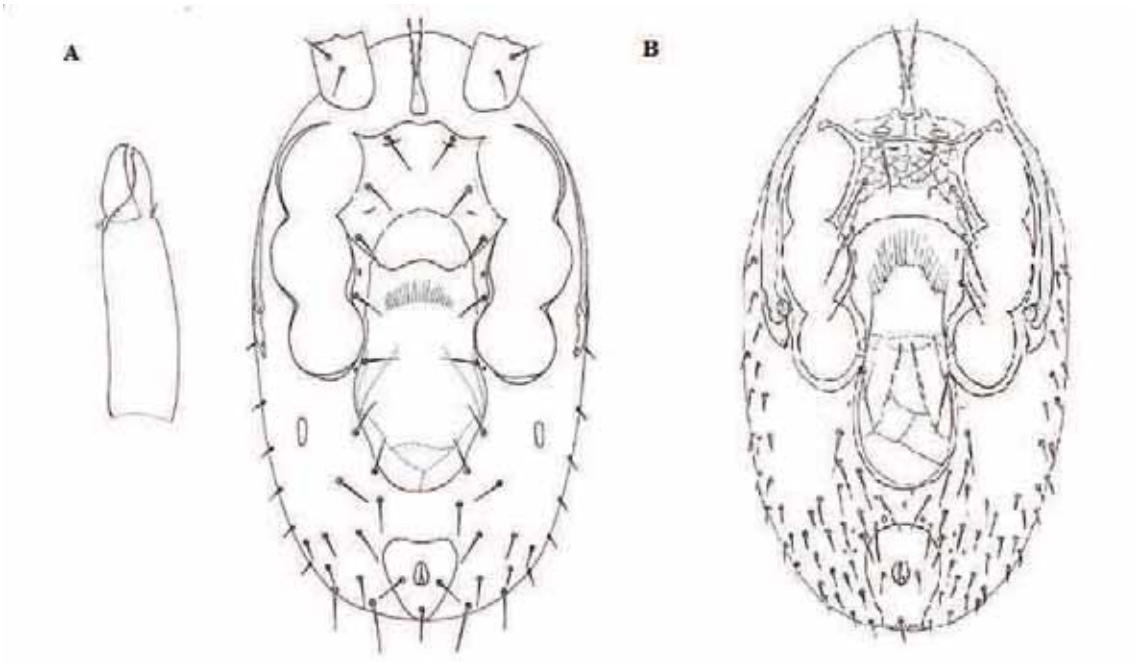

Figure 18. A. *Holostaspis*. B. *Pneumolaelaps* (modified of Evans & Till, 1966)

Discussion

The discovery and descriptions of the new species considered in this study represents the first record of *Gaeolaelaps* and *Ololaelaps* known from Brazil.

Finding new laelapid species in Brazil does not seem to be a difficult task, suggesting that the laelapid fauna is highly diverse and very poorly known. Considering that in other countries in South America mites of this group have been inadequately studied, it should be expected that the richness of species of this group should be very high in that subcontinent.

Not only many other new species are expected to be found in addition to the three species here described, but also new taxa of higher order. For this reason, the key provided in this publication should be considered only the first tool to be used for the identification of genera of specimens collected in that region. It seems most

possible that other genera will be determined in faunistic studies. New discoveries in this sense should be taken into account to update the key to genera provided.

The potential of laelapids for the control edaphic pests have already been explored in some studies conducted in Brazil (Castilho et al., 2009, Freire et al., 2007), and these studies have led to the practical use of those organisms. It is expected that deeper taxonomic knowledge for the South American laelapid groups will facilitate the research and development works of professionals of other areas, hopefully leading to more intense use of these mites as biological control agents.

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CHAPTER 4 - CATALOGUE OF FREE-LIVING AND ARTHROPOD ASSOCIATED LAELAPIDAE BERLESE (ACARI: MESOSTIGMATA)

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Abstract

The cosmopolitan family Laelapidae comprises a diverse group of mites, ranging from free-living to arthropod, mammal and bird associated mites. Molecular data have been shown that in the present concept, Laelapidae is a paraphyletic family. The aim of this work was to present a list of free-living and arthropod associated species of laelapid mites, mentioning for each one corresponding taxonomic information and references. In total, 833 species belonging to 43 genera are listed in this work.

Keywords: soil mites, predatory mites, Hypoaspidinae

Introduction

Members of the cosmopolitan dermanyssoid mite family Laelapidae Berlese, 1892 occupy a diversity of habitats and are either free-living or found in association with arthropods, mammals and birds. The laelapid mites are characterized by having the genital shield rounded posteriorly, separated or occasionally abutting the anal shield; dorsal shield entire; tibia I usually with two ventral setae (including *av2*), genu IV usually with two posterolateral setae; internal malae usually well developed, with fimbriate lateral margins, and equal or to longer tha corniculi (Lindquist et al., 2009).

The free-living species, considered by different authors as part of Hypoaspidinae (e.g. Radovsky, 1969; Casanueva, 1993), have received considerable attention as biological control agents of edaphic pests. Some of these, namely *Gaeolaelps aculeifer* (Canestrini), *Stratiolaelaps miles* (Berlese) and *Stratiolaelaps scimitus* (Womersley), have been commercially produced for this propose.

Some Laelapidae species are considered of medical and veterinary importance. *Laelaps echidninus* Berlese is capable of transmitting disease agents,

such *Rickettsia typhi*, the causal agent of murine typhus in wild rodents (Mullen & OConnor, 2002). Its potential as vector of humans pathogens remains uncertain. *Haemogamasus pontiger* (Berlese) has been suspected of biting humans and causing dermatitis (Baker et al., 1956; Halliday, 2011).

The family includes about 1300 species classified in slightly over 90 genera (Beaulieu et al, 2011). Dowling & OConnor (2010) have recently reported evidences that Laelapidae is not a monophyletic family, as expected, given the still uncertain taxonomic concept of the family and its subdivisions. The aim of this work was to present a list of the free-living and arthropod associate laelapid species, with related taxonomic information and references, intending to facilitate future taxonomic and systematic research.

Organization of the catalogue

The catalogue is organized in three sections:

1) Alphabetic list by genus and species (see comments below);
2) Species that in the past were assigned to genera considered in this catalogue, but now placed in genera of other families;
3) *Incertae sedis*, species for which the available information does not allow a precise classification or when the generic placement is improper, in this case, a note with the probable generic placement is added

Comments on point 1.

The classification of the family Laelapidae has been changed over the years, since its description by Berlese, 1892. A detailed historical review was presented by Casanueva, 1993. As noted in that study there have been many attempts to develop a subfamilial classification for our target group, free-living or arthropod associated Dermanyssoidea.

As outlined below, there has been very little agreement.

Vitzthum (1941) recognized three subfamily among the taxa of interested: Hypoaspidinae Vithzthum, Laelapinae Berlese and Iphiopsidinae Kramer. Subsequent authors often recognized the first two subfamilies but the composition varied. For example, *Androlaelaps* was placed in Hypoaspidinae by Vitzthum (1941) and Casanueva (1993) but in Laelapinae by Karg (1965) and Radovsky (1967), while *Varroa* was placed in Hypoaspidinae by Vitzthum (1941), Varroidae by Delfinado & Baker (1974) or Melitthiphinae by Casanueva (1993). Based on the most comprehensive analysis of relationship in Laelapidae, Casanueva proposed two subfamilies and five tribes among the free-living and arthropod associated laelapid groups. Even so, this classification is not universally accepted (e.g Krantz & Walter, 2009). Finally, recent analyses of molecular data do not provide support for any existence subfamilial classification (Dowling & OConnor, 2010). Given the uncertainty on subfamilial classification, this catalogue will be arranged by genus name rather than subfamily. The genus *Androlaelaps* Berlese, usually mammal associated, was included in the catalogue because of the considerable number of free-living species mentioned in the literature.

Material and Methods

In developing this catalogue, we considered publications up to March 2014 containing descriptions, redescriptions and occurrence records of free-living and arthropod associated Laelapidae mites.

For genera, the following information is provided:

- Consensus name, author and date of description;
- Original designation, author, year and page; further references of re-descriptions of the genus;
- Synonym followed by its author, year and page followed by the reference in which the synonymy was established (in square brackets) and further references providing descriptive information about the synonymy;
- Etymology of the genus, when mentioned in the original description;
- The type species;

- Notes including comments on subfamilial assignment(s) with author and year and, when necessary, to explain any taxonomic or nomenclatural problems.

For each species, the following information is provided:

- Consensus name, author and year of the description;
- Original designation followed by the author, year, and page of the description; references in subsequent literature of the species that provided information about morphology of the species, occurrence records and combinations or variations of the name;
- Synonym followed by its author, year and page, followed by the reference in which the synonymy was established (in square brackets) and further references providing descriptive information about the synonymy;
- Type depository, the institution where the holotype is deposited, followed by the accession number if listed;
- Type locality, from the more specific to the more general geographic information, and habitat from which the species were collected, using the original description in the paper, followed in square brackets by the new name of the locality and/or host if applicable. For animal hosts, we added the names of the kingdom, order and family; for plants and fungi we list the names of the order and family. If available, additional information about locality and substrate are also listed in square brackets.
- Notes are added when necessary to explain any taxonomic or nomenclatural problems.

Any comment in square brackets is made by the current authors.

Catalogue of world species of free-living and arthropod associated Laelapidae

LAELAPIDAE Berlese

Laelaptidae Berlese, 1892: 30.

Gamasidae.— Banks, 1904: 11 (in part).

Laelaptidae.— Berlese, 1913b: 10; Vitzthum, 1941: 761 (in part); Hughes, 1948: 129; Baker & Warton, 1952: 91; Willmann, 1952b: 393; Bregetova, 1956: 70 (in part), Evans, 1957: 216; Karg, 1965: 270; Bregetova, 1977: 483.

Parasitidae.— Banks, 1915a: 71 (in part).

Parasitinae.— Banks, 1915a: 76 (in part).

Neoparasitidae.— Evans, 1957: 216 (in part).

Eviphididae.— Evans, 1957: 216 (in part).

Dermanyssidae.— Evans & Till, 1966: 109 (in part).

Laelapidae.— Krantz, 1978: 132; Evans & Till, 1979: 199; Casanueva, 1993: 40; Zaher, 1986: 176.

***Alloparasitus* Berlese, 1920.**

Pseudoparasitus (*Alloparasitus*) Berlese, 1920: 169.

Halbertia Hull in Turk & Turk, 1952: 483 [Junior synonymy of *Alloparasitus* by Evans, 1957: 221; of *Hypoaspis* (*Alloparasitus*) by Evans & Till, 1966: 159; of *Alloparasitus* by Bregetova, 1977: 549].

Hypoaspis.— Hull, 1918: 67 (in part); Hughes, 1976: 292 (in part); Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

Androlaelaps.— Vitzthum, 1929: 22.

Alloparasitus.— Evans, 1957: 221; Bregetova, 1977: 549; Casanueva, 1993: 40; Karg & Schorlemmer, 2013: 203.

Hypoaspis (*Euandrolaelaps*) Bregetova, 1977: 527 [Junior synonymy of *Hypoaspis* (*Alloparasitus*) by Karg, 1993: 140].

Hypoaspis (*Alloparasitus*).— Evans & Till, 1966: 160; Aswegen & Loots, 1970: 210, Karg, 1979: 74; Evans & Till, 1979: ??; Karg, 1982: 237; Karg, 1989: 107; Karg, 1993a: 136; Huhta & Karg, 2010: 328.

Euandrolaelaps.— Casanueva, 1993: 40.

TYPE SPECIES: *Laelaps* (*Hypoaspis*) *oblongus* Halbert, 1915: 70.

NOTE: For this genus we followed the diagnosis given by Huhta & Karg, 2010: 328.

***Alloparasitus eugenitalis* (Karg, 1978) n. comb..**

Hypoaspis (*Hypoaspis*) *eugenitalis* Karg, 1978b: 22.

Hypoaspis (*Alloparasitus*) *eugenitalis*.— Karg, 1979: 75; Karg, 1982: 237; Karg, 1989b: 119; Huhta & Karg, 2010: 328.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Misituni, Tarapaca, Chile, in soil.

***Alloparasitus eupraedonis* (Karg, 1989) n. comb..**

Hypoaspis (*Alloparasitus*) *eupraedonis* Karg, 1989b: 123.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Alloparasitus femorata* (Karg, 1978) n. comb..**

Hypoaspis (Hypoaspis) femorata Karg, 1978b: 19.

Hypoaspis (*Alloparasitus*) *femorata*.— Karg, 1979: 76; Karg, 1982: 237; Karg, 1989b: 119; Huhta & Karg, 2010: 328.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 30 km east of Parinacota, Tarapaca, Chile, under rocks near the sea.

***Alloparasitus oblongus* (Halbert, 1915).**

Laelaps (*Hypoaspis*) *oblongus* Halbert, 1915: 70.

Pseudoparasitus angulatus Berlese, 1916b: 164 [Junior synonymy of *H.* (*A.*) *oblonga* by Evans & Till, 1966: 222; Bregetova, 1977: 552; Karg, 1993a: 140].

Hypoaspis oblongus.— Hull, 1918: 67.

Pseudoparasitus (*Alloparasitus*) *angulatus*.— Berlese, 1920: 169.

Halbertia oblongus.— Turk & Turk, 1952: 483.

Gymnolaelaps oblongus.— Willmann, 1952: 426.

Hypoaspis (*Alloparasitus*) *oblonga*.— Evans & Till, 1966: 222; Karg, 1979: 75; Karg, 1982: 237; Karg, 1989b: 119; Karg, 1993a: 140; Gwiazdowicz & Gulvik, 2005: 119; Huhta & Karg, 2010: 328.

Hypoaspis oblonga.— Costa, 1968: 15; Lapina, 1976: 36.

Hypoaspis (*Hypoaspis*) *oblonga*.— Karg, 1971: 167.

Alloparasitus oblongus.— Bregetova, 1977: 552.

Hypoaspis (*Alloparasitus*) *oblongus*.— Luxton, 1998: 19.

TYPE DEPOSITORY: of *L.* (*H.*) *oblongus*: National Museum, Dublin, Ireland; of *P. angulatus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: of *L.* (*H.*) *oblongus*: Westport, Clare Island, Ireland, under bark of decayed trees; of *P. angulatus*: "Citta di Castello", Umbria, Italy, in moss [mentioned as “muscis”].

***Alloparasitus pratensis* (Huhta & Karg) n. comb..**

Hypoaspis (*Alloparasitus*) *pratensis* Huhta & Karg: 326.

TYPE DEPOSITORY: Zoological Museum, University of Helsinki, Finland.

TYPE LOCALITY AND HABITAT: Sipoo, 20 km east of Helsinki, Finland, in dry, rocky meadow.

***Alloparasitus pycnosis* (Karg, 1979) n. comb..**

Hypoaspis (*Alloparasitus*) *pycnosis* Karg, 1979: 77.

Hypoaspis (*Alloparasitus*) *pycnosis*.— Karg, 1982: 237; Karg, 1989b: 119.

Hypoaspis (*Alloparasitus*) *pygnosis* [sic].— Huhta & Karg, 2010: 328.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Azul [probably Rio Azul] Valley, near El Bolsón, [Rio Negro], Argentina, in litter of a forest of *Libocedrus* and *Lomatia* [Pinales: Cupressaceae and Proteales: Proteaceae].

***Alloparasitus sardous* (Berlese, 1911).**

Laelaps (Androlaelaps) sardous Berlese, 1911b: 433.

Hypoaspis laevis var. *pilifer* Oudemans, 1912b: 231 [Junior synonymy of *L.* (*Androlaelaps*) *sardous* by Berlese, 1916a: 67; of *H.* (*Gaeolaelaps*) *sardoa* by Evans & Till, 1966: 175; of *H.* (*Alloparasitus*) *sardoa* by Karg, 1993a: 140; of *Alloparasitus sardous* by Farrier & Hennessey, 1993: 64]

Hypoaspis laevis var. *pilifer*.— Oudemans, 1912c: 245.

Androlaelaps pilifer Oudemans, 1912d: 262 [Junior synonymy of *L.* (*Androlaelaps*) *sardous* by Berlese, 1916a: 67]

Androlaelaps pilifer.— Oudemans, 1913b: 179; Buitendijk, 1945: 298; Turk & Turk, 1952: 483; Hughes, 1948: 136.

Androlaelaps sardous.— Vitzthum, 1929: 27; Willmann, 1935: 22; Radford, 1943: 61; Radford, 1950: 366; Eads, 1951: 212; Willmann, 1952b: 425; Bregetova, 1956: 83; Mrciak & Brelih, 1972: 343; Ambros, 1983a: 202; Ambros, 1983b: 144.

Hypoaspis (*Androlaelaps*) *sardous*.— Zumpt & Patterson, 1950: 67.

Laelaps sardous; *non Laelaps*.— Tipton, 1960: 306.

Hypoaspis (*Gaeolaelaps*) *sardoa*.— Evans & Till, 1966: 175.

Hypoaspis (*Hypoaspis*) *sardoa*.— Karg, 1971: 166; Karg, 1978b: 20.

Hypoaspis sardoa.— Beron, 1974: 180; Lundqvist, 1974: 42; Hughes, 1976: 297; Zaher, 1986: 187; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347.

Hypoaspis (*Euandrolaelaps*) *sardous*.— Bregetova, 1977: 530.

Hypoaspis (*Alloparasitus*) *sardoa*.— Karg, 1979: 76; Karg, 1982: 237; Tenorio, 1982: 267; Tenorio et al., 1985: 300; Karg, 1989b: 119; Karg, 1993a: 140; Gwiazdowicz & Gulvik, 2005: 119; Huhta & Karg, 2010: 328.

Alloparasitus sardous.— Farrier & Hennessey, 1993: 64.

Hypoaspis sardous.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: of *L. (A.) sardous*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H. laevis* var. *pilifer*: F. Heselhaus's collection.

TYPE LOCALITY AND HABITAT: of *L. (A.) sardous*: Asuni, Sardinia, Italy, in nests of wild murids [Mammalia: Muridae]; of *H. laevis* var. *pilifer*: Sittard, The Netherlands, in nest of an unidentified mole [Mammalia: Talpidae].

NOTE: Evans & Till, 1966: 175 questioned the subgeneric placement of *L.* (*A.*) *sardous*.

***Alloparasitus subterraneus* (Willmann, 1952) n. comb..**

Gymnolaelaps subterraneus Willmann, 1952b: 426.

Hypoaspis helianthi Samšiňák, 1958: 189 [Junior synonymy of *H. subterraneus* by Samšiňák, 1960: 280].

Hypoaspis subterraneus.— Samšiňák, 1960: 280.

Hypoaspis (*Hypoaspis*) *subterranea*.— Karg, 1971: 167.

Hypoaspis (*Geolaelaps*) *subterraneus*.— Bregetova, 1977: 500.

Hypoaspis (*Geolaelaps*) *helianthi*.— Bregetova, 1977: 500; Karg, 1979: 82; Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 119; Karg, 1993a: 142; Gwiazdowicz & Gulvik, 2005: 120.

Hypoaspis (*Alloparasitus*) *subterranea*.— Karg, 1979: 74; Karg, 1982: 237; Karg, 1989b: 119; Huhta & Karg, 2010: 328.

Hypoaspis helianthi.— Ma & Wang, 1998: 1.

TYPE DEPOSITORY: of *G. subterraneus* and *H. helianthi*: unspecified.

TYPE LOCALITY AND HABITAT of *G. subterraneus*: Kłodzko, Poland (= Glatz, Germany), on *Pitymis subterraneus* [Rodentia: Cricetidae]; of *H. helianthi*: Prague, Czech Republic, in sunflower seeds.

NOTES: (a) Bregetova, 1977: 501 and Karg, 1993a: 142 considered *H. subterranea* and *H. helianthi* as synonyms. However, inadvertently they considered the former as junior synonymy of the latter. (b) Bregetova, 1977: 501 suspected *Hypoaspis lutegiensis* Shcherbak, 1971 to be a junior synonymy of *H. subterranea*.

***Alloparasitus tribina* (Karg, 1979) n. comb..**

Hypoaspis (*Alloparasitus*) *tribina* Karg, 1979: 78.

Hypoaspis (Alloparasitus) tribina.— Karg, 1982: 237; Karg, 1989b: 119; Huhta & Karg, 2010: 328.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 1170 m above sea level, Piltriquitron, near El Bolsón, [Rio Negro], Argentina, in moss growing on *Nothofagus pumilio* [Fagales: Nothofagaceae] tree.

***Alloparasitus yamauchii* (Ishikawa, 1982) n. comb..**

Hypoaspis (*Euandrolaelaps*) *yamauchii* Ishikawa, 1982: 89.

TYPE DEPOSITORY: Biological Laboratory, Matsuyama Shinonome Junior College, Matsuyama, Japan; accession number MSJC-BL 156.

TYPE LOCALITY AND HABITAT: abandoned mine of Kawashimo-kô, Kawashimo, Tobé-chô, Ehime, Japan, in baited traps.

***Androlaelaps* Berlese, 1903.**

Laelaps (*Androlaelaps*) Berlese, 1903: 14.

Laelaps (*Haemolaelaps*) Berlese, 1910: 261 [Junior synonymy of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Bregetova, 1977: 533; Zaher, 1986: 180; Fain & Hart, 1988].

Hypoaspis (*Haemolaelaps*).— Berlese, 1916: 170; Vitzthum, 1941: 763; Zumpt, 1950b: 299.

Atricholaelaps Ewing, 1929: 186 [Junior synonymy of *Haemolaelaps* by Strandtmann, 1949: 329; Zumpt & Patterson, 1951: 70; Keegan, 1956a: 231; Tipton, 1960: 242; of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Zaher, 1986: 180; Fain & Hart, 1988].

Eubrachylaelaps Ewing, 1929: 186 [Junior synonymy of *Haemolaelaps* by Zumpt & Patterson, 1951: 70; Zumpt & Till, 1958: 267; of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Zaher, 1986: 180; Fain & Hart, 1988].

Eubrachylaelaps.— Vitzthum, 1941: 769; Jameson Jr., 1950a: 62; Furman, 1955: 51; Fonseca, 1958: 162; Tipton, 1960: 241; Furman & Tipton, 1961: 170.

Cyclolaelaps Ewing, 1933: 5 [Junior synonymy of *Eubrachylaelaps* by Jameson Jr., 1950a: 62; Furman, 1955: 51; Tipton, 1960: 241; of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Zaher, 1986: 180; Fain & Hart, 1988].

Ischnolaelaps Fonseca, 1936: 19 [Junior synonymy of *Atricholaelaps* by Strandtmann, 1946: 169; of *Haemolaelaps* by Strandtmann, 1949: 329; Zumpt & Patterson, 1951: 70; Keegan, 1956a: 231; Tipton, 1960: 242; of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Zaher, 1986: 180; Fain & Hart, 1988].

Cavilaelaps Fonseca, 1936a: 25 [Junior synonymy of *Haemolaelaps* by Zumpt & Patterson, 1951: 70].

Cavilaelaps.— Casanueva, 1993: 41.

Ischnolaelaps.— Vitzthum, 1943: 769; Strandtmann, 1946: 168; Fonseca, 1958b: 46.

Hypoaspis (*Androlaelaps*).— Vitzthum, 1943: 763; Zumpt, 1950b: 299; Zumpt & Patterson, 1950.

Atricholaelaps.— Vitzthum, 1943: 770; Strandtmann, 1946: 168; Fonseca, 1958a: 169; Fonseca, 1958b: 46.

Haemolaelaps.— Vitzthum, 1929: 22; Strandtmann, 1949: 333; Zumpt & Patterson, 1951: 70; Trägårdh, 1952: 66; Evans, 1957: 231; Fonseca, 1958b: 46; Costa, 1961a: 5; Bregetova, 1956: 72; Keegan, 1956a: 231; Tipton, 1960: 242; Schweizer, 1961: 151; Furman & Tipton (1961): 184;

Hypoaspis.— Hughes, 1948: 129 (in part).

Cyclolaelaps.— Zumpt, 1950b: 299; Zumpt & Patterson, 1951: 69.

Turkiella Zumpt & Till, 1953: 215 [Junior synonymy of *Androlaelaps* by Keegan, 1956a: 226; Evans, 1957: 230; Tipton, 1960: 257; Till, 1963: 14; Evans & Till, 1966: 150; Fain & Hart, 1988].

Zygolaelaps Tipton, 1957: 367 [Junior synonymy of *Androlaelaps* by Till, 1963: 14; Evans & Till, 1966: 150; Zaher, 1986: 180; Fain & Hart, 1988].

Androlaelaps.— Zumpt & Patterson, 1951: 69; Furman, 1952: 49; Furman, 1954: 119; Bregetova, 1956: 71; Keegan, 1956a: 226; Evans, 1957: 230; Till, 1963: 11; Evans & Till, 1966: 150; Hafez et al., 1982: 3; Zaher, 1986: 180; Hughes, 1976: 288; Bregetova, 1977: 533; Casanueva, 1993: 40; Botelho, 2002: 53.

Gromphadorholaelaps Till, 1969: 515 [Junior synonymy of *Androlaelaps* by Karg, 1991: 167].

Gnatholaelaps Till, 1972: 153 [Junior synonymy of *Androlaelaps* by Fain & Hart, 1988].

Gnatholaelaps.— Casanueva, 1993: 41.

Androlaelaps (*Haemolaelaps*).— Hafez et al., 1982: 3.

TYPE SPECIES: *Laelaps* (*Iphis*) *hermaphrodita* Berlese, 1887: XL, 6.

NOTE: According to Zumpt & Patterson, 1951: 70 the redescription of *Macrolaelaps* Ewing, 1929 by Ewing, 1933: 6 refers to *Haemolaelaps* Berlese, 1910. With that redescription a single species *Macrolaelaps peruvianus* was described. Lee & Strandtmann, 1967: 26 and Furman, 1972: 4 considered this species to belong to *Gigantolaelaps* Fonseca, 1939. The latter interpretation is adopted in this publication.

***Androlaelaps abrothrix* Gettinger & Lareschi, 2009.**

Androlaelaps abrothrix Gettinger & Lareschi, 2009: 162.

TYPE DEPOSITORY: División de Entomología, Museo de La Plata, La Plata, Argentina.

TYPE LOCALITY AND HABITAT: 19 km North La Angostura, 40°37'13"S, 71°42'22"W, along national route 234, Aluminé, Neuquén, Argentina, on *Abrothrix longipilis* (Rodentia: Cricetidae).

***Androlaelaps aduncus* (Allred, 1969).**

Androlaelaps (*Haemolaelaps*) *aduncus* Allred, 1969: 219.

Androlaelaps aduncus.— Allred, 1975: 125.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number B-67765.

TYPE LOCALITY AND HABITAT: Bari Doab Canal, Lahore, Pakistan (= West Pakistan), on *Tatera indica* [Rodentia: Muridae].

***Androlaelaps aegypticus* Hafez, ElBadry & Nasr, 1982.**

Androlaelaps aegypticus Hafez, ElBadry & Nasr, 1982: 4.

Androlaelaps aegypticus.— Zaher, 1986: 182; Basha & Yousef, 2000: 396.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Faculty of Agriculture, Cairo University, Giza, Egypt, in manure.

***Androlaelaps androgynus* (Bregetova, 1952).**

Haemolaelaps androgynus Bregetova, 1952: 867.

Haemolaelaps androgynus.— Bregetova, 1956: 89; Tipton, 1960: 242; Costa, 1961a: 6; Reitblat, 1963: 71; Wang, 1963: 200; Ye & Ma, 1996: 296.

Androlaelaps androgynus.— Costa, 1966c: 73; Bregetova, 1977: 534.

Haemolaelaps androgynms [sic].— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

TYPE LOCALITY AND HABITAT: type series, Armenia, on *Meriones persicus* and *Mus musculus* [Rodentia: Muridae], Astrakhan, Russia, on *Citellus pygmaeus* [Rodentia: Sciuridae].

***Androlaelaps androgynus caluri* (Costa, 1961).**

Haemolaelaps androgynus caluri Costa, 1961a: 9.

Androlaelaps androgynus caluri.— Costa, 1966c: 73.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Raman, Wadi Masri and Mezada, Israel, on *Sekeetamys calurus* [Rodentia: Muridae].

***Androlaelaps angustiscutis* (Bregetova, 1952).**

Haemolaelaps angustiscutis Bregetova, 1952: 867.

Haemolaelaps angustiscutis.— Zemskaia, 1955: 298; Bregetova, 1956: 92; Ye & Ma, 1991: 99; Ren & Guo, 2008: 327.

Haemolaelaps angustiscutus [sic].— Tipton, 1960: 242.

Androlaelaps angustiscutis.— Bregetova, 1977: 532.

Haemolaelaps fragilis Chen, Bai & Gu, 1995a: 228 [Junior synonymy of *H. angusticustis* by Ma, 2006: 23].

Haemolaelaps fragilis.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: of *H. angustiscutis*: Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; of

H. fragilis: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: type series of *H. angustiscutis*: Turkmenistan, on *Rhombomys opimus* [Rodentia: Muridae] and in its nest, Tajikistan, on *Meriones erythrourus* [Rodentia: Muridae] and in its nest; of *H. fragilis*: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, on *Allactaga sibirica* [Rodentia: Dipodidae].

***Androlaelaps angustotactus* Karg, 1994.**

Androlaelaps angustotactus Karg, 1994: 188.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 5 m above sea level, Charles Darwin Research Station, Puerto Ayora, Santa Cruz, Galapagos Islands, dry zone, in litter.

***Androlaelaps anomalis* (Wang, Liao & Lin, 1981) n. comb..**

Haemolaelaps anomalis Wang, Liao & Lin, 1981: 105.

Haemolaelaps anomalis.— Wang & Liao, 2000: 23; Ma, 2006: 554; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Fujian Research Institute of Epidemic Diseases, Fujian, China.

TYPE LOCALITY AND HABITAT: Fujian (= Fukien), China, on *Tamiops swinhoei monticolus* [Rodentia: Sciuridae].

***Androlaelaps anourosorecis* (Gu & Wang, 1981) n. comb..**

Haemolaelaps anourosorecis Gu & Wang, 1981: 390.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guiyang, Guizhou Province, China.

TYPE LOCALITY AND HABITAT: Guizhou, China, on *Anourosorex squamipes* [Soricomorpha: Soricidae].

***Androlaelaps anticlea* (Domrow, 1972) n. comb..**

Haemolaelaps anticlea Domrow, 1972b: 290.

Haemolaelaps anticlea.— Domrow, 1980a: 222; Domrow, 1987: 829.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Tanjil Bren, Victoria, Australia, on *Gymnobelideus leadbeateri* (Diprotodontia: Petauridae).

***Androlaelaps argentiventer* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelaps argentiventer Baker, Traub & Evans, 1962: 96.

Haemolaelaps argentiventer.— Teng & Pan, 1964: 326.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 2472.

TYPE LOCALITY AND HABITAT: Subang, Selangor, Malasia (=Malaya), on *Rattus argentiventer* [Rodentia: Muridae].

***Androlaelaps arvicanthis* Radford, 1944.**

Androlaelaps arvicanthis Radford, 1944: 162.

Androlaelaps arvicanthis.— Radford, 1950: 366; Eads, 1951: 212; Till, 1963: 17; Costa, 1969b: 193; Zumpt & Elliot, 1970: 346; Karg, 1993b: 283.

Turkiella arvicanthis.— Zumpt & Till, 1953: 221.

Androlaelaps equatoriensis Keegan, 1956a: 230 [Junior synonymy of *A. arvicanthis* by Till, 1963: 17; Zumpt & Elliot, 1970: 346].

Androlaelaps equatoriensis.— Oyoun & El Kady, 1995: 96.

TYPE DEPOSITORY of *A. arvicanthis*: British Museum (Natural History), London, England; of *A. equatoriensis*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT of *A. arvicanthis*: Masindi, Bunyoro, Uganda, on *Arvicanthis abyssinicus rubescens* [Rodentia: Muridae]; of *A. equatoriensis*: Yei, Equatoria, South Sudan (= Anglo-Egyptian Sudan), on unidentified rodent [Rodentia].

***Androlaelaps barrerai* (Fonseca, 1960). n. comb.**

Atricholaelaps (*Ischnolaelaps*) *barrerai* Fonseca, 1960: 27.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Peru, unspecified substrate.

***Androlaelaps bayoumi* Basha & Yousef, 2000.**

Androlaelaps bayoumi Basha & Yousef, 2000: 396.

TYPE DEPOSITORY: Plant Protection Department, Faculty of Agriculture, Zagazig University, Zagazig, Egypt.

TYPE LOCALITY AND HABITAT: Kom-Hamada, Behira, Egypt, on honeybee, *Apis mellifera*, workers [Hymenoptera: Apidae].

***Androlaelaps bellasoma* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps bellasoma Sakamoto, Jorgensen & Herrin, 1979: 43.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Fetekro, Ivory Coast, on *Rousettus angolensis* [Pteropodidae].

***Androlaelaps benedictae* Fain & Hart, 1988.**

Androlaelaps benedictae Fain & Hart, 1988: 447.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Bitale Bololo, Kivu, Democratic Republic of the Congo (= Zaire), on *Lophuromys woosnami* [Rodentia: Muridae].

***Androlaelaps benoiti* Till, 1973.**

Androlaelaps benoiti Till, 1973: 159.

TYPE DEPOSITORY: Musée Royal de l'Afrique Centrale, Tervuren, Belgium; accession number M.T. 115665.

TYPE LOCALITY AND HABITAT: Lubumbashi (= Elizabethville), Karavia, Democratic Republic of the Congo (= Zaire), on *Saccostomus campestris* [Rodentia: Nesomyidae].

***Androlaelaps bergalloi* Gettinger, Martins-Hatano, Lareschi & Malcolm, 2005.**

Androlaelaps bergalloi Gettinger, Martins-Hatano, Lareschi & Malcolm, 2005: 45.

Androlaelaps jaymalcolmi.— Gettinger, Martins-Hatano, Lareschi & Malcolm, 2005: 46,47 (*nomen nudum*).

TYPE DEPOSITORY: Instituto Nacional de Pesquisas da Amazônia, Manaus, State of Amazonas, Brazil.

TYPE LOCALITY AND HABITAT: Fazenda Esteio, ca. 80 km north of Manaus, PDBFF, near the camp "Cidade Powell" (2°24'S, 59°53'W), State of Amazonas, Brazil, on *Monodelphis brevicaudata* (Didelphimorphia: Didelphidae).

***Androlaelaps bibbyi* (Strandtmann & Hunt, 1950) n. comb..**

Haemolaelaps bibbyi Strandtmann & Hunt, 1950: 85.

Haemolaelaps bibbyi.— Delfinado, 1960: 103; Tipton, 1960: 242.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Samar, Philippine Islands, “on rats, probably *Rattus frugivorus*” [sic] [Rodentia: Muridae].

***Androlaelaps bidens* (Domrow, 1979) n. comb..**

Haemolaelaps bidens Domrow, 1979a: 246.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Ulu Trengganu, Kuala Brang, Malaysia, on *Sundasciurus hippurus* (Rodentia: Sciuridae).

***Androlaelaps boleensis* (Ye & Ma, 1996) n. comb..**

Haemolaelaps boleensis Ye & Ma, 1996: 297.

Haemolaelaps boleensis.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Xinjiang Institute for Endemic Disease Control and Research, Urumqi, China.

TYPE LOCALITY AND HABITAT: Bole (44°50’N, 82°E), Xinjiang, China, on *Alactagulus pumilio* [Rodentia: Dipodidae].

***Androlaelaps bresslaui* (Fonseca, 1936) n. comb..**

Cavilaelaps bresslaui Fonseca, 1936a: 25.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Jujuy, Argentina, on *Caviella australis* [

***Androlaelaps brevicaudae* Karg, 1990.**

Androlaelaps brevicaudae Karg, 1990: 48.

Androlaelaps brevicaudae.— Karg, 1994: 213.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Barnaeri [? Barueri, State of São Paulo], Brazil, in upper soil layers.

***Androlaelaps brevitrematicus* Karg, 1990.**

Androlaelaps brevitrematicus Karg, 1990: 47.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], in upper soil layers.

***Androlaelaps callosus* (Berlese, 1916).**

Hypoaspis (*Haemolaelaps*) *callosus* Berlese, 1916b: 171.

Cyclolaelaps lophuromius Radford, 1939: 243 [Junior synonymy of *A. callosus* by Till, 1963: 18; Fain & Hart, 1988: 440].

Haemolaelaps callosus.— Radford, 1943: 61; Tipton, 1960: 242.

Cyclolaelaps lophuromius.— Radford, 1943: 62; Radford, 1950: 369.

Haemolaelaps calosus [sic].— Radford, 1950: 366.

Hypoaspis (*Haemolaelaps*) *calosus* [sic].— Zumpt & Patterson, 1951: 70.

Hypoaspis (*Haemolaelaps*) *lophuromius.*— Zumpt & Patterson, 1951: 70.

Haemolaelaps lophuromius.— Zumpt & Till, 1953: 238; Furman, 1955: 59; Tipton, 1960: 242.

Haemolaelaps sudanicus Zumpt & Till, 1954: 213 [Junior synonymy of *A. callosus* by Till, 1963: 19; Fain & Hart, 1988: 440].

Eubrachylaelaps lophuromius.— Furman, 1955: 59.

Haemolaelaps sudanicus.— Keegan, 1956a: 237; Tipton, 1960: 242.

Androlaelaps callosus.— Till, 1963: 18; Dusbábek et al., 1982: 170; Fain & Hart, 1988: 440.

Androlaelaps sudanicus.— Okereke & Rack, 1983: 438.

TYPE DEPOSITORY of *H.* (*H.*) *callosus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *C. lophuromius*: unspecified [according to Till, 1963: 21, syntype in British Museum (Natural History), London, England]; of *H. sudanicus*: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT of *H.* (*H.*) *callosus*: East Africa, on *Lophuromys zena* [Mammalia: Muridae]; of *C. lophuromius*: Kampala, Uganda, on *Lophuromys aquilus aquilus* [Rodentia: Muridae]; of *H. sudanicus*: near Torit, South Sudan (= Anglo-Egyptian Sudan), on *Lophuromys flavopunctatus* [Rodentia: Muridae].

***Androlaelaps calypso* (Domrow, 1965) n. comb..**

Haemolaelaps calypso Domrow, 1965: 173.

Haemolaelaps calypso.— Domrow, 1972a: 109; Domrow, 1980a: 222; Domrow, 1987: 829.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Bearii, north of Strathmerton, Victoria, Australia, on *Petaurus breviceps* (Diprotodontia: Phalangeridae).

***Androlaelaps capensis* (Hirst, 1916).**

Haemolaelaps ? *capensis* Hirst, 1916: 79.

Hypoaspis (*Haemolaelaps*) *spinitarsus* Berlese, 1918: 123 [Suspected junior synonymy of *H. capensis* by Zumpt & Till, 1958: 267; junior synonymy of *H. capensis* by Till, 1963: 21].

Haemolaelaps mystromys Radford, 1942b: 300 [Junior synonymy of *A. capensis* by Till, 1963: 21].

Haemolaelaps capensis.— Radford, 1943: 61; Strandtmann, 1949: 331; Zumpt, 1950b: 299; Radford, 1950: 366; Zumpt & Till, 1953: 239, 246; Lavoipierre, 1956: 295; Tipton, 1960: 242.

Haemolaelaps spinitarsus.— Radford, 1943: 61; Keegan, 1956b: 317; Radford, 1950: 367.

Haemolaelaps mystromys.— Radford, 1943: 61; Keegan, 1946: 72; Radford, 1950: 367; Zumpt & Till, 1953: 246; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *capensis.*— Zumpt & Patterson, 1951: 70.

Hypoaspis (*Haemolaelaps*) *mystromys.*— Zumpt & Patterson, 1951: 70.

Hypoaspis (*Haemolaelaps*) *spinitarsus.*— Lombardini, 1936: 42; Zumpt & Patterson, 1951: 70.

Androlaelaps capensis.— Till, 1963: 21; Fain & Hart, 1988: 448.

TYPE DEPOSITORY of *H. capensis*: unspecified [according to Till, 1963: 23, in British Museum (Natural History), London, England]; of *H.* (*H.*) *spinitarsus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H. mystromys*: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT of *H. capensis*: Grahamstown, Cape [mentioned as Cape Colony], South Africa, on *Cryptomys* (= *Georychus*) *hottentotus* [Rodentia: Bathyergidae]; of *H.* (*H.*) *spinitarsus*: M'fongosi, Zululand [KwaZulu-Natal], South Africa, on *Georychus* sp. [Mammalia: Bathyergidae]; of *H. mystromys*: Glen Craig, Albany, South Africa, on the *Mystromys albicaudatus* [Rodentia: Nesomyidae].

***Androlaelaps capillatus* Karg, 1993.**

Androlaelaps capillatus Karg, 1993b: 271.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Academy Bay, Santa Cruz, Galapagos Islands, in litter.

***Androlaelaps capromydis* de la Cruz, 1981.**

Androlaelaps capromydis de la Cruz, 1981: 2.

Androlaelaps capromydis.— Cuervo et al., 1994: 17.

TYPE DEPOSITORY: Instituto de Zoología, Academia de Ciencias de Cuba, Havana, Cuba.

TYPE LOCALITY AND HABITAT: Alto de Topes de Collantes, Trinidad, Cienfuegos, Cuba, on *Capromys prehensilis prehensilis* (Capromyidae).

***Androlaelaps casalis* (Berlese, 1887).**

Gamasus lagenarius Johnston, 1848: 305.

Hypoaspis ? *ampullarius* [sic] Oudemans, 1936: 204 [replacement name for *G. lagenarius*, given the existence of *Gamasus lagenarius* Dugès, 1834: ???; junior symonym of *H. soarianus* by Turk, 1953: 11].

Iphis casalis Berlese, 1887: XXXVIII, 8.

Iphis casalis.— Berlese, 1892: 35.

Laelaps casalis.— Berlese, 1892: 42.

Hypoaspis oculatus Oudemans, 1915a: 183 [Junior synonymy of *Haemolaelaps casalis* by Strandtmann & Wharton, 1958: 34; McKinley, 1963: 65; Till, 1963: 23; McGraw & Farrier, 1969: 137; Fain & Hart, 1988: 440; Farrier & Hennessey, 1993: 64; Karg, 1993a: 164; of *A. casalis casalis* by Evans & Till, 1966: 152].

Hypoaspis oculatus.— Oudemans, 1915b: 134.

Hypoaspis soarianus Hull, 1925: 209 [Junior synonymy of *A. casalis casalis* by Evans & Till, 1966: 152; of *A. casalis* by Karg, 1993a: 164; Farrier & Hennessey, 1993: 64].

Haemolaelaps oculatus.— Oudemans, 1929: 13; Buitendijk, 1945: 299; Strandtmann, 1963: 4.

Haemolaelaps molestus Oudemans, 1929: 13 [Junior synonymy of *A. casalis casalis* by Evans & Till, 1966: 152; of *H. oculatus* and *H. casalis* by Strandtmann, 1963: 4; 5; Till, 1963: 23; Rack, 1986: 160; McKinley, 1963: 65; McGraw & Farrier, 1969: 137; Fain & Hart, 1988: 440; Farrier & Hennessey, 1993: 64; of *I. casalis* by Karg, 1993a: 164].

Hypoaspis (*Haemolaelaps*) *casalis*.— Lombardini, 1936: 42.

Haemolaelaps molestus.— Willmann, 1939: 173; Radford, 1943: 61; Strandtmann, 1949: 337; Radford, 1950: 367; Tipton, 1960: 242; Strandtmann, 1963: 4.

Atricholaelaps megaventralis Strandtmann, 1947: 112 [Junior synonymy of *Haemolaelaps casalis* by Allred & Beck, 1956: 40; McKinley, 1963: 65; 5; Till, 1963: 23; Hugles, 1976: 288; McGraw & Farrier, 1969: 137; Fain & Hart, 1988: 441; Farrier & Hennessey, 1993: 64; of *A. casalis casalis* by Evans & Till, 1966: 152].

Atricholaelaps megaventralis.— Fox, 1947: 598; Strandtmann, 1948: 189.

Hypoaspis freemani Hughes, 1948: 129 [Junior synonymy of *Haemolaelaps megaventralis* by Strandtmann, 1956: 138; McKinley, 1963: 65; 5; Till, 1963: 23; McGraw & Farrier, 1969: 137; Fain & Hart, 1988: 441; Farrier & Hennessey, 1993: 64; of *A. casalis casalis* by Evans & Till, 1966: 152; Hughes, 1976: 288; of *Iphis casalis* by Karg, 1993a: 164]

Haemolaelaps megaventralis.— Strandtmann, 1949: 337; Bregetova, 1952: 872; Eads et al., 1952: 251; Asanuma, 1953: 11; Zumpt & Till, 1953: 243; Womersley, 1956a: 563; Howell et al., 1957: 84; Allred & Roscoe, 1957: 397; Allred, 1958: 26; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *megaventralis*.— Zumpt & Patterson, 1951: 70.

Haemolaelaps freemani.— Asanuma, 1952: 89.

Haemolaelaps haemorrhagicus Asanuma, 1952: 87 [Junior synonymy of *H. casalis* by Strandtmann & Wharton, 1958: 34; McKinley, 1963: 65; 5; Till, 1963: 23; McGraw & Farrier, 1969: 137; Fain & Hart, 1988: 441; Farrier & Hennessey, 1993: 64; of *A. casalis casalis* by Evans & Till, 1966: 152].

Haemolaelaps haemorrhagicus.— Asanuma, 1953: 10; Tipton, 1960: 242; Teng & Pan, 1964: 330.

Haemolaelaps casalis.— Bregetova, 1956: 89; Allred & Beck, 1956: 40; Tipton, 1960: 242; Schweizer, 1961: 153; McKinley, 1963: 65; Reitblat, 1963: 70; Wang, 1963: 201; Allred & Goates, 1964b: 171; Goncharova & Buyakova, 1964: 279; Teng & Pan, 1964: 330; Domrow, 1973: 64; Shcherback, 1973: 446; Allred, 1975: 126; Sakamoto et al., 1979: 43; Domrow, 1980b: 209; Domrow, 1987: 829; Wang & Liao, 2000: 19; Xin et al., 2010: 2.

Laelaps casalis; *non Laelaps*.— Tipton, 1960: 290.

Androlaelaps casalis.— Till, 1963: 23; Makowski, 1965: 461; Costa, 1966c: 73; Evans & Till, 1966: 152; Wilson, 1967: 137; Treat, 1967: 276; Allred, 1969: 243; Karg, 1971: 185; Furman, 1972: 50; Beron, 1974: 173; Prasad, 1974: 150; Hughes, 1976: 288; Whitaker Jr. et al., 1976: 435; Bregetova, 1977: 533; Karg, 1978b: 31; Tenorio et al., 1985: 300; Rack, 1986: 160; Zaher, 1986: 181; Fain & Hart, 1988: 440; Karg, 1990: 49; Karg, 1993a: 164; Karg, 1993b: 272; Whitaker Jr., 1997: 195; Basha & Yousef, 2000: 396; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 119; Huhta & Karg, 2010: 334.

Androlaelaps megaventralis.— Spain & Luxton, 1971: 185.

Androlaelaps casalis casalis.— Evans & Till, 1966: 152; Treat, 1975: 64; Hughes, 1976: 288; Farrier & Hennessey, 1993: 64; Fouly & Al-Rehiayani, 2011: 142.

Androlaelaps (*Haemolaelaps*) *casalis*.— Barrera, 1979: 477; Estébanez-Gonzales & Cervantes, 2005: 26.

Haemolaelaps magaventralis [sic].— Ren & Guo, 2008: 327.

TYPE DEPOSITORY of *I. casalis*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H. oculatus*: unspecified; of *H. soarianus*: C.D. Soar's collection; of *H. molestus*: unspecified; of *A. megaventralis*: United States National Museum, Washington, District of Columbia, United States of America; of *H. freemani*: unspecified; of *H. haemorragicus*: according to the author the holotype was lost in a fire.

TYPE LOCALITY AND HABITAT of *I. casalis*: Italy, in houses; of *H. oculatus*: Ravensbosch, Valkenburg, The Netherlands, in an unspecified bird nest; of *H. soarianus*: Great Britain, unspecified substrate; of *H. molestus*: Finhum (Friesland), Nes (Westdongeradeel, Friesland) and Schipborg (Drenthe), The Netherlands, in houses; of *A. megaventralis*: Georgia, Unites States of America, on "gray squirrel" [Rodentia: Sciuridae]; of *H. freemani*: unspecified locality, in sieving from grain and debris; of *H. haemorragicus*: Songo, Notheast Manchuria, in nest of *Apodemus agrarius* [Rodentia: Muridae].

NOTES: (a) As summarized by Halliday, 2011: 63, *Gamasus fenilis* Mégnin, 1876 is considered as senior synonym of *A. casalis* by some authors (e.g. Samšiňák, 1958: 186; Strandtmann, 1963: 4; McGraw & Farrier, 1969: 137; Garrett &

Haramoto, 1967: 387), but not by others (Domrow, 1980: 209; Farrier & Hennessey, 1993: 64) the synonymy remains unresolved because of the short and inadequate original description. Specimens reported by McGraw & Farrier, 1969: 137 as *Haemolaelaps fenilis* were reidentified as *Androlaelaps casalis casalis* by Farrier & Hennessey, 1993: 64. (b) Evans & Till, 1966: 152 considered *?Gamasus fenilis* to be a synonym of *A. casalis casalis* despite mentioning that the identity of the former could not be ascertained because of the short and inadequate original description.

***Androlaelaps casaloides* Karg, 1993.**

Androlaelaps casaloides Karg, 1993b: 271.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Caseta, near Santa Rosa, Santa Cruz, Galapagos Islands, dry zone, on a dead turtle [Animalia].

***Androlaelaps caurinus* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps caurinus Sakamoto, Jorgensen & Herrin, 1979: 45.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Yama, Ivory Coast, on *Steatomys caurinus* [Rodentia: Nesomyidae].

***Androlaelaps cehengensis* (Gu, 1983) n. comb..**

Haemolaelaps cehengensis Gu, 1983: 157.

Haemolaelaps cehegensis.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guiyang, China.

TYPE LOCALITY AND HABITAT: Ceheng, 24°58' N, 105°48' E, Guizhou, China, on *Petaurista alborufus* [Rodentia: Sciuridae].

***Androlaelaps centrocarpus* (Berlese, 1911).**

Laelaps (Haemolaelaps) centrocarpus Berlese, 1911b: 432.

Haemolaelaps mauritanicus Hirst, 1925: 98 [Junior synonymy of *A. centrocarpus* by Till, 1963: 25].

Haemolaelaps centrocarpus.— Radford, 1943: 61; Radford, 1950: 366; Tipton, 1960: 242; Costa, 1961a: 27; Furman, 1966: 331; Sakamoto et al., 1979: 42.

Haemolaelaps mauritanicus.— Radford, 1943: 61; Radford, 1950: 366; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *centrocarpus*.— Lombardini, 1936: 42; Zumpt & Patterson, 1951: 70;

Laelaps centrocarpus; *non Laelaps*.— Tipton, 1960: 290.

Androlaelaps centrocarpus.— Till, 1963: 25; Costa, 1966c: 73.

TYPE DEPOSITORY of *L.* (*H.*) *centrocarpus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H. mauritanicus*: unspecified.

TYPE LOCALITY AND HABITAT of *L.* (*H.*) *centrocarpus*: Somalia [mentioned as Somalia inglese], on unidentified murids [Mammalia: Muridae]; of *H. mauritanicus*: dunes of Azeffal, Mauritania, on *Gerbillus hirtipes* [Rodentia: Muridae].

***Androlaelaps chaetospinicus* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps chaetospinicus Sakamoto, Jorgensen & Herrin, 1979: 47.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 11.3 km North of Prince's Town, Ghana, on *Praomys tullbergi* [Rodentia: Muridae].

***Androlaelaps chersonesi* (Domrow, 1979) n. comb..**

Haemolaelaps chersonesi Domrow, 1979a: 248.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 3700' above sea level, Kedah, Gunong Jerai, Malaysia, on *Hylomys suillus* [Erinaceidae].

***Androlaelaps chinchillulae* (Strandtmann, 1948) n. comb..**

Atricholaelaps chinchillulae Strandtmann, 1948: 189.

Atricholaelaps (*Ischnolaelaps*) *chinchillulae*.— Fonseca, 1960: 1.

Haemolaelaps chinchillulae.— Tipton, 1960: 242.

TYPE DEPOSITORY: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, United States of America.

TYPE LOCALITY AND HABITAT: 16000 feet above sea level, 50 miles [80 km] southwest of Illave, Caccachara, Peru, on *Chinchillula sahamae* [Rodentia: Cricetidae].

***Androlaelaps chinensis* (Wang, 1963) n. comb..**

Haemolaelaps chinensis Wang, 1963: 201.

Haemolaelaps chinensis.— Teng & Pan, 1964: 330; Gu, 1983: 159; Wang & Liao, 2000: 21; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Fujian, China, unspecified substrate.

***Androlaelaps circularis* (Ewing, 1933).**

Cyclolaelaps circularis Ewing, 1933: 6.

Cyclolaelaps circularis.— Radford, 1943: 62; Radford, 1950: 369.

Eubrachylaelaps circularis.— Jameson Jr., 1950a: 63; Keegan, 1953: 37; Jameson Jr., 1951: 556; Furman, 1955: 56; Allred & Beck, 1956: 38; Allred, 1957: 206; Allred & Roscoe, 1957: 397; Allred, 1958: 17; Tipton, 1960: 241; Furman & Tipton (1961): 170; Allred & Goates, 1964a: 72; Estébanez-Gonzales & Cervantes, 2005: 27.

Androlaelaps (*Eubrachylaelaps*) *circularis*.— Barrera, 1979: 477.

Androlaelaps circularis.— Farrier & Hennessey, 1993: 65.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1071.

TYPE LOCALITY AND HABITAT: Salina, Utah, United States of America, on *Peromyscus truei truei* [Rodentia: Cricetidae].

***Androlaelaps cleptusa* (Domrow, 1972) n. comb..**

Haemolaelaps cleptusa Domrow, 1972b: 291.

Haemolaelaps cleptusa.— Domrow, 1987: 830.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Tanjil Bren, Victoria, Australia, on *Gymnobelideus leadbeateri* (Diprotodontia: Petauridae).

***Androlaelaps colii* Till, 1972.**

Androlaelaps colii Till, 1972: 156.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Johannesburg, South Africa, on *Colius indicus* [Coliidae].

***Androlaelaps comatus* Berlese, 1923.**

Androlaelaps comatus Berlese, 1923: 252.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Androlaelaps concurrens* (Berlese, 1918) n. comb..**

Hypoaspis (*Haemolaelaps*) *concurrens* Berlese, 1918: 126.

Hypoaspis (*Haemolaelaps*) *concurrens*.— Lombardini, 1936: 42.

Haemolaelaps concurrens.— Radford, 1943: 61; Radford, 1950: 366; Tipton, 1960: 242.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Bosa and Vallombrosa, Sardinia, Italy, in moss [mentioned as muscis].

***Androlaelaps congoensis* Till, 1963.**

Androlaelaps congoensis Till, 1963: 28.

Androlaelaps congoensis.— Costa, 1968: 23; Allred, 1969: 242.

Haemolaelaps congoensis.— Allred, 1975: 126.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mulungu, Democratic Republic of the Congo (= Belgian Congo), in nests of *Spermestes cucullatus* [Estrildidae].

***Androlaelaps cordatus* (Teng & Pan, 1964) n. comb..**

Haemolaelaps cordatus Teng & Pan, 1964: 327.

Haemolaelaps cordatus.— Bai et al., 1987: 388; Ren & Guo, 2008: 327; Ma & Lin, 2009: 36.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Yunnan, China, on *Rattus losea celsus* [Rodentia: Muridae].

***Androlaelaps cricetomydis* Till, 1963**.

Androlaelaps cricetomydis Till, 1963: 29.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1962.6.12.1.

TYPE LOCALITY AND HABITAT: Malengo Highlands, Tanzania (= Tanganyika), in food store of *Cricetomys gambianus* [Rodentia: Nesomyidae].

***Androlaelaps cricetomys* Zumpt & Elliott, 1970**

Androlaelaps cricetomys Zumpt & Elliott, 1970: 341.

Haemolaelaps cricetomys.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Zaria, Nigeria, on *Cricetomys gambianus* [Rodentia: Nesomyidae].

***Androlaelaps crispus* (Groknovskaya & Huan-Hoe, 1961) n. comb..**

Haemolaelaps crispus Groknovskaya & Huan-Hoe, 1961: 1634.

Haemolaelaps crispus.— Wang, 1963: 207.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Kam-Dong, Lao Cai, Vietnam, in chicken house.

***Androlaelaps crocidura* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps crocidura Sakamoto, Jorgensen & Herrin, 1979: 48.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Banco Forest, Ivory Coast, on *Crocidura* sp. [Soricomorpha: Soricidae].

***Androlaelaps crowei* (Jameson Jr., 1947)**.

Eubrachylaelaps crowei Jameson Jr., 1947: 391.

Eubrachylaelaps crowei.— Jameson Jr., 1950a: 62; Radford, 1950: 370; Jameson Jr., 1951: 556; Eads et al., 1952: 250; Keegan, 1953: 37; Furman, 1955: 59; Allred & Beck, 1956: 37; Tipton, 1960: 241.

Androlaelaps crowei.— Farrier & Hennessey, 1993: 65.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1779.

TYPE LOCALITY AND HABITAT: Rexroad Ranch, 13 miles [21 km] southwest of Meade, Meade, Kansas, United States of America, on *Onychomys leucogaster arcticeps* [Rodentia: Cricetidae].

***Androlaelaps cryptomius* (Radford, 1939).**

Ischnlolaelaps cryptomius Radford, 1939: 248.

Ischnolaelaps cryptomius.— Radford, 1943: 62.

Liponyssus lawrencei Zumpt & Patterson, 1951: 89 [Junior synonymy of *A. cryptomius* by Till, 1963: 31].

Hypoaspis (*Haemolaelaps*) *cryptomius*.— Zumpt & Patterson, 1951: 70.

Haemolaelaps cryptomius.— Zumpt & Till, 1953: 241; Tipton, 1960: 242.

Liponyssus lawrencei.— Zumpt & Patterson, 1953: 8.

Androlaelaps cryptomius.— Till, 1963: 31.

TYPE DEPOSITORY of *I. cryptomius*: unspecified [according to Till, 1963: 34, in C.D. Radford's collection and Musée Royal de l'Afrique Centrale, Tervuren, Belgium]; of *L. lawrencei*: Natal Museum, Pietermaritzburg, South Africa.

TYPE LOCALITY AND HABITAT of *I. cryptomius*: Wynberg, Cape, South Africa, on *Georychus capensis* [Rodentia: Bathyergidae]; of *L. lawrencei*: near Wynberg, Cape, South Africa, on *Georychus capensis* [Rodentia: Bathyergidae].

***Androlaelaps cubicularis* (Berlese, 1887) n. comb..**

Laelaps (*Iphis*) *cubicularis* Berlese, 1887: XXXVIII, 7.

Iphis cubicularis.— Berlese, 1892: 35.

Laelaps cubicularis.— Berlese, 1892: 42.

Laelaps cubicularis; *non Laelaps*.— Tipton, 1960: 292.

Haemolaelaps cubicularis.— Schweizer, 1961: 154.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Italy, in stables, on *Mus decumanus* [now *Rattus norvegicus*] [Rodentia: Muridae].

***Androlaelaps cuicensis* Gettinger, 1997.**

Androlaelaps cuicensis Gettinger, 1997: 346.

Androlaelaps cuicensis.— Gettinger & Martins-Hatano, 2003: 909.

TYPE DEPOSITORY: Museu de Zoologia, Universidade de São Paulo, São Paulo, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Fazenda Água Limpa, 12 km south Brasilia, Distrito Federal, Brazil, on *Monodelphis rubida* [Didelphimorphia: Didelphidae].

***Androlaelaps dasymys* (Radford, 1939).**

Ischinolaelaps dasymys Radford, 1939: 245.

Ischinolaelaps dasymys.— Radford, 1943: 62.

Hypoaspis (*Haemolaelaps*) *labuschagnei* Zumpt & Patterson, 1951: 85 [Junior synonymy of *A. dasymys* by Till, 1963: 34; Fain & Hart, 1988: 441].

Hypoaspis (*Haemolaelaps*) *dasymys.*— Zumpt & Patterson, 1951: 70.

Haemolaelaps dasymys.— Zumpt & Till, 1953: 247; Sakamoto et al., 1979: 43.

Haemolaelaps davisi Zumpt & Till, 1956: 287 [Junior synonymy of *A. dasymys* by Till, 1963: 34; Fain & Hart, 1988: 441].

Haemolaelaps labuschagnei.— Taufflieb & Mouchet, 1959: 352; Tipton, 1960: 242.

Haemolaelaps dasymus [sic].— Tipton, 1960: 242.

Haemolaelaps davisi.— Tipton, 1960: 242.

Androlaelaps dasymys s.l. [sic].— Till, 1963: 34.

Androlaelaps dasymys.— Fain & Hart, 1988: 441; Matthee & Ueckermann, 2008: 189.

TYPE DEPOSITORY of *I. dasymys*: unspecified [according to Till, 1963, syntype in British Museum (Natural History), London, England]; of *H.* (*H.*) *labuschagnei* and *H. davisi*: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT of *I. dasymys*: Kakumiro, Uganda, on *Dasymys helukus helukus* [Rodentia: Muridae]; of *H.* (*H.*) *labuschagnei*: Amersfort, Transvaal, South Africa, in nest of *Rattus rattus* [Rodentia: Muridae]; of *H. davisi*: north of the Mashai River, Kingdom of Lesotho (= Basutoland), on *Mystromys albicaudatus* [Rodentia: Nesomyidae].

***Androlaelaps debilis* (Jameson Jr., 1950).**

Eubrachylaelaps debilis Jameson Jr., 1950a: 64.

Eubrachylaelaps debilis.— Jameson Jr., 1951: 556; Keegan, 1953: 37; Furman, 1955: 58; Allred & Beck, 1956: 38; Allred, 1958: 18; Tipton, 1960: 241; Allred & Goates, 1964a: 72.

Androlaelaps (*Eubrachylaelaps*) *debilis*.— Barrera, 1979: 477.

Androlaelaps debilis.— Farrier & Hennessey, 1993: 65.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Quincy, Plumas, California, United States of America, on *Peromyscus maniculatus* (Rodentia: Cricetidae).

***Androlaelaps dendropicos* Cort & Forbes, 1975.**

Androlaelaps dendropicos Cort & Forbes, 1975: 569.

Haemolaelaps dendropicos.— Domrow, 1981: 118.

TYPE DEPOSITORY: Koninklijk Museum voor Midden Afrika, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Kisanga, Lubumbashi (= Elizabethville), Democratic Republic of the Congo (= Congo, Zaire), on *Dendropicos elachus* [Piciformes: Picidae].

***Androlaelaps dengi* (Ye & Ma, 1991) n. comb..**

Haemolaelaps dengi Ye & Ma, 1991: 98.

Haemolaelaps dengisp [sic].— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Xinjiang Institute for Endemic Disease Control and Research, Xinjiang, China.

TYPE LOCALITY AND HABITAT: Mori, Xinjiang (43°48 ' N, 90°15 ' E), China, on *Lagurus lagurus* [Rodentia: Cricetidae].

***Androlaelaps deomys* Fain & Hart, 1988.**

Androlaelaps deomys Fain & Hart, 1988: 451.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Irangi, Kivu, Democratic Republic of the Congo (= Zaire), on *Deomys ferrurineus vandenberghei* [Rodentia: Muridae].

***Androlaelaps desmodilliscus* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps desmodilliscus Sakamoto, Jorgensen & Herrin, 1979: 49.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 9 km Northeast of Barga, Upper Volta, on *Desmodilliscus braueri* [Rodentia: Muridae].

***Androlaelaps dissimilis* (Asanuma, 1953) n. comb..**

Haemolaelaps dissimilis Asanuma, 1953: 12.

Haemolaelaps dissimilis.— Tipton, 1960: 242.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: Miyake Island, Izu Seven Islands, Japan, on *Emberzia rustica latifascia* [Passeriformes: Emberizidae].

***Androlaelaps dogieli* (Schulman, 1957) n. comb..**

Haemolaelaps dogieli Schulman, 1957: 95.

Haemolaelaps dogieli.— Ye & Ma, 1996: 296.

TYPE DEPOSITORY: Zoological Institute, Academy of Sciences of the USSR, Russia.

TYPE LOCALITY AND HABITAT: Karelia, on *Sicista betulina* [Rodentia: Dipodidae].

***Androlaelaps domesticus* (Berlese, 1887) n. comb..**

Laelaps (*Iphis*) *domesticus* Berlese, 1887: XXXVIII, n. 8.

Iphis domesticus.— Berlese, 1892: 35.

Laelaps domesticus.— Berlese, 1892: 42.

Laelaps domesticus; *non Laelaps*.— Tipton, 1960: 292.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Italy, in association with flour in houses.

***Androlaelaps domrowi* (Womersley, 1957) n. comb..**

Haemolaelaps domrowi Womersley, 1957: 301.

Haemolaelaps domrowi.— Domrow, 1958: 358; Tipton, 1960: 242; Domrow, 1961: 61; Domrow, 1962: 275; Domrow, 1963: 201; Domrow, 1967: 770; Domrow, 1979b: 191; Domrow, 1980b: 210; Domrow, 1987: 830.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia

TYPE LOCALITY AND HABITAT: Mount Glorious, Queensland, Australia, on *Perameles nasuta* [Peramelemorphia: Peramelidae].

***Androlaelaps ebsi* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps ebsi Sakamoto, Jorgensen & Herrin, 1979: 51.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Tatarko, Upper Volta, on *Taterillus gracilis* [Rodentia: Muridae].

***Androlaelaps ellobii* (Bregetova, 1952) n. comb..**

Haemolaelaps ellobii Bregetova, 1952: 870.

Haemolaelaps ellobii.— Bregetova, 1956: 93; Schulman, 1957: 97; Tipton, 1960: 242; Reitblat, 1963: 70.

TYPE DEPOSITORY: Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

TYPE LOCALITY AND HABITAT: type series, Chkalov, West Kazakhstan and Tajikistan, on *Ellobius talpinus* [Rodentia: Cricetidae], Turkmenistan, on *E. talpinus* and *Ellobius fuscocapillus* [Rodentia: Cricetidae].

***Androlaelaps elongatus* (Berlese, 1918) n. comb..**

Hypoaspis (*Haemolaelaps*) *elongatus* Berlese, 1918: 125.

Hypoaspis (*Haemolaelaps*) *elongatus*.— Lombardini, 1936: 42.

Haemolaelaps elongatus.— Radford, 1943: 61; Radford, 1950: 366; Tipton, 1960: 242.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, “Etruria” and Sardinia, Italy, in hay litter in stables.

***Androlaelaps euryplatamus* Yang & Li, 1992.**

Androlaelaps euryplatamus Yang & Li, 1992: 428.

Androlaelaps euryplatamus.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute for Endemic Disease Control, Qinghai, China.

TYPE LOCALITY AND HABITAT: Guinan (35°21’N, 100°59’E), Qinghai, China, in nest of *Passer monianus* [Passeriformes: Passeridae].

***Androlaelaps ewingi* (Keegan, 1956) n. comb..**

Haemolaelaps ewingi Keegan, 1956a: 243.

Haemolaelaps ewingi.— Tipton, 1960: 242.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: El Mansuriya, Imbaba, Giza, Egypt, in nest of *Gerbillus gerbillus* [Rodentia: Muridae].

NOTE: Costa, 1961: 16 suspected *H. ewingi* to be a junior synonymy of *Androlaelaps hirsti* (Keegan).

***Androlaelaps extremitatis* Karg, 1991.**

Androlaelaps extremitatis Karg, 1991: 165.

TYPE DEPOSITORY: Arachnida section, Zoological Museum, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Madagascar, on *Princisia* sp. [Blattodea: Blaberidae].

***Androlaelaps extremus* Karg, 1990.**

Androlaelaps extremus Karg, 1990: 50.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Maracay, Venezuela, on fallen leaves and humus layer in a forest.

***Androlaelaps fahrenholzi* (Berlese, 1911).**

Laelaps (*Haemolaelaps*) *fahrenholzi* Berlese, 1911b: 432.

Liponyssus setiger Ewing, 1920: 290 [Junior synonymy of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Laelaps californicus Ewing, 1925: 5 [Junior synonymy of *H. glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; Tipton, 1960: 289; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Laelaps glasgowi Ewing 1925: 6 [Junior synonymy of *A. fahrenholzi* by Evans & Till, 1966: 156; Domrow, 1987: 830; Farrier & Hennessey, 1993: 65; Karg, 1993a: 164].

Laelaps virginianus Ewing, 1925: 6 [Junior synonymy of *Atricholaelaps glasgowi* by Ewing, 1947: 84; of *H. glasgowi* by Strandtmann, 1949: 343; Womersley,

1955: 421; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Hypoaspis microti Oudemans, 1926: 101 [Junior synonymy of *Haemolaelaps glasgowi* by Bregetova, 1952: 866; of *H. fahrenholzi* by Strandtman, 1963: 4; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Haemolaelaps mohrae Oudemans, 1928: 374 [Junior synonymy of *H. fahrenholzi* by Willmann, 1952b: 402; Strandtmann, 1963: 4; Domrow, 1987: 830; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Haemolaelaps mohrae.— Oudemans, 1929: 13; Radford, 1943: 61; Radford, 1950: 367; Tipton, 1960: 242.

Hypoaspis cricetophilus Vitzthum, 1930c: 417 [Junior synonymy of *Haemolaelaps glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; of *A. glasgowi* by Till, 1963: 40; Farrier & Hennessey, 1993: 65; of *A. cricetophilus* by Evans & Till, 1966: 156]

Lelaps [sic] *stegemani* Hefley, 1935: 22 [Junior synonymy of *H. glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156].

Atricholaelaps glasgowi.— Wharton, 1938: 140; Harkema, 1936: 162; Ewing, 1947: 84; Strandtmann, 1948: 187; Linard et al., 1984b: 215.

Ischnolaelaps rhabdomys Radford, 1939: 249 [Junior synonymy of *A. glasgowi* by Till, 1963: 40; Farrier & Hennessey, 1993: 65; of *A. fahrenholzi* by Evans & Till, 1966: 156].

Laelaps californicus.— Radford, 1943: 59.

Laelaps glasgowi.— Radford, 1943: 59.

Laelaps virginianus.— Radford, 1943: 59.

Haemolaelaps fahrenholzi.— Radford, 1943: 61; Radford, 1950: 366; Willmann, 1952b: 402; Tipton, 1960: 242; Garrett & Allred, 1971: 294; Mrciak & Brelih, 1972: 343; Domrow, 1973: 64; Sakamoto et al., 1979: 43; Domrow, 1987: 830.

Ischnolaelaps rhabdomys.— Radford, 1943: 62.

Haemolaelaps microti.— Buitendijk, 1945: 297.

Atricholaelaps sigmodoni Strandtmann, 1946: 164 [Junior synonymy of *H. glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Haemolaelaps scalopi Keegan, 1946: 71 [Junior synonymy of *H. glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Atricholaelaps strandtmanni Fox, 1947: 598 [Junior synonymy of *H. glasgowi* by Strandtmann, 1949: 343; Womersley, 1955: 421; of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Atricholaelaps virginianus.— Ewing, 1947: 84.

Haemolaelaps glasgowi.— Strandtmann, 1949: 343; Jameson Jr., 1950b: 140; Zumpt & Patterson, 1950: 68; Bregetova, 1952: 872; Eads et al., 1952: 250; Asanuma, 1953: 11; Keegan, 1953: 37; Zumpt & Till, 1953: 239, 246; Zumpt & Till, 1954: 213; Burgess, 1955: 639; Ellis Jr., 1955: 16; Womersley, 1955: 421; Zemskaia, 1955: 297; Bregetova, 1956: 86; Allred & Beck, 1956: 40; Lavoipierre, 1956: 295; Zumpt & Till, 1956: 282; Howell et al., 1957: 84; Allred & Roscoe, 1957: 397; Drummond, 1957: 50; Schulman, 1957: 97; Allred, 1958: 22; Hays & Guyton, 1958: 260; Taufflieb & Mouchet, 1959: 351; Tipton, 1960: 242; Allred, 1961: 124; Costa, 1961a: 12; Costa, 1961b: 258; Furman & Tipton, 1961: 185; Costa, 1962: 489; Mauri & Capri, Randolph & Eads 1962: 60; Allred, 1963: 231; Goates, 1963: 4; Wang, 1963: 202; Reitblat, 1963: 70; Allred & Goates, 1964a: 72; Hansen, 1964: 77; Goncharova & Buyakova, 1964: 279; Teng & Pan, 1964: 330; Eads et al., 1965: 19; Mauri, 1965: 17; Mellott & Connell, 1965: 87; Mauri, 1966a: 52; Mauri, 1966b: 36; Mauri, 1967a: 69; Mauri, 1967b: 517; Mauri, 1967c: 3; Mauri & Capri, 1970: 134; Shcherback, 1973: 446; Fernández, 1977: 4; Fernández & Capri, 1978: 48; Wang, Liao & Lin, 1981: 105; Ye & Ma, 1991: 98; Wang & Liao, 2000: 19; Ren & Guo, 2008: 327; Xin et al., 2010: 2.

Haemolaelaps scalopi.— Radford, 1950: 367.

Hypoaspis (*Haemolaelaps*) *eos* Zumpt & Patterson, 1951: 79 [Junior synonymy of *A. glasgowi* by Till, 1963: 40; of *A. fahrenholzi* by Evans & Till, 1966: 156; Farrier & Hennessey, 1993: 65].

Hypoaspis (*Haemolaelaps*) *rhabdomys*.— Zumpt & Patterson, 1951: 70.

Haemolaelaps rhabdomys.— Zumpt & Till, 1953: 242; Tipton, 1960: 242.

Haemolaelaps eos.— Zumpt & Till, 1956: 282.

Atricholaelaps (*Ischnolaelaps*) *glasgowi.*— Fonseca, 1958a: 176; Fonseca, 1958b: 50; Fonseca, 1960: 1; Linardi et al., 1984a: 240.

Laelaps fahrenholzi; *non Laelaps*.— Tipton, 1960: 294.

Laelaps microti; *non Laelaps.*— Tipton, 1960: 301.

Laelaps stegemani; *non Laelaps*.— Tipton, 1960: 308.

Laelaps virginianus; *non Laelaps*.— Tipton, 1960: 310.

Hypoaspis microti.— Strandtman, 1963: 4.

Hypoaspis mohrae.— Strandtmann, 1963: 4.

Androlaelaps glasgowi.— Costa, 1966c: 73; Till, 1963: 40; Bregetova, 1977: 534.

Androlaelaps (Haemolaelaps) glasgowi.— Taufflieb et al., 1967: 123.

Androlaelaps fahrenholzi.— Evans & Till, 1966: 156; Solomon, 1968a: 675; Whitaker Jr. & Wilson, 1968: 538; Dusbábek, 1970: 274; Karg, 1971: 187; Furman, 1972: 50; Timm, 1972: 19; Beron, 1974: 163; Whitaker & Schmeltz, 1974: 480; Treat, 1975: 67; Whitaker Jr. et al., 1976: 435; Goff & Whitaker Jr., 1977: 458; Whitaker Jr., 1997: 195; de la Cruz, 1981: 7; Ambros, 1983a: 202; Ambros, 1983b: 144; Ambros, 1983c: 61; Karg, 1990: 52; Karg, 1993a: 164; Oyoun & El Kady, 1995: 96; Farrier & Hennessey, 1993: 65; Cuervo et al., 1994: 17; Barros-Battesti et al., 1998: 721; Cobanoglu & Bayram, 1998: 190; Botelho et al., 2002: 54; Nieri-Bastos et al., 2004: 32; Gwiazdowicz & Gulvik, 2005: 119; Lareschi et al., 2006: 597; Matthee & Ueckermann, 2008: 189; Lareschi, 2011: 798.

Androlaelaps (*Haemolaelaps*) *fahrenholzi*.— Barrera, 1979: 476; Estébanez-Gonzales, 1997: 5; Estébanez-Gonzales & Cervantes, 2005: 26.

Lelaps [sic] *stegemoni* [sic].— Farrier & Hennessey, 1993: 65.

Androlaelaps ahrenholzi [sic].— Nieri-Bastos et al., 2004: 31.

