A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta with keys and descriptions of the new genera

RYSZARD HAITLINGER

Institute of Environmental Biology, Department of Invertebrate Systematics and Ecology, Wrocław University of Environmental and Life Sciences, Poland

(Received 26 August 2021; accepted 25 October 2021; first published 17 March 2022)

Abstract
The data on host-mites associations between Canestriniidae and insects are summarized. Names of many hosts, incorrectly mentioned in the original works, have been corrected. 9 new genera have been described: Balearella, Cercediphota, Ciprusenia, Ismaeilenia, Javanellina, Kuramasenia, Midiphota, Phaleratusellus and Sumatranella, 24 species are transferred to another or new genera Balearella asilahica, B. balearica, B. samsinaki, Ciprusenia carabica, C. izabelae, C. kamelskyi, C. sellnicki, C. vivianae, Ismaeilenia egypti, Javanellina maroccana, Javanellina macgilavryi, Kuramasenia illegalis, K. paavoi, K. pehingensis, K. pictura, K. ramoni, Midiphota hispanica, M. jureceki, Phaleratusellus alatus, Pedocanestrinia damiani, P. roberti, Sumatranella batocerae, S. elae and S.phoebinae. 370 species of canestriniids belonging to 101 genera were collected from 361 species of hosts belonging to 113 genera. Canestriniidae were found in 12 Insecta families and in 2 Diplopoda families but species of the families Blattidae and Geotrupidae are accidental hosts. The main hosts of Canestriniidae are Cassidinae (Chrysomelidae) (77 canestriniid species), Cetoniniae (Scarabaeidae) (48), Carabinae (Carabidae) (42), Macroliniinae (Passalidae) (35) and Dynastinae (Scarabaeidae) (20). About 58% of the canestriniid genera are associated with one genus of host and about 60% of canestriniid species are associated with one host species. Canestriniids with large host number have also been found: Aurlensithiana battosi (15 host species), Grandelopopsis gambosa (15) and many others. Most canestriniid species found in Asia (109), South America (78), Africa (66), Europe (51), Oceania (33) and Central America (28). Many species of canestriniids were found in Indonesia (47), Brazil (44) and Papua New Guinea (23). Keys to genera of the Asia, Europe and Oceania are provided.

Keywords: Checklist of canestriniid species, lists of host species, distribution, host specificity, new genera

Introduction
Canestriniidae belongs to the least known families of mites among the Astigmata. They are mainly phoretically related to some insect families. However, some of the canestriniids may be parasites. It was established that the sister mite of Vereoxia bogerii Haitlinger, 1995 was extracting hemolymph from their hosts (Okabe et al. 2017). So far, these mites have been found on insects belonging to12 families: Blattidae, Carabidae, Cerambycidae, Chrysomelidae, Elateridae, Geotrupidae, Lucanidae, Passandridae, Passalidae, Scarabaeidae, Tenebrionidae and Zoopheridae (Tables I-XIV). Their presence in Blattidae and Geotrupidae is random. Moreover, one species Diplopodocoptes transkeiensis Fain, 1987 was collected from the Diplopoda (Fain 1987b). This requires confirmation that Diplopoda are in fact permanent hosts of this species. Sometimes is included in the Canestriniidae Sphaecus elsenii Fain, 1974 described on the basis of the hypopus stage (Fain 1974), S. elsenii was collected in Africa from Sphex furmosus Christ, 1791 [=S. unbrosum metallicus (Taschenberg, 1813)].

Correspondence: Ryszard Haitlinger, Institute of Environmental Biology, Department of Invertebrate Systematics and Ecology, Wrocław University of Environmental and Life Sciences, Kozuchowska 5B, Wrocław 51-631, Poland. Email: ryszard.haitlinger@upwr.edu.pl

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
1869)] (Hymenoptera: Sphecidae). Fain included this species in the family Acaridae and subfamily Rizoglyphinae. Therefore, this species has not been included in the tables. Currently, 370 species of Canestriniidae are known. Except 370 canestriniid species are included in Table 2 subspecies, 18 species determined to the genus, 6 species determined to the family and 4 species determined as near known species (Okabe & Goka 2008). In the future, this number of species can be expected to be at least doubled. The knowledge of their relationship to the hosts is based mainly on taxonomic work. So far, only one paper has been published discussing the relationship of canestriniid mites with Carabidae (Samšiňák 1971). Santiago-Blay and Fain (1994) published list of mites (including canestriniid mites) associated with Chrysolomelidae and Haitlinger (2000) introduced a list of canestriniids occurring on Tenebrionidae. Many species need a generic revision. In this work 9 new genera are described and 24 species were transferred to another genus. In paper on Ibizella balearica n. gen. from Balearic Islands (Haitlinger & Šundić 2016) was described new genus. According to International Code on Zoological Nomenclature, generic name created after 1999 without type species designation are unavailable. Therefore, in this work a new genus Balearella is described and the designated typical species B. balearica.

Keys to the genera for females and males of Asia, Europe and Oceania are provided. All species of canestriniid mites are listed in this work, also undetermined species and all their hosts. Many insects were described from museums material labeled mistakenly or with synonyms and sometimes impossible to identify. In this work, if possible, many names were verified. The aim of this work is providing current knowledge about the relationship between canestriniid mites and their hosts.

Material and methods

The list of canestriniid mites and their hosts was prepared based on literature data. In many papers names of insects are improper or distorted. Canestriniid mites whose generic identify is questionable are marked with an asterisk in the tables (*). Also, wrong names of the hosts (synonyms, spelling errors) are in parentheses and with asterisk. Generic status of some species is given variously in the literature. For example, Grandiella conula Summers & Schuster, 1979 was transferred to the genus Emmodithiana Haitlinger, 1993. Later this species was transferred to the genus Teklathiana (Haitlinger 1999a). Haitlinger (1993c) provided the justification for transferring this species to the genus Emmodithiana. The correct name is Emmodithiana conula. Hatohylla rosascostai (Lombardini, 1939) described as Coleoglyphus rosascostai was transferred to the genus Hatohylla Haitlinger, 1990. O’Connor (2004) lists him as Grandiella rosascostai. This species certainly does not belong to this genus. This species differs from Grandiella species in the shape of the opisthosoma and the number of caudal setae, See also key to the Neotropical genera (Haitlinger 1999a).

Canestrinia pentodontis (Berlese, 1897) has been described as C. dorciola var. pentodontis. Because there are no drawings of this species and laconic description its species identify requires confirmation.

Results

Balearella gen. nov.

Ibizella Haitlinger & Šundić, 2016 syn. nov.

Type species. Balearella balearica (Haitlinger & Šundić, 2016)

Female. Propodosomal plate very narrow. Hysterosoma with 6 pairs of setae. Setae h1 and h2 on ventral side of idiosoma, shifted far from posterior margin of idiosoma. Setae c1 and d1 distinctly shorter than setae c2 and d2. Setae cG on Ge I distinctly longer than setae mG. Tarsi I–IV very short.

Male. Propodosomal plate narrow, sejugal suture weakly developed or absent, adanal suckers present, dorum without ornamentation or ornamented in median and posterior part of idiosoma, setae d2 distinctly longer than setae d1. Hysterosoma with only 5 pairs of setae. Ventral side of idiosoma with 6 pairs of setae at posterior margin of idiosoma. Setae cG I distinctly longer than setae mG I. Tarsi I–IV very short.

Etymology. The genus was named after archipelago of the Balearic Islands where holotype was collected.

The new genus includes 3 species: Balearella balearica, B. samsinaki (Beron, 1965) comb. nov. (Canestrinia. samsinaki, Ibizella samsinaki) and B. asilahica (Hitlinger & Šundić, 2018) comb. nov. (I. asilahica).

Cercediphotia gen. nov.

Neophotia: Samšiňák, 1971 (part)

Type species. Cercediphotia latissima (Samšiňák, 1971) (Neophotia latissima)

Female. Hysterosoma and opisthosoma ornamented with shell-like structures. The width of the idiosoma is not much less than its length. Setae d1, e1, e2
enlarged. Setae d₁ placed near setae e₁. Setae c₂ and d₂ long. Setae h₁, h₂, h₃ and cp very long, setae, p₁-3, ad₁, ad₂, f₂ relatively long. Sejugal furrow absent. Propodosomal plate and setae ve present. Tarsi III and IV longer than tarsi I and II.

**Etymology.** The genus name is based on the name of another genus *Photia* with the addition cercedilla. This is the front part name of the town Cercedilla where holotype was found.

**Remarks.** The new genus differs from all other European genera enlarged setae d₁, e₁, e₂ and the location setae d₁ near the setae e₁. The latter feature is common to the new genus *Midiphotia*. The genus *Cerediphota* differs from the new *Midiphotia* in its long setae c₂, enlarged setae d₁, e₁, e₂, a broad opisthosoma and in the lack of a sejugal furrow (see also keys).

**Ciprusenia gen. nov.**

*Ciprusenia*: Berlese, 1911 (part)

**Type species.** *Ciprusenia izabelae* (Haitlinger, 1992) (*Percanestrinia izabelae*)

Female. Idiosoma with 6 or 7 pairs of short dorsal setae (series c, d, e, f). Setae ve present. Hysterosoma with longitudinal lines at its sides or in the posterior part or without ornamentation. Sejugal furrow present, setae c₂ and d₂ at last twice as long as setae c₁ and d₁ (except for *C. sellnicki*). Setae cp, h₁ and h₂ very long, setae h₃ relatively long. Ta IV long (over 100 μm).

Male. Hysterosoma with transverse lines, cell-shaped structures or without ornamentation. Opisthosoma narrow, narrowest in the central part. Sejugal furrow present. Setae c₁ are at the level of the setae c₂ or slightly below that of level. Setae ve present. Setae d₁ absent or present. All dorsal setae (series c, d, e) short or semilong (<80), setae cp, h₁ and h₂ very long, setae h₃ short or semilong. Tarsi IV semilong (<100). Adanal suckers present.

**Etymology.** The name of the new genus was based on the name of the country where the holotype was collected. *C. carabica* (Berlese, 1882) **comb. nov.** (*Coleopteraphagus carabica, Canestrinia sardica, C. carabica, Percanestrinia carabica*), *C. kamelskyi* (Samsši, 1970) **comb. nov.** (*P. kamelskyi*), *C. sellnicki* (Samsši, 1965) **comb. nov.** (*P. sellnicki*), *C. viviani* (Haitlinger, 1992) **comb. nov.** (*P. viviani*).

**Remarks.** The new genus *Ciprusenia* is similar to the genus *Canestrinia*. It differs in covering the dorsal side of the idiosoma by longitudinal and transverse lines and setae h₃ relatively long (females); it is also similar to the genus *Percanestrinia* but it differs in the location of the setae c₁ located near the setae c₂ (males) (see also keys).

**Ismaeilienia gen. nov.**

*Percanestrinia*: Berlese, 1911 (part)

**Type species.** *Ismaeilienia egypti* (Bishlavy & Allam, 2003) (*Percanestrinia egypti*)

Female. Sejugal furrow absent. Dorsum covered by irregular sclerites shaped or without ornamentation. Setae vi trilobed, some dorsal bifurcate setae. Setae ve present. Posterior margin of idiosoma with concave in the medial part. Below the setae se 7 or 8 pairs of short setae. In addition, there is a pair of longer setae cp on the dorsum. On the posterior margin of idiosoma or on the inside of it there are 2 pairs of setae h₁ and h₂ and short setae h₃.

Male. Dorsum with irregular sclerites or without ornamentation. Opisthosoma narrow, narrowest in the central part. Sejugal furrow absent. Setae vi, c₂ and e₂ bifurcated. Setae ve present. Dorsum with 7 pairs of short setae (series c, d, e, f) and a pair of long setae cp. At posterior margin of idiosoma 2 pairs of long setae h₁ and h₂ and a pair of shorter setae h₃. Adanal suckers present.

**Etymology.** The name of the new genus is based on the name of town Ismaielia near which the holotype was collected.

**Remaks.** The new genus differs from all other genera in posterior margin of idiosoma concave and some setae bifurcated (females and males) (see also keys). *Ismaeilienia maroccana* (Cooreman, 1953) **comb. nov.** (*Percanestrinia maroccana*).

**Javanellina gen. nov.**

*Canestrinia*: Berlese, 1881 (part)

**Type species.** *Javanellina macgillavryi* (Oudemans, 1923) (*Canestrinia macgillavryi*)

Female. Hysterosoma only partially ornamented, opisthosoma very short and much narrower than the hysterosoma, covered with shell-like structures. Sejugal furrow present, propodosomal plate absent. Setae ve absent. Doorsum with 7 pairs of short dorsal setae (series c, d, e, f). Setae d₁ and d₂ shifted near opisthosoma. Setae e₁, e₂ and f blunt ended and longer than setae c and d. Moreover, there are two pairs of long caudal setae h₁ and h₂ and long setae cp. The ventral side has short and smooth setae and one pair of long setae h₃. Legs I–IV short.
Male. Dorsum with 7 pairs of setae (series c, d, e, f), idiosoma without ornamentation. All these setae short. Moreover, there are two pairs of long caudal setae h1 and h2 and long setae cp. Setae d1 and d2 shifted near opisthosoma. Opisthosoma short, much narrower than hysterosoma. Sejugal furrow and adanal suckers present. On the ventral side, at the anal opening, there are 4 pairs of setae (p1-3, f2) and on posterior margin long setae h3. Legs I–IV short.

**Etymology.** The genus name is based on the name of the Island of Java, where the holotype was collected with the addition word *nellina*.

**Remarks.** This genus is similar to the genus *Haitlingeria*. It differs in ornamentation in the form of shell-like and circular structures, setae e1 and e2 blunt ended and setae e1 about three times longer than the setae e2 (females). *Javanellina* gen. nov. is also similar to the genus *Kuramasenia* gen. nov. It differs in the lack of ornamentation and very short opisthosoma (males) (see also keys).

---

**Kuramasenia gen. nov.**

*Canestrinia*: Berlese, 1881 (part)

**Type species.** *Kuramasenia picta* (Samšiňák, 1971) (*Canestrinia picta*).

Female. Idiosoma with lines or cell-shaped structures. Hysterosoma the same width as the opisthosoma or only slightly wider. Idiosoma with 6 pairs of setae (series c, d, e). Setae d2 more than twice as long as setae d1. Setae h1, h2 and cp long. Posterior margin of idiosoma almost simple or slightly rounded. Sejugal furrow and setae ve present. Tarsi IV longer than the others.

Male. Opisthosoma clearly narrower than the hysterosoma, slightly narrowed in the middle part.

**Setae ve present.** Idiosoma with 6 pairs of dorsal setae (series c, d, e). Setae d2 longer than setae d1. Setae e2 located just at the posterior margin of idiosoma. Setae h1, h2 and cp very long, setae h3 much shorter. Sejugal furrow and adanal suckers present. Tarsi III and IV longer than tarsi I and II.

**Etymology.** The genus name is based on the name of Mount Kurama where the holotype was found with the addition word *senia*.

*Kuramasenia pekingensis* (Samšiňák, 1971) comb. nov. (*Canestrinia pekingensis*), *K. illegalis* comb. nov. (*C. illegalis*), *K. paavo* (Haitlinger, 1994) comb. nov. (*C. paavo*), *K. ramoni* (Haitlinger, 1994) (*C. ramoni*).

**Remarks.** The genus *Kumarasenia* (females) is similar to the genus *Canestrinia* and differs from it in: short setae h1 and the presence of 6 pairs of short setae on the hysterosoma and opisthosoma. Males are similar to the genus *Javanellina* and differs from I in: hysterosoma and opisthosoma fully or partially ornamented by cell-shaped structures or lines and longer opisthosoma (see also keys).

---

**Midiphotia gen. nov.**

*Neophotia*: Samšiňák, 1971 (part)

**Type species.** *Midiphotia jureceki* (Samšiňák, 1971) (*Neophotia jureceki*).

Female. Hysterosoma and opisthosoma partially ornamented cell-shaped or longitudinal lines. Sejugal furrow well developed. Propodosomal plate absent. Setae ve present. Dorsal surface with 6 pairs of short setae (series c, d, e). All of these setae of a similar length. Setae h1, h2 and cp very long, setae h3 short. Tarsi III and IV longer than tarsi I and II. Opisthosoma in the posterior part only a little narrowed.

Male. Idiosoma not ornamented. Opisthosoma very short and narrow. All dorsal setae from series c, d, e very short and smooth. Setae h1 and cp very long. Setae ve present. 4 pairs of short setae below the genital region. Sejugal furrow and adanal suckers present. Legs IV thicker than legs I–III.

**Etymology.** The genus name is based on the name of another genus *Photia* with the addition midi. This is the last part name of the mountain peak Pic du Midi where the holotype was found.

*Midiphotia hispanica* (Samšiňák, 1971) comb. nov. (*Canestrinia hispanica*).

**Remarks.** The new genus differs from all European genera in setae d1 placed near setae e1 or at least half the distance between setae c1 and e1 (females) (see remarks for *Cercediphotia*) and is similar to *Neophotia* (males). It differs in the presence of 2 pairs of long caudal setae and the relatively distant position of adanal suckers from the anal opening (see also keys).

---

**Neophotia Samšiňák, 1971**

**Type species.** *Neophotia drozdotocka*, Samšiňák, 1971.

Female. Hysterosoma, opisthosoma and the ventral part of opisthosoma covered by denticles. Sejugal furrow only in the middle of the idiosoma. Propodosomal plate absent. Setae ve present. Setae c2 at least twice as long as setae c1. Setae d2 missing. Dorsal surface with 5 pairs of short setae (serie c, d, e). Setae h1-h3 and cp long or very long. 7 pairs of short setae below of genital region. Copulatory tube

---
unusually long. Tarsi III and IV significantly longer than tarsi I and II. Opisthosoma in the posterior part strongly narrowed.

Male. Dorsum without ornamentation. All dorsal setae short (series c, d, e). Only setae h₁ and cp are long. Two pairs of setae at anal opening Setae ve present. Incomplete sejugal furrow and adanal suckers present. Legs IV very thick, much thicker than the legs I–III.

Remarks. This genus differs from other genera of presence on the dorsal and ventral parts of the opisthosoma denticles (females); it is similar to the genus Midiphotia (males). See remarks for this genus.

Percanestrinia Berlese, 1880

Type species. Percanestrinia blaptis (Canestrini & Berlese, 1880) (Allocetes blaptis) Female. Sejugal furrow present. All dorsal setae long or semilong. Setae cp, h₁ and h₂ longer than the rest, setae h₃ short. Dorsum with 7 pairs of setae (below sejugal furrow). Setae c₁ shifted beyond the level of setae d₂ and are located right next to each other. Setae se, cp, h₁ and h₂ with or without spiketes. Below genital region 6 pairs of setae. Tarsi I–IV clearly longer than the others.

Males. Opisthosoma short, clearly narrower than the hysterosoma, narrower in the middle part. Setae c₁ and others long or semilong placed as in females. Setae cp, h₁ and h₂ very long, setae h₃ short. Sejugal furrow and adanal suckers present. Tarsi I–IV of similar length.

Remarks. This genus is different from all other genera of shifted setae c₁ beyond the level of setae d₂ and setae c₁ located near setae d₁ (females and males) (see also keys). P. norodomii Haitlinger, 1992.

Phaleratusellus gen. nov.

Phaleratus: Nesbitt, 1976 (part)

Type species. Phaleratusellus alatus (Summers & Schuster, 1982) (Phaleratus alatus) Male. Sejugal furrow and propodosomal plate absent. Adanal suckers represented by a pair of pits resembling alveoli of microsetae. Dorsal surface with different types of setae: very wide flabelliform, long heavy tubular, short and heavily extended and microsetae. Caudal setae with extended bases. Setae vi short, stout, possibly barbed. Setae ve identifiable as a pair of alveoli having no apparent shafts. Three pairs of minute paranal stae and 1 pair of microsetae on ventrolateral walls of opisthosoma. Legs I–IV slender, all similar in size. A small ventral seta at the tip of each tarsus stout, spur-like, slightly more prominent on tarsi III and IV.

Etymology. The name of the new genus is based on the name of another genus Phaleratus with the addition word ellus.

Remarks. This genus is similar to the genus Passalophagus Nesbitt, 1976 and Phaleratus Nesbitt, 1976. Summers & Schuster (1982a) describing the species Phaleratus alatus they stated: the assignment of this new species to Phaleratus Nesbitt is a provisional action which may yield a split-upsome future date, when the finding of kindred species shows how to make a better arrangement. However, the differences between these species are large enough to already now that both species belong to different genera. The genus Phaleratusellus differs from the genus Passalophagus in normal, relatively thin legs I–IV vs. legs I–IV short and thick, sclerotized socket-like cup about the coxa absent vs. sclerotized socket-like cup about the coxa present, three pairs of wide flabelliform setae vs. two pairs of wide flabelliform setae; from Phaleratus it differs in 4 kinds of dorsal setae: very wide flabelliform, relatively long with extended bases, short, barbed with widened tops and microsetae vs. long plumose, long tubular with widened base, microsetae; caudal setae with widened bases and pointed vs. caudal setae with widened bases, tubular, blunt ended.

Pseudocanestrinia Khaustov & Eidelberg, 2001
Pseudocanestrinia. damiani (Haitlinger, 1989) comb. nov. (C. damiani), P. roberti (Haitlinger, 1990), comb. nov.

Sumatranella gen. nov.

Canestriniella: Berlese, 1910 (part)

Type species. Sumatranella elae (Haitlinger, 1989) (Canestriniella elae)
This genus includes also species: Sumatranella bato cereae (Vishnupriya & Mohanasundaram, 1988) comb. nov. (male described as female!) (Canestriniella bato cereae, Grandiella bato cereae), S. phoe binae (Haitlinger, 1995) comb. nov. (Canestriniella phoe binae).

Male. Idiosoma oval bears 8–10 of sort dorsal setae according three long caudal setae, located on ventral side or on the posterior margin Sejugal furrow and propodosomal plate absent, adanal suckers present, dorsum without ornamentation. Opisthosoma narrow, extended posteriorly. Posterior margin of opisthosoma almost straight or with appendix. Tarsi
III and IV without ambulacra. Ventral part below adanal suckers to 12 short and nude setae.

Female. Dorsum is covered with cell-shaped structures. All setae from the c, d, e series are short and of similar length. The setae h₁, h₂ and h₃ are located on ventral side. Setae p₁ and p₃ are longer than the other setae of the p and ad series.

Etymology. The genus name is based on the name of Island Sumatra where the holotype was collected with addition word nella.

Remarks. The new genus is similar to the genera Gioharattia, Jullongia and Teophyssa. It different from them in: almost the entire of dorsal side of idiosoma is ornamented, setae d and e on tarsi III and IV are very long (females). The new genus Sumatranella differs from all other genera by the lack of ambulacra on tarsi III and IV (males) (see also keys).

Class Insecta Linnaeus, 1758
Order Blattoidea Latreille, 1810
Family Blattidae Latreille, 1810

This family contains 3 subfamilies. Only one species of canestriniids was found in subfamily Blattinae Latreille, 1810

Subfamily Blattinae Latreille, 1810

This subfamily contains 23 genera. Only one species Coleopterophagus blattophagus Banks, 1914 was found on Periplaneta americana (Linnaeus, 1758) in Panama (Banks 1914). It is an accidental host, and the species described requires generic revision.

Order Coleoptera Linnaeus, 1758
Family Carabidae Latreille, 1802

This family contains 28 subfamilies with about 40,000 species. Canestriniid mites were stated only on species belonging to 2 subfamilies: Carabinae and Harpalinae.46 species of canestriniids from 18 genera were found on 78 host species belonging to 7 genera.

Subfamily Carabinae Latreille, 1802

14 genera, 42 species and 3 subspecies of canestriniids are related to the subfamily Carabinae. Canestriniids only collected from species belonging to the genera Calosoma Weber, 1801, Carabus Linnaeus, 1758 and Cychrus Fabricius, 1794. They were collected from 74 host species belonging to 4 genera (Berlese 1911; Cooreman 1950; Samšiňák 1964, 1971; Beron 1971; Haitlinger 1988a, 1994b, 1995a; Khaustov & Eidelberg, 2001; Trach 2006) (Tables). Extremely, Photia polymorpha Samšiňák, 1971 was collected from 12 host species, P. procrustis (Berlese, 1881) (8 species), Procericola bourgneii (Oidemans, 1923) (7), Percanestriniella levis (Samšiňák, 1971) (6), Photia chrysocarabi Cooreman, 1950 (6), P. heijniana Samšiňák, 1971 (5), P. bilkorun Samšiňák, 1971 (4) and P. adolfinae Haitlinger, 1994 (3). The remaining Carabinae are hosts for one or two canestriniid species. The largest number of canestriniid species stated on Carabus coriaceus Linnaeus, 1758 (6). From species belonging to the genus Carabus canestriniids were collected only in Asia and Europe. In Asia 19 species of canestriniids were found on 38 Carabus species (Table). In Europe 28 canestriniid species were collected from 33 Carabus species. These mites have been found in 12 Asian countries: China 6 species, India (1), Iran (1), Israel (1), Japan (2), Kyrgyzstan (1), Lebanon (2), Russia (Siberia) (4), South Korea (1), Taiwan (1), Turkey (7), Uzbekistan (1). In Europe they were found in 27 countries, Abkhazia and the Crimea, most in Poland (10) and Ukraine (8).

Subfamily Harpalinae Bonelli, 1810

This subfamily contains about 20,000 species. Only 4 species of canestriniids belonging to 4 genera were found on 4 species of hosts from 3 genera. May be Megacanestrinia mucronata Trägårdh, 1906 collected on Carabidae undet. is also associated with Harpalinae (Trägårdh 1906). The species of Harpalinae are exceptionally hosts of canestriniids. Globosophotia bettinae Haitlinger, 1991 was collected from Pterostichus globosus (Fabricius, 1792) in Morocco (Haitlinger 1991f) (Table). It is the only species collected from the genus Pterostichus Bonelli, 1810 which contains more than 1100 species. All 4 mite species were collected in Africa (Table I).

Family Cerambycidae Latreille, 1802

The large family consist about 10 subfamilies, about 428 genera and over 26,000 species. Canestriniidae were collected from species of two subfamilies: Cerambycinae and Lamiinae. Canestriniidae rarely occur on Cerambycidae. So far, 16 species of canestriniid mites belonging to 7 genera have been found on 17 species and 8 genera of Cerambycidae (Tables XII and Tables XIV). The relationships of canestriniids and cerambycids and their distribution are very
Table I. List of canestriniids and their hosts from Africa.

| Countries                      | Mites                          | Hosts                                |
|--------------------------------|--------------------------------|--------------------------------------|
| Africa                         | Canestrinia remigans           | Morica planata                       |
|                                | Coleoglyphus fascipes*         | Copris sp., Heliocorpis hamadryas, Tefflus megerlei |
|                                | Coleopterophagus neglectus     | Augosoma centaurus                   |
|                                | Saniothina pycnosa             | Pycnocerus sp.                       |
| Algeria                        | Pseudoamansia chrysomelina     | ?                                    |
| Botswana                       | Sorbinophela sandyi            | Poecilophilus maculatissima          |
| Burundi                        | Boetophela werneri             | Plaesiorrhina mhondana               |
| Cameroon                       | Boetophela erhardi             | Mecynorrhina savage                  |
|                                | Cetonicola isadoras            | M. savage                           |
|                                | Donnelafontia calostegis       | Calostega crassicornis               |
|                                | Paraphagella grimaldi          | M. polyphemus                        |
|                                | P. indira                      | M. savage                           |
|                                | Phelliculophela roaldi         | Goliathus goliathus                  |
|                                | Saniothiana barombaica         | Odontopezus cupreus lucens           |
| Democratic Republic of the     | Afrocstrinaria straeleni       | Diconorrhina micans                  |
| Congo                          | Cetonicola hispidus            | D. micans, Eudicella gralli, Smaragdesthes africana |
|                                | Coleopterophagus pulcher*      | Porphyrnota cinnamomea               |
|                                | Diplognatophilus africanus     | Rhabdotis sobrina                    |
|                                | Donnelafontia suatohia         | Odontopezus cupreus                  |
|                                | Paraphagella eudicellae        | Eudicella gralli mechowi, E. euthalia berthorandi |
|                                | P. minor                       | E. smithi                            |
|                                | P. princeps                    | D. icerornhina micans, S. africana nautica |
| Egypt                          | Ismailienia egypti             | Blaps polychresta                    |
| Ethiopia                       | Barbtiangia elongata           | Diplognatha gagate                   |
|                                | B. ethiopic                    | Cetoninae undet.                     |
|                                | Diplognatophilus ethiopicus    | Cassidinae undet.                    |
|                                | Tamarangia ethiopicus          | Pachnodia abyssinic                  |
|                                | T. nigra                       | P. thoracica                         |
| Ghana                          | Boetophela ephrai               | Cassidinae undet.                    |
|                                | Boleohylla garrica             | Metallonotus metallicus              |
|                                | Cetonicola orestesi            | Timesorrhina irisa                   |
| Guinea                         | Pseudoparaphagella gerardii    | Caelorhina thoreyi                   |
| Kenya                          | Chelinochroa dictyphora        | Cerambycidae undet.                  |
|                                | Diplocodocopes transkeiens     | Odontopygidae undet. (Diplopora)     |
| Liberia                        | Cetonicola orestesi            | Timesorrhina irisa                   |
|                                | Paraphagella ingrida           | T. irisa                             |
| Madagascar                     | Ambilohylla favosa             | Damatria formosus                    |
|                                | Athogavia nosiana              | Oryctes pyrrhus                      |
| Morocco                        | Camiohylla feziana             | Blaps appendiculata                  |
|                                | Globoskoptia bettinae          | Pterostrichus globosus               |
|                                | Balearella asilahica           | Tenebrionidae undet.                 |
|                                | Ismailienia maroccana          | Blaps pinguis                        |
|                                | Midiphobia hispanica           | Carabus melanocholic                  |
|                                | Mesophobia penticillata tercia | C. melanocholic                       |
|                                | Pseudoomansia chrysomelina     | Timarcha sp.                         |
| Republic of the Congo          | Paraphagella odae              | Stepanorrhina guttata                |
|                                | Cetonicola maritae             | S. guttata                           |
| Republic of South Africa       | Boetophela cassandrae          | Cassidinae undet.                    |
|                                | B. ginae                       | Eudicella smithi                     |
|                                | Kahoorangia alamae             | Dichista rufa                        |
|                                | Megacanestrinia mucronata       | Carabidae undet.                     |

(Continued)
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

Table I. (Continued).

| Country     | Host species                          |
|-------------|---------------------------------------|
| Senegal     | **Afrocanestrinia samsoni**           |
|             | *Smaragdesthes africana*              |
| Sierra Leone| **Tamarangia fabiolae**               |
|             | *Pachnodia marginata*                 |
|             | **T. flaviani**                       |
|             | *P. marginata*                        |
| Sudan       | **Coleopterophagus quadririseosus**   |
|             | *Cetoniinae undet.*                   |
| Tanzania    | **Afrocanestrinia rufinae**           |
|             | *Smaragdesthes africana oertzeni*     |
|             | **Anaspistes unguiculatus**           |
|             | *Sternotomis bohemani*                |
|             | **Athogavia gamana**                  |
|             | *Oryctes monoceros*                   |
|             | **A. tanzanica**                      |
|             | *O. monoceros*                        |
|             | **Barbiangia alvar**                  |
|             | *Cetoniinae undet.*                   |
|             | **Boetophela robertsoni**             |
|             | *Diconorhina derbyana obertonhi*      |
|             | **B. silvanae**                       |
|             | *Anisorrhina laeviplaga*              |
|             | **B. sybillae**                       |
|             | *Goliathus albosignatus*              |
|             | **B. symeonii**                       |
|             | *Elasocheilon heterospila*            |
|             | **Cetonicola vatus**                  |
|             | *Euphoria hebracea*                   |
|             | **Irmongia helgae**                   |
|             | *Passalidae undet.*                   |
|             | **Megascanestrinia beloniana**        |
|             | *Tetflus purpureipennis*              |
|             | **Olgatia usequaica**                 |
|             | *Passalidae undet.*                   |
| Tunisia     | **Bircherica bertrami**               |
|             | *Temebrionidae undet.*                |
|             | **Ciprusenia carabica**               |
|             | *Carabus morbillosus*                 |
|             | **C. kamelskyi**                      |
|             | *Blaps sp.*                           |
| Uganda      | **Boleohylla kiogana**                |
|             | *Psammodes carbonarius*               |

* Generic identify is questionable.

Table II. List of host species from Africa.

| Family          | Subfamily    | Host species                                                                 |
|-----------------|--------------|-------------------------------------------------------------------------------|
| Carabidae       | Carabinae    | **Carabus melanancholicus, C. morbillosus**                                   |
| Harpalinae      |              | **Pterostichus globosus, Tetflus meyerlei, T. purpureipennis**                |
| Cerambycidae    | Lamiae       | **Sternotomis bohemani**                                                      |
| Chrysomelidae   | Chrysomelinae|                                                                              |
| Scarabaeidae    | Cetoniinae   | **Anisorrhina laeviplaga, Caelorrhina thorei, Dichista rufa,**                |
|                 |              | **Diconorhina derbyana obertonhi,**                                           |
|                 |              | **D. micans, Elasocheilon heterospila, Eudicella euthalia bertherandi,**       |
|                 |              | **E. gralli mechowi, E. smithi, Euphoria herbacea,**                          |
|                 |              | **Goliathus albosignatus, G. goliathus, Mecynorhina polyphemus,**             |
|                 |              | **M. savage, Pachnodia abyssynica,**                                          |
|                 |              | **P. thoracica, Poecilophila maculatissima,**                                 |
|                 |              | **Plaesiorhina mhondana, Porphyronota cinnamomea,**                           |
|                 |              | **Rhabdotis sobrinae, Smaragdesthes africana,**                               |
|                 |              | **S. oertzeni, Stepanorhina guttata,**                                        |
|                 |              | **Timesorhina iris**                                                          |
| Dynastinae      |              | **Oryctes monoceros, O. pyrhus**                                              |
| Scarabaeinae    |              | **Copris sp., Heliocopris hamadyrachas**                                     |
| Tenebrionidae   | Laginae      | **Calostega crassicornis, Metallonotus metallicus, Odontopeus cupreus,**      |
|                 |              | **O. cupreus lucens**                                                         |
|                 | Pimelinae    | **Morica planata, Psammodes carbonarius**                                     |
|                 | Tenebrioninae| **Blaps appendiculata, B. polychresta, Damatria formosus**                   |
| Zoophoridae     | Zoophorinae  | **Pycnocrus sp.**                                                             |
poorly known. Only 2 species related to cerambycids are known from Africa, 2 from America, 6 from Asia and one from Europe (Summers & Schuster 1982b; Haitlinger 1989d, 1995b) (Tables I, III, V, VII and XIV).

Subfamily Cerambycinae Latreille, 1802

The subfamily includes about 3900 species. Only 3 canestriniid species were collected from 4 species of hosts: Dicanestrinia cerambycica (Canestrini, 1878) from Cerambyx cerdo Linnaeus, 1758 in Italy, Phriknodora pustulosa Summers & Schuster, 1982 from Juapiaras batus (Linnaeus, 1758) and J. mexicanus Thomson, 1860 in Mexico and Panama and P. scabra Summers & Schuster, 1982 from Trachyderes succinctus gg (Linnaeus, 1758) in Panama (Canestrini 1878; Vitzthum 1924; Summers & Schuster 1982b) (Table III). On the basis of current research, it can be concluded that Cerambycinae are very rare hosts of canestriniid mites.