TYPE DEPOSITORY of *L.* (*H.*) *fahrenholzi*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *L. setiger*: unspecified; of *L. californicus* (accession number 905), *L. glasgowi* (accession number 906) and *L. virginianus* (accession number 907): United States National Museum, Washington, District of Columbia, United States of America; of *Hypoaspis microti*, *H. mohrae* and *H. cricetophilus*: unspecified; of *L. stegemani*: University of Kansas, Kansas, United States of America; of *I. rhabdomys*: unspecified; of *A. sigmodoni*: United States National Museum, Washington, District of Columbia, United States of America; of *H. scalopi*: Army Medical Museum, Washington, United States of America; of *A. strandtmanni*: Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico; of *H.* (*H.*) *eos*: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT of *L.* (*H.*) *fahrenholzi*: Germany, on wild murids [Mammalia: Muridae]; of *L. setiger*: Madison, Wisconsin, United States of America, on unidentified “short-tailed shrew” [probably *Blarina brevicauda*] [Soricomorpha: Soricidae]; of *L. californicus*: Topaz, California, United States of America, in mouse nest; of *L. glasgowi*: Urbana, Illinois, United States of America, on “wild rat” [Rodentia: Muridae]; of *L. virginianus*: East Falls Church, Virginia, United States of America, on “wild mouse” [Rodentia: Muridae]; of *Hypoaspis microti*: Arnhem, The Netherlands, on *Microtus amphibious* [Rodentia: Cricetidae]; of *H. mohrae*: Holstein, Maart and Glückstadt, Germany, in nest of *Microtus arvalis* [Rodentia: Cricetidae]; of *H. cricetophilus*: Tungljau, China, in nest of *Phodopus bedfordiae* [Rodentia: Cricetidae]; of *L. stegemani*: near East Syracuse, Onondaga and Oswego County Sanitarium, Oswego, New York, United States of America, on *Mephitis nigra* [Carnivora: Mephitidae]; of *I. rhabdomys*: Onderstepoort, Transvaal, South Africa, on *Rhabdomys pumilio* (Rodentia: Muridae); of *A. sigmodoni*: Galveston, near LaMarque, Texas, United States of America, on *Sigmodon hispidus texianus* [Rodentia: Cricetidae]; of *H. scalopi*: Omaha, Nebraska, United States of America, on *Scalopus aquaticus* [Mammalia: Talpidae]; of *A. strandtmanni*: Camp O’Reilly, Gurabo, Puerto Rico, on *Rattus*

sp. [Rodentia: Muridae] or *Mus musculus* [Rodentia: Muridae]; of *H.* (*H.*) *eos*: Rietfontein, near Johannesburg, Transvaal, South Africa, on *Rhabdomys pumilio* [Rodentia: Muridae].

NOTES: (a) Specimens reported as *Atricholaelaps sigmodoni* by Randolph & Eads, 1946: 599 were re-identified as *Androlaelaps geomys* (Strandtmann) by Strandtmann, 1949: 340. (b) Apparently Ambros, 1983b: 144 considered to be *A. fahrenholzi* the specimens previously identified as *H. glasgowi* by Bregetova, 1956: 86.

***Androlaelaps flagellatus* (Womersley, 1957) n. comb..**

Haemolaelaps flagellata Womersley, 1957: 300.

Haemolaelaps flagellatus.— Domrow, 1973: 64; Domrow, 1977: 198; Domrow, 1987: 830.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Fisher Island, Bass Strait, Australia, in nest material from burrows *Puffinus tenuirostris* [Procellariiformes: Procellariidae].

NOTE: Specimes reported by Womersley, 1955: 423 as *Haemolaelaps marsupialis* Berlese were described as *H. flagellata*.

***Androlaelaps foenalis* (Berlese, 1887) n. comb..**

Laelaps (*Iphis*) *foenalis* Berlese, 1887: XXXVIII, n.7.

Iphis foenalis.— Berlese, 1892: 35.

Laelaps foenalis.— Berlese, 1892: 42.

Laelaps foenalis; *non Laelaps*.— Tipton, 1960: 294.

Haemolaelaps foenalis.— Schweizer, 1961: 152.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Padua and Florence, Italy, in stables, on *Mus decumanus* [now *Rattus norvegicus*] [Rodentia: Muridae].

***Androlaelaps franzi* Marais & Loots, 1970 n. comb..**

Androlaelaps (*Androlaelaps*) *franzi* Marais & Loots, 1970: 7.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: near Cunene River, Angola, in soil.

***Androlaelaps frontalis* (Banks, 1910).**

Gamasus frontalis Banks, 1910: 3.

Androlaelaps sinuosa Furman, 1954: 120 [Junior synonymy of *A. frontalis* by Johnston, 1959: 61; Farrier & Hennessey, 1993: 66].

Androlaelaps frontalis.— Johnston, 1959: 61; Farrier & Hennessey, 1993: 66.

Androlaelaps (*Androlaelaps*) *sinuosa*.— Barrera, 1979: 477.

TYPE DEPOSITORY of *G. frontalis*: unspecified [according to Johnston, 1959 Museum of Comparative Zoology at Harvard College, Massachusetts, United States of America]; of *A. sinuosa*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT of *G. frontalis*: Los Palmos, 3500 feet [1067 m] above sea level, Santa Rosa Mountains, California, United States of America, on *Perognathus* sp. [Rodentia: Heteromyidae]; of *A. sinuosa*: Pigeon Pass, Riverside, California, United States of America, on *Perognathus* sp., probably *P. fallax fallax* [Rodentia: Heteromyidae].

***Androlaelaps galagus* (Lavoipierre, 1955).**

Haemolaelaps galagus Lavoipierre, 1955a: 304.

Haemolaelaps galagus.— Taufflieb & Mouchet, 1959: 352; Sakamoto et al., 1979: 43.

Androlaelaps galagus.— Till, 1963: 36; Dusbábek, Daniel & Till, 1982: 171; Fain & Hart, 1988: 441.

TYPE DEPOSITORY: Liverpool School of Tropical Medicine, Liverpool, England.

TYPE LOCALITY AND HABITAT: Barombikang Forest, British Cameroons, on *Galago alleni* [Primates: Galagidae].

***Androlaelaps gallinarii* (Grokhovskaya & Huan-Hoe, 1961) n. comb..**

Haemolaelaps gallinarii Grokhovskaya & Huan-Hoe, 1961: 1634.

Haemolaelaps audyi Baker, Traub & Evans, 1962: 92 [Junior synonymy of *H. gallinarii* by Nadchatram, Domrow & Ngengebule, 1966: 131].

Haemolaelaps gallinarii.— Domrow, 1963: 201; Nadchatram et al., 1966: 131.

Haemolaleaps audyi.— Gu & Wang, 1980: 47; Chen, Bai & Gu, 1995: 229.

TYPE DEPOSITORY: of *H. gallinarii*: unspecified; of *H. audyi*: United States National Museum, Washington, District of Columbia, United States of America, accession number 2469.

TYPE LOCALITY AND HABITAT: of *H. gallinarii*: Kam-Dong, Lao Cai, Vietnam, in chicken house substrate; of *H. audyi*: Selangor, Gombak Forest Reserve, near Pahang Road, 20 km north of Kuala Lumpur, Malaya (= Malaysia), on *Callosciurus tenuis* [Rodentia: Sciuridae].

***Androlaelaps geomys* (Strandtmann, 1949).**

Haemolaelaps geomys Strandtmann, 1949: 339.

Haemolaelaps geomys.— Allred & Beck, 1956: 41; Lavoipierre, 1956: 295; Hays & Guyton, 1958: 260; Tipton, 1960: 242.

Androlaelaps geomys.— Tuszynski & Whitaker, Jr., 1972: 546; Farrier & Hennessey, 1993: 66; Wilkins & Houck, 2001: 311.

Androlaelaps (*Haemolaelaps*) *geomys*.— Barrera, 1979: 477.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Brooks, Georgia, United States of America, on *Geomys* sp. [Rodentia: Geomyidae].

NOTE: Specimens reported as *Atricholaelaps sigmodoni* by Randolph & Eads, 1946: 599 were re-identified as *Androlaelaps geomys* (Strandtmann) by Strandtmann, 1949: 340.

***Androlaelaps georychi* Till, 1963.**

Androlaelaps georychi Till, 1963: 38.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Knysna, Cape, South Africa, on *Georychus capensis* [Rodentia: Bathyergidae].

***Androlaelaps ghanensis* Till, 1963.**

Androlaelaps ghanensis Till, 1963: 38.

Androlaelaps ghanensis.— Zumpt & Elliott, 1970: 344; Dusbábek, Daniel & Till, 1982: 175.

Haemolaelaps ghanensis.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1962.6.12.10.

TYPE LOCALITY AND HABITAT: Ghana, on *Claviglis* sp. [Rodentia: Gliridae].

***Androlaelaps graingeri* Zumpt & Patterson, 1952.**

Androlaelaps graingeri Zumpt & Patterson, 1952: 162.

Turkiella graingeri.— Zumpt & Till, 1953: 224.

Androlaelaps graingeri.— Till, 1963: 42.

Androlaelaps ?graingeri.— Costa, 1969b: 194.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Kerio Valley, Kenya, on unidentified rodent.

***Androlaelaps grandiculatus* Eads, 1951.**

Androlaelaps grandiculatus Eads, 1951: 212.

Androlaelaps grandiculatus.— Eads et al., 1952: 250; Furman, 1954: 119; Farrier & Hennessey, 1993: 66.

Androlaelaps gradiculatus [sic].— Fonseca, 1957/58: 179.

Androlaelaps (*Androlaelaps*) *grandiculatus*.— Barrera, 1979: 477; Estébanez-Gonzales & Cervantes, 2005: 26.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1912.

TYPE LOCALITY AND HABITAT: Zavala, Texas, United States of America, on *Perognathus merriami* [Rodentia: Heteromyidae].

***Androlaelaps guimaraesi* (Fonseca, 1958) n. comb..**

Atricholaelaps (*Atricholaelaps*) *guimaraesi* Fonseca, 1958: 172.

TYPE DEPOSITORY: unspecified; accession number 2209.

TYPE LOCALITY AND HABITAT: Northeastern Brazil, on *Hesperomys* sp. [Rodentia: Cricetidae].

***Androlaelaps hattenae* (Domrow, 1963) n. comb..**

Haemolaelaps hattenae Domrow, 1963: 201.

Haemolaelaps hattenae.— Domrow, 1972a: 109; Domrow, 1980b: 211; Domrow, 1987: 831.

TYPE DEPOSITORY: National Insect Colletion, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Green's Beach, Tasmania, Australis, on *Bettongia cuniculus* (Diprotodontia: Potoroidae; mencioned as Macropodidae).

***Androlaelaps haydocki* (Till, 1959).**

Haemoloaelaps haydocki Till, 1959: 426.

Haemoloaelaps haydocki.— Groknovskaya & Huan-Hoe, 1961: 1636; Domrow, 1981: 118.

Androlaelaps haydocki.— Till, 1963: 45; Cort & Forbes, 1975: 571.

Androlaelaps (*Haemolaelaps*) *haydocki*.— Marais & Loots, 1970: 2.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Luanshya, Zambia (= Northern Rhodesia), on *Thripias namaquus* [Piciformes: Picidae].

***Androlaelaps heliosciuri* Till, 1963.**

Androlaelaps heliosciuri Till, 1963: 46.

Androlaelaps heliosciuri.— Costa, 1969b: 198; Fain & Hart, 1988: 441.

Haemolaelaps heliosciuri.— Sakamoto et al., 1979: 41.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Amani, Tanzania (= Tanganyika), on *Heliosciurus gambianus* [Rodentia: Sciuridae].

***Androlaelaps hermaphrodita* (Berlese, 1887).**

Laelaps (*Iphis*) *hermaphrodita* Berlese, 1887: XL, n. 6.

Laelaps hermaphrodita.— Berlese, 1892: 35.

Iphis hermaphrodita.— Berlese, 1892: 35.

Hypoaspis hermaphrodita.— Oudemans, 1902b: 23; Oudemans, 1903b: 129; Buitendijk, 1945: 296.

Laelaps (*Androlaelaps*) *hermaphrodita*.— Berlese, 1903: 14.

Androlaelaps hermaphrodita.— Oudemans, 1912: 262; Hull, 1925: 208; Radford, 1943: 61; Eads, 1951: 212; Furman, 1954: 119; Womersley, 1956: 506; Fonseca, 1957/58: 179; Tipton, 1960: 296; Garrett & Haramoto, 1967: 387; Wilson, 1967: 139; Domrow, 1980b: 212; Tenorio et al., 1985: 300; Domrow, 1987: 827.

Androlaelaps setosus Fox, 1946b: 173 [Junior synonymy of *A. hermaphrodita* by Wilson, 1967: 139; Garrett & Haramoto, 1967: 387; Farrier & Hennessey, 1993: 66].

Androlaelaps setosus.— Thurman Jr. et al., 1948: 134; Radford, 1950: 366; Eads, 1951: 213; Furman, 1954: 120; Fonseca, 1957/58: 179; Furman, 1972: 56; Baker, 1991: 223.

Hypoaspis (*Androlaelaps*) *hermaphrodita*.— Zumpt & Patterson, 1950: 67; Eads, 1951: 212; Turk & Turk, 1952: 483

Androlaelaps hemaphrodita [sic].— Radford, 1950: 366.

Androlaelaps hermaphroditus.— Womersley, 1956a: 575; Wang & Li, 1965: 237; Domrow, 1977: 200; Domrow, 1980b: 212; Farrier & Hennessey, 1993: 66.

Androlaelaps foxi Fonseca, 1958: 180 [Junior synonymy of *A. hermaphrodita* by Wilson, 1967: 139].

Laelaps hermaphrodita; *non Laelaps*.— Tipton, 1960: 296.

Androlaelaps foxi.— Botelho et al., 2002: 54.

Haemolaelaps vietnamensis Grochovskaya & Huan-Hoe, 1961: 1636 [Junior synonymy of *A. hermaphrodita* by Wilson, 1967: 139].

Haemolaelaps travisi Delfinado, 1961: 49 [Junior synonymy of *A. hermaphrodita* by Wilson, 1967: 139].

Androlaelaps foxi.— Mauri & Alzuet, 1970: 143; Furman, 1972: 51.

Androlaelaps (*Androlaelaps*) *setosus*.— Barrera, 1979: 477.

Haemolaelaps hermaphrodita.— Shaw, 1999: 45.

TYPE DEPOSITORY: of *L.* (*I.*) *hermaphrodita*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *A. setosus*: Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico; of *H. foxi*: unspecified, accession number 2412; of *H. vietnamensis*: unspecified; of *H. travisi*: Chicago Natural History Museum, Chicago, United States of America.

TYPE LOCALITY AND HABITAT: of *L.* (*I.*) *hermaphrodita*: Rome, Italy, in a field; of *A. setous*: San Juan (Santurce), Puerto Rico, on *Rattus norvegicus* [Rodentia: Muridae]; of *A. foxi*: Comorango, Pesqueira, State of Pernambuco, Brazil, on *Zygodontomys pixuna* (Rodentia: Cricetidae); of *H. vietnamensis*: type series, Fu Kui, Tan-Hoa, Vinh-Linh, Cam Pha, Hallam, Ha-Giang, Lao Cai, Vietnam, on *Suncus murinus* [Soricomorpha: Soricidae], *Rattus concolor*, *Rattus rattus hainanicus*, *Rattus norvegicus*, *Rattus rattus flavipectus* and *Rattus sabanus* [Rodentia: Muridae] and in chicken house; of *H. travisi*: Manila, Philippines, on *Rattus* sp. [Rodentia: Muridae].

***Androlaelaps himizu* Jameson Jr., 1966 n. comb..**

Haemolaelaps himizu Jameson Jr., 1966: 103.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Ohara, Kyoto-Fu, Honshu, Japan, on *Urotrichus talpoides* [Mammalia: Talpidae].

***Androlaelaps hirsti* (Keegan, 1956).**

Haemolaelaps hirsti Keegan, 1956a: 242.

Haemolaelaps hirtsi [sic].— Tipton, 1960: 242.

Haemolaelaps hirsti.— Costa, 1961a: 14; Sakamoto et al., 1979: 42.

Androlaelaps hirsti.— Till, 1963: 46; Costa, 1966c: 73; Zumpt & Elliott, 1970: 345.

Androlaelaps (*Haemolaelaps*) *hirsti*.— Taufflieb et al., 1967: 123.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Yubo, Equatoria, South Sudan (= Sudan), on unidentified rat [Rodentia].

NOTE: Costa, 1961 suspected *A. hirsti* to be senior synonym of *A. ewingi*.

***Androlaelaps hirstionyssoides* (Costa, 1961).**

Haemolaelaps hirstionyssoides Costa, 1961a: 16.

Haemolaelaps hirstionyssoides.— Costa, 1962: 491; Sheals, 1964: 16.

Androlaelaps hirstionyssoides.— Costa, 1966c: 73.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Zikhron Ya'aqov, Israel, on *Spalax ehrenbergi* [Rodentia: Spalacidae].

***Androlaelaps hirsuta* Furman, 1972.**

Androlaelaps hirsuta Furman, 1972: 51.

Androlaelaps hirsuta.— Gettinger et al., 2005: 47.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number SVP 13950.

TYPE LOCALITY AND HABITAT: 1335 m above sea level, La Laguna, 2 km north of and 4 km west of Caripe, Monagas, Venezuela, on *Marmosa fuscata* [Didelphimorphia: Didelphidae].

***Androlaelaps hollisteri* (Ewing, 1925).**

Laelaps hollisteri Ewing, 1925: 2.

Eubrachylaelaps hollisteri.— Ewing, 1929: 187; Jameson Jr., 1947: 391; Jameson Jr., 1950a: 63; Radford, 1950: 370; Jameson Jr., 1951: 556; Furman, 1955: 58; Allred & Beck, 1956: 38; Allred, 1958: 20; Tipton, 1960: 241; Allred & Goates, 1964a: 72.

Laelaps hollisteri.— Radford, 1943: 59.

Androlaelaps hollisteri.— Farrier & Hennessey, 1993: 66.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 900.

TYPE LOCALITY AND HABITAT: San Francisco, California, United States of America, on *Peromyscus californicus* [Rodentia: Cricetidae].

***Androlaelaps hsui* Wang & Li, 1965.**

Androlaelaps hsui Wang & Li, 1965: 235.

Androlaelaps hsui.— Wang & Liao, 2000: 25; Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Fujian (= Fukien), China, on *Rattus losea exiguus* [Rodentia: Muridae].

***Androlaelaps hystrici* (Zumpt & Till, 1953).**

Haemolaelaps hystrici Zumpt & Till, 1953: 235.

Haemolaelaps hystrici.— Keegan, 1956a: 239; Tipton, 1960: 242; Sakamoto et al., 1979: 43.

Androlaelaps hystrici.— Till, 1963: 49.

Androlaelaps (*Haemolaelaps*) *hystrici*.— Taufflieb et al., 1967: 123.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Karamoja district, Uganda, on *Hystrix cristata* [Hystricidae].

***Androlaelaps ilhacardosoi* Gettinger & Martins-Hatano, 2003.**

Androlaelaps ilhacardosoi Gettinger & Martins-Hatano, 2003: 909.

TYPE DEPOSITORY: Instituto Butantan, São Paulo, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Ilha do Cardoso, State of São Paulo, Brazil, on *Monodelphis americana* (Didelphidae).

***Androlaelaps impensus* Eads, 1952.**

Androlaelaps impensus Eads, 1952: 239.

Androlaelaps impensus.— Furman, 1954: 119; Fonseca, 1957/58: 179.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1983.

TYPE LOCALITY AND HABITAT: New York, United States of America, on a lily, *Lilium* sp. [Plantae: Liliacea] bulb, imported from Japan.

***Androlaelaps inops* (Berlese, 1911) n. comb..**

Laelaps (*Haemolelaps*) *inops* Berlese, 1911b: 432.

Haemolaelaps inops.— Radford, 1943: 61; Radford, 1950: 366; Lavoipierre, 1956: 291; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *inops.*— Lombardini, 1936: 42; Zumpt & Patterson, 1951: 70.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Nigeria, on murids [Mammalia: Muridae].

***Androlaelaps insculptus* (Keegan, 1956).**

Haemolaelaps insculptus Keegan, 1956a: 244.

Haemolaelaps insculptus.— Tipton, 1960: 242; Costa, 1961a: 19.

Androlaelaps insculptus.— Costa, 1966c: 73.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Abu Rawash, Imababa, Giza, Egypt, on *Gerbillus pyramidum* [Rodentia: Muridae].

***Androlaelaps jamesoni* (Furman, 1955).**

Eubrachylaelaps jamesoni Furman, 1955: 52.

Eubrachylaelaps jamesoni.— Tipton, 1960: 241.

Androlaelaps jamesoni.— Farrier & Hennessey, 1993: 66.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Cerro del Cañon del Sumidaro, 19 km from Tuxtla Gutierrez, Chiapas, Mexico, on *Peromyscus mexicanus saxatilis* [Rodentia: Cricetidae].

***Androlaelaps johnstoni* Eads & Hightower, 1951.**

Androlaelaps johnstoni Eads & Hightower, 1951: 249.

Androlaelaps johnstoni.— Furman, 1954: 120; Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Gaines, Texas, United States of America, in nesting material of *Neotoma micropus* [Rodentia: Cricetidae].

***Androlaelaps kathuensis* Jordaan, 1988.**

Androlaelaps kathuensis Jordaan, 1988: 132.

TYPE DEPOSITORY: Department of Zoology, Potchesfstroom University for Cristian Higher Education, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: 40 km west of Kuruman, Northern Cape, South Africa, in soil underneath *Ziziphus mucronata* [Rosales: Rhamnaceae].

***Androlaelaps keegani* (Fonseca, 1958) n. comb..**

Atricholaelaps (*Ischnolaelaps*) *keegani* Fonseca, 1958: 174.

TYPE DEPOSITORY: unspecified, accession number 2533.

TYPE LOCALITY AND HABITAT: Northeastern Brazil, on *Oryzomys subflavus* [Rodentia: Cricetidae].

***Androlaelaps kenyaensis* Marais & Loots, 1970 n. comb..**

Androlaelaps (*Haemolaelaps*) *kenyaensis* Marais & Loots, 1970: 15

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: Mount Kenya, Kenya, in forest soil.

***Androlaelaps kivuensis* Fain & Hart, 1988.**

Androlaelaps kivuensis Fain & Hart, 1988: 445.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Lemera, Kivu, Democratic Republic of the Congo, on *Lophuromys* sp. [Rodentia: Muridae].

***Androlaelaps kununeensis* Marais & Loots, 1970 n. comb..**

Androlaelaps (*Androlaeloaps*) *kununeensis* Marais & Loots, 1970: 11.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: near Cunene River, Angola, in soil.

***Androlaelaps laertes* (Domrow, 1972) n. comb..**

Haemolaelaps laertes Domrow, 1972a: 109.

Haemolaelaps laertes.— Domrow, 1972b: 291; Domrow, 1980a: 221; Domrow, 1987: 831.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Canungra, Queensland, Australia, on *Rattus fuscipes* [Rodentia: Muridae].

***Androlaelaps latiporus* (Bai & Gu, 1993) n. comb..**

Haemolaelaps latiporus Bai & Gu, 1993a: 39.

Haemolaelaps latiporus.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Ningxia Institute of Endemic Disease Control, Yinchuan, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Androlaelaps lehfeni* Oyoun & El Kady, 1995.**

Androlaelaps lehfeni Oyoun & El Kady, 1995: 94.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Egypt.

TYPE LOCALITY AND HABITAT: Beer Lehfin, North Sinai, Egypt, on *Gerbillus pyramidum* [Rodentia: Muridae].

***Androlaelaps leviculus* Eads, 1951: 213.**

Androlaelaps leviculus Eads, 1951: 213.

Androlaelaps leviculus.— Eads et al., 1952: 250; Keegan, 1953: 38; Allred & Beck, 1956: 34; Fonseca, 1957/58: 179; Furman, 1954: 119; Goates, 1963: 4; Allred & Goates, 1964a: 72; Farrier & Hennessey, 1993: 67.

Hypoaspis leviculus.— Allred, 1958: 28.

Androlaelaps (*Androlaelaps*) *leviculus*.— Barrera, 1979: 477.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1913.

TYPE LOCALITY AND HABITAT: Zavala, Texas, United States of America, on *Perognathus hispidus* [Rodentia: Heteromyidae].

***Androlaelaps liae* (Wang, 1963) n. comb..**

Haemolaelaps liae Wang, 1963: 200.

Haemolaelaps liae.— Teng & Pan, 1964: 330; Wang & Liao, 2000: 21; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Fujian, China, on *Rattus fulvescens* [Rodentia: Muridae].

***Androlaelaps lipsi* Till, 1972.**

Androlaelaps lipsi Till, 1972: 160.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Lubumbashi (= Elizabethville), Democratic Republic of the Congo (= Congo), in nest of *Steatomys pratensis* [Rodentia: Nesomyidae].

***Androlaelaps longipes* (Bregetova, 1952).**

Haemolaelaps longipes Bregetova, 1952: 867.

Haemolaelaps namrui Radford, 1954: 310 [Junior synonymy of *A. longipes* by Till, 1963: 50].

Haemolaelaps longipes.— Zemskaia, 1955: 298; Bregetova, 1956: 92; Tipton, 1960: 242; Costa, 1961a: 21; Reitblat, 1963: 71; Wang, 1963: 200; Furman, 1966: 331; Allred, 1975: 126; Ibraim & Abdel-Samad, 1990: 97.

Haemolaelaps aegyptius Keegan, 1956a: 246 [Junior synonymy of *H. longipes* by Costa, 1961a: 21; Till, 1963: 50].

Haemolaelaps aegyptius.— Tipton, 1960: 242.

Androlaelaps longipes.— Till, 1963: 50; Costa, 1966c: 73; Allred, 1969: 242; Beron, 1974: 174; Bregetova, 1977: 534.

TYPE DEPOSITORY of *H. longipes*: Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; of *H. namrui* and *H. aegyptius*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: of *H. longipes*: type series, Armenia, on *Meriones tristami* [Rodentia: Muridae], Turkmenistan and Tajikistan, on *Meriones erythrourus* and *Rhombomys opimus* [Rodentia: Muridae], Astrakhan, Russia, on *Meriones tamariscinus* and *Citellus pygmaeus* [Rodentia: Muridae]; of *H. namrui*: Ta'izz, Yemem, on *Meriones rex buryi* [Rodentia: Muridae]; of *H. aegyptius*: Saint Catherine monastery, Sinai, Egypt, on *Meriones crassus* [Rodentia: Muridae]

***Androlaelaps longirodus* (Ma, 2006) n. comb..**

Haemolaelaps longirodus Ma, 2006: 553.

Haemolaelaps longirodus.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Intitute for Endemic Disease Prevention and Control of Qinghai Province, China.

TYPE LOCALITY AND HABITAT: Huangnan, Qinghai, China, on *Ochotona erythrotis* [Ochotonidae].

***Androlaelaps longoventris* Karg, 1978.**

Androlaelaps longoventris Karg, 1978b: 31.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Azapa, Tarapaca, Chile, in soil.

***Androlaelaps machadoi* (Till, 1972) n. comb..**

Gnatholaelaps machadoi Till, 1972: 153.

Gnatholaelaps machadoi.— Fain & Hart, 1988: 449.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Alto Chicapo, Angola, in nest of *Dendrohyrax arboreus* [Procaviidae].

***Androlaelaps macrosetoses* (Marais & Loots, 1970) n. comb..**

Androlaelaps (*Haemolaelaps*) *macrosetoses* Marais & Loots, 1970: 17.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: Kaliba, Kivu, Democratic Republic of the Congo (= Congo), in soil.

***Androlaelaps macroventralis* (Asanuma, 1953) n. comb..**

Haemolaelaps macroventralis Asanuma, 1953: 14.

Haemolaelaps macroventralis.— Tipton, 1960: 242; Gu & Wang, 1981: 394.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: Onsen, Matsuyama, Shikoku, Japan, on *Petaurista leucogenys* [Rodentia: Sciuridae].

***Androlaelaps madagascariensis* (Tipton, 1957)**

Zygolaelaps madagascariensis Tipton, 1957: 369.

Androlaelaps madagascariensis.— Dowling & OConnor, 2010: 118.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number USNM 294520.

TYPE LOCALITY AND HABITAT: 69 km from Tananarive, Tamatave road, Madagascar, on *Nesogale dobsoni* [Tenrecidae].

***Androlaelaps malachela* (Sakamoto, Jorgensen & Herrin, 1979).**

Haemolaelaps malachela Sakamoto, Jorgensen & Herrin, 1979: 53.

Androlaelaps malachela.— Fain & Hart, 1988: 451.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Sienso, Ivory Coast, on *Funisciurus pyrrhopus* [Rodentia: Sciuridae].

***Androlaelaps marioi* (Fonseca, 1964) n. comb..**

Atricholaelaps (*Ischnolaelaps*) *marioi* Fonseca, 1964: 111.

TYPE DEPOSITORY: Instituto Butantan, São Paulo, State of São Paulo, Brazil (D.Moraes-Battesti, personal communication), acession number 2039.

TYPE LOCALITY AND HABITAT: Biriguí, State of São Paulo, Brazil, on *Didelphys* sp. (mencioned as “cuica”) [Didelphimorphia: Didelphidae].

***Androlaelaps marmosops* Martins-Hatano, Gettinger & Bergalo, 2001.**

Androlaelaps marmosops Martins-Hatano, Gettinger & Bergalo, 2001: 686.

TYPE DEPOSITORY: Museu Nacional do Rio de Janeiro, Rio de Janeiro, State of Rio de Janeiro, Brazil.

TYPE LOCALITY AND HABITAT: Serrinha do Alambari, Itatiaia, State of Rio de Janeiro, Brazil, on *Marmosops incanus* [Didelphimorphia: Didelphidae].

***Androlaelaps marshalli* (Berlese, 1911).**

Laelaps (*Androlaelaps*) *marshalli* Berlese, 1911b: 433.

Hypoaspis (*Androlaelaps*) *marshalli*.— Berlese, 1918: 131; Zumpt & Patterson, 1950: 69.

Androlaelaps marshalli.— Radford, 1943: 61; Radford, 1950: 366; Costa, 1961a: 45; Eads, 1951: 212; Keegan, 1956a: 227; Tipton, 1960: 300; Till, 1963: 53; Costa, 1966c: 73; Allred, 1969: 242; Costa, 1969b: 202; Allred, 1975: 125; Oyoun & El Kady, 1995: 96; Matthee & Ueckermann, 2008: 185.

Androlaelaps oudemansi Radford, 1944: 161 [Junior synonymy of *A. marshalli* by Till, 1963: 54].

Androlaelaps oudemansi.— Fox, 1946b: 174; Radford, 1950: 366; Eads, 1951: 213.

Hypoaspis (*Androlaelaps*) *africanus* Zumpt, 1950b: 300 [Junior synonymy of *A. marshalli* by Keegan, 1956a: 227 ; Costa, 1961a: 45; Till, 1963: 54].

Hypoaspis (*Androlaelaps*) *africanus*.— Zumpt & Patterson, 1950: 70.

Hypospis (*Androlaelaps*) *africanoides* Zumpt & Patterson, 1950: 72 [Junior synonymy of *A. marshalli* by Keegan, 1956a: 227; Costa, 1961a: 45; Till, 1963: 54].

Androlaelaps africanus.— Eads, 1951: 239, Zumpt & Patterson, 1952: 162.

Androlaelaps africanoides.— Eads, 1951: 239

Androlaelaps africanoides.— Zumpt & Patterson, 1952: 162.

Turkiella africanus.— Zumpt & Till, 1953: 216.

Turkiella oudemansi.— Zumpt & Till, 1953: 221.

Laelaps (*Androlaelaps*) *marshalli*.— Sheals, 1964: 15.

Androlaelaps (*Androlaelas*) *marshalli*.— Taufflieb et al., 1967: 123.

TYPE DEPOSITORY of *L.* (*A.*) *marshalli*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *A. oudemansi*: British Museum (Natural History), London, England; of *H.* (*A.*) *africanus* and *H.* (*A.*) *africanoides*: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT of *L.* (*A.*) *marshalli*: Somalia [mentioned as Somalia Britannica], on unidentified murids [Mammalia: Muridae]; of *A. oudemansi*: Masindi, Bunyoro, Uganda, on *Arvicanthis abyssinicus rubescens* [Rodentia: Muridae]; of *H.* (*A.*) *africanus*: Abercorn pont, Zululand [KwaZulu-Natal], South Africa, on *Saccostomus* sp. [Rodentia: Nesomyidae]; of *H.* (*A.*) *africanoides*: Filabusi, Zimbabwe (= South Rhodesia), on *Tatera schinzi* [Rodentia: Muridae].

NOTE: Turk & Turk, 1952: 484 believed *H.* (*A.*) *africanus* and *H.* (*A.*) *africanoides* not to belong to *Hypoaspis* (*Androlaelaps*).

***Androlaelaps marsupialis* (Berlese, 1910) n. comb..**

Laelaps (*Haemolaelaps*) *marsupialis* Berlese, 1910: 261.

Haemolaelaps marsupialis.— Vitzthum, 1928: 187; Radford, 1943: 61; Radford, 1950: 366; Strandtmann, 1949: 329; Domrow & Smith, 1956: 202; Keegan, 1956b: 315; Womersley, 1957: 297; Domrow, 1957: 207; Fonseca, 1958b: 50; Tipton, 1960: 242; Domrow, 1961: 61; Domrow, 1962: 276; Domrow, 1963: 202; Domrow, 1967: 770; Domrow, 1973: 64; Domrow, 1980b: 210; Domrow, 1987: 831.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy

TYPE LOCALITY AND HABITAT: Australia, on unidentified bandicoot [Peramelemorphia: Peramelidae].

NOTES: (a) Domrow & Smith, 1956: 202 reported *Hypoaspis perameles* (an unpublished name cited by H. Womersley, 1955 in a letter; *nomen nudum*) to correspond to *Haemolaelaps marsupialis*. (b) Specimes reported by Womersley, 1955: 423 as *H. marsupialis* were described as *Haemolaelaps flagellata* by Womersley, 1957: 300.

***Androlaelaps martini* (Jameson Jr., 1951).**

Eubrachylaelaps martini Jameson Jr., 1951: 556.

Eubrachylaelaps martini.— Furman, 1955: 58; Tipton, 1960: 241.

Androlaelaps (*Eubrachylaelaps*) *martini*.— Barrera, 1979: 477.

Androlaelaps martini.— Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 1977.

TYPE LOCALITY AND HABITAT: Ajusco, 40 km south of Mexico City, Distrito Federal, Mexico, on *Neotomodon alstoni* (Rodentia: Cricetidae).

***Androlaelaps maurii* Lareschi & Gettinger, 2009.**

Androlaelaps maurii Lareschi & Gettinger, 2009: 1352.

Androlaelaps maurii.— Lareschi, 2010: 201; Lareschi, 2011: 798.

TYPE DEPOSITORY: División de Entomología, Museo de La Plata, La Plata, Argentina; accession number MLP-LER403-1.

TYPE LOCALITY AND HABITAT: Reserva Ecológica Costanera Sur (34°36'S, 58°27'W), Ciudad Autónoma de Buenos Aires, Argentina, on *Deltamys kempi* (Rodentia: Cricetidae).

NOTE: Specimens reported by Lareschi & Mauri, 1998, González & Pardinãs, 2002: 711 and Lareschi et al., 2006: 598 as *Androlaelaps rotundus* (Fonseca) were reidentified as *Androlaelaps maurii* Lareschi & Gettinger, 2009 in the description of the species.

***Androlaelaps mesopicos* (Radford, 1942).**

Haemolaelaps mesopicos Radford, 1942a: 192.

Haemolaelaps mesopicos.— Radford, 1943: 61; Radford, 1950: 366; Zumpt & Till, 1953: 244; Till, 1959: 423; Tipton, 1960: 242; Domrow, 1981: 118.

Haemolaelaps mesopicus [sic].— Strandtmann, 1948: 189

Hypoaspis (*Haemolaelaps*) *mesopicos*.— Zumpt & Patterson, 1951: 70.

Androlaelps mesopicos.— Till, 1963: 56; Cort & Forbes, 1975: 571.

Androlaelaps (*Haemolaelaps*) *mesopicos*.— Marais & Loots, 1970: 2.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Kabale, Kigezi, Uganda, on *Mesopicos ruwenzorii* [Piciformes: Picidae].

***Androlaelaps micropteropi* Zumpt & Elliott, 1970.**

Androlaelaps micropteropi Zumpt & Elliott, 1970: 344.

Haemolaelaps micropteropi.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Ibadan, Nigeria, on *Micropteropus pusillus* [Pteropodidae].

***Androlaelaps minutiventralis* (Gu, 1983) n. comb..**

Haemolaelaps minutiventralis Gu, 1983: 159.

Haemolaelaps minutiventralis.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guiyang, Guizhou Province, China.

TYPE LOCALITY AND HABITAT: Ceheng, 24°58'N, 105°48'E, Guizhou, China, on *Petaurista alborufus* [Rodentia: Sciuridae].

***Androlaelaps misionalis* Lareschi, 2010.**

Androlaelaps misionalis Lareschi, 2010: 200.

Androlaelaps misionalis.— Lareschi, 2011: 798.

TYPE DEPOSITORY: Collection of the División de Entomología, Museo de La Plata, La Plata, Argentina, accession number MLP-CNP1925-10.

TYPE LOCALITY AND HABITAT: Salto El Paraíso (27°13'S; 54°02'W), Misiones, Argentina, on *Akodon montensis* (Rodentia: Cricetidae).

***Androlaelaps modestus* Reitblat, 1963.**

Androlaelaps modestus Reitblat, 1963: 72.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia

TYPE LOCALITY AND HABITAT: Yevlakh, Azerbaijan, on *Allactaga elater* [Rodentia: Dipodidae].

***Androlaelaps morlani* (Strandtmann, 1949).**

Haemolaelaps morlani Strandtmann, 1949: 337.

Haemolaelaps morlani.— Lavoipierre, 1956: 295; Tipton, 1960: 242; Wang, 1963: 201; Teng & Pan, 1964: 328.

Androlaelaps morlani (?).— Whitaker Jr. & Wilson, 1968: 538.

Androlaelaps morlani.— Whitaker Jr., 1997: 195; Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Grady, Georgia, United States of America, on *Rattus rattus* [Rodentia: Muridae].

***Androlaelaps murinus* (Berlese, 1911).**

Laelaps (*Haemolaelaps*) *murinus* Berlese, 1911b: 432.

Hypoaspis (*Haemolaelaps*) *murinus*.— Berlese, 1918: 131; Zumpt & Patterson, 1951: 70.

Ischnolaelaps arvicanthis Radford, 1939: 246 [Junior synonymy of *H. murinus* by Keegan, 1956a: 233; Zumpt & Till, 1958: 267; Till, 1963: 58].

Haemolaelaps murinus.— Radford, 1943: 61; Radford, 1950: 367; Keegan, 1956a: 233; Keegan, 1956b: 318; Sakamoto et al., 1979: 43.

Ischnolaealps arvicanthis.— Radford, 1943: 62.

Hypoaspis (*Haemolaelaps*) *arvicanthis*.— Zumpt & Patterson, 1951: 70.

Laelaps murinus; *non Laelaps*.— Tipton, 1960: 242;

Androlaelaps murinus.— Till, 1963: 58; Zumpt & Elliott, 1970: 344; Fain & Hart, 1988: 442.

Androlaelaps (*Haemolaelaps*) *murinus*.— Taufflieb et al., 1967: 123.

TYPE DEPOSITORY of *L.* (*H.*) *murinus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *I. arvicanthis*: unspecified.

TYPE LOCALITY AND HABITAT of *L.* (*H.*) *murinus*: Southern Ethiopia, Ethiopia, on unidentified murid [Mammalia: Muridae]; of *I. arvicanthis*: Kakumiro, Uganda, on *Arvicanthis abyssinicus rubescens* [Rodentia: Muridae].

***Androlaelaps myrmecophila* Evans & Till, 1966.**

Androlaelaps casalis myrmecophila Evans & Till, 1966: 154.

Androlaelaps myrmecophila.— Huhta & Karg, 2010: 334.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Black Wood of Rannoch, Perthshire, Scotland, in nests of *Formica rufa* [Hymenoptera: Formicidae].

***Androlaelaps nadchatrami* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelaps nadchatrami Baker, Traub & Evans, 1962: 94.

Haemolaelaps nadchatrami.— Domrow, 1979a: 246.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 2470.

TYPE LOCALITY AND HABITAT: Gombak Forest Reserve, Selangor, 20 km north of Kuala Lumpur, Malasia (=Malaya), on *Callosciurus caniceps* [Rodentia: Sciuridae].

***Androlaelaps neoflagellatus* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelps neoflagellata Baker, Traub & Evans, 1962: 95.

Haemolaelps neoflagellata.— Domrow, 1979a: 248.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 2471.

TYPE LOCALITY AND HABITAT: Gombak Forest Reserve, Selangor, 20 km north of Kuala Lumpur, Malasia (=Malaya), on *Rhinosciurus laticaudatus* [Rodentia: Sciuridae].

***Androlaelaps novemspinosus* Li, Yang & Zhang, 1998.**

Androlaelaps novemspinosus Li, Yang & Zhang, 1998: 264.

Androlaelaps novemspinosus.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Research Institute of Endemic Disease Control of Qinghai Province, Quinghai, China.

TYPE LOCALITY AND HABITAT: 2400 m above sea level, Huangzhong (36°34'N, 101°54'E), Qinghai, China, in nest of *Cricetulus longicaudatus* [Rodentia: Cricetidae].

***Androlaelaps oliffi* (Zumpt & Patterson, 1951).**

Hypoaspis (*Haemolaelaps*) *oliffi* Zumpt & Patterson, 1951: 81.

Haemolaelaps oliffi.— Zumpt & Till, 1953: 243; Tipton, 1960: 242.

Androlaelaps oliffi.— Till, 1963: 60.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Vredefort, Orange Free State, South Africa, in nests of *Tatera brantsii* [Rodentia: Muridae].

***Androlaelaps omnitectus* (Vitzthum, 1928) n. comb..**

Hypoaspis (*Haemolaelaps*) *omnitectus* Vitzthum, 1928: 181.

Haemolaelaps omnitectus.— Radford, 1943: 61; Radford, 1950: 367; Strandtmann, 1949: 329; Tipton, 1960: 242.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Wai Lima, Java, Indonesia, on *Chrysocolaptes validus* [Piciformes: Picidae].

***Androlaelaps orientalis* (Ibrahim & Abdel-Samad, 1990) n. comb..**

Androlaelaps (*Haemolaelaps*) *orientalis* Ibrahim & Abdel-Samad, 1990: 97.

Androlaelaps (*Haemolaelaps*) *orientalis*.— Basha & Yousef, 2000: 396.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Sidye Krier, Alexandria, Egypt, in litter under fig trees.

***Androlaelaps orientalis* (Teng & Pan, 1964) n. comb..**

Haemolaelaps orientalis Teng & Pan, 1964: 325.

Haemolaelaps orientalis.— Wang, Liao & Lin, 1981: 105; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Yunnan, China, on *Tupaia glis* [Tupaiidae].

***Androlaelaps ovalis* (Costa, 1961).**

Haemolaelaps ovalis Costa, 1961a: 24.

Androlaelaps ovalis.— Costa, 1966c: 73.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: type series, Mishmar Ha'emeq, Nir David and Shavei Zion, Israel, on *Meriones tristrami* [Rodentia: Muridae].

***Androlaelaps pachyptilae* (Zumpt & Till, 1956).**

Haemolaelaps pachyptilae Zumpt & Till, 1956: 285.

Haemolaelaps pachyptilae.— Tipton, 1960: 242; Domrow, 1977: 195; Domrow, 1987: 832.

Androlaelaps pachyptilae.— Till, 1963: 62; Hunter, 1964a: 639; Hunter, 1970: 51; Spain & Luxton, 1971: 185; Furman, 1972: 54; Karg, 1991: 167; Fain & Galloway, 1993: 98; Pugh, 1993: 333.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Heard Island, in nest of *Pachyptila desolata* [Procelariidae].

***Androlaelaps pakistanicus* Allred, 1970.**

Androlaelaps pakistanicus Allred, 1970: 107.

Androlaelaps pakistanicus.— Allred, 1975: 125.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number B-66530.

TYPE LOCALITY AND HABITAT: Naltar, Gilgit, Gilgit Agency, Pakistan (= West Pakistan), on *Cricetulus migratorius* [Rodentia: Cricetidae].

***Androlaelaps palaniae* (Domrow, 1981) n. comb..**

Haemolaelaps palaniae Domrow, 1981: 115**.**

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 3973.

TYPE LOCALITY AND HABITAT: Rantau Panjang, Selangor, Malaysia, on *Chrysocolaptes lucidus* (Piciformes: Picidae).

***Androlaelaps paracasalis* (Ryke, 1963).**

Hypoaspis paracasalis Ryke, 1963: 4.

Hypoaspis paracasalis.— Costa, 1969a: 167; McGraw & Farrier, 1969: 148; Halliday, 2005: 34.

Hypoaspis (*Holostaspis*) *paracasalis*.— Aswegen & Loots, 1970: 193; Karg, 1979: 98; Karg, 1982: 248.

Androlaelaps paracasalis.— Jordaan, 1988: 129.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: Potchefstroom, South Africa, in soil of a blue-gum [*Eucalyptus* sp.] plantation.

***Androlaelaps parahirsti* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps parahirsti Sakamoto, Jorgensen & Herrin, 1979: 54.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 20 km northwest of Chinguetti, Mauritania, on *Gerbillus gerbillus* [Rodentia: Muridae].

***Androlaelaps parasingularis* Gu, Wang & Fan, 1996.**

Androlaelaps parasingularis Gu, Wang & Fan, 1996: 408.

Androlaelaps parasingularis.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Department of Parasitology, Medical School, Nanjing University, Nanjing, Jiangsu Province, China.

TYPE LOCALITY AND HABITAT: Yuanjiang (23.6°N, 101.9°E), Yunnan, China, on unidentified scarabaeid beetles (Coleoptera: Scarabaeidae).

***Androlaelaps paraxeri* Fain & Hart, 1988.**

Androlaelaps paraxeri Fain & Hart, 1988: 450.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Irangi, Kivu, Democratic Republic of the Congo (= Zaire), on *Paraxerus bohemi emini* (=*Tamiscus emini emini*) [Rodentia: Sciuridae].

***Androlaelaps patersoni* (Zumpt & Till, 1956).**

Haemolaelaps patersoni Zumpt & Till, 1956: 286.

Haemolaelaps patersoni.— Tipton, 1960: 242.

Androlaelaps patersoni.— Till, 1963: 63.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: near Rustenburg, Transvaal, South Africa, on *Gyps coprotheres* [Accipitridae].

***Androlaelaps pavlovskii* Bregetova, 1955.**

Androlaelaps pavlovskii Bregetova, 1955.

Androlaelaps pavlovskii.— Bregetova, 1956: 83; Wang & Li, 1965: 238; Allred, 1975: 125; Yang & Li, 1992: 428; Liu, Ma & Ding, 2000: 380.

Hypoaspis pavlovskii.— Allred, 1969: 242; Ren & Guo, 2008: 329.

Hypoaspis (*Euandrolaelaps*) *pavlovskii*.— Bregetova, 1977: 530.

Hypoaspis (*Laelaspis*) *pavlovskii*.— Karg, 1979: 100; Karg, 1982: 248; Xin et al., 2010: 2.

Hypoaspis (*Euandrolaelaps*) *pavlovskii*.— Ishikawa, 1982: 91.

NOTE: Bregetova, 1955 appud Bregetova, 1956.

***Androlaelaps penelope* (Domrow, 1964) n. comb..**

Haemolaelaps penelope Domrow, 1964: 156.

Haemolaelaps penelope.— Domrow, 1972a: 110; Domrow, 1979b: 192; Domrow, 1980a: 222; Domrow, 1987: 832.

TYPE DEPOSITORY: National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: 2000’ above sea level, rainforest, Mount Glorious, South East Queensland, Queensland, Australia, on *Trichosurus caninus* (Diprotodontia: Phalangeridae).

***Androlaelaps petauristae* (Gu & Wang, 1980) n. comb..**

Haemolaelaps petauristae Gu & Wang, 1980: 46.

Haemolaelaps petauristae.— Gu, 1983: 159; Chen, Bai & Gu, 1995: 229; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Guilin, Guangxi Autonomous Region, China, on *Petaurista elegans* [Rodentia: Sciuridae].

***Androlaelaps phialiger* (Berlese, 1916) n. comb..**

Hypoaspis (*Haemolaelaps*) *phialiger* Berlese, 1916b: 170.

Hypoaspis (*Haemolaelaps*) *phialiger*.— Lombardini, 1936: 42.

Haemolaelaps phialiger.— Radford, 1943: 61; Radford, 1950: 367.

Haemolaelaps phialger [sic].— Tipton, 1960: 242.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, in nests of *Acromyrmex lundi* [Hymenoptera: Formicidae].

***Androlaelaps phoeniculi* (Zumpt & Till, 1954).**

Haemolaelaps phoeniculi Zumpt & Till, 1954: 209.

Haemolaelaps phoeniculi.— Tipton, 1960: 242.

Androlaelaps phoeniculi.— Till, 1963: 65; Cort & Forbes, 1975: 575; Karg, 1990: 48.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: near Potchefstroom, Transvaal, South Africa, on *Phoeniculus purpureus* [Phoeniculidae].

***Androlaelaps pilosus* Baker, 1991.**

Androlaelaps pilosus Baker, 1991: 219**.**

TYPE DEPOSITORY: British Museum (Natural History), London, England, accession number 1989.10.11.2-12

TYPE LOCALITY AND HABITAT: El Pedregoso, east of Facinas, Cadiz, Spain, on cephalothorax of female *Macrothele calpeiana* (Hexathelidae).

***Androlaelaps praeporus* (Gu & Wang, 1981) n. comb..**

Haemolaelaps praeporus Gu & Wang, 1981: 392.

Haemolaelaps praeporus.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guiyang, Guizhou, China.

TYPE LOCALITY AND HABITAT: Guizhou, China, on *Rattus losea* [Rodentia: Muridae].

***Androlaelaps projecta* Furman, 1972.**

Androlaelaps projecta Furman, 1972: 54.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America, accession number SVP 34089..

TYPE LOCALITY AND HABITAT: La Vega del Rio Santo Domingo, 2 km southwest of Altamira, Barinas, Venezuela, on *Sciurus granatensis* [Rodentia: Sciuridae].

***Androlaelaps pulchriventris* Karg, 1978.**

Androlaelaps pulchriventris Karg, 1978b: 28.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Farellones, Santiago, Chile, in wet turf.

***Androlaelaps pumilionis* Karg, 1993.**

Androlaelaps pumilionis Karg, 1993b: 270.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Tortuga Bay, Santa Cruz, Galapagos Islands, in litter in rocks crevices.

***Androlaelaps quartus* (Domrow, 1961) n. comb..**

Haemolaelaps quartus Domrow, 1961: 61.

Haemolaelaps quartus.— Domrow, 1963: 202; Domrow, 1980b: 212; Domrow, 1987: 832.

TYPE DEPOSITORY: National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Peacock Creek, Bonalbo, New South Wales, Australia, on *Aepyprymnus rufescens* (Diprotodontia: Potoroidae; mentioned as Macropodidae).

***Androlaelaps rahmi* Fain & Hart, 1988.**

Androlaelaps rahmi Fain & Hart, 1988: 444.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Kasindi, Kivu, Democratic Republic of the Congo (= Zaire), on *Crocidura* sp. [Soricomorpha: Soricidae].

***Androlaelaps razumovae* (Bregetova, 1952).**

Haemolaelaps razumovae Bregetova, 1952: 870.

Haemolaelaps razumovae.— Bregetova, 1956: 91; Tipton, 1960: 242.

Androlaelaps rasumovae [sic].— Bregetova, 1977: 534.

Androlaelaps razumovae.— Karg, 1978b: 30; Karg, 1990: 49.

TYPE DEPOSITORY: Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

TYPE LOCALITY AND HABITAT: neighborhoud of Kobi, Georgia, on *Prometheomys schaposchnikowi* [Rodentia: Cricetidae] and in its nest.

***Androlaelaps reithrodontis* (Ewing, 1925) n. comb..**

Laelaps reithrodontis Ewing, 1925: 7

Atricholaelaps reithrodontis.— Ewing, 1929: 186

Laelaps reithrodontis.— Radford, 1943: 60.

Haemolaelaps reithrodontis.— Tipton, 1960: 242; Mauri, 1965: 17; Mauri, 1967a: 69.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 908.

TYPE LOCALITY AND HABITAT: Huanuluan, Rio Negro, Argentina, on *Reithrodon cuniculoides* [Rodentia: Cricetidae].

***Androlaelaps reticulatus* (Fonseca, 1935) n. comb..**

Ischnolaelaps reticulatus Fonseca, 1935: 19.

Ischnolaelaps reticulatus.— Radford, 1943: 62.

Haemolaelaps reticulatus.— Tipton, 1960: 242.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Instituto Butantan, São Paulo, State of São Paulo, Brazil, on *Euryzygomatomys spinosus catellus* [Rodentia: Echimyidae].

***Androlaelaps reticulus* (Hafez, ElBadry & Nasr, 1982).**

Androlaelaps (*Haemolaelaps*) *reticulus* Hafez, ElBadry & Nasr, 1982: 6.

Androlaelaps reticulatus.— Zaher, 1986: 184; Basha & Yousef, 2000: 396.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Etay El-Barood, Beheera, Egypt, in litter.

***Androlaelaps rhabdomysi* Matthee & Ueckermann, 2008.**

Androlaelaps rhabdomysi Matthee & Ueckermann, 2008: 186.

TYPE DEPOSITORY: National Collection of Arachnida, Plant Protection Research Institute, Pretoria, South Africa.

TYPE LOCALITY AND HABITAT: Wellington region (33°26'25"S; 19°03'02"E), Western Cape, South Africa, on *Rhabdomys pumilio* (Rodentia: Muridae).

***Androlaelaps rhodesiensis* (Zumpt & Patterson, 1951).**

Hypoaspis (*Haemolaelaps*) *rhodesiensis* Zumpt & Patterson, 1951: 82.

Haemolaelaps rhodesiensis.— Zumpt & Till, 1953: 243; Tipton, 1960: 242.

Androlaelps rhodesiensis.— Till, 1963: 66.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Dowa, Rusapi, Zimbabwe (= South Rhodesia), on *Saccostomus campestris* [Rodentia: Nesomyidae].

***Androlaelaps rohaniae* (Domrow, 1979) n. comb..**

Haemolaelaps rohaniae Domrow, 1979a: 243.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Johor, Labis Forest Reserve, Bekok, Tong Nam, Malaysia, on *Pteromyscus pulverulentus* (Rodentia: Sciuridae).

***Androlaelaps rotundus* (Fonseca, 1935).**

Eubrachylaelaps rotundus Fonseca, 1935b: 20

Eubrachylaelaps rotundus.— Radford, 1943: 62; Radford, 1950: 370; Jameson Jr., 1951: 556; Furman, 1955: 59; Fonseca, 1958: 163; Fonseca, 1959: 98; Fonseca, 1960: 1; Tipton, 1960: 241; Furman & Tipton, 1961: 171; Mauri, 1966a: 51; Mauri, 1967b: 518; Mauri, 1967a: 67; Fernández, 1977: 4; Fernández & Capri, 1978: 48; Linard et al., 1984b: 215; Nieri-Bastos et al., 2004: 31; Estébanez-Gonzales & Cervantes, 2005: 27.

Eubrachilaelaps [sic] *rotundus*.— Mauri, 1965: 16; Mauri, 1966b: 36; Mauri & Capri, 1970: 133.

Androlaelaps rotundus.— Furman, 1972: 56; Barros-Battesti et al., 1998: 721; Gettinger & Owen, 2000: 425; Botelho et al., 2002: 54; Lareschi et al., 2006: 598; Gettinger & Lareschi, 2009: 162; Lareschi & Gettinger, 2009: 1353; Lareschi & Barros-Battesti, 2010: 114; Lareschi, 2010: 201; Lareschi, 2011: 798.

Androlaelaps (*Eubrachylaelaps*) *rotundus*.— Barrera, 1979: 477.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: São Paulo, State of São Paulo, Brazil, on a small undetermined wild rodent species.

NOTE: Specimens reported by Lareschi & Mauri, 1998, González & Pardinãs, 2002: 711 and Lareschi et al., 2006: 598 as *Androlaelaps rotundus* (Fonseca) were reidentified as *Androlaelaps maurii* Lareschi & Gettinger, 2009 in the description of the new species.

***Androlaelaps sanduensis* (Gu &Wang, 1981) n. comb..**

Haemolaelaps sanduensis Gu & Wang, 1981: 393.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guiyang, Guizhou, China.

TYPE LOCALITY AND HABITAT: Guizhou, China, on *Mus pahari* [Rodentia: Muridae].

***Androlaelaps sangsteri* (Radford, 1942).**

Liponyssus sangsteri Radford, 1942a: 190.

Liponyssus sangsteri.— Zumpt & Till, 1953b: 7.

Haemolaelaps sangsteri.— Strandtmann & Wharton, 1958: 44; Sakamoto et al., 1979: 41.

Androlaelaps sangsteri.— Till, 1963: 68; Fain & Hart, 1988: 442.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Bwamba Valley, Toro, Uganda, on *Protoxerus stangeri centricola* [Rodentia: Sciuridae].

***Androlaelaps scapularis* (Berlese, 1918).**

Hypoaspis (*Haemolaelaps*) *scapularis* Berlese, 1918: 124.

Hypoaspis (*Haemolaelaps*) *scapularis*.— Lombardini, 1936: 42.

Ischnolaelaps bathyergus Radford, 1939: 250 [Junior synonymy of *A. scapularis* by Till, 1963: 70].

Haemolaelaps scapularis.— Radford, 1943: 61; Radford, 1950: 367; Keegan, 1956b: 317.

Ischnolaelaps bathyergus.— Radford, 1943: 62.

Hypoaspis (*Haemolaelaps*) *bathyergus*.— Zumpt & Patterson, 1951: 70.

Haemolaelps eloffi Zumpt & Till, 1953: 226 [Junior synonymy of *A. scapularis* by Till, 1963: 70].

Haemolaelaps natalensis Zumpt & Till, 1953: 230 [Junior synonymy of *A. scapularis* by Till, 1963: 70].

Haemolaelaps bathyergus.— Zumpt & Till, 1953: 243; Tipton, 1960: 242.

Haemolaelaps eloffi.— Zumpt & Till, 1954: 209; Tipton, 1960: 242.

Haemolaelaps natalensis.— Zumpt & Till, 1954: 209; Tipton, 1960: 242.

Androlaelaps scapularis.— Till, 1963: 70.

TYPE DEPOSITORY: of *H.* (*H.*) *scapularis*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *I. bathyergus*: unspecified [according to Till, 1963 in Dr. C. D. Radford's collection]; of *H. eloffi* and *H.* natalensis: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT of *H.* (*H.*) *scapularis*: Durban, KwaZulu-Natal, South Africa, on *Spalax typhus* [Mammalia: Spalacidae]; of *I. bathyergus*: Strandtfountein, Cape Town, South Africa, on *Bathyergus suillus* [Rodentia:

Bathyergidae]; of *H. eloffi*: near Bloemfontein, Orange Free State, South Africa, on *Cryptomys bigalkei* [Rodentia: Bathyergidae]; of *H. natalensis*: near Pietermaritzburg, Natal, South Africa, on *Crytomyus natalensis* [Rodentia: Bathyergidae].

***Androlaelaps schaeferi* (Till, 1969).**

Androlaelaps schaeferi Till, 1969.

Androlaelaps sp..— Schaefer & Peckham, 1968.

Gromphadorholaelaps schaeferi Till, 1969: 516.

Gromphadorholaelaps schaeferi.— Costa, 1980: 547; Fain & Grootaert, 1991: 335; Gerdeman et al., 1998: 301.

Androlaelaps schaeferi.— Karg, 1991: 167.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: Connecticut, United States of America, in laboratory colonies of *Gromphadorhina portentosa* [Blattodea: Blaberidae].

***Androlaelaps schusteri* Hirschmann, 1966.**

Androlaelaps schusteri Hirschmann, 1966: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Carro, Marseille, France, in gravel and sand on the beach.

***Androlaelaps sciureus* (Fonseca, 1935) n. comb..**

Ischnolaelaps sciureus Fonseca, 1936: 31.

Ischnolaelaps sciureus.— Radford, 1943: 62.

Ischnolaelaps sciurinus [sic].— Strandtmann, 1949: 331.

Haemolaelaps sciureus.— Tipton, 1960: 242.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Estrella, Rio de Janeiro, Brazil, on *Coelogenys pacca* [now *Cuniculus paca*] [Rodentia: Cuniculidae].

***Androlaelaps sciuricola* Fain & Hart, 1988.**

Androlaelaps sciuricola Fain & Hart, 1988: 448.

TYPE DEPOSITORY: Musée royal de l'Afrique centrale, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Irangi Mifuti, Kivu, Democratic Republic of the Congo (= Zaire), on *Funisciurus* sp. [Rodentia: Sciuridae].

***Androlaelaps sclerotarsus* (Gu & Bai, 1995) n. comb..**

Haemolaelaps sclerotarsus Gu & Bai, 1995: 429.

Haemolaelaps clerotarsus [sic].— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Zhongwei (37°5'N, 105°1'E), Ningxia Hui Autonomous Region, China, "in a synoekete cave of beetle and *Eremias prezewalskii*" [Squamata: Lacertidae].

***Androlaelaps scutalis* Marais & Loots, 1970 n. comb..**

Androlaelaps (*Androlaelaps*) *scutalis* Marais & Loots, 1970: 3.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: on the left side of the Chari-river, near Lake Chad [Cameroon], in damp soil.

***Androlaelaps semidesertus* (Bregetova, 1952) .**

Haemolaelaps semidesertus Bregetova, 1952: 870.

Haemolaelaps semidesertus.— Bregetova, 1956: 91; Tipton, 1960: 242; Reitblat, 1963: 72; Teng & Pan, 1964: 328; Reitblat, 1965: 863; Shcherback, 1973: 446; Ren & Guo, 2008: 327.

Androlaelaps semidesertus.— Bregetova, 1977: 534.

TYPE DEPOSITORY: Zoological Museum, Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

TYPE LOCALITY AND HABITAT: type series, Tajikistan, on *Allactaga elater* [Rodentia: Dipodidae] and in its nest, Astrakhan and Stalingrad, Russia,on *Allactaga jaculus* [Rodentia: Dipodidae].

***Androlaelaps setaceosus* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelaps setaceosa Baker, Traub & Evans, 1962: 99.

Haemolaelaps setaceosa.— Domrow, 1979a: 246.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 2474.

TYPE LOCALITY AND HABITAT: 20 km north of Kuala Lumpur, Selangor, Malasia (=Malaya), on *Lariscus insignis* [Rodentia: Sciuridae].

***Androlaelaps setosa* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelaps setosa Baker, Traub & Evans, 1962: 97.

Haemolaelaps setosa.— Domrow, 1979a: 246.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America, accession number 2473.

TYPE LOCALITY AND HABITAT: Gombak Forest Reserve, Selangor, 20 km north of Kuala Lumpur, Malasia (=Malaya), on *Aeromys tephromeles* [Rodentia: Sciuridae].

***Androlaelaps shealsi* Costa, 1968.**

Androlaelaps shealsi Costa, 1968: 21.

Androlaelaps sheali [sic].— Costa, 1968: 24.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Ha'Emeq, Israel, in forest litter.

***Androlaelaps sikapusi* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps sikapusi Sakamoto, Jorgensen & Herrin, 1979: 55.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Oda, Ghana, on *Lophuromys sikapusi* [Rodentia: Muridae].

***Androlaelaps singularis* Wang & Li, 1965.**

Androlaelaps singularis Wang & Li, 1965: 237.

Androlaelaps singularis.— Gu & Duan, 1991: 340; Gu, Wang & Fan, 1996: 409; Ren & Guo, 2008: 328; Wang & Liao, 2000: 26; Xin et al., 2010: 2.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Fujian, China, *Suncus murinus* [Soricida].

***Androlaelaps sisyphus* (Domrow, 1980) n. comb..**

Haemolaelaps sisyphus Domrow, 1980a: 222.

Haemolaelaps sisyphus.— Domrow, 1987: 832.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Timbilica State Forest, New South Wales, Australia, in nasal passages of *Trichosurus vulpecula* (Diprotodontia: Phalangeridae).

***Androlaelaps spatuliformis* (Lavoipierre, 1956).**

Haemolaelaps spatuliformis Lavoipierre, 1956: 293.

Haemolaelaps spatuliformis.— Tipton, 1960: 242.

Androlaelaps spatuliformis.— Till, 1963: 72.

TYPE DEPOSITORY: Liverpool School of Tropical Medicine, Liverpool, England.

TYPE LOCALITY AND HABITAT: Bombe Rest House, near Kumba, Cameroon (= British Cameroons), on *Anomalurus fraseri* [Rodentia: Anomaluridae].

***Androlaelaps soricinus* Jameson Jr., 1966 n. comb..**

Haemolaelaps soricinus Jameson Jr., 1966: 100.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 6400 feet [1951 m] above sea level, 10 miles [16 km] east of Wu-She, Nan-T'ou, Taiwan, on *Anourosorex squamipes* [Soricomorpha: Soricidae].

***Androlaelaps spegazzinii* (Berlese, 1923).**

Hypoaspis (*Haemolaelaps*) *spegazzinii* Berlese, 1923: 254.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Abyssinia [= Ethiopian region], unspecified substrate.

***Androlaelaps spinosulus* (Berlese, 1920).**

Hypoaspis (*Haemolaelaps*) *spinosulus* Berlese, 1920: 152.

Hypoaspis (*Haemolaelaps*) *spinosolus* [sic].— Lombardini, 1936: 42.

Haemolaelaps spinosulus.— Radford, 1943: 61; Radford, 1950: 367.

Androlaelaps spinosulus.— Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Mexico, on unspecified substrate.

***Androlaelaps spinosus* (Furman, 1955).**

Eubrachylaelaps spinosus Furman, 1955: 54.

Eubrachylaelaps spinosus.— Tipton, 1960: 241.

Androlaelaps (*Eubrachylaelaps*) *spinosus*.— Barrera, 1979: 477.

Androlaelaps spinosus.— Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Four miles [6 km] east of Apatzingan, Michoacan, Mexico, on *Peromyscus* sp. [Rodentia: Cricetidae].

***Androlaelaps spreo* (Zumpt & Till, 1956).**

Haemolaelaps spreo Zumpt & Till, 1956: 290.

Haemolaelaps spreo.— Tipton, 1960: 242.

Androlaelaps spreo.— Till, 1963: 73; Till, 1972: 156.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Springs, South Africa, on *Spreo bicolor* [Passeriformes: Sturnidae].

***Androlaelaps sternalis* (Ewing, 1923).**

Ichoronyssus sternalis Ewing, 1923: 13.

Haemolaelaps sternalis.— Strandtmann, 1956: 138.

Androlaelaps sternalis.— Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 24746.

TYPE LOCALITY AND HABITAT: Plummer Island, Maryland, on a “woodchuck” [*Marmota morax*] [Rodentia: Sciuridae].

***Androlaelaps steyni* (Till, 1959).**

Haemolaelaps steyni Till, 1959: 430.

Haemolaelaps steyni.— Groknovskaya & Huan-Hoe, 1961: 1636; Domrow, 1981: 118.

Androlaelaps steyni.— Till, 1963: 75; Cort & Forbes, 1975: 572.

Androlaelaps (*Haemolaelaps*) *steynii* [sic].— Marais & Loots, 1970: 2.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: near Mabelikwa, north Transvaal, South Africa, on *Lybius torquatus* [Piciformes: Lybiidae].

***Androlaelaps subpavlovskii* Liu, Ma & Ding, 2000.**

Androlaelaps subpavlovskii Liu, Ma & Ding, 2000: 380.

Androlaelaps subpavlovshi [sic].— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute of Parasitic Diseases, Hubei Academy of Medical Sciences, Hubei, China.

TYPE LOCALITY AND HABITAT: about 2000 m above sea level, Shennongjia Forest region (31°15’-31°57’N, 109°56’-110°58’E), Hubei, China, on *Petaurista clarkei* [Rodentia: Sciuridae].

***Androlaelaps subterraneus* (Berlese, 1920) n. comb..**

Hypoaspis (*Haemolaelaps*) *subterraneus* Berlese, 1920: 153.

Hypoaspis (*Haemolaelaps*) *subterrameus*.— Lombardini, 1936: 42.

Haemolaelaps subterraneus.— Radford, 1943: 61; Radford, 1950: 367.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in deep soil.

***Androlaelaps suncus* Till, 1963.**

Androlaelaps suncus Till, 1963: 76.

Androlaelaps suncus.— Till, 1972: 160; Fain & Hart, 1988: 442.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Tibedi, Kingdom of Lesotho (= Basutoland), on *Suncus varius* [Soricomorpha: Soricidae].

***Androlaelaps tachyoryctes* (Radford, 1941).**

Haemolaelaps tachyoryctes Radford, 1941: 309.

Haemolaelaps tachyoryctes.— Radford, 1943: 61; Radford, 1950: 367; Zumpt & Till, 1953: 240; Keegan, 1956a: 236; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *tachyoryctes*.— Zumpt & Patterson, 1951: 70.

Androlaelaps tachyoryctes.— Till, 1963: 78; Dusbábek et al., 1982: 171; Fain & Hart, 1988: 443.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Kapretwa, Mount Elgon, Kenya, on *Tachyoryctes ruddi* [Rodentia: Spalacidae].

***Androlaelaps taterae* (Zumpt & Patterson, 1951).**

Hypoaspis (*Haemolaelaps*) *taterae* Zumpt & Patterson, 1951: 83.

Haemolaelaps taterae.— Zumpt & Till, 1953: 244; Tipton, 1960: 242.

Androlaelaps taterae.— Till, 1963: 80.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Zuurbekom, Roodepoort, Transvaal, South Africa, on *Tatera brantsii* [Rodentia: Muridae].

***Androlaelaps taterakempi* (Sakamoto, Jorgensen & Herrin, 1979) n. comb..**

Haemolaelaps taterakempi Sakamoto, Jorgensen & Herrin, 1979: 58.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Damongo, Ghana, on *Tatera valida kempi* [Rodentia: Muridae].

***Androlaelaps tateronis* (Radford, 1939).**

Ischnolaelaps tateronis Radford, 1939: 247.

Ischnolaelaps tateronis.— Radford, 1943: 62.

Hypoaspis (*Haemolaelaps*) *tateronis*.— Zumpt & Patterson, 1951: 70.

Haemolaelaps tateronis.— Zumpt & Till, 1953: 242; Tipton, 1960: 242; Sakamoto et al., 1979: 42.

Haemolaelaps radfordi Keegan, 1956a: 241 [Junior synonymy of *A. tateronis* by Till, 1963: 82; Zumpt & Elliot, 1970: 346].

Haemolaelaps radfordi.— Tipton, 1960: 242.

Androlaelaps tateronis.— Till, 1963: 82; Zumpt & Elliot, 1970: 346; Okereke, 1979: 280.

TYPE DEPOSITORY of *I. tateronis*: unspecified [according to Till, 1963 syntype in British Museum (Natural History), London, England]; of *H. radfordi*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT of *A. tateronis*: Toio River, Gulu, Uganda, on *Taterona benvenuta* [Rodentia: Muridae]; of *H. radfordi*: Yei, Equatoria, South Sudan (= Sudan), on unidentified rat [Rodentia].

***Androlaelaps tauffliebi* Till, 1963.**

Androlaelaps tauffliebi Till, 1963: 83.

Haemolaelaps tauffliebi.— Sakamoto et al., 1979: 41.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1962.6.12.21.

TYPE LOCALITY AND HABITAT: Lac Calundo, Angola, on *Cryptomys mechowi*

[Rodentia: Bathyergidae].

***Androlaelaps telemachus* (Domrow, 1964) n. comb..**

Haemolaelaps telemachus Domrow, 1964: 160.

Haemolaelaps telemachus.— Domrow, 1972a: 110; Domrow, 1977: 198; Domrow, 1980a: 221; Domrow, 1987: 832.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Glenlofty, Victoria, Australia, on *Antechinus flavipes* (Dasyuromorphia: Dasyuridae).

***Androlaelaps theseus* (Zumpt, 1950).**

Hypoaspis (*Androlaelaps*) *theseus* Zumpt, 1950b: 301.

Hypoaspis (*Androlaelaps*) *theseus*.— Zumpt & Patterson, 1950: 73; Lavoipierre, 1955b: 126.

Androlaelaps theseus.— Zumpt & Patterson, 1952: 162; Cooreman, 1954: 163; Till, 1963: 85.

Turkiella theseus.— Zumpt & Till, 1953: 225.

Androlaelaps ?theseus.— Costa, 1969b: 196.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Wakkerstroom, Transvaal, South Africa, on *Mastomys coucha* [Rodentia: Muridae].

NOTE: Turk & Turk, 1952: 484 believed *H.* (*A.*) *theseus* not to belong to *Hypoaspis* (*Androlaelaps*).

***Androlaelaps tillae* Makowski, 1965.**

Androlaelaps tillae Makowski, 1965: 461.

Androlaelaps tillae.— Zumpt & Elliott, 1970: 341.

Haemolaelaps tillae.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Bloemof Nature Reserve, Transvaal, South Africa, on *Cynictis penicillata* [Carnivora: Herpestidae].

***Androlaelaps torresi* Mauri & Alzuet, 1970.**

Androlaelaps torresi Mauri & Alzuet, 1970: 143.

Androlaelaps torresi.— Mauri & Capri, 1970: 134.

TYPE DEPOSITORY: División de Entomología de La Facultad de Ciencias Naturales y Museo de La Plata, La Plata, Argentina.

TYPE LOCALITY AND HABITAT: General Lavalle, Buenos Aires, Argentina, on *Ctenomys talarum antonii* [Rodentia: Ctenomyidae].

***Androlaelaps traubi* (Strandtmann, 1948) n. comb..**

Atricholaelaps traubi Strandtmann, 1948: 187.

Haemolaelaps traubi.— Asanuma, 1953: 10; Tipton, 1960: 242; Baker et al., 1962: 91; Domrow, 1963: 202; Teng & Pan, 1964: 328, Domrow, 1979a: 246; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Myitkyina, Burma, on *Callosciuius quinquestriatus quinquestriatus* [Rodentia: Sciuridae].

***Androlaelaps triangularis* (Wang, 1963) n. comb..**

Haemolaelaps triangularis Wang, 1963: 202.

Haemolaelaps triangularis.— Teng & Pan, 1964: 329; Gu & Wang, 1981: 392; Wang & Liao, 2000: 22.

Haemolaelaps triangular [sic].— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Fujian, China, unspecified substrate.

***Androlaelaps trifurcatoides* Yan & Ma, 1999.**

Androlaelaps trifurcatoides Yan & Ma, 1999: 149.

Androlaelaps trifurcatoides.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Wuhan (30°31'N, 114°16'E), Hubei, China, in humus under trees.

***Androlaelaps trifurcatus* Wang & Li, 1965.**

Androlaelaps trifurcatus Wang & Li, 1965: 238.

Androlaelaps trifurcatus.— Li et al., 1998: 266; Ren & Guo, 2008: 328; Wang & Liao, 2000: 27.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Fujian, China, on *Rattus losea exiguus* [Rodentia: Muridae].

***Androlaelaps tuberans* Furman, 1972.**

Androlaelaps tuberans Furman, 1972: 56.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America, accession number SVP 15761.

TYPE LOCALITY AND HABITAT: 150 m above sea level, Belén, Río Cununcunuma, Tropical Forest Amazonas, Venezuela, on *Marmosa cinerea* [Didelphimorphia: Didelphidae].

***Androlaelaps turcmenicus* (Meledzhayeva, 1963) n. comb.**

Haemolaelaps turcmenicus Meledzhayeva, 1963: 55.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series: Kerky, Zakhmet, Karakum, Turkmenistan, in tunnel of Barkan cat and on unidentified tenebrionid beetle [Coleoptera: Tenebrionidae].

***Androlaelaps ulixes* (Domrow, 1972) n. comb..**

Haemolaelaps ulixes Domrow, 1972a: 112.

Haemolaelaps ulixes.— Domrow, 1980a: 222; Domrow, 1987: 833.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Brindabella Range, Australian Capital Territory, on *Schoinobates volans* (Diprotodontia: Petauridae).

NOTE: *Haemolaelaps ulixes* was described based on speciemens previously reported by Domrow, 1964: 156 as *Haemolaelaps ulysses*.

***Androlaelaps ultraspinosus* (Baker, Traub & Evans, 1962) n. comb..**

Haemolaelaps ultraspinosa Baker, Traub & Evans, 1962: 98.

TYPE DEPOSITORY: Chicago Natural History Museum, Illinois, United States of America; accession number 63025.

TYPE LOCALITY AND HABITAT: Palawan Island, Puerto Princessa, Babuyan, Philippines, on *Hylopetes nigripes nigripes* [Rodentia: Sciuridae].

***Androlaelaps ulysespardinasi* Lareschi, 2011.**

Androlaelaps ulysespardinasi Lareschi, 2011: 795.

TYPE DEPOSITORY: Collection of División de Entomología, Museo de La Plata, La Plata, Argentina; accession number MLP-CNP742-3.

TYPE LOCALITY AND HABITAT: 95m above sea level, Estancia Santa Inés (27°31'32'S; 55°52'19'W), Ruta 105, km 10, Posadas, Misiones, Argentina, on *Akodon philipmyersi* (Rodentia: Cricetidae).

***Androlaelaps ulysses* (Domrow, 1961) n. comb..**

Haemolaelaps ulysses Domrow, 1961: 63.

Haemolaelaps ulysses.— Domrow, 1965: 173; Domrow, 1972a: 111; Domrow, 1980a: 222; Domrow, 1987: 833.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Warramate Hills, near Lilydale, Victoria, Australia, on *Pseudocheirus peregrinus laniginosus* (Diprotodontia: Phalangeridae).

NOTE: Specimens reported by Domrow, 1964: 156 as *Haemolaelaps ulysses* were described as *Haemolaelaps ulixes* by Domrow, 1972a: 112.

***Androlaelaps verneri* Dusbábek, Daniel & Till, 1982.**

Androlaelaps verneri Dusbábek, Daniel & Till, 1982: 172**.**

TYPE DEPOSITORY: Institute of Parasitology of the Czechoslovak Academy of Science, Prague, Czech Republic; accession number PaÚ ČSAV 1924.

TYPE LOCALITY AND HABITAT: Toro Game Reserve, Semliki Valley, Uganda, on *Pelomys minor* [Rodentia: Muridae].

***Androlaelaps villosissimus* (Berlese,) n. comb..**

Hypoaspis (*Haemolaelaps*) *villosissimus* Berlese,

Haemolaelaps villosissimus.— Berlese, 1918: 128; Radford, 1943: 61; Radford, 1950: 367; Zumpt & Till, 1953: 244; Keegan, 1956b: 315; Tipton, 1960: 242.

Hypoaspis (*Haemolaelaps*) *villosissimus*.— Lombardini, 1936: 42; Zumpt & Patterson, 1950: 68; Zumpt & Patterson, 1951: 83.

Androlaelaps villosissimus.— Till, 1963: 87.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: M'fongosi, Zululand [KwaZulu-Natal], South Africa, on *Saccostomus campestris* [Rodentia: Nesomyidae] and *Mus coucha* [Rodentia: Muridae].

***Androlaelaps walkerae* Till, 1963.**

Androlaelaps walkerae Till, 1963: 88.

Androlaelaps walkerae.— Fain & Hart, 1988: 443.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Muguga North, Kenya, on *Tachyoryctes splendens* [Rodentia: Spalacidae].

***Androlaelaps wilkini* (Till, 1959).**

Haemolaelaps wilkini Till, 1959: 432.

Androlaelaps wilkini.— Till, 1963: 90; Cort & Forbes, 1975: 571.

Androlaelaps (*Haemolaelaps*) *wilkini*.— Marais & Loots, 1970: 2.

Haemolaelaps wilkini.— Domrow, 1981: 118.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: near Debeete, Botswana (= Bechuanaland Protectorate), on *Myrmecocichla formicivora* [Passeriformes: Muscicapidae].

***Androlaelaps willmanni* (Fonseca, 1958) n. comb..**

Atricholaelaps (*Atricholaelaps*) *willmanni* Fonseca, 1958: 170.

TYPE DEPOSITORY: unspecified, accession number 2410.

TYPE LOCALITY AND HABITAT: Triunfo, State of Pernambuco, Brazil, on *Zygodontomys pixuna* [Rodentia: Cricetidae].

***Androlaelaps yiliensis* (Ye & Ma, 1996) n. comb..**

Haemolaelaps yiliensis Ye & Ma, 1996: 296.

Haemolaelaps yiliensis.— Ma, 2007: 922; Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Xinjiang Institute for Endemic Disease Control and Research, Urumqi, China.

TYPE LOCALITY AND HABITAT: Chabuchaer (43°50'N, 81°05'E), Xinjiang, China, on *Meriones tamariscinus* [Rodentia: Muridae].

***Androlaelaps zaheri* (Hafez, ElBadry & Nasr, 1982).**

Androlaelaps (*Haemolaelaps*) *zaheri* Hafez, ElBadry & Nasr, 1982: 5.

Androlaelaps zaheri.— Zaher, 1986: 183; Basha & Yousef, 2000: 396.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Faculty of Agriculture, Cairo University, Giza, Egypt, in manure.

***Androlaelaps zhongweiensis* (Bai, Chen & Wang, 1987) n. comb..**

Haemolaelaps zhongweiensis Bai, Chen & Wang, 1987: 387.

Haemolaelaps zhongweiensis.— Ren & Guo, 2008: 327.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Zhongwei (37°5'N, 105°1'E), Ningxia Hui Autonomous District, China, in a mouse hole.

***Androlaelaps ziegleri* Karg, 1991.**

Androlaelaps ziegleri Karg, 1991: 166.

TYPE DEPOSITORY: Arachnida section, Zoological Museum, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Madagascar, on *Princisia* sp. [Blattodea: Blaberidae].

***Androlaelaps zulu* (Berlese, 1918).**

Hypoaspis (*Haemolaelaps*) *inops* var. *zulú* Berlese, 1918: 125.

Haemolaelaps inops var. *zulu.*— Radford, 1943: 61; Radford, 1950: 366; Keegan, 1956a: 234; Keegan, 1956b: 318.

Hypoaspis (*Haemolaelaps*) *zulu.*— Zumpt & Patterson, 1951: 70.

Androlaelaps zulu.— Till, 1963: 91; Okereke, 1979: 280; Dusbábek et al., 1982: 172; Fain & Hart, 1988: 443.

Haemolaelaps zulu.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: M'fongosi, Zululand [KwaZulu-Natal], South Africa, on *Arvicanthus dorsalis* [Mammalia: Muridae].

NOTE: This species was originally described as *Hypoaspis* (*Haemolaelaps*) *inops* var. *zulu* Berlese, 1918: 125.

***Androlaelaps zuluensis* (Zumpt, 1950).**

Hypoaspis (*Androlaelaps*) *zuluensis* Zumpt, 1950b: 300.

Hypoaspis (*Androlaelaps*) *zuluensis*.— Zumpt & Patterson, 1950: 70.

Turkyella zuluensis.— Zumpt & Till, 1953: 218.

Androlaelaps zuluensis.— Keegan, 1956a: 229; Till, 1963: 94; Allred, 1969: 242; Costa, 1969b: 202; Allred, 1975: 125; Okereke & Rack, 1983: 439; Fain & Hart, 1988: 443; Karg, 1993b: 270; Oyoun & El Kady, 1995: 96.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Abercorn pont, Zululand, KwaZulu-Natal, South Africa, on *Aethiomys namaquensis* [Rodentia: Muridae].

NOTE: Turk & Turk, 1952: 484 believed *H.* (*A.*) *zuluensis* not to belong to *Hypoaspis* (*Androlaelaps*).

***Androlaelaps zumpti* Till, 1963.**

Androlaelaps zumpti Till, 1963: 95.

Androlaelaps zumpti.— Till, 1972: 160; Fain & Hart, 1988: 448; Matthee & Ueckermann, 2008: 189.

Haemolaelaps zumpti.— Sakamoto et al., 1979: 43.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Richmond, Cape, South Africa, on *Rattus* (*Aethomys*) sp. [Rodentia: Muridae].

***Angosomaspis* Costa, 1971.**

Angosomaspis Costa, 1971: 92.

TYPE SPECIES: *Angosomaspis multisetosus* Costa, 1971.

***Angosomaspis multisetosus* Costa, 1971.**

Angosomaspis multisetosus Costa, 1971: 92.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: near Abidjan, Ivory Coast, on *Angosoma centarus* (Coleoptera: Dynastidae).

***Bisternalis* Hunter, 1963.**

Bisternalis Hunter, 1963: 5.

Bisternalis.— Baker et al., 1994: 181; Casanueva, 1993: 40; Ueckerman & Loots, 1995: 35.

TYPE SPECIES: *Bisternalis rettenmeyeri* Hunter, 1963: 6.

***Bisternalis camargoi* Baker, Flechtmann & Delfinado-Baker, 1984.**

Bisternalis camargoi Baker, Flechtmann & Delfinado-Baker, 1984: 183.

TYPE DEPOSITORY: Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, State of São Paulo, Brazil; accession number 1399.

TYPE LOCALITY AND HABITAT: Acanga, Borelos, Amazonas, Brazil, in nest of *Lestrimellita limao* (Hymenoptera: Apidae).

***Bisternalis formosus* Baker, Flecthmann & Delfinado-Baker, 1984**.

Blisternalis [sic] *formosus* Baker, Flecthmann & Delfinado-Baker, 1984: 183.

TYPE DEPOSITORY: Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, São Paulo, Brazil; accession number 1525.

TYPE LOCALITY AND HABITAT: Aruti, Amazonas, Brazil, in nest of *Trigona* (*Trigona*) *fulviventris* (Hymenoptera: Apidae).

***Bisternalis hunteri* Baker, Delfinado-Baker & Ordaz, 1983.**

Bisternalis hunteri Baker, Delfinado-Baker & Ordaz, 1983: 3.

Bisternalis hunteri.— Baker et al., 1984: 183; Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum and Natural History, Beltsville, Maryland, United States of America.

TYPE LOCALITY AND HABITAT: Barro Colorado Island, Panama Canal Zone, in nest of *Trigona* sp. [Hymenoptera: Apidae].

NOTE: Species described based on an adult female previously considered a paratype of *Bisternalis rettenmeyeri* Hunter, 1963.

***Bisternalis mexicanus* Baker, Delfinado-Baker & Ordaz, 1983.**

Bisternalis mexicanus Baker, Delfinado-Baker & Ordaz, 1983: 7.

Bisternalis mexicanus.— Baker et al., 1984: 188; Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum of Natural History, Beltsville, Maryland, United States of America.

TYPE LOCALITY AND HABITAT: Potrero Viejo, Cordoba, Veracruz, Mexico, in nest of *Melipona* sp. [Hymenoptera: Apidae].

***Bisternalis rettenmeyeri* Hunter, 1963.**

Bisternalis rettenmeyeri Hunter, 1963: 6.

Bisternalis rettenmeyeri.— Baker et al., 1983: 3; Baker et al., 1984: 188; Farrier & Hennessey, 1993: 67.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Barro Colorado Island, Panama Canal Zone, in nest of *Trigona* sp. [Hymenoptera: Apidae].

NOTE: An adult female previously considered a paratype of *Bisternalis rettenmeyeri* Hunter, 1963 was described as *Bisternalis hunter* Baker, Delfinado-Baker & Ordaz, 1983.

***Bisternalis trigonarum* Baker, Flechtmann & Delfinado-Baker, 1984.**

Bisternalis trigonarum Baker, Flechtmann & Delfinado-Baker, 1984: 185.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, State of São Paulo, Brazil; accession number 1520.

TYPE LOCALITY AND HABITAT: Tauari, Pará, Brazil, in nest of *Trigona chanchamayoensis* (Hymenoptera: Apidae).

***Blaberolaelaps* Costa, 1980.**

Blaberolaelaps Costa, 1980: 547.

Blaberolaelps.— Hunter, Rosario & Flechtmann, 1988: 297; Casanueva, 1993: 40.

TYPE SPECIES: *Blaberolaelaps matthiesensis* Costa, 1980: 548.

***Blaberolaelaps beckeri* Hunter, Rosario & Flechtmann, 1988.**

Blaberolaelaps beckeri Hunter, Rosario & Flechtmann, 1988: 298.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queriroz”, Universidade de São Paulo, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Morro Reuter, Dois Irmãos, State of Rio Grande do Sul, Brazil, on *Hieroblatta cassidea* [Blattodea: Blaberidae].

***Blaberolaelaps matthiesensis* Costa, 1980.**

Blaberolaelaps matthiesensis Costa, 1980: 548.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: São Paulo, Brazil, in a laboratory colony of *Blaberus piracicabensis* [Blattodea: Blaberidae].

***Cerambylaelaps* Costa, 1978.**

Cerambylaelaps Costa, 1978: 188.

TYPE SPECIES: *Cerambylaelaps nadchatrami* Costa, 1978: 189.

***Cerambylaelaps nadchatrami* Costa, 1978.**

Cerambylaelaps nadchatrami Costa, 1978: 189.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Hooper study area, 12th mile Gombak, Selangor, Malaysia, on unidentified cerambycid [Coleoptera: Cerambycidae].

***Chapalania* Hoffmann & López-Campos, 1995.**

Chapalania Hoffmann & López-Campos, 1995: 38.

ETYMOLOGY: The genus name refers to Lago de Chapala, Jalisco, Mexico, near which the types of the type species were collected.

TYPE SPECIES: *Chapalania cifuentesi* Hoffmann & López-Campos, 1995: 39.

***Chapalania cifuentesi* Hoffmann & López-Campos, 1995.**

Chapalania cifuentesi Hoffmann & López-Campos, 1995: 39.

TYPE DEPOSITORY: Anita Hoffmann's collection, Instituto de Biología, Universidad Nacional Autónoma de Mexico, Mexico D. F., Mexico.

TYPE LOCALITY AND HABITAT: near Lago de Chapala, Jalisco, Mexico, on *Strategus aloeus* (Coleoptera: Melolonthidae).

***Coleolaelaps* Berlese, 1914.**

Coleolaelaps Berlese, 1914: 141.

Coleolaelaps.— Vitzthum, 1929: 23 (in part); Vitzthum, 1943: 763; Costa & Hunter, 1971: 326; Casanueva, 1993: 40.

Hypoaspis (*Coleolaelaps*).— Bregetova, 1977: 496; Joharchi & Halliday, 2011: 24.

TYPE SPECIES: *Laelaps* (*Iphis*) *agrestis* Berlese, 1887, Fasc. XL, n.7, by original designation.

***Coleolaelaps agrestis* (Berlese, 1887).**

Laelaps (*Iphis*) *agrestis* Berlese, 1887: XL, n. 7.

Iphis agrestis.— Berlese, 1892: 35.

Laelaps agrestis.— Berlese, 1892: 42.

Hypoaspis (*Coleolaelaps*) *agrestis*.— Berlese, 1913b: 199.

Coleolaelaps agrestis.— Berlese, 1914: 141; Vitzthum, 1929: 27; Lombardini, 1936: 39; Womersley, 1956a: 585; Costa & Hunter, 1971: 328; Ma, 1997: 26; Karg, 1999: 433.

Laelaps agrestis; *non Laelaps*.— Tipton, 1960: 286.

Coleolaelaps ?agrestis.— Costa, 1966c: 73.

Hypoaspis (*Coleolaelaps*) *agrestis*.— Bregetova, 1977: 499.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Italy, on *Melolontha fullonis* [Coleoptera: Scarabaeidae].

***Coleolaelaps abnormalis* Costa & Hunter, 1971.**

Coleolaelaps abnormalis Costa & Hunter, 1971: 331.

Coleolaelaps abnormalis.— Karg, 1999: 432; Joharchi & Halliday, 2011: 24; Joharchi et al., 2012: 283.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Sdeh Nekhemia, Israel, on larva of *Anoxia orientalis* [Coleoptera: Scarabaeidae].

***Coleolaelaps amazon* Berlese, 1920.**

Coleolaelaps amazon Berlese, 1920: 156.

Coleolaelaps amazon.— Lombardini, 1936: 39.

Hypoaspis (*Coleolaelaps*) *amazon*.— Evans, 1955: 361; Ryke, 1959: 7.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Bardeira, Somalia, on unidentified centipedes [Chilopoda].

***Coleolaelaps asiaticus* Karg, 1999**.

Coleolaelaps asiaticus Karg, 1999: 431.

Coleolaelaps asiaticus.— Joharchi & Halliday, 2011: 24.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Alma Ata, Kazakhstan, on *Polyphylla* cf. *adspersa* [Coleoptera: Scarabaeidae].

***Coleolaelaps bakeri* Costa & Hunter, 1971.**

Coleolaelaps bakeri Costa & Hunter, 1971: 337.

Coleolaelaps bakeri.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America.

TYPE LOCALITY AND HABITAT: Saint Andrew's State Park, Florida, United States of America, on *Polyphylla pubescens* [Coleoptera: Scarabaeidae].

***Coleolaelaps brachysetus* Costa & Hunter, 1971.**

Coleolaelaps brachysetus Costa & Hunter, 1971: 333.

Coleolaelaps brachysetus.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America.

TYPE LOCALITY AND HABITAT: Douglas, Georgia, United States of America, on *Polyphylla occidentalis* [Coleoptera: Scarabaeidae].

***Coleolaelaps brasilianus* Lombardini, 1940.**

Coleolaelaps brasilianus Lombardini, 1940: 102.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Brazil, on *Oryctes* sp. [Coleoptera: Dynastidae].

***Coleolaelaps camini* Costa & Hunter, 1971.**

Coleolaelaps camini Costa & Hunter, 1971: 346.

Coleolaelaps camini.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America.

TYPE LOCALITY AND HABITAT: Visalia, California, United States of America, on *Polyphylla sobrina* [Coleoptera: Scarabaeidae].

***Coleolaelaps coriaceus* Berlese, 1920.**

Coleolaelaps coriaceus Berlese, 1920: 156.

Coleolaelaps coriaceus.— Lombardini, 1936: 39.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: South America, unspecified substrate.

***Coleolaelaps costai* Joharchi & Halliday, 2011.**

Coleolaelaps costai Joharchi & Halliday 2011: 24.

Coleolaelaps costai.— Bahrami et al., 2011: 350.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 2130 m above sea level, Shahrestanak (35°57'N, 51°21'E), Karaj, Tehran, Iran, on *Polyphylla olivieri* (Coleoptera: Scarabaeidae).

***Coleolaelaps egregius* Berlese: 1920.**

Coleolaelaps egregius Berlese: 1920: 155.

Coleolaelaps egregius.— Lombardini, 1936: 39.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, unspecified substrate.

***Coleolaelaps ferdowsi* Joharchi, 2012.**

Coleolaelaps ferdowsi Joharchi in Joharchi et al., 2012: 280.

TYPE DEPOSITORY: Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Tehran, Iran.

TYPE LOCALITY AND HABITAT: Neishabour, Khorasan Razavi, Iran, on larva of *Polyphylla* sp. (Coleoptera: Scarabaeidae).

***Coleolaelaps gracilis* Costa & Hunter, 1971.**

Coleolaelaps gracilis Costa & Hunter, 1971: 335.

Coleolaelaps gracilis.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America; accession number 5409.

TYPE LOCALITY AND HABITAT: Kissimmee, Florida, United States of America, on *Polyphylla gracilis* [Coleoptera: Scarabaeidae].

***Coleolaelaps indicus* Bhattacharyya, 1967.**

Coleolaelaps indicus Bhattacharyya, 1967: 131.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India; accession number Z.S.I. Reg. No. 2730/17.

TYPE LOCALITY AND HABITAT: Stn. No. 22, North East Frontier Agency, Kameng Division, Bhalukpung, Arunachal Pradesh, India, in soil of potato and brinjal cultivation [Solanales: Solanaceae].

***Coleolaelaps inopinatus* Grandi, 1926.**

Coleolaelaps inopinatus Grandi, 1926, 211.

Coleolaelaps inopinatum [sic].— Womersley, 1956a: 585.

Coleolaelaps ?inopinatus.— Costa, 1966c: 73.

Coleolaelaps inopinatus.— Costa & Hunter, 1971: 356.

Hypoaspis (*Coleolaelaps*) *inopinatus*.— Bregetova, 1977: 499; Karg, 1999: 433.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: unspecified type locality, on *Anoxiae matutinalis* v. *suturalis* [Scarabaiedae].

NOTE: According to Costa & Hunter, 1971: 323, *C. inopinatus* may be conspecific with *C. agrestis*.

***Coleolaelaps krantzi* Costa & Hunter, 1971.**

Coleolaelaps krantzi Costa & Hunter, 1971: 339.

Coleolaelaps krantzi.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America.

TYPE LOCALITY AND HABITAT: Dahlonega, Georgia, United States of America, on *Polyphylla comes* [Coleoptera: Scarabaeidae].

***Coleolaelaps lizeri* Berlese, 1914.**

Coleolaelaps lizeri Berlese, 1914: 142.

Coleolaelaps lizeri.— Lombardini, 1940: 103.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, on *Diloboderus abderus* [Coleoptera: Scarabaeidae].

***Coleolaelaps longisetatus* Ishikawa, 1968.**

Coleolaelaps longisetatus Ishikawa, 1968: 211.

Coleolaelaps longisetatus.— Costa & Hunter, 1971: 342; Ma, 1997: 26; Karg, 1999: 433.

Hypoaspis (*Coleolaelaps*) *longisetatus*.— Ishikawa, 1985: 185.

TYPE DEPOSITORY: Biological Laboratory, Matsuyama Shinonome Junior College, Matsuyama, Japan.

TYPE LOCALITY AND HABITAT: Oda Machi, Shikoku, Japan, on *Polyphylla laticollis* (Coleoptera: Scarabaeidae).

***Coleolaelaps longius* Lombardini, 1940.**

Coleolaelaps longius Lombardini, 1940: 104.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Brazil, on *Oryctes* sp. [Coleoptera: Dynastidae].

***Coleolaelaps massoumii* Khanjani, Ghaedi & Ueckermann, 2013.**

Hypoaspis surii Khanjani, Ghaedi & Ueckermann, 2013: 473.

TYPE DEPOSITORY: Acarology Laboratory, Bu-Ali Sina University, Hamedan, Iran.

TYPE LOCALITY AND HABITAT: 1733 m above sea level, potato farms at Hamedan (36°46'N, 48°34'E), Iran, on *Polyphylla olivieri* (Coleoptera: Scarabaeidae) from cherry trees.

***Coleolaelaps maximus* Cooreman, 1948.**

Coleolaelaps maximus Cooreman, 1948: 7.

TYPE DESPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: l'île Tshegera, Lake Kivu, 3 km south of Bolengo, Democratic Republic of the Congo, in a tool to cut weeds.

***Coleolaelaps minor* Lombardini, 1940: 104.**

Coleolaelaps minor Lombardini, 1940: 104.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Brazil, on *Mallodon* sp. [Coleoptera: Cerambycidae].

***Coleolaelaps passali* Lombardini, 1940.**

Coleolaelaps passali Lombardini, 1940: 104.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Brazil, on a passalid beetle [Coleoptera: Passalidae].

***Coleolaelaps pinguis* Berlese.**

Coleolaelaps pinguis Berlese.

Coleolaelaps pinguis.— Lombardini, 1936: 39.

NOTE: Berlese appud Lombardini, 1936.

***Coleolaelaps proximus* Cooreman, 1948.**

Coleolaelaps proximus Cooreman, 1948: 13.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Kisenyi, northeast of Lake Kivu, Democratic Republic of the Congo, near a small pond, on unspecified substrate.

***Coleolaelaps sternotomus* Cooreman, 1948.**

Coleolaelaps sternotomus Cooreman, 1948: 14.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Kalondo, near the shore of Lake Ndalaga, Democratic Republic of the Congo, on unspecified substrate.

***Coleolaelaps tillae* Costa & Hunter, 1971.**

Coleolaelaps tillae Costa & Hunter, 1971: 344.

Coleolaelaps tillae.— Ma, 1997: 26; Karg, 1999: 433.

TYPE DEPOSITORY: American Museum of Natural History, New York, United States of America.

TYPE LOCALITY AND HABITAT: Yen-Ping, China, on *Polyphylla mongola* [Coleoptera: Scarabaeidae].

***Coleolaelaps tongyuensis* Ma, 1997.**

Coleolaelaps tongyuensis Ma, 1997: 26.

Coleolaelaps tongyuensis.— Karg, 1999: 433.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Tongyu (44.8°N, 123.1°E), Jilin, China, on unidentified beetle, in a decomposed rodent nest.

***Coleolaelaps variosetatus* Karg, 1999.**

Coleolaelaps variosetatus Karg, 1999: 430.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Aladagh Mountain, Demirkazik, Turkey, on *Anoxia villosa* [Coleoptera: Scarabaeidae].

***Cosmolaelaps* Berlese, 1903.**

Laelaps (*Cosmolaelaps*) Berlese, 1903: 13.

Laelaps (*Cosmolaelaps*).— Berlese, 1904: 415.

Cosmolaelaps.— Berlese, 1920: 157; Vitzthum, 1929: 22; Bregetova, 1956: 71; Evans, 1957: 231; Sheals, 1962: 107; Rosario, 1981: 37; Zaher, 1986: 200; Casanueva, 1993: 40; Hunter, 1993: 23; Botelho et al., 2002: 54; Karg & Schorlemmer, 2013: 202; Moreira et al., 2014: 318.

Hypoaspis (*Cosmolaelaps*).— Vitzthum, 1941: 762; Schweizer, 1961: 149; Evans & Till, 1966: 160; Bregetova, 1977: 511; Karg, 1979: 71 (in part); Karg, 1981a: 213 (in part); Karg, 1988: 509 (in part); Hafez et al., 1982: 3; Karg, 1982: 234; Karg, 1989: 107; Karg, 1993a: 136 (in part); Fouly et al., 1997: 33; Fariji et al., 2008: 207; Huhta & Karg, 2010: 330 (in part).

Hypoaspis.— Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

TYPE SPECIE: *Laelaps claviger* Berlese, 1883: fasc.IV, n.2.

NOTE: Karg 1979: ????, 1993a: 137 considered *Hypoaspis* (*Cosmolaelaps*) to be the senior synonym of *Stratiolaelaps* Berlese, which was not accepted by subsequent (Walter & Campbell, 2003; Karg & Schorlemmer, 2013; Moreira et al., 2014). In this publication the latter interpretation is adopted.

***Cosmolaelaps aciphilus* (Karg, 1987).**

Hypoaspis (*Cosmolaelaps*) *aciphila* Karg, 1987: 295.

Hypoaspis (*Cosmolaelaps*) *aciphila*.— Karg, 1988: 511; Mašán, 1992: 387; Karg, 1993a: 138.

Cosmolaelaps aciphilus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: “Pra dei Cavai” Farm, San Stino, Livenza, Venice, Italy, in corn field soil.

***Cosmolaelaps acutiscutus* Teng, 1982.**

Cosmolaelaps acutiscutus Teng, 1982: 162.

Cosmolaelaps acutiscutus.— Wang & Wang, 1991: 250; Moreira et al., 2014: 319.

Hypoaspis (*Cosmolaelaps*) *acutiscutus*.— Bai & Ma, 2012: 557.

Hypoaspis acutiscutus.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Taipei, China.

TYPE LOCALITY AND HABITAT: Jiangsu, China, on unidentified Coleoptera.

***Cosmolaelaps alexandrini* (Fox, 1946).**

Ischnolaelaps alexandrini Fox, 1946a: 447.

Hypoaspis s. l. *alexandrini*.— Strandtmann, 1949: 348.

Androlaelaps alexandrini.— Farrier & Hennessey, 1993: 64.

Cosmolaelaps alexandrini.— Freire & Moraes, 2007: 356; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico.

TYPE LOCALITY AND HABITAT: Camp O'Reilly, Gurabo, Puerto Rico, on *Rattus rattus* [Rodentia: Muridae].

***Cosmolaelaps anserinus* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *anserina* Karg, 1981a: 222.

Hypoaspis (*Cosmolaelaps*) *anserina*.— Karg, 1988: 513; Cuervo et al., 1994: 18.

Cosmolaelaps anserinus.— Farrier & Hennessey, 1993: 68; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Cuba, unspecified substrate.

***Cosmolaelaps barbatus* Moreira, Klompen & Moraes, 2014.**

Cosmolaelaps barbatus Moreira, Klompen & Moraes, 2014: 322.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: from a laboratory colony initiated with specimens collected at Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil, from litter under *Capsicum chinense* (Solanales: Solanaceae).

***Cosmolaelaps bengalensis* (Bhattacharyya, 1968).**

Hypoaspis bengalensis Bhattacharyya, 1968: 543.

Hypoaspis bengalensis.— Prasad, 1974: 150.

Hypoaspis (*Cosmolaelaps*) *bengalensis*.— Karg, 1987: 293; Karg, 1988: 512; Huhta & Karg, 2010: 330.

Cosmolaelaps bengalensis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: Uttar Jhapardaha, Domjur, Howrah, West Bengal, India, in grass litter.

***Cosmolaelaps bicuspisetosus* Willmann, 1953.**

Cosmolaelaps bicuspisetosus Willmann, 1953: 460.

Hypoaspis (*Cosmolaelaps*) *bicuspisetosus*.— Bregetova, 1977: 511.

Hypoaspis (*Cosmolaelaps*) *bicuspisetosa*.— Karg, 1981a: 214; Karg, 1987: 293; Karg, 1988: 511; Mašán, 1992: 387; Karg, 1993a: 137.

Cosmolaelaps bicuspisetosus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: 1400-1500 m above sea level, Heiligenblut, Glockner Group, Austria, from sieved grass from a steppe meadow.

***Cosmolaelaps bipennatus* (Karg, 2003).**

Hypoaspis (*Cosmolaelaps*) *bipennata* Karg, 2003b: 230.

Cosmolaelaps bipennatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Pichinca (probably Pichincha), Ecuador, in moss.

***Cosmolaelaps bispinosus* (Karg, 1997).**

Hypoaspis (*Cosmolaelaps*) *bispinosa* Karg, 1997a: 84.

Cosmolaelaps bispinosus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Mont Koghi, New Caledonia, unspecified substrate.

***Cosmolaelaps brevilingua* Karg, 2006.**

Hypoaspis (*Cosmolaelaps*) *brevilingua* Karg, 2006: 149.

Cosmolaelaps brevilingua.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Flavio Alfaro, Ecuador, in litter of cacao plantation.

***Cosmolaelaps brevipedestrus* (Karg, 1985).**

Hypoaspis (*Cosmolaelaps*) *brevipedestra* Karg, 1985: 234.

Hypoaspis (*Cosmolaelaps*) *brevipedestra*.— Karg, 1988: 516; Faraji et al., 2008: 207.

Cosmolaelaps brevipedestrus.— Farrier & Hennessey, 1993: 68; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: near Havana-Mariel, Cuba, in nest of *Nasutitermes* sp. (Isoptera: Termitidae).

***Cosmolaelaps brevistilis* (Karg, 1978).**

Hypoaspis (*Cosmolaelaps*) *brevistilis* Karg, 1978b: 1.

Hypoaspis (*Cosmolaelaps*) *brevistilis*.— Karg, 1979: 72; Karg, 1981a: 218; Karg, 1987: 290; Karg, 1988: 516; Xu & Liang, 1996: 193; Karg, 2003b: 232; Karg & Schorlemmer, 2009: 61.

Cosmolaelaps brevistilis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Misituni, Tarapaca, Chile, in soil.

***Cosmolaelaps burdwanensis* (Bhattacharyya, 1972).**

Hypoaspis burdwanensis Bhattacharyya, 1972: 133.

Cosmolaelaps burdwanensis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), India.

TYPE LOCALITY AND HABITAT: near Burdwan Railway Station, Burdwan, West Bengal, India, on soil under *Vigna* sp. [Fabales: Fabaceae].

***Cosmolaelaps busolii* Moreira, Klompen & Moraes, 2014.**

Cosmolaelaps busolii Moreira, Klompen & Moraes, 2014: 331.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Rodovia 226 (Pariquera-Açu-Cananéia), km 16, Cananéia, State of São Paulo, Brazil, from soil under *Syagrus romanzoffiana* (Arecales: Arecaceae).

***Cosmolaelaps calamitus* (Faraji & Halliday, 2009).**

Cosmolaelaps calamitus.— Moreira et al., 2014: 319.

Hypoaspis (*Cosmolaelaps*) *calamitus* Faraji & Halliday, 2009: 258.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Wreck Rock, 12 km south of Agnes Water, Queensland, Australia, on *Macropanesthia* sp. (Blattodea: Blaberidae).

***Cosmolaelaps carvalhoi* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *carvalhoi* Aswegen & Loots, 1970: 175.

Hypoaspis (*Cosmolaelaps*) *carvalhoi*.— Karg, 1981a: 220; Karg, 1987: 292; Karg, 1988: 518.

Cosmolaelaps carvalhoi.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museu do Dundo, Dundo, Lunda Norte, Angola; accession number Ang. 16 888.

TYPE LOCALITY AND HABITAT: Luachimo River, near Dundo, tourist road (7.22' S, 20.50' E), Angola, in forest soil.

***Cosmolaelaps cassoidea* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *cassoidea* Karg, 1981a: 221.

Hypoaspis (*Cosmolaelaps*) *cassoidea*.— Karg, 1987: 291; Karg, 1988: 517; Karg, 1993b: 267; Karg, 2006: 150; Faraji et al., 2008: 207.

Cosmolaelaps cassoidea.— Freire & Moraes, 2007: 356; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: type series, Venezuela and Brazil, in litter.

***Cosmolaelaps chenchuanhoi* (Samšiňák, 1964).**

Stratiolaelaps chenchuanhoi Samšiňák, 1964: 37.

Hypoaspis (*Cosmolaelaps*) *chenchuanhoi*.— Karg, 1985: 237; Karg, 1988: 514; Karg, 2006: 151; Bai & Ma, 2012: 558.

Cosmolaelaps chenchuanhoi.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institute of Zoology of the Chinese Academy of Sciences, Beijin, China.

TYPE LOCALITY AND HABITAT: Shun-te, Canton, China, in nest of *Odontotermes formosanus* [Isoptera: Termitidae].

***Cosmolaelaps chianensis* (Gu, 1990).**

Hypoaspis chianensis Gu, 1990: 441.

Hypoaspis (*Cosmolaelaps*) *hefeiensis* Xu & Liang, 1996: 193 [Junior synonymy of *C. chianensis* by Ma, 2006: 23; Bai & Ma, 2012: 558].

Hypoaspis (*Cosmolaelaps*) *hefeiensis*.— Bei et al., 2003: 648.

Hypoaspis chianensis.— Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *chianensis*.— Bai & Ma, 2012: 558.

Cosmolaelaps chianensis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: of *H. chianensis*: Department of Parasitology, Guiyang Medical College, Guiyang, Guizhou, China; of *H.* (*C.*) *hefeiensis*: Department of Environmental and Resources Biology, Fudan University, Shangai, China.

TYPE LOCALITY AND HABITAT: of *H. chianensis*: Xingyi (24.9°N, 104.7°E), Guizhou, China, on *Mus pahara* [Rodentia: Muridae]; of *H.* (*C.*) *hefeiensis*: Hefei, Anhui, China, in moss.

***Cosmolaelaps chini* Bai & Gu, 1993.**

Cosmolaelaps chini Bai & Gu, 1993a: 40.

Cosmolaelaps chini.— Ren & Guo, 2008: 328; Moreira et al., 2014: 319.

Hypoaspis (*Cosmolaelaps*) *chini*.— Bai & Ma, 2012: 558.

TYPE DEPOSITORY: Ningxia Institute of Endemic Disease Control, Yinchuan, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, on unidentified ants [Hymenoptera: Formicidae].

***Cosmolaelaps claviger* (Berlese, 1883).**

Laelaps claviger Berlese, 1883a: IV, 2.

Laelaps claviger.— Berlese, 1883b: 216; Moniez, 1894: 204.

Hypoaspis claviger.— Canestrini, 1885: 83; Costa, 1968: 5.

Laelaps claviger.— Berlese, 1892: 35.

Iphis claviger.— Berlese, 1892: 35.

Laelaps (*Cosmolaelaps*) *claviger*.— Berlese, 1903: 20; Halbert, 1915: 73.

Cosmolaelaps claviger.— Hull, 1918: 68; Lombardini, 1936: 39; Afifi & Van der Geest, 1984: 587; Luxton, 1998: 18; Moreira et al., 2014: 319.

Cosmolaelaps bregetovae Pirianyk, 1959: 101 [Junior synonymy of *H.* (*C.*) *claviger* by Bregetova, 1977: 513].

Laelaps claviger; *non Laelaps*.— Tipton, 1960: 291.

Hypoaspis (*Hypoaspis*) *auris* Karg, 1965: 276 [Junior synonymy of *H. claviger* by Costa, 1968: 5].

Hypoaspis (*Cosmolaelaps*) *claviger*.— Evans & Till, 1966: 182; Karg, 1971: 166; Bregetova, 1977: 513; Karg, 1978b: 8; Karg, 1979: 72; Karg, 1981a: 216; Karg, 1988: 513; Karg, 2000: 247.

Hypoaspis (*Cosmolaelaps*) *macroanalis* Bernhard in Hirschmann et al., 1969: 137 [Junior synonymy of *H.* (*C.*) *claviger* by Karg, 1981a: 216; Karg, 1988: 513; of *H.* (*C.*) *claviger claviger* by Karg, 1993a: 138].

Hypoaspis (*Cosmolaelaps*) *claviger auris*.— Karg, 1971: 166; Karg, 1993a: 138.

Hypoaspis (*Cosmolaelaps*) *bregetovae*.— Karg, 1988: 513; Karg, 1993a: 138.

Hypoaspis (*Cosmolaelaps*) *claviger claviger*.— Karg, 1993a: 138.

TYPE DEPOSITORY: of *L. claviger*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *C. bregetovae*: unspecified; of *H.* (*H.*) *auris*: in author's collection; of *H.* (*C.*) *macroanalis*: unspecified.

TYPE LOCALITY AND HABITAT: of *L. claviger*: type series, Padua and Acireale, Sicily, Italy, in moss [mentioned as "muscis"]; of *C. bregetovae*: Zarechye, Dnipro, Kaneva, Ukraine, on *Microtus ratticeps* [Rodentia: Cricetidae] and *Clethrionomys glareolus* (Rodentia: Cricetidae]); of *H.* (*H.*) *auris*: Egeln, Sachsen-Anhalt, Germany, in pasture soil; of *H.* (*C.*) *macroanalis*: Erlangen, Germany, in litter, alder and linden stump and rotting acorns.

NOTE: Oudemans, 1902b: 19 considered *H. claviger* to be the junior synonymy of *Hypoaspis pavidus* Koch. Berlese, 1904: 276, did not accept that synonymy. The latter interpretation is adopted in this publication.

***Cosmolaelaps communis* Trägårdh, 1931.**

Cosmolaelaps communis Trägårdh, 1931: 613.

Cosmolaelaps communis.— Pirianyk, 1959: 104; Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Masatierra, Juan Fernandez Island, under stones.

***Cosmolaelaps confinisetarum* Moreira, Klompen & Moraes, 2014.**

Cosmolaelaps confinisetarum Moreira, Klompen & Moraes, 2014: 333.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Rodovia Geraldo de Barros, km 204, São Pedro, State of São Paulo, Brazil, from litter under *Syagrus oleracea* (Arecales: Arecaceae).

***Cosmolaelaps crossocauda* (Karg, 2006).**

Hypoaspis (*Cosmolaelaps*) *crossocauda* Karg, 2006: 150.

Cosmolaelaps crossocauda.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near San Andres, Ecuador, in moss on epiphytes.

***Cosmolaelaps cubaensis* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *cubaensis* Karg, 1981a: 224.

Hypoaspis (*Cosmolaelaps*) *cubaensis*.— Karg, 1987: 292; Karg, 1988: 518; Karg, 1994: 183; Cuervo et al., 1994: 18.

Cosmolaelaps cubaensis.— Farrier & Hennessey, 1993: 68; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Cuba, in litter.

***Cosmolaelaps cuneifer* (Michael, 1891).**

Laelaps cuneifer Michael, 1891: 647.

Hypoaspis cuneifer.— Oudemans, 1902b: 24; Oudemans, 1903b: 129; Buitendijk, 1945: 295; Gu & Bai, 1992: 192; Munderloh, 1996: 590.

Laelaps (*Cosmolaelaps*) *cuneifer*.— Berlese, 1903: 20; Berlese, 1904: 416; Donisthorpe, 1927: 214.

Laelaps (*Cosmolaelaps*) *cuneifer* var. *americanus* Berlese, 1904: 418.

Laelaps cuneifer var. *americanus*.— Banks, 1907: 610.

Cosmolaelaps cuneifer.— Hull, 1918: 68; Vitzthum, 1929: 25; Lombardini, 1936: 39; Schweizer, 1949: 40; Thurman, Mulrennan & Branch, 1949: 2; Willmann, 1951: 116; Bregetova, 1956: 75; Goncharova & Buyakova, 1964: 281; Moreira et al., 2014: 319.

Laelaps cuneifer; *non Laelaps*.— Tipton, 1960: 292.

Hypoaspis (*Cosmolaelaps*) *cuneifer*.— Schweizer, 1961: 149; Evans & Till, 1966: 184; Karg, 1971: 163; Bregetova, 1977: 511; Karg, 1978b: 8; Karg, 1979: 71; Karg, 1981a: 216; Karg, 1987: 293; Karg, 1988: 511; Mašán, 1992: 387; Karg, 1993a: 138.

Cosmolaelaps cuneifer var. *americanus*.— Farrier & Hennessey, 1993: 68.

TYPE DEPOSITORY: of *L. cuneifer:* unspecified; of *C. cuneifer* var. *americanus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: of *L. cuneifer*: Innsbruck, Tyrol, Austria, in nests of *Camponotus herculeanus* [Hymenoptera: Formicidae]; of *C. cuneifer* var. *americanus*: Colebrook, Connecticut, United States of America, in nest of *Aphenogaster fulva* var. *picea* [Hymenoptera: Formicidae].

***Cosmolaelaps cursorius* (Karg, 1988).**

Hypoaspis (*Cosmolaelaps*) *cursoria* Karg, 1988: 523.

Hypoaspis (*Cosmolaelaps*) *cursoria*.— Karg, 1993b: 265.

Cosmolaelaps cursorius.— Farrier & Hennessey, 1993: 68; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Cosmolaelaps dendrophilus* Davydova, 1977.**

Cosmolaelaps dendrophilus Davydova, 1977: 23.

Cosmolaelaps dendrophilus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Rovno, Kargat, Novosibirsk, Russia, on rotting stems of trees and stumps.

***Cosmolaelaps digrediens* (Berlese, 1923) n. comb..**

Cosmolaelaps simplex var. *digrediens* Berlese, 1923: 253.

Hypoaspis (*Hypoaspis*) *simplex* v. *digrediens*.— Aswegen & Loots, 1970: 181.

Hypoaspis (*Cosmolaelaps*) *digrediens*.— Karg, 1981a: 218; Karg, 1987: 291; Karg, 1988: 517.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Cosmolaelaps diversichaetatus* Grochovskaya & Huan-Hoe, 1961.**

Cosmolaelaps diversichaetatus Grochovskaya & Huan-Hoe, 1961: 1633.

Cosmolaelaps diversichaetatus.— Garrett & Haramoto, 1967: 387; Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 319.

Hypoaspis (*Cosmolaelaps*) *diversichaetatus*.—Tenorio et al., 1985: 300.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Cam Pha, Hallam, Kha-Zhang, Tây-Nguyên, Vietnam, on *Rattus rattus flavipectus*, *Rattus sabanus* and *Crocidura dracula* [Soricomorpha: Soricidae].

***Cosmolaelaps diversus* (Karg, 1994).**

Hypoaspis (*Cosmolaelaps*) *diversa* Karg, 1994: 182.

Cosmolaelaps diversus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Pinnacle Rock, Bartolomé, Galapagos Islands, in damp litter of mangrove.

***Cosmolaelaps ensiger* (Berlese, 1904) n. comb..**

Laelaps (*Cosmolaelaps*) *vacuus* var. *ensiger* Berlese, 1904: 420.

Cosmolaelaps vacuus var. *ensiger*.— Schweizer, 1949: 40.

Cosmolaelaps ensifer [sic].— Willmann, 1951: 115.

Cosmolaelaps vacuus var. *ensiger*.— Schweizer, 1949: 40; Schweizer, 1961: 150.

Hypoaspis ensiger.— Costa, 1968: 19

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Cansiglio Forest, Italy, in nests of *Myrmica laevinodis* [Hymenoptera: Formicidae].

NOTE: This species were described based on specimens from Trento, Italy reported as *L.* (*C.*) *scalpriger* by Berlese, 1903: 19.

***Cosmolaelaps euarmatus* (Karg, 1996).**

Hypoaspis (*Cosmolaelaps*) *euarmata* Karg, 1996: 151.

Hypoaspis (*Cosmolaelaps*) *euarmata*.— Karg, 1997a: 84.

Cosmolaelaps euarmatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Hienghène, New Caledonia, in litter in rock crevices.

***Cosmolaelaps eucapillatus* (Karg, 2003).**

Hypoaspis (*Cosmolaelaps*) *eucapillata* Karg, 2003b: 232.

Cosmolaelaps eucapillatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Loreto, Ecuador, in soil and litter.

***Cosmolaelaps euventricosus* (Karg, 1995).**

Hypoaspis (*Cosmolaelaps*) *euventricosa* Karg, 1995: 24.

Hypoaspis (*Cosmolaelaps*) *euventricosa*.— Faraji & Halliday, 2009: 260.

Cosmolaelaps euventricosus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: New Guinea, on unidentified passalid beetle [Coleoptera: Passalidae].

***Cosmolaelaps furcatoides* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *furcatoides* Karg, 1981a: 231.

Hypoaspis (*Cosmolaelaps*) *furcatoides*.— Karg, 1985: 237; Karg, 1987: 290; Karg, 1988: 516; Karg, 2006: 150.

Cosmolaelaps furcatoides.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Aracariguan [State of São Paulo], Brazil, in soil.

***Cosmolaelaps gladii* (Karg, 1993).**

Hypoaspis (*Cosmolaelaps*) *gladii* Karg, 1993b: 264.

Cosmolaelaps gladii.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Academy Bay, Santa Cruz, Galapagos Islands, in litter.

***Cosmolaelps guoi* (Bai & Ma, 2012).**

Hypoaspis (*Cosmolaelaps*) *guoi* Bai & Ma, 2012: 556.

Cosmolaelaps guoi.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Medical Entomology Collection, Institute of Microbiology and Epidemiology, Academy of Military Medical Science, Beijing, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Cosmolaelaps guttulatus* (Karg, 1978).**

Hypoaspis (*Cosmolaelaps*) *guttulata* Karg, 1978b: 5.

Hypoaspis (*Cosmolaelaps*) *guttulata*.— Karg, 1979: 72; Karg, 1981a: 218; Karg, 1985: 236; Karg, 1987: 291; Karg, 1988: 516; Xu & Liang, 1996: 193.

Cosmolaelaps guttulatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Laguna La Cotacotani [Parinacora], Chile, under stones on the edge of the lake.

***Cosmolaelaps hastiger* Berlese, 1920 n. comb..**

Cosmolaelaps vacuus var. *hastiger* Berlese, 1920: 157.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in ant nests [Hymenoptera].

***Cosmolaelaps hortensis* (Ishikawa, 1986).**

Hypoaspis (*Cosmolaelaps*) *hortensis* Ishikawa, 1986: 174.

Cosmolaelaps hortensis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Department of Zoology, National Science Museum (Natural History), Tokyo, Japan.

TYPE LOCALITY AND HABITAT: Kuwabara, Matsuyama-shi, Ehime, Japan, on *Oxidus gracilis* [Polydesmida: Paradoxosomatidae].

***Cosmolaelaps hrdyi* (Samšiňák, 1961).**

Hypoaspis (Cosmolaelaps) hrdýi Samšiňák, 1961: 205.

Hypoaspis (*Cosmolaelaps*) *hrdyi*.— Karg, 1985: 237; Karg, 1988: 516; Bai & Ma, 2012: 558.

Hypoaspis hrydi [sic].— Gu, 1990: 441; Li, Zheng & Yang, 1996: 55.

Hypoaspis hrdyi.— Ma, 1996: 48; Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *shenyangensis* Bei, Shi & Yin, 2003: 648 [Junior synonymy of *C. hrdyi* by Ma, 2006: 23; Bai & Ma, 2012: 558].

Cosmolaelaps hrdyi.— Ma, 2005a: 535; Moreira et al., 2014: 319.

Cosmolaelaps shenyangensis.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: of *H.* (*C.*) *hrdyi*: Entomological Institut of Chinese Academy of Sciences, Beijing, China; of *H.* (*C.*) *shenyangensis*: College of Plant Protection, Shenyang Agricultural University, Shenyang, Liaoning Province, China.

TYPE LOCALITY AND HABITAT: of *H.* (*C.*) *hrdyi*: Hsin-hui, Canton, China, in termite mound; of *H.* (*C.*) *shenyangensis*: Tianzhu Mountain, Liaoning, China, in soil litter.

***Cosmolaelaps inarmatus* (Karg, 1997).**

Hypoaspis (*Cosmolaelaps*) *inarmata* Karg, 1997a: 83.

Cosmolaelaps inarmatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Mont Koghi, New Caledonia, unspecified substrate.

***Cosmolaelaps indicus* Bhattacharyya, 1966.**

Cosmolaelaps indicus Bhattacharyya, 1966: 154.

Hypoaspis calcuttaensis Bhattacharyya, 1971: 501 [replacement name, given the existence of *Laelaps* (*Hypoaspis*) *indicus* Vitzthum, 1921].

Hypoaspis calcuttaensis.— Prasad, 1974: 151.

Hypoaspis (*Cosmolaelaps*) *indicus*.— Karg, 1988: 514; Karg, 2006: 151.

Cosmolaelaps indicus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: author's collection.

TYPE LOCALITY AND HABITAT: Calcutta University College of Science, Ballygunge, Kolkata (= Calcutta), West Bengal, India, in soil litter under decomposed water hyacinth, *Eichhornia* sp. [Commelinales: Pontederiaceae].

***Cosmolaelaps jaboticabalensis* Moreira, Klompen & Moraes, 2014.**

Cosmolaelaps jaboticabalensis Moreira, Klompen & Moraes, 2014: 331.

TYPE DEPOSITORY: Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: from a laboratory colony initiated with specimens collected at Jaboticabal, State of São Paulo, Brazil, from litter under *Eriobotrya japonica* (Rosales: Rosaceae).

***Cosmolaelaps kassaii* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *kassaii* Aswegen & Loots, 1970: 190.

Hypoaspis (*Geolaelaps*) *kassai*.— Karg, 1982: 239.

Hypoaspis kassaii.— Beaulieu, 2009: 37.

Gaeolaelaps kassaii.— Nemati & Kavianpour, 2013: 70.

Cosmolaelaps kassaii.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museu do Dundo, Dundo, Lunda Norte, Angola; accession number Ang. 17383.

TYPE LOCALITY AND HABITAT: near Tshitengo River (7°40' S, 21°45' E), subaffluent of the Kasai River Angola, in forest soil.

***Cosmolaelaps keni* (Hafez, ElBadry & Nasr, 1982).**

Hypoaspis (*Cosmolaelaps*) *keni* Hafez, ElBadry & Nasr, 1982: 7.

Cosmolaelaps keni.— Zaher, 1986: 201; Nasr & Nawar, 1989b: 77; El-Banhawy et al., 2006: 66; Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Nagh-Hamaadi, Kena, Egypt, in soil under mango trees [Sapindales: Anacardiaceae].

***Cosmolaelaps lawrencei* (Aswegen & Loots, 1970). n. comb..**

Hypoaspis (*Laelaspis*) *lawrencei* Aswegen & Loots, 1970: 197.

Hypoaspis (*Cosmolaelaps*) *lawrencei*.— Karg, 1981a: 217; Karg, 1987: 290; Karg, 1988: 515; Karg, 1995: 22.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Natal [South Africa], unspecified substrate.

***Cosmolaelaps leeae* (Tseng, 1977).**

Hypoaspis leeae Tseng, 1977: 49.

Hypoaspis leeae.— Ren & Guo, 2008: 329

Hypoaspis (*Cosmolaelaps*) *leeae*.— Bai & Ma, 2012: 558.

Cosmolaelaps leeae.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Tainan Branch Office, Bureau of Commodity Inspection and Quarentine, Tainan, Taiwan.

TYPE LOCALITY AND HABITAT: Yun-Lin, Taiwan, in litter.

***Cosmolaelaps lepoauris* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *lepoauris* Karg, 1981a: 224.

Hypoaspis (*Cosmolaelaps*) *lepoauris*.— Karg, 1988: 513; Cuervo et al., 1994: 18; Karg, 2006: 150.

Cosmolaelaps lepauris [sic].— Farrier & Hennessey, 1993: 69.

Cosmolaelaps lepoauris.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Cuba, in soil.

***Cosmolaelaps leptochaetes* Ma & Lin, 2009.**

Cosmolaelaps leptochaetes Ma & Lin, 2009: 30.

Hypoaspis (*Cosmolaelaps*) *leptochaetes*.— Bai & Ma, 2012: 557.

Cosmolaelaps leptochaetes.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Guiyang (26°34'N, 106°41'E), Guizhou, China, in litter.

***Cosmolaelaps leptolingua* (Karg, 1994).**

Hypoaspis (*Cosmolaelaps*) *leptolingua* Karg, 1994: 183.

Cosmolaelaps leptolingua.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 860 m above sea level, Cerro Crocker, Santa Cruz, Galapagos Islands, in thick layer of wood litter (fern-sedges zone).

***Cosmolaelaps liae* Bai & Gu, 1993.**

Cosmolaelaps liae Bai & Gu, 1993a: 42.

Cosmolaelaps liae.— Ma, 2007: 920; Moreira et al., 2014: 319.

Hypoaspis (*Cosmolaelaps*) *liae*.— Bai & Ma, 2012: 558.

TYPE DEPOSITORY: Ningxia Institute of Endemic Disease Control, Yinchuan, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, on unidentified ants [Hymenoptera: Formicidae].

***Cosmolaelaps lingua* (Karg, 1987).**

Hypoaspis (*Cosmolaelaps*) *lingua* Karg, 1987: 295.

Hypoaspis (*Cosmolaelaps*) *lingua*.— Karg, 1988: 516.

Cosmolaelaps lingua.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: “Pra dei Cavai” Farm, San Stino, Livenza, Venice, Italy, in corn field soil.

***Cosmolaelaps lisimilis* Ma, 2007.**

Cosmolaelaps lisimilis Ma, 2007: 920.

Hypoaspis (*Cosmolaelaps*) *lisimilis*.— Bai & Ma, 2012: 558.

Cosmolaelaps lisimilis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Haikou (20°N, 110°20’E), Hainan, China, in soil.

***Cosmolaelaps longanalis* (Karg, 2003).**

Hypoaspis (*Cosmolaelaps*) *longanalis* Karg, 2003b: 232.

Cosmolaelaps longanalis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Imbabura, Ecuador, in meadow soil.

***Cosmolaelaps longocrinitus* (Karg, 2006).**

Hypoaspis (*Cosmolaelaps*) *longocrinita* Karg, 2006: 148.

Cosmolaelaps longocrinitus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near La Mana, Ecuador, in litter.

***Cosmolaelaps longodigiti* (Karg, 1979).**

Hypoaspis (*Cosmolaelaps*) *longodigiti* Karg, 1979: 73.

Hypoaspis (*Cosmolaelaps*) *longodigiti*.— Karg, 1981a: 218; Karg, 1987: 290; Karg, 1988: 515.

Cosmolaelaps longodigiti.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 920 m above sea level, near Norquinco, Argentina, in litter.

***Cosmolaelaps longogenitalis* (Karg, 1978).**

Hypoaspis (*Cosmolaelaps*) *longogenitalis* Karg, 1978b: 2.

Hypoaspis (*Cosmolaelaps*) *longogenitalis*.— Karg, 1979: 71; Karg, 1981a: 217; Karg, 1987: 290; Karg, 1988: 514; Karg, 1995: 22.

Cosmolaelaps longogenitalis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Misituni, Tarapaca, Chile, in soil and in a saline.

***Cosmolaelaps longus* (Hafez, ElBadry & Nasr, 1983).**

Hypoaspis (*Cosmolaelaps*) *longus* Hafez, ElBadry & Nasr, 1983: 8.

Cosmolaelaps longus.— Zaher, 1986: 201; Nasr & Nawar, 1989b: 77; Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: National Research Center, Dokki, Giza, Egypt, in litter under *Lantana camara* [Lamiales: Verbenaceae].

***Cosmolaelaps lutegiensis* Shcherbak, 1971.**

Cosmolaelaps lutegiensis Shcherback, 1971a: 76.

Cosmolaelaps lutegiensis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institute of Zoology, Ukrainian Academy of Sciences, Ukraine; accession number 60-1.

TYPE LOCALITY AND HABITAT: Lyutezh, Kiev, Svyatoshin, Ukraine, in soil and litter of a pine forest.

NOTE: Bregetova, 1977: 501 suspected this species to be a junior synonymy of *G. helianthi*.

***Cosmolaelaps mabilogus* Rosario, 1981.**

Cosmolaelaps mabilogus Rosario, 1981: 38.

Cosmolaelaps mabilogus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Makiling Botanic Gardens, Mount Makiling, College, Laguna, Philippines, in secondary forest litter.

***Cosmolaelaps machadoi* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *machadoi* Aswegen & Loots, 1970: 179.

Hypoaspis (*Cosmolaelaps*) *machadoi*.— Karg, 1981a: 217; Karg, 1988: 514; Karg, 2006: 151.

Cosmolaelaps machadoi.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Museu do Dundo, Dundo, Lunda Norte, Angola.

TYPE LOCALITY AND HABITAT: near Tshitengo River (7.40’ S, 21.45’ E), affluent of the Luango and subaffluent of the Kassai Rivers, Angola, in soil.

***Cosmolaelaps machaeratus* (Domrow, 1957).**

Haemolaelaps machaeratus Domrow, 1957: 207.

Cosmolaelaps machaeratus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Green Ant Island, Great Barrier Reef, Australia, on leaf mould.

***Cosmolaelaps macrochaetus* (Karg, 1988).**

Hypoaspis (*Cosmolaelaps*) *macrochaeta* Karg, 1988: 520.

Cosmolaelaps macrochaetus.— Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Cosmolaelaps mahuncai* (Karg, 1988).**

Hypoaspis (*Cosmolaelaps*) *mahuncai* Karg, 1988: 519.

Cosmolaelaps mahuncai.— Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Vigie Point, near Castries, Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Cosmolaelaps malakutsilyus* Rosario, 1981.**

Cosmolaelaps malakutsilyus Rosario, 1981: 39.

Cosmolaelaps malakutsilyus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Animal Science pasture, University of the Philippines at Los Banos campus, College, Laguna, Philippines, on hog manure.

***Cosmolaelaps masculinus* (Karg, 1988).**

Hypoaspis (*Cosmolaelaps*) *masculina* Karg, 1988: 521.

Cosmolaelaps musculinus.— Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 319.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Vigie Point, near Castries, Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Cosmolaelaps mediocuspis* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *mediocuspis* Karg, 1981a: 227.

Hypoaspis (*Cosmolaelaps*) *mediocuspis*.— Karg, 1987: 292; Karg, 1988: 518; Karg, 2003b: 232.

Cosmolaelaps mediocuspis.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Ecuador, in soil.

***Cosmolaelaps michaeli* (Huhta & Karg, 2010).**

Hypoaspis (*Cosmolaelaps*) *michaeli* Huhta & Karg, 2010: 329.

Cosmolaelaps michaeli.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: Zoological Museum, University of Turku, Finland.

TYPE LOCALITY AND HABITAT: Nauvo, Seili, southwestern archipelago of Finland, in nest of *Tetramorium* sp. [Hymenoptera: Formicidae].

***Cosmolaelaps mixta* (Shcherbak, 1971).**

Hypoaspis mixta Scherbak, 1971b: 27.

Hypoapis mixta.— Lapina, 1976: 31; Bregetova, 1977: 513.

Hypoaspis (*Cosmolaelaps*) *mixta*.— Karg, 1988: 518; Karg, 1993a: 140.

Cosmolaelaps mixta.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Lyutizh, Kiev, Ukraine, in soil, litter and ant nest.

***Cosmolaelaps multidentatus* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *multidentatus* Aswegen & Loots, 1970: 177.

Hypoaspis (*Cosmolaelaps*) *multidentata*.— Karg, 1981a: 217; Karg, 1988: 513.

Cosmolaelaps multidentatus.— Moreira et al., 2014: 319.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Lastourville, South Africa, in grottos soil.

***Cosmolaelaps multisetosus* Domrow, 1957.**

Cosmolaelaps multisetosus Domrow, 1957: 209.

Hypoaspis (*Cosmolaelaps*) *multisetosus*.— Faraji & Halliday, 2009: 260.

Cosmolaelaps multisetosus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Low Isles, (145°34'E; 16°23'S), Great Barrier Reef, Australia, on leaf mould on cay.

***Cosmolaelaps nasoseta* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *nasoseta* Karg, 1981a: 220.

Hypoaspis (*Cosmolaelaps*) *nasoseta*.— Karg, 1987: 290; Karg, 1988: 515; Karg, 2000: 247.

Cosmolaelaps nasosetus.— Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *nasoseti* [sic].— Cuervo et al., 1994: 18.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: type series, Cuba and Venezuela, in litter.

***Cosmolaelaps neocuneifer* (Evans & Till, 1966).**

Hypoaspis (*Cosmolaelaps*) *neocuneifer* Evans & Till, 1966: 187.

Hypoaspis (*Cosmolaelaps*) *neocuneifer*.— Bregetova, 1977: 512; Karg, 1978b: 8; Karg, 1979: 71; Karg, 1981a: 216; Karg, 1987: 293; Karg, 1988: 511; Mašán, 1992: 387; Karg, 1993a: 137.

Hypoaspis neocuneifer.— Gu & Bai, 1992: 192.

Cosmolaelaps neocuneifer.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: White Hill Wood, Canterbury, in nests of *Formica rufa* [Hymenoptera: Formicidae].

***Cosmolaelaps ningxiaensis* Bai & Gu, 1993.**

Cosmolaelaps ningxiaensis Bai & Gu, 1993a: 44.

Cosmolaelaps ningxiaensis.— Ren & Guo, 2008: 328; Xin et al., 2010: 2; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *ningxiaensis*.— Bai & Ma, 2012: 558.

TYPE DEPOSITORY: Ningxia Institute of Endemic Disease Control, Yinchuan, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, on unidentified ants [Hymenoptera: Formicidae].

***Cosmolaelaps oliveirai* Moreira, Klompen & Moraes, 2014.**

Cosmolaelaps oliveirai Moreira, Klompen & Moraes, 2014: 339.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Núcleo Agrícola Vale do Ribeira, IAC, Pariquera-Açu, State of São Paulo, Brazil, from soil under *Astrocaryum aculeatissimum* (Arecales: Arecaceae).

***Cosmolaelaps onustus* (Berlese, 1904).**

Laelaps (*Cosmolaelaps*) *onustus* Berlese, 1904b: 16.

Cosmolaelaps onustus.— Willmann, 1949a: 116.

Laelaps onustus; *non Laelaps*.— Tipton, 1960: 302.

Hypoaspis onustus.— Costa, 1968: 19

Hypoaspis (*Cosmolaelaps*) *onusta.*— Karg, 1981a: 216; Karg, 1988: 512; Karg, 1993a: 138.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in litter.

***Cosmolaelaps ornatus* (Berlese, 1903).**

Laelaps (*Cosmolaelaps*) *ornatus* Berlese, 1903: 19.

Laelaps (*Cosmolaelaps*) *ornatus*.— Berlese, 1904: 421.

Cosmolaelaps ornatus.— Hull, 1918: 68; Vitzthum, 1929: 25; Moreira et al., 2014: 320.

Laelaps ornatus; *non Laelaps*.— Tipton, 1960: 302.

Hypoaspis (*Cosmolaelaps*) *ornatus*.— Schweizer, 1961: 149.

Hypoaspis (*Cosmolaelaps*) *ornata*.— Karg, 1981a: 216; Karg, 1987: 293; Karg, 1988: 512; Mašán, 1992: 387; Karg, 1993a: 138.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, in nests of *Solenopsis fugax* [Hymenoptera: Formicidae].

***Cosmolaelaps pahabaeus* Rosario, 1981.**

Cosmolaelaps pahabaeus Rosario, 1981: 42.

Cosmolaelaps pahabaeus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Makiling Botanic Gardens, Mount Makiling, College, Laguna, Philippines, on soil of secondary forest.

***Cosmolaelaps panniculus* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *pannicula* Karg, 1981a: 229.

Hypoaspis (*Cosmolaelaps*) *pannicula*.— Karg, 1987: 291; Karg, 1988: 517.

Cosmolaelaps panniculus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: “Faz. Itaquere” [sic], [?State of São Paulo], Brazil, in soil.

***Cosmolaelaps paracuneifer* (Gu & Bai, 1992).**

Hypoaspis paracuneifer Gu & Bai, 1992: 189.

Hypoaspis paracuneifer.— Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *paracuneifer*.— Bai & Ma, 2012: 558; Xin et al., 2010: 3.

Cosmolaelaps paracuneifer.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Haiyuan (16.5°N, 105.6°E), Ningxia Autonomous Region, China, in ant nest [Hymenoptera: Formicidae].

***Cosmolaelaps paravacua* Nasr & Nawar, 1989.**

Cosmolaelaps paravacua Nasr & Nawar, 1989: 77.

Cosmolaelaps paravacua.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Acarology Research Unit, National Research Centre, Dokki, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: El-Wasta, Beni-Suef, Egypt, in soil under *Zea maize* [sic] [*Zea mays*] [Poales: Poaceae].

***Cosmolaelaps parvidentis* (Karg & Schorlemmer, 2009).**

Hypoaspis (*Cosmolaelaps*) *parvidentis* Karg & Schorlemmer, 2009: 61.

Cosmolaelaps parvidentis.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Forest near University park, Maracay, Venezuela, in litter and humus.

***Cosmolaelaps paulista* Freire & Moraes, 2007.**

Cosmolaelaps paulista Freire & Moraes, 2007: 355.

Cosmolaelaps paulista.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Cananéia (24°53’45”S; 47°50’17”W), State of São Paulo, Brazil, in litter of the Atlantic Forest.

***Cosmolaelaps penicillatus* (Karg, 1979).**

Hypoaspis (*Cosmolaelaps*) *penicillata* Karg, 1979: 73.

Hypoaspis (*Cosmolaelaps*) *penicillata*.— Karg, 1981a: 214; Karg, 1987: 292; Karg, 1988: 511.

Cosmolaelaps penicillatus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 300 m above sea level, Rio Azul Valley, near El Bolsón, [Rio Negro], Argentina, in litter of *Nothofagus dombeyi* [Fagales: Fagaceae].

***Cosmolaelaps pugiocuspis* (Karg, 1981).**

Hypoaspis (*Cosmolaelaps*) *pugiocuspis* Karg, 1981a: 220.

Hypoaspis (*Cosmolaelaps*) *pugiocuspis*.— Karg, 1987: 291; Karg, 1988: 517.

Cosmolaelaps pugiocuspis.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Brazil, in litter.

***Cosmolaelaps pumili* (Karg, 1988).**

Hypoaspis (*Cosmolaelaps*) *pumili* Karg, 1988: 524.

Hypoaspis (*Cosmolaelaps*) *punuli* [sic].— Karg, 1988: 523.

Cosmolaelaps pumili.— Farrier & Hennessey, 1993: 69; Moreira et al., 2014: 320.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Vigie Point, near Castries, Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Cosmolaelaps punyalus* Rosario, 1981.**

Cosmolaelaps punyalus Rosario, 1981: 43.

Cosmolaelaps punyalus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Animal Science pasture, University of the Philippines, Los Banos campus, College, Laguna, Philippines, on soil of *Imperata cylindrical* grassland [Poales: Poaceae].

***Cosmolaelaps qinghaiensis* (Li, Yang & Yue, 1997).**

Hypoaspis qinghaiensis Li, Yang & Yue, 1997: 60.

Hypoaspis qinghaiensis.— Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelps*) *qinghaiensis*.— Bai & Ma, 2012: 558.

Cosmolaelaps qinghaiensis— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Qinghai Institute for Endemic Disease Control and Research, Qinghai, China.

TYPE LOCALITY AND HABITAT: 3400 m above sea level, Tongde, Qinghai, China, on *Cricetulus longicaudatus* [Rodentia: Cricetidae].

***Cosmolaelaps quasiclaviger* Ma & Lin, 2009.**

Cosmolaelaps quasiclaviger Ma & Lin, 2009: 33.

Hypoaspis (*Cosmolaelaps*) *quasiclaviger*.— Bai & Ma, 2012: 558.

Cosmolaelaps quasiclaviger.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Xunhua (35°47'N, 102°27'E), Qinghai, China, in forest soil.

***Cosmolaelaps reconditus* (Berlese, 1905) n. comb..**

Laelaps (*Cosmolaelaps*) *reconditus* Berlese, 1905: 170.

Laelaps reconditus; *non Laelaps*.— Tipton, 1960: 305.

Hypoaspis (*Cosmolaelaps*) *recondita*.— Karg, 1981a: 218; Karg, 1988: 516; Karg, 1987: 290.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Buitenzorg, Java, Indonesia, unspecified substrate.

nao no artigo

***Cosmolaelaps rectangularis* Sheals, 1962.**

Cosmolaelaps rectangularis Sheals, 1962: 107.

Hypoaspis rectangularis.— Costa, 1968: 18.

Hypoaspis (*Cosmolaelaps*) *rectangularis*.— Karg, 1978b: 9; Karg, 1979: 72; Karg, 1981a: 217; Karg, 1988: 514; Karg, 2006: 151; Faraji et al., 2008: 207.

Cosmolaelaps rectangularis.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1961-6-20-47.

TYPE LOCALITY AND HABITAT: Nahuel Huapi, Arroyo Pilmaiquen, Patagonia, Argentina, unspecified substrate.

***Cosmolaelaps reticulatus* (Xu & Liang, 1996).**

Hypoaspis (*Cosmolaelaps*) *reticulatus* Xu & Liang, 1996: 191.

Cosmolaelaps reticulatus.— Ma, 2005b: 74; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *reticulatus*.— Bai & Ma, 2012: 557.

TYPE DEPOSITORY: Department of Environmental and Resources Biology, Fudan University, Shangai, China.

TYPE LOCALITY AND HABITAT: Hefei, Anhui, China, in moss.

***Cosmolaelaps robustochaetes* Ma & Lin, 2009.**

Cosmolaelaps robustochaetes Ma & Lin, 2009: 29.

Hypoaspis (*Cosmolaelaps*) *robustochaetes*.— Bai & Ma, 2012: 557.

Cosmolaelaps robustochaetes.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Guiyang (26°34'N, 106°41'E), Guizhou, China, in litter, tree cavity and tree bark.

***Cosmolaelaps robustoventralis* Ma, 2011.**

Cosmolaelaps robustoventralis Ma, 2011: 84.

Hypoaspis (*Cosmolaelaps*) *robustoventralis*.— Bai & Ma, 2012: 558.

Cosmolaelaps robustoventralis.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Dali (25°42'N, 100°10'E), Yunnan, China, in litter.

***Cosmolaelaps robustus* (Berlese, 1905).**

Laelaps (*Cosmolaelaps*) *robustus* Berlese, 1905: 170.

Cosmolaelaps robustus.— Lombardini, 1936: 39; Bregetova, 1956: 75; Goncharova & Buyakova, 1964: 281; Moreira et al., 2014: 320.

Laelaps robustus; *non Laelaps*.— Tipton, 1960: 305.

Hypoaspis (*Cosmolaelaps*) *robustus*.— Bregetova, 1977: 513; Karg, 1978b: 9.

Hypoaspis (*Cosmolaelaps*) *robusta*.— Karg, 1979: 72; Karg, 1981a: 217; Karg, 1988: 514; Karg, 1993a: 139; Karg, 2006: 150.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Tjiompea, Java, Indonesia, unspecified substrate.

NOTE: Speciments reported by Lapina, 1970 were reidentified as *Cosmolaelaps vacua* by Lapina, 1976: 28.

***Cosmolaelaps scalpriger* (Berlese, 1902) n. comb..**

Laelaps scalpriger Berlese, 1902: 699.

Laelasps (*Cosmolaelaps*) *scalpriger*.— Berlese, 1903: 19 (in part).

Laelaps (*Cosmolaelaps*) *vacuus* var. *scalpriger*.— Berlese, 1904: 421.

Laelaps scalpriger; *non Laelaps*.— Tipton, 1960: 306.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, in nests of unidentified ants.

NOTE: Specimens from Trento, Italy reported as *L.* (*C.*) *scalpriger* by Berlese, 1903: 19 were described as *Laelaps* (*Cosmolaelaps*) *vacuus* var. *ensiger*.

***Cosmolaelaps serratus* Trägårdh, 1952.**

Cosmolaelaps serratus Trägårdh, 1952: 63.

Cosmolaelaps serratus.— Hirschmann et al., 1969: 137; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *serrata*.— Karg, 1981a: 217; Karg, 1988: 514; Karg, 2006: 151.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Pare, Arihiri, Society Islands, Tahiti , unspecified substrate.

***Cosmolaelaps simplex* Berlese, 1920.**

Cosmolaelaps simplex Berlese, 1920: 157.

Cosmolaelaps simplex.— Lombardini, 1936: 39; Fouly et al., 1997: 36; Fouly & Al-Rehiayani, 2011: 142; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *simplex*.— Karg, 1981a: 217; Karg, 1988: 513.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Buenos Aires, Argentina and Termuco, Chile, unspecified substrate.

***Cosmolaelaps sorecis* (Li, Zheng & Yang, 1996).**

Hypoaspis sorecis Li, Zheng & Yang, 1996: 55.

Hypoaspis sorecis.— Li et al., 1997: 60; Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *sorecis*.— Bai & Ma, 2012: 558.

Cosmolaelaps sorecis.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Qinghai Province Institute of Endemic Disease Control, Qinghai, China.

TYPE LOCALITY AND HABITAT: Huzhu (36°50'N, 102°28'E), Qinghai, China, on *Sorex sinalis* [Soricomorpha: Soricidae].

***Cosmolaelaps subacutiscutus* Bai & Wang, 2005.**

Cosmolaelaps subacutiscutus Bai & Wang, 2005: 26.

Cosmolaelaps subacutiscutus.— Ren & Guo, 2008: 328; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *subacutiscutus*.— Bai & Ma, 2012: 557.

TYPE DEPOSITORY: Institute of Microbiology and Epidemiology, Academy of Military Medical Science, Beijing, China.

TYPE LOCALITY AND HABITAT: Yinchuan suburb (38.50°N, 106.30°E), Ningxia Hui Autonomous Region, China, in decomposing stratum of rice straw.

***Cosmolaelaps subpictus* (Gu & Bai, 1992).**

Hypoaspis subpictus Gu & Bai, 1992: 192.

Hypoaspis (*Cosmolaelaps*) *subpictus*.— Bai & Ma, 2012: 557.

Cosmolaelaps subpictus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Haiyuan (16.5°N, 105.6°E), Ningxia Autonomous Region, China, in ant nest [Hymenoptera: Formicidae].

***Cosmolaelaps sungaris* (Ma, 1996).**

Hypoaspis sungaris Ma, 1996: 48.

Cosmolaelaps sungaris.— Ma, 2005a: 536; Moreira et al., 2014: 320.

Hypoaspis sungaris.— Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *sungaris*.— Bai & Ma, 2012: 558.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Qianguoerluosi Mongolian Autonomous County (45°N, 125°E), Jilin, China, on *Cricetulus barabensis* [Rodentia: Cricetidae].

***Cosmolaelaps tetraspinae* (Karg, 1995).**

Hypoaspis (*Cosmolaelaps*) *tetraspinae* Karg, 1995: 23.

Hypoaspis (*Cosmolaelaps*) *tetraspinae*.— Faraji & Halliday, 2009: 260.

Cosmolaelaps tetraspinae.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Ile des Pins, New Caledonia, in litter.

***Cosmolaelaps thysanifer* Zeman, 1982.**

Cosmolaelaps thysanifer Zeman, 1982: 234.

Cosmolaelaps thysanifer.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Arachnoentomological Department, Institute of Parasitology, Czechoslovak Academy of Science, Prague, Czech Republic; accession number Pa. Ú. ČSAV1890.