Subfamily Lamiinae Latreille, 1825

The subfamily contains over 3052 genera and over 29,258 species (Saha et al. 2013) but 9 canestriniid species were collected only from 14 host species belonging to 5 genera (Summers & Schuster 1982b; Vishnupriya & Mohanasundaram 1988; Haitlinger 1989d, 1995b). Most species (10) belong to the genus Batocera Castellnau, 1840 (which contains 54 species); 6 species of canestriniids collected from them. They belong to 2 genera: Canestriniella Berlesee, 1910 and Sumatranelea gen. nov. C. togata Berlesee, 1910 was collected from Batocera lineolata Chevrolat, 1852 from Java. Summers & Schuster (1982b) quote it after him, adding a possible second name for this species C. lineolata Chev. Both of these names are wrong. The correct name seems to be B. lineolata. This species was known from China, Japan, Korea and Taiwan and most recently from India (Boyane et al. 2020). Also, Batocera proserpina mentioned by Summers & Schuster (1982b) has the correct name B. wallacei proserpina Thomson, 1865. Probably most of canestriniids found on Lamiinae are associated with only one host. The exception is C. togata found on 3 hosts, S. elae (Haitlinger, 1989) and C. physsana Haitlinger, 1989 found on 2 hosts (Tables VIII and X). Canestriniids from Lamiinae were collected from Africa (Kenya, Tanzania – 2 species), Central Africa (Panama – 3 species of the genus Thopia Summers & Schuster, 1982 from 3 species of hosts) and Asia (India – 1 species, Indonesia – 5 species, Malaysia 1 species, 4 from the genus Sumatranelea from 10 species of the genus Batocera Castellnau, 1840 and 1 species of the genus Clyster Arrow, 1908 (Tables XII and XIV).

Family Chrysomelidae Latreille, 1802

This family contains 11 subfamilies and about 35,000 species but canestriniids were obtained mainly from Cassidinae, less from Chrysomelinae and exceptionally from Eumolpinae. 85 species of canestriniids and 3 unidentified species from 23 genera were found on 153 species and 8 unidentified species of chrysomelids of 39 genera (Table X).

?? Of the 159 species of Chrysomelidae, 84 species of canestriniids were collected

Subfamily Chrysomelinae Latreille, 1802

This subfamily contains about 3000 species and about 132 genera (Flinte et al. 2017). 6 canestriniid species: Amansiella bilobata Khaustov & Eidelberg, 2001, Lombardintella gentilis Lombardini, 1941, Paramansiia bicornis Khaustov & Eidelberg, 2001, P. mentasthri Cooreman, 1950, Pseudoamansiia chrysomelinius Cooreman, 1950 and P. decorata Trach & Khaustov, 2007 were collected from only 16 species of Chrysomelinae and two species were determined to the genus (Table X) (Lombardini 1941; Cooreman 1950; Jolivet and Theodrides 1955; 1960; Fain 1987a; Khaustov & Eidelberg, 2001; Trach 2006, 2006; Trach & Khaustov, 2007). P. chrysomelinius was obtained from 10 host species, all belonging to the genus Timarcha Latreille, 1829. P. bicornis was obtained from 3 hosts belonging to genus Chrysolina Motschulsky, 1860. Other canestriniids were collected from two or ne host species. Species from the genera Pseudoamansiia Cooreman, 1950 and Amansiella

Table III. List of canestriniids and their hosts from America.

| Country       | Mites                     | Hosts                        |
|---------------|---------------------------|------------------------------|
|               | Central America            |                              |
| Belize        | Grandiellops jambosa       | Discornopa batesi            |
| Costa Rica    | Acroctacarus mirabilis     | Physonota alutacea           |

(Continued)
Table III. (Continued).

| Arrunstithiana esacaudata | Stolas lebasii |
|---------------------------|----------------|
| Bibulothiana albertae    | Chelymorphe comata |
| Danaithiana chanchamayoica | Semiotus imperialis |
| Ennodithiana melindae    | Coptocyclo leprosa |
| Olaflithiana ivetiae     | Holocassis testudinaria |
| Phriknodora avae        | Stolas lebasii |

**Cuba**
- D. chanchamayoica  | Semiotus imperialis |
- E. melindae        | Coptocyclo dorsopunctata |

**Guatemala**
- Acrotaracus mirabilis | Physonota sp. |
- Arrunstithiana esacaudata | Stolas punicea |
- Grandiellopsis gambosa | Discomorpha biplagiata |

**Honduras**
- Bibulothiana brevispinata | Stolas discoides |
- Metriothiana bolebori  | Metrionella bilimeki |

**Mexico**
- Acrotaracus alutaceus | Physonota alutacea, P. gigantea, Platycyclo deruta |
- A. mirabilis         | P. alutacea, Physonota sp. |
- Arrunstithiana esacaudata | Stolas sp. |
- Bibulothiana cyriaki | Chelymorphe infecta |
- B. vatica            | Cyronota tristigma |
- Ennodithiana manuist | Coptocyclo dorsoptagiata |
- Grandiella marinae   | Echoma confluens |
- G. soniae            | Stolas punicea |
- Phriknodora pustulosa | Juaiparbus mexicanus |

**Nikaragua**
- Grandiellopsis jambosa | Discomorpha distincta |

**Panama**
- Bibulothiana brevispinata | Stolas ephippium |
- Coleopterophagus blattophagus | Periplaneta americana |
- Ennodithiana conula        | Omaspides bistriata |
- E. platysma               | Coptocyclo sp. |
- Grandiellopsis gambosa    | Discomorpha sp., D. depilata |
- Olaflithiana foliacae     | Stolas lenis |
- Ovarrothiana echinoderma  | Eugenysa sp. |
- O. kinseyi                | Discomorpha sp. |
- Phriknodora pustulosa     | Juaiparbus hattus |
- P. sparsa                 | Trachyderes succinctus |
- Teklithiana conula        | Omaspides bistriata |
- T. rugosita               | Acromis sparsa |
- Thopia bulbocaudata       | Neoptychodes trilineatus |
- T. punnacea               | Lagocheirus faveolatus |
- T. tenar                  | Taenioites scalatus |

**South America**

**Argentina**
- Grandiella tachiannae    | Botanochara bonariensis, B. macularia, B. tessellata, B. duodecimverrucata |
- G. tetracaudata          | B. subnervoasa |
- Grandiellopsis ariani    | Carlobuchia tricostata |
- Olaflithiana foliacae    | Stolas paranensis |
- O. antiqua               | S. antiqua |

**Bolivian**
- Arrunstithiana battosi   | Stolas cruentata, S. huanocensis, S. pleurosticha, S. scoparia |
- A. esacaudata            | Stolas sp., Canistra sp. |
- A. quadrata              | S. funebris |
- Bibulothiana brevispinata | S. lineaticollis |
- Gasuthiana abufarica     | Coralimela brunnea |
- Grandiella decemcaudata  | Echoma clypeata |
- G. longini               | Goniochena flavoparsa |
- Grandiellopsis violae    | Canistra procera |
- Olaflithiana multifida   | Stolas cruentata |
- Ovarrothiana leopoldi    | Miocalaspis gentilis |
- O. ludomiri              | Cyclosoma tristis |
- Teklithiana onnae        | Acromis sparsa |

(Continued)
Table III. (Continued).

| Brazil          | Arrunsithiana arcuta | Stolas decemguttata, S. sexesignata |
|-----------------|----------------------|-------------------------------------|
|                 | A. battosi          | Mesophalia gibosa, S. lenis, S. oblita, S. ignita, S. conspersa, S. paranas, S. chalybae |
|                 | A. escaudata        | Cassidiniae sp. |
|                 | A. quadrata         | S. aenea, S. conspersa, S. indigacee |
|                 | A. spicantis        | Canistra rubiginosa, S. conspersa, S. chalybae |
|                 | Bibulothiana brevispinata | Microtenochira bifrenstrata |
|                 | B. cypriki          | Chelymorpha nigrilis, C. vermiculata |
|                 | B. everittae        | C. inflata |
|                 | B. owaldisi         | S. plagicollis |
|                 | Canestrinia manicata* | Doryphora tessellata |
|                 | Dorynthiana delnari | Dorynita sp. |
|                 | D. jurandi          | D. pugionata |
|                 | Ennodithiana maniusi | Omaspidida basilica, Coptocycla contempa |
|                 | E. medoni           | Acromis spinifex |
|                 | E. megesi           | Crambelela illudens |
|                 | Euorithiana aidae   | Plagiometeria vigens |
|                 | E. heliodori        | P. ludiera, P. punctatissima |
|                 | E. penelopae        | Echoma clupeata |
|                 | Gasuthiana abapoica | Alurnus elysianus |
|                 | G. coarica          | Meristomela marginata |
|                 | G. melilae          | Tenebrionidae undet. |
|                 | Grandiella minor    | Canistra dohni |
|                 | G. octacaudata      | Stolas chalybae |
|                 | G. taczanae         | Anacassius fuscata, Botanochara impressa, B. sedecimpustulata, B. regina, B. nyforeticulata, B. angulata |
|                 | G. tertia           | Cassidiniae undet |
|                 | G. tetracaudata     | Coptocycla adamanita, Cyrtotyna thalassina, C. tigrina, Euomulus fulgidus, Stolas chalybae, S. lacordaire |
|                 | Grandiellopsis ariani | Carlbroughia carbonaria |
|                 | G. gambsosa         | Discomorpha batesi, D. spectanda, D. variegata, D. dromedarius, D. duclis, D. salvini |
|                 | G. odosi            | Polychalca punctatissima |
|                 | Hatohyella bahiana  | Nyctobates maxima |
|                 | H. bibrianae        | Tenebrionidae undet. |
|                 | H. morrata          | Nyctobates gigan |
|                 | Jowitella barbara   | Passalidae undet. |
|                 | Olafithana adelinae | Anacassius crirum |
|                 | O. folicia          | Stolas aerolata, S. chalybae, S. conspersa, S. impexa, S. impluvia, S. oblita, S. festiva, S. nudicolis, S. lacunosa, S. subrecticulata |
|                 | O. joliveti         | Elytrospinossa xanthopyga |
|                 | O. multifida        | Stolas antiqua |
|                 | Ovarothiana erazmi  | Eugenysa bacchus |
|                 | O. nikodemi         | E. delicata |
|                 | O. ozannae          | Agenysa caedemadens |
|                 | Sabothana boi       | Charidotis sp. |
|                 | S. reidari          | Charidotella kessleri |
|                 | S. ricardoi         | Charidotis frunci |
|                 | Thioia boguvolae    | Polychalca punctatissima |
|                 | T. corinnae         | P. dentipennis |
| Colombia        | A. battosi          | S. niobe |
|                 | A. ilosi            | Cyrtotyna dissecta |
|                 | A. quadrata         | Eugenysa colombiana |
|                 | Bibulothiana brevispinata | S. coeruleascens, S. ephippium |
|                 | Danaithiana archidonaica | Semiotus furcatus |

(Continued)
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

| Country          | Species 1                          | Species 2                          |
|------------------|-----------------------------------|-----------------------------------|
| Ecuador          | Arrunsithia artemon               | Stolas lativittata               |
|                  | A. battosi                        | S. inexculta                      |
|                  | A. erinna                         | S. pectinata                      |
|                  | Bibulothiana brevispinata         | S. coerulescens                   |
|                  | Danaithiana archidonaiica         | Semiotus furcatus                 |
|                  | D. aryaica                        | S. virgatus                       |
|                  | D. ecuadorica                     | S. furcatus                       |
|                  | Grandiella cooremami             | Canistra osculati                 |
|                  | G. ecuadorensis                   | C. osculati                       |
|                  | G. soniae                         | Stolas coalita                    |
|                  | Grandiella tetracaudata           | Echoma clypeata                   |
|                  | G. tetracaudata omopla             | E. clypeata                       |
|                  | Grandiellopsis cyclosoma          | Cyclosoma palliata                |
|                  | G. gambosa                        | Discomorpha breiti, D. variegata, D. schusteri |
|                  | Ovarrothiana erazmi               | Eugenysa grossa, E. venosa       |
|                  | Thoripa ameae                      | Polychalea dentipennis            |
| French Guiana    | Arrunsithia esacaudata            | Echoma clypeata                   |
|                  | Averthiana anoni                  | Zatrephina lineata                |
|                  | Gasuthiana oleraica               | Alurnus bipunctatus               |
|                  | Grandiella tetracaudata           | Echoma clypeata                   |
|                  | G. tetracaudata omopla             | E. clypeata                       |
|                  | Grandiellopsis cyclosoma          | Cyclosoma palliata                |
|                  | G. gambosa                        | Discomorpha breiti, D. variegata, D. schusteri |
|                  | Ovarrothiana erazmi               | Eugenysa grossa, E. venosa       |
|                  | Thoripa ameae                      | Polychalea dentipennis            |
| Paraguay         | Grandiella decemcaudata           | Stolas sp.                        |
|                  | G. tacjannae                      | Botanochara sanguinea             |
| Peru             | Arrunsithia battosi               | Stolas pleurosticha S. erichsoni, S. funebris |
|                  | A. squarrosa                      | Eugenysa grossa, Stolas lebasii, Stolas sp. |
|                  | Bibulothiana everittae            | Chelymorpha rufofugattata         |
|                  | Danaithiana chanchamayoica        | Semiotus imperialis               |
|                  | Grandiella rogeri                 | Goniochenia haroldi               |
|                  | G. soniae                         | Stolas erichsoni, S. placida      |
|                  | G. tacjannae                      | Botanochara convexiuscula         |
|                  | G. tetracaudata                   | B subnervosa, Stolas sp.          |
|                  | Grandiellopsis orsenna            | Cyclosoma mirabilis               |
|                  | Ovarrothiana nikodemi             | Eugenysa diversis                 |
|                  | O. oznnae                         | E. regalis                        |
|                  | Peruthiana brianae                | Cassidinae undet.                 |
| South America    | Arrunsithia laticeps              | S. inequalis                      |
| (countries       | A. quadrata                       | S. inequalis                      |
| unknown)         |                                   |                                   |
| Surinam          | Ennodithiana penelopeae           | Acromis spinifex                  |
| Trinidad         | Acrotacarus alutaceus             | Physonota alutacea                |
| & Tobago         |                                   |                                   |
| Venezuela        | Grandiella pentagona              | Cassidinae undet.                 |
|                  | Hatohylla rosascostai             | Nyctobates sp.                    |

*Generic identify is questionable*
Table IV. List of host species from Central America and South America.

| Family           | Subfamily | Host species                                                                 |
|------------------|-----------|-------------------------------------------------------------------------------|
| **Central America** |           |                                                                              |
| Cerambycidae     | Cerambycinae | *Juiparopus batus*, *J. mexicanus*, *Trachyderes succinctus*                |
| Laminae          |           | *Lagochirius faveolatus*, *Neopychodes trilineatus*, *Taeniotes scalatus*    |
| Chrysomelidae    |           | *Acromis sparsa*, *Chelymorpha comata*, *C. infecta*, *Coptocyclo leprosa*,  |
|                  | Cassidyina | *Cyrtonota tristigma*, *Discomorpha batesi*, *D. bialpata*, *D. depilata*,  |
|                  |           | *D. distincta*, *Echoma confluens*, *Eugynysa sp.* , *Helocassis testudinaria*, |
|                  |           | *Metronella bilimeki*, *Omaspides bistrata*, *Physonota alutea*, *P. gigantea*, |
|                  |           | *Platyctyla Deruta*, *Stolas discoides*, *S. epiphiptum*, *S. lebasi*, *S. punicea* |
| Elateridae       |           | *Semiotus imperialis*                                                        |
| Blattidae        | Blattinae | *Periplaneta americana*                                                      |
|                  |           |                                                                              |
| **South America** |           |                                                                              |
| Chrysomelidae    |           | *Acromis sparsa*, *A. spinifex*, *Agenysa caademadens*, *A. crassicornis*,  |
|                  | Cassidyina | *Athurus bipunctatus*, *A. boucardi*, *A. clysius*, *Anacassius fuscata*, *A. rubrum*, *Botanochara angulata*, *B. bonariensis*, *B. convexiwsula*, *B. duodecinverrucata*, *B. impressa*, *B. macularea*, *B. regina*, *B. ruforcitculata*, *B. sanguinea*, *B. sedecimipustulata*, *B. subnervosa*, *B. tessellata*, *Canistra dohrni*, *C. osculiit*, *C. procera*, *C. rubiginosa*, *Carlobruchia carbonaria*, *C. tricostata*, *Charidotis sp.*, *Chelymorpha illuendens*, *Cyclosoma mirabilis*, *C. palliata*, *C. tristis*, *Cyrtonota cyanae*, *C. dissecta*, *C. textilis*, *C. tigrina*, *C. thalassina*, *Discomorpha batesi*, *D. breiti*, *D. conspersipennis*, *D. dromedarius*, *D. duclais*, *D. instabilis*, *D. languinosha*, *D. miniata*, *D. salvini*, *D. schusteri*, *D. spectanda*, *D. variegeta*, *Doryphora pugionata*, *Doryphora tessellata*, *Echoma clypeata*, *Eugynysa bacchus*, *E. columbiana*, *E. delicata*, *E. divers*, *E. grossa*, *E. venosa*, *Goniochys flavosparsa*, *G. haroldi*, *Meristomela marginata*, *Mesomphalia gibbosa*, *Microtenochira bifrenestrata*, *Miocalaspis gentilis*, *Omaspides basilica*, *S. funebris*, *S. huanocensis*, *S. ignita*, *S. impexa*, *S. inliviati*, *S. indigaceae*, *S. inequalis*, *S. inescula*, *S. lacordairei*, *S. lacunosa*, *S. latetvittata*, *S. lenis*, *S. lineaticollis*, *S. nioba*, *S. nudicollis*, *S. obiita*, *S. paranensis*, *S. pectinata*, *S. plagiocollis*, *S. pleurostichia*, *S. scoparia*, *S. sexignata*, *S. subreticulata*, *Zathrephina lineate* |
|                  | Chrysomelinae | *Elytrophaera xanthopyga*, *Eumolpus fulgidus*                               |
| Elateridae       | Dendrometrae | *Semiotus furcatus*, *S. imperialis*, *S. virgatus*                            |
| Tenebrionidae    | Tenebrioninae | *Nyctobaetes gigas*, *N. maxima*, *Nyctobates sp.*                          |