TYPE LOCALITY AND HABITAT: near Bubovice, Beroun, Bohemia, Czech Republic, in nest of *Formica fusca* [Hymenoptera: Formicidae] in a meadow.

***Cosmolaelaps transvaalensis* Ryke, 1963.**

Cosmolaelaps transvaalensis Ryke, 1963: 7.

Cosmolaelaps transvaalensis.— Costa, 1968: 19; Moreira et al., 2014: 320.

Hypoaspis (*Hypoaspis*) *transvaalensis*.— Aswegen & Loots, 1970: 182.

Hypoaspis (*Cosmolaelaps*) *transvaalensis*.— Karg, 1978b: 9; Karg, 1979: 73; Karg, 1981a: 219; Karg, 1987: 292; Karg, 1988: 518.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: Potchefstroom, South Africa, in litter of a blue-gum [*Eucalyptus* sp.] plantation.

***Cosmolaelaps trifidus* (Pearse, Patterson, Rankin & Wharton, 1936).**

Seiodes trifidus Pearse, Patterson, Rankin & Wharton, 1936: 474.

Cosmolaelaps passali Hunter & Mollin, 1964: 247 [Junior synonymy of *C. trifidus* by Delfinado & Baker, 1975: 52; Farrier & Hennessey, 1993: 70].

Cosmolaelaps trifidus.— Delfinado & Baker, 1975: 52; Hunter, 1993: 22.

Hypoaspis (*Cosmolaelaps*) *passali*.— Karg, 1988: 517; Karg, 1993a: 139.

Cosmolaelaps trifidus.— Farrier & Hennessey, 1993: 70; Moreira et al., 2014: 320.

TYPE DEPOSITORY: of *S. trifidus* and *C. passali*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: of *S. trifidus*: Duke Forest, Durham, North California, United States of America, on *Passalus cornutus* (Coleoptera: Passalidae); of *C. passali*: Athens, Georgia, United States of America, from laboratory colony inicitialized with mites collected on *Popilius disjunctus* [Coleoptera: Passalidae].

***Cosmolaelaps tuberculatus* (Mašán, 1992).**

Hypoaspis (*Cosmolaelaps*) *tuberculata* Mašán, 1992: 383.

Hypoaspis (*Cosmolaelaps*) *quadrituberculata*.— Karg, 1993: 137 (*nomen nudum*).

Cosmolaelaps tuberculatus.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: in the author's collection at Institute of Zoology and Ecosozology of the Slovak Academy of Sciences, Bratislava, Slovakia

TYPE LOCALITY AND HABITAT: Považaký Inovec – Hrádok, Slovakia, in nest of *Lasius flavus* [Hymenoptera: Formicidae].

NOTE: According to P. Mašán (pers. communication, 2012), the name referred to by Karg, 1993: 137, *Hypoaspis* (*Cosmolaelaps*) *quadrituberculata*, refers to the original manuscript name (unpublished) for *H.* (*C.*) *tuberculata*.

***Cosmolaelaps ungeri* (Karg, 1985).**

Hypoaspis (*Cosmolaelaps*) *ungeri* Karg, 1985: 235.

Hypoaspis (*Cosmolaelaps*) *ungeri*.— Karg, 1988: 515.

Cosmolaelaps ungeri.— Farrier & Hennessey, 1993: 70; Moreira et al., 2014: 320.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: near Havana-Mariel, Cuba, in nest of *Nasutitermes* sp. (Isoptera: Termitidae).

***Cosmolaelaps vacuus* (Michael, 1891).**

Laelaps vacua Michael, 1891: 651.

Hypoaspis militiformis Oudemans, 1902: 53 [Junior synonymy of *H.* (*C.*) *vacua* by Bregetova, 1977: 512].

Laelaps (*Cosmolaelaps*) *vacuus*.— Berlese, 1904: 419; Halbert, 1915: 72; Donisthorpe, 1927: 214.

Laeleps [sic] (*Cosmolaelaps*) *styliferus* Halbert, 1915: 73 [Junior synonymy of *C. vacua* by Luxton, 1998: 18].

Cosmolaelaps styliferus.— Hull, 1918: 69.

Cosmolaelaps vacuus.— Hull, 1918: 69; Vitzthum, 1929: 25; Lombardini, 1936: 39; Willmann, 1951: 115; Buitendijk, 1945: 298; Schweizer, 1949: 40; Rosario, 1981: 44; Teng, 1982: 163; Bai & Gu, 1993a: 41; Farrier & Hennessey, 1993: 70; Freire & Moraes, 2007: 356; Moreira et al., 2014: 320.

Laelaps (*Cosmolaelaps*) *styliferus*.— Donisthorpe, 1927: 214.

Cosmolaelaps militiformis.— Buitendijk, 1945: 298; Grochovskaya & Huan-Hoe, 1961: 1633.

Laelaps vacua; *non Laelaps*.— Tipton, 1960: 309.

Hypoaspis (*Cosmolaelaps*) *vacua*.— Evans & Till, 1966: 190; Karg, 1971: 163; Bregetova, 1977: 512; Karg, 1978b: 9; Karg, 1979: 72; Karg, 1981a: 219;

Karg, 1987: 292; Karg, 1988: 518; Karg, 1993a: 139; Karg, 1994: 182; Karg, 2000: 247; Gwiazdowicz, 2004: 181; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 120; Bai & Ma, 2012: 558.

Hypoaspis vacua.— Costa, 1968: 19; Solomon, 1968b: 664; Allred, 1969: 242; Shcherbak, 1971b: 27; Prasad, 1974: 151; Allred, 1975: 127; Tseng, 1977: 55; Gupta & Chattopadhyay, 1978: 79; Gupta & Paul, 1989: 317; Ma, 1996: 48; Munderloh, 1996: 590; Ren & Guo, 2008: 329.

Hypoaspis (*Cosmolaelaps*) *serratosimilis* Bernhard in Hirschmann et al., 1969: 136 [Junior synonymy of *H.* (*C.*) *vacua* by Bregetova, 1977: 512; Karg, 1981a: 219; Farrier & Hennessey, 1993: 70; Karg, 1993a: 139].

Cosmolaelaps vacua.— Lapina, 1976: 28; Zeman, 1982: 237; Luxton, 1998: 18; Xin et al., 2010: 2.

Cosmolaelaps vacuum [sic].— Teng, 1982: 163.

Hypoaspis (*Cosmolaelaps*) *serratosimilis*.— Ishikawa, 1986: 175.

Hypoaspis vacura [sic].— Karg, 2003b: 233.

TYPE DEPOSITORY: of *L. vacua*: unspecified; of *H. militiformis*: unspecified; of *L.* (*C.*) *styliferus*: National Museum, Dublin, Ireland; of *H.* (*C.*) *serratossimilus*: unspecified.

TYPE LOCALITY AND HABITAT: of *L. vacua*: near Innsbruck, Tyrol, Austria, in nest of *Camponotus herculeanus* [Hymenoptera: Formicidae]; of *H. militiformis*: Italy, unspecified substrate; of *L.* (*C.*) *styliferus*: Mulranny, Clare Island, Ireland, on *Lasius flavus* [Hymenoptera: Formicidae] and sphagnum; Erlangem Germany, on fungus on a tree, litter of alder, oak and poplar, decaying coir mat, rotting husks and under stones; of *H.* (*C.*) *serratossimilis*: Polster, Germany, in nest of *Lasius fuliginosus* (Hymenoptera: Formicidae), soil (different sepecies of plants) and under dry stones.

NOTE: (a) *Hypoaspis* (*Cosmolaelaps*) *serratosimilis* was described based on specimens identified by Bernhard, 1955 as *Hypoaspis* (*Cosmolaelaps*) *serratus* Trägardh. (b) Speciments reported by Lapina, 1970 as *Cosmolaelaps robustus* Berlese were reidentified as *C. vacua* by Lapina, 1976: 28.

***Cosmolaelaps vanmoli* (Loots, 1980).**

Hypoaspis (*Hypoaspis*) *vanmoli* Loots, 1980: 760.

Cosmolaelaps vanmoli.— Moreira et al., 2014: 320.

TYPE DEPOSITORY: Koninklijk Museum voor Midden Africa, Tervuren, Belgium; accession number 143.518.

TYPE LOCALITY AND HABITAT: Morne Blanc, Mahé Centre, Seychelles, in soil of endemic forest.

***Cosmolaelaps wangae* Bai & Gu, 1993.**

Cosmolaelaps wangae Bai & Gu, 1993a: 43.

Cosmolaelaps wangae.— Chen et al., 1995b: 501; Ren & Guo, 2008: 328; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *wangae*.— Huhta & Karg, 2010: 331; Bai & Ma, 2012: 558.

TYPE DEPOSITORY: Ningxia Institute of Endemic Disease Control, Yinchuan, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Cosmolaelaps weeversi* (Oudemans, 1926).**

Hypoaspis weeversi Oudemans, 1926: 101.

Hypoaspis weeversi.— Buitendijk, 1945: 297.

Cosmolaelaps weeversi.— Strandtmann, 1963: 3; Hunter & Mollin, 1964: 250; Moreira et al., 2014: 320.

Hypoaspis (*Cosmolaelaps*) *weeversi*.— Karg, 1987: 291; Karg, 1979: 73; Karg, 1981a: 219; Karg, 1988: 517; Karg, 1993a: 139.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Rio de Janeiro Botanic Garden, Rio de Janeiro, Brazil, on rotten fruit of *Phytelephas* sp. [Arecales: Arecaceae].

***Dynastaspis* Costa, 1971.**

Dynastaspis Costa, 1971: 90.

TYPE SPECIES: *Dynastaspis walhallae* Costa, 1971.

***Dynastaspis hercules* Costa, 1976.**

Dynastaspis hercules Costa, 1976: 187.

Dynastaspis hercules.— Farrier & Hennessey, 1993: 71.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Guadeloupe, Lesser Antilles [Caribbean area], on *Hercules hercules* [sic] [probably *Dynastes hercules*] (Coleoptera: Dynastidae).

***Dynastaspis walhallae* Costa, 1971.**

Dynastaspis walhallae Costa, 1971: 90.

Dynastaspis walhallae.— Costa, 1976: 193; Farrier & Hennessey, 1993: 71.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Walhalla, South Carolina, United States of America, on larva of *Dynastes tytius* (Coleoptera: Dynastidae) in dead Black locust tree.

***Dyscinetonyssus* Moss & Funk, 1965.**

Dyscinetonyssus Moss & Funk, 1965: 235.

Dyscinetonyssus.— Casanueva, 1993: 40.

TYPE SPECIES: *Dyscinetonyssus hystricosus* Moss & Funk, 1965: 235.

***Dyscinetonyssus hystricosus* Moss & Funk, 1965**.

Dyscinetonyssus hystricosus Moss & Funk, 1965: 237.

Dycinetonyssus [sic] *hystricosus*.— Farrier & Hennessey, 1993: 71.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 2965.

TYPE LOCALITY AND HABITAT: Highlands Hammock State Park, Highland, Florida, United States of America, under elytra of *Dyscinetus trachypygus* Burmeister (Coleoptera: Scarabaeidae).

***Gaeolaelaps* Evans & Till, 1966.**

Gymnolaelaps.— Vitzthum, 1929: 22 (in part).

Hypoaspis (*Gaeolaelaps*) Evans & Till, 1966: 160; Evans & Till (1979); Fariji et al., 2008: 207.

Hypoaspis.— Hughes, 1976: 292 (in part); Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

Hypoaspis (*Geolaelaps*).— Bregetova, 1977: 499; Karg, 1979: 79; Karg, 1982: 237; Karg, 1989: 107; Karg, 1993a: 136.

Gaeolaelaps Walter & Oliver, 1989; Casanueva, 1993: 40; Farrier & Hennessey, 1993; Beaulieu, 2009: 35.

Geolaelaps.— Rosario, 1981: 46; Hunter, 1993: 23; Karg & Schorlemmer, 2013: 203.

TYPE SPECIES: *Laelaps aculeifer* Canestrini, 1884: 698, by original designation.

NOTES: (a) The use of the names *Gaelaelaps* and *Geolaelaps* is extensively discussed by Halliday & Lindquist, 2007. (b) For this genera we followed the diagnosis of Beaulieu, 2009: 35.

***Gaeolaelaps acme* (Womersley, 1955) n. comb..**

Hypoaspis acme Womersley, 1955: 414.

Hypoaspis (*Geolaelaps*) *acme*.— Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 115.

Hypoaspis acme.— Domrow, 1987: 833.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Fisher Island, Bass Strait, Australia, in nesting material in burrows of *Puffinus tenuirostris* [Procellariiformes: Procellariidae].

***Gaeolaelaps aculeifer* (Canestrini, 1884).**

Laelaps aculeifer Canestrini, 1884: 698.

Hypoaspis aculeifer.— Canestrini, 1885: 84; Oudemans, 1902b: 24; Oudemans, 1903b: 129; Sellnick, 1931: 695; Lombardini, 1936: 42; Willmann, 1949a: 115; Willmann, 1951: 117; Willmann, 1952a: 146; Turk, 1953: 11; Bregetova, 1956: 77; Fonseca, 1958b: 50; Strandtmann, 1963: 3; Costa, 1961b: 258; Costa, 1962: 489; Costa, 1966a: 141; Costa, 1966c: 74; Solomon, 1968a: 675; Bhattacharyya, 1968: 540; Costa, 1968: 11; Beron, 1974: 176; Lapina, 1976: 31; Hughes, 1976: 292; Karg, 1978b: 18; Neves & Carmona, 1981/82: 295; Zeman, 1982: 233; Ruf & Koehler, 1993: 198; Pinto-da-Rocha, 1995: 87; Ma, 1996: 48; Cobanoglu & Bayram, 1998: 190; Liu & Ma, 2003: 654; Ren & Guo, 2008: 329.

Laelaps (*Iphis*) *aculeifer.*— Berlese, 1892: LXIII, 10; Halbert, 1923: 367.

Laelaps aculeifer.— Berlese, 1892: 42.

Androlaelaps concisus Womersley, 1956a: 579 [Junior synonymy of *H. aculeifer* by Strong & Halliday, 1994: 87].

Laelaps aculeifer; *non Laelaps*.— Tipton, 1960: 286.

Hypoaspis (*Hypoapis*) *aculeifer*.— Karg, 1962: 61.

Geolaelaps concisus.— Ryke, 1963: 11.

Gaeolaelaps aculeifer.— Hyatt, 1964: 472; Beaulieu, 2009: 36; Bahrami et al., 2011: 351; Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

Hypoaspis (*Gaeolaelaps*) *aculeifer*.— Evans & Till, 1966: 166; Teng, 1982: 162; Luxton, 1998: 20; Faraji et al., 2008: 207.

Hypoaspis (*Hypoaspis*) *aculeifer*.— Karg, 1971: 171.

Hypoaspis aculifer [sic].— Mrciak & Brelih, 1972: 343; Munderloh, 1996: 590.

Hypoaspis (*Geolaelaps*) *aculeifer*.— Bregetova, 1977: 503; Karg, 1979: 84; Karg, 1982: 242, Tenorio, 1982: 262; Tenorio et al., 1985: 300; Karg, 1989b: 116; Karg, 1993a: 143; Karg, 2000: 247; Gwiazdowicz & Gulvik, 2005: 119.

Hypoaspis (*Geolaelaps*) *consisa* [sic].— Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116.

Geolaelalps aculeifer.— Walter & Oliver, 1990: 295; Farrier & Hennessey, 1993: 72.

TYPE DEPOSITORY: of *G. aculeifer*: unspecified; of *A. concisus*: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: of *L. aculeifer*: botanic garden, Padua, Italy, unspecified substrate; of *A. concisus*: Holland, intercepted at Perth, Western Australia, on *Begonia* sp. bulb [Curcubitales: Begoniaceae], with *Rhizoglyphus echinopus* [Sarcoptiformes: Acaridae].

NOTE: Oudemans, 1929: 393 and Buitendijk, 1945: 295 considered *H. aculeifer* to be a junior synonymy of *Acarus cadaverinus* Hermann, 1804. Strandtmann, 1963: 3, did not accept that synonymy. The latter interpretation is adopted in this publication.

***Gaeolaelaps aculeifer longior* (Berlese, 1892) n. comb..**

Laelaps (*Iphis*) *aculeifer* var. *longior* Berlese, 1892: LXIII, 10.

Laelaps longior Berlese, 1883b: 216 (*nomen nudum*).

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Acireale, Catania, Sicilia, Italy, in moss.

NOTE: Berlese, 1883: 215 mentioned the description of *Laelaps longior* [which we assume to refer to *L.* (*I.*) *aculeifer* var. *longior*] as being given in “Loc. pred. s. n. r. 1, 6”; however, the original description was only given by Berlese (1892).

***Gaeolaelaps aculeiferoides* (Teng, 1982).**

Hypoaspis (*Geolaelaps*) *aculeiferoides* Teng, 1982: 161.

Gaeolaelaps aculeiferoides.— Beaulieu, 2009: 37.

Hypoaspis aculeiferoides.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Taipei, China.

TYPE LOCALITY AND HABITAT: Beijing, China, in nest of *Citellus dauricus* [Rodentia: Sciuridae].

***Gaeolaelaps analis* (Karg, 1982) n. comb..**

Hypoaspis (*Geolaelaps*) *analis* Karg, 1982: 251.

Hypoaspis (*Geolaelaps*) *analis*.— Karg, 1989b: 117; Karg, 2000: 247.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Venezuela, in soil.

***Gaeolaelaps angustiscutatus* (Willmann, 1951).**

Hypoaspis angustiscutatus Willmann, 1951: 117.

Hypoaspis angustiscutatus.— Hirschmann et al., 1969: 140; Lapina, 1976: 31

Hypoaspis elongatus Götz in Hirschmann et al., 1969: 140 [Junior synonymy by Bregetova, 1977: 504; Karg, 1993a: 141].

Hypoaspis (*Hypoaspis*) *elongate* [sic].— Karg, 1971: 169.

Hypoaspis (*Hypoaspis*) *angustiscutatus*.— Karg, 1971: 169.

Hypoaspis (*Geolaelaps*) *angustiscutata*.— Bregetova, 1977: 504; Karg, 1979: 81; Karg, 1982: 239; Karg, 1993a: 141.

Hypoaspis (*Geolaelaps*) *elongata*.— Karg, 1979: 81; Karg, 1982: 239.

Gaeolaelaps angustiscutatus.— Beaulieu, 2009: 36; Trach, 2012: 161; Kavianpour et al., 2013: 7; Nemati & Kavianpour, 2013: 71; Kavianpour & Nemati, 2014: 321.

Gaeolaelaps elongata.— Nemati & Kavianpour, 2013: 71.

TYPE DEPOSITORY: of *H. angusticustatus* and *H. elongatus*: unspecified.

TYPE LOCALITY AND HABITAT: of *G. angusticustatus*: 140 m above sea level, Leitha River, Zurndorf, Pannonian Basin, Austria, in soil from swamp with moss and grass; of *H. elongatus*: unspecified [probably Germany], unspecified substrate.

NOTE: According to Beaulieu, 2009: 37, specimens reported by Lapina, 1976: ??? have some morphological characteristics of *Cosmolaelaps* Berlese.

***Gaeolaelaps angustus* (Karg, 1965).**

Hypoaspis (*Hypoaspis*) *angustus* Karg, 1965: 274.

Hypoaspis angustus.— Costa, 1966a: 145; Zeman, 1982: 233; Ma, 1996: 51.

Hypoaspis (*Hypoaspis*) *angusta*.— Karg, 1971: 171; Karg, 1978b: 15.

Hypoaspis (*Geolaelaps*) *angustus*.— Bregetova, 1977: 504.

Hypoaspis (*Geolaelaps*) *angusta*.— Karg, 1979: 81; Karg, 1982: 239; Karg, 1993a: 141; Ruf & Koehler, 1993: 197.

Geolaelalps angustus.— Walter & Oliver, 1990: 295.

Hypoaspis angusta.— Farrier & Hennessey, 1993: 77; Ruf & Koehler, 1993: 197.

Gaeolaelaps angustus.— Beaulieu, 2009: 36.

Gaeolaelaps angusta.— Kavianpour et al., 2013: 7; Nemati & Kavianpour, 2013: 70; Kavianpour & Nemati, 2014: 321.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: "Biologischen Zentralanstalt Berlin", Kleinmachnow, Germany, in pasture soil.

***Gaeolaelaps arabicus* (Hafez, ElBadry & Nasr, 1982).**

Hypoaspis (*Hypoaspis*) *arabicus* Hafez, ElBadry & Nasr, 1982: 9.

Hypoaspis arabicus.— Zaher, 1986: 188; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347.

Gaeolaelaps arabicus.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Faculty of Agriculture, Cairo University, Giza, Egypt, in manure.

***Gaeolaelaps ardoris* (Karg, 1993) n. comb..**

Hypoaspis (*Geolaelaps*) *ardoris* Karg, 1993b: 263.

Hypoaspis s. l. *ardoris*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Tortuga Bay, Santa Cruz, Galapagos Islands, in moist litter on rock crevices.

***Gaeolaelaps armstrongi* (Womersley, 1956) n. comb..**

Androlaelaps armstrongi Womersley, 1956a: 576.

Geolaelaps armstrongi.— Ryke, 1963: 11.

Hypoaspis (*Geolaelaps*) *armstrongi*.— Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Acacia Plateau, New South Wales, Australia, on unidentified beetle.

***Gaeolaelaps barbarae* (Strong, 1995).**

Hypoaspis barbarae Strong, 1995: 221.

Hypoaspis (*Gaeolaelaps*) *barbarae*.— Faraji & Halliday, 2009: 249.

Gaeolaelaps barbarae.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Australian Capital Territory, Australia, on *Hadronyche* sp. (Araneae: Hexathelidae).

***Gaeolaelaps barbatula* (Karg, 1989) n. comb..**

Hypoaspis (*Geolaelaps*) *barbatula* Karg, 1989c: 3.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Leutratal Nature Reserve, near Jena, Germany, with *Arrhenatheretum* sp. [Poales: Poaceae].

***Gaeolaelaps blattae* (Strong & Halliday, 1994).**

Hypoaspis blattae Strong & Halliday, 1994: 88.

Hypoaspis blattae.— Strong, 1995: 222; Strong, 1996: 426.

Hypoaspis (*Gaeolaelaps*) *blattae*.— Faraji & Halliday, 2009: 249.

Gaeolaelaps blattae.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Dimbulah, Queensland, Australia, on *Macropanesthia rhinoceros* [Blattodea: Blaberidae].

NOTE: Faraji & Halliday, 2009 considered some of the paratypes of *H. blattae* to belong to different species; these were designated as paratypes of *H.* (*G.*) *concavus* Faraji & Halliday, 2009 and *H.* (*G.*) *segregatus* Faraji & Halliday, 2009.

***Gaeolaelaps bregetovae* (Shereef & Afifi, 1980).**

Hypoaspis bregetovae Shereef & Afifi, 1980: 129.

Hypoaspis bregetovae.— Zaher, 1986: 189; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347.

Gaeolaelaps bregetovae.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in organic manure.

***Gaeolaelaps brevior* (Faraji & Halliday, 2009) n. comb..**

Hypoaspis (*Gaeolaelaps*) *brevior* Faraji & Halliday, 2009: 252.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Dawson Range, Blackdown Tableland, Queensland (23°49'S, 149°06'E), Australia, on *Parapanesthia* sp. (Blattodea: Blaberidae).

***Gaeolaelaps brevipellis* (Karg, 1979).**

Hypoaspis (*Geolaelaps*) *brevipellis* Karg, 1979: 87.

Hypoaspis (*Geolaelaps) brevipellis.*— Karg, 1982: 243; Karg, 1989b: 117; Karg, 2000: 247.

Gaeolaelaps brevipellis.— Nemati & Mohseni, 2013: 75.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near El Bolsón, [Rio Negro], Argentina, in litter.

***Gaeolaelaps brevipilis* (Bernhard in Hirschmann et al., 1969).**

Hypoaspis (*Hypoaspis*) *brevipilis* Bernhard in Hirschmann et al., 1969: 133.

Hypoaspis (*Hypoaspis*) *brevipilis*.— Karg, 1971: 171.

Hypoaspis (*Geolaelaps*) *brevipilis*.— Karg, 1979: 85; Karg, 1982: 243; Karg, 1989b: 116; Karg, 1993a: 144; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 119.

Gaeolaelaps brevipilis.— Beaulieu, 2009: 37; Nemati & Mohseni, 2013: 76.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, in sludge.

NOTE: Bregetova, 1977: 504, Karg, 1979: 85; Karg, 1982: 243, Karg, 1989b: 116 and Karg 1993: 144 suspected this species to be a junior synonymy of *Laelaps elegantulus* Berlese, 1903.

***Gaeolaelaps carabidophilus* Trach, 2012.**

Gaeolaelaps carabidophilus Trach, 2012: 158.

Gaeolaelaps carabidophilus.— Nemati & Mohseni, 2013: 79.

TYPE DEPOSITORY: Museum of Zoology, I.I. Mechnikov Odessa National University, Odessa, Ukraine.

TYPE LOCALITY AND HABITAT: Belgorod-Dnestrovsky, vicinity of Zatoka (46°00'N, 30°23'E), Odessa, Ukraine, on *Stenophus mixtus* (Coleoptera: Carabidae).

***Gaeolaelaps cerata* (Karg, 1982).**

Hypoaspis (*Geolaelaps*) *cerata* Karg, 1982: 251.

Hypoaspis (*Geolaelaps*) *cerata*.— Karg, 2000: 247; Karg, 2006: 148.

Gaeolaelaps cerata.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Venezuela, in soil.

***Gaeolaelaps changlingensis* (Ma, 2000).**

Hypoaspis changlingensis Ma, 2000: 150.

Hypoaspis changlingensis.— Ren & Guo, 2008: 329.

Gaeolaelaps changlingensis.— Nemati & Kavianpour, 2013: 71.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Taipingchuan (44°24'N, 123°11'E), Changling, Jilin, China, in soil.

***Gaeolaelaps ciconia* (Karg, 1979) n. comb..**

Hypoaspis (*Geolaelaps*) *ciconia* Karg, 1979: 82.

Hypoaspis (*Geolaelaps*) *ciconia*.— Karg, 1982: 241; Karg, 1987: 299; Karg, 1989b: 118; Karg, 1989c: 5.

Hypoaspis s. l. *ciconia*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Rio Azul Valley, near El Bolsón, [Rio Negro], Argentina, in litter of *Nothofagus dombeyi* [Plantae: Nothofagaceae].

***Gaeolaelaps circularis* Hyatt, 1964.**

Gaeolaelaps circularis Hyatt, 1964: 470.

Hypoaspis (*Geolaelaps*) *circularis*.— Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116.

Gaeolaelaps circularis.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1963.10.3.19.

TYPE LOCALITY AND HABITAT: Mérida, Venezuela, on unidentified beetle (Coleoptera: Passalidae).

***Gaeolaelaps concavus* (Faraji & Halliday, 2009) n. comb..**

Hypoaspis (*Gaeolaelaps*) *concavus* Faraji & Halliday, 2009: 246.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Duaringa, Queensland, Australia, on *Macropanesthia rhinoceros* (Blattodea: Blaberidae).

NOTE: Faraji & Halliday, 2009 considered some of the paratypes of *H. blattae* Strong & Halliday, 1994 to belong to different species; some of these were designated as paratypes of *H.* (*G.*) *cancavus*.

***Gaeolaelaps concinna* (Teng, 1982).**

Hypoaspis (*Geolaelaps*) *concinna* Teng, 1982: 160.

Gaeolaelaps concinna.— Beaulieu, 2009: 37.

Hypoaspis concinna.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Taipei, China.

TYPE LOCALITY AND HABITAT: Beijing, China, in nest of *Cricetus triton* [Rodentia: Cricetidae].

***Gaeolaelaps corpolongus* Rosario, 1981.**

Geolaelaps corpolongus Rosario, 1981: 48.

Gaeolaleaps corpolongus.— Strong & Halliday, 1994: 91; Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mount Makiling, Mud Spring Area, College, Laguna, Philippines, on *Panesthia* sp. [Blattodea: Blaberidae] from decomposing bark of fallen log.

***Gaeolaelaps dactylifera* (Fouly & Al-Rehiayani, 2011).**

Hypoaspis dactylifera Fouly & Al-Rehiayani, 2011: 145.

Gaeolaelaps dactylifera.— Nemati & Kavianpour, 2013: 70.

TYPE DEPOSITORY: Zoology Laboratory, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia.

TYPE LOCALITY AND HABITAT: Melida, Al-Qassim, Saudi Arabi, in litter.

***Gaeolaelaps dailingensis* (Ma & Yin, 1998).**

Hypoaspis (*Geolaelaps*) *dailingensis* Ma & Yin, 1998: 226.

Hypoaspis (*Gaeolaelaps*) *dailingensis*.— Ren & Guo, 2008: 329.

Gaeolaelaps dailingensis.— Beaulieu, 2009: 37; Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Liangshui Natural Preserve (47°10'N, 128°53'E), Dailing, Yichun, Heilongjiang, China, in forest soil.

***Gaeolaelaps debilis* (Ma, 1996).**

Hypoaspis debilis Ma, 1996: 51.

Hypoaspis debilis.— Ren & Guo, 2008: 329.

Gaeolaelaps debilis.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Sheli (45°33'N, 123°23'E), Daan, Jilin, China, in nest of *Citellus dauricus* [Rodentia: Sciuridae].

***Gaeolaelaps deinos* (Zeman, 1982).**

Hypoaspis deinos Zeman, 1982: 231.

Gaeolaelaps deinos.— Beaulieu, 2009: 37; Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: Arachnoentomological Department, Institute of Parasitology, Czechoslovak Academy of Science, Prague, Czech Republic; accession number Pa. Ú. ČSAV1888.

TYPE LOCALITY AND HABITAT: Prague, Czech Republic, in nest of *Lasius flavus* [Hymenoptera: Formicidae] in garden soil.

***Gaeolaelaps disjunctus* (Hunter & Yeh, 1969).**

Hypoaspis (*Geolaelaps*) *disjuncta* Hunter & Yeh, 1969: 97.

Hypoaspis (*Geolaelaps*) *disjuncta*.— Delfinado & Baker, 1975: 53.

Geolaelaps disjuncta.— Walter & Oliver, 1990: 295; Hunter, 1993: 22.

Geolaelaps disjunctus.— Farrier & Hennessey, 1993: 73.

Gaeolaelaps disjuncta.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: The Acarology Collection, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: from laboratory culture maintained at Athens, Georgia, United States of America, with *Popilius disjunctus* [Coleoptera: Passalidae].

***Gaeolaelaps egenus* (Berlese, 1918) n. comb..**

Hypoaspis (*Stratiolaelaps*) *egenus* Berlese, 1918: 122.

Hypoaspis (*Hypoaspis*) *egenus*.— Aswegen & Loots, 1970: 186.

Hypoaspis (*Geolaelaps*) *egena*.— Karg, 1982: 241; Karg, 1987: 299; Karg, 1989b: 118; Karg, 1989c: 5.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Zululand, South Africa, on *Mus* sp. (Rodentia: Muridae).

***Gaeolaelaps elegantulus* (Berlese, 1903) n. comb..**

Laelaps elegantulus Berlese, 1903: 241.

Laelaps (*Hypoaspis*) *elegantulus*.— Berlese, 1904: 304; Berlese, 1904: 414.

Gymnolaelaps elegantulus.— Vitzthum, 1929: 25; Schweizer, 1949: 39.

Laelaps elegantulus; *non Laelaps*.— Tipton, 1960: 293.

Hypoaspis (*Geolaelaps*) *elegantulus*.— Bregetova, 1977: 504.

Hypoaspis (*Geolaelaps*) *elegantula*.— Teng, 1982: 161.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Cison di Valmarino, Treviso, Italy, in nests of *Tapinoma erraticum* [Hymenoptera: Formicidae].

NOTES: (a) Bregetova, 1977: 504 and Karg, 1979: 85, 1982: 243, 1989b: 116, 1993: 144) suspected this species to be identical to *G. brevipilis* (Berlese, 1903). (b) Karg, 1982: 243 suspected this species to be a senior synonym of *Hypoaspis* (*Hypoaspis*) *franzi* Aswegen & Loots, 1970.

***Gaeolaelaps ellipsoides* (Bernhard in Hirschmann et al., 1969).**

Hypoaspis (*Hypoaspis*) *ellipsoides* Bernhard in Hirschmann et al., 1969: 133.

Hypoaspis ellipsoides.— Karg, 1962: 63.

Gaeolaelaps ellipsoides.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, in forest floor, moss, *Calluna* sp. [Plantae: Ericacea], sludge and compost.

***Gaeolaelaps etiopicus* (Berlese, 1918).**

Hypoaspis (*Stratiolaelaps*) *etiopicus* Berlese, 1918: 120.

Hypoaspis (*Hypoaspis*) *etiopicus*.— Aswegen & Loots, 1970: 188.

Hypoaspis (*Geolaelaps*) *etiopica*.— Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 118; Karg, 1989c: 5.

Gaeolaelaps etiopicus.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, in humus.

***Gaeolaelaps eupygidialis* (Karg, 2003) n. comb..**

Hypoaspis (*Geolaelaps*) *eupygidialis* Karg, 2003b: 233.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Tenatol, Ecuador, in litter and soil.

***Gaeolaelaps expolitus* (Berlese, 1904) n. comb..**

Laelaps (*Hypoaspis*) *expolitus* Berlese, 1904b: 18.

Hypoaspis expolitus.— Willmann, 1951: 117; Costa, 1968: 3.

Laelaps expolitus; *non Laelaps*.— Tipton, 1960: 293.

Hypoaspis (*Geolaelaps*) *expolitus*.— Bregetova, 1977: 508.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in litter.

NOTE: Bregetova, 1977: 508 suspected this species to be senior synonym of *Hypoaspis minor* Costa.

***Gaeolaelaps exquisita* (Karg, 1989) n. comb..**

Hypoaspis (*Geolaelaps*) *exquisita* Karg, 1989b: 122.

Hypoaspis (*Geolaelaps*) *exquisita*.— Karg, 1989c: 4.

Hypoaspis s. l. *exquisita*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Gaeolaelaps farajii* Nemati & Mohseni, 2013.**

Gaeolaelaps farajii Nemati & Mohseni, 2013: 72.

Gaeolaelaps farajii.— Kavianpour & Nemati, 2014: 321.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: 845 m above seal level, Izeh (31°49'52"N, 49°52'9"E), Khuzestan, Iran, in soil.

***Gaeolaelaps fishtowni* (Ruf & Koehler, 1993).**

Hypoaspis fishtowni Ruf & Koehler, 1993: 194.

Hypoaspis (*Geolaelaps*) *fishitowni*.— Ruf & Koehler, 1993: 197.

Hypoaspis (*Geolaelaps*) *fishitowni*.— Karg, 1993a: 141.

Gaeolaelaps fishtowni.— Beaulieu, 2009: 37; Trach, 2012: 162; Nemati & Kavianpour, 2013: 70.

TYPE DEPOSITORY: Author's collection, University Bremen, Germany.

TYPE LOCALITY AND HABITAT: from a laboratory culture started with specimens from Bügerpark, Bremerhaven, Germany.

***Gaeolaelaps franzi* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *franzi* Aswegen & Loots, 1970: 185.

Hypoaspis (*Geolaelaps*) *franzi*.— Karg, 1982: 243; Karg, 1989b: 117.

Gaeolaelaps franzi.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: *Hagenia* forest, at the western side of Mont Meru, Kenya, in soil.

***Gaeolaelaps gillespiei* Beaulieu, 2009.**

Gaeolaelaps gillespiei Beaulieu, 2009: 38.

TYPE DEPOSITORY: Canadian National Collection of Insects, Arachnids and Nematodes, at Agriculture and Agri-Food Canada, Ottawa, Canada.

TYPE LOCALITY AND HABITAT: Sidney, British Columbia, Canada, in roots and soil of wilting gerbera plants [Asterales: Asteraceae].

***Gaeolaelaps glabrosimilis* (Bernhard in Hirschmann et al., 1969)**

Hypoaspis glabrosimilis Bernhard in Hirschmann et al., 1969: 134.

Hypoaspis (*Geolaelaps*) *glabrosimilis*.— Bregetova, 1977: 501; Karg, 1979: 82; Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 118; Karg, 1989c: 5; Karg, 1993a: 142.

Hypoaspis (*Geolaelaps*) nr *glabrosimilis*.— Tenorio, 1982: 264; Tenorio et al., 1985: 300.

Hypoaspis (*Gaeolaelaps*) *glabrosimilis*.— Faraji et al., 2008: 208.

Gaeolaelaps glabrosimilis.— Beaulieu, 2009: 36; Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, on *Lasius fuliginosus* [Hymenoptera: Formicidae].

NOTES: (a) This species was described based on specimens identified by Bernhard, 1955 as *Hypoaspis* (*Stratiolaelaps*) *glaber* Trägardh. (b) Bregetova, 1977: 503 suspected this species to be a junior synonymy of *H. hermaphroditoides* Oudemans.

***Gaeolaelaps gleba* (Karg, 1978).**

Hypoaspis (*Hypoaspis*) *glabra* Karg, 1978b: 24.

Hypoaspis (*Geolaelaps*) *gleba* Karg, 1979: 79 [replacement name, given the existence of *Hypoaspis glaber* Trägardh, 1952].

Hypoaspis (*Geolaelaps*) *gleba*.— Karg, 1982: 239; Karg, 2006: 147.

Gaeolaelaps gleba.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Misituni, Tarapaca, Chile, in plankton sample with phyllopoda [Animalia].

***Gaeolaelaps gracilis* Meledzhayeva, 1963.**

Hypoaspis gracilis Meledzhayeva, 1963: 52.

Hypoaspis negevi Costa, 1969a: 167 [Junior synonymy by Bregetova, 1977: 508; Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116].

Hypoaspis gracilis.— Ye & Ma, 1991: 99.

Hypoaspis (*Geolaelaps*) *gracilis*.— Bregetova, 1977: 508; Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116; Gwiazdowicz & Klemt, 2004: 14.

Gaeolaelaps negevi.— Beaulieu, 2009: 36; Walter & Moser, 2010: 405.

Gaeolaleaps gracilis.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: of *H. gracilis*: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia; of *H. negevi*: unspecified.

TYPE LOCALITY AND HABITAT: of *G. gracilis*: type series: Kizyldzha-Baba, on great gerbil [Rodentia: Sciuridae]; Kizyldzha-Baba, in tunnel of great gerbil; Lengych, on red-tailed gerbil [Rodentia: Sciuridae]; vicinity of Kadyr-Gotyr, Karabile, in tunnel of Afghan vole [Rodentia: Cricetidae]; vicinity of Morgunovka, Kushka, on great gerbil; all in Karakum, Turkmenistan; of *H. negevi*: Yeroham, Israel, in nest of *Spalax ehrenbergi* [Rodentia: Spalacidae].

***Gaeolaelaps guttaforma* (Karg, 1989) n. comb..**

Hypoaspis (*Geolaelaps*) *guttaforma* Karg, 1989c: 1.

Hypoaspis s. l. *guttaforma*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Leutratal Nature Reserve, near Jena, Germany, with *Arrhenatheretum* sp. [Poales: Poaceae].

***Gaeolaelaps haiyuanensis* (Bai, Gu & Chen, 1994).**

Hypoaspis haiyuanensis Bai, Gu & Chen, in Bai et al., 1994: 296.

Hypoaspis haiyvanensis.— Ren & Guo, 2008: 329.

Gaeolaelaps haiyuanensis.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China

TYPE LOCALITY AND HABITAT: Haiyuan (36.5° N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Gaeolaelaps invictianus* Walter & Moser, 2010.**

Gaeolaelaps invictianus Walter & Moser, 2010: 400.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number 47,760..

TYPE LOCALITY AND HABITAT: Pineville, Louisiana, United States of America, on alate *Solenopsis invicta* (Hymenoptera: Formicidae).

***Gaeolaelaps iranicus* Kavianpour & Nemati, 2013.**

Gaeolaelaps iranicus Kavianpour & Nemati, in Kavianpour et al., 2013: 3.

Gaeolaelaps iranicus.— Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: 1777 m above sea level, Shahreza (32°03'N, 51°54'E), Esfahan, Iran, in soil.

***Gaeolaelaps isodentis* (Karg, 1989) n. comb..**

Hypoaspis (*Geolaelaps*) *isodentis* Karg, 1989b: 121.

Hypoaspis (*Geolaelaps*) *isodentis.*— Karg, 2000: 247.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Gaeolaelaps jondishapouri* Nemati & Kavianpour, 2013.**

Gaeolaelaps jondishapouri Nemati & Kavianpour, 2013: 64.

Gaeolaelaps jondishapouri.— Kavianpour & Nemati, 2014: 320.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: Ahwaz, Khuzestan, Iran, in soil.

***Gaeolaelaps kargi* (Costa, 1968).**

Hypoaspis kargi Costa, 1968: 7.

Hypoaspis kargi.— Shcherbak, 1971b: 21; Lapina, 1976: 36.

Hypoaspis (*Geolaelaps*) *kargi*.— Bregetova, 1977: 509; Karg, 1979: 85; Karg, 1982: 243; Karg, 1989b: 117; Teng et al., 1992: 197; Karg, 1993a: 145; Xu & Liang, 1996: 191; Ren & Guo, 2008: 329.

Gaeolaelaps kargi.— Beaulieu, 2009: 37; Kavianpour et al., 2013: 8; Nemati & Mohseni, 2013: 76; Kavianpour & Nemati, 2014: 322.

Hypoaspis (*Gaeolaelaps*) *kargi*.— Saito & Takaku, 2011: 90.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Akko junction, Israel, in nest of *Spalax ehrenbergi* [Rodentia: Spalacidae].

NOTE: Bregetova, 1977: 509 suspected this species to be a junior synonymy of *Hypoaspis neglectus* Willman.

***Gaeolaelaps koseii* (Hafez, ElBadry & Nasr, 1982).**

Hypoaspis (*Hypoaspis*) *koseii* Hafez, ElBadry & Nasr, 1982: 10.

Hypoaspis koseii.— Zaher, 1986: 190; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347; El-Banhawy et al., 2006: 66.

Gaeolaelaps koseii.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: El-Koseya, Asiut, Egypt, in soil of an orange orchard [Plantae: Rutacaea].

***Gaeolaelaps krantzi* (Arutunjan, 1993).**

Hypoaspis krantzi Arutunjan, 1993: 116.

Gaeolaelaps krantzi.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Armenian Institute of Zoology, Yerevan, Armenia; accession number 558.

TYPE LOCALITY AND HABITAT: on *Megopis scabricorne* (Coleoptera: Cerambycidae) deposited in the insect collection of the Armenian Institute of Zoology, Yerevan, Armenia.

NOTE: The name of the author of the species was transliterated in the original description as Arutunian.

***Gaeolaelaps latopuga* (Karg, 2006).**

Hypoaspis (*Geolaelaps*) *latopuga* Karg, 2006: 147.

Gaeolaelaps latopuga.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near La Mana, Ecuador, in litter.

***Gaeolaelaps loksai* (Karg, 2000).**

Hypoaspis (*Geolaelaps*) *loksai* Karg, 2000: 246.

Hypoaspis (*Geolaelaps*) *loksai*.— Karg, 2006: 148.

Hypoaspis s. l. *loksai*.— Beaulieu, 2009: 37.

Gaeolaelaps loksai.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: between Pifo and Papallacta, Pichinca [probably Pichincha], Ecuador, in moss and litter.

***Gaeolaelaps macra* (Karg, 1978).**

Hypoaspis (*Hypoaspis*) *macra* Karg, 1978b: 25.

Hypoaspis (*Geolaelaps*) *macra*.— Karg, 1979: 80; Karg, 1982: 238; Karg, 2006: 147.

Gaeolaelaps macra.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Azapa, Tarapaca, Chile, in soil.

***Gaeolaelaps magkadikitus* (Rosario, 1981).**

Geolaelaps magkadikitus Rosario, 1981: 50.

Gaeolaelaps magkadikitus.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Animal Science pasture, University of the Philippines, Los Banos campus, College, Laguna, Philippines, in litter.

***Gaeolaelaps marksi* (Strandtmann & Crossley, 1962).**

Hypoaspis marksi Strandtmann & Crossley, 1962: 180.

Hypoaspis marksi.— Farrier & Hennessey, 1993: 77.

Gaeolaelaps marksi.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: bed of former White Oak Lake, USAEC Controlled Area, Roane, Tennesse, United States of America, in soil.

***Gaeolaelaps matinikus* Rosario, 1981.**

Geolaelaps matinikus Rosario, 1981: 52.

Gaeolaelaps matinikus.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Forestry Nursery, University of the Philippines, Los Banos campus, Mud Spring Area, Mount Makiling, College, Laguna, Philippines, on *Asparagus plumosus* [Plantae: Asparagacea].

***Gaeolaelaps millipedus* Rosario, 1981.**

Geolaelaps millipedus Rosario, 1981: 54.

Gaeolaelaps millipedus.— Beaulieu, 2009: 36; Trach, 2012: 161.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mud Spring Area, Mount Makiling, College, Laguna, Philippines, on unidentified millipede [Animalia] from decomposing bark of fallen log.

***Gaeolaelaps minor* (Costa, 1968).**

Hypoaspis minor Costa, 1968: 9.

Hypoaspis (*Hypoaspis*) *minor*.— Karg, 1978b: 26.

Hypoapis (*Geolaelaps*) *minor*.— Karg, 1979: 82; Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 117; Karg, 1989c: 4; Karg, 1993a: 142.

Hypoaspis minor.— Gu & Bai, 1991: 182.

Hypoapis (*Gaeolaelaps*) *minor*.— Faraji et al., 2008: 208.

Gaeolaelaps minor.— Beaulieu, 2009: 36; Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Ha'Emeq, Israel, in moss in a forest.

NOTE: Bregetova, 1977: 508 suspected this species to be a junior synonymy of *Hypoaspis* (*Geolaelaps*) *expolitus* Berlese.

***Gaeolaelaps mohrii* (Ishikawa, 1982).**

Hypoaspis (*Geolaelaps*) *mohrii* Ishikawa, 1982: 92.

Gaeolaelaps mohrii.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Biological Laboratory, Matsuyama Shinonome Junior College, Matsuyama, Japan; accession number MSJC- BL 157.

TYPE LOCALITY AND HABITAT: abandoned mine at Ueki-kôzan, Ueki, Nomura-chô, Ehime, Japan, in baited traps.

***Gaeolaelaps mossadeghi* Kavianpour & Nemati, 2014.**

Gaeolaelaps mossadeghi Kavianpour & Nemati, 2014: 316.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: 1849 m above sea level, Shahreza (31°58'15.14"N, 51°50'53.63"E), Esfahan, Iran, in soil.

***Gaeolaelaps neoaculeifer* (Hirschmann, 1966).**

Hypoaspis neoaculeifer Hirschmann, 1966: 35.

Hypoaspis neoaculeifer.— Costa, 1966a: 147; Zeman, 1982: 233; Farrier & Hennessey, 1993: 78.

Geolaelalps neoaculeifer.— Walter & Oliver, 1990: 295.

Gaeolaelaps neoaculeifer.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Tomales Bay, California, United States of America, supralittoral, in sand and seagrass.

***Gaeolaelaps nolli* (Karg, 1962).**

Hypoaspis nolli Karg, 1962: 62.

Hypoaspis nolli.— Karg, 1965: 311; Costa, 1968: 9.

Hypoaspis (*Hypoaspis*) *nolli*.— Karg, 1971: 169; Karg, 1978b: 16.

Hypoaspis (*Geolaelaps*) *nolli*.— Karg, 1979: 80; Karg, 1982: 239; Karg, 1993a: 140; Xu & Liang, 1996: 191; Karg, 2006: 148.

Geolaelaps nolli.— Farrier & Hennessey, 1993: 73.

Hypoaspis nolli.— Fain et al., 1995: 112.

Hypoaspis (*Gaeolaelaps*) *nolli*.— Faraji et al., 2008: 207.

Gaeolaelaps nolli.— Beaulieu, 2009: 36; Bahrami et al., 2011: 351; Trach, 2012: 162; Kavianpour et al., 2013: 7; Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Author's collection; accession number 840.

TYPE LOCALITY AND HABITAT: Kleinmachnow experiment station, Biologische Zentralanstalt (BZA), Kleinmachnow, Germany, in agricultural soil and grassland.

NOTES: (a) Fain et al., 1995: 112 disagreed from Evans & Till, 1966: 173 who considered *Hypoaspis nolli* Karg as a junior synonymy of *Hypoaspis* (*Gaeolaelaps*) *praesternalis* Willman, considering as *H. nolli* the specimens Evans & Till, 1966 had illustrated as *H.* (*G.*) *praesternalis*; Farrier & Hennessey, 1993: 73 and Kavianpour & Nemati, 2014: 321 agreed with Fain et al., 1995. (b) Bregetova, 1977: 509 reproduced in her publication the illustrations of Evans & Till, 1966: 173, reffering to them as *H.* (*G.*) *praesternalis*. (c) Kavianpour et al., 2013: 8 suspected that the specimens reported as *Gaeolaelaps postreticulatus* (Xu & Liang) by Montazeri et al., 2011 could be *G. nolli*.

***Gaeolaelaps orbiculatus* Nemati & Mohseni, 2013.**

Gaeolaelaps orbiculatus Nemati & Mohseni, 2013: 76.

Gaeolaelaps orbiculatus.— Kavianpour & Nemati, 2014: 321.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: 845 m above seal level, Izeh (31°49’52”N, 49°52’9”E), Khuzestan, Iran, , in soil.

***Gaeolaelaps oreithyiae* Walter & Oliver, 1989.**

Geolaelaps oreithyiae Walter & Oliver, 1989: 295.

Geolaelaps oreithyiae.— Farrier & Hennessey, 1993: 73.

Gaeolaelaps oreithyiae.— Beaulieu, 2009: 37; Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Fort Collins, Colorado, U.S.A, from a laboratory colony initiated from females collected in an abandoned alfafa field.

***Gaeolaelaps orientalis* (Hafez, ElBadry & Nasr, 1982).**

Hypoaspis (*Hypoaspis*) *orientalis* Hafez, ElBadry & Nasr, 1982: 11.

Hypoaspis orientalis.— Zaher, 1986: 191; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347.

Gaeolaelaps orientalis.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: National Research Center, Dokki, Giza, Egypt, under *Poinciana* sp. trees [Fabales: Fabaceae].

***Gaeolaelaps paraculeifer* Rosario, 1981.**

Geolaelaps paraculeifer Rosario, 1981: 55.

Gaeolaelaps paraculeifer.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mud Spring Area, Mount Makiling, College, Laguna, Philippines, on unidentified passalid beetle [Coleoptera: Passalidae].

***Gaeolaelaps passali* (Hyatt, 1964) n. comb..**

Hypoaspis passali Hyatt, 1964: 472.

Hypoaspis (*Geolaelaps*) *passali*.— Karg, 1979: 82; Karg, 1982: 241; Karg, 1987: 299; Karg, 1989b: 118; Karg, 1989c: 5.

Hypoaspis s. l. *passali*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1963.10.3.20..

TYPE LOCALITY AND HABITAT: Río Caura, Bolívar, Venezuela, on unidentified beetle (Coleoptera: Passalidae).

***Gaeolaelaps passalus* Rosario, 1981.**

Geolaelaps passalus Rosario, 1981: 58.

Gaeolaelaps passalus.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mud Spring Area, Mount Makiling, College, Laguna, Philippines, on unidentified passalid beetle [Coleoptera: Passalidae].

***Gaeolaelaps pinnae* (Karg, 1987) n. comb..**

Hypoaspis (*Geolaelaps*) *pinnae* Karg, 1987: 299.

Hypoaspis (*Geolaelaps*) *pinnae*.— Karg, 1989b: 117; Karg, 1989c: 4.

Hypoaspis s. l. *pinnae*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: “Pra dei Cavai” Farm, in San Stino, Livenza, Venice, Italy, in corn field soil.

***Gaeolaelaps postreticulatus* (Xu & Liang, 1996).**

Hypoaspis (*Geolaelaps*) *postreticulatus* Xu & Liang, 1996: 189.

Gaeolaelaps postreticulatus.— Beaulieu, 2009: 37.

Hypoaspis (*Gaeolaelaps*) *postreticulatus*.— Saito & Takaku, 2011: 91.

TYPE DEPOSITORY: Department of Environmental and Resources Biology, Fudan University, Shanghai, China.

TYPE LOCALITY AND HABITAT: Lujiang, Anhui, China, in moss.

NOTE: Kavianpour et al., 2013: 8 suspected that the specimens reported as *G. postreticulatus* by Montazeri et al., 2011 could be *Gaeolaelaps nolli* (Willmann).

***Gaeolaelaps praesternalis* (Willmann, 1949) n. comb..**

Hypoaspis praesternalis Willmann, 1949a: 115.

Hypoaspis praesternalis.— Evans, 1953: 272; Karg, 1965: 311; Ryke, 1963: 2; Costa, 1968: 9; Solomon, 1968b: 664; Shcherbak, 1971b: 21; Lapina, 1976: 36; Ma, 1997: 31; Ren & Guo, 2008: 329.

Hypoaspis (*Hypoaspis*) *praesternalis*.— Karg, 1978b: 15; Aswegen & Loots, 1970: 190.

Hypoaspis (*Geolaelaps*) *praesternalis*.— Karg, 1979: 85; Teng, 1982: 162; Karg, 1982: 243; Karg, 1989b: 117; Karg, 1993a: 144; Xu & Liang, 1996: 191; Ma & Yin, 1998: 223; Gwiazdowicz & Klemt, 2004: 14.

Hypoaspis (*Gaeolaelaps*) *praesternalis*.— Evans & Till, 1966: 173; Saito & Takaku, 2011: 88.

Hypoaspis praesentalis.— Chadhury et al., 2010: 136.

Gaeolaelaps praesternalis.— Kavianpour et al., 2013: 8; Kavianpour & Nemati, 2014: 322.

TYPE DEPOSITORY: in autlhor's collection.

TYPE LOCALITY AND HABITAT: Ciechocinek, Poland, in sod root from salt marsh.

NOTES: (a) Karg, 1979: 85 considered the specimens identified as *Hypoaspis* (*Gaeolaelaps*) *praesternalis* by Evans & Till, 1966: 173 to belong to a different species. (b) Fain et al., 1995: 112 disagreed from Evans & Till, 1966: 173 who considered *Hypoaspis nolli* Karg as a junior synonymy of *Hypoaspis* (*Gaeolaelaps*) *praesternalis* Willman, considering as *H. nolli* the specimens Evans & Till, 1966 had illustrated as *H.* (*G.*) *praesternalis*; Farrier & Hennessey, 1993: 73 and Kavianpour & Nemati, 2014: 321 agreed with Fain et al., 1995. (c) Bregetova, 1977: 509 reproduced in her publication the illustrations of Evans & Till, 1966: 173, reffering to them as *H.* (*G.*) *praesternalis*.

***Gaeolaelaps praesternaloides* (Ma & Yin, 1998).**

Hypoaspis (*Geolaelaps*) *praesternaloides* Ma & Yin, 1998: 223.

Hypoaspis (*Gaeolaelaps*) *praesternaloides*.— Ren & Guo, 2008: 329; Saito & Takaku, 2011: 91.

Gaeoalelaps praesternaloides.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Liangshui Natural Preserve (47°10N, 128°53'E), Dailing, Yichun, Heilongjiang, China, in forest soil.

***Gaeolaelaps pugni* (Karg, 1979).**

Hypoaspis (*Geolaelaps*) *pugni* Karg, 1979: 85.

Hypoaspis (*Geolaelaps*) *pugni*.— Karg, 1982: 242; Karg, 1989b: 116.

Hypoaspis s. l. *pugni*.— Beaulieu, 2009: 37.

Gaeolaelaps pugni.— Nemati & Mohseni, 2013: 75.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 700 m above sea level, Mont Piltriquitron, near El Bolsón, [Rio Negro], Argentina, in rat nest.

***Gaeolaelaps queenslandicus* (Womersley, 1956).**

Androlaelaps queenslandicus Womersley, 1956a: 577.

Androlaelaps queenslandicus.— Wang & Li, 1965: 239.

Geolaelaps queenslandicus.— Ryke, 1963: 13; Walter & Oliver, 1990: 295; Farrier & Hennessey, 1993: 73.

Gaeolaelaps queenslandicus.— Hyatt, 1964: 472; Beaulieu, 2009: 37; Kavianpour et al., 2013: 8; Nemati & Kavianpour, 2013: 71; Kavianpour & Nemati, 2014: 321.

Hypoaspis queenslandicus.— Costa, 1966a: 141; Spain & Luxton, 1971: 186; Zeman, 1982: 233; Zaher, 1986: 191; Nasr & Nawar, 1989: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347; El-Banhawy et al., 2006: 66.

Hypoaspis (*Hypoaspis*) *queenslandicus*.— Aswegen & Loots, 1970: 190; Hafez et al., 1982: 4.

Hypoaspis (*Geolaelaps*) *queenslandica*.— Karg, 1979: 81; Tenorio, 1982: 265; Tenorio et al., 1985: 300; Karg, 1993a: 141; Karg, 1993b: 266.

Hypoaspis (*Gaeolaelaps*) *queenslandica*.— Faraji et al., 2008: 207.

Gaeolaelaps queenslandica.— Trach, 2012: 162.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Taringa, South Queensland, Australia, in litter.

***Gaeolaelaps rarosae* Rosario, 1981.**

Geolaelaps rarosae Rosario, 1981: 59.

Gaeolaelaps rarosae.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mud Spring Area, Mount Makiling, College, Laguna, Philippines, on decomposing bark of fallen log with passalids beetles [Coleoptera: Passalidae].

***Gaeolaelaps rosei* (Strong & Halliday, 1994).**

Hypoaspis rosei Strong & Halliday, 1994: 93.

Hypoaspis rosei.— Strong, 1995: 222; Strong, 1996: 426.

Hypoaspis (*Gaeolaelaps*) *rosei*.— Faraji & Halliday, 2009: 249.

Gaeolaelaps rosei.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: 26 km southwest of Boree Creek, near Urana, New South Wales, Australia, on *Geoscapheus dilatatus* [Blattodea: Blaberidae].

***Gaeolaelaps ruggi* (Strong & Halliday, 1994).**

Hypoaspis ruggi Strong & Halliday, 1994: 91.

Hypoaspis ruggi.— Strong, 1995: 222.

Hypoaspis (*Gaeolaelaps*) *ruggi*.— Faraji & Halliday, 2009: 249.

Gaeolaelaps ruggi.— Beaulieu, 2009: 36; Walter & Moser, 2010: 405.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Magnetic Island, Queensland, Australia, on *Macropanesthia rhinoceros* [Blattodea: Blaberidae].

***Gaeolaelaps saboorii* Joharchi & Babaeian, 2014.**

Gaeolaelaps saboorii Joharchi & Babaeian, 2014: 90.

TYPE DEPOSITORY: Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Yazd, Iran.

TYPE LOCALITY AND HABITAT: 2422 m above sea level, Polur (35°50'N, 52°17'E), Mazandaran, Iran, on *Acinopus* sp. (Coleoptera: Carabidae).

***Gaeolaelaps schusteri* (Hirschmann, 1966).**

Hypoaspis schusteri Hirschmann, 1966: 35.

Hypoaspis schusteri.— Costa, 1974: 221.

Hypoaspis (*Geolaelaps*) *schusteri*.— Karg, 1979: 81; Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 117; Karg, 1989c: 4; Karg, 1993a: 141.

Gaeolaelaps schusteri.— Beaulieu, 2009: 36; Walter & Moser, 2010: 405

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Kavouri, Athens, Greece; Palaea, Epidaurus, Peloponnes, Greece; and Le Brusc, Toulon, France, on flat beach (sand and gravel).

***Gaeolaelaps segregatus* (Faraji & Halliday, 2009) n. comb..**

Hypoaspis (*Gaeolaelaps*) *segregatus* Faraji & Halliday, 2009: 249.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Blackdown Base, Dawson Range, Queensland, Australia, on *Geoscapheus* sp. (Blattodea: Blaberidae).

NOTE: Faraji & Halliday, 2009 considered some of the paratypes of *H. blattae* Strong & Halliday, 1994 to belong to different species; some of these were designated as paratypes of *H.* (*G.*) *segregatus*.

***Gaeolaelaps seriopilosa* (Karg, 1978) n. comb..**

Hypoaspis (*Hypoaspis*) *seriopilosa* Karg, 1978b: 16.

Hypoaspis (*Geolaelaps*) *seriopilosa*.— Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 115.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 1000 m above Azapa, Tarapaca, Chile, in soil.

***Gaeolaelaps similisetae* (Karg, 1965).**

Hypoaspis (*Hypoaspis*) *similisetea* [sic] Karg, 1965: 273.

Hypoaspis similisetae.— Costa, 1968: 21; Ma, 1988: 147; Ma, 1996: 51.

Hypoaspis (*Hypoaspis*) *similisetae*.— Karg, 1971: 167; Karg, 1978b: 16.

Hypoaspis (*Geolaelaps*) *similisetae*.— Karg, 1979: 80; Karg, 1982: 239; Karg, 1993a: 140; Karg, 2006: 148.

Geolaelaps similisetae.— Farrier & Hennessey, 1993: 73; Nemati & Mohseni, 2013: 80.

Gaeolaelaps similisetae.—Beaulieu, 2009: 36; Trach, 2012: 161.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: Zörbig, near Halle, Sachsen-Anhalt, Germany, in field and pasture soil.

***Gaeolaelaps singuloides* (Gu & Duan, 1991).**

Androlaelaps singuloides Gu & Duan, 1991: 339.

Androlaelaps singuloides Gu & Duan, 1993: 48 (objective homonymy).

Androlaelaps singuloides.— Gu, Wang & Fan, 1996: 409; Ren & Guo, 2008: 328.

Gaeolaelaps singuloides.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guizhou Province, China.

TYPE LOCALITY AND HABITAT: Longchuan (24.3°N, 97.9°E), Yunnan Province, China, on *Gryllulus* sp. [Orthoptera: Gryllidae].

***Gaeolaelaps sitalaensis* (Bhattacharyya, 1965) n. comb..**

Hypoaspis sitalaensis Bhattacharyya, 1965: 149.

Hypoaspis (*Geolaelaps*) *sitalaensis*.— Karg, 1989b: 118; Karg, 1989c: 4.

TYPE DEPOSITORY: author's collection.

TYPE LOCALITY AND HABITAT: near Sonarpur, Sitala, 16 km southeast of Kolkata (= Calcutta), West Bengal, India, in soil near stump of a fig tree.

***Gaeolaelaps spiculifer* (Berlese, 1918) n. comb..**

Hypoaspis spiculifer Berlese, 1918: 118.

Hypoaspis spiculifer.— Ryke, 1963: 5; Halliday, 2005: 35.

Hypoaspis (*Hypoaspis*) *spiculifer*.— Aswegen & Loots, 1970: 189.

Hypoaspis (*Geolaelaps*) *spiculifera*.— Karg, 1982: 241; Karg, 1987: 298; Karg, 1989b: 118; Karg, 1989c: 5.

Hypoaspis s. l. *spiculifer*.—Beaulieu, 2009: 37.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Gaeolaelaps spiniseta* (Barilo, 1991).**

Hypoaspis (*Geolaelaps*) *spiniseta* Barylo, 1991: 13.

Gaeolaelaps spiniseta.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institute of Zoology, Kiev, Ukraine; accession number G-76.

TYPE LOCALITY AND HABITAT: vicinities of Samarkand, Uzbekistan, in soil under mixed grass.

***Gaeolaelaps subminor* (Gu & Bai, 1991).**

Hypoaspis subminor Gu & Bai, 1991: 181.

Hypoaspis subminor.— Ren & Guo, 2008: 329.

Gaeolaelaps subminor.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China

TYPE LOCALITY AND HABITAT: Zhangning (27.4°N, 105.6°E), Ningxia Hui Autonomous Region, China, on *Cricetulus barabensis* [Rodentia: Cricetidae].

***Gaeolaelaps taitzujungi* (Samšiňák, 1964).**

Hypoaspis taitzujungi Samšiňák, 1964: 46.

Hypoaspis taitzujungi.— Ren & Guo, 2008: 329.

Gaeolaelaps taitzujungi.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institute of Zoology of the Chinese Academy of Sciences, Beijin, China.

TYPE LOCALITY AND HABITAT: Kanton Province, China, in a termite mound.

***Gaeolaelaps tarsalis* (Bhattacharyya, 1968).**

Hypoaspis tarsalis Bhattacharyya, 1968: 540.

Hypoaspis tarsalis.— Prasad, 1974: 151.

Gaeolaelaps tarsalis.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: Nursery Garden, Botanical Garden, Shibpur, Howrah, West Bengal, India, in soil.

***Gaeolaelaps tengi* (Gu & Bai, 1991).**

Hypoaspis tengi Gu & Bai, 1991: 183.

Hypoaspis tengi.— Ren & Guo, 2008: 329.

Gaeolaelaps tengi.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China

TYPE LOCALITY AND HABITAT: Zhangning (27.4°N, 105.6°E), Ningxia Hui Autonomous Region, China, on *Phodopus roborovskii* [Rodentia: Cricetidae].

***Gaeolaelaps tenuisetus* Rosario, 1981.**

Geolaelaps tenuisetus Rosario, 1981: 61.

Gaeolaelaps tenuisetus.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Makiling Botanic Gardens, Mount Makiling, College, Laguna, Philippines, on soil of secondary forest.

***Gaeolaelaps theodori* (Costa, 1974).**

Hypoaspis theodori Costa, 1974: 224.

Hypoaspis (*Geolaelaps*) *theodori*.— Karg, 1979: 82; Karg, 1982: 241; Karg, 1987: 299; Karg, 1989b: 118; Karg, 1989c: 5; Karg, 1993a: 143; Karg, 1993b: 263.

Gaeolaelaps theodori.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Nakhsholim, Israel, in algal debris.

***Gaeolaelaps transversanalis* (Karg, 2000) n. comb..**

Hypoaspis (*Geolaelaps*) *transversanalis* Karg, 2000: 247

Hypoaspis (*Geolaelaps*) *transversanalis*.— Karg, 2003b: 233.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: between Pifo and Papallacta, Pichinca [probably Pichincha], Ecuador, in litter.

***Gaeolaelaps tridentifera* (Karg, 1978).**

Hypoaspis (*Hypoaspis*) *tridentifera* Karg, 1978b: 14.

Hypoaspis (*Geolaelaps*) *tridentifera*.— Karg, 1979: 85; Karg, 1982: 243; Karg, 1989b: 117.

Gaeolaelaps tridentifera.— Nemati & Mohseni, 2013: 75.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Valdivia, Valdivia, Chile, in litter and humus.

***Gaeolaelaps vanpletzeni* (Aswegen & Loots, 1970).**

Hypoaspis (*Hypoaspis*) *vanpletzeni* Aswegen & Loots, 1970: 183.

Hupoaspis (*Geolaelaps*) *vanpletzeni*.— Karg, 1982: 242; Karg, 1989b: 116.

Hypoaspis vanpletzeni.— Strong & Halliday, 1994: 91; Strong, 1995: 222.

Gaeolaelaps vanpletzeni.— Beaulieu, 2009: 36; Nemati & Mohseni, 2013: 76.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: Knysna, South Africa, in forest soil.

***Gaeolaelaps variabilis* (Faraji & Halliday, 2009).**

Hypoaspis (*Gaeolaelaps*) *variabilis* Faraji & Halliday, 2009: 254.

Gaeolaelaps variabilis.— Walter & Moser, 2010: 405.

TYPE DEPOSITORY: Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Mount Woowoonga, Queensland, Australia, on *Macropanesthia mackerrasae* (Blattodea: Blattidae).

***Gaeolaelaps verticis* (Karg, 1978).**

Hypoaspis (*Hypoaspis*) *verticis* Karg, 1978b: 16.

Hypoaspis (*Geolaelaps*) *verticis* Karg, 1979: 80 (objective synonym).

Hypoaspis (*Geolaelaps*) *verticis*.— Karg, 1982: 239; Karg, 1994: 184; Karg, 2006: 147.

Gaeolaelaps verticis.— Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 600 m above sea level, near the main road of Cholilai, Epuyen, Argentina, in litter.

***Gaeolaelaps vertisimilis* (Karg, 1994).**

Hypoaspis vertisimilis Karg, 1994: 184.

Hypoaspis (*Geolaelaps*) *vertisimilis*.— Karg, 2006: 147.

Gaeolaelaps vertisimilis.— Beaulieu, 2009: 36; Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 450 m above sea level, below “Green Crater”, Fernandina, Galapagos Islands, *Psychotria* (Gentianales: Rubiaceae) zone, in litter.

***Gaeolaelaps wufengensis* (Liu & Ma, 2003).**

Hypoaspis wufengensis Liu & Ma, 2003: 653.

Hypoaspis wufengensis.— Ren & Guo, 2008: 329.

Gaeolaelaps wufengensis.— Beaulieu, 2009: 36.

TYPE DEPOSITORY: Medical Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Hubei, China, on *Collocalia brevirostris* [Apodiformes: Apodidae].

***Gaeolaelaps zachvatkini* (Buyakova & Goncharova, 1972) n. comb..**

Hypoaspis zachvatkini Buyakova & Goncharova, 1972: 451.

Hypoaspis (*Geolaelaps*) *zachvatkini*.— Bregetova, 1977: 506; Karg, 1979: 84; Karg, 1982: 242; Karg, 1989b: 116.

Hypoaspis zachvatkini.— Ma, 1996: 48.

Hypoaspis s. l. *zachvatkini*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Chita, Eastern Siberia, Russia, in soil.

***Gaeolaelaps zhoumanshuae* (Ma, 1997).**

Hypoaspis zhoumanshuae Ma, 1997: 31.

Hypoaspis zhoumanshuae.— Ma, 2005b: 74; Ren & Guo, 2008: 329.

Gaeolaelaps zhoumanshuae.— Nemati & Kavianpour, 2013: 70; Nemati & Mohseni, 2013: 80.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Baicheng (45°37'N, 122°49'E), Jilin, China, in humus.

***Gymnolaelaps* Berlese, 1916.**

Hypoaspis (Gymnolaelaps) Berlese, 1916b: 170.

Laeliphis Hull, 1925: 207 [Junior synonymy of *H.* (*G.*) by Vitzthum, 1941: 762; of *Gymnolaelaps* by Turk, 1953: 11].

Hypoaspis (Gymnolaelaps).— Berlese, 1923; Vitzthum, 1943: 762; Evans &Till, 1966: 160; Aswegen & Loots, 1970: 199; Bregetova, 1977: 523.

Pseudoparasitus (*Gymnolaelaps*).— Karg, 1978a: 205; Karg, 1981: 217; Karg, 1993a: 133.

Gymnolaelaps.— Hull, 1918: 68; Vitzthum, 1929: 22 (in part); Schweizer, 1949: 39; Trägårdh, 1952: 66; Evans, 1957: 221; Sheals, 1962: 109; Casanueva, 1993: 40; Joharchi et al., 2011: 23; Joharchi & Halliday, 2013: 40.

Austrogamasus Womersley, 1942 [Junior synonymy of *H.* (*G.*) by Hunter, 1967: 101.]

Pseudoparasitus (*Gymnolaelaps*).— Karg, 1981b: 210; Karg, 2000: 248.

TYPE SPECIES: *Laelaps myrmecophilus* Berlese, 1892: LXIX, n. 2, by original designation

NOTE: For this genus we followed Joharchi….

***Gymnolaelaps acanthopus* (Berlese, 1923) n. comb..**

Hypoaspis (*Gymnolaelaps*) *acanthopus* Berlese, 1923: 123.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Loyalty Island.

***Gymnolaelaps aequatorialis* (Berlese, 1905).**

Laelaps (*Pseudoparasitus*) *aequatorialis* Berlese, 1905: 169.

Laelaps aequatorialis; *non Laelaps*.— Tipton, 1960: 286.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Buitenzorg, Java, Indonesia, unspecified substrate.

***Gymnolaelaps artavilensis* Joharchi & Halliday, 2013.**

Gymnolaelaps artavilensis Joharchi & Halliday, 2013: 41.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1875 m above sea level, Ardabil (38°15’N, 48°17’E), Iran, in nest of *Pheidole pallidula* (Hymenoptera: Formicidae).

***Gymnolaelaps birksianus* (Hull, 1925).**

Laeliphis birksianus Hull, 1925: 208.

Gymnolaelaps birksianus.— Turk, 1953: 11.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Staffordshire, England, on dead wood.

***Gymnolaelaps bisetus* (Aswegen & Loots, 1970) n. comb..**

Hypoaspis (*Gymnolaelaps*) *bisetus* Aswegen & Loots, 1970: 200.

Pseudoparasitus (*Gymnolaelaps*) *bisetus*.— Karg, 1981b: 217; Karg, 1989a: 334.

TYPE DEPOSITORY: Museu do Dundo, Dundo, Lunda Norte, Angola; accession number Ang. 17384.

TYPE LOCALITY AND HABITAT: near Kasai River at Nordeste (7°22' S, 21°50'E), Lunda Norte, Angola, in soil.

***Gymnolaelaps caudicomatus* (Berlese, 1916).**

Hypoaspis (*Gymnolaelaps*) *caudicomatus* Berlese, 1916b: 170.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, in nests of *Acromyrmex lundi* [Hymenoptera: Formicidae].

***Gymnolaelaps fuscipes* (Hull, 1925).**

Laeliphis fuscipes Hull, 1925: 207.

Gymnolaelaps fuscipes.— Turk, 1953: 11.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Swanage, England, unspecified substrate.

***Gymnolaelaps guangxiensis* Ma, 2007.**

Gymnolaelaps guangxiensis Ma, 2007: 920.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Nanning (22°54'N, 108°20'E), Guangxi Zhuang Autonomous Region, China, in soil.

***Gymnolaelaps heselhausi* (Oudemans, 1912).**

Hypoaspis heselhausi Oudemans, 1912a: 216.

Hypoaspis heselhausi.— Oudemans, 1913c: 65; Oudemans, 1913b: 183; Buitendijk, 1945: 296; Bregetova, 1956: 78; Goncharova & Buyakova, 1964: 277; Evans & Till, 1966: 177; Costa, 1969a: 165; Lundqvist, 1974: 42; Beaulieu, 2009: 37.

Hypoapsis heselhauusi [sic].— Mrciak & Brelih, 1972: 343.

Hypoaspis (*Geolaelaps*) *heselhausi*.— Bregetova, 1977: 500.

Hypoaspis (Laelaspis) heselhausi.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1993a: 159.

Laelaspis heselhausi.— Farrier & Hennessey, 1993: 81.

Hypoaspis (*Laelaspis*) *haselhausi* [sic].— Gwiazdowicz & Klemt, 2004: 14.

Gymnolaelaps heselhausi.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: F. Heselhau's collection.

TYPE LOCALITY AND HABITAT: Sittard, The Netherlands, in nest of *Talpa europaea* [Mammalia: Talpidae].

***Gymnolaelaps hospes* (Berlese, 1923).**

Hypoaspis hospes Berlese, 1923: 254.

Hypoaspis (*Pneumolaelaps*) *hospes.*— Aswegen & Loots, 1970: 209.

Pseudoparasitus (*Gymnolaelaps*) *hospes.*— Karg, 1981b: 218; Karg, 1989a: 334.

Gymnolaelaps hospes.— Joharchi et al., 2011: 23.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, in termite nests [Isoptera: Termitidae].

NOTE: According to Hunter & Husband, 1973: 77 this species may be placed in the genus *Androlaelaps*. (b) Specimens reported as *Pseudoparasitus* (*Gymnolaelaps*) *hospes* by Nemati et al., 2000: 381 were reidentified as *L. kabitae* by Joharchi & Halliday, 2013: 47.

***Gymnolaelaps krantzi* (Hunter, 1967).**

Hypoaspis (*Gymnolaelaps*) *krantzi* Hunter, 1967: 101.

Gymnolaelaps krantzi.— Farrier & Hennessey, 1993: 74; Joharchi et al., 2011: 23.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Ashville, North Carolina, United States of America, on *Dendroctonus frontalis* [Coleoptera: Curculionidae].

***Gymnolaelaps laevis* (Michael, 1891).**

Laelaps laevis Michael, 1891: 648.

Laelaps (*Hypoaspis*) *laevis*.— Berlese, 1904: 406; Karawajew, 1909: 234; Donisthorpe, 1927: 213.

Gymnolaelaps laevis.— Hull, 1918: 68; Vitzthum, 1929: 25; Ma, 2007: 920; Joharchi et al., 2012: 2013; Joharchi & Halliday, 2013: 44.

Laelaps laevis; *non Laelaps.*— Tipton, 1960: 298.

Hypoaspis (*Gymnolaelaps*) *laevis*.— Evans & Till, 1966: 220; Hunter, 1967: 99; Bregetova, 1977: 527.

Pseudoparasitus (*Gymnolaelaps*) *laevis*.— Karg, 1978a: 207; Karg, 1981b: 218; Karg, 1989a: 334; Karg, 1993a: 135.

Laelaspis laevis.— Bai & Gu, 1994: 181; Ren & Guo, 2008: 328; Xin et al., 2010: 2.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: near Innsbruck, Tyrol, Austria, in nests of unidentified ants [Hymenoptera: Formicidae].

NOTE: (a) Specimens reported as *Laelaps ovalis* by Wasmann were reidentified as *L.* (*H.*) *laevis* by Berlese, 1904: 406. (b) Specimens reported as *Laelaps myrmecophilus* by Moniez, 1894: 204 were reidentified as *L.* (*H.*) *laevis* by Berlese, 1904: 406.

***Gymnolaelaps longisetus* (Aswegen & Loots, 1970) n. comb..**

Hypoaspis (*Alloparasitus*) *longisetus* Aswegen & Loots, 1970: 210.

Pseudoparasitus (*Gymnolaelaps*) *longisetus*.— Karg, 1981b: 217; Karg, 1989a: 334.

TYPE DEPOSITORY: Dundo Museum, Dundo, Lunda Norte, Angola, accession number Ang. 17384.

TYPE LOCALITY AND HABITAT: near the Kasai River at Nordeste (7°22’S, 21°50’ E), Lunda Norte, Angola, in forest soil.

***Gymnolaelaps margopilus* (Hunter, 1966).**

Pseudoparasitus margopilus Hunter, 1966a: 8.

Pseudoparasitus margopilus.— Farrier & Hennessey, 1993: 87.

Gymnolaelaps margopilus.— Joharchi et al., 2011: 32.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Singapore, intercepted at Hawaii, United States of America, on *Vanda dearei* [Asparagales: Orchidaceae].

***Gymnolaelaps markewitschi* (Pirianyk, 1959).**

Laelaspis markewitschi Pirianyk, 1959: 97.

Laelaspis markewitschi.— Reitblat, 1963: 81; Lapina, 1976: 52; Bregetova, 1977: 547.

Hypoaspis markewitschi.— Shcherbak, 1971b: 29.

Gymnolaelaps markewitschi.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Zarechye, Dnipro, Kaneva, Ukraine, on *Microtus arvalis* [Rodentia: Cricetidae]; *Microtus ratticeps* [Rodentia: Cricetidae]; *Apodemus agrarius* [Rodentia: Muridae] and *Clethrionomys glareolus* [Rodentia: Cricetidae].

***Gymnolaelaps messor* Joharchi, Halliday, Saboori & Kamali, 2011.**

Gymnolaelaps messor Joharchi, Halliday, Saboori & Kamali, 2011: 23.

Gymnolaelaps messor.— Joharchi & Halliday, 2013: 44.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1831 m above sea level, Karaj, Iran (36°01'N, 51°09'E), in nest of *Messor* sp. (Hymenoptera: Formicidae).

***Gymnolaelaps mexicana* (Banks, 1915).**

Neoberlesia mexicana Banks, 1915b: 61.

Gymnolaelaps mexicana.— Farrier & Hennessey, 1993: 74.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: San Miguel, Hidalgo, Mexico, in nest of *Pheidole vasliti acolhua* [Hymenoptera: Formicidae].

***Gymnolaelaps myrmecophilus* (Berlese, 1892).**

Laelaps myrmecophilus Berlese, 1892: LXIX, 2.

Laelaps myrmecophilus.— Berlese, 1892: 35.

Laelaps ovalis Moniez, 1894: 203 [Junior synonymy of *L.* (*Hypoaspis*) *myrmecophilus* by Berlese, 1904: 409]

Laelaps myrmecophilus.— Moniez, 1894: 204.

Hypoaspis ovalis.— Oudemans, 1902b: 7.

Hypoaspis myrmecophilus.— Oudemans, 1902b: 24; Oudemans, 1903b: 129; Buitendijk, 1945: 296.

Laelaps (*Hypoaspis*) *myrmecophilus*.— Berlese, 1904: 409; Donisthorpe, 1927: 213.

Hypoaspis (*Gymnolaelaps*) *myrmecophilus*.— Berlese, 1916b: 170.

Gymnolaelaps myrmecophilus.— Hull, 1918: 68; Vitzthum, 1929: 25; Sellnick, 1931: 695; Shulov, 1957: 234; Costa, 1966c: 74; Joharchi et al., 2011: 28; Joharchi & Halliday, 2013: 44.

Laelaps myrmecophilus; *non Laelaps*.— Tipton, 1960: 302.

Laelaps ovalis; *non Laelaps*.— Tipton, 1960: 303.

Hypoaspis (Gymnolaelaps) myrmecophila.— Evans & Till, 1966: 214; Hunter, 1967: 99; Bregetova, 1977: 526.

Pseudoparasitus (*Gymnolaelaps*) *myrmecophilus*.— Karg, 1978a: 207; Karg, 1981b: 218; Karg, 1989a: 334; Karg, 1993a: 135; Xu & Liang, 1996: 195.

Gymnolaelaps myrmecophila.— Gu & Guo, 1997: 247.

TYPE DEPOSITORY: of *G. myrmecophilus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *L. ovalis*: unspecified.

TYPE LOCALITY AND HABITAT: of *G. myrmecophilus*: Neapoli, Portici and Monte Argentario, Toscana, Italy, in nest of unidentified ants [Hymenoptera: Formicidae]; of *L. ovalis*: Exaten [mentioned as Exaeten], The Netherlands, associated with *Formica sanguinea* [Hymenoptera: Formicidae].

NOTE: (a) Specimens reported as *Laelaps ovalis* by Wasmann, 18??: ?? were reidentified as *L.* (*H.*) *laevis* by Berlese, 1904: 406. (b) Specimens reported as *Laelaps myrmecophilus* by Moniez, 1894: 204 were reidentified as *L.* (*H.*) *laevis* by Berlese, 1904: 406.

VER LEONARDI – TEXTO BERLESE, 1904

***Gymnolaelaps myrmophilus* (Michael, 1891).**

Laelaps myrmophila Michael,1891: 649.

Laelaps (*Hypoaspis*) *myrmophylus*.— Berlese, 1904: 410; Donisthorpe, 1927: 213.

Gymnolaelaps myrmophilus.— Hull, 1918: 68; Vitzthum, 1929: 25; Schweizer, 1949: 40; Joharchi et al., 2011: 23.

Laelaps myrmecophila; *non Laelaps*.— Tipton, 1960: 302.

Hypoaspis (*Gymnolaelaps*) *myrmophila*.— Evans & Till, 1966: 218; Bregetova, 1977: 523.

Pseudoparasitus (*Gymnolaelaps*) *myrmophilus*.— Karg, 1978a: 206; Karg, 1981b: 218; Karg, 1989a: 334; Karg, 1993a: 135.

Laelaspis myrmophila.— Bai & Gu, 1994: 182; Ma, 1995b: 499; Ren & Guo, 2008: 328.

Gymnolaelaps myrmophila.— Joharchi & Halliday, 2013: 45.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: near Ajaccio, Corsica, in nest of *Aphaenogaster testaceopitosa* [sic] [probably *A. testaceopilosa*] [Hymenoptera: Formicidae].

VER LEONARDI – TEXTO BERLESE, 1904

***Gymnolaelaps myrmophilus novus* (Lombardi, 1957). n. comb..**

Hypoaspis myrmophilus var. *novus* Lombardi, 1957: 288.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Orto Botanico di Rome, Italy, ant nest under rock.

***Gymnolaelaps ningxiaensis* (Bai & Gu, 1994).**

Laelaspis ningxiaensis Bai & Gu, 1994: 181.

Laelaspis ningxiaensis.— Ma, 1995b: 499; Ren & Guo, 2008: 328.

Gymnolaelaps ningxiaensis.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Gymnolaelaps obscuroides* (Costa, 1968).**

Hypoaspis obscuroides Costa, 1968: 14.

Hypoaspis (*Holostaspis*) *obscuroides*.— Karg, 1979: 98; Karg, 1982: 248.

Gymnolaelaps obscuroides.— Joharchi & Halliday, 2013: 45.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Nahal Sha'ar, Galilee, Israel, in litter of *Laurus nobilis* [Laurales: Lauraceae].

***Gymnolaelaps prestoni* Joharchi, Halliday, Saboori & Kamali, 2011.**

Gymnolaelaps prestoni Joharchi, Halliday, Saboori & Kamali, 2011: 26.

Gymnolaelaps prestoni.— Joharchi & Halliday, 2013: 48.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 2130 m above sea level, Karaj, Iran (35°57'N, 51°21'E), in nest of *Myrmica* sp. [Hymenoptera: Formicidae].

***Gymnolaelaps reniculus* (Karg, 1981).**

Pseudoparasitus (Gymnolaelaps) reniculus Karg, 1981b: 218.

Pseudoparasitus (Gymnolaelaps) reniculus.— Karg, 1989a: 334; Karg, 2003: 235.

Gymnolaelaps reniculus.— Joharchi et al., 2011: 25.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Barueri, State of São Paulo, Brazil, in soil with *Camponodos rufipes* [Hymenoptera: Formicidae].

***Gymnolaelaps sinensis* Wang, Zhou & Ji, 1991.**

Gymnolaelaps sinensis Wang, Zhou & Ji, 1991: 5.

Gymnolaelaps weishanensis Gu & Guo, 1997: 246 [Junior synonymy of *G. sinensis* by Ma, 2006: 23].

Gymnolaelaps sinensis.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: of *G. sinensis*: Sanitary and Anti-Epidemic Station of Sichuan, Sichuan, China; of *G. weishanensis*: Department of Parasitology, Medical School, Nanjing University, Nanjing, Jiangsu Province, China.

TYPE LOCALITY AND HABITAT: of *G. sinensis*: Qingyin Pavilion, Mount Emei, Sichuan, China, in nest of unidentified bird; of *G. weishanensis*: Weishan, 25.3°N, 100.3°E), Yunnan, China, on *Apodemus chevreri* [Rodentia: Muridae].

***Gymnolaelaps sitalaensis* Bhattacharyya, 1966.**

Gymnolaelaps sitalaensis Bhattacharyya, 1966: 153.

Gymnolaelaps sitalaensis.— Wang et al., 1991: 6; Joharchi et al., 2011: 28.

TYPE DEPOSITORY: Author's collection.

TYPE LOCALITY AND HABITAT: Sonarpur, Sitala, 24 Parganas, West Bengal, India, in faecal litter of pigeon [Columbiformes: Columbidae].

***Gymnolaelaps shealsi* Hunter & Costa, 1971.**

Gymnolaelaps shealsi Hunter & Costa, 1971: 52.

Hypoaspis (*Pneumolaelaps*) *shealsi*.— Karg, 1979: 90; Karg, 1982: 245; Karg, 1993a: 149.

Pneumolaleaps shealsi.— Farrier & Hennessey, 1993: 86.

Gymnolaelaps shealsi.— Joharchi et al., 2011: 28.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Trebloc, Mississippi, United States of America, on imported fire ants [*Solenospis invicta*] [Hymenoptera: Formicidae].

***Gymnolaelaps spinosus* (Berlese, 1920).**

Hypoaspis (*Gymnolaelaps*) *spinosus* Berlese, 1920: 154.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in litter.

***Gymnolaelaps submyrmecophila* (Xu & Liang, 1996).**

Pseudoparasitus (*Gymnolaelaps*) *submyrmecophila* Xu & Liang, 1996: 195.

Gymnolaelaps submyrmecophila.— Joharchi et al., 2011: 28.

TYPE DEPOSITORY: Department of Environmental and Resources Biology, Fudan University, Shanghai, China.

TYPE LOCALITY AND HABITAT: Shangai, China, in litter.

***Gymnolaelaps tonsilis* (Karg, 1989).**

Pseudoparasitus (*Gymnolaelaps*) *tonsilis* Karg, 1989a: 335.

Gymnolaelaps tonsilis.— Farrier & Hennessey, 1993: 74.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Vigie-Point, near Castries, Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Gymnolaelaps triquetrus* (Karg, 2003) n. comb..**

Pseudoparasitus (*Gymnolaelaps*) *triquetrus* Karg, 2003b: 234.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Quito, Pichinca [probably Pichincha], Ecuador, in soil and litter in irrigation canal.

***Gymnolaelaps unospinosus* (Karg, 1978).**

Pseudoparasitus (*Gymnolaelaps*) *unospinosus* Karg, 1978a: 205.

Pseudoparasitus (*Gymnolaelaps*) *unospinosus*.— Karg, 1981b: 218; Karg, 1989a: 334.

Gymnolaelaps unospinosus.— Joharchi et al., 2011: 25.

TYPE DEPOSITORY: Zoologischen Abteilung des Ungarischen Naturwissenschaftlichen Museums, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near El Bolson, Rio Azul Valley, Argentina, in litter of *Notophagus dombey* [Fagales: Fagaceae] and *Myrceugenia exsupca* [Myrtales: Myrtaceae].

***Gymnolaelaps victoriensis* Sheals, 1962.**

Gymnolaelaps victoriensis Sheals, 1962: 109.

Gymonolaleaps victoriensis.— Bhattacharyya, 1968: 539; Hunter & Costa, 1971: 51.

Pseudoparasitus (*Gymnolaelaps*) *victoriensis*.— Karg, 1978a: 206; Karg, 1981b: 218; Karg, 1989a: 335.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1961-6-20-49.

TYPE LOCALITY AND HABITAT: Nahuel Huapi, Victoria Island, Argentina, in soil under *Libocedrus* sp. [Pinales: Cupressaceae].

***Gymnolaelaps zaheri* Afifi & Abdel-Halim, 1988.**

Gymnolaelaps zaheri Afifi & Abdel-Halim, 1988: 398.

Gymnolaelaps zaheri.— Joharchi & Halliday, 2013: 48.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in debris.

***Holostaspis* Kolenati, 1858.**

Holostaspis Kolenati, 1858: 87.

Holostaspis.— Berlese, 1882c: 3 (in part); Canestrini, 1885: 55; Berlese, 1913b: 96 (in part); Vitzthum, 1929: 22; Evans, 1957: 231; Bregetova, 1977: 547; Casanueva, 1993: 40; Ueckermann & Loots, 1995: 35.

Laelaps (*Oolaelaps*) Berlese, 1904: 428 [Junior synonymy of *Holostaspis* by Turk, 1953: 11; Bregetova, 1977: 547].

Hypoaspis (*Holostaspis*), Vitzthum, 1943: 762; Evans & Till, 1966: 160; Aswegen & Loots, 1970: 171; Karg, 1978: 9; Karg, 1979: 94; Karg, 1982: 247; Karg, 1989: 108; Karg, 1993a: 136.

Hypoaspis.— Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

Holotaspis [sic].— Karg & Schorlemmer, 2013: 203.

TYPE SPECIES: *Holostaspis isotricha* Kolenati, 1858: 87.

***Holostaspis caligynius* Berlese, 1910.**

Holostaspis caligynius Berlese, 1910: 250.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, on *Copris* spp. [Coleoptera: Scarabaeidae].

***Holostaspis chelaris* (Teng, Zhang & Cui, 1992).**

Hypoaspis (*Holostaspis*) *chelaris* Teng, Zhang & Cui, 1992: 196.

Hypoaspis chelaris.— Ma, 2000: 384; Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Beijing, China, in soil.

***Holostaspis forcipata* Willmann, 1956.**

Hypoaspis (*Hypoaspisella*) *richteri* Karg, 1965: 276 [Junior synonymy by Bregetova, 1977: 499; Karg, 1993a: 157].

Hypoaspis (*Geolaelaps*) *forcipata*.— Bregetova, 1977: 499; Gwiazdowicz & Gulvik, 2005: 120.

Hypoaspis (*Holostaspis*) *forcipata*.— Karg, 1979: 97; Karg, 1982: 248; Karg, 1993a: 157.

TYPE DEPOSITORY: of *H. forcipata*: unspecified; of *H.* (*H.*) *richteri*: author's collection.

TYPE LOCALITY AND HABITAT: of *H. forcipata*: ; of *H.* (*H.*) *richteri*: Potsdamer forest, Potsdam, Germany, in soil of a mixed oak forest.

***Holostaspis hamadryadis* Berlese, 1910**.

Holostaspis hamadryadis Berlese, 1910: 251.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Cape of Good Hope [Cape Peninsula, South Africa], on *Heliocopris hamadryas* [=*Copris hamadryas*] [Coleoptera: Scarabaeidae].

***Holostaspis isotricha* Kolenati, 1858.**

Holastaspis isotricha Kolenati, 1858.

Holostaspis isotricha.— Oudemans, 1914a: 68; Vitzthum, 1929: 26; Bregetova, 1977: 549.

Hypoaspis (*Holostaspis*) *isotricha*.— Evans & Till, 1966: 203; Karg, 1979: 97; Karg, 1982: 248; Karg, 1993a: 157.

NOTES: (a) Vitzthum, 1929: 26 considered *L. oophilus* as junior synonymy of *H. isotricha*, we followed Evans & Till, 1966 that considered them as separate species. (b) Wasmann did a brief description and Evans & Till, 1966 considered him as the author.

NOTE: Kolenati, 1858 appud Oudemans, 1914.

***Holostaspis longipes* Berlese, 1910.**

Holostaspis longipes Berlese, 1910: 251.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Egypt, on *Copris isidis* [Coleoptera: Scarabaeidae].

***Holostaspis montanus* (Berlese, 1904).**

Laelaps (*Oolaelaps*) *montanus* Berlese, 1904: 430.

Laelaps (*Oolaelaps*) *montanus*.— Halbert, 1915: 73; Donisthorpe, 1927: 214.

Oolaelaps montanus.— Hull, 1918: 69.

Gymnolaelaps viennensis Sellnick, 1935: 347 [Junior synonymy by Bregetova, 1977: 549; Karg, 1993a: 146].

Holostaspis montanus.— Vitzthum, 1929: 26; Schweizer, 1949: 40.

Laelaps montanus; *non Laelaps.*— Tipton, 1960: 301.

Hypoaspis (*Holostaspis*) *montana*.— Evans & Till, 1966: 206.

Hypoaspis montana.— Shcherbak, 1971b: 24; Lapina, 1976: 36.

Holostaspis montana.— Bregetova, 1977: 549; Luxton, 1998: 20.

Hypoaspis (*Pneumolaelaps*) *montana*.— Karg, 1979: 88; Karg, 1982: 244; Karg, 1993: 146; Huhta & Karg, 2010: 332.

Hypoaspis montana.— Bai et al., 1994: 295.

TYPE DEPOSITORY: of *L.* (O.) *montanus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *G. viennensis*: unspecified.

TYPE LOCALITY AND HABITAT: of *L.* (O.) *montanus*: Cansiglio Forest, Veneto, Italy, in nest of unidentified ants; of *G. viennensis*: Anninger, Austria, in nest of *Formica rufa* [Hymenoptera: Formicidae].

***Holostaspis mucronatus* (Berlese, 1923) n. comb..**

Oolaelaps mucronatus Berlese, 1923: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Holostaspis oophila* Wasmann, 1897.**

Holostaspis oophila Wasmann, 1897: 172.

Uropoda oophila Wasmann, 1894: 197 (*nomen nudum*).

Laelaps oophilus Moniez, in Wasmann, 1897: 172.

Hypoaspis oophilus.— Oudemans, 1902b: 24; Oudemans, 1903b: 130; Buitendijk, 1945: 296.

Laelaps (*Oolaelaps*) *oophilus*.— Berlese, 1904: 428; Donisthorpe, 1927: 214.

Oolaelaps oophilus.— Oudemans, 1914: 68; Hull, 1918: 69.

Laelaps oophila; *non Laelaps*.— Tipton, 1960: 302.

Hypoaspis (*Holostaspis*) *oophila*.— Evans & Till, 1966: 206; Karg, 1979: 97; Karg, 1982: 247; Karg, 1993: 157.

Holostaspis oophila.— Bregetova, 1977: 549.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, among eggs in colonies of *Formica sanguinea* and *Formica rufobarbis* [Hymenoptera: Formicidae].

NOTES: (a) Vitzthum, 1929: 26 and Turk, 1953: 11 considered *L. oophilus* as junior synonymy of *H. isotricha*, we followed Evans & Till, 1966 that considered them as separate species. (b) Wasmann did a brief description and Evans & Till, 1966 considered him as the author.

***Holostaspis orientalis* (Berlese, 1923) n. comb..**

Oolaelaps orientalis Berlese, 1923: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Holostaspis parvulus* (Berlese, 1904).**

Laelaps (*Oolaelaps*) *parvulus* Berlese, 1904: 431.

Holostaspis parvulus.— Vitzthum, 1929: 26; Sellnick, 1931: 695; Schweizer, 1949: 40; Bregetova, 1977: 549.

Laelaps parvulus; *non Laelaps*.— Tipton, 1960: 303.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: “Mursinzi, Russia” [probably Murzintsy, Ukraine], in nest of *Formica fusca* [Hymenoptera: Formicidae].

***Holostaspis punctulatus* Berlese, 1910.**

Holostaspis punctulatus Berlese, 1910: 250.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, on *Copris molossus* [Coleoptera: Scarabaeidae].

***Holostaspis serpentis* (Karg, 1979) n. comb..**

Hypoaspis (*Holostaspis*) *serpentis* Karg, 1979: 96.

Hypoaspis (*Holostaspis*) *serpentis*.— Karg, 1982: 247.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 720 m above sea level, Mount Piltriquitron, near El Bolsón, [Rio Negro], Argentina, in moss in a swamp.

***Holostaspis tridentata* (Karg, 1979) n. comb..**

Hypoaspis (*Holostaspis*) *tridentata* Karg, 1979: 96.

Hypoaspis (*Holostaspis*) *tridentata*.— Karg, 1982: 247.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 1140 m above sea level, Mount Piltriquitron, near El Bolsón, [Rio Negro], Argentina, in litter under *Mulinum spinosum* [Apiales: Apiaceae].

***Hunteracarus* Costa, 1975.**

Hunteracarus Costa, 1975: 263.

ETYMOLOGY: The genus was named in honor to Dr. Preston E. Hunter.

TYPE SPECIES: *Hunteracarus womersleyi* Costa, 1975: 264.

***Hunteracarus womersleyi* Costa, 1975.**

Hunteracarus womersleyi Costa, 1975: 264.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia; accession number T7219.

TYPE LOCALITY AND HABITAT: Tooloom Scrub (28°28'S, 152°22'E), Urbenville New South Wales, Australia, on *Cephalodesmius armiger* (Coleoptera: Scarabaeidae).

***Hunteria* Delfinado-Baker, Baker & Flechtmann, 1984**

Hunteria Delfinado-Baker, Baker & Flechtmann, 1984: 6.

Hunteria.— Casanueva, 1993: 40.

ETYMOLOGY: The genus was named in honor to Dr. Preston Hunter.

TYPE SPECIES: *Hunteria brasiliensis* Delfinado-Baker, Baker & Flechtmann, 1984: 9.

***Hunteria brasiliensis* Delfinado-Baker, Baker & Flechtmann.**

Hunteria brasiliensis Delfinado-Baker, Baker & Flechtmann, 1984: 9.

Hypoaspis brasiliensis.— Smiley et al., 1996: 201.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, São Paulo, Brazil; accession number 1369.

TYPE LOCALITY AND HABITAT: São Luis, Maranhão, Brazil, in nest of *Melipona compressipes fasciculata* [Hymenoptera: Apidae].

***Hypoaspis* Canestrini, 1885.**

Hypoaspis Canestrini, 1885: 55.

Laelaps.— Berlese, 1887: XL, 8 (in part).

Laelaps (*Hypoaspis*).— Berlese 1904: 405 (in part).

Hypoaspis.— Oudemans, 1902c: 289 (in part); Banks, 1915a: 80; Berlese, 1916: 167; Vitzthum, 1929: 23; Evans, 1957: 231; Schweizer, 1961: 149 (in part); Evans & Till, 1966: 158 (in part); Aswegen & Loots, 1970: 170 (in part); Costa,1971: 70; Hughes, 1976: 292 (in part); Bregetova, 1977: 494 (in part); Karg, 1979: 66 (in part); Rosario, 1981: 63; Zaher, 1986: 185; Casanueva, 1993: 40; Karg, 1993a: 133 (in part); Karg, 1993a: 135; Strong & Hallyday, 1994: 88; Strong, 1995: 219; Joharchi & Halliday, 2011: 26; Joharchi et al., 2013: 383; Karg & Schorlemmer, 2013: 202; Razavi Susan et al., 2014: 52.

Coleolaelaps.— Vitzthum, 1929: 23 (in part).

Hypoaspis (*Hypoaspis*).— Vitzthum, 1943: 762; Bregetova, 1956: 72; Schweizer, 1961: 151; Evans & Till, 1966: 160; Aswegen & Loots, 1970: 171; Bregetova, 1977: 494; Karg, 1979: 69; Hafez et al., 1982: 3; Karg, 1982: 235; ; Karg, 1989: 107; Fariji et al., 2008: 207.

Hypoaspis (*Hypohasta*) Karg, 1979: 70 [Junior synonymy of *Hypoaspis* (*Hypoaspis*) by O. Joharchi, personal communication of 2013].

Hypoaspis (*Hypohasta*).— Karg, 1982: 236; Karg, 1989: 107.

Hypohasta.— Karg & Schorlemmer, 2013: 202.

TYPE SPECIES: *Gamasus krameri* G. & R. Canestrini, 1881: 1083.

***Hypoaspis alborzensis* Razavi Susan & Joharchi, 2014.**

Hypoaspis alborzensis Razavi Susan & Joharchi in Razavi Susan et al., 2014: 52.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, Faculty of Agriculture, University of Tehran, Karaj, Iran, accession number ARS-20130311-1a.

TYPE LOCALITY AND HABITAT: 1384 m above sea level, Karaj (35°48'N, 50°59'E), Alborz, Iran, on *Oryctes* sp. (Coleoptera: Scarabaeidae) under *Platanus* sp. (Proteales: Platanaceae).

***Hypoaspis allomyrinatus* (Ishikawa, 1968).**

Coleolaelaps allomyrinatus Ishikawa, 1968: 210.

Hypoaspis allomyrinatus.— Costa & Hunter, 1971: 325; Ishikawa, 1985: 185; Joharchi et al., 2012: 279.

TYPE DEPOSITORY: Biological Laboratory, Matsuyama Shinonome Junior College, Matsuyama, Japan.

TYPE LOCALITY AND HABITAT: Matsuyama, Shikoku, Japan, on *Allomyrina dichotomus* (Coleoptera: Scarabaeidae).

***Hypoaspis athiasae* Costa, 1971.**

Hypoaspis athiasae Costa, 1971: 81.

Hypoaspis (*Hypoaspis*) *athiasi* [sic].— Karg, 1979: 69; Karg, 1982: 235.

Hypoaspis (*Hypoaspis*) *athiasae*.— Khanjani & Ueckermann, 2005: 119.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Ivory Cost, in humid soil.

***Hypoaspis boas* (Ryke & Meyer, 1958).**

Coleolaelaps boas Ryke & Meyer, 1958: 158.

Hypoaspis (*Hypoaspis*) *boas*.— Aswegen & Loots, 1970: 174; Karg, 1982: 235; Khanjani & Ueckermann, 2005: 121.

Coleolaelaps boas.— Ishikawa, 1985: 188.

Hypoaspis boas.— Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: Department of Zoology, Potchefstroom University, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: Potchefstroom, South Africa, on *Oryctes boas* [Coleoptera: Dynastidae].

***Hypoaspis campestris* (Berlese, 1887).**

Laelaps (*Iphis*) *campestris* Berlese, 1887: fasc. XL, n. 7.

Hypoaspis campestris.— Oudemans, 1902b: 24; Oudemans, 1903b: 129.

Hypoaspis (*Coleolaelaps*) *campestris*.— Berlese, 1913b: 199.

Coleolaelaps campestris.— Vitzthum, 1929: 26; Womersley, 1956a: 585.

Laelaps campestris; *non Laelaps*.— Tipton, 1960: 290.

Hypoaspis (*Hypoaspis*) *campestris*.— Bregetova, 1977: 496; Karg, 1979: 70; Karg, 1982: 236; Karg, 1993a: 136.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Italy, on *Pentodontis punctati* [probably *Pentodon bidens punctatus*] [Coleoptera: Scarabaeidae] and *Melolontha fullone* [Coleoptera: Scarabaeidae].

NOTES: (a) Berlese 1892: fasc. LXX, n. 4, 1892: 44, considered *Hypoaspis krameri* (described from a male) to be the senior synonym of *H. campestris* (described from a female). (b) Oudemans, 1902b: 22 did not considered the male of *H. campestris* Berlese to be the same as *Hypoaspis krameri*. The latter interpretation is adopted in this publication. The latter interpretation is adopted in this publication.

***Hypoaspis chongqingensis* Ma, Zhang & Li, 2003**.

Hypoaspis chongqingensis Ma, Zhang & Li, 2003: 72.

Hypoaspis chongqingensis.— Ren & Guo, 2008: 329

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Chongqing (29°34'N, 106°30'E), China, on *Polyphylla laticollis* [Coleoptera: Scarabaeidae].

***Hypoaspis coxalis* (Hyatt, 1964).**

Coleolaelaps coxalis Hyatt, 1964: 475.

Hypoaspis coxalis.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: British Museum (Natural History), London, England, accession number 1963.10.3.70.

TYPE LOCALITY AND HABITAT: Morón, Venezuela, on *Megosoma elephas* (Coleoptera: Dynastidae).

***Hypoaspis dubius* Costa, 1971.**

Hypoaspis dubius Costa, 1971: 84.

Hypoaspis (*Hypoaspis*) *dubia*.— Karg, 1979: 69; Karg, 1982: 236.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Apia, West Samoa, laboratory rearing started with specimes collected on *Oryctes monoceros* from Ivory Coast (Coleoptera: Scarabaeidae).

***Hypoaspis eupatori* (Womersley, 1956).**

Coleolaelaps eupatori Womersley, 1956a: 587.

Hypoaspis (*Hypoaspis*) *eupatori*.— Karg, 1979: 69; Karg, 1982: 235.

Hypoaspis euputori [sic].— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Brisbane, Australia, on *Eupatorus australicus* [now *Haploscapanes australicus*] [Coleoptera: Dynastidae].

***Hypoaspis granulatus* (Hyatt, 1964).**

"*Coleolaelaps*" *granulatus* Hyatt, 1964: 477.

Coleolaelaps granulates.— Bhattacharyya, 1967: 132.

Hypoaspis granulatus.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1963.10.3.94.

TYPE LOCALITY AND HABITAT: Río Caura, Bolívar, Venezuela, on unidentified beetle (Coleoptera: Scarabaeidae).

***Hypoaspis heteronychus* (Womersley, 1956) n. comb..**

Coleolaelaps heteronychus Womersley, 1956b: 116.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: M. Edw. (probably Mount Edward), Maclean, New South Wales, Australia, on *Heteronychus sanctaehelenae* [Coleoptera: Dynastidae].

***Hypoaspis hunanensis* Ma & Zheng, 2000**.

Hypoaspis hunanensis Ma & Zheng, 2000: 373.

Hypoaspis hunanensis.— Ren & Guo, 2008: 329; Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: Central-South Forestry University, Zhuzhou, Hunan, China.

TYPE LOCALITY AND HABITAT: Liuyang (28°10'N, 113°38'E), Hunan, China, on unidentified scarabid beetle [Coleoptera: Scarabaeidae].

***Hypoaspis integer* (Berlese, 1911).**

Laelaps (*Hypoaspis*) *integer* Berlese, 1911: 186.

Hypoaspis (*Coleolaelaps*) *integer*.— Berlese, 1913b: 199.

Coleolaelaps integer.— Berlese, 1914: 142; Vitzthum, 1929: 26; Willmann, 1935: 23; Lombardini, 1936: 39; Samšiňák, 1960: 280; Costa, 1966c: 73.

Hypoaspis integer.— Buitendijk, 1945: 296; Costa, 1971: 76; Costa & Hunter, 1971: 351; Karg, 1999: 430; Joharchi & Halliday, 2011: 27.

Laelaps integer; *non Laelaps*.— Tipton, 1960: 298.

Hypoaspis (*Hypoaspis*) *integer*.— Karg, 1979: 70; Karg, 1982: 236; Karg, 1993a: 136 (all sensu Samšiňák, 1960).

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: unspecified locality, on *Oryctes nasicornis* [= *Oryctem nasicornem*] [Coleoptera: Scarabaeidae].

NOTES: (a) According to Joharchi & Halliday, 2011: 27, the specimens reported by Willmann, 1935 as *Coleolaelaps integer* is a different species. (b) Specimens identified as *Coleolaelaps* ? *integer* by Womersley (1956a): 585 were described as *Hypoaspis* (*Hypohasta*) *serrata* by Karg (1979): 70.

***Hypoaspis jambar* Ishikawa, 1985.**

Hypoaspis jambar Ishikawa, 1985: 185.

TYPE DEPOSITORY: Department of Zoology, National Science Museum (Natural History), Tokyo, Japan; accession number NSMT-Ac9708.

TYPE LOCALITY AND HABITAT: Ié Forestry Road, Kunigami, Ryukyus, Okinawa Island, Japan, on *Cheirotonus jambar* (Coleoptera: Scarabaeidae) on living *Quercus miyagii* (= *Cyclobalanopsis miyagii*) [Fagales: Fagaceae].

***Hypoaspis krameri* (Canestrini & Canestrini, 1881).**

Gamasus krameri Canestrini & Canestrini, 1881: 1083.

Laelaps krameri.— Canestrini & Canestrini, 1882: 60; Berlese, 1892: 42.

Hypoaspis krameri.— Canestrini, 1885: 80; Oudemans, 1902b: 22; Oudemans, 1903b: 130; Buitendijk, 1945: 296; Domocoş, 1969: 112; Rosario, 1981: 64; Strong & Halliday, 1994: 94; Joharchi & Halliday, 2011: 27.

Laelaps (*Iphis*) *kramerii* [sic].— Berlese, 1892, LXX, 4.

Iphis kramerii.— Berlese, 1892: 35.

Coleolaelaps krameri.— Lombardini, 1936: 39.

Laelaps krameri; *non Laelaps.*— Tipton, 1960: 298.

Hypoaspis stammeri Götz in Hirschmann et al., 1969: 140 [Junior synonymy by Karg, 1993: 136].

Hypoaspis (*Hypoaspis*) *krameri*.— Schweizer, 1961: 151; Evans & Till, 1966: 163; Karg, 1971: 170; Bregetova, 1977: 496; Karg, 1979: 70; Karg, 1982: 236; Ishikawa, 1985: 188; Karg, 1993a: 136; Gwiazdowicz & Gulvik, 2005: 119; Faraji et al., 2008: 207.

TYPE DEPOSITORY: of *G. krameri* and *H. stammeri*: unspecified.

TYPE LOCALITY AND HABITAT: of *G. krameri*: Padua, Italy, on rotten wood; of *H. stammeri*: unspecified (probably Germany), on *Geotrupes sylvaticus* [Coleoptera: Geotrupidae].

NOTES: (a) Berlese 1892: fasc. LXX, n. 4, 1892: 44, considered *H. krameri* (described from a male) to be the senior synonym of *Hypoaspis campestris* (described from a female). (b) Oudemans, 1902b: 22 did not considered the male of *Hypoaspis campestris* Berlese to be the same as *H. krameri*.

***Hypoaspis larvicolus* Joharchi & Halliday, 2011.**

Hypoaspis larvicolus Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1384 m above sea level, Karaj (35°48'N, 50°59'E), Iran, on larva of *Polyphylla* sp. (Coleoptera: Scarabaeidae).

***Hypoaspis latisternalis* Hyatt, 1964.**

"*Coleolaelaps*" *latisternalis* Hyatt, 1964: 481.

Hypoaspis latisternalis.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1963.10.3.95.

TYPE LOCALITY AND HABITAT: Río Caura, Bolívar, Venezuela, on unidentified beetle (Coleoptera: Scarabaeidae).

****Hypoaspis lepisternalis* Ma, 2004.**

Hypoaspis lepisternalis Ma, 2004: 18.

Hypoaspis lepisternalis.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Lushan Mountain (29°32'N, 115°55'E), Jiangxi, China, on *Polyphylla laticollis* [Coleoptera: Scarabaeidae].

Pode ser Coleo. para Joharchi & Halliday, 2011.

***Hypoaspis liui* (Samšiňák, 1962).**

Coleolaelaps liui Samšiňák, 1962: 196.

Hypoaspis (*Hypoaspis*) *liui*.— Karg, 1979: 69; Karg, 1982: 235.

Hypoaspis liui .— Gu & Duan, 1991: 342; Ren & Guo, 2008: 329; Joharchi et al., 2012: 279.

Coleolaelaps liui.— Karg, 1999: 432.

Hypoaspis spinaperaffinis Ma & Cui in Ma et al., 2002: 736 [Junior synonymy of *H. liui* by Ma, 2006: 23].

Hypoaspis spinaperaffinis.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: of *C. liui*: Author's collection; accession number 632K; of *H. spinaperaffinis*: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: of *C. liui*: South China, on a dynastid beetle [Coleoptera: Scarabaeidae]; of *H. spinaperaffinis*: Ji'an (41°08'N, 126°09'E), Jilin, China, on unidentified beetle.

***Hypoaspis longchuanensis* Gu & Duan, 1991.**

Hypoaspis longchuanensis Gu & Duan, 1991: 341

Hypoaspis longchuanensis Gu & Duan, 1993: 50 (objective homonymy).

Hypoaspis longchuanensis.— Ren & Guo, 2008: 329; Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: Department of Parasitology, Guiyang Medical College, Guizhou Province, China.

TYPE LOCALITY AND HABITAT: Longchuan (24.3°N, 97.9°E),Yunnan, China, on *Xylotrupes* sp. [Coleoptera: Scarabaeidae].

***Hypoaspis louisensis* Loots, 1980.**

Hypoaspis louisensis Loots, 1980: 764.

TYPE DEPOSITORY: Koninklijk Museum voor Midden Africa, Tervuren, Belgium; accession number 143.554.

TYPE LOCALITY AND HABITAT: Anse Louis, Mahé Sud, Seychelles, in a mangrove.

***Hypoaspis maryamae* Joharchi & Halliday, 2011.**

Hypoaspis maryamae Joharchi & Halliday, 2011: 31.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 2250 m above sea level, Yazd (31°38'N, 53°59'E), Iran, on *Polyphylla olivieri* (Coleoptera: Scarabaeidae).

***Hypoaspis melolonthae* Joharchi & Halliday, 2011.**

Hypoaspis melolonthae Joharchi & Halliday, 2011: 33.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 2300 m above sea level, Yazd (31°33'N, 54°11'E), Iran, on *Melolontha melolontha* (Coleoptera: Scarabaeidae).

***Hypoaspis metasternalis* Hyatt, 1964.**

Coleolaelaps metasternalis Hyatt, 1964: 472.

Coleolaelaps metasternalis.— Ishikawa, 1968: 211.

Hypoaspis metasternalis.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: British Museum (Natural History), London, England, accession number 1963.10.3.21.

TYPE LOCALITY AND HABITAT: 1000 m above sea level, Cota, Venezuela, on unidentified beetle (Coleoptera: Scarabaeidae).

***Hypoaspis neokrameri* Costa, 1971.**

Hypoaspis neokrameri Costa, 1971: 71.

Hypoaspis (*Hypoaspis*) *neokrameri*.— Karg, 1979: 69; Karg, 1982: 235.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Tivon, Israel, on *Oryctes nasicornis* (Coleoptera: Scarabaeidae).

***Hypoaspis pentodoni* Costa, 1971.**

Hypoaspis pentodoni Costa, 1971: 71.

Hypoaspis (*Hypoaspis*) *pentodoni*.— Karg, 1979: 70; Karg, 1982: 236; Karg, 1993a: 136.

Hypoaspis pentodoni.— Joharchi & Halliday, 2011: 35.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Haemek, Israel, on *Pentodon bispinosus* (Coleoptera: Scarabaeidae).

***Hypoaspis phyllognathi* Costa, 1971.**

Hypoaspis phyllognathi Costa, 1971: 74.

Hypoaspis (*Hypoaspis*) *phyllognathi*.— Karg, 1979: 70; Karg, 1982: 236; Karg, 1993a: 137; Khanjani & Ueckermann, 2005: 121.

Hypoaspis phyllognathi.— Joharchi & Halliday, 2011: 35; Bahrami et al., 2011: 351.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Bardawill, Northern Sinai, Israel, on *Phyllognathus silenus* (Coleoptera: Scarabaeidae).

***Hypoaspis polyphyllae* Khanjani & Ueckermann, 2005.**

Hypoaspis (*Hypoaspis*) *polyphyllae* Khanjani & Ueckermann, 2005: 119.

Hypoaspis (*Hypoaspis*) *polyphyllae*.— Faraji et al., 2008: 207.

Hypoaspis polyphyllae.— Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: Acarology Laboratory, Bu-Ali Sina University, Hamadan, Iran.

TYPE LOCALITY AND HABITAT: Ganjnameh, Hamadan, Iran, on *Polyphylla olivieri* (Coleoptera: Scarabaeidae) on roots of black cherry [Rosales: Rosaceae].

***Hypoaspis punctatus* Aswegen & Loots, 1970.**

Hypoaspis (*Hypoaspis*) *punctatus* Aswegen & Loots, 1970: 172.

Hypoaspis (*Hypoaspis*) *punctata*.— Karg, 1982: 236.

TYPE DEPOSITORY: Koninklijk Museum voor Midden Africa, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Kundelungu, Democratic Republic of the Congo (= Belgian Congo), in soil.

***Hypoaspis remilleti* Costa, 1971.**

Hypoaspis remilleti Costa, 1971: 86.

Hypoaspis (*Hypoaspis*) *remilleti*.— Karg, 1979: 69; Karg, 1982: 235.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: near Abidjan, Ivory Coast, on *Heteroligus meles* (Coleoptera: Dynastidae).

***Hypoaspis rhinocerotis* Oudemans, 1925.**

Hypoaspis rhinocerotis Oudemans, 1925: 30.

Coleolaelaps rhinocerotis.— Oudemans, 1927: 189; Buitendijk, 1945: 298; Cooreman, 1948: 9; Ryke & Meyer, 1958: 158.

Hypoaspis rhinocerotis.— Costa, 1971: 78; Ren & Guo, 2008: 329; Razavi Susan et al., 2014: 55.

Hypoaspis (*Hypoaspis*) *rhinocerotis*.— Karg, 1979: 70; Karg, 1982: 236; Khanjani & Ueckermann, 2005: 119.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Ambon, Indonesia, on *Oryctes rhinoceros* [Coleoptera: Scarabaeidae].

***Hypoaspis rhizotrogi* Mašán, 1998. ok**

Hypoaspis (*Hypospis*) *rhizotrogi* Mašán, 1998: 20.

TYPE DEPOSITORY: Institute of Zoology of the Slovak Academy of Sciences in Bratislava, Slovakia.

TYPE LOCALITY AND HABITAT: Pobedím (Podunajská nížina lowland), southwest Slovakia, on *Rhizotrogus aequinoctialis* (Coleoptera: Scarabaeidae).

***Hypoaspis rhopaea* (Womersley, 1956).**

Coleolaelaps rhopaea Womersley, 1956a: 588.

Hypoaspis (*Hypohasta*) *rhopaea*.— Karg, 1979: 70; Karg, 1982: 236.

Hypoaspis rhopaea.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Broken Hill, New South Wales, Australia, on larvae of *Rhopaea magnicornis* [Coleoptera: Scarabaeidae].

***Hypoaspis serrata* (Karg, 1979).**

Hypoaspis (*Hypohasta*) *serrata* Karg, 1979: 70.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Western Samoa, on *Oryctes rhinoceros* [Coleoptera: Scarabaeidae].

NOTE: Specimens identified as *Coleolaelaps integer* by Womersley (1956a): 585 were described as *Hypoaspis* (*Hypohasta*) *serrata* by Karg (1979): 70.

***Hypoaspis simplexans* (Womersley, 1956)**.

Coleolaelaps simplexans Womersley, 1956a: 586.

Coleolaelaps simplexans.— Ishikawa, 1968: 213.

Hypoaspis (*Hypohasta*) *simplexans*.— Karg, 1979: 71; Karg, 1982: 236.

Hypoaspis simplexans.— Ma et al., 2003: 72; Ma, 2004: 18; Joharchi, Ostovan & Saboori, 2012: 279.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Acacia Plateau, New South Wales, Australia, on unidentified scarab pupa [Coleoptera: Scarabaeidae].

***Hypoaspis spinacrassus* Rosario, 1981.**

Hypoaspis spinacrassus Rosario, 1981: 65.

Hypoaspis spinacrassus.— Gu et al., 1992: 430; Ma et al., 2002: 737.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: International Rice Research Institute experimental farm, Philippines, on unidentified dynastine beetle [Coleoptera: Dynastidae].

***Hypoaspis surii* (Khanjani, Ghaedi & Ueckermann, 2013).**

Hypoaspis (*Hypoaspis*) *surii* Khanjani, Ghaedi & Ueckermann, 2013: 470.

TYPE DEPOSITORY: Acarology Laboratory, Bu-Ali Sina University, Hamedan, Iran.

TYPE LOCALITY AND HABITAT: 1876 m above sea level, potato farms at Bahar (34°54'N, 48°26'E), Hamedan, Iran, on *Polyphylla olivieri* (Coleoptera: Scarabaeidae).

***Hypoaspis striatus* Hyatt, 1964.**

Coleolaelaps striatus Hyatt, 1964: 477.

Hypoaspis striatus.— Joharchi et al., 2012: 279.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1963.10.3.91.

TYPE LOCALITY AND HABITAT: Caracas, Venezuela, on *Dynastes* sp. (Coleoptera: Dynastidae).

***Hypoaspis submontana* Bai, Gu & Chen, 1994.**

Hypoaspis submontana Bai, Gu & Chen in, Bai et al., 1994: 295.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Haiyuan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Hypoaspis surigaoensis* Rosario, 1981.**

Hypoaspis surigaoensis Rosario, 1981: 67.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mangagoy, Bislig, Surigao del Sur, Philippines, on unidentified dynastid beetle [Coleoptera: Dynastidae].

***Hypoaspis terrestris* Leonardi, 1899.**

Laelaps terrestris Leonardi, 1899: 508.

Hypoaspis (*Coleolaelaps*) *terrestris*.— Berlese, 1913b: 199.

Hypoaspis (*Hypoaspis*) *terrestris*.— Bregetova, 1977: 494; Karg, 1979: 70; Karg, 1982: 236; Karg, 1993a: 137.

Hypoaspis terrrestris.— Ma & Zheng, 2000: 373; Ma et al., 2003: 75; Joharchi & Halliday, 2011: 35.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Portici, Italy, on larva of *Cetonia* sp. (Coleoptera: Scarabaeidae).

***Hypoaspis terrestrisimilis* Ma, Zhang & Li, 2003.**

Hypoaspis terrestrisimilis Ma, Zhang & Li, 2003: 72.

Hypoaspis terrestrisimilis.— Ren & Guo, 2008: 329; Joharchi & Halliday, 2011: 27.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Chongqing (29°34'N, 106°30'E), China, on *Polyphylla laticollis* [Coleoptera: Scarabaeidae].

***Hypoaspis weni* Bai, Gu & Chen, 1994.**

Hypoaspis weni Bai, Gu & Chen, in Bai et al., 1994: 297.

Hypoaspis weni.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: suburb of Yinchuan (38.5°N, 106.3°E), Ningxia Hui Autonomous Region, China, on unidentified insect larva.

***Laelaspis* Berlese, 1903.**

Laelaps (*Laelaspis*) Berlese, 1903: 13.

Laelaps (*Laelaspis*).— Berlese, 1904: 422.

Laelaps.— Ewing, 1909: 64 (in part).

Laelaspis.— Berlese, 1920: 157; Vitzthum, 1929: 22; Evans, 1957: 231; Hunter, 1961: 672; Bregetova, 1977: 542; Zaher, 1986: 195; Casanueva, 1993: 40; Joharchi et al., 2011: 28; Joharchi et al., 2012: 19; Joharchi et al., 2012: 2000; Karg & Schorlemmer, 2013: 203.

Hypoaspis (*Laelaspis*).— Vitzthum, 1943: 762; Evans & Till, 1966: 160; Aswegen & Loots, 1970: 193; Karg, 1979: 99; Karg, 1982: 234; Karg, 1989: 108; Karg, 1993a: 136; Fariji et al., 2008: 208.

Hypoaspis.— Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

TYPE SPECIES: *Iphis astronomicus* Koch, 1839, fasc. 27, fig.18.

***Laelaspis astronomicus* (Koch, 1839).**

Iphis astronomicus Koch, 1839: fasc. 27, fig.18.

Iphis astronomicus.— Berlese, 1889: LIV, 6; Berlese, 1892: 35.

Laelaps (*Laelaspis*) *astronomicus*.— Berlese, 1903.

Hypoaspis astronomicus.— Buitendijk, 1945: 295.

Laelaspis astronomicus.— Lombardi, 1936: 43; Schweizer, 1949: 40; Hunter, 1961: 672; Schweizer, 1961: 147; Reitblat, 1963: 81; Hunter, 1964b: 296; Lapina, 1976: 52; Bregetova, 1977: 547; Teng, 1981: 398; Zaher, 1986: 196; Nasr & Nawar, 1989b: 76; Joharchi et al., 2012: 2001.

Laelaspis ovatus Willmann, 1951: 115 [Junior synonymy of *H.* (*L.*) *astronomica* by Evans & Till, 1966: 208; Bregetova, 1977: 547; Karg, 1993a: 160; Joharchi et al., 2012: 2001].

Laelaps astronomicus; *non Laelaps*.— Tipton, 1960: 288.

Laelaspis ovatus.— Hunter, 1961: 676; Reitblat, 1963: 80.

Hypoaspis (*Laelaspis*) *astronomica*.— Evans & Till, 1966: 208; Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 120; Karg, 1993a: 160; Karg, 1993b; Faraji et al., 2008: 208.

Laelaspis ?*astronomica*.— Costa, 1966c: 74.

Laelaspis zaheri Shereef & Soliman, 1978: 845 [Junior synonymy of *L. astronomicus* by Zaher, 1986: 196; Joharchi et al., 2012: 2001].

TYPE DEPOSITORY of *L. astronomica*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *L. ovatus*: unspecified; of *L. zaheri*:

TYPE LOCALITY AND HABITAT of *L. astronomicus*: Germany; of *L. ovatus*: Pannonian Basin, Austria, in soil; of *L. zaheri*:

***Laelaspis australicus* (Womersley, 1956).**

Gymnolaelaps australicus Womersley, 1956a: 582.

Laelaspis australicus.— Domrow, 1957: 208; Joharchi & Halliday, 2013: 46.

Pseudoparasitus (*Gymnolaelaps*) *australicus*.— Karg, 1978a: 206; Karg, 1981b: 218; Karg, 1989a: 335.

Gymnolaelaps australicus.— Farrier & Hennessey, 1993: 74; Joharchi et al., 2011: 25.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Glen Osmond, South Australia, in soil.

NOTE: Specimens reported by Nemati, 1999: ??, Nemati et al., 2000:?? and Jalalizand et al., 2004: ??? were considered by Joharchi & Halliday, 2013: 46 to belong to a different species, within *Laelaspis*.

***Laelaspis aviator* Berlese, 1920.**

Laelaspis aviator Berlese, 1920: 158.

Laelaspis aviator.— Lombardi, 1936: 43; Hunter, 1961: 675; Reitblat, 1963: 80; Joharchi et al., 2012: 2014.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Pisa, Italy, on *Protaetia morio* [mentioned as *Cetonia morio*] [Coleoptera: Scarabaeidae].

***Laelaspis badrii* Nasr & Nawar, 1989.**

Laelaspis badrii Nasr & Nawar, 1989b: 76.

Laelaspis badrii.— Joharchi et al., 2012: 2014.

TYPE DEPOSITORY: Acarology Research Unit, National Research Centre, Dokki, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Om-Saber village, Tahreer, Behera, Egypt, in soil under *Magifera indica* [Sapindales: Anacardiaceae].

***Laelaspis bakeri* Hunter & Davis, 1962.**

Laelaspis bakeri Hunter & Davis, 1962: 247.

Hypoaspis (*Laelaspis*) *bakeri*.— Hunter & Glover, 1968: 64.

Laelaspis bakeri.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Livingston, Michigan, United States of America, with *Myrmica fracticornis* [Hymenoptera: Formicidae].

***Laelaspis brevichelis* Hunter, 1964.**

Laelaspis brevichelis Hunter, 1964b: 299.

Hypoaspis (*Laelaspis*) *brevichelis*.— Hunter & Glover, 1968: 64.

Laelaspis brevichelis.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: University of Kansas Natural History Reservation, Lawrence, Kansas, United States of America, in nest and on adults and larvae of *Crematogaster* (*Acarocoelia*) *lineolata* [Hymenoptera: Formicidae].

***Laelaspis brevidentis* (Karg, 1978) n. comb..**

Hypoaspis (*Holostaspis*) *brevidentis* Karg, 1978: 12.

Hypoaspis (*Laelaspis*) *brevidentis*.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 120.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Azapa, Tarapaca, Chile, in soil.

***Laelaspis brevipilis* Hunter, 1961.**

Laelaspis brevipilis Hunter, 1961: 680.

Hypoaspis (*Laelaspis*) *brevipilis*.— Hunter & Glover, 1968: 65.

Laelaspis brevipilis.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Stanford University, California, United States of America, on Argentine ant [*Linepithema humile*] [Hymenoptera: Formicidae].

***Laelaspis calidus* Berlese, 1923.**

Laelaspis calidus Berlese, 1923: 255.

Hypoaspis (*Laelaspis*) *calidus*.— Aswegen & Loots, 1970: 194.

Laelaspis calidus.— Hunter, 1961: 676; Joharchi et al., 2012: 19.

Hypoaspis (*Laelaspis*) *calida*.— Karg, 1982: 250; Karg, 1989b: 120.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Laelaspis dariusi* Joharchi & Jalaeian, 2012.**

Laelaspis dariusi Joharchi & Jalaeian, in Joharchi et al., 2012: 20.

TYPE DEPOSITORY: Department of Plant Protection, Yazd Branch, Islamic Azad University, Tehran, Iran.

TYPE LOCALITY AND HABITAT: 858 m above sea level, Khorasan Razavi, Kalate Naderi (Laeen), 37°07'N, 59°29'E, Iran, in soil of apple orchard.

***Laelaspis digitalis* Teng, 1981.**

Laelaspis digitalis Teng, 1981: 397.

Laelaspis digitalis.— Bai & Gu , 1993b: 438.

Hypoaspis digitalis.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Institute of Zoology, Academia Sinica, Beijing, China.

TYPE LOCALITY AND HABITAT: Morin Dawa (48°N, 124°E), Hulun Boir Meng, Inner Mongolia, China, on *Cricetulus barabensis* [Rodentia: Cricetidae].

***Laelaspis dubitatus* Hunter, 1964.**

Laelaspis dubitatus Hunter, 1964b: 293.

Hypoaspis (*Laelaspis*) *dubitatus*.— Hunter & Glover, 1968: 64; Faraji et al., 2008: 208.

Laelaspis dubitata.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Clarke, Georgia, United States of America, with *Aphaenogaster* sp. [Hymenoptera: Formicidae].

***Laelaspis equitans* (Michael, 1891).**

Laelaps equitans Michael, 1891: 649.

Iphis equitans.— Leonardi, 1896.

Laelaps (*Laelaspis*) *equitans*.— Berlese, 1903: 16; Berlese, 1904: 423; Donisthorpe, 1927: 213.

Laelaspis equitans.— Hull, 1918: 63; Vitzthum, 1929: 26; Hunter, 1961: 675; Reitblat, 1963: 81; Bregetova, 1977: 545; Bai & Gu, 1993b: 441; Ren & Guo, 2008: 328; Joharchi et al., 2012: 2002.

Laelaps equitans; *non Laelaps*.— Tipton, 1960: 293.

Hypoaspis (*Laelaspis*) *equitans*.— Evans & Till, 1966: 210; Karg, 1979: 102; Karg, 1982: 250; Karg, 1989b: 120; Karg, 1993a: 162.

Laelaspis aequitans [sic].— Farrier & Hennessey, 1993: 81.

Hypoaspis equitans.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: near Ajaccio, Corsica, in nest of *Tetramorium caespitum* [Hymenoptera: Formicidae].

***Laelaspis equitans longitarsa* (Berlese, 1904).**

Laelaps (*Laelaspis*) *equitans* var. *longitarsa* Berlese, 1904: 424.

Laelaspis equitans var. *longitarsa*.— Hunter, 1961: 675; Joharchi et al., 2012: 2014.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series: Russia, on *Tetramorium caespitum* [mentioned as *Tetramorii caespitum*] [Hymenoptera: Formicidae] and in its nests.

***Laelaspis finitimus* (Berlese, 1903).**

Laelaps (*Laelaspis*) *finitimus* Berlese, 1903: 15.

Laelaps (*Laelaspis*) *finitimus*.— Berlese, 1904: 426.

Laelaspis finitimus.— Buitendijk, 1945: 297; Hunter, 1961: 675; Reitblat, 1963: 81; Bregetova, 1977: 544; Joharchi et al., 2012: 2014.

Laelaps finitimus; *non Laelaps*.— Tipton, 1960: 294.

Hypoaspis (*Laelaspis*) *finitima*.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 120; Karg, 1993a: 160.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, in nest of *Tapinoma erraticum* [Hymenoptera: Formicidae].

***Laelaspis formationis* (Karg, 1989b) n. comb..**

Hypoaspis (*Laelaspis*) *formationis* Karg, 1989b: 125.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Laelaspis humeratus* (Berlese, 1904).**

Laelaps (*Laelaspis*) *humeratus* Berlese, 1904: 425.

Laelaspis humeratus.— Hull, 1925: 210; Vitzthum, 1929: 26; Hunter, 1961: 675; Joharchi et al., 2012: 22; Joharchi et al., 2012: 2014.

Laelaps (*Laelaspis*) *humeratus*.— Donisthorpe, 1927: 213.

Laelaspis humeratus.— Willmann, 1938: 149; Willmann, 1951: 113; Reitblat, 1963: 80.

Laelaps humeratus; *non Laelaps*.— Tipton, 1960: 297.

Hypoaspis (*Laelaspis*) *humerata*.— Evans & Till, 1966: 212; Karg, 1979: 102; Karg, 1982: 250; Karg, 1989b: 120; Karg, 1993a: 161.

Hypoaspis humerata.— Lapina, 1976: 43.

Laelaspis humerata.— Bregetova, 1977: 545.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Luxemburg, in nest of unidentified ant.

***Laelaspis humi* (Womersley, 1955).**

Laelapsella humi Womersley, 1955: 417.

Laelapsella humi.— Domrow, 1987: 841.

Hypoaspis (*Laelaspis*) *humi*.— Karg, 1979: 99; Karg, 1982: 248

TYPE DEPOSITORY: South Australia Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Fisher Island, Bass Strait, Australia, in nesting material in burrows of *Puffinus tenuirostris* [Procellariiformes: Procellariidae].

***Laelaspis imitatus* Reitblat, 1963.**

Laelaspis imitates Reitblat, 1963: 76.

Laelaspis imitatus.— Bregetova, 1977: 547; Joharchi et al., 2012: 2002.

Hypoaspis (*Laelaspis*) *imitata*.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 120; Karg, 1993a: 161; Karg, 2000: 246.

Hypoaspis (*Laelaspis*) *imitate* [sic].— Nemati & Babaeian, 2010: 364.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: Tagybeyly, Agdam, Azerbaijan, on *Meriones tristrami* [Rodentia: Muridae].

***Laelaspis kamalii* Joharchi & Halliday, 2012**

Laelaspis kamalii Joharchi & Halliday, in Joharchi et al., 2012: 2004.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1890 m above sea level, Arrange (35°55'N, 51°04'E), Alborz, Iran, in nest of *Tapinoma* sp. (Hymenoptera: Formicidae).

***Laelaspis latanalis* (Karg, 2000) n. comb..**

Hypoaspis (*Laelaspis*) *latanalis* Karg, 2000: 246.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Venezuela, in litter.

***Laelaspis latodentis* (Karg, 1993) n. comb..**

Hypoaspis (*Laelaspis*) *latodentis* Karg, 1993b: 265.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Puntudo, Santa Cruz, Galapagos Islands, in wet moss on rocks, Pteridophyta-Cyperaceae zone.

***Laelaspis longipilis* Hunter, 1964.**

Laelaspis longipilis Hunter, 1964b: 297.

Hypoaspis (*Laelaspis*) *longipilis*.— Hunter & Glover, 1968: 64.

Laelaspis longipilis.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Nogales, Arizona, United States of America, in lumber foundation.

***Laelaspis lundi* Hunter, 1961.**

Laelaspis lundi Hunter, 1961: 677.

Hypoaspis (*Laelaspis*) *lundi*.— Hunter & Glover, 1968: 64.

Laelaspis lundi.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Fortin, Veracruz, Mexico, on bulbs of *Polianthus* sp. [probably *Polianthes*] [Plantae: Agavaceae].

***Laelaspis mandibularis* (Ewing, 1909).**

Laelaps mandibularis Ewing, 1909: 65.

Hypoaspis (*Laelaspis*) *johnieae* Hunter & Glover, 1968: 70 [Junior synonymy of *L. mandibularis* by Hennessey & Farrier, 1988: 31; Farrier & Hennessey, 1993: 81].

Laelaspis mandibularis.— Hennessey & Farrier, 1988: 31; Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY of *L. mandibularis*: Illinois State Laboratory of Natural History, Urbana, Illinois; of *H.* (*L.*) *johnieae*: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: of *L. mandibularis*: Arcola, Illinois, United States of America, unspecified substrate; of *H.* (*L.*) *johnieae*: Sebastian, Florida, United States of America, in moist sand pine litter.

***Laelaspis metapodalii* (Karg, 1978) n. comb..**

Hypoaspis (*Holostaspis*) *metapodalii* Karg, 1978b: 9.

Hypoaspis (*Laelaspis*) *metapodalii*.— Karg, 1979: 100; Karg, 1982: 248.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Valley 130 km northwest of Santiago, Chile, in mud.

***Laelaspis moseri* (Hunter & Glover, 1968).**

Hypoaspis (*Laelaspis*) *moseri* Hunter & Glover, 1968: 67.

Laelaspis moseri.— Farrier & Hennessey, 1993: 81.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Pineville, Louisiana, United States of America, in laboratory cultures of *Anuroyryllus* [sic] *muticus* [probably *Anurogryllus muticus*] [Orthoptera: Gryllidae].

***Laelaspis mossadeghi* Babaeian & Joharchi, 2013.**

Laelaspis mossadeghi Babaeian & Joharchi, 2013 in Babaeian et al., 2013: 354.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: Dotu, Shahrekord, Iran, in nest of *Messor* sp. (Hymenoptera: Formicidae).

***Laelaspis mumai* (Hunter & Glover, 1968).**

Hypoaspis (*Laelaspis*) *mumai* Hunter & Glover, 1968: 65.

Laelaspis mumai.— Farrier & Hennessey, 1993: 82.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Fort Pierce, Florida, United States of America, in citrus litter.

***Laelaspis myrmicae* (Greim in Hirschmann et al., 1969).**

Hypoaspis (*Laelaspis*) *myrmicae* Greim in Hirschmann et al., 1969: 139.

Hypoaspis (*Holostaspis*) *myrmicae*.— Karg, 1979: 95; Karg, 1982: 247; Karg, 1993a: 156.

Laelaspis myrmicae.— Joharchi et al., 2012: 2015.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, on *Myrmica laevinodis* [Hymenoptera: Formicidae].

***Laelaspis obscurus* (Costa, 1968).**

Hypoaspis obscurus Costa, 1968: 11.

Hypoaspis (*Laelaspis*) *obscura*.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 119.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Ha'Emeq, Israel, in garden litter.

***Laelaspis ovisugus* (Berlese, 1903).**

Laelaps (*Laelaspis*) *ovisugus* Berlese, 1903: 14.

Laelaps (*Laelaspis*) *ovisugus*.— Berlese, 1904: 427.

Laelaps ovisugas; *non Laelaps*.— Tipton, 1960: 303.

Laelaspis ovisugus.— Hunter, 1961: 675; Reitblat, 1963: 81; Bregetova, 1977: 546.

Hypoaspis (*Laelaspis*) *ovisuga*.— Karg, 1979: 100; Karg, 1982: 249; Karg, 1993a: 159.

Laelaspis ovisugus.— Joharchi et al., 2012: 2015.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, associated with unidentified ants.

***Laelaspis patulus* Allred, 1969.**

Laelaspis patulus Allred, 1969: 234.

Laelaspis patulus.— Allred, 1975: 128; Ren & Guo, 2008: 329; Joharchi et al., 2011: 28; Joharchi et al., 2012: 2014.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number B-66376.

TYPE LOCALITY AND HABITAT: Naran, 2408 m above sea level, Kaghan Valley, Hazara, Pakistan (= West Pakistan), on *Apodemus flavicollis* [Rodentia: Muridae].

***Laelaspis pauli* Hunter & Davis, 1962.**

Laelaspis pauli Hunter & Davis, 1962: 250.

Laelaspis pauli.— Hunter, 1964b: 300; Farrier & Hennessey, 1993: 82.

Hypoaspis (*Laelaspis*) *pauli*.— Hunter & Glover, 1968: 64.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Morgan, Georgia, United States of America, in ground litter around nest of *Crematogaster* sp. [Hymenoptera: Formicidae].

***Laelaspis pennatus* Joharchi & Halliday, 2012**

Laelaspis pennatus Joharchi & Halliday, in Joharchi et al., 2012: 2007.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: Esfahan, Iran, in nest of *Tetramorium caespitum* [Hymenoptera: Formicidae].

***Laelaspis persicus* Joharchi & Halliday, 2012**

Laelaspis persicus Joharchi & Halliday, in Joharchi et al., 2012: 2009.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1595 m above sea level, Taleghan (36°71'N, 50°32'E), Alborz, Iran, in nest of *Pheidole pallidula* (Hymenoptera: Formicidae).

***Laelaspis picketti* (Hunter & Glover, 1968).**

Hypoaspis (*Laelaspis*) *picketti* Hunter & Glover, 1968: 71.

Laelaspis picketti.— Farrier & Hennessey, 1993: 82.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Malabar, Florida, United States of America, in citrus litter.

***Laelaspis piloscutuli* Hunter, 1961.**

Laelaspis piloscutuli Hunter, 1961: 677.

Hypoaspis (*Laelaspis*) *piloscutuli*.— Hunter & Glover, 1968: 64.

Laelaspis piloscutuli.— Farrier & Hennessey, 1993: 82.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Fortin, Veracruz, Mexico, intercepted at Laredo, Texas, United States of America, on orchid plants [Asparagales: Orchidaceae].

***Laelaspis planus* (Womersley, 1956). ok**

Gymnolaelaps planus Womersley, 1956a: 583.

Laelaspis planus.— Domrow, 1957: 208.

Pseudoparasitus (*Gymnolaelaps*) *planus* .— Karg, 1978a: 206; Karg, 1981b: 218; Karg, 1989a: 335.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Mylor, South Australia, in moss.

***Laelaspis regalis* Berlese, 1920.**

Laelaspis regalis Berlese, 1920: 157.

Laelaspis regalis.— Lombardi, 1936: 43; Hunter, 1961: 675; Hunter, 1964b: 296; Hennessey & Farrier, 1988: 31.

Laelaspis cf. *regalis*.— Costa, 1966c: 74.

Laelaspis regalis.— Farrier & Hennessey, 1993: 82.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Columbia, United States of America, in moss [mentioned as muscis].

***Laelaspis seccedens* Berlese, 1920.**

Laelaspis seccedens Berlese, 1920: 158.

Laelaspis secedens.— Lombardi, 1936: 43; Hunter, 1961: 675; Halliday, 2005: 35; Joharchi et al., 2012: 2015.

Hypoaspis (*Laelaspis*) *seccedens*.— Aswegen & Loots, 1970: 196.

Hypoaspis (*Laelaspis*) *secedens*.— Karg, 1982: 249; Karg, 1989b: 120.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Somalia, on unidentified Coleptera [Coleoptera].

***Laelapis sinicus* Chang, Cheng & Yin, 1963.**

Laelaspis sinensis Bai & Gu, 1993b: 438 [Junior synonymy of *L. sinicus* by Ma, 2006: 23].

Laelaspis sinensis.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Haiyan (36.5°N, 105.6°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Laelaspis variopilus* (Greim in Hirschmann et al., 1969).**

Hypoaspis (*Laelaspis*) *variopilus* Greim in Hirschmann et al., 1969: 140.

Hypoaspis (*Holostaspis*) *variopili*.— Karg, 1993a: 154.

Hypoaspis (*Holostaspis*) *variopilis*.— Karg, 1979: 95; Karg, 1982: 247.

Laelaspis variopilus.— Joharchi et al., 2012: 2015.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, on *Tetramorium caespitum* [Hymenoptera: Formicidae].

***Laelaspis volgini* Shereef & Afifi, 1980.**

Laelaspis volgini Shereef & Afifi, 1980: 123.

Laelaspis volgini.— Zaher, 1986: 197; Nasr & Nawar, 1989b: 76; Joharchi et al., 2012: 2014.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in organic manure.

***Laelaspis vitzthumi* (Womersley, 1956).**

Gymnolaelaps vitzthumi Womersley, 1956: 584.

Laelaspis vitzthumi.— Domrow, 1957: 207; Hunter, 1961: 676; Joharchi, Halliday, Saboori & Kamali, 2011: 23.

Hypoaspis (*Laelaspis*) *vitzthumi*.— Hunter & Glover, 1968: 64.

Pseudoparasitus (*Gymnolaelaps*) *vitzthumi*.— Karg, 1978a: 206; Karg, 1981b: 218; Tenorio, 1982: 272; Tenorio et al., 1985: 301; Karg, 1989a: 334.

Gymnolaelaps vitzthumi.— Farrier & Hennessey, 1993: 74.

Pseudoparasitus vitzhumi [sic].— Shaw, 1999: 45.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Taringa, South Queensland, Australia, unspecified substrate.

NOTE: Specimens reported by Nemati et al., 2000:??, Ramezani & Nemati, 2010: ???, Joharchi et al., 2011: ??, Dehghan et al., 2011: ?? and Kazemi et al., 2011: ??? were considered by Joharchi & Halliday, 2013: 46 to belong to a different species, within *Laelaspis*.

***Laelaspis zhongweiensis* Bai & Gu, 1993.**

Laelaspis zhongweiensis Bai & Gu, 1993b: 439.

Laelaspis zhongweiensis.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Zhongwei (37.5°N, 105.1°E), Ningxia Hui Autonomous Region, China, in nest of unidentified ants [Hymenoptera: Formicidae].

***Laelaspis zuluensis* Trägårdh, 1906.**

Laelaspis zuluensis Trägårdh, 1906b: 873.

Laelaspis zuluensis.— Hunter, 1961: 675.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Umfolozi, Zululand, KwaZulu-Natal, South Africa, with *Pheidole* sp. [Hymenoptera: Formicidae] under a rock.

***Laelaspisella* Marais & Loots, 1969.**

Laelaspisella Marais & Loots, 1969: 1.

Hypoaspis (*Laelaspisella*).— Karg, 1989: 107 (in part).

Laelaspisella.— Joharchi & Halliday, 2013: 46; Karg & Schorlemmer, 2013: 194 (in part).

TYPE SPECIES: *Laelaspisella epigynialis* Marais & Loots, 1969: 4.

NOTE: This genus was originally described in Laelapinae because of morphological characteristics of the species composing it, although the behavior of those species is not typical of species of that subfamily. Karg & Schorlemmer, 2013 referred it to Hypoaspidinae.

***Laelaspisella canestrinii* (Berlese, 1892).**

Laelaps canestrinii Berlese, 1892: LXIX, 1.

Hypoaspis canestrinii.— Oudemans, 1902b: 24; Oudemans, 1903b: 129; Buitendijk, 1945: 295.

Laelaps (*Hypoaspis*) *canestrinii*.— Berlese, 1904.

Gymnolaelaps canestrinii.— Vitzthum, 1929: 25; Sellnick, 1931: 695; Costa, 1962: 491; Costa, 1966c: 74; Bhattacharyya, 1968: 539; Joharchi et al., 2011: 23.

Hypoaspis (*Gymnolaelaps*) *canestrini* [sic].— Lombardini, 1936: 42.

Laelaps canestrini [sic]; *non Laelaps*.— Tipton, 1960: 290.

Hypoaspis (*Gymnolaelaps*) *canestrinii*.— Hunter, 1967: 99; Bregetova, 1977: 523.

Pseudoparasitus (*Gymnolaelaps*) *canestrinii*.— Karg, 1981b: 218; Karg, 1989a: 334; Karg, 1993a: 135.

Laelaspisella canestrinii.— Joharchi & Halliday, 2013: 46.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Ponte Molle, Rome and Portici, Italy, in nest of unidentified ants [Hymenoptera: Formicidae].

***Laelaspisella epigynialis* Marais & Loots, 1969.**

Laelaspisella epigynialis Marais & Loots, 1969: 4.

Hypoaspis (*Laelaspisella*) *epigynialis*.— Karg, 1989: 109.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: near Maseru, Lesotho, in soil.

***Laelaspisella kabitae* (Bhattacharyya, 1968).**

Gymnolaelaps kabitae Bhattacharyya, 1968: 537.

Gymnolaelaps kabitae.— Prasad, 1974: 150.

Pseudoparasitus (*Gymnolaelaps*) *kabitae*.— Karg, 1989a: 334.

Laelaspisella kabitae.— Joharchi & Halliday, 2013: 47.

TYPE DEPOSITORY: author's collection.

TYPE LOCALITY AND HABITAT: Sonarpur, Sitala, 24 Parganas, West Bengal, India, in soil litter under decaying water cabbage, *Pistia stratiotes* [Alismatales: Araceae] at the sides of a pond.

NOTE: Specimens reported as *Pseudoparasitus* (*Gymnolaelaps*) *hospes* (Berlese) by Nemati et al., 2000: 381 were reidentified as *L. kabitae* by Joharchi & Halliday, 2013: 47.

***Laelaspisella macrodorsalis* Marais & Loots, 1969.**

Laelaspisella macrodorsalis Marais & Loots, 1969: 8.

Hypoaspis (*Laelaspisella*) *macrodorsalis*.— Karg, 1989: 110.

TYPE DEPOSITORY: Koninklijk Museum voor Midden Afrika, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Kivu, Democratic Republic of the Congo, in soil.

***Laelaspoides* Eickwort, 1966.**

Laelaspoides Eickwort, 1966: 410.

Laelaspoides.— Casanueva, 1993: 40.

TYPE SPECIES: *Laelaspoides ordwayae* Eickwort, 1966: 411.

NOTE: Reffering to *Laelaspoides ordwayae* Eickwort, 1966, Farrier & Hennessey, 1993: 87 mistakenly mentioned the supposed synonymy of *Laelaspoides* under *Pseudoparasitus* Oudemans, by confusing that genus with *Laelapsoides* Willmann. The latter had been synonymized under *Pseudoparasitus* by Evans, 1957.

***Laelaspoides ordwayae* Eickwort, 1966.**

Laelaspoides ordwayae Eickwort, 1966: 411.

Pseudoparasitus ordwayae.— Farrier & Hennessey, 1993: 87.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Lakeview Woods, Douglas, Kansas, United States of America, in nests of *Augochlorella persimilis* (Hymenoptera: Halictidae).

***Lucanaspis* Costa, 1971**

Lucanaspis Costa, 1971: 88.

TYPE SPECIES: *Lucanaspis brachypedes* Costa, 1971: 88.

***Lucanaspis brachypedes* Costa, 1971.**

Lucanaspis brachypedes Costa, 1971: 88.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Abidjan, Ivory Coast, on unidentified lucanid beetle [Coleoptera: Lucanidae].

***Meliponaspis* Vitzthum, 1930.**

Meliponaspis Vitzthum, 1930: 297.

TYPE SPECIES: *Meliponaspis debilipes* Vitzthum, 1930: 297.