Table V. List of canestriniiids and their hosts from Asia and Oceania.

| Country          | Genus (species) | Host species                    |
|------------------|-----------------|---------------------------------|
| **Asia**         |                 |                                 |
| Abkhasia         | *Photia bilkorum* | *Carabus protensis*             |
| Cambodia         | *Melisa samasinaki* | *Passalidae undet.*            |
| China            | *Beechiphotia volkeri* | *Carabus sp.*                  |
|                  | *Canestrinia kaeperi* | *C. formosus subformosus*      |
|                  | *Ciprusena viviana* | Host unknown                   |
|                  | *Coleopterophagus belzebubi* | *Protaetia funebris*          |
|                  | *C. near berlese* | *Dorcas curvidens*, *D. curvidens hope*, *D. titanus niliferi* |
|                  | *C. rudolfi* | *Protaetia brevitas*            |
|                  | *Gioharattia maharae* | *Thaumastopeus nigritus*       |
|                  | *Karamasaenya pauv* | *C. gehinni*                   |
|                  | *K. pekingensis* | *C. anchocephalus*, *C. augustus*, *C. brandti*, *C. gemmifer*, *C. ghytophorus*, *C. ignitemenla angusticollis*, *C. ladosseii buchi*, *C. pastulifer pastulifer*, *C. pastulifer guerrry*, *C. pastulifer pratti*, *C. pastulifer szechwanensis* |
|                  | *K. ramoni* | *C. ladosseii coelestis*        |

(Continued)
A review of host-commensal associations between canestriniid mites (Astigmata: Canestrinidae) and Insecta

| Table V. (Continued). |
|------------------------|
| **Melisia sentosa** | Passalidae undet. |
| **Photia melchiori** | Carabus sp. |
| **China (Tibet)** | **K. pekingensis** | C. anchocephalus, C. pustulifer |
| **Cyprus** | **Ciprusenia izabelae** | Blaps gibba |
| | **Balearella samsinaki** | Blaps sp. |
| | **Photia procustidis** | Carabus anatolicus anatolicus, C. coriaceus |
| **Georgia** | **Percanestrinia blaptis** | Blaps lethifera |
| | **Photia blikorum** | Carabus komarovi |
| | **Procericola ichthyoides scabricola** | Carabus scabrosus colchicus |
| **India** | **Apalotacarus echinatus** | Pharophilus dilatus, Pleurarius brachyphyllus. Passalidae undet. |
| | **A. protensus** | Macrolinus nicobaricus |
| | **A. scessus** | Plurarius brachyphyllus |
| | **Athogavia assamica** | Trichogomphus martabani |
| | **Coleopterophagus procerus** | Oryctes rhinoceros |
| | **Melisia anomala** | Episphenus indicus, Episphenus sp. |
| | **M. klapaleki** | E. indicus |
| | **Paramelisia alatus** | Pleurarius brachyphyllus |
| | **P. lacuna** | P. brachyphyllus |
| | **Percanestriniella vlachiana** | Carabus boyssi, C. stoliczk anus |
| | **Phaleratusellus alatus** | Pleurarius brachyphyllus |
| | **Sandrophela sohiae** | Hemisodorcus sp. |
| | **Shillongia marzenea** | Leptaulax dentatus |
| | **Sumatranella batocera** | Batocera rufomaculata |
| **Indonesia** | **Albinorattia igeri** | Heterorrhina sexmaculata dohrni, Ischiopsopha latreillei, I. olivacea, Lomaptera kaestneri, Myceterophallus sp. |
| | **Amboinophila bernae** | Prospocoilus bison, P. bison cinctus |
| | **Apalotacarus fulgens** | Peloides tridens |
| | **Arraphosoma paralinax** | Labienus gigas |
| | **Athogavia borneoica** | Oryctes rhinoceros |
| | **A. scagana** | Oryctes sp. |
| | **Aurilossongia dioni** | Chalcosoma atlas |
| | **Canestrinia jaevensis** | Host unknown |
| | **C. microdisca** | Host unknown |
| | **C. nepalensis** | D. nepalensis |
| | **Canestrinia sp.** | Odontolabis dalmani |
| | **Canestrinia sp.** | Dorcus paryi |
| | **Canestrinia sp.** | D. titanus |
| | **Canestrinia sp.** | D. mirabilis, D. titan us |
| | **Canestriniella amplexans** | Batocera maculata |
| | **C. physsana** | B. celebiana, B. humeridens |
| | **C. togata** | B. numitor ferruginea, B. rubus |
| | | B. lineolata, B. thomsoni, B. wallacei proserpina, Clyster trachypygus |
| | **Contramelisia danielae** | Passalidae undet. |
| | **Gioharatta maharae** | Chalcothea neglecta, C. smargdina, Coilodera diardi, Pseudochalcothea auripes, Thaumastocephus cupripes, T. nigritus, Cetoninae undet. |
| | **Hargeinella papuana** | Trichogomphus bronchus |
| | **Javanellina macgillavryi** | Host unknown |
| | **Jullongia iliae** | Passalidae undet |
| | **Lidiophela aruica** | Dorcus saiga |
| | **L. boguea** | Labienus ptox |
| | **L. celinae** | Passalidae undet. |
| | **L. iga** | Passalidae undet. |
| | **L. pelagiae** | Labienus gigas |
| | **Melisia ariadnae** | Passalidae undet. |

(Continued)
| M. gabriellae         | Acreus laevicollis |
|-----------------------|--------------------|
| M. hieronimae        | A. laevicollis     |
| M. ingeborgae        | Passalidae undet.  |
| M. irenae            | Passalidae undet.  |
| M. lombardini        | A. grandis         |
| M. marietiae         | Passalus sp.        |
| M. melaniae          | A. laevicollis     |
| Noemiaphela barryi   | Dorcus taurus, Dorcus sp. |
| N. izabelae          | Cidognathus graffi |
| Rugoniphela marloni  | Dorcus antaeus, D. bucephalus, D. eurycephalus |
| Sandrophela amarae   | Dorcus bucephalus, D. eurycephalus, D. reichei clypeatus, D. taurus, D. titanus |
| S. near amarae       | D. alcidés         |
| S. dittae            | D. bucephalus      |
| S. tugoni            | Odontolabis lecordeirei, O. wollastonii |
| S. near tugoni       | Odontolabis castelhauyi, O. eremicola, O. spectabilis |
| S. spectanda         | D. bucephalus, D. titanus palawanicus, Hexathrius mandibularis |
| S. near spectanda    | D. amamias kubotai, D. metacostatus, D. striatiipennis, D. antaeus, D. titanus okinawanus, D. t. suishimanus, D. t. tokanoshimaensis |
| Sandrophela sp       | Scarabaeinae undet. |
| Sumatranella elae    | Batocera ferruginea, B. rubus |
| S. phoebeinae        | Batocera albofasciata octomaculata |
| Tamarophela batjanica| Passalidae undet.  |
| Teophyssa beatae     | Passalidae undet.  |
| T. honorata          | Gonatas naviculator |
| T. teresae           | Passalidae undet.  |
| Vandevalia adriassae | Trichogomphus bronchus |
| V. oppressa          | T. lunicollis      |
| Vereoxia bogerii     | Lucanidae undet., Odontolabis dalmani |

**Iran**
- Camirohylla sp.
- Dila sp.
- Coleopterophagus baali
- Proteaia speciosa
- Photia polymorpha
- Carabus persianus

**Israel**
- Photia procustidis
- Carabus impressus karmelita

**Japan**
- Canestriniidae undet.
- Figulus sp.
- Canestriniidae undet.
- Dorcus rectus
- Canestriniidae undet.
- D. montivagus, D. rubrofemoratus, D. titanus
- Coleopterophagus belzebubi
- Proteaia orientalis
- C. berleset
- Dorcus rectus
- C. near berlesei
- D. curvidens hopei, D. titanus pilifer
- Haïltingeria longilobata
- Carabus blaptoides
- Kuramasenia pictura
- D. titanus castanicolor
- Photia polymorpha
- C. blaptoides levisi, C. capito, C. gehini, C. rugipennis

**Kyrgyzstan**
- Percanestriniella levis
- Carabus akindus musartianus, C. balassogloi, C. cicaticosus, C. turcomannorum, C. tanypedilus

**Lebanon**
- Photia procerca marani
- Carabus syriacus
- P. procustidis
- ?

**Malaysia**
- Canestriniella togata
- Batocera wallacei proserpina
- Goharattia maharae
- Pseudochalcothea pomacea

**Philippines**
- Apalotacarus scaurus
- Macrolinus weberi
- Canestrinia sp.
- Dorcus titanus, Odontolabis alces
- Goharattia maharae
- Thaumastopeus cupripes
- Sandrophela near spectanda
- Dorcus titanus palawanicus

(Continued)
Table V. (Continued).

| Country          | Mite Species                              | Host Species                          |
|------------------|-------------------------------------------|---------------------------------------|
| Russia (Siberia) | Photia lopatini                           | Carabus lopatini                      |
|                  | P. pacifica                               | C. kolbei                             |
|                  | P. polymorpha                             | C. imperialis, C. schoenherri, C. schrenki, C. vietinghoffi |
|                  | P. sibirica                               | C. schoenherri                        |
| South Korea      | Hautilingera longilobata                  | Dorcus titanus castanicolor           |
|                  | Photia polymorpha                         | C. constricticollis                   |
| Sri Lanka        | Giorharattia caroe                        | Heterorhina elegans, Heterorhina sp. |
| Syria            | Coleopterophagus dionizyi                 | Protaetia metallica                   |
|                  | C. maroni                                 | P. speciosa                           |
| Vietnam          | Contramelisia vietnamensis                | Passalidae undet.                     |
|                  | Melisia balogi                            | Passalidae undet.                     |
|                  | M. helena                                 | Passalidae undet.                     |
|                  | M. hieronimae                             | Passalidae undet.                     |
|                  | M. jadwigae                               | Passalidae undet.                     |
|                  | M. mahunkai                               | Passalidae undet.                     |
|                  | M. occidii                                | Passalidae undet.                     |
|                  | M. rutae                                  | Passalidae undet.                     |
|                  | Sandrophela rodioni                       | Dorcus platymelus, D. titanus         |
| Taiwan           | Apalotacarus aristatus                    | Aceratus grandis                      |
|                  | A. truus                                  | Leptaulx bicolor                      |
|                  | Coleopterophagus belzebub                 | Protaetia orientalis                  |
|                  | Kuramasenia illegalis                     | Carabus nankotaizanus, C. smaragdinus longipennis |
|                  | Melisia superba                           | Aceratus grandis                      |
| Thailand         | Canestrinia sp.                           | Dorcus curvidens                      |
|                  | Melisia kieronimae                        | Passalidae undet.                     |
| Turkey           | Coleopterophagus megnini                  | Protaetia cuprea ignicollis           |
|                  | Photia chrysocarabii                      | ?                                     |
|                  | P. graeca                                 | Carabus coriaceus kindermanni         |
|                  | P. procer aadamensis                      | C. scabrosus transversalis            |
|                  | P. procer turcica                         | C. scabrosus amasicus, C. s. audouni, C. s. caucasicus, C. s. cabrosus |
|                  | P. procustid                              | C. mulsantianus, C. paiafa, C. punctatus |
|                  | Procericola bourgognei                    | C. coriaceus                          |
|                  | Procericola ichthyoides scabricola        | Carabus scabrosus scabrosus           |
| Uzbekistan       | Percanestrinia noromdi                    | Blaps holconota                       |
|                  | Percanestriniella levis                   | Carabus sturoskyi, C. turcomannorum   |
| Australia        | Apalotacarus fisticulus                   | Pharophilus nitidulus                 |
|                  | A. gracilis                               | Passalidae undet.                     |
|                  | A. luisii                                 | Mastochilus australasicus, M. questionis |
|                  | Cnecoderma dolichopoda                    | Pharoohilus dilatus,                 |
|                  | C. ovalis                                 | P. nitidulus,                         |
|                  | Hypopteryx collaris                       | Mastochilus australasicus             |
|                  | Lidoiohela pauliana                      | Passalidae undet.                     |
|                  | Melista leptinotarsa                     | Passalidae undet.                     |
|                  | Taseopus platythrix                       | Amarygmus stitus                      |
|                  |                                          | Passalidae undet.                     |
|                  |                                          | Passalidae undet.                     |
| Papua New Guinea | Albinorattiia igori                       | Lethosesthes nigrerrima               |
|                  | Amboinophela bernae                       | Proposoilus bison cinctus             |
|                  | Apalotacarus cixaris                      | Protomocoelus australis               |
|                  | A. fasculus                              | Labiens ptox                          |
|                  | A. paxillius                              | Passalidae undet.                     |
|                  | A. petilus                                | Celejus puncti thorax, Protomocoelus australis |
|                  | A. rigescens                             | Passalidae undet.                     |
|                  | Arraphosoma minax                         | Labiens commergus                     |

(Continued)
Table V. (Continued).

| Athogavia arybbasi  | Dynastinae undet. |
|---------------------|-------------------|
| Aurilossongia bolanica | Xylotrupes gideonasperulus |
| A. fileasi           | Dynastinae undet. |
| A. guarana           | Xylotrupes sp.    |
| A. hoaria            | Xylotrupes sp.    |
| A. norae             | Xylotrupes gideon |
| Cooremania wauensis  | Dorcus arfaktianus |
| C. kienaensis        | Lucanidae undet.  |
| Lidiophela pecki     | Labienu sp.       |
| Mossongia bissaina   | Dynastinae undet. |
| M. savina            | Dynastinae undet. |
| Passalophagus georlei| Labienu sp., Passalidae undet. |
| Phaleratus fentoni   | Passalidae undet. |
| Sajonophela alfredae | Protomocoelus australis |
| Sandrophela kokodaica| Passandra trigemina |
| **Solomon Islands**  |                   |
| Apalotacarus glaber  | Protomocoelus triumphator |
| Phaleratus fentoni   | P. triumphator    |

* Generic identify is questionable.

Table VI. List of host species from Asia and Oceania.

| Family          | Subfamily | Species                                                                                                                                                                                                 |
|-----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carabidae       | Carabinae | Carabus akinti musartianus, C. anatolicus anatolicus, C. anchocephalus, C. augustus ignigera, C. blaptopodes, C. blaptopodes capito, C. blaptopodes levisi, C. blaptopodes rugipennis, C. boysi, C. brandtii, C. cicatricosus, C. constricticollis, C. coriacus, C. coriacus kindermani, C. formosus subformosus, C. gehini, C. gemenfier, C. glyptopterus, C. ignmetallanguisticollis, C. imperialis, C. impressus carmelita, C. kolbei, C. komarovi, C. lafossei buchi, C. lafossei coelestis, C. lopatini, C. nankotaizanus, C. paiata, C. persianus, C. protensis, C. pustulifer guerryi, C. pustulifer pratti, C. pustulifer pustulifer, C. pustulifer szechwanensis, C. scabrosus amasicus, C. scabrosus audouni, C. scabrosus caucasicus, C. scabrosus colchicus, C. scabrosus scabrosus, C. scabrosus transversalis, C. schoenherri, C. schrenki, C. smaragdinus longipennis, C. stolitzkanus, C. sturowskyi, C. syriacus, C. tanypedilus, C. turcomannorum, C. vieinghoffii |
| Cerambycidae    | Lamiinae  | Batocera albofasciata, B. celebiana, B. humeridens, B. lineolata, B. maculate, B. numitor ferruginea, B. rubus, B. rufomaculata, B. thomsoni, B. wallacei proserpina |
| Lucanidae       | Lucaninae | Cladognathus giraffa, Dorcus alcidus, D. anamianus kubotai, D. antaeus, D. bucephalus, D. curvidenns, D. curvidens hopper, D. eurycephalus, D. metacostatus, D. mirabilis, D. monivagus, D. nepalensis, D. parryi, D. platymelus, D. rectus, D. reichei, D. reichei clypeatus, D. rubrofemoratus, D. saiga, D. striatipennis, D. taurus, D. tatus castanicolor, D. tatus okinawaensis, D. tatus, D. tatus piliifer, D. tatus palawanicus, D. tatus sakishimanus, D. tatus tokunoshimaensis, Hexathrius mandibularis, Hemisodorus rubrofemoratus, Lucanus sp., Odontolab castelnaudi, O. dalmani, O. eremicola, O. lacordeirei, O. spectabilis, O. wollastoni, Proposoculus bison |
| Passalidae      | Passalinae | Acerarius grandis, A. laevicollis, Episphenus indicus, Gonatas naviculator, Labienus gigas, L. ptox, Leptaulax bicolor, L. dentatus, Macrolinus weberi, Passalus sp., Pelopides tridens, Phorophilus dilatus, Pleurarius brachyphylus |
| Scarabaeidae    | Cetoniinae | Chalcoetha neglecta, C. smaragdina, Heterorhina elegans, H. sexmaculata, Ischiospilus latreilli, I. olivacea, Lomaptera kaestneri, Mycterophilus sp., Protoetia brevitarsus, P. cuprea ignicollis, P. funebris |