***Meliponaspis debilipes* Vitzthum, 1930.**

Meliponaspis debilipes Vitzthum, 1930: 297.

TYPE DEPOSITORY: unspecified [Zoologischen Staatssammlung München, according to http://www.zsm.mwn.de/; accessed on March 6, 2014].

TYPE LOCALITY AND HABITAT: Kenya, in nest of *Melipona alinderi* [Hymenoptera: Apidae].

***Melittiphis* Berlese, 1918.**

Melittiphis Berlese, 1918: 117.

Melittiphis.— Evans, 1957: 229; Casanueva, 1993: 40; Walter et al., 2002: 132.

TYPE SPECIES: *Laelaps* (*Iphis*) *alvearius* Berlese, 1895 apud Tipton, 1960).

***Melittiphis alvearius* (Berlese, 1895).**

Laelaps (*Iphis*) *alvearius* – Berlese,1895.

Melittiphis alvearius.— Berlese, 1918: 117; Vitzthum, 1930a: 285; Tipton, 1960: 286; Evans & Till, 1966: 275; Farrier & Hennessey, 1993: 82; Knihinicki & Halliday, 1995: 323.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Italy, in nest of unidentified bees.

***Melittiphisoides* Delfinado-Baker, Baker & Flechtmann, 1984.**

Melittiphisoides Delfinado-Baker, Baker & Flechtmann, 1984: 3

Melittiphisoides.— Casanueva, 1993: 40.

TYPE SPECIES: *Melittiphisoides apiarium* Delfinado-Baker, Baker & Flechtmann, 1984: 6.

***Melittiphisoides apiarium* Delfinado-Baker, Baker & Flechtmann, 1984.**

Melittiphisoides apiarium Delfinado-Baker, Baker & Flechtmann, 1984: 6.

TYPE DEPOSITORY: Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, State of São Paulo, Brazil; acession number 1233.

TYPE LOCALITY AND HABITAT: Recife, State of Pernambuco, Brazil, in nest of *Melipona scutellaris* [Hymenoptera: Apidae].

***Mumulaelaps* Clark, 2012.**

Mumulaelaps Clark in Clark & Hawke, 2012: 189.

ETYMOLOGY: reffers to the first syllables of the Māori (Polynesian language of the indigenous Māori ethnic group of New Zealand) name mumutaua or mmutawa or mumuwaru for the adults combined with the commom root, ‘laelaps’.

TYPE SPECIES: *Mumulaelaps amnochostos* Clark, in Clark & Hawke, 2012: 193.

***Mumulaelaps ammochostos* Clark, 2012.**

Mumulaelaps ammochostos Clark in Clark & Hawke, 2012: 193.

TYPE DEPOSITORY: Canterbury Museum, Christchurch, New Zealand.

TYPE LOCALITY AND HABITAT: Southshore (43°33.668’S, 172°42.986’E), Christchurch, South Island, New Zealand, on larvae of *Pericoptus truncatus* [Coleoptera: Scarabaeidae].

***Myrmolaelaps* Trägårdh, 1906.**

Myrmolaelaps Trägårdh, 1906b: 874.

Myrmolaelaps.— Vitzthum, 1943: 764; Casanueva, 1993: 40.

TYPE SPECIES: *Myrmolaelaps equitans* Tragardh, 1906.

***Myrmolaelaps equitans* Trägårdh, 1906.**

Myrmolaelaps equitans Trägårdh, 1906b: 874.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Umfolozi, Zululand, KwaZulu-Natal, South Africa, with *Pheidole* sp. [Hymenoptera: Formicidae] under a rock.

***Myrmoleichus* Berlese, 1903.**

Myrmoleichus Berlese, 1903: 244.

Myrmoleichus.— Berlese, 1904: 434.

TYPE SPECIES: *Myrmoleichus coronatus* Berlese, 1903: 244.

***Myrmoleichus coronatus* Berlese, 1903.**

Myrmoleichus coronatus Berlese, 1903: 244.

Myrmoleichus coronatus.— Berlese, 1904: 435; Lombardi, 1936: 45.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Cison di Valmarino, Treviso, Italy, in nest of unidentified ant.

***Myrmozercon* Berlese, 1902.**

Myrmozercon Berlese, 1902: 699.

Myrmozercon.— Berlese, 1904: 444; Banks, 1915a: 80; Rosario & Hunter, 1988: 466; Walter, 2003: 81; Shaw & Seeman, 2009: 44; Joharchi et al., 2011: 28; Ghafarian et al., 2013: 22; Joharchi & Moradi, 2013: 245.

Myrmonyssus Berlese, 1903: 16 [Junior synonymy of *Myrmozercon* by Banks, 1915a: 84; Rosario & Hunter, 1988: 466; Ghafarian et al., 2013: 22].

Myrmonyssus.— Berlese, 1904: 436; Hull, 1918: 63; Baker & Strandtmann, 1948: 386; Casanueva, 1993: 40.

Myrmonyssus (*Laelaspulus*) Berlese, 1904: 437 [Junior synonymy of *Myrmozercon* by Shaw & Seeman, 2009: 54; Joharchi et al., 2011: 28; Ghafarian et al., 2013: 22; Joharchi & Moradi, 2013: 245]

Myrmonyssus (*Myrmonyssus*) Vitzthum, 1943: 764.

Laelaspulus.— Evans & Till, 1965: ???

Parabisternalis Ueckermann & Loots, 1995: 35 [Junior synonymy of *Myrmozercon* by Shaw & Seeman, 2009: 54; Joharchi et al., 2011: 28; Ghafarian et al., 2013: 22; Joharchi & Moradi, 2013: 245].

TYPE SPECIES: *Myrmozercon brevipes* Berlese, 1902, by original designation.

***Myrmozercon acuminatus* (Berlese, 1903).**

Myrmonyssus (*Laelaspulus*) *acuminatus* Berlese, 1903: 18.

Myrmonyssus acuminatus.— Berlese, 1904: 441; Vitzthum, 1930b: 89; Hull, 1918: 63; Hunter & Hunter, 1963: 336.

Myrmonyssus (*Laelaspulus*) *acuminatus*.— Donisthorpe, 1927: 214; Lombardini, 1936: 45; Schweizer, 1949: 41; Schweizer, 1961: 152.

Myrmozercon acuminatus.— Rosario & Hunter, 1988: 469; Shaw & Seeman, 2009: 54; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, on *Messor barbarus capitatus* var. *minor* [= *Messor minor*] [Hymenoptera: Formicidae].

***Myrmozercon aequalis* (Banks, 1916).**

Myrmonyssus aequalis Banks, 1916: 227.

Myrmonyssus equalis [sic].— Hunter & Hunter, 1963: 336.

Myrmozercon aequalis.— Walter, 2003: 83; Shaw & Seeman, 2009: 53; Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Devonport, Hobart and Ulverstone, Tasmania, Australia, on unidentified ants, and Bagdad, Tasmania, Australia, on thorax of *Iridomyrmex gracilis* [Hymenoptera: Formicidae].

NOTE: Vitzthum (1930b: 89) belived this species to belong to a different genus.

***Myrmozercon antennophoroides* (Berlese, 1903).**

Myrmonyssus antennophoroides Berlese, 1903: 244.

Myrmonyssus antennophoroides.— Berlese, 1904: 439; Vitzthum, 1930b: 89; Hunter & Hunter, 1963: 336.

Myrmonyssus (*Myrmonyssus*) *antennophoroides*.— Lombardini, 1936: 45.

Myrmozercon antennophoroides.— Rosario & Hunter, 1988: 469; Shaw & Seeman, 2009: 54; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Bevagna, Perugia (Umbria), Italy, on *Camponotus aethiops* [Hymenoptera: Formicidae].

***Myrmozercon beardae* Shaw & Seeman, 2009.**

Myrmozercon beardae Shaw & Seeman, 2009: 48.

Myrmozercon beardae.— Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia; accession number SAMA J11550.

TYPE LOCALITY AND HABITAT: Lucindale, South Australia, with ants (Lea Collection).

***Myrmozercon brachiatus* (Berlese, 1903).**

Myrmonyssus brachiatus Berlese, 1903: 17.

Myrmonyssus brachiatus.— Berlese, 1904: 441; Vitzthum, 1930b: 89; Hunter & Hunter, 1963: 335.

Myrmonyssus (*Myrmonyssus*) *brachiatus*.— Lombardini, 1936: 45.

Myrmozercon brachiatus.— Rosario & Hunter, 1988: 470; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, on *Messor barbarus capitatus* var. *minor* [= *Messor minor*] [Hymenoptera: Formicidae].

***Myrmozercon brevipes* Berlese, 1902.**

Myrmozercon brevipes Berlese, 1902: 700.

Myrmozercon brevipes.— Berlese, 1904: 445; Lombardini, 1936: 45; Rosario & Hunter, 1988: 470; Walter, 2003: 83; Joharchi & Moradi, 2013: 253.

Myrmozercon ovatum Karawajew, 1909: 236 [Junior synonymy by Joharchi & Moradi, 2013: 253].

TYPE DEPOSITORY: of *M. brevipes*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *M. ovatum*: unspecified.

TYPE LOCALITY AND HABITAT: of *M. brevipes*: Bevagna, Umbria, Italy, in nests of unidentified ants; of *M. ovatum*: type series; Ashkhabad, Turkmenistan, on *Myrmecocystus emergi* and *Tapinoma erraticum nigerrimum* [Hymenoptera: Formicidae].

NOTE: Ghafarian et al., 2013: 26 suspected *M. brevipes* to be the senior synonym of *M. ovatum*.

***Myrmozercon burwelli* Shaw & Seeman, 2009.**

Myrmozercon burwelli Shaw & Seeman, 2009: 44.

Myrmozercon burwelli.— Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia; accession number QMS 83733.

TYPE LOCALITY AND HABITAT: Boombana National Park (27°24'07"S, 152°47'23"E), Queensland, Australia, in nest of *Polyrhachis* (*Campomyrma*) *flavibasis* (Hymenoptera: Formicidae) in subtropical rainforest.

***Myrmozercon chapmani* (Baker & Strandtmann, 1948).**

Myrmonyssus chapmani Baker & Strandtmann, 1948: 388.

Myrmonyssus chapmani.— Hunter & Hunter, 1963: 337; Farrier & Hennessey, 1993: 82.

Myrmozercon chapmani.— Rosario & Hunter, 1988: 470; Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Laredo, Texas, United State of America, on orchid plants [Asparagales: Orchidaceae] imported from Federal District, Mexico.

***Myrmozercon clarus* (Hunter & Hunter, 1963).**

Myrmonyssus clarus Hunter & Hunter, 1963: 339.

Myrmozercon clarus.— Rosario & Hunter, 1988: 469; Joharchi & Moradi, 2013: 253.

Myrmonyssus clarus.— Farrier & Hennessey, 1993: 82.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Athens, Georgia, United States of America, with *Crematogaster clara* under thr bark of pine log [Hymenoptera: Formicidae].

***Myrmozercon crinitus* Joharchi, 2013.**

Myrmozercon crinitus Joharchi, in Joharchi & Moradi, 2013: 245.

TYPE DEPOSITORY: Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Yazd, Iran.

TYPE LOCALITY AND HABITAT: 1550 m above sea level, Alborz, Karaj (35°48'N, 50°59'E), Iran, on *Pheidole pallidula* (Hymenoptera: Formicidae).

***Myrmozercon cyrusi* Ghafarian & Joharchi, 2013.**

Myrmozercon cyrusi Ghafarian & Joharchi, in Ghafarian et al., 2013: 23.

Myrmozercon cyrusi.— Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Acarological collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Yazd, Iran.

TYPE LOCALITY AND HABITAT: 945 m above sea level, Kenevist Rural District (36.97'N, 59.68'E), Central District, Mashhad, Khorasan Razavi, Iran, in nest of *Monomorium* sp. [Hymenoptera: Formicidae].

***Myrmozercon diplogenius* (Berlese, 1903).**

Myrmonyssus diplogenius Berlese, 1903: 16.

Myrmonyssus diplogenius.— Berlese, 1904: 438; Vitzthum, 1930b: 89; Baker & Strandtmann, 1948: 388; Hunter & Hunter, 1963: 335.

Myrmonyssus (*Myrmonyssus*) *diplogenius*.— Lombardini, 1936: 45.

Myrmozercon diplogenius.— Rosario & Hunter, 1988: 469; Shaw & Seeman, 2009: 54; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Portici, Naples, Italy, on *Camponotus aethiops* [Hymenoptera: Formicidae].

***Myrmozercon eidmanni* (Sellnick, 1941).**

Myrmonyssus eidmanni Sellnick, 1941: 221.

Myrmonyssus eidmanni.— Hunter & Hunter, 1963: 336.

Myrmozercon eidmanni.— Rosario & Hunter, 1988: 470; Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Botonós, Bioko (= Fernando Poo), Equatorial Guinea, in nest of *Crematogaster impressa* [Hymenoptera: Formicidae].

***Myrmozercon flexuosus* (Michael: 1891).**

Laelaps flexuosa Michael: 1891: 650.

Myrmonyssus ? *flexuosus*.— Berlese, 1904: 440.

Laelaps flexuosa; *non Laelaps*.— Tipton, 1960: 294.

Myrmonyssus ? *flexuosa***.—** Hunter & Hunter, 1963: 337.

Laelaspulus flexuosus.— Evans & Till, 1965: ???

Myrmozercon flexuosus.— Shaw & Seeman, 2009: 55; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: near Innsbruck, Tyrol, Austria, in nests of *Camponotus herculeanus* [Hymenoptera: Formicidae].

***Myrmozercon iainkayi* Walter, 2003.**

Myrmozercon iainkayi Walter, 2003: 83.

Myrmozercon iainkayi.— Shaw & Seeman, 2009: 51; Joharchi & Moradi, 2013: 252.

TYPE DEPOSITORY: University of Queensland Insect Collection, Department of Zoology & Entomology, The University of Queensland, Saint Lucia, Queensland, Australia.

TYPE LOCALITY AND HABITAT: Bundaberg, Queensland, Australia, in arboreal leaf nest of *Polyrachis* sp. (Hymenoptera: Formicidae).

***Myrmozercon karajensis* Joharchi, Halliday, Saboori & Kamali, 2011.**

Myrmozercon karajensis Joharchi, Halliday, Saboori & Kamali, 2011: 29.

Myrmozercon karajensis.— Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran.

TYPE LOCALITY AND HABITAT: 1880 m above sea level, Karaj, Iran (35°55'N, 51°04'E), in nest of *Camponotus* sp. [Hymenoptera: Formicidae].

***Myrmozercon liguricus* (Vitzthum, 1930).**

Myrmonyssus liguricus Vitzthum, 1930b: 90.

Myrmonyssus liguricus.**—** Sellnick, 1941: 221; Hunter & Hunter, 1963: 336.

Myrmozercon liguricus.— Rosario & Hunter, 1988: 470; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Santa Margherita Ligure, Genova, Italy, on adults of *Crematogaster* (*Acrocoelia*) *scutellaris* [Hymenoptera: Formicidae] on *Castanea vesca* [Fagales: Fagaceae].

***Myrmozercon michaeli* Joharchi, 2013.**

Myrmozercon crinitus Joharchi, in Joharchi & Moradi, 2013: 248.

TYPE DEPOSITORY: Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Yazd, Iran.

TYPE LOCALITY AND HABITAT: 2422 m above sea level, Damavand Mountain (35°52'N, 52°07'E), Iran, in nest of *Messor* sp.[Hymenoptera: Formicidae].

***Myrmozercon minor* (Sellnick, 1941) n. comb..**

Myrmonyssus minor Sellnick, 1941: 225.

Myrmonyssus minor.— Hunter & Hunter, 1963: 337.

Myrmozercon minor.— Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Botonós, Bioko (= Fernando Poo), Equatorial Guinea, in nest of *Crematogaster impressa* [Hymenoptera: Formicidae].

***Myrmozercon rotundiscutum* Rosario & Hunter, 1988.**

Myrmozercon rotundiscutum Rosario & Hunter, 1988: 469.

Myrmozercon rotundiscutum.— Farrier & Hennessey, 1993: 83; Shaw & Seeman, 2009: 53; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: National Museum of Natural History, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: 2135 m above sea level, Dismal Swamo, Elmore, Idaho, United State of America, on *Camponotus* sp. [Hymenoptera: Formicidae].

***Myrmozercon scutellatus* (Hull, 1923).**

Myrmonyssus scutellatus Hull, 1923: 611.

Myrmonyssus scutellatus.— Hunter & Hunter, 1963: 336.

Myrmozercon scutellatus.— Rosario & Hunter, 1988: 470; Walter, 2003: 83; Shaw & Seeman, 2009: 53; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Forel, Western Australia, Australia, with *Iridomyrmex innocens* [Hymenoptera: Formicidae].

***Myrmozercon spinosus* (Hunter & Hunter, 1963).**

Myrmonyssus spinosus Hunter & Hunter, 1963: 337.

Myrmozercon spinosus.— Rosario & Hunter, 1988: 469; Joharchi & Moradi, 2013: 253.

Myrmonyssus spinosus.— Farrier & Hennessey, 1993: 83.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Lawrence, Kansas, United States of America, in nest of *Crematogaster* sp. [Hymenoptera: Formicidae].

***Myrmozercon sternalis* Babaeian, Joharchi & Saboori, 2013.**

Myrmozercon sternalis Babaeian, Joharchi & Saboori, 2013: 454.

TYPE DEPOSITORY: Acarological Collection, Jalal Afshar Zoological Museum, Faculty of Agriculture, University of Tehran, Karaj, Iran.

TYPE LOCALITY AND HABITAT: 1124 m above sea level, Najm Abad (35°52'N, 50°30'E), Karaj, Iran, in nest of *Formica* sp. (Hymenoptera: Formicidae).

***Myrmozercon tauricus* Trach & Khaustov, 2011.**

Myrmozercon tauricus Trach & Khaustov, 2011: 23.

Myrmozercon tauricus.— Joharchi & Moradi, 2013: 250.

TYPE DEPOSITORY: Museum of Zoology, I. I. Mechnikov National University of Odessa, Odessa, Ukraine; accession number 19-02-2000/01.

TYPE LOCALITY AND HABITAT: "Cape Martyan" Nature Reserve, Crimea, Ukraine, in nest of *Crematogaster schmidti* (Hymenoptera: Formicidae) under bark of *Pinus pallasiana* [Pinales: Pinaceae].

***Myrmozercon titan* (Berlese, 1916).**

Myrmonyssus titan Berlese, 1916b: 171.

Myrmonyssus titan.— Vitzthum, 1930b: 89; Hunter & Hunter, 1963: 336.

Myrmonyssus (*Myrmonyssus*) *titan*.— Lombardini, 1936: 45.

Myrmozercon titan.— Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, associated with unidentified ants [Hymenoptera].

***Myrmozercon yemeni* (Ueckermann & Loots, 1995).**

Parabisternalis yemeni Ueckermann & Loots, 1995: 36.

Myrmozercon yemeni.— Trach & Khaustov, 2011: 26; Joharchi & Moradi, 2013: 253.

TYPE DEPOSITORY: National Collection of Acari, Plant Protection Research Institute, Pretoria, South Africa.

TYPE LOCALITY AND HABITAT: Al Kowd (13.23°N, 44.07°E), Yemen, from malaise trap.

***Neoberlesia* Berlese, 1892.**

Neoberlesia Berlese, 1892: fasc. LXII, n. 5.

Neoberlesia.— Berlese, 1904: 442; Casanueva, 1993: 40.

TYPE SPECIES: *Neoberlesia equitans* Berlese, 1892: fasc. LXII, n. 5.

***Neoberlesia equitans* Berlese, 1892.**

Neoberlesia equitans Berlese, 1892: LXII, 5.

Neoberlesia equitans.— Berlese, 1904: 443.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Neapolim, Portici, Italy, in ant nest and on unidentified ants [Hymenoptera: Formicidae].

***Neohypoaspis* Delfinado, Baker & Roubik, 1983.**

Neohypoaspis Delfinado-Baker, Baker & Roubik, 1983: 197.

Neohypoaspis.— Casanueva, 1993: 40.

TYPE SPECIES: *Neohypoaspis ampliseta* Delfinado-Baker, Baker&Roubik, 1983: 197.

***Neohypoaspis ampliseta* Delfinado-Baker, Baker & Roubik, 1983.**

Neohypoaspis ampliseta Delfinado-Baker, Baker & Roubik, 1983: 197.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number USNM 4056.

TYPE LOCALITY AND HABITAT: 22 km northeast of Chepo, Panama, Panama, in nest of *Trigona* (*Trigona*) *hypogea* [Hymenoptera: Apidae].

***Ololaelaps* Berlese, 1904.**

Laelaps (*Hypoaspis*).— Berlese, 1903: 14 (in part), Berlese, 1904: 405.

Ololaelaps Berlese, 1904: 260.

Ololaelaps.— Sellnick, 1940: 66; Evans, 1957: 220; Ryke, 1962: 124; Bregetova & Koroleva, 1964: 62; Evans & Till, 1966: 228; Bregetova, 1977: 536; Zaher, 1986: 178; Casanueva, 1993: 40, Karg, 2000: 248.

Laelaps.— Ewing, 1909: 64 (in part).

Ololaelaps (*Ololaelaps*).— Vitzthum, 1941: 763; Karg, 2000: 248.

Laelaps (*Ololaelaps*).— Silvestri, 1918-19

Pseudoparasitus (*Ololaelaps*).— Karg, 1978a: 205; Karg, 1981b: 210; Karg, 1993a: 133 .

Hypoaspis Berlese, 1903: 14 (non *Hypoaspis* Canestrini).— Evans & Till, 1966: 228; Zaher, 1986: 178.

Pristolaelaps Womersley, 1956a: 571 [Junior synonymy of *Ololaelaps* by Ryke, 1962: 124; Bregetova & Koroleva, 1964: 64; Evans & Till, 1966: 228; Bregetova, 1977: 536; Zaher, 1986: 178].

Ololaelaps (*Pristolaelaps*).— Karg, 2000: 248.

TYPE SPECIES: *Hypoaspis venetus* Berlese, 1902 apud Berlese, 1903.

NOTE: Evans, 1957: 220 presumed *Hyletastes* Gistel, 1848 [mentioned as *Hyletastea* Gistel, 1884] to be a possible junior synonymy of *Ololaelaps*.

***Ololaelaps bregetovae* Shereef & Soliman, 1980.**

Ololaelaps bregetovae Shereef & Soliman, 1980: 81.

Ololaelaps bregetovae.— Zaher, 1986: 179, El-Banhawy et al., 2006: 66.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in debris.

***Ololaelaps burdwanensis* Bhattacharyya, 1978.**

Ololaelaps burdwanensis Bhattacharyya, 1978: 86.

TYPE DEPOSITORY: presumabiily at Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: Burdwan, West Bengal, India, in soil under grass beside pond.

***Ololaelaps caucasicus* Bregetova & Koroleva, 1964.**

Ololaelaps caucasicus Bregetova & Koroleva, 1964: 73.

Ololaelaps caucasica.— Bregetova, 1977: 539.

TYPE DEPOSITORY: Zoological Institute of the Academy of Science of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series, vicinity of Kizlyar, Dagestan, Russia, on fallen rotting foliage of *Elaeagnus* [Plantae: Elaeagnaceae] thickets, and Erevan, Armenia, in litter under an ash tree.

***Ololaelaps dililoensis* Marais & Loots, 1972.**

Ololaelaps dililoensis Marais & Loots, 1972: 31.

Ololaelaps dililoensis.— Jordaan & Loots, 1987: 49.

TYPE DEPOSITORY: Koninklijk Museum voor Midden-Afrika, Tervuren, Belgium.

TYPE LOCALITY AND HABITAT: Eala, Democratic Republic of the Congo (= Congo), in soil.

***Ololaelaps formidabilis* Berlese, 1913.**

Ololaelaps formidabilis Berlese, 1913: 82.

Ololaelaps formidabilis.— Lombardini, 1936: 45; Ryke, 1962: 126.

Pseudoparasitus (*Ololaelaps*) *formidabilis*.— Karg, 1978a: 210; Karg, 1981b: 211.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Samarang, Java, Indonesia, unspecified substrate.

***Ololaelaps gamagarensis* Jordaan & Loots, 1987.**

Ololaelaps gamagarensis Jordaan & Loots, 1987: 49.

TYPE DEPOSITORY: Zoology Department, Potchefstroom University for Cristian Higher Education, Potchefstroom, South Africa.

TYPE LOCALITY AND HABITAT: on the banks of the Gamagara River, Sishen, Northern Cape, South Africa, in soil underneath grasses and reeds.

***Ololaelaps haemisphaericus* Berlese, 1916.**

Ololaelaps (*Cypholaelaps*) *haemisphaericus* Berlese, 1916b: 166.

Ololaelaps (*Cypholaelaps*) *haemisphaericus*.— Lombardini, 1936: 45.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, unspecified substrate.

***Ololaelaps hemisphaerus* Berlese, 1916.**

Ololaelaps hemisphaera Berlese, 1916c: 303.

Ololaelaps hemisphaera.— Ryke, 1962: 125; Hennessey & Farrier, 1988: 32.

Pseudoparasitus (*Ololaelaps*) *hemisphaerus*.— Karg, 1978a: 210; Karg, 1981b: 211; Karg, 1993a: 134.

Pseudoparasitus hemisphaerus.— Karg, 1994: 186.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Columbia, United States of America, in litter.

NOTE: Ryke, 1962: 125 mistakenly mentioned Sellnick (1940) as having redescribed *Ololaelaps hemisphaera* Berlese, 1916 as *Ololaelaps haemisphaericus*, when Sellnick (1940) actually redescribed *O. haemisphaericus* Koch.

***Ololaelaps holaspis* (Oudemans, 1902).**

Hypoaspis holaspis Oudemans, 1902: 53.

Hypoaspis holaspis.— Buitendijk, 1945: 296.

Ololaelaps holaspis.— Ryke, 1962: 126.

Pseudoparasitus (*Ololaelaps*) *holaspis*.— Karg, 1978a: 211; Karg, 1981b: 211; Karg, 1993a: 134.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Europe, unspecified substrate.

***Ololaelaps interruptus* (Karg, 1994) n. comb..**

Pseudoparasitus interruptus Karg, 1994: 186.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 620 m above sea level, Cerro Bandera, 4 km northeast of Santa Rosa, Santa Cruz, Galapagos Islands, in litter of *Miconia* sp. (Plantae: Melastomataceae) in a cave.

***Ololaelaps leptochelae* (Karg, 1994) n. comb..**

Pseudoparasitus leptochelae Karg, 1994: 187.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Puntudo, Santa Cruz, Galapagos Islands, in moist litter, Pteridophyta-Cyperaceae zone.

***Ololaelaps moderatus* (Silvestri, 1918). – não é Ololaelaps**

Laelaps (?*Ooloelaps*) [sic] *moderatus* Silvestri, 1918: 12.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Thiès, Senegal, in nest of *Eutermes trinervius* [Isoptera: Termitidae].

***Ololaelaps mooiensis* Ryke, 1962.**

Ololaelaps mooiensis Ryke, 1962: 126.

Ololaelaps mooiensis.— Marais & Loots, 1972: 34; Jordaan & Loots, 1987: 49; Halliday, 2005: 36.

Pseudoparasitus (*Ololaelaps*) *mooiensis*.— Karg, 1978a: 210; Karg, 1981b: 211.

TYPE DEPOSITORY: Institute for Zoological Research, Potchefstroom University, South Africa.

TYPE LOCALITY AND HABITAT: Mooi River, Potchefstroom, South Africa, in wet top soil layer.

***Ololaelaps nasri* Hassan, 1989.**

Ololaelaps nasri Hassan, 1989: 593.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Kafr Shokr, Qualiobia, Egypt, in litter under citrus trees.

***Ololaelaps obovatus* (Womersley, 1960) n. comb..**

Pristolaelaps obovata Womersley, 1960: 33.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Koroit, Victoria, Australia, unspecified substrate.

***Ololaelaps paratasmanicus* Ryke, 1962.**

Ololaelaps paratasmanicus Ryke, 1962: 127.

Ololaelaps paratasmanicus.— Spain & Luxton, 1971: 186.

Pseudoparasitus (*Ololaelaps*) *paratasmanicus*.— Karg, 1978a: 211; Karg, 1981b: 211.

TYPE DEPOSITORY: Arachnida Section, British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Allan's Bay, Dunedin, New Zealand, in bracken [Plantae: Dennstaedtiaceae].

***Ololaelaps placentula* (Berlese, 1887).**

Laelaps placentula Berlese, 1887: XLIV, 3.

Laelaps placentula.— Berlese, 1892: 35.

Hypoaspis placentula.— Oudemans, 1902b: 23; Oudemans, 1903b: 129; Buitendijk, 1945: 296.

Laelaps (*Hypoaspis*) *placentula*.— Berlese, 1903: 14.

Ololaelaps placentula.— Berlese, 1904: 261, Hull, 1918: 66; Sellnick, 1940: 69; Cooreman, 1943: 24; Bregetova & Koroleva, 1964: 70; Lapina, 1976: 58; Bregetova, 1977: 539; Ryke, 1962: 125; Evans & Till, 1966: 235; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 120.

Ololaelaps confinis Berlese, 1904: 261 [Junior synonymy by Ryke, 1962: 125; Evans & Till, 1966: 235; Luxton, 1998: 20].

Laelaps (*Ololaelaps*) *confinis*.— Halbert, 1915: 70.

Ololaelaps confinis.— Hull, 1918: 66; Lombardini, 1936: 45.

Laelaps placentula; *non Laelaps*.— Tipton, 1960: 304.

Pseudoparasitus (*Ololaelaps*) *placentulus*.— Karg, 1978a: 210; Karg, 1981b: 211; Karg, 1993a: 134.

Ololaelaps placentulus.— Farrier & Hennessey, 1993: 83.

TYPE DEPOSITORY: of *L. placentula* and *O. confinis*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: of *L. placentula*: Vallombrosa, Florence, Italy, in moss [mentioned as “muscis”]; of *O. confinis*: Norway, unspecified substrate.

NOTES: (a) Oudemans, 1902c: 289 considered this species to be the senior synonym of *Laelaps placentula* Berlese. Subsequent authors considered them to be different species. The latter interpretation is adopted in this publication. (b) Oudemans, 1906: 99 considered this species to be a junior synonymy of *Iphis pyrobolus* Koch, 1839 (designated by Berlese, 1903 as type species of *Eviphis*, Eviphididae), and also a synonym of *Iphis haemisphaericus* Koch, 1839 (designated by Berlese, 1914 as type species of *Periphis* Berlese, junior synonymy of *Stylochyrus* Canestrini & Canestrini, Ologamasidae). The usage of the name *I. haemisphaericus* is very confusing, as discussed by Bregetova & Koroleva, 1964: 63; they thus proposed *Ololaelaps sellnicki* for specimens referred as *O. haemisphaericus* by Franz & Beier, 1948; Willmann, 1949a: 116, 1950, 1952, 1954, 1956, Halaskova & Kunst, 1961, all *sensu* Sellnick, 1940: 69. The latter interpretation is adopted in this publication. That name should not be mistaken by *Ololaelaps* (*Cypholaelaps*) *haemisphaericus* Berlese, 1916: 166.

***Ololaelaps placidus* (Banks, 1895).**

Laelaps placidus Banks, 1895: 128.

Hypoaspis venetus Berlese, 1903: 14 [Junior synonymy of *O. placidus* by Hennessey & Farrier, 1988: 32].

Ololaelaps venetus – Berlese, 1904: 260; Hull, 1918: 66; Balogh, 1938: ???, Schweizer, 1949: 41; Franz, 1950: ???, Haarlov, 1957: ???, Ryke, 1962: 125; Domocoş, 1969: 112.

Laelaps placidus.— Banks, 1907: 610.

Laelaps magnichela Ewing, 1909: 65 [Junior synonymy of *O. placidus* by Hennessey & Farrier, 1988: 32; Farrier & Hennessey, 1993: 84].

Laelaps flavus Ewing, 1909: 66 [Junior synonymy of *O. placidus* by Hennessey & Farrier, 1988: 32; Farrier & Hennessey, 1993: 84].

Laelaps (*Ololaelaps*) *tumidulus*.— Halbert, 1915: 70.

Laelaps flavus; *non Laelaps*.— Tipton, 1960: 294.

Laelaps tumidulus; *non Laelaps*.— Tipton, 1960: 309.

Laelaps placidus; *non Laelaps*.— Tipton, 1960: 304.

Laelaps venetus; *non Laelaps*.— Tipton, 1960: 309.

Ololaelaps halaskovae Bregetova & Koroleva, 1964: 81 [Junior synonymy of *O. veneta* by Evans & Till, 1966: 231; Bregetova, 1977: 541].

Ololaelaps veneta.— Evans & Till, 1966: 231; Bregetova, 1977: 541; Luxton, 1998: 20; Gwiazdowicz & Klemt, 2004: 14; Ren & Guo, 2008: 329.

Ololaelaps venetus.— Domocoş, 1969: 112.

Ololaelaps halaškovae.— Lapina, 1976: 62.

Pseudoparasitus (*Ololaelaps*) *venetus*.— Karg, 1978a: 209; Karg, 1981b: 210; Karg, 1993a: 133.

Ololaelaps placidus.— Hennessey & Farrier, 1988: 32; Farrier & Hennessey, 1993: 84.

Ollaelaps [sic] *veneta*.— Gwiazdowicz & Gulvik, 2005: 120.

TYPE DEPOSITORY: of *L. placidus*: unspecified; of *H. veneta*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *L. magnichela* and *L. flavus*: Illinois State Laboratory of Natural History, Urbana, Illinois, United States of

America; of *O. halaskovae*: Zoological Institute of the Academy of Science of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT of *L. placidus*: near Roslyn, Long Island, New York, United States of America, on wet sphagnum; of *H. veneta*: unspecified; of *L. magnichela*: Muncie, Illinois, United States of America, in moss; of *L. flavus*: Arcola, Illinois, United States of America, under logs; of *O. halaskovae*: vicinity of Sablino, Pribytkovo, Leningrand Oblast, Russia, in a spruce forest in moss, on the roots of old stumps; vicinity of Sitenki village, Luga region, Leningrand Oblast, Russia, in moist moss in a damp mixed forest; Sharshada, former Krasnoborskii region, Tatar ASSR, Leningrand Oblast, Russia, in the soil on a floodland meadow; Usady, Pestretsy region, Leningrand Oblast, Russia, in the surface layer of a long-fallow field; Zakarpatskaya Oblast, Ukraine, in nests of *Microtus arvalis* [Rodentia: Cricetidae] and *Apodemus agrarius* [Rodentia: Muridae]; vicinity of Egorovka village, former Sanzheriiskii region, Moldavia, on *Mus musculus* [Rodentia: Muridae] in a field; Kislovodsk, Russia, in moss on a stone on a steppe; Derg-Kokh village, North Ossetia, on turf in pastures on floodland of Terek River; Ilimsk, Irkutsk oblast, Russia, in litter layer in a mixed forest; Yakimovka village, Zhigalovo region, Russia, in litter layer in a spruce forest; interfluves of the Malaya Pyara and Érgera Rivers, Svobodnyy region, Amurskaya Oblast, Russia, on *Clethrionomys rufocanus* [Rodentia: Cricetidae].

NOTES: (a) *Hypoaspis venetus* Berlese was described based on the specimens reported by Berlese, 1889: LIV, 5 as *Laelaps tumidulus* (K.), sensu Canestrini & Canestrini, 1882: 70. The type specimens of *Gamasus tumidulus* Koch were considered by Berlese, 1903b: 14 to correspond to the female of *Gamasus calcaratus* Koch, whose holotype was a male. *Ololaelaps venetus* was reported as *Hypoaspis tumidulus* by Canestrini, 1885: 87; Oudemans, 1902b: 23; Oudemans, 1903b: 129; Buitendijk, 1945: 297. (b) Specimens reported by Halaskova & Kunst, 1961: 24 as *Ololaelaps* sp. were identified as *O. halaskovae* by Bregetova & Koroleva, 1964. (c) According to Bregetova & Koroleva, 1964, *O. venetus* could be the senior synonym of *O. sellnick*i.

***Ololaelaps sitalaensis* Bhattacharyya, 1978.**

Ololaelaps sitalaensis Bhattacharyya, 1978: 84.

TYPE DEPOSITORY: presumabiily at Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: Sonarpur, Sitala, 24 Parganas, West Bengal, India, in litter under decaying *Pistia striatotes* at margin of pond [Alismatales: Araceae].

***Ololaelaps platensis* Berlese, 1916.**

Ololaelaps platensis Berlese, 1916b: 166.

Ololaelaps platensis.— Lombardini, 1936: 45; Ryke, 1962: 125.

Pseudoparasitus (*Ololaelaps*) *platensis*.— Karg, 1978a: 210; Karg, 1981b: 211; Karg, 1993b: 269.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, unspecified substrate.

***Ololaelaps rectagoni* (Karg, 1993) n. comb..**

Pseudoparasitus (*Ololaelaps*) *rectagoni* Karg, 1993b: 269.

Pseudoparasitus rectagoni.— Karg, 1994: 188.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: San Christobal, South of Wrack Bay, Galapagos Islands, in moist and salty litter.

***Ololaelaps sellnicki* Bregetova & Koroleva, 1964.**

Ololaelaps sellnicki Bregetova & Koroleva, 1964: 77.

Ololaelaps haemisphaericus.— Sellnick, 1940: 69; Franz & Beier, 1948; Willmann, 1949a: 116, 1950, Willmann, 1952a: 146; 1954, 1956, Halaskova & Kunst, 1961, Reitblat, 1963: 75.

Ololaelaps sellnicki.— Evans & Till, 1966: 231; Solomon, 1968a: 675; Beron, 1974: 175; Lapina, 1976: 62; Bregetova, 1977: 541.

Pseudoparasitus (*Ololaelaps*) *sellnicki*.— Karg, 1978a: 209; Karg, 1981b: 211; Karg, 1993a: 134.

Ololaelaps sellnicki.— Farrier & Hennessey, 1993: 84.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Vir'ma village, Belomorskii industrial region, Gulf of Onega, Coast of the White Sea, on *Fucus* sp. [Algae]

NOTES: (a) This species was described based on specimens identified by Sellnick, 1940 as *O. haemisphaericus* Koch, 1839. (b) According to Bregetova & Koroleva, 1964, *O. venetus* could be the senior synonym of *O. sellnick*i. (c) It is here understood that Reitblat, 1963: 75 was referring to *O. sellnicki*, a species name assigned by Bregetova & Koroleva, 1964: 77 to *O. haemisphaericus sensu* Sellnick, 1940. (d) Ryke, 1962: 125 mistakenly mentioned Sellnick (1940) as having redescribed *Ololaelaps hemisphaera* Berlese, 1916 as *Ololaelaps haemisphaericus*, when Sellnick (1940) actually redescribed *O. haemisphaericus* Koch.

***Ololaelaps sinensis* Berlese, 1923.**

Ololaelaps venetus var. *sinensis* Berlese, 1923: 252.

Ololaelaps sinensis.— Ryke, 1962: 126; Bai et al., 1996: 74.

Pseudoparasitus (*Ololaelaps*) *sinensis*.— Karg, 1978a: 210; Karg, 1981b: 211.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: near Beijing, China, unspecified substrate.

***Ololaelaps tasmanicus* (Womersley, 1956).**

Pristolaelaps tasmanicus Womersley, 1956a: 571.

Pristolaelaps tasmanicus.— Womersley, 1960: 35.

Ololaelaps tasmanicus.— Ryke, 1962: 126; Bhattacharyya, 1978: 86; Farrier & Hennessey, 1993: 84.

Pseudoparasitus (*Ololaelaps*) *tasmanicus*.— Karg, 1978a: 211; Karg, 1981b: 211; Tenorio, 1982: 271; Tenorio et al., 1985: 301.

TYPE DEPOSITORY: South Australian Museum, Adelaide, Australia.

TYPE LOCALITY AND HABITAT: Tasmania, intercepted at Burnley Plant Research Laboratory, Burnley, Victoria, Australia, on strawberry plants.

***Ololaelaps translineatus* (Barilo, 1991) n. comb..**

Pseudoparasitus (*Ololaelaps*) *translineatus* Barylo, 1991: 15.

TYPE DEPOSITORY: Institute of Zoology, Kiev, Ukraine; accession number G-79.

TYPE LOCALITY AND HABITAT: Baisun, Surkhan-Darja, Uzbekistan, in turf of park land.

***Ololaelaps ussuriensis* Bregetova & Koroleva, 1964.**

Ololaelaps ussuriensis Bregetova & Koroleva, 1964: 75.

Ololaelaps ussuriensis.— Bregetova, 1977: 539; Bai et al., 1996: 74; Ren & Guo, 2008: 329.

TYPE DEPOSITORY: Zoological Institute of the Academy of Science of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series, Lesozavodsk and Pokrovka, Primorsky Territory, Russia, on *Apodemus agrarius* [Rodentia: Muridae]; Pad'Buyanikha, Russia, in nest of *Microtus fortis* [Rodentia: Cricetidae]; Ussuriysk, Russia, on *Cricetulus barabensis* [Rodentia: Cricetidae] and on *A. agrarius*; Kraskino, Russia, on *M. fortis*; Russkiy Island, Russia, in nest of *M. fortis*.

***Ololaelaps wangi* Bai, Gu & Wang, 1996.**

Ololaelaps wangi Bai, Gu & Wang, 1996: 74.

TYPE DEPOSITORY: Institute of Endemic Disease Control, Ningxia Hui Autonomous Region, China.

TYPE LOCALITY AND HABITAT: Southern Yinchuan suburb (38.5°N, 106.3°E), Ningxia Hui Autonomous Region, China, on decaying *Zea mags* [sic; probably *Zea mays*] [Poales: Poaceae].

***Oloopticus* Karg, 1978.**

Pseudoparasitus (*Oloopticus*) Karg, 1978a: 207.

Pseudoparasitus (*Oloopticus*).— Karg, 1981b: 210; Karg, 1993a: 133.

Oloopticus.— Karg, 2000: 248; Karg & Schorlemmer, 2013: 196.

TYPE SPECIES: *Oloopticus costalis* Karg, 1978a: 207.

***Oloopticus africanus* Karg & Schorlemmer, 2013.**

Oloopticus africanus Karg & Schorlemmer, 2013: 200.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Morogoro, Tanzania, in litter.

NOTE: Species described based on specimen identified by Athias-Henriot, 1969 as "genre? (Pachylaelapidae)".

***Oloopticus brevispiculae* Karg, 2006.**

Oloopticus brevispiculae Karg, 2006: 151.

Oloopticus brevispiculae.— Karg, 2003a: 28 (*nomen nudum*).

Ollopticus brevispiculae.— Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near La Mana, Ecuador, in litter.

***Oloopticus costalis* Karg, 1978.**

Pseudoparasitus (*Oloopticus*) *costalis* Karg, 1978a: 207.

Pseudoparasitus (*Oloopticus*) *costalis*.— Karg, 1981b: 210; Karg, 1997b: 42.

Oloopticus costalis.— Karg, 2003a: 28; Karg, 2003b: 236; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Zoologischen Abteilung des Ungarischen Naturwissenschaftlichen Museums, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Norquinco, Epuyen and El Bolson, Argentina, in litter and grass.

***Oloopticus gradulus* Karg, 2003.**

Oloopticus gradulus Karg, 2003b: 236.

Oloopticus gradulus.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 201.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Tenatol, Ecuador, in litter of a cocoa plantation.

***Oloopticus longospinosus* Karg, 2000.**

Oloopticus longospinosus Karg, 2000: 250.

Oloopticus longospinosus.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near La Libertad, Imbabura, Ecuador, on grass.

***Oloopticus nudus* Karg, 2000.**

Oloopticus nudus Karg, 2000: 250.

Oloopticus nudus.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: La Selva, Heredia, Costa Rica, in soil.

***Oloopticus parvioculus* Karg, 2000.**

Oloopticus parvioculus Karg, 2000: 249.

Oloopticus parvioculus.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Forest at Rio Guajalito, Pichinca (probably Pichincha), Ecuador, in soil with roots.

***Oloopticus pinguis* (Karg, 1997).**

Pseudoparasitus (*Oloopticus*) *pinguis* Karg, 1997b: 42.

Oloopticus pinguis.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museums für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Otavalo, Imbabura, Ecuador, in moss on trees.

***Oloopticus pulcher* Karg, 2003.**

Oloopticus pulcher Karg, 2003a: 29.

Oloopticus pulcher.— Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Staatlichen Museum für Naturkunde Görlitz, Görlitz, Germany.

TYPE LOCALITY AND HABITAT: near Calderon, Ecuador, in litter of bamboo forest.

***Oloopticus reticulatus* Karg, 1978.**

Pseudoparasitus (*Oloopticus*) *reticulatus* Karg, 1978a: 207.

Pseudoparasitus (*Oloopticus*) *reticulatus*.— Karg, 1981b: 210; Karg, 1997b: 42.

Oloopticus reticulatus.— Karg, 2003a: 28; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Zoologischen Abteilung des Ungarischen Naturwissenschaftlichen Museums, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 5 km south of Epuyen, near the main road to Cholila, Argentina, in litter.

***Oloopticus retiventer* Karg, 2000.**

Oloopticus retiventer Karg, 2000: 250.

Oloopticus retiventer.— Karg, 2003a: 29; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: La Selva, Heredia, Costa Rica, in soil.

***Oloopticus sulcus* Karg, 2003.**

Oloopticus sulcus Karg, 2003b: 235.

Oloopticus sulcus.— Karg, 2003a: 29; Karg, 2006: 152; Karg & Schorlemmer, 2013: 202.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Quito, Pichinca (probably Pichincha), Ecuador, in soil and litter in irrigation canal.

***Pneumolaelaps* Berlese, 1920.**

Hypoaspis (*Pneumolaelaps*) Berlese, 1920: 151; Vitzthum, 1941: 762; Evans, 1957: 231; Schweizer, 1961: 150; Evans & Till, 1966: 160, Aswegen & Loots, 1970: 207; Bregetova, 1977: 514; Karg, 1979: 88; Karg, 1982: 243; Karg, 1984: 38; Karg, 1989: 107; Karg, 1993a: 136; Fariji et al., 2008: 208.

Hypoaspis.— Hull, 1918: 67 (in part); Hughes, 1948: 129 (in part); Hughes, 1976: 292 (in part); Karg, 1979: 66 (in part); Karg, 1993a: 135 (in part).

Pneumolaelaps.— Vitzthum, 1929: 22; Hunter, 1966b: 357; Hunter & Husband, 1973: 77; Rosario, 1981: 68; Casanueva, 1993: 40; Karg & Schorlemmer, 2013: 203.

Qinghailaelaps Gu & Yang, 1984: ??? [Junior synomy of *Pneumolaelaps* by Ma, 2006: 23].

TYPE SPECIES: *Iphis bombicolens* G.&R. Canestrini, 1885: 96.

***Pneumolaelaps aequalipilus* Hunter, 1966.**

Pneumolaelaps aequalipilus Hunter, 1966b: 360.

Pneumolaelaps aequalipilus.— Hunter & Husband, 1973: 78; Farrier & Hennessey, 1993: 85.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Athens, Georgia, United States of America, on *Bombus pennsylvanicus* [Hymenoptera: Apidae].

***Pneumolaelaps antipai* (Solomon, 1968) n. comb..**

Hypoaspis antipai Solomon, 1968b: 663.

Hypoaspis (*Pneumolaelaps*) *antipai*.— Karg, 1979: 89; Karg, 1982: 244; Karg, 1993a: 147.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Jijila, Dobruja, Romania, on *Crocidura suaveolens* [Soricomorpha: Soricidae].

NOTE: Karg, 1979: 88; Karg, 1982: 244 and Karg, 1993a: 147 suspected this species to be a senior synonym of *Hypoaspis grandiporus* Greim, 1969.

***Pneumolaelaps arctos* (Karg, 1984).**

Hypoaspis (*Pneumolaelaps*) *arctos* Karg, 1984: 37.

Pneumolaelaps arctos.— Farrier & Hennessey, 1993: 85.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Diskofjord, near Humlebired, Greenland, in nest of *Bombus hyperboreus* [Hymenoptera: Apidae].

***Pneumolaelaps asperatus* (Berlese, 1904) n. comb..**

Laelaps (*Hypoaspis*) *asperatus* Berlese, 1904b: 17.

Laelaps asperatus; *non Laelaps*.— Tipton, 1960: 287.

Hypoaspis (*Hypoaspisella*) *procerus* Karg, 1965: 277 [Junior synonymy of *H.* (*G.*) *asperatus* by Bregetova, 1977: 506].

Hypoaspis asperatus.— Costa, 1968: 3; Shcherbak, 1971b: 24.

Hypoaspis (*Geolaelaps*) *asperatus*.— Bregetova, 1977: 506.

Hypoaspis (*Pneumolaelaps*) *asperata*.— Karg, 1979: 90; Karg, 1982: 245; Karg, 1993a: 149; Faraji et al., 2008: 208.

TYPE DEPOSITORY: of *L.* (*H.*) *asperatus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H.* (*H.*) *procerus*: author's collection.

TYPE LOCALITY AND HABITAT: of *L.* (*H.*) *asperatus*: type series, Padua, Italy, hay litter in stable and Florence, Italy, in litter; of *H.* (*H.*) *procerus*: Zörbig, near Halle, Sachsen-Anhalt, Germany, unspecified substrate.

NOTE: Bregetova, 1977: 506 suspected the species to be senior synonym of *Hypoaspis* (*Hypoaspisella*) *intermedius* Bernard.

***Pneumolaelaps azarbaijaniensis* (Fariji, Abedi & Ostovan, 2008) n. comb..**

Hypoaspis (*Pneumolaelaps*) *azarbaijaniensis* Fariji, Abedi & Ostovan, 2008: 205.

TYPE DEPOSITORY: National Museum of Natural History, Leiden, The Netherlands.

TYPE LOCALITY AND HABITAT: Uleq, Salmas, West Azarbaijan, Iran, in soil mixed with wheat straw in a barn.

***Pneumolaelaps baywangus* Rosario, 1981**.

Pneumolaelaps baywangus Rosario, 1981: 70.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Makiling Botanic Gardens, Mount Makiling, College, Laguna, Philippines, in secondary forest litter.

***Pneumolaelaps berlesei* (Bernhard in Hirschmann et al., 1969) n. comb..**

Hypoaspis (*Hypoaspisella*) *berlesei*.— Bernhard in Hirschmann et al., 1969: 136.

Hypoaspis (*Pneumolaelaps*) *berlesei*.— Karg, 1979: 93; Karg, 1982: 247; Karg, 1993a: 154.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, under carion and under stone on humus on forest floor.

***Pneumolaelaps bombicolens* (Canestrini, 1885).**

Iphis bombicolens Canestrini, 1885: 96.

Laelaps (*Iphis*) *bombicolens*.— Berlese, 1892: LXVII, 8.

Laelaps bombicolens.— Berlese, 1892: 35.

Iphis bombicolens.— Berlese, 1892: 35.

Hypoaspis bombicolens.— Oudemans, 1902b: 24; Oudemans, 1903: 87; Oudemans, 1903b: 130; Oudemans, 1905: 7; Hull, 1918: 67; Hull, 1925: 210; Buitendijk, 1945: 295; El-Banhawy & Nasr, 1984: 78.

Hypoaspis (*Pneumolaelaps*) *bombicolens* – Berlese, 1920.

Pneumolaelaps bombicolens.— Vitzthum, 1929: 26; Schweizer, 1949: 39; Hunter, 1966b: 359; Farrier & Hennessey, 1993: 85; Ye & Ma, 1996: 298; Ren & Guo, 2008: 328.

Laelaps bombicolens; *non Laelaps*.— Tipton, 1960: 289.

Hypoaspis (*Pneumolaelaps*) *bombicolens*.— Bregetova, 1977: 522; Evans & Till, 1966: 191; Schweizer, 1961: 151; Karg, 1979: 90; Karg, 1982: 244; Karg, 1993a: 148.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Padua, Italy, on *Bombus* sp. [Hymenoptera: Apidae].

***Pneumolaelaps breviseta* (Evans & Till, 1966) n. comb..**

Hypoaspis (*Pneumolaelaps*) *breviseta* Evans & Till, 1966: 193.

Hypoaspis (*Pneumolaelaps*) *breviseta*.— Bregetova, 1977: 523; Karg, 1979: 90; Karg, 1982: 244; Karg, 1993a: 148.

Hypoaspis breviseta.— Farrier & Hennessey, 1993: 77.

Hypoaspis brevista [sic].— El-Banhawy & Nasr, 1984: 78; Chmielewski, 1998: 205.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Scarborough, Yorkshire, England, on *Bombus muscorum* [Hymenoptera: Apidae].

***Pneumolaelaps collina* (Huhta & Karg, 2010) n. comb..**

Hypoaspis (*Pneumolaelaps*) *collina* Huhta & Karg, 2010: 332.

TYPE DEPOSITORY: Zoological Museum, University of Helsinki, Finland.

TYPE LOCALITY AND HABITAT: Hailuoto Island, near Oulu, Finland, in compost of garbage and garden residues.

***Pneumolaelaps colomboi* (Evans & Till, 1966) n. comb..**

Hypoaspis (*Pneumolaelaps*) *colomboi* Evans & Till, 1966: 194.

Pneumolaelaps bombivicinus Davydova, 1971: 89 [Junior synonymy by Bregetova, 1971: 518].

Hypoaspis (*Pneumolaelaps*) *colomboi*.— Bregetova, 1977: 518; Karg, 1979: 88; Karg, 1982: 244; Karg, 1993a: 146.

TYPE DEPOSITORY: of *P. colomboi* and *P. bombivicinus*: unspecified.

TYPE LOCALITY AND HABITAT: of *P. colomboi*: Langley Park, Buckinghamshire, England, in nest of *Bombus lapidarius* [Hymenoptera: Apidae]; of *P.*

bombivicinus: Rovenskoe, Novosibirskaya Oblast, subterraneous tunnels inhabited by bumblebees (Hymenoptera: Apidae).

***Pneumolaelaps connieae* Hunter & Husband, 1973.**

Pneumolaelaps connieae Hunter & Husband, 1973: 84.

Pneumolaelaps connieae.— Farrier & Hennessey, 1993: 85.

TYPE DEPOSITORY: Acarine Collection, Department of Entomology, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: Grand Rapids, Kent, Michigan, United States of America, on *Bombus americanorum* [Hymenoptera: Apidae].

***Pneumolaelaps costai* Hunter & Husband, 1973.**

Pneumolaelaps costai Hunter & Husband, 1973: 87.

Pneumolaelaps costai.— Farrier & Hennessey, 1993: 85.

TYPE DEPOSITORY: Acarine Collection, Department of Entomology, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: Kalamazoo, Michigan, United States of America, in nest of *Bombus americanorum* [Hymenoptera: Apidae].

***Pneumolaelaps curtipilus* (Greim in Hirschmann et al., 1969) n. comb..**

Hypoaspis curtipilus Greim in Hirschmann et al., 1969: 138.

Hypoaspis (*Pneumolaelaps*) *curtipilis* [sic].— Karg, 1979: 91; Karg, 1982: 246; Karg, 1993: 151.

Hypoaspis (*Pneumolaelaps*) *curtipilus*.— Faraji et al., 2008: 208.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Erlangen-Bayreuth-Steigerwald, Germany, on *Camponotus ligniperda*, *Lasius fuliginosus*, *Lasius alienus*, *Lasius flavus* [Hymenoptera: Formicidae].

***Pneumolaelaps dentipilosa* (Karg, 1978) n. comb..**

Hypoaspis (*Holostaspis*) *dentipilosa* Karg, 1978b: 11.

Hypoaspis (*Pneumolaelaps*) *dentipilosa*.— Karg, 1979: 92; Karg, 1982: 246.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: 84 km northwest of Santiago, Chile, under rocks.

***Pneumolaelaps eulinguae* (Karg, 2003) n. comb..**

Hypoaspis (*Pneumolaelaps*) *eulinguae* Karg, 2003b: 233.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Quito, Pichinca (probably Pichincha), Ecuador, in soil and litter in irrigation canal.

***Pneumolaelaps fuscicolens* (Oudemans, 1903).**

Hypoaspis fuscicolens Oudemans, 1903: 87.

Hypoaspis fuscicolens.— Oudemans, 1904: 83; Voigts & Oudemans, 1905: 232; Buitendijk, 1945: 295; Evans & Till, 1966: 196.

Pneumolaelaps fuscicolens.— Hunter, 1966b: 360.

Hypoaspis (*Pneumolaelaps*) *fuscicolens*.— Bregetova, 1977: 519; Karg, 1979: 91; Karg, 1982: 245; Karg, 1984: 36; Karg, 1993a: 150.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: unspecified.

***Pneumolaelaps giffordi* (Evans & Till, 1966).**

Hypoaspis (*Gaeolaelaps*) *giffordi* Evans & Till, 1966: 170.

Hypoaspis giffordi.— Costa, 1968: 11; Solomon, 1968b: 664; Ma, 2000: 150.

Hypoaspis (*Geolaelaps*) *giffordi*.— Bregetova, 1977: 510.

Hypoaspis (*Pneumolaelaps*) *giffordi*.— Karg, 1979: 92; Karg, 1982: 246, Karg, 1993a: 153.

Hypoaspis s. l. *giffordi*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Rannoch, Perthshire, Scotland, on birch timber rotted by *Polyporus betulinus* [Fungi: Polyporaceae].

***Pneumolaelaps gigantis* (Karg, 1982) n. comb..**

Hypoaspis (*Pneumolaelaps*) *gigantis* Karg, 1982: 251.

Hypoaspis (*Pneumolaelaps*) *gigantis*.— Karg, 2003b: 234.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Venezuela, in soil.

***Pneumolaelaps golanii* (Costa, 1969) n. comb..**

Hypoaspis golanii Costa, 1969a: 163.

Hypoaspis (*Geolaelaps*) *golanii*.— Bregetova, 1977: 510.

Hypoaspis (*Pneumolaelaps*) *golanii*.— Karg, 1979: 90; Karg, 1982: 245.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mount Hermon, border between Syria and Lebanon, in nest of *Spalax ehrenbergi* [Rodentia: Spalacidae].

***Pneumolaelaps grandiporus* (Greim in Hirschmann et al., 1969) n. comb..**

Hypoaspis grandiporus Greim in Hirschmann et al., 1969: 139.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Steigerwald, Germany, in tree nests of *Camponotus ligniperda* and *Lasius fuliginosus* [Hymenoptera: Formicidae].

NOTES: Karg, 1979: 88; Karg, 1982: 244 and Karg, 1993a: 147 suspected this species to be a junior synonymy of *Hypoaspis antipai* Solomon, 1968.

***Pneumolaelaps groenlandica* (Trägårdh, 1906).**

Hypoaspis bombicolens var. *groenlandica* Trägårdh, 1906a: 34.

Hypoaspis bombicolens var. *groenlandica*.— Hunter, 1966b: 359.

Pneumolaelaps groenlandica.— Hunter & Husband, 1973: 79.

Hypoaspis (*Pneumolaelaps*) ?*groenlandica*.— Bregetova, 1977: 519.

Hypoaspis (*Pneumolaelaps*) *groenlandica*.— Karg, 1979: 90; Karg, 1982: 244; Karg, 1993a: 148.

Pneumolaelaps groenlandicus.— Farrier & Hennessey, 1993: 85.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Tigsalŭk, Greenland, on *Bombus* sp. [Hymenoptera: Apidae].

NOTE: Specimens reported as *Laelaps nanus*? by Kramer, 1883: 259 were reidentified as *Hypoaspis bombicolens* var. *groenlandica* by Trägårdh, 1906a: 34.

***Pneumolaelaps hermonensis* (Costa, 1969) n. comb..**

Hypoaspis hermonensis Costa, 1969a: 165.

Hypoaspis (*Pneumolaelaps*) *hermonensis*.— Karg, 1979: 90; Karg, 1982: 245.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Mount Hermon, border between Syria and Lebanon, in nest of *Spalax ehrenbergi* [Rodentia: Spalacidae].

***Pneumolaelaps heyi* (Karg, 1962) n. comb..**

Hypoaspis (*Hypoaspisella*) *heyi* Karg, 1962: 64.

Hypoaspis (*Hypoaspisella*) *heyi*.— Bhattacharyya, 1968: 546.

Hypoaspis heyi.— Costa, 1969a: 167.

Hypoaspis (*Pneumolaelaps*) *heyi*.— Karg, 1979: 90; Karg, 1982: 245; Karg, 1993: 149.

TYPE DEPOSITORY: Author's collection; accession number 852.

TYPE LOCALITY AND HABITAT: Experiment station, Biologische Zentralanstalt (BZA), Teltow, Germany, in grassland.

***Pneumolaelaps hirschmanni* (Karg, 1979: 93) n. comb..**

Hypoaspis gracilis Greim in Hirschmann et al., 1969: 138.

Hypoaspis (*Pneumolaelaps*) *hirschmanni* Karg, 1979: 93 [replacement name, given the existence of *H. gracilis* Meledzahayeva, 1963].

Hypoaspis (*Pneumolaelaps*) *hirschmanni*.— Karg, 1982: 247; Karg, 1993a: 153; Faraji et al., 2008: 208.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Bayreuth-Erlangen, Germany, in soil nests of *Myrmica scabrinodis*, *Myrmica schenki*, *Tetramorium caespitum*,

Tapinoma erraticum, *Lasius flavus*, *Lasius niger*, *Formica sanguinea*, *Formica rufa rufopratensis*, *Formica pratensis*, *Formica fusca*, *Formica rufibarbis* [Hymenoptera: Formicidae].

NOTE: Karg, 1979: 93, proposed *H.* (*P.*) *hirschmanni* to replaced *Hypoaspis gracilis* Greim in Hirschmann et al., 1969: 138, apparentely because that name was pre-occupied by *Hypoaspis gracilis* Meledzhayeva, 1963: 52.

***Pneumolaelaps hyatti* (Evans & Till, 1966).**

Hypoaspis (*Pneumolaelaps*) *hyatti* Evans & Till, 1966: 198.

Hypoaspis (*Pneumolaelaps*) *hyatti*.— Costa, 1966b: 191; Costa, 1966c: 74; Bregetova, 1977: 523; Karg, 1979: 91; Costa, 1980: 548; Karg, 1982: 254; Karg, 1993a: 150.

Hypoaspis hyatti.— Lapina, 1976: 43; Senotrusova, 1982: 5; Ren & Guo, 2008: 329.

Pneumolaelaps hyatti.— Ye & Ma, 1991: 100; Farrier & Hennessey, 1993: 85.

Quinghailaelaps gui Bai, 1992: ??? [Junior synonymy of *P. hyatti* by Ma, 2006: 23]

Pneumolaelaps hyattl [sic].— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Scarborough, Yorkshire, England, on *Bombus muscorum* [Hymenoptera: Apidae].

***Pneumolaelaps intermedius* (Bernhard in Hirschmann et al., 1969).**

Hypoaspis (*Hypoaspisella*) *intermedius* Bernhard in Hirschmann et al., 1969: 135.

Hypoaspis (*Pneumolaelaps*) *intermedia*.— Karg, 1979: 89; Karg, 1982: 244; Karg, 1993a: 147.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Erlangen, Germany, in compost and rotting garden waste, *Elymus* sp. hay [Poales: Poaceae] and on fungi on rotten stump.

NOTE: Bregetova, 1977: 506 suspected this species to be a junior synonymy of *H.* (*Gaeolaelaps*) *asperatus* Berlese, 1905.

***Pneumolaelaps kaibaeus* Rosario, 1981.**

Pneumolaelaps kaibaeus Rosario, 1981: 72.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Carranglan, Nueva Ecija, Philippines, in litter.

***Pneumolaelaps karawaiewi* (Berlese, 1904).**

Laelaps (*Androlaelaps*) *karawaiewi* Berlese, 1904: 432.

Hypoaspis (*Androlaelaps*) *karawaieni* [sic].— Zumpt & Patterson, 1950: 67.

Androlaelaps karawaiewi.— Radford, 1943: 61 Willmann, 1949a: 116; Radford, 1950: 366; Eads, 1951: 212; Willmann, 1951: 116, Furman, 1954: 119; Bregetova, 1956: 83; Tipton, 1960: 298; Shcherbak, 1969: 79; Karg, 1971: 185; Lapina, 1976: 52; Davydova, 1977: 26; Ren & Guo, 2008: 328.

*Hypoaspis karawaiewi***.—** Costa, 1968: 7.

Hypoaspis (*Euandrolaelaps*) *karawaiewi*.— Bregetova, 1977: 530.

Hypoaspis (*Pneumolaelaps*) *karawaiewi*.— Karg, 1979: 90; Karg, 1982: 244; Karg, 1993a: 149; Faraji et al., 2008: 208.

Pneumolaelaps karawaiewi.— Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: “Mursinzi, Russia” [probably Murzintsy, Ukraine], in nest of *Formicae pratensis* [Hymenoptera: Formicidae].

***Pneumolaelaps lasiomyrmecophila* (Bernhard in Hirschmann et al., 1969) n. comb..**

Hypoaspis (*Hypoaspisella*) *lasiomyrmecophilus* Bernhard in Hirschmann et al., 1969: 135.

Hypoaspis (*Pneumolaelaps*) *lasiomyrmecophila*.— Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 153.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Germany, in nest of *Lasius fuliginosus* [Hymenoptera: Formicidae].

NOTE: Bernhard, 1955 described this species in a unpublished manuscript as *Hypoaspis* (*Hypoaspisella*) *myrmecophilus*.

***Pneumolaelaps longanalis* Hunter & Husband, 1973.**

Pneumolaelaps longanalis Hunter & Husband, 1973: 81.

Pneumolaelaps longanalis.— Royce & Krantz, 1989: 161; Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: Acarine Collection, Department of Entomology, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: Gull Lake Biological Station, Kalamazoo, Michigan, United States of America, on *Bombus griseocollis* [Hymenoptera: Apidae].

***Pneumolaelaps longipilus* Hunter, 1966.**

Pneumolaelaps longipilus Hunter, 1966b: 365.

Pneumolaelaps longipilus.— Husband, 1968: 111; Hunter & Husband, 1973: 78; Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Athens, Georgia, United States of America, on *Bombus pennsylvanicus* [Hymenoptera: Apidae].

***Pneumolaelaps lubricoides* Karg, 1971 .**

Hypoaspis (*Pneumolaelaps*) *lubricoides*.— Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 152; Huhta & Karg, 2010: 331.

TYPE DEPOSITORY:

TYPE LOCALITY AND HABITAT:

***Pneumolaelaps lubricus* (Oudemans & Voights, 1904).**

Hypoaspis lubrica Oudemans & Voigts, in Voights & Oudemans, 1904: 654.

Hypoaspis lubrica.— Voigts & Oudemans, 1905: 230; Allred & Beck, 1956: 39; Samšiňák, 1960: 278; Shcherback, 1973: 446; Beron, 1974: 175; Lundqvist, 1974: 42; Hughes, 1976: 295; Whitaker Jr., 1997: 195; Ma, 1996: 48; Ma, 2000: 384; Ren & Guo, 2008: 329; Beaulieu, 2009: 37; Xin et al., 2010: 2.

Hypoaspis (*Haemolaelaps*) *inversus* Berlese, 1918: 127 [Junior synonymy of *H. lubrica* by Samšiňák, 1960: 278; Evans & Till, 1966: 172; Farrier & Hennessey, 1993: 86, Karg, 1993a: 151].

Hypoaspis compressus Hull, 1925: 209 [Junior synonymy of *H. lubrica* by Evans & Till, 1966: 172; Farrier & Hennessey, 1993: 86; Karg, 1993a: 151].

Hypoaspis (*Haemolaelaps*) *inversus*.— Lombardini, 1936: 42.

Haemolaelaps inversus.— Radford, 1943: 61; Radford, 1950: 366; Tipton, 1960: 242.

Hypoaspis smithii Hughes, 1948: 131 [Junior synonymy of *H. lubrica* by Samšiňák, 1960: 278; Evans & Till, 1966: 172; Hughes, 1976: 295; Bregetova, 1977: 505; Farrier & Hennessey, 1993: 86; Karg, 1993a: 151].

Hypoaspis murinus Strandtmann & Menzies, 1948: 479 [Junior synonymy of *H. smithii* by Strandtmann, 1956: 138; of *H. lubrica* by Allred & Beck, 1956: 39; Samšiňák, 1960: 278; Evans & Till, 1966: 172; Hugles, 1976: 295; Bregetova, 1977: 505; Farrier & Hennessey, 1993: 86; Karg, 1993a: 151].

Hypoaspis murinus.— Strandtmann & Menzies, 1952: 268; Bregetova, 1956: 79; Reitblat, 1963: 76; Goncharova & Buyakova, 1964: 277.

Haemolaelaps lubrica.— Buitendijk, 1945: 299; Groknovskaya & Huan-Hoe, 1961: 1634.

Hypoaspis (*Gaeolaelaps*) *lubrica*.— Evans & Till, 1966: 172.

Hypoaspis (*Geolaelaps*) *lubrica*.— Bregetova, 1977: 505.

Hypoaspis (*Pneumolaelaps*) *lubrica*.— Karg, 1979: 91; Karg, 1982: 245; Karg, 1993a: 151; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 120; Faraji et al., 2008: 208.

Pneumolaelaps lubricus.— Farrier & Hennessey, 1993: 86.

Pneumolaelaps lubrica.— Bahrami et al., 2011: 351.

TYPE DEPOSITORY: of *H. lubrica*: unspecified; of *H.* (*H.*) *inversus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *H. compressus*: unspecified; of *H. murinus*: United States National Museum, Washington, District of Columbia, United States of America; of *H. smithii*: unspecified.

TYPE LOCALITY AND HABITAT: of *H. lubrica*: Oslebshausen, Bremen, Germany, on the ground of a barnyard; of *H.* (*H.*) *inversus*: Florence, Italy, in hay litter in stables; of *H. compressus*: Great Britain, unspecified substrate; of *H.*

murinus: Galveston, Texas, United States of America, on *Rattus norvegicus* [Rodentia: Muridae]; of *H. smithii*: Edinburgh, Scotland, on rotting oats.

***Pneumolaelaps machadoi* Elsen, 1973.**

Pneumolaelaps machadoi Elsen, 1973: 181.

TYPE DEPOSITORY: Museu do Dundo, Dundo, Lunda Norte, Angola.

TYPE LOCALITY AND HABITAT: Dundo, Angola, on *Chalicodoma* (*Carinella*) *torrida* (Hymenoptera: Apidae).

***Pneumolaelaps marginepilosa* Sellnick, 1940.**

Hypoaspis marginepilosa Sellnick, 1940: 93.

Hypoaspis marginepilosa.— Lundqvist, 1974: 42

Hypoaspis (*Pneumolaelaps*) *marginepilosa*.— Bregetova, 1977: 521; Karg, 1979: 91; Karg, 1982: 245; Karg, 1993a: 150; Gwiazdowicz & Klemt, 2004: 14; Gwiazdowicz & Gulvik, 2005: 120.

Pneumolaelaps marginalis Willmann, 1953: 465 [Junior synonymy of *H.* (*P.*) *marginepilosa* by Bregetova, 1977: 521; Karg, 1993a: 150].

Haemolaelaps montshadskyi Violovitsh, 1961 [Junior synonymy of *H.* (*P.*) *marginepilosa* by Bregetova, 1977: 521].

Hypospis (*Pneumolaelaps*) *marginalis*.— Evans & Till, 1966: 199.

Pneumolaelaps marginalis.— Hunter, 1966b: 360.

TYPE DEPOSITORY: of *H. marginepilosa*: Göteborgs Naturhistoriska Museum, Göteborg, Sweden; of *P. marginalis*: unspecified.

TYPE LOCALITY AND HABITAT: of *H. marginepilosa*: Gröf, Skaftártunga, Iceland, in nest of *Bombus jonellus* [Hymenoptera: Apidae]; of *P. marginalis*: from hillside meadow at Lärchenecks, opposite to Pitzalm, Haller Mauern, on *Bombus mucidus* [Hymenoptera: Apidae].

***Pneumolaelaps minutissima* (Evans & Till, 1966) n. comb..**

Hypoaspis (*Pneumolaelaps*) *minutissima* Evans & Till, 1966: 201.

Hypoaspis (*Pneumolaelaps*) *minutissima*.— Bregetova, 1977: 519; Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 152; Huhta & Karg, 2010: 331.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Gosforth, Cumberland, England, on *Bombus terrestris* [Hymenoptera: Apidae].

***Pneumolaelaps mistipilus* Hunter, 1966.**

Pneumolaelaps mistipilus Hunter, 1966b: 363.

Pneumolaelaps mistipilus.— Husband, 1968: 111; Hunter & Husband, 1973: 79; Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Georgia, United Sates of America, on *Bombus impatiens* [Hymenoptera: Apidae].

***Pneumolaelaps ovoidea* (Greim in Hirschmann et al., 1969) n. comb..**

Hypoaspis ovoideus Greim in Hirschmann et al., 1969: 139.

Hypoaspis (*Pneumolaelaps) ovoidea*.— Karg, 1979: 93; Karg, 1982: 247; Karg, 1993a: 154.

Hypoaspis (*Pneumolaelaps) ovoideus*.— Faraji et al., 2008: 208.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: unspecified (probably Germany), on *Lasius fuliginosus*, *Lasius brunneus* and *Formica rufa rufa* [Hymenoptera: Formicidae].

***Pneumolaelaps patae* Hunter & Husband, 1973.**

Pneumolaelaps patae Hunter & Husband, 1973: 83.

Pneumolaelaps patae.— Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: Universitetets Zoologiske Museum, Copenhagen, Denmark.

TYPE LOCALITY AND HABITAT: Tigsalŭk, Tlumle, Greenland, on *Bombus* sp. [Hymenoptera: Apidae].

***Pneumolaelaps patagoniensis* (Sheals, 1962) n. comb..**

Hypoaspis patagoniensis Sheals, 1962: 106.

Hypoaspis (*Holostaspis*).— Karg, 1978b: 11.

Hypoaspis (*Pneumolaelaps*) *patagoniensis*.— Karg, 1979: 92; Karg, 1982: 246.

TYPE DEPOSITORY: British Museum (Natural History), London, England; accession number 1961-6-20-48.

TYPE LOCALITY AND HABITAT: Nahuel Huapi, Arroyo Pilmaiquen, Lake Gutierrez, Patagonia Andina, Argentina, in moss and lichens on rock.

***Pneumolaelaps pini* (Hirschmann, Bernhard, Greim & Götz, 1969) n. comb..**

Hypoaspis pini Hirschmann, Bernhard, Greim & Götz, 1969: 140.

Hypoaspis ninabregus McGraw & Farrier, 1969: 144 [Junior synonymy by Karg, 1982: 246; Karg, 1993a: 152].

Hypoaspis ninabregus.— Farrier & Hennessey, 1993: 78.

Hypoaspis (*Pneumolaelaps*) *pini*.— Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 152.

TYPE DEPOSITORY: of *P. pini*: unspecified.

TYPE LOCALITY AND HABITAT: of *P. pini*: Erlangen, Germany, on spruce stump; of *H. ninabregus*: Davie, North Carolina, United States of America, with *Dendroctonus frontalis*, *Ips avulsus*, *Ips grandicolis* [Coleoptera: Scolytidae] on *Pinus echinata* [Pinales: Pinaceae].

***Pneumolaelaps procera* Karg, 1965.**

Hypoaspis (*Hypoaspisella*) *incertus* Bernhard in Hirschmann et al., 1969: 136 [Junior synonymy by Karg, 1993a: 151].

Hypoaspis incertus.— Lapina, 1976: 44.

Hypoaspis (*Pneumolaelaps*) *procera*.— Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 151.

Hypoaspis (*Holostaspis*) *procera*.— Karg, 1978b: 11.

TYPE DEPOSITORY: of *H.* (*H.*) *incertus*: unspecified.

TYPE LOCALITY AND HABITAT: of *H.* (*H.*) *incertus*: Erlangen, Germany, in moist forest soil with decaying pine needles and moss.

***Pneumolaelaps richardsi* Hunter & Husband, 1973.**

Pneumolaelaps richardsi Hunter & Husband, 1973: 86.

Pneumolaelaps richardsi.— Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: Acarine Collection, Department of Entomology, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: 5200 feet [1585 m] about sea level, Prairie Bluff Montain, Alberta, Canada, on *Bombus bifarius* [Hymenoptera: Apidae].

***Pneumolaelaps saana* (Huhta & Karg, 2010) n. comb..**

Hypoaspis (*Pneumolaelaps*) *saana* Huhta & Karg, 2010: 331.

TYPE DEPOSITORY: Zoological Museum, University of Helsinki, Finland.

TYPE LOCALITY AND HABITAT: Saana Moutain, northwestern corner of Lapland Enontekiö, Finland, from a fell.

***Pneumolaelaps sclerotarsus* (Costa, 1968) n. comb..**

Hypoaspis sclerotarsus Costa, 1968: 21.

Hypoaspis (*Pneumolaelaps*) *sclerotarsa*.— Karg, 1979: 88; Karg, 1982: 244; Karg, 1993a: 146.

Hypoaspis sclerotarsa.— Munderloh, 1996: 590.

Hypoaspis (*Pneumolaelaps*) *sclerotarsus*.— Faraji et al., 2008: 208.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Ha'Emeq, Israel, in litter.

***Pneumolaelaps sinhai* Hunter & Husband, 1973.**

Pneumolaelaps sinhai Hunter & Husband, 1973: 82.

Pneumolaelaps sinhai.— Farrier & Hennessey, 1993: 86.

TYPE DEPOSITORY: Acarine Collection, Department of Entomology, University of Georgia, Athens, United States of America.

TYPE LOCALITY AND HABITAT: 5200 feet [1585 m] above sea level, Prairie Bluff Mountain, Alberta, Canada, on *Psithyrus suckleyi* [Hymenoptera: Apidae].

***Promacrolaelaps* Costa, 1971.**

Promacrolaelaps Costa, 1971: 94.

Promacrolaelaps.— Joharchi et al., 2013: 380.

TYPE SPECIES: *Promacrolaelaps hunteri* Costa, 1971.

***Promacrolaelaps hunteri* Costa, 1971.**

Promacrolaelaps hunteri Costa, 1971: 94.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Tivon, Israel, on *Promacrus bimucronatus* (Coleoptera: Scarabaeidae).

***Promacrolaelaps propomacrus* Joharchi, Halliday & Beyzavi, 2013.**

Promacrolaelaps propomacrus Joharchi, Halliday & Beyzavi, 2013: 380.

TYPE DEPOSITORY: Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University, Yazd, Iran.

TYPE LOCALITY AND HABITAT: Kamfiruz, Fars, Iran, on adult of *Propomacrus bimucronatus* (Coleoptera: Scarabaeidae).

***Pseudoparasitus* Oudemans, 1902.**

Pseudoparasitus Oudemans, 1902b: 29.

Pseudoparasitus.— Vitzthum, 1929: 22; Evans, 1957: 221; Hunter, 1966a: 1; Bregetova, 1977: 535; Evans & Till, 1966: 224; Casanueva, 1993: 40; Karg, 1993a: 133; Karg, 2000: 248; Joharchi et al., 2011: 3L2; Kazemi, 2014: 42.

Laelaps (*Hoplolaelaps*) Berlese, 1903: 14 [Junior synonymy of *Pseudoparasitus* by Berlese, 1916a: 30; Evans 1957: 221; Evans & Till, 1966: 224].

Laelaps (*Hoplolaelaps*) Berlese, 1910: 259 - pseudolaelaps – Berlese, 1916a: 30.

Hypoaspis.— Hull, 1918: 66 (in part).

Laelaps (*Pseudoparasitus*).— Halbert, 1920: 70.

Hoplolaelaps.— Vitzthum, 1941:

Laelapsoides Willmann, 1952: 150 [Junior synonymy of *Pseudoparasitus* by Evans, 1957: 221; Evans & Till, 1966: 224; Hunter, 1966a: 1; Bregetova, 1977: 535].

Austrogamasellus Domrow, 1957: 204 [Junior synonymy of *Pseudoparasitus* by Evans & Till, 1966: 224; Hunter, 1966a: 1; Bregetova, 1977: 535].

Pseudoparasitus (*Pseudoparasitus*).— Karg, 1981b: 210; Karg, 1993a: 133; Karg, 2000: 248.

TYPE SPECIES: *Laelaps meridionalis* Canestrini: 1882: 922, by original designation.

***Pseudoparasitus arculus* Karg, 2003.**

Pseudoparasitus (*Pseudoparasitus*) *arculus* Karg, 2003b: 235.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Tenatol, Ecuador, in litter layer of a cocoa plantation.

***Pseudoparasitus astriatus* Hunter, 1966.**

Pseudoparasitus astriatus Hunter, 1966a: 6.

Pseudoparasitus astriatus.— Farrier & Hennessey, 1993: 87.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Mexico City, Mexico, intercepted at San Ysidro, California, United States of America, in soil.

***Pseudoparasitus camini* (Domrow, 1957).**

Austrogamasellus camini Domrow, 1957: 204.

Pseudoparasitus camini.— Hunter, 1966a: 13.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Low Isles (145°34'E, 16°23'S), Great Barrier Reef, Australia, in leaf mould on cay.

***Pseudoparasitus centralis* Berlese, 1920.**

Pseudoparasitus centralis Berlese, 1920: 167.

Pseudoparasitus centralis.— Lombardini, 1936: 48; Evans & Till, 1966: 225; Bregetova, 1977: 536; Ma, 2004: 18.

Pseudoparasitus (*Pseudoparasitus*) *centralis*.— Karg, 1978a: 211; Karg, 1981b: 211; Karg, 1989a: 335; Karg, 1993a: 134; Karg, 1997b: 43.

Pseudoparasitus centralis.— Joharchi et al., 2011: 32.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Florence, “Etruria”, Italy, in humus.

NOTE: According to Evans & Till, 1966: 225, *P. centralis* might be a synonym of *P. meridionalis* (G. et R. Canestrini, 1882), but a definitive conclusion could not be reached because the type specimens of *P. meriodionalis* were apparently lost. Joharchi et al., 2011: 32 considered them as different species.

***Pseudoparasitus domrowi* Hunter, 1966.**

Pseudoparasitus domrowi Hunter, 1966a: 7.

Pseudoparasitus domrowi.— Farrier & Hennessey, 1993: 87.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Peru, intercepted at Miami, Florida, United States of America, on orchid plants [Asparagales: Orchidaceae].

***Pseudoparasitus ennsi* Hunter, 1966.**

Pseudoparasitus ennsi Hunter, 1966a: 3.

Pseudoparasitus ennsi.— Farrier & Hennessey, 1993: 87.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Bentsen State Park, Texas, United States of America, under rocks.

***Pseudoparasitus exilis* Karg, 1981.**

Pseudoparasitus (*Pseudoparasitus*) *exilis* Karg, 1981b: 217.

Pseudoparasitus (*Pseudoparasitus*) *exilis*.— Karg, 1989a: 335; Karg, 1997b: 43.

Pseudoparasitus exilis.— Karg, 1993b: 267.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: “Faz. Itaquere” [sic], [?State of São Paulo], Brazil, in soil.

***Pseudoparasitus germanicus* (Karg, 1965). ok**

Ololaelaps (*Cypholaelaps*) *germanicus* Karg, 1965: 277.

Pseudoparasitus germanicus.— Bregetova, 1977: 536.

Pseudoparasitus (*Pseudoparasitus*) *germanicus*.— Karg, 1978a: 212; Karg, 1981b: 212; Karg, 1989a: 335; Karg, 1993a: 134; Karg, 1997b: 43.

TYPE DEPOSITORY: author's collection.

TYPE LOCALITY AND HABITAT: Zörbig, near Halle, Sachsen-Anhalt, Germany, on turnip of experimental plot [Plantae: Brassicaceae].

***Pseudoparasitus gracilipes* (Banks, 1916).**

Cyrtolaelaps gracilipes Banks, 1916: 228.

Pseudoparasitus gracilipes.— Halliday, 1998.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: type series, Sydney and Liverpool, New South Wales, Australia, unspecified substrate and Lal Lal, Victoria, Australia with *Camponotus nigriceps*, *Ectatomma metallicum Polyrachis hexacantha* and *Ponera lutea* [Hymenoptera: Formicidae].

***Pseudoparasitus guttulae* Karg, 1997.**

Pseudoparasitus (*Pseudoparasitus*) *guttulae* 1997b: 44.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Otavolo, Imbabura, Ecuador, in moss on trees.

***Pseudoparasitus hajiqanbari* Kazemi, 2014.**

Pseudoparasitus hajiqanbari Kazemi, 2014: 43.

TYPE DEPOSITORY: Acarological Collection, Institute of Science and High Technology and Environmental Sciences, Graduate University of Advanced Technology, Kerman, Iran.

TYPE LOCALITY AND HABITAT: 48 m above sea level, Sisangan Forest Park (36°34'N; 51°48'E), Mazandaran, Iran, in litter.

***Pseudoparasitus indicus* Bhattacharyya, 1977.**

Pseudoparasitus indicus Bhattacharyya, 1977: 2.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: Kalyani, Nadia, West Bengal, India, in litter under *Shorea* sp. [Plantae: Dipterocarpaceae].

***Pseudoparasitus jiangxiensis* Ma, 2007.**

Pseudoparasitus jiangxiensis Ma, 2007.

Pseudoparasitus jiangxiensis.— Ren & Guo, 2008: 329; Ma, 2011: 85.

TYPE DEPOSITORY:

TYPE LOCALITY AND HABITAT:

***Pseudoparasitus jilinensis* Ma, 2004.**

Pseudoparasitus jilinensis Ma, 2004: 18.

Pseudoparasitus jilinensis.— Ren & Guo, 2008: 329

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Changchun (43°54'N, 125°18'E), Jilin, China, in forest soil.

***Pseudoparasitus juvencus* Berlese, 1916.**

Pseudoparasitus juvencus Berlese, 1916b: 164.

Pseudoparasitus juvencus.— Lombardini, 1936: 48.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Bosa, Oristano, Sardinia, Italy, in moss [mentioned as "muscis"].

***Pseudoparasitus lativentris* (Karg, 1978).**

Reticulolaelaps lativentris Karg, 1978b: 26.

Pseudoparasitus lativentris.— Nemati et al., 2013: 79.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near La Union, on the road to Valdivia, Valdivia, Chile, in muddy soil.

***Pseudoparasitus maior* Berlese, 1916.**

Pseudoparasitus maior Berlese, 1916b: 164.

Pseudoparasitus major [sic].— Lombardini, 1936: 48.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, unspecified substrate.

***Pseudoparasitus marginatus* Karg, 1997.**

Pseudoparasitus (*Pseudoparasitus*) *marginatus* Karg, 1997b: 44.

TYPE DEPOSITORY: Museums für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Antisana, Pichincha, Ecuador, in litter.

***Pseudoparasitus meridionalis* (Canestrini & Canestrini, 1882).**

Laelaps meridionalis Canestrini & Canestrini, 1882: 922.

Laelaps meridionalis Berlese, 1883b: 217.

Hypoaspis meridionalis.— Canestrini, 1885: 88.

Laelaps meridionalis.— Berlese, 1886: XXXII, 8; Berlese, 1892: 35.

Hoplolaelaps meridionalis.— Berlese, 1903

Laelaps (*Pseudoparasitus*) *meridionalis*.— Halbert, 1915: 70.

Pseudoparasitus meridionalis.— Hull, 1918: 63; Vitzthum, 1929: 27; Lombardini, 1936: 48; Luxton, 1998: 20; Joharchi et al., 2011: 32.

Laelaps meridionalis; *non Laelaps.*— Tipton, 1960: 300.

Pseudoparasitus (*Pseudoparasitus*) *meridionalis*.— Karg, 1981b: 212; Karg, 1989a: 335; Karg, 1993a: 134; Karg, 1997b: 43.

TYPE DEPOSITORY:

TYPE LOCALITY AND HABITAT: Civitavecchia & Messina, Italy, in moss under rock.

NOTE: According to Evans & Till, 1966: 225, *P. centralis* might be a synonym of *P. meridionalis* (G. et R. Canestrini, 1882), but a definitive conclusion could not

be reached because the type specimens of *P. meriodionalis* were apparently lost. Joharchi et al., 2011: 32 considered them as different species.

***Pseudoparasitus missouriensis* (Ewing, 1909).**

Hylestates missouriensis Ewing, 1909: 66.

Pseudoparasitus obsoletus Berlese, 1916b: 164 [Junior synonymy of *G. missouriensis* by Hennessey & Farrier, 1988: 30; Farrier & Hennessey, 1993: 74; Joharchi et al., 2011: 33].

Laelaspis austriacus Sellnick, 1935: 351 [Junior synonymy of *G. missouriensis* by Hennessey & Farrier, 1988: 30; Farrier & Hennessey, 1993: 74; of *P. missouriensis* by Joharchi et al., 2011: 33; Joharchi et al., 2012: 2012].

Pseudoparasitus obsoletus.— Lombardini, 1936: 48.

Gymnolaelaps missouriensis.— Ellis Jr., 1955: 16; Hennessey & Farrier, 1988: 30; Farrier & Hennessey, 1993: 74.

Laelaspis austriacus.— Willmann, 1951: 113; Pirianyk, 1959: 100; Reitblat, 1963: 81; Lapina, 1976: 52.

Gymnolaelaps austriacus.— Hunter, 1961: 680.

Pseudoparasitus austriacus.— Hunter, 1966a: 9.

Hypoaspis (*Euryaspis*) *austriacus*.— Bernhard, 1971: 8.

Hypoaspis (*Gymnolaelaps*) *austriacus*.— Bregetova, 1977: 526.

Hypoaspis (*Holostaspis*) *austriaca*.— Karg, 1978b: 11.

Hypoaspis (*Laelaspis*) *austriaca*.— Karg, 1979: 101; Karg, 1982: 249; Tenorio, 1982: 264; Tenorio et al., 1985: 300; Karg, 1989b: 120; Karg, 1993a: 161.

Hypoaspis (*Laelaspis*) *misoriensis* [sic].— Babaeian et al., 2010: 328.

Pseudoparasitus missouriensis.— Joharchi et al., 2011: 32.

Pseudoparasitus missuriensis [sic].— Kazemi, 2014: 47.

TYPE DEPOSITORY of *H. missouriensis*: Illinois State Laboratory of Natural History, Urbana, Illinois, United States of America; of *P. obsoletus*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *L. austriacus*: unspecified.

TYPE LOCALITY AND HABITAT of *H. missouriensis*: Columbia, Missouri, United States of America, under bark and in trash; of *P. obsoletus*: Columbia, United

States of America, in moss [mentioned as “muscis”]; of *L. austriacus*: Anninger, Austria, in nest of *Formica rufa* [Hymenoptera: Formicidae].

***Pseudoparasitus nasipodaliae* Karg, 1993.**

Pseudoparasitus nasipodaliae Karg, 1993b: 267.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 360 m above sea level, north Bellavista, Santa Cruz, Galapagos Islands, decaying leaves and fruits of avocado grove.

***Pseudoparasitus ocularis* Karg, 1981.**

Pseudoparasitus (*Pseudoparasitus*) *ocularis* Karg, 1981b: 212.

Pseudoparasitus (*Pseudoparasitus*) *ocularis*.— Karg, 1989a: 335; Karg, 1997b: 43.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Venezuela, in soil.

***Pseudoparasitus orientalis* (Osipova, 1969).**

Laelaspis orientalis Osipova, 1969: 1739.

Pseudoparasitus orientalis.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: Zoological Museum, Moscow University, Moscow, Russia; accession number Td-1.

TYPE LOCALITY AND HABITAT: Chuisky Valley, Kyrgyzstan, on unspecified rodents.

***Pseudoparasitus ovatulus* (Halbert, 1915).**

Laelaps (*Hypoaspis*) *ovatulus* Halbert, 1915: 71.

Hypoaspis ovatulus.— Hull, 1918: 67.

Laelaps dentatus Halbert, 1920: 123 [Junior synonymy of *P. ovatulus* by Luxton, 1998: 18].

Gymnolaelaps anomalus Willmann, 1951: 116 [Junior synonymy of *P. dentatus* by Bregetova, 1977: 536; Karg, 1993a: 135; Luxton, 1998: 19].

Laelapsoides dentatus.— Willmann, 1952.

Halbertia ovatula.— Turk & Turk, 1952: 483.

Pseudoparasitus dentatus.— Hunter, 1966a: 2; Evans & Till, 1966: 227; Bregetova, 1977: 536; Kazemi, 2014: 47.

Pseudoparasitus anomalus.— Hunter, 1966a: 13.

Pseudoparasitus (*Pseudoparasitus*) *dentatus*.— Karg, 1978a: 212; Karg, 1981b: 212; Karg, 1989a: 335; Karg, 1993a: 135; Karg, 1997b: 44.

Pseudoparasitus ovatulus.— Luxton, 1998: 19.

TYPE DEPOSITORY: of *L.* (*H.*) *ovatulus*: National Museum, Dublin, Ireland; of *L. dentatus*: ????; of *G. anomalus*: unspecified.

TYPE LOCALITY AND HABITAT: of *L.* (*H.*) *ovatulus*: Mulranny, Clare Island, in flowers of *Campanula* sp. [Plantae: Campanulaceae]; of *L. dentatus*: ????; of *G. anomalus*: 386 m above sea level, Marzer Kogel, Marz-Rohrbach, Pannonian Basin, Austria, in soil.

***Pseudoparasitus ovulum* Berlese, 1920.**

Pseudoparasitus ovulum Berlese, 1920: 167.

Pseudoparasitus ovulum.— Farrier & Hennessey, 1993: 87.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Columbia, United States of America, in moss [mentioned as muscis].

***Pseudoparasitus parasitizans* Berlese, 1916.**

Pseudoparasitus (*Pseudopachys*) *parasitizans* Berlese, 1916: 165.

Pseudoparasitus (*Pseudopachys*) *parasitizans*.— Lombardini, 1936: 48.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Padua, Italy, on *Talpa europaea* [mentioned as *Talpam europaeam*] [Mammalia: Talpidae].

***Pseudoparasitus paucidentis* (Karg, 1989).**

Hypoaspis (*Laelaspis*) *paucidentis* Karg, 1989b:125.

Hypoaspis (*Laelaspis*) *paucidentis*.— Karg, 1993b: 266; Karg, 1994: 185.

Hypoaspis paucidentis.— Karg, 1994: 182.

Pseudoparasitus paucidentis.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Pseudoparasitus porulatus* Karg, 1989.**

Pseudoparasitus (*Pseudoparasitus*) *porulatus* Karg, 1989a: 338.

Pseudoparasitus (*Pseudoparasitus*) *porulatus*.—Farrier & Hennessey, 1993: 87; Karg, 1997b: 44.

Pseudoparasitus porulatus.— Karg, 1993b: 268.

TYPE DEPOSITORY: Naturwissenschaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: Vigie-Point, near Castries, Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

***Pseudoparasitus puellus* Berlese, 1916.**

Pseudoparasitus puellus Berlese, 1916b: 165.

Pseudoparasitus puellus.— Lombardini, 1936: 48.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Olavarría, near Buenos Aires, Argentina, unspecified substrate.

***Pseudoparasitus quadrisetatus* Karg, 1981.**

Pseudoparasitus (*Pseudoparasitus*) *quadrisetatus* Karg, 1981b: 212.

Pseudoparasitus (*Pseudoparasitus*) *quadrisetatus*.— Karg, 1989a: 335; Farrier & Hennessey, 1993: 87; Karg, 1997b: 43.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Sierra Esperon, Cuba, in soil.

***Pseudoparasitus quinquepara* (Karg, 2000).**

Hypoaspis (*Laelaspis*) *quinquepara* Karg, 2000: 246.

Pseudoparasitus quinquepara.— Joharchi et al., 2012: 2013.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: near Antisana, Pichincha, Ecuador, in dry moss.

***Pseudoparasitus schatzi* Karg, 1993.**

Pseudoparasitus schatzi Karg, 1993b: 268.

Pseudoparasitus (*Pseudoparasitus*) *schatzi*.— Karg, 2003b: 235.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: 2 km north of Bellavista, Santa Cruz, Galapagos Islands, in agricultural zone.

***Pseudoparasitus schusteri* Hirschmann, 1966.**

Pseudoparasitus schusteri Hirschmann, 1966: 35.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Cananeia, State of São Paulo, Brazil, in mangrove.

***Pseudoparasitus spathulatus* Berlese, 1920.**

Pseudoparasitus spathulatus Berlese, 1920: 168.

Pseudoparasitus spathulatus.— Lombardini, 1936: 48.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Sardinia, Bosa and Golfo Aranci, Italy, in moss [mentioned as “muscis”].

***Pseudoparasitus stigmatus* (Fox, 1946).**

Mysolaelaps stigmatus Fox, 1946a: 449.

Austrogamasellus stigmatus.— Domrow, 1957: 204.

Pseudoparasitus stigmatus.— Hunter, 1966a: 11; Farrier & Hennessey, 1993: 87.

Pseudoparasitus stigmaticus [sic].— Tenorio, 1982: 270; Tenorio et al., 1985: 301.

TYPE DEPOSITORY: Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico.

TYPE LOCALITY AND HABITAT: Camp O'Reilly, Gurabo, Puerto Rico, on *Rattus rattus* [Rodentia: Muridae].

***Pseudoparasitus strictior* Berlese, 1916.**

Pseudoparasitus meridionalis var. *strictior* Berlese, 1916b: 163.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Palermo, Sicilia, Italy, in moss [mentioned as "muscis"].

***Pseudoparasitus thatcheri* Hunter & Moser, 1968.**

Pseudoparasitus thatcheri Hunter & Moser, 1968: 119.

Pseudoparasitus thatcheri.— McGraw & Farrier, 1969: 148; Farrier & Hennessey, 1993: 87.

Hypoaspis (*Laelaspis*) *thatcheri*.— Karg, 1982: 249; Karg, 1989b: 120.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Elizabeth, Louisiana, United States of America, in boring dust from *Pinus taeda* [Pinales: Pinaceae] containing *Dendroctonus frontalis* [Coleoptera: Curculionidae] and wood borers.

***Pseudoparasitus tilli* Costa, 1968.**

Pseudoparasitus tilli Costa, 1968: 24.

Hypoaspis (*Holostaspis*) *tilli*.— Karg, 1978b: 11.

Hypoaspis (*Laelaspis*) *tilli*.— Karg, 1979: 99; Karg, 1982: 248.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Qiryat Tiv'on, Israel, in litter of *Quercus-Styrax* [Fagales: Fagaceae; Ericales: Styracaceae].

***Pseudoparasitus trincisus* Hunter, 1966.**

Pseudoparasitus trincisus Hunter, 1966a: 4.

Pseudoparasitus trincisus.— Tenorio, 1982: 271; Farrier & Hennessey, 1993: 88.

Pseudoparasitus (*Pseudoparasitus*) *trincisus*.— Tenorio et al., 1985: 301.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Costa Rica, intercepted at Brownsville, Texas, United States of America, on orchid plants [Asparagales: Orchidaceae].

***Raymentia* Womersley, 1956.**

Raymentia Womersley, 1956: 570.

TYPE SPECIES: *Raymentia anomala* Womersley, 1956: 571.

NOTE: Walter et al. (2002): 132 discussed the closest relation of this genus to Hypoaspidinae and Mellithipidinae, without assigning it to any of them.

***Raymentia anomala* Womersley, 1956.**

Raymentia anomala Womersley, 1956: 571.

Raymentia anomala.— Walter et al., 2002: 135.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Jameroo, New South Wales, Australia, associated with unidentified native bees [Hymenoptera].

***Raymentia eickwortiana* Walter & Beard, 2002.**

Raymentia eickwortiana Walter & Beard, in Walter et al., 2002: 135.

TYPE DEPOSITORY: Australian National Insect Collection, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Armidale, New South Wales, Australia, on *Lasioglossum lacthium* (Hymenoptera: Halictidae).

***Raymentia walkeriana* Walter & Beard, 2002.**

Raymentia walkeriana Walter & Beard, in Walter et al., 2002: 137.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Lorien Wildlife Refuge, near Lansdowne, New South Wales, Australia, on *Lasioglossum atronitens* (Hymenoptera: Halictidae).

***Reticulolaelaps* Costa, 1968.**

Reticulolaelaps Costa, 1968: 26.

Reticulolaelaps.— Nemati et al., 2013: 74.

TYPE SPECIES: *Reticulolaelaps faini* Costa, 1968: 26.

***Reticulolaelaps faini* Costa, 1968.**

Reticulolaelaps faini Costa, 1968: 26.

Reticulolaelaps faini.— Nemati et al., 2013: 74.

TYPE DEPOSITORY: British Museum (Natural History), London, England.

TYPE LOCALITY AND HABITAT: Mishmar Ha'Emeq, Israel, in litter.

***Reticulolaelaps hallidayi* Joharchi, Nemati & Babaeian, 2013.**

Reticulolaelaps hallidayi Joharchi, Nemati & Babaeian in Nemati et al., 2013: 76.

TYPE DEPOSITORY: Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord, Iran.

TYPE LOCALITY AND HABITAT: 845 m above sea level, Izeh (31°49'52"N, 49°52'9"E), Khuzestan, Iran, in soil.

***Sphaeroseius* Berlese, 1904.**

Sphaeroseius Berlese, 1904: 433.

Sphaeroseius.— Krantz & Platnick, 1995: 3.

TYPE SPECIES: *Sphaeroseius ecitonis* Wasmann, 1900: 256.

NOTE: This genus was originally described in the family Laelapidae. A reappraisal of its suprageneric placement was discussed by Krantz & Platnick, 1995: 8, who decided to included it for the time being in Hypoaspidinae despite uncertainties about the morphology of this group.

***Sphaeroseius ecitonis* (Wasmann, 1900).**

Laelaps ecitonis Wasmann, 1900: 433.

TYPE DEPOSITORY:

TYPE LOCALITY AND HABITAT: Brazil, in nest of *Neivamyrmex nigrescens* [mentioned as *Eciton schmitti*]

NOTE: Berlese, 1904: 433 mentioned that this species could be a junior synonymy of *Laelaps comes* Moniez, 1894.

***Sphaeroseius ecitophilus* (Mello-Leitão).**

Brucharachne ecitophila Mello-Leitão, 1925: 234.

Sphaeroseius ecitophilus.— Krantz & Platnick, 1995: 4.

TYPE DEPOSITORY: Museu Nacional, Rio de Janeiro, Rio de Janeiro.

TYPE LOCALITY AND HABITAT: Córdoba, Argentina, ????

***Stigmatolaelaps* Krantz, 1998.**

Stigmatolaelaps Krantz, 1998: 292.

Stigmatolaelaps.— Walter et al., 2002: 132.

TYPE SPECIES: *Hypoaspis greeni* Oudemans, 1903 ("morphotype 2" – see comments in *S. greeni* below).

***Stigmatolaelaps greeni* (Oudemans, 1902).**

Hypoaspis greeni Oudemans, 1902: 37.

Hypoaspis greeni Oudemans, 1903b: 128 (objective homonymy).

Hypoaspis (*Pneumolaelaps*) *greeni*.— Berlese, 1920: 151; Lombardini, 1936: 42.

Hypoaspis greeni.— Buitendijk, 1945: 295.

Pneumolaelaps greeni.— Hunter, 1966b: 360; Hunter & Husband, 1973: 77.

Stigmatolaelaps greeni.— Krantz, 1998: 295.

TYPE DEPOSITORY: unspecified (according to Krantz, 1998: 295 in Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands).

TYPE LOCALITY AND HABITAT: India, on *Koptorthosoma* (= *Xylocopa*) *tenuiscapa* [Hymenoptera: Apidae].

NOTES: (a) Hunter & Husband, 1973: 17 suggested a separate generic taxon for *P. greeni.* (b) According to Krantz, 1998: 292, this species was described based on two different morphotypes. Morphotype 2 was considered by Krantz, 1998

as *P. greeni* and assigned as the type species of *Stigmolaelaps*, then described. He described morphotype 1 as a new species, *Stigmolaelaps hunteri* Krantz, 1998.

***Stigmatolaelaps hunteri* Krantz, 1998.**

Stigmatolaelaps hunteri Krantz, 1998: 295.

TYPE DEPOSITORY: Natural Museum of Natural History, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: North Talawa, 9 miles [14 km] south-southwest of Annaradhapura, Sri Lanka, on *Xylocopa* (*Mesotrichia*) *tenuiscapa* (Hymenoptera: Apidae).

NOTE: According to Krantz, 1998: 292, *Hypoaspis greeni* Oudemans was described based on two different morphotypes. Morphotype 2 was considered by Krantz, 1998 as *P. greeni* and assigned as the type species of *Stigmolaelaps*, then described. *Stigmolaelaps hunteri* was described based on morphotype 1.

***Stigmatolaelaps sumatrensis* Krantz, 1998.**

Stigmatolaelaps sumatrensis Krantz, 1998: 297.

TYPE DEPOSITORY: National Museum of Natural History, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Kampong Silau, Maradja Asaham [sic, probably Asahan], Sumatra, Indonesia, on *Xylocopa* (*Mesotrichia*) *latipes* (Hymenoptera: Apidae).

***Stratiolaelaps* Berlese, 1882.**

Hypoaspis.— Canestrini, 1885 (in part); Hughes, 1976: 292 (in part)

Hypoaspis (*Stratiolaelaps*).— Berlese, 1916b: 168; Vitzthum, 1943: 763; Evans & Till, 1966: 160, Aswegen & Loots, 1970: 202; Bregetova, 1977: 510.

Stratiolaelaps.— Trägårdh, 1952: 66; Evans, 1957: 221; Hughes, 1961: 217; Evans & Till, 1979: 201; Rosario, 1981: 76; Zaher, 1986: 198; Casanueva, 1993: 40; Walter & Campbell, 2003: 256; Karg & Schorlemmer, 2013: 202.

Davisiella Zumpt & Patterson, 1951: 78 [Junior synonymy of *H.* (*S.*) by Evans & Till, 1966: 159; Brevetova, 1977: 510; Evans & Till, 1979: 201; Walter & Campbell, 2003: 256].

Hypoaspis (*Cosmolaelaps*).— Karg, 1979: 71 (in part); Karg, 1981a: 213 (in part); Karg, 1988: 509 (in part); Huhta & Karg, 2010: 330 (in part).

TYPE SPECIES: *Laelaps* (*Iphis*) *miles* Berlese, 1892: fasc. LXIII, n.9.

NOTE: Karg 1979, 1993: 137 considered *Hypoaspis* (*Cosmolaelaps*) to be the senior synonym of *Stratiolaelaps* Berlese, which was not accepted by subsequent authors (Walter & Campbell, 2003; Moreira et al., 2014). In this publication the latter interpretation is adopted.

***Stratiolaelaps afer* (Berlese, 1916) n. comb..**

Hypoaspis (*Stratiolaelaps*) *gryllotalpae* var. *afer* Berlese, 1916b: 168.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Stratiolaelaps brasiliensis* (Berlese, 1918).**

Hypoaspis (*Stratiolaelaps*) *brasiliensis* Berlese, 1918: 119.

Hypoaspis (*Stratiolaelaps*) *brasiliensis*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Santos, Brazil, in soil under palm log.

***Stratiolaelaps bregetovae* (Fonseca, 1959).**

Cosmolaelaps bregetovae Fonseca, 1959: 94.

Cosmolaelaps bregetovae.— Botelho et al., 2002: 54.

Stratiolaelaps bregetovae.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: unspecified (in Instituto Butantan, São Paulo, State of São Paulo, Brazil, according to D. M. Barros-Battesti; accession number 3481).

TYPE LOCALITY AND HABITAT: 1500 m above sea level, Valleabajo, Bolivia, on *Oxymycterus doris* [Rodentia: Muridae].

***Stratiolaelaps cardiophorus* (Berlese, 1916).**

Hypoaspis (*Stratiolaelaps*) *cardiophorus* Berlese, 1916b: 169.

Hypoaspis (*Stratiolaelaps*) *cardiophorus*.— Lombardini, 1936: 42.

Hypoaspis (*Cosmolaelaps*) *cardiophora*.— Karg, 1981a: 216; Karg, 1987: 294; Karg, 1988: 512; Huhta & Karg, 2010: 330.

Stratiolaelaps cardiophorus.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, in nests of *Acromyrmex lundi* [Hymenoptera: Formicidae].

***Stratiolaelaps corpulentus* (Berlese, 1920) n. comb..**

Hypoaspis (*Stratiolaelaps*) *corpulentus* Berlese, 1920: 153.

Hypoaspis (*Stratiolaelaps*) *corpulentus*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Florencia and Pontedera, Italy, in moss [mentioned as muscis].

***Stratiolaelaps dani* (Grokhovskaya & Huan-Hoe, 1969).**

Cosmolaelaps dani Grokhovskaya & Huan-Hoe, 1969: 818.

Hypoaspis (*Cosmolaelaps*) *dani*.— Karg, 1988: 513.

Stratiolaelaps dani.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Institute of Epidemiology and Microbiology, Russian Academy of Medical Sciences, Moscow, Russia.

TYPE LOCALITY AND HABITAT: Cao Bang, Namkep, Tintuk, Vietnam, in substrate of poultry-houses.

***Stratiolaelaps egenus* (Berlese, 1918).**

Hypoaspis (*Stratiolaelaps*) *egenus* Berlese, 1918: 122.

Hypoaspis (*Stratiolaelaps*) *egenus*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: M'fongozi, Zululand [KwaZulu-Natal], South Africa, on *Mus coucha* [Mammalia: Muridae].

***Stratiolaelaps fuscus* (Berlese, 1916).**

Hypoaspis (*Stratiolaelaps*) *fuscus* Berlese, 1916b: 168.

Hypoaspis (*Stratiolaelaps*) *fuscus*.— Berlese, 1918: 131; Lombardini, 1936: 42; Aswegen & Loots, 1970: 207.

Hypoapis (*Cosmolaelaps*) *fusca*.— Karg, 1981a: 216; Karg, 1987: 295; Karg, 1988: 512; Huhta & Karg, 2010: 330.

Stratiolaelaps fuscus.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: East Africa, unspecified substrate.

***Stratiolaelaps gibbosus* (Koyumdzhieva, 1979) n. comb..**

Hypoaspis (*Stratiolaelaps*) *gibbosus* Koyumdzhieva, 1979: 71.

TYPE DEPOSITORY: Institute of Zoology, Bulgarian Academy of Sciencies, Sofia, Bulgaria.

TYPE LOCALITY AND HABITAT: unspecified type locality (probably Bulgaria), in abandoned nest of *Picus viridis* on a tree (Piciformes: Picidae).

***Stratiolaelaps gryllotalpae* (Berlese, 1910) n. comb..**

Laelaps (*Hypoaspis*) *gryllotalpae* Berlese, 1910: 259.

Hypoaspis (*Stratiolaelaps*) *gryllotalpae* Berlese, 1916b: 168.

Laelaps gryllotalpae; *non Laelaps*.— Tipton, 1960: 296.

Hypoaspis (*Geolaelaps*) *gryllotalpae*.— Bregetova, 1977: 504.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, on *Gryllotalpa vulgaris* [Orthoptera: Gryllotalpidae].

***Stratiolaelaps hirtipes* (Berlese, 1920) n. comb..**

Hypoaspis (*Stratiolaelaps*) *hirtipes* Berlese, 1920: 154.

Hypoaspis (*Stratiolaelaps*) *hirtipes*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Samarang, Java, Indonesia, unspecified substrate.

***Stratiolaelaps lamington* Walter &Campbell, 2003.**

Stratiolaelaps lamington Walter & Campbell, 2003: 260.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Lamington National Park, 28°13'S, 153°08'E), Queensland, Australia, on *Asplenium* litter [Polypodiales: Aspleniaceae], subtropical rainforest canopy.

***Stratiolaelaps longicostalis* (Karg, 1978).**

Hypoaspis (*Cosmolaelaps*) *longicostalis* Karg, 1978b: 5.

Hypoaspis (*Cosmolaelaps*) *longicostalis*.— Karg, 1979: 72; Karg, 1981a: 216; Karg, 1987: 295; Karg, 1988: 512; Karg, 1996: 151; Karg, 1997a: 83; Huhta & Karg, 2010: 331.

Stratiolaelaps longicostalis.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Misituni, Tarapaca, Chile, on algae.

***Stratiolaelaps lorna* Walter & Campbell, 2003.**

Stratiolaelaps lorna Walter & Campbell, 2003: 265.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Bauple State Forest, Gympie, Queensland, Australia, from colony established with mites from tree hollow used by brush-tailed possums and gliders.

***Stratiolaelaps lamington* Walter & Campbell, 2003.**

Stratiolaelaps lamington Walter & Campbell, 2003: 260.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Lamington National Park (28°13'S, 153°08'E), Queensland, Australia, in *Asplenium* sp. litter [Polypodiales: Aspleniaceae], in subtropical rainforest canopy.

NOTE: Specimens reported as *Hypoaspis miles* by Halliday, 1998: ??? and Halliday, 2001: ??? were reidentified as *S. lamington*.

***Stratiolaleaps marylin* Walter & Campbell, 2003.**

Stratiolaleaps marylin Walter & Campbell, 2003: 265.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Saint Lucia Campus (27°30'S, 153°01'E), University of Queensland, Queensland, Australia, in bamboo litter.

***Stratiolaelaps miles* (Berlese, 1892).**

Laelaps (*Iphis*) *miles* Berlese, 1892: LXIII, 9.

Laelaps miles.— Berlese, 1892: 35.

Iphis miles.— Berlese, 1892: 35.

Hypoaspis miles.— Oudemans, 1902b: 24; Oudemans, 1903b: 129; Costa, 1966c: 74; Bhattacharyya, 1967: 129; Solomon, 1968a: 675; Allred, 1969: 242; Garret & Allred, 1971: 294; Shcherback, 1973: 446; Beron, 1974: 165; Allred, 1975: 127; Hughes, 1976: 299; Koyumdjieva, 1979: 72; Ren & Guo, 2008: 329.

Hypoaspis (*Stratiolaelaps*) *miles*.— Berlese, 1916b: 168; Evans & Till, 1966: 222; Aswegen & Loots, 1970: 205; Bregetova, 1977: 511; Koyumdzhieva, 1979: 72; Ishikawa, 1982: 94; Karg, 1993b: 262; Strong & Hallyday, 1994: 87.

Hypoaspis (*Stratiolaelaps*) *miles*.— Lombardini, 1936: 42.

Cosmolaelaps gurabensis Fox, 1946b: 449 [Junior synonymy of *H.* (*S.*) *miles* by Evans & Till, 1966: 222; of *H. miles* by Costa, 1966c: 74; Hugles, 1976: 299; of *H.* (*S.*) *miles* by Bregetova, 1977: 511; of *S. miles* by Rosario, 1981: 76; of *H.* (*C.*) *miles* by Tenorio, 1982: 264; of *C. miles* by Farrier & Hennessey, 1993: 69].

Cosmolaelaps gurabensis.— Thurman et al., 1949: 1; Ellis Jr., 1955: 16; Bregetova, 1956: 75; Hays & Guyton, 1958: 260; Reitblat, 1963: 76; Goncharova & Buyakova, 1964: 281; Grokhovskaya & Huan-Hoe, 1969: 819.

Hypoaspis gurabensis.— Allred & Beck, 1956: 39; Allred, 1958: 28.

Laelaps miles; *non Laelaps.*— Tipton, 1960: 301.

Stratiolaelaps gurabensis.— Hughes, 1961: 217; Costa, 1962: 489.

Hypoaspis (*Stratiolaelaps*) *milescuneifer* Greim in Hirschmann et al., 1969: 139 [Junior synonymy of *H.* (*S.*) *miles* by Bregetova, 1977: 511; of *H.* (*C.*) *miles* by Karg, 1981a: 217; Karg, 1988: 513; Karg, 1993a: 139; of *C. miles* by Farrier & Hennessey, 1993: 69].

Hypoaspis (*Cosmolaelaps*) *miles*.— Karg, 1971: 163; Karg, 1978b: 9; Karg, 1979: 72; Karg, 1981a: 217; Tenorio, 1982: 264; Tenorio et al., 1985: 300; Karg, 1988: 513; Karg, 1993a: 139; Faraji et al., 2008: 207; Bai & Ma, 2012: 558.

Stratiolaelaps miles.— Domrow, 1974: 16; Rosario, 1981: 76; Zaher, 1986: 199; Shaw, 1999: 45; Walter & Campbell, 2003: 267; Moreira et al., 2014: 322.

Hypoaspis (*Striatolaelapa*) [sic] *miles*.— Hafez et al., 1982: 3.

Cosmolaelaps miles.— Farrier & Hennessey, 1993: 69; Ma, 1995a: 432; Ma, 1998: 163.

TYPE DEPOSITORY: of *S. miles*: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy; of *C. gurabensis*: Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico; of *H.* (*S.*) *milescuneifer*: unspecified.

TYPE LOCALITY AND HABITAT: of *L.* (*I.*) *miles*: Padua, Italy, in stable and in hay; *C. gurabensis*: type series, Camp O'Reilly, Gurabo, Puerto Rico, on "*Rattus* sp. or *Mus musculus musculus*" [sic] [Rodentia: Muridae]; of *H.* (*S.*) *milescuneifer*: Erlangen, Germany, on *Lasius niger* [Hymenoptera: Formicidae].

NOTES: (a) Hirschmann et al. (1969) described *H.* (*S.*) *milescuneifer* based on specimens that (apparently) were described as *Stratiolaelaps cuneifer* in an unpublished dissertation by Greim, 1952 at Erlangen. (b) specimens reported by Domrow, 1987: 846 and Shaw, 1999: 45 as *S. miles* were reidentified as *Stratiolaelaps scimitus* (Womersley)

by Walter & Campbell, 2003: 266. (c) Domrow, 1974: 16, Rosario, 1981: 76 and Domrow, 1987: 846 considered *S. scimitus* to be a junior synonymy of *S. miles* (Berlese), but Walter & Campbell, 2003: 266 considered them to be different species; that latter interpretation is accepted in this publication. (d) Specimens reported as *Hypoaspis miles* by Halliday, 1998: ??? and Halliday, 2001: ??? were reidentified as *Stratiolaelaps lamington*.

***Stratiolaelaps misellus* (Berlese, 1918).**

Hypoaspis (*Stratiolaelaps*) *misellus* Berlese, 1918: 121.

Hypoaspis (*Stratiolaelaps*) *misellus*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Somalia, on rotting wood in woods by Juba river.

***Stratiolaelaps ornatissima* (Aswegen & Loots, 1970).**

Hypoaspis (*Stratiolaelaps*) *ornatissima* Aswegen & Loots, 1970: 203.

Hypoaspis (*Cosmolaelaps*) *ornatissima*.— Karg, 1981a: 216; Karg, 1987: 294; Karg, 1988: 512; Huhta & Karg, 2010: 330.

Hypoaspis (*Stratiolaelaps*) *ornatissima*.— Karg, 1993b: 262.

Stratiolaelaps ornatissima.— Walter & Campbell, 2003: 257; Moreira et al., 2014: 322.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Ngorong, Tanzania (= Tanganyika), unspecified substrate.

***Stratiolaelaps pauperculus* (Berlese, 1918).**

Hypoaspis (*Stratiolaelaps*) *pauperculus* Berlese, 1918: 120.

Hypoaspis (*Stratiolaelaps*) *pauperculus*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Samarang, Java, Indonesia, in humus.

***Stratiolaelaps reticulata* (Zumpt & Patterson, 1951) n. comb..**

Davisiella reticulata Zumpt & Patterson, 1951: 78.

TYPE DEPOSITORY: South African Institute for Medical Research, Johannesburg, South Africa.

TYPE LOCALITY AND HABITAT: Vumba, Umtali, Zimbabwe [=South Rhodesia], on *Crocidura luna* [Soricomorpha: Soricidae].

***Stratiolaelaps retirugi* (Ma, Yang & Zhang, 2004).**

Cosmolaelaps retirugi Ma, Yang & Zhang, 2004: 93.

Cosmolaelaps retirugi.— Ren & Guo, 2008: 328.

Hypoaspis (*Cosmolaelaps*) *retirugi*.— Bai & Ma, 2012: 558.

Stratiolaelaps retirugi.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Institute for Endemic Disease Prevention and Control of Qinghai Province, Qinghai, China.

TYPE LOCALITY AND HABITAT: Zongzhai, Huangzhong (36°27'N, 101°30'E), Qinghai, China, on *Rattus norvegicus* [Rodentia: Muridae].

***Stratiolaelaps rugosissimus* (Berlese, 1916).**

Hypoaspis (*Stratiolaelaps*) *rugosissimus* Berlese, 1916b: 169.

Hypoaspis (*Stratiolaelaps*) *rugosissimus*.— Lombardini, 1936: 42.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, unspecified substrate.

***Stratiolaelaps scimitus* (Womersley, 1956).**

Cosmolaelaps scimitus Womersley, 1956a: 580.

Hypoaspis (*Cosmolaelaps*) *scimitus*.— Karg, 1978b: 8.

Hypoaspis (*Cosmolaelaps*) *scimita*.— Karg, 1979: 71; Karg, 1981a: 216; Tenorio, 1982: 267; Tenorio et al., 1985: 300; Karg, 1987: 293; Karg, 1988: 512; Huhta & Karg, 2010: 330.

Hypoaspis (*Stratiolaelaps*) *miles elsi* Aswegen & Loots, 1970: 205 [Junior synonymy of *S. scimitus* by Walter & Campbell, 2003: 266].

Hypoaspis (*Cosmolaelaps*) *elsi*.— Karg, 1981a: 216; Karg, 1987: 294; Karg, 1988: 512; Huhta & Karg, 2010: 331.

Hypoaspis (*Stratiolaelaps*) *elsi*.— Karg, 1993b: 262.

Cosmolaelaps scimitus.— Farrier & Hennessey, 1993: 69.

Hypoaspis (*Stratiolaelaps*) *antennata* Karg, 1993b: 262 [Junior synonymy of *S. scimitus* by Walter & Campbell, 2003: 266].

Hypoaspis (*Stratiolaelaps*) *scimita*.— Strong & Hallyday, 1994: 87.

Stratiolaelaps scimitus.— Walter & Campbell, 2003: 266; Faraji & Halliday, 2009: 260; Moreira et al., 2014: 322.

Hypoaspis (*Cosmolaelaps*) *antennata*.— Huhta & Karg, 2010: 331.

TYPE DEPOSITORY of *C. scimitus*: South Australian Museum, Adelaide, Australia; of *H.* (*S.*) *miles elsi*: Institute for Zoological Research, Potchefstroom University, South Africa; of *H.* (*S.*) *antennata*: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT of *C. scimitus*: Sansapore, Dutch New Guinea, on *Rattus concolor* [Rodentia: Muridae]; of *H.* (*S.*) *miles elsi*: ?Namibia [= S.W.A., probably South West Africa], unspecified substrate; of *H.* (*S.*) *antennata*: Academy Bay, Santa Cruz, Galapagos Islands, supralittoral zone, on decaying leaves.

NOTES: (a) Specimens reported by Domrow, 1987: 846 and Shaw, 1999: 45 as *Stratiolaelaps miles* (Berlese) were re-identified as *S. scimitus* by Walter & Campbell, 2003: 266. (b) Domrow, 1974: 16, Rosario, 1981: 76 and Domrow, 1987: 846 considered *S. scimitus* to be a junior synonymy of *S. miles* (Berlese), but Walter & Campbell, 2003: 266 considered them to be different species; that latter interpretation is accepted in this publication.

***Stratiolaelaps womersleyi* Walter & Campbell, 2003.**

Stratiolaelaps womersleyi Walter & Campbell, 2003: 264.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Central Highlands, Cement Creek (37°43'S, 145°42'E), Victoria, Australia, in cool-temperate rainforest litter.

***Stratiolaelaps xiajiangensis* (Liu & Ma, in Liu et al., 2000).**

Cosmolaelaps xiajiangensis Liu & Ma, in Liu et al., 2000: 381.

Cosmolaelaps xiajiangensis.— Ma et al., 2004: 93; Ren & Guo, 2008: 328; Ma & Lin, 2009: 35.

Hypoaspis (*Cosmolaelaps*) *xiajiangensis*.— Bai & Ma, 2012: 558.

Stratiolaelaps xiajiangensis.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: Institute of Parasitic Diseases, Hubei Academy of Medical Sciences, Hubei, China.

TYPE LOCALITY AND HABITAT: about 1600-1800 m above sea level,Shennongjia Forest region ((31°15'-31°57'N, 109°56'-110°58'E), Hubei, China, on unidentified insectivora.

***Stratiolaelaps yeruiyuae* (Ma, 1995).**

Cosmolaelaps yeruiyuae Ma, 1995a: 432.

Cosmolaelaps yeruiyuae.— Ma, 1998: 163; Liu et al., 2000: 381; Ren & Guo, 2008: 328.

Hypoaspis (*Cosmolaelaps*) *yeruiyuae*.— Bai & Ma, 2012: 558.

Stratiolaelaps yeruiyuae.— Moreira et al., 2014: 322.

TYPE DEPOSITORY: First Institute of Endemic Disease Research, Jilin, China.

TYPE LOCALITY AND HABITAT: Qianguoerluosi (45°N, 125°E), Mongolian Autonomous County, Jilin, China, on *Cricetulus barabensis* [Rodentia: Cricetidae].

***Suracarus* Flechtmann, 2005.**

Suracarus Flechtmann, 2005: 39.

ETYMOLOGY: *Sur*, Latin, shortened form of *super*; *acarus*, mite, refers to the size of the mite, masculine.

TYPE SPECIES: *Suracarus inusitatus* Flechtmann, 2005: 39.

***Suracarus inusitatus* Fletchtmann, 2005.**

Suracarus inusitatus Fletchtmann, 2005: 39.

TYPE DEPOSITORY: Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, State of São Paulo, Brazil.

TYPE LOCALITY AND HABITAT: Caruari, Amazonas, Brazil, in nest of *Trigona albipennis* (Hymenoptera: Apidae).

***Tengilaelaps* Gu, Wang & Fan, 1996.**

Tengilaelaps Gu, Wang & Fan, 1996: 406.

TYPE SPECIES: *Tengilaelaps cerambycius* Gu, Wang & Fan, 1996.

***Tengilaelaps cerambycius* Gu, Wang & Fan, 1996.**

Tengilaelaps cerambycius Gu, Wang & Fan, 1996: 407.

Tengilaelaps cerambycius.— Ren & Guo, 2008: 328.

TYPE DEPOSITORY: Department of Parasitology, Medical School, Nanjing University, Nanjing, China.

TYPE LOCALITY AND HABITAT: Huating (24.2°N, 102.8°E), Yunnan, China, on unidentified cerambycid (Coleoptera: Cerambycidae).

***Xylocolaelaps* Royce & Krantz, 2003.**

Xylocolaelaps Royce & Krantz, 2003: 108.

TYPE SPECIES: *Xylocolaelaps burgetti* Royce & Krantz, 2003: 110.

***Xylocolaelaps burgetti* Royce & Krantz, 2003.**

Xylocolaelaps burgetti Royce & Krantz, 2003: 110.

TYPE DEPOSITORY: National Museum of Natural History, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Chiang Mai, Thailand, in nest of *Xylocopa* (*Nyctomelitta*) *tranquebarica* (Hymenoptera: Apidae).

Species related in the past to genera considered to belong to Laelapidae, but now placed in genera of other families or Laelapidae groups not considered in this catalogue

***Gymnolaelaps annectans* Womersley, 1955.**

Gymnolaelaps annectans Womersley, 1955: 419.

Gymnolaelaps annectans Womersley, 1956a: 584 (objective homonymy).

Pseudoparasitus annectans.— Hunter, 1961: 12.

Gymnolaelaps annectans.— Domrow, 1961: 61; Domrow, 1962: 274; Domrow, 1963: 201; Domrow, 1967: 769; Domrow, 1973: 63; Domrow, 1976: 187; Domrow, 1987: 828; Farrier & Hennessey, 1993: 73; Joharchi, Halliday, Saboori & Kamali, 2011: 25.

Hypoaspis nidicorva Evans & Till, 1966: 179 [Junior synonym by Domrow, 1973: 63; Tenorio, 1982: 268; Farrier & Hennessey, 1993: 73; Joharchi & Halliday, 2013: 48].

Hypoaspis nidicorva.— Shcherback, 1971a: 78.

Hypoaspis (*Gymnolaelaps*) *nidicorva*.— Bregetova, 1977: 524.

Hypoaspis (*Holostaspis*) *nidicorva*.— Karg, 1978b: 14.

Pseudoparasitus (*Gymnolaelaps*) *annectans*.— Karg, 1978a: 206; Karg, 1981b: 218; Tenorio, 1982: 268; Tenorio et al., 1985: 301; Karg, 1989a: 334.

Hypoaspis (*Laelaspis*) *nidicorva*.— Karg, 1979: 101; Karg, 1982: 249; Karg, 1989b: 120; Karg, 1993a: 159.

Gymnolaleaps nidicorva.— Joharchi et al., 2012: 2013.

Nidilaelaps annectans.— Shaw, 2012: 28 [here considered to belong to Laelapinae].

NOTE: Morphological characters of species of this genus does not support its close relation to *Hypoaspis* s.l., however its phoretic association with vertebrates relates it to Laelapinae, whereas its seemingly predatory behavior relates it to Hypoaspidinae (Shaw, 2012: 25).

***Haemolaelaps nuttalli* (Hirst, 1915).**

Laelaps nuttalli Hirst, 1915.

Haemolaelaps nuttalli.— Buitendjik, 1945: 299.

NOTE: presently in *Laelaps* (Laelapidae: Laelapinae) (Zumpt, 1950a: 77).

***Haemolaelaps qinghaiensis* (Yang & Gu, 1985).**

Haemogamasus qinghaiensis Yang & Gu, 1985: 54.

Haemolaelaps qinghaiensis.— Yang et al., 1993: 253.

NOTE: Yang et al., 1993: 253 mentioned this species under *Haemogamasus* and *Haemolaelaps*. We considered the citation under *Haemolaelaps* to be a *lapsus calami*.

***Haemolaelaps thompsoni* Turk, 1950.**

Haemolaelaps thompsoni Turk, 1950.

NOTE: presently in *Laelaps* Koch (Laelapidae: Laelapinae) (Zumpt, 1950: 77).

***Holostaspis aemulans* Berlese, 1910.**

Holostaspis aemulans Berlese, 1910: 163.

NOTE: presently in Macrochelidae (Berlese, 1918: 146).

***Holostaspis asperrimus* Berlese, 1910.**

Holostaspis asperrimus Berlese, 1910: 163.

NOTE: presently in Macrochelidae (Hartini & Takaku, 2012: 11).

***Holostaspis confusa* Foà, 1900.**

Holostaspis confusa Foà, 1900: 137.

NOTE: presently in *Glyptholaspis* (Macrochelidae) (Hyatt & Emberson, 1988: 116).

***Holostaspis cordiger* Berlese, 1888.**

Holostaspis cordiger Berlese, 1888: 195.

NOTE: presently in *Macrocheles* (Macrochelidae) (Hyatt & Emberson, 1988: 116).

***Holostaspis dispar* Berlese, 1910.**

Holostaspis dispar Berlese, 1910: 251.

NOTE: presently in Macrochelidae (Hartini & Takaku, 2012: 9).

***Holostaspis* (*Gamasholaspis*) Berlese, 1904.**

Holostaspis (*Gamasholaspis*) Berlese, 1904: 265.

NOTE: presently in Parholaspidae Evans.

***Holostaspis* (*Gamasholaspis*) *gamasoides* Berlese, 1904.**

Holostaspis (*Gamasholaspis*) *gamasoides* Berlese, 1904: 265.

NOTE: presently in *Gamasholaspis* (Parholaspidae) (Tenorio & Marshall, 1977: 329).

***Holostaspis* (*Holaspulus*) Berlese.**

Holostaspis (*Holaspulus*) Berlese: 265.

NOTE: presently in Parholaspidae Evans.

***Holostaspis* (*Holaspulus*) *tenuipes* Berlese, 1904.**

Holostaspis (*Holaspulus*) *tenuipes* Berlese, 1904: 266.

Hypoaspis tenuipes.— Berlese, 1918: 117.

NOTE: presently in *Holaspulus* (Parholaspidae) (Tenorio & Marshall, 1977: 332).

***Holostaspis kraepelini* Berlese, 1910.**

Holostaspis kraepelini Berlese, 1910: 164.

NOTE: presently in Macrochelidae (Berlese, 1918: 146).

***Holostaspis longispinosus* (Kramer)**

Gamasus longispinosus Kramer, 1876: 100.

Holostaspis longispinosus.— Canestrini & Canestrini, 1882: 31; Canestrini, 1885: 63; Berlese, 1887: XLIV, 1.

NOTE: presently in *Geholaspis* (*Geholaspis*) (Macrochelidae) (Luxton, 1998: 18).

***Holostaspis longulus* Berlese, 1887.**

Holostaspis longulus Berlese, 1887: XLIII, 9.

NOTE: presently in *Longicheles* (Macrochelidae) (Emberson, 2010: 45).

***Holostaspis longulus* var. *hortorum* Berlese, 1904.**

Holostaspis longulus var. *hortorum* Berlese, 1904: 265.

NOTE: transferred to *Geholaspis* (*Longicheles*) *hortorum* (Macrochelidae) by Hyatt & Emberson, 1988: 74.

***Holostaspis mandibularis* Berlese, 1904.**

Holostaspis mandibularis Berlese, 1904: 263.

NOTE: presently in *Longicheles* (Macrochelidae) (Emberson, 2010: 45).

***Holostaspis marginatus* (Hermann, 1804).**

Acarus marginatus Hermann, 1804: 76.

Holostaspis marginatus.— Canestrini & Canestrini, 1882: 26; Berlese, 1883: 215; Canestrini, 1885: 61; Berlese, 1889: LII, 4, 5, 6.

NOTES: (a) Foà, 1900: 139 and Berlese, 1904: 277 mentioned that this species could be the senior synonym of *Holostaspis vagabundus* Berlese. (b) junior synonym of *Macrocheles muscaedomesticae* Scalopi (Macrochelidae) (Krantz, 1962: 146).

***Holostaspis marginatus* var. *americanus* Berlese, 1888.**

Holostaspis marginatus var. *americanus* Berlese, 1888: 195.

NOTE: presently in *Glyptholaspis* (Macrochelidae) (Filipponi & Pegazzano, 1963).

***Holostaspis marginatus* var. *littoralis* Halbert, 1915.**

Holostaspis marginatus var. *littoralis* Halbert, 1915: 67.

NOTE: junior synonym of *Macrocheles glaber* (Müller, 1860) (Luxton, 1998: 18), of Macrochelidae (Evans & Browning 1956: 16)

***Holostaspis merdarius* Berlese, 1889.**

Holostaspis merdarius Berlese, 1889: fasc. LII, n. 1.

Holostaspis adulescens Berlese, 1910: 252 [junior synonymy of *Macrocheles merdarius* by Filipponi & Pegazzano, 1963).

NOTE: presently in Macrochelidae (Berlese, 1918: 146).

***Holostaspis montivagus* Berlese, 1887.**

Holostaspis montivagus Berlese, 1887: XLIV, 4.

NOTE: presently in *Macrocheles* (*Macrocheles*) (Macrochelidae) (Schmölzer, 1993: 428).

***Holostaspis* (*Holostaspella*) *ornatus* Berlese, 1904.**

Macrocheles vagabundus Oudemans, 1902: 43 [misidentification, according to Berlese, 1904: 277].

Holostaspis (*Holostaspella*) *ornatus* Berlese, 1904: 277.

NOTES: This species was described based on specimen reported by Oudemans, 1902: 43 as *M. vagabundus*, presently in Macrochelidae.

***Holostaspis penicilliger* Berlese, 1904.**

Holostaspis penicilliger Berlese, 1904: 264.

NOTE: presently in Macrochelidae (Berlese, 1918: 146; Halliday, 1998)

***Holostaspis pisentii* Berlese, 1887.**

Holostaspis pisentii Berlese, 1887: XLV, 1.

Holostaspis pisentii.— Berlese, 1888: 195.

NOTE: presently in Macrochelidae (Berlese, 1918: 146)

***Holostaspis posteroarmatus* Berlese, 1904.**

Holostaspis posteroarmatus Berlese, 1904: 263.

NOTE: presently in Macrochelidae (Berlese, 1918: 146).

***Holostaspis hamadryadis* Berlese**

Holostaspis hamadryadis Berlese

NOTE: presently in Macrochelidae (Berlese, 1918: 146)

***Holostaspis isidis* Berlese, 1910.**

Holostaspis isidis Berlese, 1910: 252.

NOTE: presently in Macrochelidae (Berlese, 1918: 146)

***Holostaspis subbadius* Berlese, 1904.**

Holostaspis subbadius Berlese, 1904: 264.

NOTE: presently in *Macrocheles* (Macrochelidae) (Fillipponi & Pegazzano, 1963: 73).

***Holostaspis subbadius* var. *robustulus* Berlese, 1904.**

Holostaspis subbadius var. *robustulus* Berlese, 1904: 264.

Holostaspis humeratus Berlese, 1908: 13.

NOTE: presently in *Macrocheles* (Macrochelidae) (Hyatt & Emberson, 1988: 106).

***Holostaspis subbadius* var. *scutatus* Berlese, 1904.**

Holostaspis subbadius var. *scutatus* Berlese, 1904: 264.

NOTE: presently in *Macrocheles* (Macrochelidae) (Fillipponi & Pegazzano, 1963).

***Holostaspis terreus* (Canestrini & Fanzago, 1877).**

Gamasus terreus Canestrini & Fanzago, 1877: 48.

Holostaspis terreus.— Canestrini & Canestrini, 1882: 29; Canestrini, 1885: 62.

NOTE: presently in *Macrocheles* (Macrochelidae) (Hyatt & Emberson, 1988: 74).

***Holostaspis tridentinus* Canestrini & Canestrini, 1882.**

Holostaspis tridentinus Canestrini & Canestrini, 1882: 30

Holostaspis tridentinus.— Canestrini, 1885: 63; Berlese, 1887: XLIII, 7.

NOTE: presently in *Nothrholaspis* (Macrochelidae) (Emberson, 2010: 47).

***Holostaspis vagabundus* Berlese, 1889.**

Holostaspis vagabundus Berlese, 1889: LII, 8.

NOTES: (a) Foà, 1900: 139 and Berlese, 1904: 277 mentioned that this species could be the junior synonym of *Holostaspis marginatus*. (b) junior synonym of *Glyptholaspis americana* (Berlese) (Macrochelidae) (Hyatt & Emberson, 1988: 116).

***Hypoaspis bandicoota* Womersley, 1956.**

Hypoaspis bandicoota Womersley, 1956a: 573.

NOTE: presently in *Mesolaelaps* (Laelapidae: Laelapinae) (Domrow, 1958).

***Hypoaspis coleoptratus* Berlese, 1888.**

Hypoaspis coleoptratus Berlese, 1888: 198.

Laelaps (*Hypoaspis*) *coleoptratus*.— Berlese, 1903: 14.

Ololaelaps coleoptrata.— Berlese, 1904: 261.

NOTE: presently in *Ologamasellus* (Ologamasidae) (Berlese, 1916)

***Hypoaspis coleoptratus* Berlese, 1888.**

Hypoaspis coleoptratus Berlese, 1888.

NOTE: presently in *Hydrogamasellus* Hirschmann (Ologamasidae) (Lee, 1970).

***Hypoaspis corniger* (Berlese, 1891).**

Epicrius corniger Berlese, 1891: 2.

Hypoaspis corniger.— Oudemans, 1903: 87; Oudemans, 1904: 86.

NOTE: transferred to *Episeius* Hull by Schweizer, 1949: 66, a junior synonym of *Cheiroseius* Berlese (Blattisociidae).

***Hypoaspis cossi* (Dugès, 1834).**

Gamasus cossi Dugès, 1834: 19.

Hypoaspis cossi.— Oudemans, 1902b: 19; Oudemans, 1903b: 130.

NOTE: presently in *Proctolaelaps* Berlese (Melicharidae) (Evans, 1958: 198).

***Hypoaspis gehennalis* Oudemans, 1916.**

Hypoaspis gehennalis Oudemans, 1916: 308.

Donia gehennalis.— Oudemans, 1939a: 197; Buitendijk, 1945: 295.

NOTE: designated by Oudemans, 1939a: 197 as type species of *Donia* Oudemans of Neoparasitidae (probably Rhodacaroidea).

***Hypoaspis glaber* (Berlese, 1886).**

Epicrius glaber Berlese, 1886: 9.

Hypoaspis glabra.— Oudemans, 1903: 87; Oudemans, 1904: 86.

NOTE: presently in *Cheiroseius* Berlese (Blattisociidae) (Karg, 1981: 60).

***Hypoaspis globulus* (Koch, 1839).**

Iphis globulus Koch, 1839: 17.

Hypoaspis globulus.— Oudemans, 1902c: 289.

NOTES: (a) Oudemans, 1902c: 289 considered this species to be the senior synonym of *Laelaps placentula* Berlese. Subsequent authors considered them to be different species. The latter interpretation is adopted in this publication. (b) *I. globulus* was designated as the type species of *Hyletastea* Gistel, 1884.

***Hypoaspis haemisphaericus* (Koch, 1839).**

Iphis haemisphaericus Koch, 1839.

Hypoaspis haemisphaericus.— Oudemans, 1906: 99; Buitendijk, 1945: 296.

Ololaelaps haemisphaericus.— Willmann, 1951: 113.

Periphis haemisphaericus.— Berlese, 1914.

NOTES: Designated by Berlese, 1914 as type species of *Periphis* Berlese, junior synonym of *Stylochyrus* Canestrini & Canestrini, Ologamasidae.

***Hypoaspis hypudaei* Oudemans, 1902.**

Hypoaspis hypudaei Oudemans, 1902b: 21.

Hypoaspis hypudaei.— Oudemans, 1903b: 130; Oudemans, 1913a: 6; Oudemans, 1913b: 185; Hull, 1918: 67.

Hypoaspis pygmaeus.— Oudemans, 1916: 299.

Haemolaelaps pygmaeus.— Wolf, 1934: 644.

Chamolaelaps hypudaei.— Turk & Turk, 1952: 482.

NOTE: junior synonym of *Proctolaelaps pygmaeus* (Müller) (Melicharidae) (Oudemans, 1916a: 299; Buitendijk, 1945: 296).

***Hypoaspis lealaptoides* (Berlese, 1885).**

Epicrius lealaptoides Berlese, 1885: 21.

Hypoaspis laelaptoides.— Oudemans, 1903: 87; Oudemans, 1904: 86.

NOTE: presently in *Cheiroseius* Berlese (Blattisociidae) (Bregetova, 1977: 191).

***Hypoaspis necorniger* Oudemans, 1903.**

Hypoaspis necorniger Oudemans, 1903: 87.

Hypoaspis necorniger.— Oudemans, 1904: 87.

Platyseius necorniger.— Buitendijk, 1945: 296.

Episeius nerconiger.— Schweizer, 1949: 67

NOTE: *Episeius* Hull is junior synonym of *Cheiroseius* Berlese (Blattisociidae).

***Hypoaspis nemorensis* (Koch, 1839).**

Gamasus nemorensis Koch, 1839: fasc. 24, fig. 18 = Veigaiidae

Hypoaspis nemorensis.— Canestrini, 1885: 82.

NOTE: presently in Veigaia Oudemans (Veigaiidae) (Oudemans, 1905).

***Hypoaspis ometes* Oudemans, 1903.**

Hypoaspis ometes Oudemans, 1903: 100.

Hypoaspis ometes.— Oudemans, 1912: 216.

Cosmolaelaps ometes.— Buitendijk, 1945: 298.

NOTE: presently in *Lasioseius* Berlese (Blattisociidae) (Berlese, 1916: 33).

***Hypoaspis ovatus* Ma, Ning & Wei, 2003.**

Hypoaspis ovatus Ma, Ning & Wei, 2003: 256.

Hypoaspis ovatus.— Ren & Guo, 2008: 329.

NOTE: junior synonym of *Proctolaelaps pygmaeus* (Müller) (Melicharidae) (Ma, 2006).

***Hypoaspis pavidus* (Koch).**

Hypoaspis pavidus.— Oudemans, 1902b: 19; Oudemans, 1903b: 129; Buitendijk, 1945: 296.

NOTES: (a) Oudemans, 1902b: 19 considered *H. pavidus* to be the senior synonym of *Hypoaspis claviger* Berlese. Berlese, 1904: 276, did not accept that synonymy. The latter interpretation is adopted in this publication. (b) transferred to *Kleemamannia* Oudemans (Ameroseiidae) by Oudemans, 1930: 137.

***Hypoaspis pectinifer* (Canestrini & Canestrini, 1881).**

Gamasus pectinifer Canestrini & Canestrini, 1881: 1082.

Hypoaspis pectinifer.— Canestrini, 1885: 83.

NOTE: presently in Pachylaelapidae, Berlese, 1892: 73.

***Hypoaspis pyrobolus* (Koch, 1839).**

Iphis pyrobolus Koch, 1839.

Hypoaspis pyrobulus.— Oudemans, 1906: 99.

NOTE: Designated by Berlese, 1903 as type species of *Eviphis*, Eviphididae.

***Hypoaspis richiardii* (Canestrini & Fanzago).**

Dermanyssus richiardii Canestrini & Fanzago, 1877: 303.

Hypoaspis richiardii.— Oudemans, 1939b: 303.

NOTE: presently in *Dermanyssus* Dugès (Dermanyssidae).

***Hypoapsis semiscissus* (Berlese, 1892).**

Laelaps (*Iphis*) *semiscissus* Berlese, 1892: LXVII, 7.

Hypoaspis semiscissus.— Oudemans, 1902: 24; Oudemans, 1903b: 129.

NOTE: presently in *Arctoseius* Thor (Ascidae) (Willmann, 1949).

***Hypoaspis spirostrepti* Oudemans, 1914.**

Hypoaspis spirostrepti Oudemans, 1914a: 69.

Hypoaspis spirostrepti.— Oudemans, 1915b: 131; Buitendijk, 1945: 300.

Laelaps (*Hypoaspis*) *spirostrepti*.— Vitzthum, 1921: 14.

Hypoaspis (*Hypoaspis*) *spirostrepti*.— Evans, 1955: 361.

NOTE: presently in *Julolaelaps* Berlese (Iphiopsididae) (Ryke, 1959: 7).

***Hypoaspis stabularis* (Koch, 1836).**

Gamasus stabularis Koch, 1836: ???.

Hypoaspis stabularis.— Canestrini, 1885: 86; Oudemans, 1902c: 189; Oudemans, 1912c: 244; Oudemans, 1913a: 7; Oudemans, 1913b: 189; Oudemans, 1913c: 64.

NOTE: presently in *Eulaelaps* Berlese (Laelapidae: Haemogamasinae) (Luxton, 1998).

***Hypoaspis subglabra* Oudemans, 1903.**

Hypoaspis subglabra Oudemans, 1903: 87.

Hypoaspis subglabra.— Oudemans, 1904: 88.

NOTE: junior synonym of *Platyseius tendens* Schrank (Blattisociidae) (Oudemans, 1929).

***Hypoaspis* (*Julolaelaps*) *nishikawai* Ishikawa, 1986.**

Hypoaspis (*Julolaelaps*) *nishikawai* Ishikawa, 1986: 170.

NOTE: Ryke 1959 considered *Julolaelaps* as subgenus of *Hypoaspis*, Maes (1983) restored *Julolaelaps* to genus level and Casanueva (1993) placed it in the family Iphiosididae.

***Hypoaspis* (*Julolaelaps*) *parvitergalis* Ishikawa, 1986.**

Hypoaspis (*Julolaelaps*) *parvitergalis* Ishikawa, 1986: 166.

NOTE: Ryke 1959 considered *Julolaelaps* as subgenus of *Hypoaspis*, Maes (1983) restored *Julolaelaps* to genus level and Casanueva (1993) placed it in the family Iphiosididae.

***Hypoaspis* (*Julolaelaps*) *parvunglatus* Ishikawa, 1986.**

Hypoaspis (*Julolaelaps*) *parvunglatus* Ishikawa, 1986: 168.

NOTE: Ryke 1959 considered *Julolaelaps* as subgenus of *Hypoaspis*, Maes (1983) restored *Julolaelaps* to genus level and Casanueva (1993) placed it in the family Iphiosididae.

***Laelaps* (*Hypoaspis*) *indicus* Vithzthum, 1921.**

Laelaps (*Hypoaspis*) *indicus* Vithzthum, 1921: 16.

Hypoaspis (*Hypoaspis*) *indicus*.— Evans, 1955: 361.

NOTE: junior synonym of *Julolaelaps luctator* Berlese, 1916 (Iphiopsididae) (Ryke, 1959: 7).

***Laelaps* (*Hypoaspis*) *longipes* Halbert, 1915.**

Laelaps (*Hypoaspis*) *longipes* Halbert, 1915: 72.

Hypoapsis longipes.— Hull, 1918: 67.

NOTE: junior synonym of *Haemogamasus pontiger* (Berlese) (Laelapidae: Haemogamasinae) (Luxton, 1998).

***Laelaspis laevis* (Oudemans & Voigts, 1904).**

Seiulus levis Oudemans & Voigts, in Voigts & Oudemans, 1904: 655.

Laelaspis laevis.— Buitendijk, 1945: 297.

NOTE: presently in *Neojordensia* Evans (Ascidae) (Schweizer, 1961: 130).

***Myrmozercon reidi* Gunther, 1951.**

Myrmozercon reidi Gunther, 1951: 155.

NOTE: junior synonym of *Varroa jacobsoni* Oudemans (Varroidae) (Delfinado, 1963: 113).

***Myrmozercon robustisetae* Rosario & Hunter, 1988**

Myrmozercon robustisetae Rosario & Hunter, 1988: 466.

Myrmozercon robustisetae.— Farrier & Henessey, 1993: 83.

NOTE: presently in *Urozercon* Berlese (Varroidae) (OConnor & Klimov, 2004).

Incertae sedis

***Cosmolaelaps* ? *novus* Lombardini, 1960.**

Cosmolaelaps ? *novus* Lombardini, 1960: 256.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Buenos Aires, Argentina, on *Acaromyrmex* [sic] *lundi* [Formicidae].

NOTE: uncertain generic placement.

***Gamasus fenilis* Mégnin, 1876.**

Gamaus fenilis Mégnin, 1876.

Hypoaspis oculatus Oudemans, 1915a: 183 [Junior synonym of *H. fenilis* by Buitendijk, 1945: 299]

Haemolaelaps mohrae Oudemans, 1928: 374 [Junior synonym of *H. fenilis* by Buitendijk, 1945: 299]

Haemolaelaps molestus Oudemans, 1929: 13 [Junior synonym of *H. fenilis* by Buitendijk, 1945: 299; Samšiňák, 1958: 186; Strandtmann, 1963: 4]

Hypoaspis fenilis.— Hill & Gordon, 1945.

Haemolaelaps fenilis.— Buitendijk, 1945: 299; Samšiňák, 1958; McGraw & Farrier, 1969: 137.

Atricholaelaps megaventralis Strandtmann, 1947: 112 [Junior synonym of *H. fenilis* by Samšiňák, 1958: 186; Garret & Haramoto, 1967: 387].

Hypoaspis freemani Hughes, 1948: 129 [Junior synonym of *H. fenilis* by Samšiňák, 1958: 186]

Haemolaelaps molestus.— Willmann, 1939: 173; Strandtmann, 1963: 4.

NOTE: As summarized by Halliday, 2011: 63, *Gamasus fenilis* Mégnin, 1876 is considered as senior synonym of *A. casalis* by some authors (e.g. Samšiňák, 1958: 186; McGraw & Farrier, 1969: 137; Garrett & Haramoto, 1967: 387), but not by others (Evans & Till, 1966: 152; Domrow, 1980: 209; Farrier & Hennessey, 1993: 64), the synonymy remains unresolved because of the short and inadequate original description.

***Holostaspis echinatus* Berlese, 1904.**

Holostaspis echinatus Berlese, 1904b: 20.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in humus.

NOTE: uncertain familial placement, not a Laelapidae.

***Holostaspis wyandottensis* Packard, 1888.**

Laelaps wyandottensis Packard, 1888: 42.

Laelaps wyandottensis.— Banks, 1907: 610.

Laelaps wyandottensis; *non Laelaps*.— Tipton, 1960: 310.

TYPE DEPOSITORY: Museum of Comparative Zoology, Cambridge, Massachusetts, United States of America.

TYPE LOCALITY AND HABITAT: Little Wyandotte Cave, Indiana, United States of America, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis alphabetica* (Berlese, 1904).**

Laelaps (*Hypoaspis*) *alphabeticus* Berlese, 1904b: 17.

Laelaps alphabeticus; *non Laelaps*.— Tipton, 1960: 286.

Hypoaspis alphabeticus.— Buitendijk, 1945: 295; Turk, 1948: 113.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Brazil, in nest of *Melipona mandacaia* [mentioned as *Meliponae mandaçaiae*] [Hymenoptera: Apidae].

NOTE: uncertain generic placement.