(Continued)
Table VI. (Continued).

| Country     | Mites                                  | Host species                  |
|-------------|----------------------------------------|-------------------------------|
| Albania     | P. procutisidis                        | C. coriacus                   |
|             | Procericola bourgognei                 | C. coriacus                   |
| Austria     | Coleopterophagus albini                | Protoaeta speciosissima       |
|             | Photoa bardoica                        | Carabus nemoralis             |
|             | P. chrysocarabiben                      | C. auronitens, C. scheidleri  |
|             | P. hejniana                            | C. alpestris hoppei, C. violaceus |
| Belgium     | P. chrysocarabiben                      | Carabus auratus, C. auronitens, C. nemoralis, C. coriacus |
|             | P. saetolata                           | C. coriacus                   |
|             | Procericola bourgognei                 | C. coriacus                   |
|             | Pseudoamansia chrysomelinus            | Timarcha sp.                  |
| Byelorussia | Dicanestrinia huberti                   | Carabus variolosus            |
|             | Photoa adolfinae                       | C. glabratuis                 |
| Bosnia & Herzegovina | Dicenestrinia knobi              | C. variolosus                 |
|             | Pseudoceanestrinia berndi              | C. catenulatus                |
| Bulgaria    | Balearella samsinaki                   | Gnaptor sp.                   |
|             | Percanestrinia blaptis                 | Blaps lethifera               |
|             | P. sellnicki                           | Carabus coriacus              |
|             | Photoa procera                         | C. scabrosus                  |
|             | Procericola bourgognei                 | C. coriacus                   |
|             | P. ichthyoides scabricola              | C. scabrosus, scabrosus       |
| Crimea      | Aamansiella trilobata                  | Timarcha tenebriosa           |
|             | C. doricola                            | Dorcus paralelopipedus        |
|             | Coleopterophagus meginni               | Protoaeta cuprina             |
|             | Paramansia bicornis                    | Chrysolina herbacea           |
|             | Paraphotia calosomae                   | Calosoma auropunctatum        |
|             | Percanestrinia blaptis                 | Blaps sp.                     |
|             | Photoa adolfinae                       | Carabus gyllenhali             |
|             | P. polymorpha                          | C. gyllenhali, C. hungaricus, gaudrildus |
|             | Pseudoceanestrinia berndi              | C. gyllenhali                 |
|             | P. damani                             | Pentodonidiota                |
|             | P. carami                             | C. bessarabicus               |
| Croatia     | Coleopterophagus meginni               | Protoaeta affinis             |
|             | Photoa hejniana                        | C. croaticus                  |
| Czech Republic | Coleopterophagus albini               | Protoaeta speciosissima       |
|             | C. meginni                             | P. cuprea obscura             |
|             | Ciprioesenia sellnicki                 | C. coriacus                   |
| Country   | Species                          | Genus                  |
|-----------|----------------------------------|------------------------|
| Denmark   | Paracanestrinia denmarkica       | Carabus sp.             |
| England   | Canestrinia dorcicola            | ?                      |
|           | Ciprusenia sellnicki             | Carabus coriaceus       |
|           | Coleopterophagus megnini         | ?                      |
|           | Procanestrinia blaptis           | ?                      |
|           | Photia saetolata                 | C. violaceus           |
| Estonia   | Coleopterophagus albini          | Protactia metallica    |
| France    | Ciprusenia carabricola           | Carabus morbillosus    |
|           | Imaielienia marocanna            | Blaps mucronata         |
|           | Lombardiniella gentilis          | Chrysolina femoralis    |
|           | Neophota iureceki                | Carabus pyrenaceus      |
|           | Paramansia menthastri            | Chrysolina herbacea     |
|           | Photia chrysocarabi              | ?                      |
|           | P. saetolata                     | C. coriaceus           |
|           | Pseudoaomansia chrysomelinus     | Timarcha gettingensis, T. interstitialis, T. tenebriosa |
|           | Procericola bourgognei           | C. coriaceus           |
|           | Pseudocanestrinia occidentalis   | Carabus auroniens      |
| Greece    | Photia graeca                    | C. coriaceus foudrusi, C. coriaceus impudicus |
|           | P. procustidis                   | C. banoni banoni       |
|           | Procericola bourgognei           | C. coriaceus           |
| Germany   | Coleopterophagus albini          | Protactia speciossima   |
|           | Procanestrinia blaptis           | Blaps letifera, Sphodrus leucophthalmus |
|           | Photia chrysocarabi              | ?                      |
|           | P. saetolata                     | C. violaceus           |
|           | Procericola bourgognei           | C. coriaceus           |
| Holland   | Canestrinia dorcicola            | Oxytherea funesta       |
|           | Ciprusenia sellnicki             | C. coriaceus           |
|           | Coleopterophagus megnini         | Protactia metallica    |
|           | P. saetolata                     | C. violaceus           |
| Hungary   | Ciprusenia sellnicki             | Carabus coriaceus       |
|           | Coleopterophagus megnini         | Protactia affinis      |
|           | Procanestrinia blaptis           | Blaps letifera, Blaps sp. |
|           | Procericola bourgognei           | C. coriaceus           |
|           | Pseudocanestrinia damiani        | Pentodon idiota        |
|           | P. mahunkai                      | C. coriaceus           |
| Italy     | Canestrinia dorcicola            | Dorcus parallopipedus   |
|           | C. pentodontis                   | ?                      |
|           | Ciprusenia carabricola           | Carabus morbillosus     |
|           | Coleopterophagus donaldi         | Protactia affinis      |
|           | C. megnini                       | P. cuprea cuprea       |
|           | Dicanestrinia cerambycis         | Cerambyx cerdo         |
|           | Dicanestrinia knobi              | Carabus varioius        |
|           | Ismaielienia marocanna           | Blaps sp.              |
|           | Lombardiniella gentilis          | Chrysomela sp.          |
|           | Procanestrinia blaptis           | Blaps occulta, B. gibba, B. lethifera |
|           | Photia procera                   | Carabus coriaceus       |
|           | P. procustidis                   | C. coriaceus           |
|           | Procericola bourgognei           | C. gigas               |
|           | P. ichthyoides ichthyoides       | C. scabrosus           |
|           | Pseudoaomansia chrysomelinus     | ?                      |
|           | Pseudocanestrinia orientalis     | ?                      |
|           | P. roberti                      | Pentodon bidens        |
| Moldova   | Canestriniidae sp.              | Cychrus semigranatus    |
|           | Ciprusenia sellnicki             | Carabus coriaceus       |

(Continued)
| Country   | Host-Proximate Taxa                                      |
|-----------|---------------------------------------------------------|
| Norway    | Coleopterophagus albinii (Protoaeta metallica)          |
| Poland    | Canestrinia dorcicola (Dorcas paraloplopopedus)         |
|           | Ciprusenia sellnicki (C. coriaceus, C. violaceus)      |
|           | Coleopterophagus albini (Protoaeta speciosissima)       |
|           | C. megnini (Cetoia aurata, Protoaeta metallica)         |
|           | Dicanestrinia huberti (Carabus variolosus)              |
|           | D. knobii (C. variolosus)                               |
|           | Percanestrinia blaptis (Blaps lethifera)                |
|           | Photia adolfinae (Carabus glabratas)                    |
|           | P. hardoica (C. nemoralis)                             |
|           | P. chrysoconari (C. auronites)                          |
|           | P. hejnniana (C. coriaceus, C. violaceus)               |
|           | P. hermgoldiae (C. armilae)                             |
|           | Procericola bourgognei (C. coriaceus)                   |
|           | Pseudocanestrinia mahunkaii (C. coriaceus)              |
| Portugal  | Midiphotia hispanica (Carabus galicianus, C. guadarramus)|
|           | Neophotia drvotocka (C. lutogensi)                      |
|           | Photia lusitanica (C. lusitanica schecki)              |
| Romania   | Canestrinia pentodontis* (Pdentodon idiota)             |
|           | Ciprusenia sellnicki (C. coriaceus)                     |
|           | Coleopterophagus albini (Protoaeta speciosissima)       |
|           | C. maroni (P. speciosissima)                            |
|           | Procericola bourgognei (C. coriaceus)                   |
| Russia    | Percanstriniella causica (Carabus sp.)                  |
|           | Photia adolfinae (C. exaratus)                          |
|           | P. hikorum (C. plasoni, C. steveni schamyl)             |
|           | P. polymorpha (C. exaratus)                             |
|           | Procericola ichthyoides scarabicola (C. scabrosus causacicus) |
| Serbia    | Coleopterophagus megninia (C. lusitanicus schaumi)      |
| Slovakia  | Ciprusenia sellnicki (Carabus coriaceus)                |
|           | Photia chrysoconari (C. violaceus)                      |
|           | P. hejnniana (C. coriaceus)                             |
|           | Procericola bourgognei (C. coriaceus)                   |
| Slovenia  | P. hejnniana (C. croaticus)                             |
|           | P. procera (C. gigas)                                   |
|           | P. procastidis (C. lusitanicus)                         |
|           | Procericola ichthyoides ichthyoides (C. gigas)           |
|           | Pseudocanestrinia orrientalis (C. caelatus, C. croaticus) |
| Spain     | Balearella balearica (Blaps sp.)                       |
|           | Camtrohyla feziana (Blaps appendiculata, Blaps sp.)     |
|           | Cercedophotia latissima (Carabus lusitanicus brevis, C. lusitanicus latus) |
|           | Mesophotia penicillata (C. melanchoic, C. melanchoic costatus) |
|           | Midiphotia hispanica (C. galicianus, C. melanchoic)     |
|           | Neophotia drvotocka (C. guadarramus)                     |
|           | Photia lusitanica (C. lusitanicus brevis, C. lusitanicus latus, C. lusitanicus breuningi, C. lusitanicus helluo, C. lusitanicus costianus, C. lusitanicus costianus) |
|           | Pseudoamansia chrysomelina (Timarcha balearica)         |
| Sweden    | Procericola bourgognei (C. coriaceus)                   |
| Ukraine   | Amanisciella trilobata (Timarcha tenebricosa)            |
|           | Canestrinia dorcicola (Dorcas paraloplopopedus)          |
|           | Ciprusenia sellnicki (Carabus coriaceus)                |
|           | Coleopterophagus albini (Protoaeta marmorata)            |
|           | C. donaldi (P. affinis)                                 |

(Continued)
Table VII. (Continued).

| Yugoslavia         | Carabus coriaceus               |
|--------------------|---------------------------------|
| Ciprusenia sellnicki| Discomorpha gambosa             |
| Coleopteropagus megmini| Extremidae Chrysomela           |
| Photia procestisid| Eumolpus tetracaudata           |
| Procericola bourgognei| Eumolpus fulgidus              |
|                     | Olivier, 1808 in Brazil (Haitlinger 1991d). |

Eumolpinae are casual hosts of canestriniid mites.

Subfamily Eumolpinae Hope, 1840

It is one of the largest subfamilies of leaf beetles containing the above 500 genera and 7000 species (Jolivet & Verma 2008). Only Grandiella tetracaudata (Lombardini, 1939) was collected from Eumolpus fulgidus Olivier, 1808 in Brazil (Haitlinger 1991d). Eumolpinae are casual hosts of canestriniid mites.

Subfamily Cassidinae Gyllenhal, 1813

To this subfamily belongs about 339 genera and about 6000 species. 77 canestriniid species of 18 genera were found on 144 species of Cassidinae from 35 genera and 6 determined to the genus (Table X) (Lombardini 1939a, 1942, 1950; Dicranotinia knobi; Paraphotia calosomae; Pericranaeus blathi; Photia adolfinae; P. chrysocarabi; P. hejiana; P. hermengilda; Photia sp.; Procericola bourgognei; Pseudoamansia decorata; Pseudoamansia sp.; Pseudocanestrinia damiani; C. dorecula var. pentodontis; this status needs explanation.

Khaustov & Eidelberg, 2001 are associated with species from the genera Timarcha and Paramania Cooreman, 1950. Lombardiniella gentilis is associated with Chrysolina Motschulsky, 1860 species; it was obtained also from undetermined Chrysomela Linnaeus, 1758. All 6 species of canestriniid have been found in Europe (Tables VII and XIV).

Discomorpha Chevrolat, 1836 (15), Botanochara Dejean, 1836 (12) and Cheyomorpha Chevrot, 1836 (6). Most canestriniids have own hosts not listed in other species. Extremely, Stolas chalybæa (Germar, 1824) is the host for 6 canestriniid mites, Echomia cyanea (Panzer, 1798) (5), Canistra osculata Guérin, 1855 (4). S. conspersa Blackwelder, 1946 (4). Polychalca punctatissima (Wolf, 1818) (3) and for S. lebasi (Boheman, 1750) (3) (Table XIV). The remaining Cassidinae are hosts for two or one canestriniid species. The largest number of hosts found for Grandiellopsis gambosa (Summers & Schuster, 1979) (15), Arrunsithiana bários Haitlinger, 1991 (15), Olafithina folicia (Fain, 1987) (12), A. quadriata (Fain, 1987) (11) Grandiella tajannae (Haitlinger, 1991) (12) and G. tetracaudata (Lombardini, 1939) (10). All host species for G. gambosa belongs to the genus Discomorpha. No other canestriniid species were collected from Discomorpha except Ovarrothiana kinseyi (Summers & Schuster, 1979). This species is also only associated with Discomorpha (Table XIV). From the remaining 6 Grandiellopsis species 3 were collected from 2 Canistra species (of the known 8), one species from one Carlebruchia (known 4), 2 species from 2 Cyclosoma (known 22) and one species from one Polychalca (known 12). 10 species of the genus Arrunsithiana Haitlinger, 1991 were found on 32 species of hosts from 6 genera (25 species of
Stolas, Canistra 2, Eugenysa 2, Cyrtornota 1, Echoma 1, Mesomphalia 1). 5 species: A. arcuata (Fain, 1987), A. artemoni Haitlinger, 1991, A. erinnae Haitlinger, 1991, A. ilosi Haitlinger, 1991 and A. laticeps (Fain, 1989) were found on separate hosts. From other species A. battosi has 3 common hosts with A. quadrata and both of these species have 2 common hosts with A. spicantis (Summers & Schuster, 1979). 6 species of the genus Bibulothiana Haitlinger, 1993 were collected from 13 host species belonging to 4 genera (Chelymorpha Chevrolat, 1836-6 species, Cyrtornota Chevrolat, 1837 – one species, Microtenochira Spaeth, 1926 – one species and Stolas – 5 species). The largest number of hosts found for B. brevispinata (Summers & Schuster, 1979) (5). All these species were found on separate hosts. 7 species of the genus Emodithiana Haitlinger, 1993 were collected from 10 host species belonging to 6 genera (Acromis Chevrolat, 1836 – one collected canestriniiid species, Coptocyla Chevrolat, 1836-2 canestriniiid species from 4 host species, Grambelea Spaeth, 1913 one species, Echoma Chevrolat, 1836 – one species, Omaspides Chevrolat, 1836-2 from 2) Only Acromis spinifex (Linnaeus, 1763) was found on 2 hosts: E. medoni Haitlinger, 1993 and E. penelope Haitlinger, 1993. All other hosts were separate for the Emodithiana species. 14 species of the genus Grandiella Lombardini, 1939 were collected from 34 host species belonging to 10 genera: Anacassis Spaeth, 1913-1 Grandiella species vs. 1 host species, Botanochara – 2 vs. 13, Canistra Erichson, 1847-3 vs. 2, Coptocyla Cyrtornota Chevrolat, 1837-2 vs. 4, Echoma Chevrolat, 1836-3 vs. 2, Eumolpus Weber, 1801-1 vs. 1, Goniochenia Weise, 1896-2 vs. 2, Orextia Spaeth, 1911-1 vs. 1, Stolas - 3 vs. 7. G. tajanae (Haitlinger, 1991) was collected from 13 host species, G. tetracaudata (Lombardini, 1939) 0 from 10 and G. soniae (Haitlinger, 1991) from 6 species. The remaining 11 species were collected from one or two host. 5 species of the genus Olafithiana Haitlinger, 1993 were collected from 18 host species belonging to 4 genera (Anacassis - 1 vs. 1, Elytrospaera Chevrolat, 1843-1 vs. 2, Helocassia Spaeth, 1952-1 vs. 1, Stolas - 2 vs. 15). O. foliacea (Fain, 1876) was collected from 12 host species, O. multifida (Fain, 1987) from 3 hosts and the remaining 2 species were collected from one host. 7 species of the genus Ovarrothiana Haitlinger, 1993 were collected from 12 host species belonging to 5 genera (Agenysa – 1 vs. 2, Cyclosoma Guérin, 1835-1 vs 1, Discomorpha – 1 vs. 1, Eugenysa Chevrolat, 1836-4 vs. 7, Miocalaspis Weise, 1899-1 vs. 1). O. erazmi Haitlinger, 1993 and O. ozanne Haitlinger, 1993 collected from 3 host species. Canestriniids from Cassidinae were collected in

| Family     | Subfamily | Species                                                                                     |
|------------|-----------|--------------------------------------------------------------------------------------------|
| Carabidae  | Carabinae | Calosoma auropunctatum, Carabus alpestris hoppei, C. ampulipennis, C. auratus, C. aurontiens, C. catenulatus, C. banoni banoni, C. besseri, C. coriaceus, C. coriaceus fourdrati, C. coriaceus impudicus, C. croaticus, C. exaratus, C. excellens, C. gallicanus, C. gigas, C. glabratus, C. guadarramatus, C. gyrenalli, C. ileguralis, C. linnaei, C. luetingi, C. lusitanicus breuningi, C. lusitanicus brevis, C. lusitanicus castillanus, C. lusitanicus helluo, C. lusitanicus laevis, C. lusitanicus latus, C. lusitanicus logronicus, C. lusitanicus schaumi, C. melanochilius, C. melanochilius costatus, C. morbillus, C. morbillus, C. pinnatus, C. pyrenaicus, C. scabrosus caucasicus, C. scabrous, C. scabrosus scabrous, C. scheideri, C. semigranosus, C. steveni schamyl, C. ulrichi, C. variolosus, C. violaceus, Cyclus semigranosus |
| Harpalinae |           | Sphodrus leucopephalus                                                                   |
| Chrysomelidae | Chrysomelinae | Chrysolina fastuosa, C. femoralis, C. herbecae, C. polita, Chrysomela sp., Timarcha balearica, T. goettingensis, T. interstitalis, T. tenereciosa |
| Lucanidae | Lucaninae | Dorcus paralipelopipedus                                                                  |
| Scarabaeidae | Cetoninae | Cetonia aurata, Oxytherea funesta, Protactina affinis, P. cuprea cuprea, P. cuprea obscura, P. cuprina, P. fiebrer, P. marmorata, P. metallica, P. speciosissima |
| Dynastinae |           | Pentodon bidens, P. idiota                                                                |
| Tenebrionidae | Tenebrioninae | Blaps appendiculata, B. gibba, B. leithfera, B. mucronata, B. occulta, Gnaptor sp.          |
only 19 countries of America. Most of them were found in Brazil (38), Colombia (13), Bolivia (12), Ecuador (12), and Peru (12) (Table III).