***Hypoaspis anila* Pramanik & Raychaudhuri, 1968.**

Hypoaspis anila Pramanik & Raychaudhuri, 1968: 353.

Hypoaspis anila.— Prasad, 1974: 150.

TYPE DEPOSITORY: Entomology Laboratory, Department of Zoology, Kolkata University, Kolkata (= Calcutta), India.

TYPE LOCALITY AND HABITAT: Ramkishorpur, 24 Parganas, West Bengal, India, in litter.

NOTE: uncertain generic placement.

***Hypoaspis atomarius* (Berlese, 1916).**

Hypoaspis atomarius Berlese, 1916b: 167.

Hypoaspis (*Pneumolaelaps*) *atomarius*.— Aswegen & Loots, 1970: 208.

Pneumolaelaps atomarius.— Rosario, 1981: 72.

Hypoaspis (*Geolaelaps*) *atomaria*.— Karg, 1982: 242; Karg, 1989b: 116.

Hypoaspis atomaria.— Strong & Halliday, 1994: 91; Strong, 1995: 222.

Hypoaspis s. l. *atomarius*.— Beaulieu, 2009: 37.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Mogadishu [mentioned as Mogadiscio], Somalia, on unidentified Coleoptera [Animalia].

NOTE: According to Hunter & Husband, 1973: 77 this species may belong to *Androlaelaps.*

***Hypoaspis australis* Hull, 1923.**

Hypoaspis australis Hull, 1923: 610.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Crawley, Western Australia, Australia, with *Camponotus chalceus* [Formicidae].

NOTE: uncertain generic placement.

***Hypoaspis baichengensis* Ma, 2000**.

Hypoaspis baichengensis Ma, 2000: 384.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Baicheng (45°37'N, 122°49'E), Jilin, China, in soil in woods poplar [Plantae: Salicaceae].

NOTE: uncertain generic placement.

***Hypoaspis baloghi* Shereef & Afifi, 1980.**

Hypoaspis baloghi Shereef & Afifi, 1980: 127.

Hypoaspis baloghi.— Zaher, 1986: 194; Nawar et al., 1993: 347.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in organic manure.
NOTE: probably a *Laelaspis*.

***Hypoaspis calcarata* Hallyday, 2005.**
Hypoaspis calcarata Hallyday, 2005: 30.
TYPE DEPOSITORY: National Collection of Mites, ARC Plant Protection Research Institute, Pretoria, South Africa.
TYPE LOCALITY AND HABITAT: Hermanus, Western Cape Province, South Africa, on *Oxalis* sp. [Plantae: Oxalidaceae] and weeds.
NOTE: probably a *Holostaspis*.

***Hypoaspis caudata* (Berlese, 1904).**
Laelaps (*Hypoaspis*) *caudatus* Berlese, 1904b: 17.
Laelaps caudatus; *non Laelaps*.— Tipton, 1960: 290.
TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.
TYPE LOCALITY AND HABITAT: Sumatra, Indonesia, on *Parathelphusa tridentata* [mentioned as *Paratelphusa tridentata*] [Decapoda: Gecarcinucidae].
NOTE: uncertain generic placement.

***Hypoaspis cavernicolus* (Packard, 1888).**
Laelaps (*Iphis*) *cavernicola* Packard, 1888: 42.
Laelaps cavernicola.— Banks, 1907: 610.
Hypoaspis cavernicola.— Oudemans, 1914b: 85; Farrier & Hennessey, 1993: 77.
Laelaps cavernicola; *non Laelaps*.— Tipton, 1960: 290.
TYPE DEPOSITORY: Museum of Comparative Zoology, Cambridge, Massachusetts, United States of America.
TYPE LOCALITY AND HABITAT: Mammoth Cave, Kentucky, United States of America, on fungus mycelium.
NOTE: uncertain generic placement.

***Hypoaspis chaetopus* Meledzhayeva, 1963.**
Hypoaspis chaetopus Meledzhayeva, 1963: 49.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series: Lengych, on clawed ground squirrel [Rodentia: Sciuridae]; Kizyldzha-Baba, on great gerbil [Rodentia: Sciuridae]; Zakhmet, in nest of great gerbil; Kara-Belenda, on clawed ground squirrel [Rodentia: Sciuridae]; Kizyldzha-Baba, in tunnel of great gerbil; Karakum Canal, on great gerbil; all in Karakum, Turkmenistan.

***Hypoaspis celeripediformis* Oudemans, 1902.**

Hypoaspis celeripediformis Oudemans, 1902b: 22.

Hypoaspis celeripediformis.— Oudemans, 1903b: 129.

Coleolaelaps celeripediformis.— Buitendijk, 1945: 298.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: The Netherlands, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis cucumerus* Nasr & Nawar, 1989.**

Hypoaspis cucumerus Nasr & Nawar, 1989a: 71.

Hypoaspis cucumerus.— Shereef et al., 1992: 1131; Nawar et al., 1993: 347.

TYPE DEPOSITORY: Acarology Research Unit, National Research Centre, Dokki, Cairo, Egypt and Agricultural Zoology Department, Faculty of Agriculture, Cairo University, Giza, Egypt.

TYPE LOCALITY AND HABITAT: Qassasin, Ismailia, Egypt, in soil under *Cucumerus melon* [sic] [probably *Cucumis melo*] [Plantae: Cucurbitaceae].

NOTE: probably *Gaeolaelaps*.

***Hypoaspis dasypus* Menzies & Strandtmann, 1952.**

Hypoaspis dasypus Menzies & Strandtmann, 1952: 265.

Hypoaspis dasypa.— Farrier & Hennessey, 1993: 77.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Austin, Travis, Texas, United States of America, in nest of *Dasypus novemcinctus* [Dasypodidae].

NOTE: probably *Gaeolaelaps*.

Hypoaspis decellei **(Van Driel, Loots & Marais, 1977).**

Hypoaspis decellei Van Driel, Loots & Marais, 1977: 321.

TYPE DEPOSITORY: Musée Royal de l'Afrique Centrale, Tervuren, Belgium; accession number M.T.133.548.

TYPE LOCALITY AND HABITAT: Diana's Peak, Saint Helena Island, in soil.

NOTE: probably *Gaeolaelaps*.

Hypoaspis decemsetae **Karg, 1994.**

Hypoaspis decemsetae Karg, 1994: 185.

TYPE DEPOSITORY: Museum für Naturkunde, Berlin, Germany.

TYPE LOCALITY AND HABITAT: Baltra road, 6 km north of Servicio Parque Nacional Galápagos, Santa Cruz, Galapagos Islands, unspecified substrate.

NOTE: probably *Pseudoparasitus*

Hypoaspis disparatus **(Banks, 1916).**

Parasitus disparatus Banks, 1916: 229.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Latrobe, Tasmania, Australia, with *Polyrachis hexacantha* [Formicidae].

NOTE: uncertain generic placement.

Hypoaspis elimatus **Berlese, 1920.**

Hypoaspis elimatus Berlese, 1920: 152.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: type series, Florence and Pisa, Italy, in litter.

NOTE: uncertain generic placement.

Hypoaspis evansi **Arutunjan, 1993.**

Hypoaspis evansi Arutunian, 1993: 115.

TYPE DEPOSITORY: Armenian Institute of Zoology, Yerevan, Armenia; accession number 46.

TYPE LOCALITY AND HABITAT: on *Geotrupes spiniger* [Geotrupidae] deposited in the insect collection of the Armenian Institute of Zoology, Yerevan, Armenia.

NOTE: uncertain generic placement.

***Hypoaspis evansi* Hunter, 1964.**

Hypoaspis evansi Hunter, 1964a: 638.

Hypoaspis evansi.— Spain & Luxton, 1971: 186; Pugh, 1993: 333.

TYPE DEPOSITORY: Australian National Insect Collection, Canberra, Australia.

TYPE LOCALITY AND HABITAT: Green Gorge, Macquarie Island, unspecified substrate.

NOTE: probably *Gaeolaelaps*.

***Hypoaspis favosus* Turk, 1948.**

Hypoaspis favosus Turk, 1948: 113.

Hypoaspis favosus.— Farrier & Hennessey, 1993: 77; Smiley et al., 1996: 201.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Saint Augustine, Trinidad, in nest of *Melipona favosa favosa* [Hymenoptera: Apidae].

NOTE: uncertain generic placement.

***Hypoaspis fortis* Berlese, 1920.**

Hypoaspis fortis Berlese, 1920: 151.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis fucorum* Hull, 1925.**

Hypoaspis fucorum Hull, 1925: 210.

Chamolaelaps fucorum.— Turk & Turk, 1952: 482.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: West Allendale, England, in nest of *Bombus smithianus* [Hymenoptera: Apidae].

NOTE: uncertain generic placement.

***Hypoaspis* (*Hypoaspis*) *gergus* Hafez, ElBadry & Nasr, 1982.**

Hypoaspis (*Hypoaspis*) *gergus* Hafez, ElBadry & Nasr, 1982: 11.

Hypoaspis gergus .— Zaher, 1986: 193; Shereef et al., 1992: 1130; Nawar et al., 1993: 347; El-Banhawy et al., 2006: 66.

Hypoaspis gregus [sic].— Nasr & Nawar, 1989a: 70.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Bondar, Girga, Sohag, Egypt, under peach trees [Plantae: Rosaceae].

NOTE: probably *Gaeolaelaps*.

***Hypoaspis grandipes* (Berlese, 1905).**

Laelaps (*Hypoaspis*) *grandipes* Berlese, 1905: 169.

Laelaps grandipes; *non Laelaps*.— Tipton, 1960: 295.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Tjibodas, Java, Indonesia, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis guiyangensis* Ma & Lin, 2009.**

Hypoaspis guiyangensis Ma & Lin, 2009: 28.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Guiyang (26°34'N, 106°41'E), Guizhou, China, under bark of withered tree.

NOTE: uncertain generic placement.

***Hypoaspis heterosetosus* (Bernhard in Hirschmann et al., 1969).**

Hypoaspis (*Hypoaspisella*) *heterosetosus* Bernhard in Hirschmann et al., 1969: 135.

Hypoaspis (*Pneumolaelaps*) *heterosetosa*.— Karg, 1979: 92; Karg, 1982: 246; Karg, 1993a: 153.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Erlangen, Germany, in compost, *Elymus* sp. hay [Plantae: Poaceae], rabbit manure.

NOTE: uncertain generic placement.

***Hypoaspis hoffmannae* Smiley, Baker & Delfinado-Baker, 1996.**

Hypoaspis hoffmannae Smiley, Baker & Delfinado-Baker, 1996: 198.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America.

TYPE LOCALITY AND HABITAT: Puchong, Selangor, Malaysia, in nest of *Trigona iridipennis* (Apidae).

NOTE: probably *Hunteria*.

***Hypoaspis holostaspoides* Canestrini, 1884.**

Hypoaspis holostaspoides Canestrini, 1884.

Hypoaspis holostaspoides.— Canestrini, 1885: 85; Oudemans, 1902b: 23.

Laelaps holostaspoides.— Berlese, 1892: LXX, 13.

Hypoaspis holaspidoides [sic].— Oudemans, 1903b: 129.

Laelaps (*Hypoaspis*) *holostaspoides*.— Berlese, 1903: 14.

Oolaelaps holostaspoides.— Berlese, 1904: 261.

Laelaps holostaspoides; *non Laelaps*.— Tipton, 1960: 297.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Porretta and Mesina, Italy, in moss.

NOTE: uncertain generic placement.

***Hypoaspis incisus* Oudemans, 1903.**

Hypoaspis incisus Oudemans, 1903: 86.

Hypoaspis incisus.— Oudemans, 1904: 82; Buitendijk, 1945: 296.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: unspecified.

NOTE: uncertain generic placement.

***Hypoaspis inepilis* Banks, 1916.**

Hypoaspis inepilis Banks, 1916: 227.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Sydney, New South Wales, Australia, with *Camponotus* sp. [Formicidae].

NOTE: uncertain generic placement.

***Hypoaspis inermis* (Berlese, 1910).**

Laelaps (*Hypoaspis*) *inermis* Berlese, 1910b: 370.

Laelaps inermis; *non Laelaps*.— Tipton, 1960: 298.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Java, Indonesia, on unidentified insect.

NOTE: uncertain generic placement.

***Hypoaspis* (*Laelaspisella*) *cavitatis* (Karg, 1982).**

Hypoaspis (*Pneumolaelaps*) *cavitatis* Karg, 1982: 253.

Hypoaspis (*Laelaspisella*) *cavitatis*.— Karg, 1989: 110.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenschaften, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Barueri, State of São Paulo, Brazil, in soil with *Camponodos rufipes* [Hymenoptera: Formicidae].

NOTE: Karg, 1989: 107 considered *Laelaspisella* as a subgenus of *Hypoaspis*, while Karg & Schorlemmer, 2013: 194 re-stated *Laelaspisella* at the genus level, including this species as a member of those taxa. While re-evaluating *Laelaspisella*, Joharchi & Halliday, 2013: 46 stated that this species appear to belong to an unknown Neotropical genus.

***Hypoaspis latifrons* Hull, 1925.**

Hypoaspis latifrons Hull, 1925: 208.

Hypoaspis latifrons.— Turk, 1953: 11.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Great Britain, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis latisternus* (Halbert, 1923).**

Laelaps latisternus Halbert, 1923: 367.

Hyletastes latisternus.— Turk & Turk, 1952: 482.

TYPE DEPOSITORY: Irish National Museum, Dublin, Ireland.

TYPE LOCALITY AND HABITAT: Lucan Demesne, Dublin, Ireland, under stones.

NOTE: uncertain generic placement.

***Hypoaspis lepta* Oudemans, 1903**.

Hypoaspis lepta Oudemans, 1903: 53.

Hypoaspis lepta.— Oudemans, 1912: 216; Buitendijk, 1945: 296.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Italy, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis lignicola* (Canestrini & Canestrini, 1882).**

Laelaps lignicola Canestrini & Canestrini, 1882: 74.

Hypoaspis lignicola.— Canestrini, 1885: 89; Oudemans, 1902: 24; Oudemans, 1903b: 129.

Laelaps (*Iphis*) *lignicola*.— Berlese, 1892: LXX, 2.

Laelaps lignicola; *non Laelaps.*— Tipton, 1960: 299.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Padova, Italy, on rotten tree.

NOTE: uncertain generic placement.

***Hypoaspis linteyini* Samšiňák, 1964.**

Hypoaspis linteyini Samšiňák, 1964: 49.

Hypoaspis linteyini.— Ren & Guo, 2008: 329

TYPE DEPOSITORY: Institute of Zoology of the Chinese Academy of Sciences, Beijin, China.

TYPE LOCALITY AND HABITAT: Kao-ho, Kanton Province, China, in nests of *Coptotermes formosanus* (Rhinotermitidae).

NOTE: uncertain generic placement.

***Hypoaspis longichaetus* Ma, 1996.**

Hypoaspis longichaetus Ma, 1996: 51.

Hypoaspis longichaetus.— Ren & Guo, 2008: 329.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Zhanyu (44°31'N, 122°38'E), Tongyu, Jilin, China, in nest of *Cricetulus barabensis* [Rodentia: Cricetidae].

NOTE: uncertain generic placement.

***Hypoaspis lyratus* (Banks, 1916).**

Parasitus lyratus Banks, 1916: 229.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Dunorlan, Tasmania, Australia, with *Amblyopone australis* [Formicidae].

NOTE: uncertain generic placement.

***Hypoaspis magnisetae* Ma, 1988.**

Hypoaspis magnisetae Ma, 1988: 147.

Hypoaspis magnisetae.— Ren & Guo, 2008: 329

TYPE DEPOSITORY: First Institute of Endemic Diseases Research, Jilin, China.

TYPE LOCALITY AND HABITAT: Oula (34°6'N, 101°43'E), Taojiang, Gansu, China, on *Marmota himalayana* [Sciuridae].

NOTE: probably *Holostaspis*.

***Hypoaspis maximus* (Berlese, 1904).**

Laelaps (*Laelaps*) *maximus* Berlese, 1904: 259.

Hypoaspis maximus.— Buitendijk, 1945: 296.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Montevideo, Uruguay, on *Hesperomys vulpinus* [Rodentia: Cricetidae]

NOTE: a) Buitendijk, 1945: 296 mentioned as *Hypoaspis maximus* without any explanation; b)uncertain generic placement.

***Hypoaspis meliponarum* Vitzthum, 1930. não é Hypo**

Hypoaspis meliponarum Vitzthum, 1930a: 290.

Hypoaspis meliponarum.— Salt, 1929: 447; Turk, 1948: 113; Baker et al., 1983: 10; Farrier & Hennessey, 1993: 78; Smiley et al., 1996: 201.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Rio Frio, Magdalena, Colombia, in nest of *Melipona interrupta* [Hymenoptera: Apidae].

NOTE: uncertain generic placement.

***Hypoaspis minusculus* Banks, 1916.**

Hypoaspis minusculus Banks, 1916: 227.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Sydney, New South Wales, Australia, with unspecified ants [Formicidae].

NOTE: uncertain generic placement.

***Hypoaspis neimongolianus* Ma & Wang, 1998.**

Hypoaspis neimongolianus Ma & Wang, 1998: 1.

Hypoaspis neimongolianus.— Ma, 2005b: 74; Ren & Guo, 2008: 329.

TYPE DEPOSITORY: National Base of Plague and Brucellosis Control, Baicheng, Jilin, China.

TYPE LOCALITY AND HABITAT: Sunite Right Banner (42°46'N, 112°40'E), Inner Mongolia Autonomous Region, China, in the nests of *Microtus brandti* [Rodentia: Cricetidae].

NOTE: uncertain generic placement.

***Hypoaspis nitidissimus* Hull, 1918.**

Hypoaspis nitidissimus Hull, 1918: 67.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: West Allendale, Leicestershire, England, in barns.

NOTE: uncertain generic placement.

***Hypoaspis orientalis* Bhattacharyya, 1968.**

Hypoaspis orientalis Bhattacharyya, 1968: 543.

Hypoaspis orientalis.— Prasad, 1974: 151.

TYPE DEPOSITORY: Zoological Survey of India, Kolkata (= Calcutta), West Bengal, India.

TYPE LOCALITY AND HABITAT: near Netra railway station, Netra, 24 Parganas, West Bengal, India, in litter and soil under *Adina cordifolia* [Plantae: Rubiaceae].

NOTE: uncertain generic placement.

***Hypoaspis pellucida* (Berlese, 1904).**

Laelaps (*Hypoaspis*) *pellucidus* Berlese, 1904b: 18.

Laelaps pellucidus; *non Laelaps*.— Tipton, 1960: 304.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Tiarno, Trento, Italy, in litter.

NOTE: uncertain generic placement.

***Hypoaspis petrovae* Shereef & Afifi, 1980.**

Hypoaspis petrovae Shereef & Afifi, 1980: 131.

Hypoaspis petrovae.— Zaher, 1986: 192; Nasr & Nawar, 1989a: 70; Shereef et al., 1992: 1130; Nawar et al., 1993: 347..

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in organic manure.

NOTE: uncertain generic placement.

***Hypoaspis praetarsalis* Karg, 1978.**

Hypoaspis (*Hypoaspis*) *praetarsalis* Karg, 1978b: 20.

TYPE DEPOSITORY: Ungarischen Naturwissenchaftlichen Museum, Budapest, Hungary.

TYPE LOCALITY AND HABITAT: near Parinacota, Tarapaca, Chile, under rocks.

NOTE: probably *Gaeolaelaps*.

***Hypoaspis pygmaeus* Meledzhayeva, 1963.**

Hypoaspis chaetopus Meledzhayeva, 1963: 53.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series: Kizyldzha-Baba, in tunnel of great gerbil [Rodentia: Sciuridae]; vicinity of Kadyr-Gotyr, Karabile, unspecified substrate; all in Karakum, Turkmenistan.

***Hypoaspis quadridentatus* Allred, 1970.**

Hypoaspis quadridentatus Allred, 1970: 110.

TYPE DEPOSITORY: United States National Museum, Washington, District of Columbia, United States of America; accession number B-67721.

TYPE LOCALITY AND HABITAT: 4.8 km above Saidu, Margarzar Road, Swat, Pakistan (= West Pakistan), on *Tatera indica* [Rodentia: Muridae].

NOTE: probably *Gaeolaelaps*

***Hypoaspis relictovi* Senotrusova, 1982.**

Hypoaspis relictovi Senotrusova, 1982: 6.

TYPE DEPOSITORY: Institute of Zoology, Kazakhstan; accession number 5067.

TYPE LOCALITY AND HABITAT: in Terskey Alatau, central Tyan Shan, Kazakhstan, in nest of *Citellus relictus* (= *Spermophilus relictus*) [Sciuridae].

NOTE: uncertain generic placement.

***Hypoaspis reticulatus* (Sheals, 1962).**

Hypoaspis reticulatus Sheals, 1962: 105.

Hypoaspis reticulotus [sic].— Sheals, 1962: 106.

TYPE DEPOSITORY: British Museum (Natural History), London, England; ; accession number 1961-6-20-46.

TYPE LOCALITY AND HABITAT: Nahuel Huapi, Puerto Catello, Patagonia, Argentina, on vegetation among rocks.

NOTE: probably *Gaeolaelaps*.

***Hypoaspis reticulatus* Chaudhury, Gupta & Saha, 2010.**

Hypoaspis reticulatus Chaudhury, Gupta & Saha, 2010: 135.

TYPE DEPOSITORY: Entomology and Wildlife Biology Research Laboratory, Calcutta University, Kolkata, India.

TYPE LOCALITY AND HABITAT: Swarup Nagar, North 24 Parganas, West Bengal, India, in nest of *Bandicoota bengalensis* [Rodentia: Muridae].

NOTE: uncertain generic placement.

***Hypoaspis rhinarius* Vitzthum, 1935.**

Hypoaspis rhinarius Vitzthum, 1935: 583.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: West Indies [Caribbean area], on *Sericoles holosericeus* [Trochilidae].

NOTE: uncertain generic placement.

***Hypoaspis sentifer* (Berlese, 1918).**

Hypoaspis sentifer Berlese, 1918: 118.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Samarang, Java, Indonesia, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis setosus* Meledzhayeva, 1963.**

Hypoaspis chaetopus Meledzhayeva, 1963: 53.

TYPE DEPOSITORY: Zoological Institute of the Academy of Sciences of the USSR, Leningrad, Russia.

TYPE LOCALITY AND HABITAT: type series: vicinity of Kadyr-Gotyr, Karabile, in tunnel of Afghan vole [Rodentia: Cricetidae]; Kizyldzha-Baba, in tunnel of great gerbil [Rodentia: Sciuridae]; all in Karakum, Turkmenistan.

***Hypoaspis solimani* Shereef, Nawar & Ahmed, 1992.**

Hypoaspis solimani Shereef, Nawar & Ahmed, 1992: 1124.

Hypoaspis solimani Nawar, Shereef & Ahmed, 1993: 344 (objective homonymy).

TYPE DEPOSITORY: Agricultural Zoology Department, Faculty of Agriculture, Cairo University, Giza, Egypt.

TYPE LOCALITY AND HABITAT: Faculty of Agriculture, Cairo University, Giza, Egypt, in compost.

NOTE: uncertain generic placement.

***Hypoaspis soricinus* Hull, 1925.**

Hypoaspis soricinus Hull, 1925: 210.

Chamolaelaps soricinus.— Turk & Turk, 1952: 482.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: West Allendale, England, on unidentified shrew [Soricidae].

NOTE: uncertain generic placement.

***Hypoaspis spiniferus* (Berlese, 1904).**

Laelaps (*Hypoaspis*) *spiniferus* Berlese, 1904: 260.

Hypoaspis spiniferus.— Buitendijk, 1945: 297.

Laelaps spiniferus; *non Laelaps*.— Tipton, 1960: 307.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: West Africa, unspecified substrate.

NOTE: uncertain generic placement.

***Hypoaspis tripodiger* Berlese, 1916.**

Hypoaspis tripodiger Berlese, 1916b: 167.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: La Plata, Argentina, in nest of *Acromyrmex lundi* [Hymenoptera: Formicidae].

NOTE: uncertain generic placement.

***Hypoaspis trispinosus* Berlese, 1920.**

Hypoaspis trispinosus Berlese, 1920: 151.

TYPE DEPOSITORY: Istituto Sperimentale per la Zoologia Agraria, Florence, Italy.

TYPE LOCALITY AND HABITAT: Florence, Italy, in humus.

NOTE: uncertain generic placement.

***Hypoaspis troglodytes* (Packard, 1888).**

Gamasus troglodytes Packard, 188: 42.

Gamasus troglodytes.— Banks, 1907: 610.

TYPE DEPOSITORY: Museum of Comparative Zoology, Cambridge, Massachusetts, United States of America.

TYPE LOCALITY AND HABITAT: Mammoth Cave, Kentucky, United States of America, on fungus mycelium.

NOTE: uncertain generic placement.

***Hypoaspis xiningensis* Ma & Lin, 2009.**

Hypoaspis xiningensis Ma & Lin, 2009: 28.

TYPE DEPOSITORY: Entomology Gallery, Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing, China.

TYPE LOCALITY AND HABITAT: Xining (36°34'N, 101°49'E), Qinghai, China, on scraps of wood.

NOTE: probably *Gaeolaelaps*

***Hypoaspis zachvatkinae* Shereef & Afifi, 1980.**

Hypoaspis zachvatkinae Shereef & Afifi, 1980: 125.

Hypoaspis zachvatkinae.— Zaher, 1986: 194.

Hypoaspis zachvatkini [sic].— Nawar et al., 1993: 347.

TYPE DEPOSITORY: Faculty of Agriculture, Cairo University, Cairo, Egypt.

TYPE LOCALITY AND HABITAT: Giza, Egypt, in organic manure.

Note: probably *Laelaspis*.

***Hypoaspis zaheri* Fouly & Al-Rehiayani, 2011.**

Hypoaspis zaheri Fouly & Al-Rehiayani, 2011: 143.

TYPE DEPOSITORY: Zoology Laboratory, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabi.

TYPE LOCALITY AND HABITAT: Onayzah, Al-Qassim, Saudi Arabi, in litter.

NOTE: uncertain generic placement.

***Hypoaspis womersleyi* (Domrow, 1957).**

Hypoaspis womersleyi Domrow, 1957: 205.

TYPE DEPOSITORY: Queensland Museum, South Brisbane, Australia.

TYPE LOCALITY AND HABITAT: Low Isles (145°34'E, 16°23'S), Great Barrier Reef, Australia, on leaf mould on cay.

NOTE: probably *Gaeolaelaps*.

***Laelaps* (*Hypoaspis*) *intermedius* Karawajew, 1909.**

Laelaps (*Hypoaspis*) *intermedius* Karawajew, 1909: 234.

NOTE: Karawajew does note that his *Laelaps intermedius* is intermediate between *L. myrmecophilus* Berlese and *L. myrmophilus* Michael. Both are currently placed in the genus *Gymnolaelaps*.

***Laelaspisella foramenis* (Karg, 1989).**

Hypoaspis (*Laelaspisella*) *foramenis* Karg, 1989: 108.

TYPE DEPOSITORY: Institut für Pflanzenschutzforschung Kleinmachnow, Kleinmachnow, Brandenburg, Germany.

TYPE LOCALITY AND HABITAT: Saint Lucia, Lesser Antilles [Caribbean area], unspecified substrate.

NOTE: Karg, 1989: 107 considered *Laelaspisella* as a subgenus of *Hypoaspis*, while Karg & Schorlemmer, 2013: 194 re-stated *Laelaspisella* at the genus level, including this species as a member of those taxa. While re-evaluating *Laelaspisella*, Joharchi & Halliday, 2013: 46 stated that this species appear to belong to an unknown Neotropical genus.

***Stratiolaelaps glaber* Trägårdh, 1952.**

Stratiolaelaps glaber Trägårdh, 1952: 66.

TYPE DEPOSITORY: unspecified.

TYPE LOCALITY AND HABITAT: Pare, Arihiri, Society Islands, Tahiti, unspecified substrate.

NOTE: uncertain generic placement.

Discussion

A total of 833 species belonging to 43 genera are reported in this paper. The genus *Androlaelaps* contains the largest number of species (227 species). Twenty of the genera are monotypic. A large number (69 species) are of uncertain taxonomic placement (*incertae sedis*), because of the insufficient details known about them until now. This suggests that a large number of species of this family is in need of adequate revision. The preparation of the catalog represents a significant step towards the proper knowledge of the taxonomy of Laelapidae, making relevant information and a list of references available to taxonomists interested on this group.

References

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CHAPTER 5 - Potential of Laelapidae mites (Acari: Mesostigmata) and entomopathogenic nematodes (Nematoda: Rhabditida) as control agents of *Frankliniella occidentalis* (Insecta: Thysanoptera)

Abstract: The thrips *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae) is a worldwide pest of several cultivated plants. Predatory mites of the subfamily Hypoaspidinae (Laelapidae) and entomopathogenic nematodes (EPN) have been considered promising biological control agents of pre-pupae/ pupae of *F. occidentalis* on the soil surface in different countries. Studies to evaluate new populations of mites of these groups and EPN as control agents of *F. occidentalis* are highly desirable. The aim of this study was to evaluate hypoaspidine and EPN species, most of which collected in Brazil, for that purpose, and to evaluate their possible antagonistic interaction. Experiments were conducted in a chamber at 25 ± 1 ºC, 70 ± 10% RH and in the dark. *Cosmolaelaps jaboticabalensis* Moreira, Klompen and Moraes and *Stratiolaelaps scimitus* (Womersley) preyed upon about 2.5 and 3.9 pre-pupae/pupae of *F. occidentalis* and laid about 2.2 and 1.4 eggs per day, respectively. *Heterorhabditis amazonensis* GL Andaló, Nguyen and Moino Jr. was the most virulent nematode, producing mortality of about 87.5% of exposed pre-pupae/ pupae. None of the evaluated predators showed preference for that nematode as prey and none of the evaluated nematodes interfered in the survivorship of the predators. These results suggest that *C. jaboticabalensis* and *S. scimitus* could be used in isolation or together with the nematode *H. amazonensis* for the control of *F. occidentalis*.

Keywords: *Cosmolaelaps*; *Stratiolaelaps scimitus*; *Heterorhabditis amazonensis*; biological control; predatory mites.

Introduction

Worldwide, the thrips *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae) causes major damage to several cultivated plants, acting as pest or vector of pathogens (Reitz 2009). Its control is usually done with the use of insecticides (Cloyd 2009). According to van Lenteren (2000), although a large number of predators, parasitoids and entomopathogens are known as thrips natural enemies, the use of these organisms for thrips control is still limited in most countries. The detection of new control agents may enhance biological control of *F. occidentalis* in those countries and even in countries where this pest has already been controlled biologically. Given that the pest spends about a third of its life cycle on the soil surface (Ebssa et al. 2001), edaphic natural enemies have the potential to play an important role in its control, complementing the use of natural enemies that live on the aerial parts of the host plants.

Predatory mites of the subfamily Hypoaspidinae (Laelapidae) have received considerable attention as potential control agents of edaphic insect pests, given that these mites are mostly found on the soil surface. It has been demonstrated that satisfactory control of *F. occidentalis* can be achieved with the use of the hypoaspidin *Gaeolaelaps aculeifer* (Canestrini) and *Stratiolaelaps miles* (Berlese) (Berndt et al. 2004; Wiethoff et al. 2004), which attack pre-pupae and pupae (edaphic phases) of that thrips. These predators are commercially produced for the control of a few pests, including *F. occidentalis*. Hypoaspidine predatory mites can be reared in large scale at relatively low prices (Freire and Moraes 2007), making their use competitive with other control methods.

Entomopathogenic nematodes (EPN) have also been demonstrated as efficient in the control of pre-pupae and pupae of *F. occidentalis*. These EPN include *Steinernema* (Rhabditida: Steinernematidae) and *Heterorhabditis* (Rhabditida: Heterorhabditidae) species (Ebssa et al. 2001; Buitenhuis and Shipp 2005). Synergistic effects have been reported when these are released along with some predatory mites [e.g. *G. aculeifer* (= *Hypoaspis aculeifer*) and *Neoseiulus cucumeris* (Oudemans) (= *Amblyseius cucumeris*), according to Premachandra et al. (2003) and Ebssa et al. (2006), respectively]. Despite the high efficiency observed for some of these nematodes by themselves, their combined use with other biological control agents can be desirable, given that the use of high dosages of the nematodes may

not always be economically feasible (Ebssa et al. 2001). However, the association of different biological control agents requires that they are not antagonistic to each other.

The aim of this study was to evaluate the effect of different hypoaspidine and EPN species, most of which collected in Brazil, as control agents of *F. occidentalis*, and to evaluate their possible antagonistic interaction.

Materials and Methods

The original sources of the predators used in the study were as follows: *Cosmolaelaps barbatus* Moreira, Klompen and Moraes - litter under pepper plants [*Capsicum chinense* Jacq. (Solanaceae)], at Piracicaba, São Paulo, Brazil, November 2011; *Cosmolaelaps jaboticabalensis* Moreira, Klompen and Moraes - litter under loquat trees [*Eriobothrya japonica* (Thunb) (Rosaceae)], at Jaboticabal, São Paulo, Brazil, December 2011; *Stratiolaelaps scimitus* (Womersley) - from manure, at Pains, Minas Gerais, Brazil, July 2011. The colonies were maintained in units similar to those described by Freire and Moraes (2007), kept in a rearing chamber at 25 ± 2 °C, 70 ± 10% RH, in the dark. They were fed with a mixture of all developmental stages of *Tyrophagus putrescentiae* (Schrank) (Acari: Astigmatina: Acaridae), offered on pieces of a commercial dog food (Purina ®).

The strains of *Heterorhabditis amazonensis* Andaló, Nguyen and Moino Jr. were obtained from the collection of entomopathogens of Laboratório de Patologia de Insetos, Universidade Federal de Lavras (UFLA), Lavras, Minas Gerais, Brazil, while *Steinernema* species were obtained from “Coleção de Entomopatógenos Oldemar Cardim Abreu", of Instituto Biológico de São Paulo, Campinas, São Paulo, Brazil. The original sources of the EPN were as follows: strains RSC 01 and RSC 05 of *H. amazonensis* - soil samples from Benjamin Constant, Amazonas, Brazil; strain GL of the same species - soil samples from Lavras, Minas Gerais, Brazil; strain A11 of *Steinernema carpocapsae* (Weiser) - North Carolina, United States of America; *Steinernema feltiae* (Filipjev) - Becker Underwood®, United States of America; strain CB06 of *Steinernema brazilense* Nguyen, Ginarte, Leite, Santos and Harakava - soil samples from Porto Murtinho, Mato Grosso do Sul, Brazil. Infective juveniles (IJ) of

the EPN were kept in an aqueous suspension in a chamber (at 16 ± 2 °C, 70 ± 10% RH, in the dark) and replicated monthly in last larval instar of *Galleria mellonela* L. (Lepidoptera: Pyralidae).

Other organisms used in this study were obtained as follows: pre-pupae and pupae of *F. occidentalis*, from a colony initiated with insects collected from sweet pepper [*Capsicum annuum* L. (Solanaceae)] and roses [*Rosa* sp. (Rosaceae)] respectively at Iacanga and Atibaia, São Paulo, Brazil, in 2011, and kept on jack-bean [*Canavalia ensiformis* (L.) (Fabaceae)]; nymphs of *Rhizoglyphus echinopus* (Fumouze and Robin) (Acari: Astigmatina: Acaridae), from a colony initiated with mites collected from *Amarilis* sp. bulbs (Amaryllidaceae) at Holambra, São Paulo, Brazil, in 2006, and kept on the same commercial dog food; all developmental stages of *T. putrescentiae*, from a colony maintained in the acarology laboratory of Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ), Universidade de São Paulo (USP) for more than five years, on the same commercial dog food; all developmental stages of the free-living nematode *Protorhabditis* sp. (Rhabditina: Rhabditidae), from a colony initiated with specimens collected from manure, at Piracicaba, 2010, and kept on pods of green- bean [*Phaseolus vulgaris* L. (Fabaceae)].

Nematode pathogenicity

The study was initiated with infective juveniles (IJ) obtained from the infection of last larval instar of *G. mellonella* reared according to the method described by Dutky et al. (1964), using the artificial diet described by Parra (1998). Ten healthy larvae were transferred to each Petri dish (9 cm diameter) lined with two filter paper disks of the same diameter. For each species, 2 mL of the aqueous stock suspension (about 1000 IJ) was transferred to a dish, kept in a chamber at 25 ^{o}C for 72 h to allow larval infection and early nematode development. After that period, all larvae were dead, being then transferred to a dry chamber consisting of a Petri dish (9 cm diameter) lined with a dry filter paper disk (Molina and Lopez 2001). They were maintained in the chamber for four days to allow further nematode development of the nematodes and for confirmation of the typical larval symptoms of each nematode genus. The use of dry chamber reduced the chance of contamination by saprophytic

organisms. The larvae were then transferred to White trap (White 1927), containing 5 mL of distilled water, to maintain the IJ in suspension after leaving the host. The suspension of each trap was then transferred to a 1 L beaker containing 800 mL of distilled water, where it remained for 24 h for decantation of the nematodes to be used in the experiments. The IJ settled on the bottom were then collected discarding the supernatant.

Each experimental unit consisted of a Petri dish (5 cm in diameter and 1 cm in height) containing 5 g of a commercial plant substrate (Bioplant ®) composed of pine bark and coconut fiber, to simulate the soil environment. Each unit was inoculated with 1.5 mL (about 1000 IJ, corresponding to about 666 IJ / mL of the substrate or 50 IJ/$cm^2$of surface area) of the respective nematode suspension. Subsequently, ten pupae of *F. occidentalis* were uniformly distributed on the surface of the substrate of each dish. A control treatment was included, corresponding to the application of 1.5 mL of distilled water to each unit. Each treatment was replicated four times and kept in a chamber at 25±2°C, 70±10% RH and in the dark. The number of dead thrips in each unit was assessed five days later. Treatment means were corrected by Abbott's formula (Abbott 1925) before transformation ($\sqrt{x + 0.5}$) to submit to analysis of variance and comparison of means (Tukey´s test).

Predator oviposition and predation potential

Oviposition and predation rates of *C. barbatus*, *C. jaboticabalensis* and *S. scimitus* were evaluated on potential prey. The main prey offered were pre-pupae/pupae of *F. occidentalis* and the combined developmental stages of three nematode species, including the two strains determined as most promising in the previous study (*H. amazonensis* GL and *S. brazilense* CB06) and the free-living *Protorhabditis* sp.. *Rhizoglyphus echinopus*, an important edaphic pest of several crops, was also included as prey.

The experimental unit consisted of a plastic Petri dish (3 cm diameter and 2 cm in height) whose base was covered with a layer of a solidified paste made of a mixture of gypsum and activated charcoal (9v:1v), kept moist by daily addition of distilled water and sealed with a plastic film. A 0 to 3-day old adult predator female

and a surplus number of the corresponding prey were added to each unit (10 pre-pupa and/or pupa of *F. occidentalis* and 20 nymphs of *R. echinopus*). The units were kept in a chamber at 25±2°C, 70±10% RH and in the dark

The units were examined at 24 h intervals for a period of 10 days, recording the number of eggs laid by each predator, the survival and the number of *F. occidentalis* and *R. echinopus* killed. At each evaluation, the eggs laid by the predator were discarded and prey killed were replaced.

Oviposition data were analyzed as a completely randomized design in a factorial scheme, with two factors, predator (three levels) and prey (five levels), respectively. Each treatment was replicated 25 times. Predation rates of the different predators were compared separately for each prey species, in a completely randomized design. For both oviposition and predation rates, treatment means were transformed ($\sqrt{x + 0.5}$) before submitting to analysis of variance and comparing them withTukey´s test.

Results

Nematode pathogenicity

Except for *S. carpocapsae* A11, all EPN strains caused relatively high mortality rates, which were not statistically different between strains (Table 1). The mortality rate caused by *S. carpsocapsae* A11 was low, and statistically different from those of other EPN strains.

Predator oviposition

When all prey were considered together, significant differences between predators were observed (F= 31.06, DF= 2, p<0.001), whereas when all predators were considered together, significant differences between prey were observed (F= 62.99; DF= 4, p<0.001). Significant differences were also observed for factor interactions (F= 14.95, DF= 8, p<0.001), indicating that predators differed between themselves in relation to oviposition rate on the different prey.

Table 1. Mortality (%) of pre-pupae/ pupae of *Frankliniella occidentalis* exposed to different strains of entomopathogenic nematodes (EPN) at the concentration of 666 IJ/mL and at 25±2°C, 70±10% RH and in the dark.

EPN	Mortality (%)
Steinernema carpocapsae A11	40.6* a
Steinernema feltiae	65.6 b
Steinernema brazilense CB06	68.7 b
Heterorhabditis amazonensis RSC05	87.5 b
Heterorhabditis amazonensis RSC01	87.5 b
Heterorhabditis amazonensis GL	93.7 b
CV (%)	8.6

*Means [corrected by Abbott (1925)´s formula] followed by the same letters are not significantly different (Tukey´s test, $p > 0.05$).

Highest calculated oviposition rate was 3.2 ± 1 eggs per female per day, by *C. jaboticabalensis* on *Protorhabditis* sp. (Table 2). The oviposition rate of *C. jaboticabalensis* was significantly higher than rates of other predators when prey was *F. occidentalis*, *S. brazilense* CB06 or *Protorhabditis* sp.. On each of these prey, oviposition rates of *C. barbatus* and *S. scimitus* were not significantly different from each other. Conversely, when prey was *R. echinopus*, oviposition rate of *S. scimitus* was significantly higher than rates of other predators, which were not significantly different from each other. On *H. amazonensis*, oviposition rates of all predators were very low; on this prey, the only significant difference referred to the higher oviposition rate of *C. jaboticabalensis* in comparison with that of *S. scimitus*.

Oviposition rates of *C. barbatus* and *C. jaboticabalensis* were significantly highest on *Protorhabditis* sp., lowest on *H. amazonensis* GL and *R. echinopus* and intermediate on *F. occidentalis* and *S. brazilense* CB06. Oviposition rates of *S. scimitus* were highest on *F. occidentalis*, *Protorhabditis* sp. and *R. echinopus*, lowest on *H. amazonensis* GL and intermediate on *S. brazilense* CB06. No significant differences were observed between the oviposition rates of *S. scimitus* on *F. occidentalis*, *Protorhabditis* sp. and *R. echinopus*. Survivorship of each predator on

all prey species was always at least 92%, except for *S. scimitus* on *R. echinopus* (88%).

Table 2. Daily oviposition (mean± SE) and % survival rates (in parentheses) of three hypoaspidine predators on different prey at 25±2°C, 70±10% RH and in the dark.

Prey	Predators		
	Cosmolaelaps barbatus	*Cosmolaelaps jaboticabalensis*	*Stratiolaelaps scimitus*
Frankiniella occidentalis	0.9 ± 0.2* Bb (100)	2.2 ± 0.6 Ba (100)	1.4 ± 0.3 Ab (92.0)
Steinernema brazilense CB06	1.0 ± 0.5 Bb (100)	2.2 ± 0.8 Ba (92.0)	0.6 ± 0.2 Bb (92.0)
Heterorhabditis amazonensis GL	0.2 ± 0.3 Cab (96.0)	0.6 ± 0.4 Ca (100)	0.1 ± 0.2 Cb (92.0)
Protorhabditis sp.	1.7 ± 0.3 Ab (100)	3.2 ± 1.1 Aa (96.0)	1.6 ± 0.7Ab (100)
Rhizoglyphus echinopus	0.4 ± 0.3 Cb (100)	0.5 ± 0.5 Cb (100)	1.9 ± 0.6 Aa (88.0)
CV (%)		14.74	

*Means followed by the same uppercase letters in each column and lowercase letters in each line are not significantly different (Tukey´s test, $p > 0.05$).

Predation potential

Significantly highest predation rates were 3.9 ± 0.7 *F. occidentalis* and 4.8 ± 1.1 *R. echinopus*, per day, in both cases, by *S. scimitus*. On both prey, predation rates of *C. barbatus* and *C. jaboticabalensis*, did not differ significantly from each other (Table 3).

Table 3. Number (±SE) of pre-pupae and pupae of *Frankliniella occidentalis* and nymphs of *Rhizoglyphus echinopus* preyed upon daily by *Cosmolaelaps barbatus*, *Cosmolaelaps jaboticabalensis* and *Stratiolaelaps scimitus*, at 25±2°C, 70 ±10% RH and in the dark.

Predator	Prey	
	Frankliniella occidentalis	*Rhizoglyphus echinopus*
Cosmolaelaps barbatus	1.9 ± 0.4* b	1.9 ± 1.1 b
Cosmolaelaps jaboticabalensis	2.5 ± 0.6 b	2.2 ± 0.9 b
Stratiolaelaps scimitus	3.9 ± 0.7 a	4.8 ± 1.1 a

*Means followed by the same letters in each column are not significantly different (Tukey´s test, $p > 0.05$).

Discussion

Nematode pathogenicity

The performance of the three strains of *H. amazonensis* was very promising and comparable to those obtained by Cavalcanti (2006) for strains RSC 05 and RSC 01 of the same species against *Caliothrips phaesoli* (Hood) (Thysanoptera: Thripidae), at similar temperature and humidity conditions. The performance of *S. feltiae* and *S. brazilense* CB06 were also promising. The result obtained with *S. feltiae* was comparable to that reported by Buitenhuis and Shipp (2005) when a higher concentration (160 IJ/cm^2) than used in this study was applied against *F. occidentalis*. The present paper refers to the first study of the efficiency of *S. brazilense* isolates against thrips species. The result obtained with *S. carpocapsae* was similar to that obtained by Ebssa et al. (2004) with three isolates at a concentration of 200 IJ/cm^2 against *F. occidentalis*, all suggesting *S. carpocapsae* to have low pathogenicity against this pest.

The differences in virulence between the nematodes evaluated in this study could be related to the differences between the symbiotic bacteria they carry. As summarized by Boemare (2002), the bacteria associated with *Steinernema* are species of *Xenorhabdus*, while those associated with *Heterorhabditis* are species of *Photorhabdus*. *Xenorhabdus bovienii* (Akhurst) has been found in association with *S. feltiae* while *Xenorhabdus nematophila* (Poinar and Thomas) has been found in association with *S. carpocapsae*. The bacteria associated with *S. brazilense* or *H. amazonensis* have not been identified.

Another possible explanation for the observed differences in virulence between the studied EPN refers to their different behavior. Similarly to what has been determined for other *Heterorhabditis* species (Lewis 2002), *H. amazonensis* has a host-seeking behavior ("cruiser") (Andaló et al. 2012). *Steinernema carpocapsae*, in turn, is an ambusher, waiting the host to approach before attacking, while *S. feltiae* is mentioned to have an intermediate behavior (Lewis 2002), what also seems to be the case with *S. brazilense* CB06 (L.G. Leite, personal communication, 2013). The more active behavior of *H. amazoensis* may have facilitated the infection of pre-pupae/

pupae of *F. occidentalis* under the conditions adopted in this study. Premachandra et al. (2003) also reported higher efficiency of a *Heterorhabditis* species (*H. bacteriophora* Poinar) than of a *Steinernema* species (*S. feltiae*) in the control of *F. occidentalis*. However, other studies (Ebssa et al. 2001, 2004) have shown higher efficiency of *Steinernema* than of *Heterorhabditis* species.

The rates of mortality of *F. occidentalis* determined in the present study, especially those caused by the native nematode strains (GL, RSC 01 and RSC5 of *H. amazonensis* and CB06 of *S. brazilense*), warrants their further consideration for thrips control. More detailed laboratory and field studies on the effect of different concentrations, appropriate time and method of release can eventually lead to their practical use. Additionally, it is possible that other Brazilian nematode species promising for thrips control can still be discovered. Although some species of *Steinernema* and *Heterorhabditis* have been reported from Brazil (Nguyen et al. 2010), only two new species of these genera, *H. amazonensis* and *S. brazilense*, were described from this vast and diverse country (Andaló et al. 2006; Nguyen et al. 2010, respectively). Many others are expected to exist.

Predator oviposition and predation potential

An advantage of *C. jaboticabalensis* in relation to other predators is that it reproduces by thelytocous parthenogenesis (our unpublished observation), implying a greater reproductive capacity compared to the other predators evaluated in this study. Thelytoky in hypoaspidins has also been reported by Walter and Oliver (1989) for populations of *Gaeolaelaps* (= *Geolaelaps*) *oreithyiae* Walter and Oliver and *Cosmolaelaps vacuus* (Michael), both from Colorado, USA, although males of *C. vacuus* have been reported in Russian and Polish populations of this species (Bregetova 1977; Gwiazdowicz 2004).

Berndt et al. (2004) evaluated the potential of *G. aculeifer* [mentioned as *Hypoaspis* (*Geolaelaps*) *aculeifer*] and *S. miles* as control agents of *F. occidentalis*, determining their mean oviposition rates to be 2.5 and 0.8 eggs per female per day, respectively, at 24 ± 0.5 °C and 70 ± 10% RH. These species have been commercialized for thrips control by different companies. The mean daily oviposition

of *S. scimitus*, estimated in this work, was intermediate to the values reported for *G. aculeifer* and *S. miles*. Cabrera et al. (2005) calculated sex ratio of 77% females for *S. scimitus*.

The predation rate of *F. occidentalis* by *C. jaboticabalensis* was intermediate to the values reported by Berndt et al. (2004) for *G. aculeifer* and *S. miles* (3.5 and 1.6 pre-pupae/pupae, respectively), whereas the estimated rate for *S. scimitus* was slightly higher than the value reported by Berndt et al. (2004) for *G. aculeifer*.

Protorhabditis sp. seems to be a suitable prey for the evaluated predators, especially for the two *Cosmolaelaps* species. When the free-living nematode *Turbatrix silusiae* de Man (Rhabditida: Panagrolaimidae) was used as prey for *G. aculeifer* and *S. miles*, estimated oviposition levels were approximately 2.2 and 0.8 eggs per day, respectively (Berndt et al. 2004). However, Afifi and Van der Geest (1984) observed low oviposition rate for *Cosmolaelaps claviger* (Berlese) (0.3 egg per female per day) when it was fed an unidentified free-living nematode. Oviposition of edaphic predatory mites on free-living nematodes has been often evaluated in the literature (Epsky et al. 1988), given that they occupy the same general habitat. These studies are usually intended to determine the main food sources of edaphic predatory mites in nature.

Although the primary objective of this study was to evaluate the potential EPN and predatory mites as control agents of *F. occidentalis*, the results obtained suggested *S. scimitus* to be more promising for the control of *R. echinopus* than the two *Cosmolaelaps* species. This concurs with the findings of Afifi and Van der Geest (1984), who observed low oviposition rate of *C. claviger* (0.5 egg per female per day) on the latter prey.

The long survivorship of the predators on the different evaluated prey species should be mistaken by the suitability of the latter in maintaining the predators alive. Adult females of *C. jaboticabalensis* can survive for about two months in the absence of food (our unpublished data).

Possible interaction of predatory mites and EPN

The evaluations conducted suggested *H. amazonensis* GL to be the most promising EPN for simultaneous use with the evaluated predators, given the lower oviposition rates of the three evaluated predator species on this than on other EPN. Although consumption of *H. amazonensis* GL was not evaluated, the low predator oviposition rates on *H. amazonensis* GL suggest that this nematode is not one of its most suitable prey. In addition, none of the two EPN evaluated in the predator oviposition study seemed to interfere with the survival of the predators, at least 92% of which were alive at the end of the study, indicating the absence of a possible significant pathogenic effect of nematodes on them. In a study on the ability of *S. feltiae* to infect edaphic mites, Epsky et al. (1988) observed low or no infection in several species of Astigmatina, Mesostigmata and Oribatida, although infection of *Alycus roseus* Koch (Endeostigmata) was observed.

Better levels of pest control have been mentioned in the literature with the simultaneous application of edaphic or plant inhabiting predatory mites and EPN. Premachandra et al. (2003) reported higher mortality of *F. occidentalis* when *G*. (= *Hypoaspis*) *aculeifer* and the EPN *H. bacteriophora* and *S. feltiae* were used simultaneously (71-82% mortality), as compared with the use of each of them in isolation (46% for *G. aculeifer*, 61% for *H. bacteriophora* and 46% for *S. feltiae*). However, this result could depend upon the density of each organism used in the evaluation. Similarly, the combined use of *N. cucumeris*, predatory mite found on aerial plant parts and in the soil, and the nematodes *H. bacteriophora* or *Heterorhabditis indica* Poinar, led to better control of *F. occidentalis* than the isolate application of any of those agents (Ebssa et al. 2006).

In conclusion, the results of this study suggest that among the natural enemies evaluated, *C. jaboticabalensis*, *S. scimitus* and *Heterorhabditis amazonensis* are the most promising for use as control agents of *F. occidentalis*. The selection of the species to be used, either in isolation or combined, would require the conduction of complementary studies, in which other factors not taken into consideration in this work could be evaluated. Aspects to be considered are densities to be released, cost of production, specificity etc..

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CHAPTER 6 - Life cycle of *Cosmolaelaps jaboticabalensis* (Acari: Mesostigmata: Laelapidae) on *Frankliniella occidentalis* (Thysanoptera: Thripidae) and two factitious food sources

Abstract: The aim of this work was to study the life cycle of *Cosmolaelaps jaboticabalensis* Moreira, Klompen and Moraes on *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae), a serious cosmopolitan pest of different crops, as well as on *Protorhabditis* sp. (Nematoda: Rhabditidae) and *Tyrophagus putrescentiae* (Astigmatina: Acaridae), prospective factitious food for the mass rearing of that predator. Experiments were conducted in a chamber at 25 ± 1 ºC, 70 ± 10% RH and in the dark. Total immature development (egg-adult) was completed in 12.3 ± 5, 6.6 ± 0.6 and 7.1 ± 0.6 on *F. occidentalis*, *Protorhabditis* sp. and *T. putrescentiae*, respectively. Fecundity and intrinsic rate of increase were higher on *Protorhabditis* sp. (71.6 ± 9.1 eggs/female; 0.28 female/female/day) than on *F. occidentalis* (63.8 ± 14.8; 0.23) and *T. putrescentiae* (43.1 ± 8.9; 0.23). *Cosmolaelaps jaboticabalensis* reproduces by thelytokous parthenogenesis and its larval stages can be completed without feeding. Protonymphs and deutonymphs of this species can survive in the absence of food for about a month, and adults, for almost two months. It was concluded that *C. jaboticabalensis* is a promising biological control agent of *F. occidentalis* and that it could be mass reared with the use of *Protorhabditis* sp. or *T. putrescentiae* as factitious food sources.

Keywords: predatory mites, biological control, Hypoaspidinae, life table.

Introduction

About 108 species are presently known to belong to *Cosmolaelaps* (Moreira et al., 2014), a genus of Hypoaspidinae composed of edaphic and free-living species. Nothing is known about the biology and potential as control agents of the vast majority of these species, but the information about some species of this group

indicates that they are potentially useful as biological control agents of organisms spending all or part of their lives in the soil (Afifi and Van der Geest 1984; Al Rehiayani and Fouly 2005).

Cosmolaelaps jaboticabalensis Moreira, Klompen and Moraes was recently described from specimens collected in São Paulo state, southeastern Brazil. A laboratory study (Moreira et al., submitted) has recently suggested the potential of this predator as a biological control agent of the edaphic stages of *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae), a cosmopolitan and important pest of many crops that can also act as vector of plant pathogens.

The successful use of a biological control agent requires the availability of an efficient process for its mass production. Soil mites have been produced in large scale using the mite *Tyrophagus putrescentiae* (Schrank) (Astigmatina: Acaridae) as factitious food (Freire and Moraes 2007b). Discovery of alternative factitious food sources for mass rearing can reduce the production cost of predatory mites, improving the chances of adoption of biological control of pest organisms. Free-living nematodes have been frequently mentioned in the literature as prey for edaphic mites (Walter 1988; Berndt et al. 2004; Castilho et al. 2009), but these have not been reported as food sources of predatory mites in mass rearing processes. In the study of Moreira et al. (submitted), the free-living nematode *Protorhabditis* sp. (Rhabditina: Rhabditidae) was observed to promote the highest oviposition level of *C. jaboticabalensis* in comparison with other food source.

Knowledge about the life cycle of *C. jaboticabalensis* should provide further insight on its potential for use in the control of *F. occidentalis* in Brazil, where that predator is naturally found. The aim of this study was to evaluate the life cycle of *C. jaboticabalensis* on *F. occidentalis* and on two organisms that could be used in its mass rearing.

Materials and Methods

The population of *C. jaboticabalensis* used in this study was the same used by Moreira et al. (submitted), whose founders were collected in litter under a loquat tree [*Eriobothrya japonica* (Thunb) (Rosaceae)], at Jaboticabal, São Paulo state, Brazil, in

December 2011. It was maintained in the laboratory in units similar to those described by Freire and Moraes (2007b), kept in a rearing chamber at 25 ± 2 °C, 70 ± 10% RH, in the dark, and fed a mixture of all developmental stages of *T. putrescentiae*, offered on pieces of a commercial dog food (Purina ®).

The organisms tested as prey were obtained as follows: pre-pupae/ pupae of *F. occidentalis*, from a colony initiated with insects collected from sweet pepper [*Capsicum annuum* L. (Solanaceae)] and roses [*Rosa* sp. (Rosaceae)], respectively, at Iacanga and Atibaia, São Paulo, Brazil in 2011, and kept on jack-bean [*Canavalia ensiformis* (L.) (Fabaceae)] plants; all developmental stages of the free-living nematode *Protorhabditis* sp., from a colony started with specimens collected from manure, at Piracicaba in 2010 and kept on pods of green-beans [*Phaseolus vulgaris* L. (Fabaceae)]; all developmental stages of *T. putrescentiae*, from a colony maintained in the Acarology Laboratory of Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ), Universidade de São Paulo (USP) for more than five years, on the same previously mentioned commercial dog food.

The study was initiated with predator eggs laid within a period of 12 h by females isolated from the stock colony. Each egg was transferred to one of 150 experimental units, each consisting of a Petri dish (3 cm diameter and 2 cm in height) whose base was covered with a layer of a solidified paste made of a mixture of gypsum and activated charcoal (9v:1v), kept moist by daily addition of distilled water. Each group of 50 predators was daily fed with surplus amounts of either prey. The units were examined at 12 h intervals until the mites reached adulthood and at 24 h intervals thereafter.

Mean durations of each immature and of the adult stage, as well as the total immature phase (egg-adult) were transformed ($\sqrt{x + 0.5}$) before submitting to ANOVA and comparing them with Tukey´s test. When prey was *F. occidentalis*, daily predation rate was also evaluated. A fertility life table (Birch 1948) was constructed for predators reared on each prey. Net reproductive rate (R_o), intrinsic rate of population increase (r_m), finite rate of population increase (λ) and mean generation time (T) were calculated and compared by Student's t test using "LifeTable.SAS" (Maia et al. 2000).

A complementary test was conducted to evaluate the ability of each predator mobile stage to survive in the absence of food. The test was initiated with ten 0-6 h old mites in each mobile stage, obtained by isolating mites of the corresponding previous stages in experimental units similar to those previously described, where they were fed with a surplus amount of *Protorhabditis* sp.. Immediately before molting (when mites became more shiny and became lethargic), mites were transferred to new experimental units without food, but whose solidified base was kept moist by daily addition of distilled water. After molting, the units were examined every 24 h to determine longevity. Mean longevity of each stage were transformed ($\sqrt{x + 0.5}$) before submitting to analysis of variance and comparing them with Tukey´s test.

Since larvae were observed to develop to protonymphs in the absence of food, an additional complementary test was conducted to determine whether the larvae could feed when offered *Protorhabditis* sp. as prey. For this purpose, ten 2 h old larvae were isolated in experimental units similar to those previously described. They were kept without food for 6 h and then offered a surplus amount of all developmental stages of *Protorhabditis* sp. on pods of green-bean. Possible consumption of nematodes was checked for a period of 3 h after the nematodes were introduced into the units, under a stereomicroscope.

Results

Development, reproduction and life table parameters

Durations of the egg or the larval stages were not significantly different on the different prey species (Table 1). Durations of the protonymphal and the deutonymphal stages as well as of the entire immature phase (egg-adult) were significantly longer on *F. occidentalis*; no significant differences were observed in relation to the duration of each of these stages between predators fed *Protorhabditis* sp. or *T. putrescentiae.*

Survivorship of each stage on all prey species was always high (76.9-98.0%). Survivorship for entire immature phase (egg-adult) ranged between 61.5 and 63.9% on the three prey species.

Table 1. Duration of different developmental stages (days ± SE); survivorship (%, in parentheses) and mean duration (days ± SE) of pre-oviposition, oviposition and post-oviposition periods of *Cosmolaelaps jaboticabalensis* fed with *Frankliniella occidentalis*, *Protorhabditis* sp. or *Tyrophagus putrescentiae* at 25±2°C, 70±10% RH and in the dark.

	Prey		
Stages	*F. occidentalis*	*Protorhabditis* sp.	*T. putrescentiae*
Egg	1.6 ± 0.3 a (76.9)	1.5 ± 0.4 a (83.6)	1.5 ± 0.4 a (76.9)
Larva	0.8 ± 0.3 a (98.0)	0.7 ± 0.2 a (86.2)	0.7 ± 0.2 a (92.0)
Protonymph	9.4 ± 5.9 b (91.8)	2.2 ± 0.4 a (90.9)	2.5 ± 0.4 a (91.3)
Deutonymph	4.6 ± 3.1 b (88.8)	2.1 ± 0.2 a (97.5)	2.3 ± 0.3 a (95.2)
Egg-adult	12.3 ± 5.0 b (61.5)	6.6 ± 0.6 a (63.9)	7.1 ± 0.6 a (61.5)
Pre-oviposition	3.9 ± 0.9 b	2.3 ± 0.7 a	2.4 ± 0.6 a
Oviposition	32.4 ± 13.7 a	31.0 ± 14.5 a	50.2 ± 13.2 b
Post-oviposition	24.5 ± 17.4 a	54.8 ± 17.3 b	16.9 ± 11.7 a
Adult longevity	57.7 ± 16.3 a	86.9 ± 13.4 c	68.1 ± 17.4 b

Means followed by the same letters in a line are not significantly different (Tukey´s test, $p>0.05$).

Pre-oviposition period was significantly longer on *F. occidentalis* (Table 1), but no significant differences were observed between durations for predators feeding on the other prey. Oviposition period was statistically the same on *F. occidentalis* and *Protorhabditis* sp. but longer on *T. putrescentiae*, whereas post-oviposition period was statistically the same on *F. occidentalis* and *T. putrescentiae*, but longer on *Protorhabditis* sp.. The combination of these different periods led to a significantly shorter longevity on *F. occidentalis*, intermediate on *T. putrescentiae* and longer on *Protorhabditis* sp.. Fecundity was intermediate when food was *F. occidentalis* (63.8 ± 14.8), significantly lower on *T. putrescentiae* (43.1 ± 8.9) and significantly higher on *Protorhabditis* sp. (71.6 ± 9.1).

For all prey species, oviposition reached the highest rates at the beginning of the oviposition period, reducing slowly afterward, reaching very low levels at the end of the first month (Fig. 1). About 80% of all eggs were laid in the first 20, 20 and 23 days of oviposition on *F. occidentalis*, *Protorhabditis* sp. and *T. putrescentiae*, respectively.

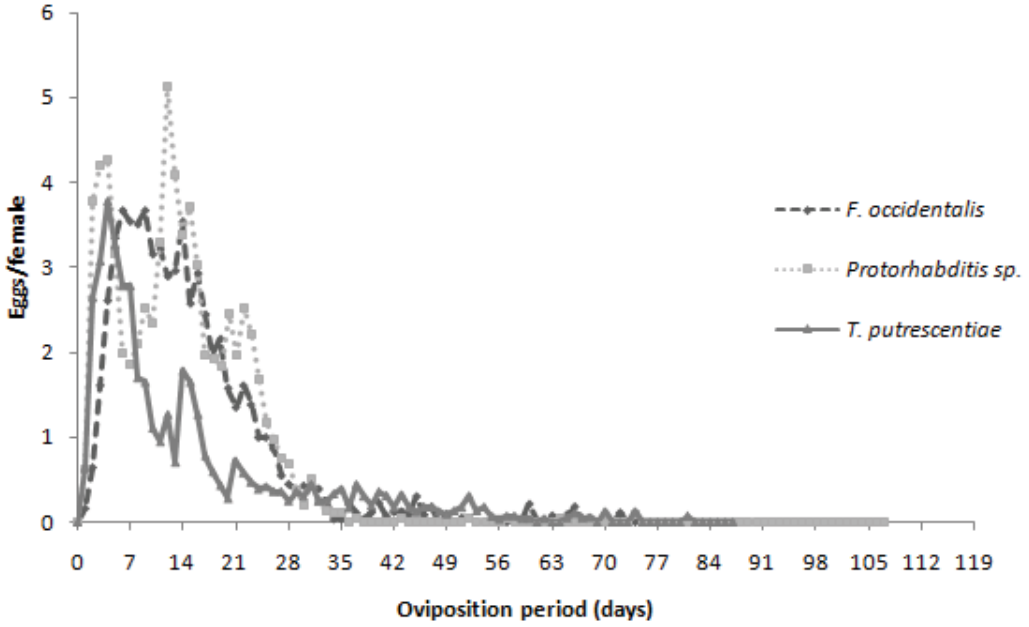

Fig. 1 Mean daily oviposition (eggs/female/day) of *Cosmolaelaps jaboticabalensis* fed with *Frankliniella occidentalis*, *Protorhabditis* sp. and *Tyrophagus putrescentiae* at 25±2°C, 70±10% relative humidity and in the dark.

During periodic observations of the stock colony, no male was ever found. Concurrently, only females were generated from eggs isolated to initiate the life table studies, and the eggs obtained from those populations also produced only females. These results indicate that the reproduction of *C. jaboticabalensis* occurs by thelytokous parthenogenesis.

On *F. occidentalis*, the population of *C. jaboticabalensis* increased approximately 39 times at each generation (R_o: 38.98), a rate slight but significantly lower than on *Protorhabditis* sp. (about 46 times), but significantly higher than on *T. putrescentiae* (approximately 26 times) (Table 2). *Cosmolaelaps jaboticabalensis* produced about 0.23 female/female/day (r_m: 0.23) on *F. occidentalis* and *T. putrescentiae*, value slightly but significantly lower than on *Protorhabditis* sp. (0.28). Concurrently, daily increase in population size was about 26% (λ: 1.26) on *F. occidentalis* and *T. putrescentiae*, value also significantly lower than on *Protorhabditis* sp. (about 32%). The mean duration of a generation of the predator was significantly higher on *F. occidentalis* (T= 15.79 days) than on *Protorhabditis* sp.

(T= 13.55) or *T. putrescentiae* (T= 13.86), what was related to the longer duration of the immature phase.

Table 2. Life table parameters of *Cosmolaelaps jaboticabalensis* fed with *Frankliniella occidentalis*, *Protorhabditis* sp. or *Tyrophagus putrescentiae* at 25±2°C, 70±10% RH and in the dark. R_o: net reproductive rate, r_m: intrinsic rate of increase, λ: finite rate of increase, T: mean generation time in days.

Prey	n	R_o	r_m	λ	T
F. occidentalis	31	38.98 b	0.23 a	1.26 a	15.79 b
Protorhabditis sp.	29	45.85 c	0.28 b	1.32 b	13.55 a
T. putrescentiae	37	26.04 a	0.23 a	1.26 a	13.86 a

Numbers followed by the same letters in each column are not significantly different (Student´s test; $p>0.05$).

Predation rate

No pre-pupae/ pupae of *F. occidentalis* were killed by larvae of the predator. On the average, 1.6 ± 0.8 and 1.7 ± 1.0 pre-pupae/ pupae were killed daily per protonymph and deutonymph of the predator, respectively, resulting in a mean total predation of 2.9 ± 1.3 prey per predator in the immature phase. Mean daily predation rate by adults increased until the end of the first week, reaching 2.6 ± 1.1 pre-pupae/ pupae per day, decreasing progressively thereafter (Fig. 2), reaching and maintaining a level below 0.5 prey per day after the first month of in the adult stage. Mean total predation rate was 54.1 ± 9.9 pre-pupae/ pupae per adult predator.

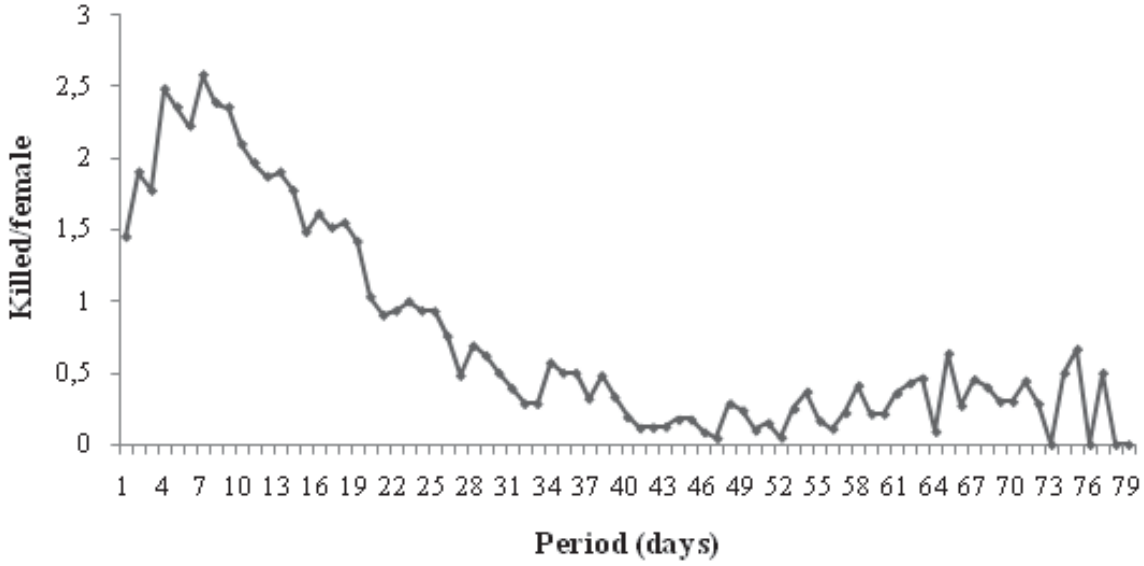

Fig. 2. Mean number of pre-pupae/ pupae of *Frankliniella occidentalis* killed by adult female of *Cosmolaelaps jaboticabalensis* at 25±2°C, 70±10% RH and in the dark.

Survival in the absence of food

All larvae survived and developed to the protonymphal stage within 24 hours. The protonymphal and deutonymphal stages survived 31.7 ± 13.9 and 36.4 ± 7.6 days in the absence of food, but none of the starving protonymph or deutonymph was observed to develop to the subsequent stage. These periods of survival were not statistically different. Adults survived 59.8 ± 7.5 days without food, being this duration significantly longer than those of protonymphs and deutonymphs.

When *Protorhabditis* sp. was added to the experimental units, larvae starved for 6 h were not observed to feed on them.

Discussion

The results of this study indicated *C. jaboticabalensis* to be able to complete its life cycle on all organisms offered as prey. The similar durations of the egg as well as of the larval stages in the presence of the different prey was expected, because those are non-feeding stages. Al Rehiayani and Fouly (2005) and Cabrera et al.

(2005) also observed that larvae of *Cosmolaelaps simplex* Berlese as well as of the hypoaspidine *Stratiolaelaps scimitus* (Womersley), respectively, did not feed. Thus, non-feeding larvae seem to be commom among the hypoaspidine.

Daily predation rates of immatures when *F. occidentalis* was offered as food were lower than that of the adults, even when considering the final phase of the oviposition, when adult predation rate is greatly reduced. The maximum predation rate obtained in the first week was lower than determined by Berndt et al. (2004) for *Gaeolaelaps aculeifer* (Canestrini) [mentioned as *Hypoaspis* (*Geolaelaps*) *aculeifer*] on pre-pupae/pupae of *F. occidentalis* (3.5 per/day) but higher then determined by the same authors for *Stratiolaelaps miles* (Berlese) (1.6 per/day), on the same prey. The latter two species have been commercialized for the control of *F. occidentalis*.

The values of intrinsic rate of population increase obtained in this and previous studies are comparable to what has been mentioned in the literature for phytoseiid predators, the mite group most often used for the biological control of phytophagous mites, as summarized by Sabelis (1985). As examples, rates close to 0.300 have been reported for *Phytoseiulus macropilis* (Banks) and *Phytoseiulus persimilis* Athias-Henriot, phytoseiid species widely used commercially for the control of pest species of the family Tetranychidae (Sabelis 1985).

The ability of biological control agents to survive in the absence of the pest they are released to control is of major importance. Wright and Chambers (1994) observed that protonymphs and deutonymphs of *S. miles* can survive between 12 and 24 days, respectively, in the absence of food. These values are much lower than determined for *C. jaboticabalensis*. Ability to survive under prey scarcity is a desirable attribute to be considered in the selection of prospective candidates for practical use.

The results of the present study showed adequate biological performance of *C. jaboticabalensis* on *Protorhabditis* sp.. Thus, this nematode and possibly others sharing the same habit may be important in maintaining this predator under natural conditions. These nematodes could also favor the persistence of that predator when the latter is released as part of a biological control program. In addition, *Protorhabditis* sp. seem promising for use as a factitious food source for the mass rearing of *C. jaboticabalensis*, provided adequate procedures are developed for mass

production of the nematode and for its appropriate delivery to the predators in the mass rearing units.

On *T. putrescentiae*, the oviposition period of *C. jaboticabalensis* was about twice as long, its fertility was about half and its intrinsic rate of increase was about the same determined by Freire and Moraes (2007a) for *Cosmolaelaps paulista* Freire and Moraes.. In turn, Enkegaard et al. (1997) determined a much lower intrinsic rate of population increase (0.054) for *S. miles* on that prey. Thus, the results of the present work suggest that *T. putrescentiae* is also suitable for the mass production of *C. jaboticabalensis*. In a mass production program, the use of *T. putrescentiae* as prey may be more convenient than the use of other food sources, given the easiness with which this prey can be produced.

In conclusion, the results of this study suggest that *C. jaboticabalensis* is a promising biological control agent of *F. occidentalis*, and that could be mass reared with the use of *Protorhabditis* sp. or *T. putrecentiae* as factitious food sources.

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CHAPTER 7 – FINAL CONSIDERATIONS

As initially proposed, the family Laelapidae Berlese was considered to contain a range of mite groups within the order Mesostigmata. Knowledge about these mites along the year led to the conclusion that the concept of the family should be trimmed, so as to contain a much smaller diversity of organisms than initially proprosed. Thus, several groups initially included in Laelapidae are now considered to belong to other families.

Despite that evolved conclusion, recent filogenitic studies have indicated that Laelapidae is still not monophyletic, including groups of species with diverse feeding habits. Thus, this work on centered on the laelapid species with free living habit or species associated with arthropods; these include mostly species of the subfamilies Hypoaspidinae and Mellithipidinae. However, even within that reduced laelapid assemblage, basic taxonomic concepts are still insufficient, what hampers considerations about the possible use of some of those organisms for practical use. Considering the particular case of the state of the knowledge of that group in Brazil, little is known, despite the expected high diversity of those mites in the country.

This was the reason leading to the initial proposition of the study reported in this document. It is expected that the preparation of a catalog to the free-living and arthropod associate laelapids may constitute a contribution not only to further studies of those mites in Brazil, but all over the world.

Likewise, the studies concerning the redefinition of *Cosmolaelaps* Berlese, the alpha-taxonomy of common species in Brazil and the conduction of biological studies envisioning the possible use of local laelapid species for the biological control of thrips pests, in isolation or in association with entomopathogenic nematodes, should represent a significant step leading to the appropriate taxonomic knowledge of those mites in Brazil, as well as to their practical use.

Much still to be done about this laelapid group. In relation to taxonomy, future activities by different authors should include the revision of the long list of species attributed to laelapid along the years, but which are still not sufficiently known to allow their conclusive placement in genera. Still in relation to taxonomy, further

efforts should be dedicated to the better knowledge about the laelapids in Brazil, with the description of new species and, certainly, new genera. Several of those new taxa have already been detected in the present study, but shortage of time did not allow their inclusion in the work here completed. Lastly, the results indicating the potential of some of the Brazilian population of laelapid species as biological control agents of pest organisms hardly represent the great wealth to be found in this country. The species involved in those studies were just some of the first isolated in our study. The possibility of finding other, better studies is considerable and should be explored in the future.