Family Elateridae Leach, 1815
Elateridae represents one of largest families within Coleoptera and contains about 10,000 species and 19 subfamilies. Canestriniids were collected only from species belonging to subfamily Semiotinae.

Subfamily Semiotinae Jacobson, 1913
4 canestriniid species of the genus Danaithiana Haitlinger, 1991 were stated only on 3 Semiotus species collected from South America and Central America (Colombia, Costa Rica, Cuba, Ecuador, Peru) (Haitlinger 1991e) (Table II, IX and X). Probably outside the genus Semiotus Eschscholtz, 1829 canestriniids do not occur on Elateridae.

Family Geotrupidae Latreille, 1802
The family has about 340 species in about 50 genera in two subfamilies: Geotrupinae and Taurocerastinae. Only one species of Canestriniidae was collected from Geotrupinae.

Subfamily Geotrupinae Latreille, 1802
Only Ciprusenia sellnicki (Samšiňák, 1964) was collected from Typhaeus typhoeus (Linnaeus, 1768) in Poland (Haitlinger 1988b). This is accidental host for Canestriniidae.

Family Lucanidae Latreille, 1804
This family contains about 1500 species, 109 genera and 4 subfamilies. Canestriniidae are associated only with subfamily Lucaninae.

Subfamily Lucaninae Latreille, 1804
16 canestriniid species and at least 7 unidentified species determined to genus, family or “as near to species” belonging to 10 genera were collected from 33 Lucaninae species of 8 genera (Tables XIII and XIV) (Cooreman 1954; Nesbitt 1976, Haitlinger 1988c, 1993b, 1994b; Kim et al. 2006; Okabe and Goka 2008). 20 host species belong to the extensive genus Dorcus MacLeay, 1819 (includes 125 species). 12 species of canestriniids were collected from them (and at least 6 unidentified species). Moreover, from 7 species of Odontolabis Hope, 1842 (36 known species) were collected 3 canestriniid species (and at least 2 unidentified species) and from genera Cladognathus Burmeister, 1847 (with 2 species), Figulus Macleay, 1819 (with 83 species), Hemisodorcus Thomson, 1862 (with 12 species), Hexathrius Hope, 1842 (with 15 species), Lucanus Scopoli, 1763 (with 61 species), Proposcoilus Westwood, 1845 (with 148 species), were collected 6 canestriniid species and 2 undetermined species. The largest number of host species stated for Sandrophela hugoni Haitlinger, 1994 (together with Sandrophela near hugoni) (6) and S. spectanda (Berlese, 1910) (5). The most species of Canestriniidae found on Dorcus titanus (Boisduval, 1835) (4 and 4 undetermined) (Tables XIII and XIV). Canestriniid mites were collected from Lucanidae exclusively in Asia and Europe.

Family Passandridae Erichson, 1845

Subfamily Passandrinae Erichson, 1845
Passandridae contains 109 described species from 9 genera. Only one species Sandrophela kokodaica Haitlinger, 1990 was collected from Passandra trigemina Newman, 1839 in Papua New Guinea (Haitlinger 1990a) (Table XIV) The presence of canestriniid mites on Passandridae requires confirmation.

Table IX. List of canestriniids and their host species among Carabidae.

| Subfamily | Host species | Mites |
|-----------|--------------|-------|
| Carabinae | Calosoma auropunctatum | Paraphotia calosomae |
|           | Carabus akini | Percanestriniella levis |
|           | C. alpestris hoppii | Photia hejniiana |
|           | C. anatolicus anatolicus | Photia procustidis |
|           | C. anchocephalus | Kuramasenia pekingensis |
|           | C. augustus | K. pekingensis |
|           | C. auratus | Photia chrysocarabi, Procerciola bourgogni |

(Continued)
### Table IX. (Continued)

| Canestriniidae (Astigmata: Canestriniidae) | Insecta |
|-------------------------------------------|---------|
| C. aurontiens                             | P. chrysocarab, P. heijniana, Pseudocanestrinia occidentalis |
| C. balassogiou                            | Percanestriniella levis |
| C. banoni                                 | Phoia procustidis |
| C. bessarabicus                           | Pseudocanestrinia carami |
| C. besseri                                | Phoia sp. |
| C. blaptoides                             | Kuramasenia pictura, Phoia polymorpha |
| C. blaptoides capito                      | P. polymorpha |
| C. blaptoides ruggipennis                 | P. polymorpha |
| C. boyi                                   | Percanestriniella vlachiana |
| C. brandti                                | K. pekingensis |
| C. caelatus                               | Pseudocanestrinia orientalis |
| C. catenulatus plasensis                  | P. berndi |
| C. chevolati                              | Proericola bourgoinei |
| C. cicatricosus                           | Percanestriniella levis |
| C. clypeatus                              | Proericola bourgoinei |
| C. constricticollis                       | Phoia polymorpha |
| C. coriaceus                              | Ciprusenia selnicki, Phoia heijniana, P. procustidis, P. saetolata, Proericola bourgoinei, Pseudocanestrinia mahunkai |
| C. coriaceus excavatus                    | P. bourgoinei |
| C. coriaceus foudrasi                     | Phoia graeca |
| C. coriaceus impudicus                    | P. graeca |
| C. coriaceus kindermanni                  | P. graeca |
| C. croaticus                              | P. heijniana, Pseudocanestrinia orientalis, Percanestriniella levis |
| C. exaratus                               | Phoia adolfinae, P. polymorpha |
| C. excellens                              | Phoia sp., Pseudocanestrinia sp. |
| C. galicianus                             | Midiphota hispanica |
| C. gehini                                | Kuramasenia paavo, Phoia polymorpha |
| C. gennifer                               | K. pekingensis |
| C. gigas                                  | Phoia procera procera, Proericola bourgoinei, P. ichthyoides ichthyoides |
| C. glabratius                             | Phoia adolfinae |
| C. glyptopterus                           | K. pekingensis |
| C. guadarramus                            | M. hispanica |
| C. gyllenhalii                            | Phoia adolfinae, P. polymorpha, Pseudocanestrinia berndi |
| C. hungaricus                             | P. polymorpha |
| C. ignimitella angusticollis              | K. pekingensis |
| C. imperialis                             | Phoia polymorpha |
| C. impressus carmelita                    | P. procustidis |
| C. irregularis                            | Phoia chrysocarab |
| C. kolbein                                | P. pacifica |
| C. komarowi                               | P. bilkorum |
| C. lafossei buchi                         | K. pekingensis |
| C. lafossei coelestis                     | K. ramoni |
| C. linnaei                                | Phoia hermgildae |
| C. lopatini                               | P. lopatini |
| C. lugetensi                              | Neophotia dvrotocka, Phoia lusitanica |
| C. lusitanicus breunings                  | Phoia lusitanica |
| C. lusitanicus castillanus                | P. lusitanica |
| C. lusitanicus helius                     | Phoia lusitanica |
| C. lusitanicus latus                      | Cercediphota latissima |
| C. lusitanicus schaumi                    | Phoia lusitanica |
| C. melancholicus                          | Mesophota penicillata tercia |
| C. melancholicus costatus                 | Midiphota hispanica, Mesophota penicillata penicillata, M. penicillata similis |
| C. morbilloso                             | Ciprusenia corbicola |
| C. mulsantianus                           | Kuramasenia illegalis, P. procustidis |
### Table IX. (Continued)

| Canestriniids                     | Host Species                        |
|-----------------------------------|-------------------------------------|
| C. nankotaiwanus                  | K. illegalis                        |
| C. nemoralis                      | Photia barboica                     |
| C. palaica                        | P. procutidus, Procercica bourgognei|
| C. persianus                      | Photia polymorpha                   |
| C. plasoni                        | P. bilorum                          |
| C. problematicus                  | P. chrysocarabii                    |
| C. protensus                      | P. bilorum                          |
| C. punctatus                      | P. procutidis                       |
| C. pustulifer guerryi             | Kurasamiang pekingensis             |
| C. pustulifer parryi              | K. pekingensis                      |
| C. pustulifer pustulifer          | K. pekingensis                      |
| C. pustulifer szechwanensis       | K. pekingensis                      |
| C. pyrenaecus                     | Midiphota jurecki                   |
| C. scabrosus                      | Photia procera procera,             |
|                                  | Procerica ichthyoides ichthyoides   |
| C. scabrosus amasicus             | P. procera turcica                  |
| C. scabrous audouini              | P. procera turcica                  |
| C. scabrosus caucasicus           | P. procera turcica                  |
| C. scabrosus colchicus            | Procerica ichthyoides scabridicola  |
| C. scabrosus scabrosus            | P. procera turcica, P. ichthyoides  |
|                                  | scabridicola                        |
| C. scabrosus sommeri              | P. ichthyoides scabridicola         |
| C. scabrosus transversalis        | Photia procera adanaensis, P.       |
|                                  | ichthyoides transversica            |
| C. scheifleri                     | Photia chrysocarabii                |
| C. schoenherri                    | Photia polymorpha, P. sibrica       |
| C. schrenki                       | P. polymorpha                       |
| C. smaragdinus longipennis        | K. illegalis                        |
| C. steveni schamyli               | Photia bilorum                      |
| C. stoliczkanus                   | Percanestriella vlachiana           |
| C. stichovskii                    | Percanestriella levis               |
| C. syriacus                       | Photia procera marani               |
| C. tanapedilus                    | P. levis                            |
| C. tucomannorum                   | P. levis                            |
| C. ulrichi                        | Photia sp., Pseudocanestrinia sp.   |
| C. variolostus                    | Dicanestria huberti, D. knobi       |
| C. vestinghoffi                   | Photia polymorpha                   |
| C. violaceus                      | P. heijniana, P. saetolata          |
| Carabus sp.                       | Paracanestria denmarkica, Percanestria caucasia, Photia melchiori, Pseudocanestria mahunkai |
| Cychrus semigranosus              | Canestriiniidae sp.                |
| Carabidae undet.                  | Megacanestria mucronata             |

### Table X. List of canestriniids and their host species among Chrysomelidae.

| Subfamily  | Host species                                                                 | Mites                                |
|------------|------------------------------------------------------------------------------|--------------------------------------|
| Harpalinae | Pterostichus globosus                                                        | Globosaphtia betitiae                |
|            | Sphodrus leucophthalus                                                       | Percanestria blapts                  |
|            | Teffius megerlie                                                             | *Coleophyta fusipes                  |
|            | T. purpureipennis                                                            | Megacanestria beloniana              |
| Acromis    | sparsa                                                                       | Teklathiana onnai, T. rugosita       |
| A. spinex  | A. crassicornis                                                              | Ovarrothiana ozanna                  |
| A. spinex  | Ananassis cribrum                                                            | Olafithiana adelina                  |
| A. sparsa  | A. fuscata                                                                    | Grandiella tajjanna                  |
| A. caedemadens | A. crassicornis                                                              | O. ozanna                            |
| A. crassicornis | Ananassis cribrum                                                            | Olafithiana adelina                  |
| A. sparsa  | A. fuscata                                                                    | Grandiella tajjanna                  |

(Continued)
A review of host-commensal associations between canestriniid mites (Astigmata: Canestrinidae) and Insecta

Table X. (Continued).

| Botanochara angulata | G. tacjannae |
|----------------------|--------------|
| B. bonariensis       | G. tacjannae |
| B. convexiscula      | G. tacjannae |
| B. duodecimverrucata | G. tacjannae |
| B. impresja          | G. tacjannae |
| B. macularia         | G. tacjannae |
| B. Regina            | G. tacjannae |
| B. ruforeticulata    | G. tacjannae |
| B. sanguinea         | G. tacjannae |
| B. sedencipustulata  | G. tacjannae |
| B. subnervosa        | G. tetracaudata |
| B. tessellata        | Canestrinia manicata*, G. tacjannae |

Canistra Dorni  
Granidiella minor

| C. osculatii       | Grandiella cooremani, G. ecuadorensis, Grandiellopsis alani, G. canistra |
|--------------------|--------------------------------------------------------------------------|
| C. proccra         | Grandiellopsis violae                                                   |
| C. rubiginosa       | Arrunsithiana. spicantis                                                 |
| Canistra sp.        | A. esacaudata                                                           |
| Carlobruchia carbonia | Grandiellopsis ariani                                    |
| C. tricostata      | G. ariani                                                               |
| Charidotella kesseli | Sabothiana reidari                                               |
| Charidatis sp.      | S. boi                                                                  |
| C. furunculus      | S. ricardoi                                                              |
| Chelymorpha comata  | Bibulothiana albertae                                                   |
| C. infecta         | B. cyriaki                                                              |
| C. inflata         | B. everitae                                                             |
| C. nigricalcis      | B. cyriaki                                                              |
| C. rifoguttata      | B. everitae                                                             |
| C. vermiculata     | B cyriaki                                                              |
| Coptocycla adamantine | Grandiella tetracaudata                                            |
| C. contempa        | Ennodithiana maniusi                                                    |
| C. dorsoplagnata   | E. maniusi                                                              |
| C. dorsopunctata   | E. melindae                                                             |
| C. leprosa         | E. melindae                                                             |
| Coptocycla sp.     | E. platysma                                                             |
| Coraliomela brunnea | Gasuthiana ahufarica                                                    |
| Crambelea illudens  | Ennodithiana megesi                                                      |
| Cyclomesa mirabilit | Grandiellopsis orsennae                                                 |
| C. palliate        | G. cyclosoma                                                             |
| C. trisste         | Ovarrothiana ludomiri                                                   |
| Cyttonota cyannea  | Grandiella tetracaudata                                                 |
| C. dissecta        | Arrunsithiana ilosi                                                     |
| C. textilis        | Grandiella sonae                                                        |
| C. thalassina      | G. tetracaudata                                                         |
| C. tigrina         | G. tetracaudata                                                         |
| C. tristigma       | G. vatta                                                                |
| Discomorpha bastei  | Grandiellopsis gambosa                                                  |
| D. biplagiata      | G. gambosa                                                              |
| D. breitl          | G. gambosa                                                              |
| D. conspersipennis | G. gambosa, Ovarrothiana kinseyi                                         |
| D. depilale        | G. gambosa                                                              |
| D. distincta       | G. gambosa                                                              |
| D. dromedarius     | G. gambosa                                                              |
| D. dualis          | G. gambosa                                                              |
| D. instabilis      | G. gambosa                                                              |
| D. languardosa     | G. gambosa                                                              |
| D. miniata         | G. gambosa                                                              |
| D. salvini         | G. gambosa                                                              |

(Continued)
| D. schusteri     | G. gambosa          |
| D. spectanda    | G. gambosa          |
| D. variegata    | G. gambosa          |
| **Discomorpha sp.** | **G. gambosa, Ovarrothiana kinseyi** |
| Dorynota pugionata | Dorynthiana jurandi |
| Dorynota sp.    | D. delmani          |
| Doryphora tessellata | Canestrinia manicata |
| **Echona clypeata** | **Arrunsthiana escauda, Ennodithiana penelopae, Grandiella demcauda, G. tetracaudata, G. tetracaudata omopla** |
| E. confinuens | Grandiella marinae  |
| Elytrophaera xanthopyga | Oafithiana joliveti |
| Eugenysa Bachus | Ovarrothiana erazmi |
| E. columbiana  | Arrunsthiana quadrata, Ovarrothiana echerderma |
| E. delcate     | O. nikodemi         |
| E. divalis     | O. nikodemi         |
| E. grossa      | O. erazmi           |
| E. regalis     | O. erazmi, O. ozanne |
| E. venosa      | Arrunsthiana squarrosa, O. erazmi |
| Eugenysa sp.   | O. echerderma       |
| Goniocenio flavosparsa | Grandiella longini |
| G. haroldi     | G. rogeri           |
| Helocassus testudinaria | Oafithiana ivettae |
| Meristomela marginata | Gashithiana coarica |
| Mesomphalia gibbona | Arrunsthiana battosi |
| Metriorithiana bilimeki | Metriorithiana bolebori |
| Microtenochira bifensdarta | Bibulothiana nevispinata |
| Miocalaspis gentilis | Ovarrothiana leopoldi |
| Omapiodes basilica | Ennodithiana manuist |
| O. bistriata   | E. zonula            |
| Oreixa wagneri | Grandiella situla   |
| Physonota alutacea | Aceracturus alutaceus, A. mirabilis |
| P. dilatata    | A. crataepus        |
| P. gigantean   | A. alutaceus        |
| Physonota sp.  | A. mirabilis        |
| Plagiometriana ludicra | Eunorithiana heliodori |
| P. phoebe      | E. aidae            |
| P. punctatissima | E. heliodori       |
| P. vigens      | E. aidae            |
| Platyccylus deruta | Aceracturus alutaceus |
| Polyacalca dentipennis | Thopia ameda, T. corinnae |
| P. punctatissima | Eunorithiana heliodori, Grandiellopsis odosi, Thopia ameda |
| Stolas aenea    | Arrunsthiana quadrata |
| S. aerolata    | Oafithiana foliacia |
| S. antiqua     | O. multifida        |
| S. chalybae    | A. battosi, A. quadrata, A. spicantis, Grandiella octocaudata, G. tetracaudata, Oafithiana foliacia |
| S. coalita     | Grandiella soniae   |
| S. caerulescens | Bibulothiana brevispinata, Grandiella soniae |
| S. conserpa    | A. battosi, A. quadrata, A. spicantis, Oafithiana foliacia |
| S. cruentata   | A. battosi, O. multifida |
| S. decemguttata | Arrunsthiana arcuata |
| S. demissa     | A. quadrata         |
| S. discoides   | Bibulothiana brevispinata |
| S. epippium    | B. brevispinata     |
| S. erichsoni   | A. battosi, Grandiella soniae |
Table X. (Continued).

| S. festiva               | Olafithiana foliacea |
|-------------------------|----------------------|
| S. funebris             | A. battosi, A. quadrata |
| S. huanocensis          | A. battosi |
| S. ignita               | A. battosi |
| S. impexus              | O. foliaca |
| S. impluvia             | O. foliaca |
| S. indigacea            | A. quadrata |
| S. inequalis            | A. laticeps, A. quadrata |
| S. inexculta            | A. battosi, Olafithiana multifida |
| S. lacordairei          | Grandiella tetracaudata |
| S. lacunose             | O. foliaca |
| S. latevittata          | Arrunsithiana artemoni |
| S. lebassii             | A. esacaudata, A. squarrosa, Phriknodora avae |
| S. lenis                | A. battosi, Olafithiana foliacea |
| S. lineaticollis        | Bibulothiana brevispinata |
| S. mannerheimi          | A. quadrata |
| S. nudicollis           | Olafithiana foliacea |
| S. niobe                | A. battosi |
| S. obliqua              | A. battosi, O. foliacea |
| S. paranensis           | A. battosi, O. foliacea |
| S. pectinata            | A. erinnae |
| S. Placiida             | Grandiella soniae |
| S. pleurosticha         | A. battosi |
| S. punicca              | A. esacaudata, Grandiella soniae |
| S. rettenbacheri        | A. quadrata |
| S. scoparia             | A. battosi |
| S. sexsignata           | A. arcuata |
| S. subreticulata        | Olafithiana foliacea |
| S. thoreyi              | A. quadrata |
| Stolas sp.              | A. esacaudata, A. quadrata, A. squarrosa, Grandiella decemcaudata, G. sicula, G. tetracaudata |
| Zatarphia lineale       | Averithiana anoni |
| Cassidyinae undet.      | A. rruntithiana esacaudata, Grandiella pentagona, Peruthiana brianne |

| Chrysolina fastuosa     | Paramansia bicornis |
|-------------------------|---------------------|
| C. femoralis            | Lombardiella gentilis |
| C. herbacea             | Paramansia bicornis, P. menthastris |
| C. polita               | P. bicornis |
| Chrysomela sp.          | Lombardiella gentilis |
| Timarcha goettingensis  | Pseudoamansia chrysolelinus, P. decorata, Pseudoamansia sp. |
| T. interstitialis        | P. chrysolelinus |
| T. tenebriosus          | Anansiella trilobata, P. chrysolelinus |

Eumolpinia

| Eumolpus fulgidus       | Grandiella tetracaudata |

*genus to be verified

**Family Passalidae Leach, 1815**

This family contains 5 subfamilies: Aulacocyclinae Kaup, 1868, Macroliniinae Kaup, 1871, Passalinae Leach, 1815, Proculinae Kaup, 1868 and Solenocyclinae Kaup, 1871 (and 52 genera) (Fonseca et al. 2011) with over 500 species. Canestriniids were found in subfamilies Macrolininae, Passalinae and Solenocyclinae. 65 species of canestriniids from 20 genera were collected from 22 species of hosts of 13 genera (Lombardini 1944; Samšiňák 1963, 1968; Vomero 1972; Nesbitt 1976; Summers & Schuster 1981b, 1982a; Haitlinger 1990d; Corpuz-Raros 2001).
Subfamily Macrolininae Kaup, 1873

35 species of canestriniiids from 8 genera were collected from 18 species of hosts belonging to 11 genera (Tables XII and XIV). However, the actual number of host species is much higher. As many as 32 species of canestriniiids were collected from unidentified Passalidae.

Subfamily Passalinae Kaup, 1868

Only 2 species: Melisa lombardni and M. melisii are described from an unidentified Passalus sp.

Subfamily Solenocyclinae Kaaup, 1871

3 species of canestriniiids from 3 genera were collected from 3 species of hosts belonging to 2 genera. 2 genera canestriniiids Olgattia Haitlinger, 1990 and Shillongia Haitlinger, 1989 are associated only with this subfamily.

Most species of Passalidae belong to genera Melisa Lombardini, 1944 (19), Apalotacarus Summers & Schuster, 1981 (16) and Lidiophela Haitlinger, 1990 (6). Canestrinid mites have been collected from Passalidae mainly in Asia, Australia, Papua New Guinea and Solomon Islands. Most species were found in Indonesia (19), Australia (8), Papua New Guinea (8) and Vietnam (8). Most canestriniiids found on Pleurarius brachyphyllus Stoliczka, 1873 (4 species), Aceraius grandis Kuwert, 1891, A. laevicollis (Illiger, 1800), Labienus gigas (Kaup, 1868) and Protomocoelus australis (Boisduval, 1835) (in all 3 species).

Family Scarabaeidae Latreille, 1802

This family contains 19 subfamilies and about 30,000 species. 70 species of canestriniiids belonging to 25 genera were found on only 66 host species, 5 determined to genus and from unidentified Cetoniinae and Dynastinae belonging to 3 subfamilies and 42 genera (Tables XI and Tables XIV). The relationship between canestriniiids and scarabaeids and their distribution is very poorly known. 42 of canestriniiid species are known from Africa, 21 from Asia, 7 from Europe and 8 species from Papua New Guinea.

Subfamily Cetoniinae Leach, 1815

This subfamily contains around 4000 species but only from 50 species belonging to 29 genera, 48 species of canestriniiids from 17 genera were collected (Berlese 1881; Trägårdh 1901, Cooreman 1950; 1954, 1955; Turk 1953; Lavoipiere 1958; Haitlinger 1990a; 1991c, 1993a, 1995b, 2002, 2011; Khaustov & Eidemberg 2001; Haitlinger & Chmielewski 2004; Khaustov 2006; Trach 2006; Trach & Khaustov, 2011). The largest number of host species was found in the genus Protaetia Burmeister, 1842 (11). 4 species of canestriniiids were collected from Smaragdesthes sfricana (Dury, 1773) and 3 canestriniiid species were collected from Dicronorrhina micans Drury, 1773, Mecynorhina savagei Harris, 1844 and Protaetia metallica (Herbst, 1782).

Canestriniiids found in Cetoniinae are mostly associated with one host species. Only 5 species of canestriniiids had more than 2 hosts: Albinorattia igot Haitlinger, 1989 (6), Coleopterophagus megnini (Berlese, 1881) (6), Giohrattia maharae Haitlinger, 1989 (5), Cetonicola hispidus Cooreman, 1955 (3) and Coleopterophagus albini Haitlinger, 1990 (3). 8 species of the genus Coleopterophagus Berlese, 1882 are associated with 11 species of the genus Protaetia (C. megnini was found on Cetonia aurata but it is an accidental host). Although, C. berlesi Kishida, 1924 and C. near berlesi were collected from Lucanidae and C. pulcher was collected from another genus of Cetoniinae but generic affiliation of these species needs an explanation. 7 species of Boetophela Haitlinger, 1989 are associated with 7 species of 7 genera (2 species from undetermined Cetoniinae). 7 species of Paraphagella Cooreman, 1955 are associated with 9 species of hosts from 6 genera. 37 species of canestriniiids were found in 14 African countries (known 54 countries); most species were found in the Democratic Republic of Congo (7), Tanzania (6), Ethiopia (5) and Cameroon (4). In Asia 11 canestriniiid species found in 10 countries (known 50 countries); most species were found in China (3), Indonesia (2) and Syria (2). In Europe 5 canestriniiid species were found in 15 countries (and Crimea) (known 45 countries); most species were found in Ukraine (5), Italy (3) and Poland (3) and in Pacific subregion was found one species in Papua New Guinea (known 22 countries).

In the original description of Boetophela ginae Haitlinger, 1989 it was stated that this species was caught in the Sumatra on the Batocera rubus (Linnaeus, 1758) (Cerambycidae) (Haitlinger 1989d). It was based on a wrong label (collected at the museum). This species and all others of this genus are found only in Africa (Haitlinger 1993a).

Subfamily Dynastinae MacLeay, 181

This subfamily contains over 1500 species and 225 genera. 20 canestriniiid species from 8 genera were
collected from 12 dynastid species belonging to 7 genera (Tables XI and XIV) (Haitlinger 1989b, Khastov & Eidelberg Khaustov & Eidelberg 2001; Trach 2006). 3 canestriniid species collected from 2 host species were found in Africa, 9 canestriniid species collected from 8 host species were found in Asia, 2 canestriniid species collected from 2 host species belonging to one genus were collected in Europe and 7 canestriniid species from 3 genera collected from one identified host species and a few unidentified hosts.

Subfamily Scarabaeinae Latreille, 1802

This subfamily contains more than 6000 species of the 200 genera. Only 2 species, Coleoglyphus fuscipes Berlese, 1910 collected from Copsis sp., Heliocoris hamadryas (Fabricius, 1775) and Tettus megerlei (Fabricius, 1801) and Scarabiphota vignoi Haitlinger, 1994 collected from undetermined Scarabaeinae in Sumatra (Haitlinger 1994b). Scarabaeinae are exceptionally hosts of canestriniids.

Family Tenebrionidae Latreille, 1802

This family contains 10 subfamilies, about 266 genera and more than 15,000 species (Bouchard et al. 2005). 22 species of canestriniids were found on only 17 species of tenebrionids (including Blaps sp. and Tenebrionidae undet.) belonging to three subfamilies: Lagriinae, Pimeliinae and Tenebrioninae (Cooreman 1953; Samšīnāk 1970; Beron 1975; Haitlinger 1990a, 1990c, 1991f, 1995b, 2000; Haitlinger & Šundić, 2016, 2018) (Tables XII and XIV). The relationships between canestriniids and tenebrioniids and the distribution of canestriniids in the world are very poorly known. 8 canestriniid species associated with tenebrioniids were found in Africa, 3 in America, 2 in Asia and ?4 in Europe and one species in Australia (Tables I, III, V and VII).

Subfamily Lagriinae Latreille, 1825

The subfamily contains 45 genera with about 800 species. Only 4 species of canestriniids were found: Donnelafontia calostegis Lavoipierre, 1958, D. suataha (Haitlinger, 1990), Boleohylla garrica Haitlinger, 1991 and Saniothiana barumbaiaca Haitlinger, 1990 from 4 species of hosts in Cameroon, Democratic Republic of Congo and Ghana (Lavoipierre 1958; Haitlinger 1990a, 1991f) (Tables XII and XIV). Donnelafontia species seem to be closely related to Lagriinae.

Subfamily Pimeliinae Latreille, 1802

The subfamily contains 223 genera and many species. Only 2 species: Boleohylla kiogana Haitlinger, 1991 collected from Psammodes carbonarius Gerstaecker, 1954 in Uganda and Canestrinia remigans Berlese, 1910 collected on Morica planata (Fabricius, 1801) in an unknown place in Africa (Haitlinger 1991f) (Tables I and XIV). Possibly C. remigans belongs to a different genus because species of the genus Canestrinia were not found in Africa and also not found on Tenebrionidae.

Subfamily Tenebrioniiinae Latreille, 1802

This subfamily contains 106 genera and many species. 11 species of canestriniids were collected from 13 species of Tenebrioniiinae (with Dila sp. and Gnaptor sp.). 2 species of the genus Percanestrinia Berlese, 1911, Balcarella gen. nov., Camirohylla Haitlinger, 1991 and Ismailenia gen. nov. were collected from 7 species of the genus Blaps Fabricius, 1775 (excluding Blaps sp. and Tenebrionidae undet.). In addition, 2 species of the genus Hatohylla Haitlinger, 1990 were collected from 2 species of the genus Nyctobates Guérin, 1834 (and one species of Hatohylla from Tenebrionidae undet.) (Cooreman 1953; Samšīnāk 1965, 1970; Beron 1975; Haitlinger 1990c, 1991b, 1991f,

Table XI. List of canestriniids and their host species among Scarabaeidae.

| Subfamily   | Host species          | Mites                      |
|-------------|-----------------------|----------------------------|
| Cetoniinae  | Aiusorhina laeviplaga | Boetophila silvanae         |
|             | Cetonia aurata        | Coleopterophagus megini    |
|             | Chalcotreta smaragdina| Goharattia maharae         |
|             | Coelorhabditheareyi  | Pseudoparaphagella gerardi |
|             | Coryphocera sp.       | Albinorattia igori         |
|             | Dichista rufa         | Kahoorangia almae          |
|             | Dicronorkina derbyana  | Boetophela robertsoni      |

(Continued)
| Taxonomy                  | Host Species                                      |
|--------------------------|---------------------------------------------------|
| *R. Haitinger*            |                                                   |
| Table XI. (Continued).    |                                                   |
| *D. micnas*              | *Afrocanestrinia straeleni, Cetonicola hispidus, Paraphagella principe* |
| *Diplognatha gagatei*     | *Barbiangia elongata*                             |
| *Elasochilmon heterospila*| *Boetophela symoeoni*                             |
| *Eudicella euthallia bertherandi* | *Paraphagella eudicellae*                     |
| *E. gralli*              | *Cetonicola hispidus*                             |
| *E. gralli mechowi*       | *Paraphagella eudicellae*                         |
| *E. smithi*              | *Boetophela ginae, P. minor*                      |
| *Euphoria herbacea*      | *Cetonicola vatus*                                |
| *Goliathus albostignathus*| *B. sybillae*                                     |
| *G. goliathus*           | *Phelliculophela roaldi*                          |
| *Heterorrhina elegant*   | *Gioharatia caroae*                               |
| *Heterorrhina sp.*        | *Gioharatia caroe*                                |
| *H. sexmaculata dorni*   | *Albinorattia igori*                              |
| *Ischiopsophora lateillei*| *A. igori*                                        |
| *L. olivacea*            | *A. igori*                                        |
| *Lethosesthes nigerrima* | *A. igori*                                        |
| *Lomaptera kaestneri*    | *A. igori*                                        |
| *Mecynorrhina polyphemus* | *Paraphagella grimaldi*                           |
| *M. savagei*             | *Boetophela erhardi, Cetonicola isadorae, Paraphagella indirae* |
| *Myceterophallus sp.*    | *A. igori*                                        |
| *Oxytherea funesta*      | *Canestrinia dorcicola*                           |
| *Pachnoda abyssinica*    | *Tamarangiu ethipica*                             |
| *P. marginata*           | *T. fabiolae, T. flaviani*                        |
| *P. thoracica*           | *T. nimfae*                                       |
| *Plaesiorrhina mhondana* | *Boetophela werner*                               |
| *Poecilopilia maculatissima* | *Sorbinophela sanodi*                         |
| *Porphyrocota binamonea* | *Coleopterophagus pulcher*                        |
| *Protaetia affinis*      | *C. donaldi, C. meginni*                          |
| *P. brevitaris*          | *C. rudolfi*                                      |
| *P. Cupera cuprea*       | *C. meginni*                                      |
| *P. Cupera ignicollis*   | *C. meginni*                                      |
| *P. cuprea obscura*      | *C. meginni*                                      |
| *P. cuprina*             | *C. meginni*                                      |
| *P. fieberi*             | *C. meginni*                                      |
| *P. funebris*            | *C. helzebubi*                                    |
| *P. marmorata*           | *C. albini*                                       |
| *P. metallica*           | *C. albini, C. dionizyi, C. meginni*              |
| *P. orientalia*          | *C. helzebubi*                                    |
| *P. speciocissima*       | *C. albini, C. maroni*                            |
| *P. speciosa*            | *C. baali, C. maroni*                             |
| *Protaetia sp.*          | *C. albini, C. megini*                            |
| *Pseudochalcostha auripes* | *Gioharatia maharae*                            |
| *P. pomacea*             | *G. maharae*                                      |
| *Rhabdotis sobrina*      | *Diplognathophilus africana*                      |
| *Smargadesthes africana* | *Afrocanestrinia samsoni, Cetonicola hispidus, Paraphagella principe* |
| *S. africana oersten*    | *Afrocanestrinia rufinae*                         |
| *Stephanorrhina guttata* | *Cetonicola maritiae, Paraphagella odae*          |
| *Thaumostoepus cupripes* | *Gioharatia maharae*                              |
| *T. nigritus*            | *G. maharae*                                      |
| *Timesorrhina iris*      | *Cetonicola oretesi, Paraphagella ingridae*       |
| *Cetoniae undet.*        | *Barbiangia alvari, B. ethipica, Boetophela cassandrae, B. ephraim, Diplognathophilus ethipicus, Gioharatia maharae* |
| *Dynastinae*             |                                                   |
| *Augosoma centaurus*     | *Coleopterophagus neglectus*                      |
| *Chalcosoma atlas*       | *Aurollossongia dioni*                            |

(Continued)
Table XI. (Continued).

| Family          | Subfamily         | Host species                                                                 | Mites                                                                 |
|-----------------|-------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Passalidae      | Macrolininae      | *Acerosetus grandis*                                                         | Apalotacarus aristatus, Melisia irenae, *M. marietiae, M. superba*   |
|                 |                   | *A. laevicollis*                                                            | *M. ariadnae, M. gabrielae, M. melaniea, M. salomeae*                |
|                 |                   | *Celejus punctithorax*                                                       | Apalotacarus petilus                                                 |
|                 |                   | *Episphenus indicus*                                                         | *M. anomala, M. klapaleki*                                           |
|                 |                   | *Episphenus sp.*                                                             | *M. smomala*                                                        |
|                 |                   | *Gonatus naviculator*                                                        | *Teophyssa honorata*                                                |
|                 |                   | *Labienus compergus*                                                         | *Arraphosoma minax*                                                 |
|                 |                   | *L. gigas*                                                                  | *A. paramanix, Lidiophela igae, L. pelagiae*                         |
|                 |                   | *L. ptos*                                                                   | Apalotacarus fusculus, Lidiophela aurica                            |
|                 |                   | *Labienus sp.*                                                               | *L. pecki, Passalophagus georlei*                                   |
|                 |                   | *Macrolinus nicobaricus*                                                     | *A. protensus*                                                      |
|                 |                   | *M. weberi*                                                                 | *A. scaurus*                                                        |
|                 |                   | *Mastochilus australasicus*                                                  | *A. luroris, Cnecodroma dolichopoda*                                |
|                 |                   | *M. quaestionis*                                                            | *A. luroris*                                                        |
|                 |                   | *Pelopodes tridens*                                                          | *A. fulgens, A. saianae*                                            |
|                 |                   | *Pharochilus dilatatus*                                                      | *A. echinatus, A. luroris*                                          |
|                 |                   | *P. nitisculus*                                                              | *A. luroris*                                                        |
|                 |                   | *Pleurarius brachyphylalus*                                                  | *A. echinatus, A. scissus, Paramelisia alatus, *P. lacuna, Phaleratusellus alatus* |
|                 |                   | *Protomocoeulus australis*                                                   | Apalotacarus cidaris, *A. petilus, Sajanophela alfredae*             |
|                 |                   | *P. triumphator*                                                            | *A. giaber, Phaleratus fentoni*                                     |
| Passalinae      | Passalus sp.       | *Melisia lombardi, M. melisma*                                               |                                                                      |
| Solenocyliniae  | Didimus sanisbaricus | Oligattia usegueica                                                                 |                                                                      |
|                 | *Leptadaux bicolor*                                                        | *A. trullus*                                                        |
|                 | *I. dentatus*                                                            | *Shillongia marzenae*                                                |

(Continued)
Table XII. (Continued).

| Lagriinae          | Calostegia crassicornis | Donnelafontia calostegis |
|--------------------|-------------------------|--------------------------|
|                    | Metallonotus metallicus | Boleohylla garrica       |
|                    | Odontopezus cupreus     | Donnelafontia suatoka    |
|                    | O. lucens               | Saniothiana barumbaica   |
| Pimeliinae         | Morica planeta          | Canestrinia remigana*    |
|                    | Psammodes carbonarius   | Boleohylla kiohana       |
| Tenebrionidae      | B. appendiculata        | Camirohylia feziana      |
|                    | B. gibba                | Ciprusenia izabelae, Percaneistrinia blaptis |
|                    | B. holconota            | P. norodom              |
|                    | B. lethifera            | P. blaptis              |
|                    | B. mueronata            | Ismaillia maroccana, P. blaptis |
|                    | B. occulta              | P. blaptis              |
|                    | B. pinguis              | I. maroccana            |
|                    | B. polychresta          | I. egypti               |
| Tenebrioninae      | Blaps sp.               | Balearella balearica, I. samsinaki, Percaneistrinia blaptis, Ciprusenia kamelski, Ismaillia maroccana |
|                    | Damastris formosus      | Ambilohylia favosa       |
|                    | Dila sp.                | Camirohylia sp.          |
|                    | Gnaptor sp.             | Balearella samsinaki     |
|                    | Nyctobates gigas        | Hatohylia morrata        |
| Cerambycinae       | N. maxima               | H. baniana               |
|                    | Nyctobates sp.          | H. rosascostai          |
|                    | Tenebrionidae undet.    | Bircericola bertramii, Chelinochroa dictyophora, Hatohylia biaianaee, Balearella asilaica, Ciprusenia vivianaee |
| Cerambycinae       | Cerambyx cerdo          | Dicanestrinia cerambycisc |
|                    | Juiaparus batus         | Phriknodora pustulosa    |
|                    | J. mexicanus            | P. pustulosa             |
|                    | Trachyderes succinctus  | P. scabra               |
| Cerambycidae       | Batocera albofasciata   | Sumatranelana phoeiniae  |
|                    | B. celebiana            | Canestriniella phyyssana |
|                    | B. numeridens           | C. phyyssana            |
|                    | B. lineolata            | C. togata               |
|                    | B. maculata             | C. amplexans            |
|                    | B. numitor ferruginea   | Sumatranelana elae      |
|                    | B. rubus                | S. elae                 |
|                    | B. rufomaculata         | S. batocerae            |
|                    | B. thomsoni             | C. togata               |
|                    | B. wallacei Proserpina  | C. togata               |
| Lamiae             | Batocera sp.            | C. togata               |
|                    | Lagochelirus faveolatus | Thopia pannucea          |
|                    | Neoptychodes trilineatus | Thopia bulbocaudata     |
|                    | Sternotomis bohemani    | Anaspistes unguiculatus  |
|                    | Taeniotes scalatus      | Thopia tenar             |
|                    | Cerambycidae undet.     | Chelinochroa dictzophora |

*genus to be verified
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

Diplopoda de Blainville in Gervais, 1844

Order Glomerida Brandt, 1833

Family Glomeridae Leach, 1815

Extensive family with 47 genera. Only one species *Diplopodocoptes transkeiensis* Fain, 1987 was found from an unidentified host in Republic of South Africa (Fain 1987b) (Tables XIII and XIV).

Family Odontopygidae Attems, 1909

Extensive family with about 55 genera. Only one species *Diplopodocoptes transkeiensis* was found from an unidentified host in Kenya (Fain 1987b) (Tables XIII and XIV).

So far only one species of Canestriniidae has been found on Diplopoda from Africa. The relationships between canestriniids and Diplopoda are unclear and requires further research.

**Family Zopheridae Solier, 1834**

This family consists 89 genera in 2 subfamilies: Colydiinae and Zopherinae (sometimes 6 subfamilies). Only 2 canestriniid species were collected from Zopheridae.

**Subfamily Colydiinae Ericson, 1842**

From *Colydium* sp. was collected *Sandrophela dittae* Haitlinger, 1991 (Haitlinger 1991f). Probably it is accidental host for Canestriniidae.

**Subfamily Zoopherinae Solier, 1834**

From *Pycnecerus* sp. was collected *Saniothiana pycnosa* Haitlinger, 1990 (Haitlinger 1990a). Probably it is accidental host for Canestriniidae.

**Class Diplopoda de Blainville in Gervais, 1844**

**Order Glomerida Brandt, 1833**

**Family Glomeridae Leach, 1815**

Extensive family with 47 genera. Only one species *Diplopodocoptes transkeiensis* Fain, 1987 was found from an unidentified host in Republic of South Africa (Fain 1987b) (Tables XIII and XIV).

**Family Odontopygidae Attems, 1909**

Extensive family with about 55 genera. Only one species *Diplopodocoptes transkeiensis* was found from an unidentified host in Kenya (Fain 1987b) (Tables XIII and XIV).

So far only one species of Canestriniidae has been found on Diplopoda from Africa. The relationships between canestriniids and Diplopoda are unclear and requires further research.

**Distribution**

Canestriniidae occur in all regions of the world, with the exception of their southern and northern ends. In Europe the most northerly were found in Estonia, South Norway (*Coleopterophagus albini* Haitlinger, 1990 collected from *Protaetia metallica* Herbst, 1782) and South Sweden [*Procericola bourgognei* (Oudemans, 1923)] from *Carabus coriaceus* Linnaeus, 1758] (Lundquist 1985; Haitlinger 2015). In Asia the most northerly were found in Russia: *Photia lopatini* Khaustov & Eidelberg, 2001 in Sachalina, collected from *C. lopatini*, *P. sibirica* Khaustov & Eidelberg, 2001 in Novosibirsk prov., collected from *C. schoenherri*, *Uriophela arieli* Haitlinger, 1991 in Amur prov. collected from *Hemisorcorus rubrofemoratus* and *P. polymorpha* Samši, 1971 from Japan in Hokkaido, collected from *C. gehini* and Russia in Vladivostok and vicinity of Ussuri, collected from *C. imperialis*, *C. schoenherri*, *C. schrenki* and *C. vestinghoffi*. *P. polymorpha* has been collected from many species of hosts. According to Khaustov and Eidelberg (2001), it could be a collective species. In America the most northerly canestriniids were found in Mexico (in Alaska, Canada and the USA, they have not been found so far); furthest in the south of America they were found in northern Argentina (Haitlinger 1992b).

In Africa, 68 species of canestriniids belonging to 32 genera were found. Most of the canestriniid genera are represented only in Africa. Only *Atheta* Haitlinger, 1989 is also known from Asia, *Camirohylla* Haitlinger, 1991 is known from Europe and Iran, *Canestrinia* Berlese, 1881, *Mesophotia* Samši, 1971 and *Ibizella* Haitlinger & Šundić, 2016 are known also from Europe, *Coleopterophagus* Berlese, 1882 *Ismaiellenia gen. nov.* and *Canestrinia* Berlese, 1911 are known from Europe or Asia. Canestriniidae were found in only 20 countries so far, from known 59 countries (including France – Majotte, Reunion, Great Britain – Saint Helene, Portugal – Madeira and Spain – Canary Islands). All mite species have been found in only one country except *Cetonicola orestesi* Haitlinger, 1991 (Ghana, Liberia), and *Diplopodocoptes transkeiensis* Fain, 1987 (Kenya, Republic of South Africa) (Table I). Most species are described from Tanzania (13), Democratic Republic of Congo (8) and Cameroon (7). Canestriniidae were collected from 44 host species belonging to 5 families and 33 genera (Tables I and II); 4 host species identified to genus and 12 identified to family. From 30 host species, only one canestriniid...
Table XIII. List of canestriiniids and their hosts among Blattidae, Diplopoda, Elateridae, Geotrupidae, Lucanidae, Passandridae and Zoopheridae.

| Family         | Subfamily | Host species                                      | Mites                                      |
|----------------|-----------|--------------------------------------------------|--------------------------------------------|
| Cladognathus giraffe |           | Noemiphela izabelae                              |                                            |
| Dorcus alicides                          | Sandrophela near amarae                          |                                            |
| D. anamianus kubatoi                      | Sandrophela sp.                                  |                                            |
| D. antabus                                 | Rugoniphela marloni, Sandrophela sp.             |                                            |
| D. arfakianus                             | Cooremania wauensis                              |                                            |
| D. bucephalus                              | S. spectanta, S. near spectanta, Rugoniphela marloni, Sandrophela amarae | |
| D. curvidens                              | Canestrinia sp., Coleopterophagus near berlesei* |                                            |
| D. curvidens hopei                        | C. near berlesei*                                |                                            |
| D. eurycephalus                           | Rugoniphela marloni, Sandrophela amarae, S. hugoni |                                            |
| D. metacostatus                           | Sandrophela sp.                                  |                                            |
| D. mirabilis                              | Canestrinia sp.                                  |                                            |
| D. montivagus                             | Canestriniidae undet.                           |                                            |
| D. nepalensis                             | Canestrinia nepalensis*                          |                                            |
| D. paralellopipedus                       | C. dorcicola                                     |                                            |
| D. parryi                                 | Canestrinia sp.                                  |                                            |
| D. rectus                                 | Canestriniidae undet., Coleopterophagus berlesei* |                                            |
| D. reichei                                | Sandrophela near hugoni                          |                                            |
| D. reihei clypeatus                       | Sandrophela amarae                               |                                            |
| D. rubrofemoratus                         | Canestriniidae undet.                           |                                            |
| D. saga                                   | Canestrinia microdisca*                          |                                            |
| D. striatipennis                          | Sandrophela sp.                                  |                                            |
| D. taurus                                 | Noemiphela barryi, Sandrophela amarae            |                                            |
| D. tetanus                                | Sandrophela near spectanta, Canestrinia sp., Canestriniidae undet., S. amarae, S. rodioni | |
| D. tetanus castanicolor                   | Haülingeria lobata                               |                                            |
| D. tetanus okinawaensis                   | Sandrophela sp.                                  |                                            |
| D. tetanus palawanicus                    | Sandrophela near spectanta                       |                                            |
| D. tetanus pilifer                        | Coleopterophagus near berlesei*                  |                                            |
| D. tetanus platymelus                     | Sandrophela rodioni                              |                                            |
| D. tetanus sakishimanus                   | Sandrophela sp.                                  |                                            |
| D. tetanus tokushimaensis                 | Sandrophela sp.                                  |                                            |
| Dorcus sp.                                | Noemiphela barryi                               |                                            |
| Figulus sp.                               | Canestriniidae undet.                           |                                            |
| Hemisodorcus rubrifemoratus               | Uriophela arieli                                 |                                            |
| Hemisodorcus sp.                          | Sandrophela sophiae                             |                                            |
| Hexathrius mandibularis                   | S. near spectanta                                |                                            |
| Lucanus sp.                               | Coleopterophagus berlesei*                      |                                            |
| Odontolabis alces                         | Canestrinia sp.                                  |                                            |
| O. castelnaudi                            | Sandrophela near hugoni                          |                                            |
| O. Dalmaci                                | Canestrinia sp., Vereoxia bogeri                 |                                            |
| O. eremica                                | Sandrophela near hugoni                          |                                            |
| O. lacordairei                            | Sandrophela hugoni                               |                                            |
| O. spectabilis                            | Sandrophela near hugoni                          |                                            |
| O. wollastonit                            | Sandrophela hugoni                               |                                            |
| Prosopocolus bison                        | Amboinophela bernaes                             |                                            |

(Continued)
Table XII. (Continued).

| Lucidae | Cooremania kietaensis, Vereoxia bogeri |
|---------|-------------------------------------|
| undet.  |                                     |
| Elateridae | Semiotus furcatus                        |
| Dendrometriidae | Danaithiana archidonaica, D. ecuatorica |
| Geotrupidae | S. imperialis, D. chanchamayoica |
| Geotrupinae | S. virgates, D. aylaica |
| Passandridae | Typhoeus typhoeus                        |
| Passandrinae | Ciprusenia sellniki |
| Zopheridae | Phryknodora                            |
| Zopherinae | Canestrinina javensis*                  |
| Diplopora | Host unknown                           |
| Host unknown | Javanellina. macgillarviyi |
| Blattidae | Host unknown                           |
| Blaptinnae | Diplopodocoptes transkeiensis          |
| *genus to be verified                    |                                     |

4 species of canestriniids were collected and from *Dicronorhina micans* (1793), *Mecynorhina savagei* Harris, 1844 and *Timesorrhina iris* (Fabricius, 1781) 3 species of canestriniid were collected. 2 canestriniid species were collected from 7 host species (Table I).

28 species of canestriniids belonging to 13 genera collected from 29 species of hosts belonging to 3 families and 19 genera have been found in Central America. Most species belong to the genus *Bibulothiana* Haitlinger, 1993 (4) and 3 species each belong to the genera *Ennodithiana* Haitlinger, 1993, *Phryknodora* Summers & Schuster, 1982 and *Thopia* Summers & Schuster, 1982; in the remaining 6 genera 1 or 2 mites were found. 21 host species belong to the Cassidinae subfamily (Chrysomelidae), one species belongs to the family Elateridae, 3 species to the subfamily Cerambycinae and 3 species to the subfamily Lamiinae (Cerambycidae). Canestriniidae were found in 9 countries, from known 20 countries. Most species were found in Panama (14), Mexico (9) and Costa Rica (7). All canestriniid species were collected from one or two host species with the exception of *Apalotacarus alutaceus* (Turk, 1948) and *Grandiellopsis gambosa* (Summers & Schuster, 1979) found on 3 hosts (Table II).

78 species of canestriniids belonging to 17 genera collected from 123 host species belonging to 3 families and 34 genera have been found in South America (Tables III and IV). Most canestriniids belong to the genera *Grandiella* Lombardini, 1939 (14), *Arrunthisiana* Haitlinger, 1991 (10), *Grandiellopsis* Fain, 1989 (9) and *Ovarothiana* Haitlinger, 1993 (7). Among hosts, 116 species of 29 genera belong to the subfamily Cassidinae, mainly to the genera *Stolas* Billberg, 1820 (35 species), *Discenorhina* Chevrolat, 1836 (13) and *Botanochora* Dejean, 1836 (12). Canestriniidae were found in 11 countries from known 14 countries. Most species were found in Brazil (44), Colombia (15), Ecuador (13), Peru (12), Bolivia (9) and French Guiana (9).

There are faunal differences between canestriniids from Central America and South America. Of the 28 canestriniid species known from Central America 13 species were found only in this region: *Ac rotacularus mirabilis, Bibulothiana albertae, B. vatica, Ennodithiana melindae, Grandiella marinae, Metriothiana bolebori, Olfasthiana ivettiae, Ovarothiana echinodera, O. kinseyi, Phryknodora aave, P. pustulosa, Teklathiana conula, T. rugosita*; including 6 species collected from Cerambycidae. These differences also apply to hosts. Of the 29-host species found in Central America, 16 were found only in this region: *Cheymorpha comata, C. inflata, Coptocylca leprosa, C. dorsoplagiata, Cyrnotona tristigma, Discenorhina biplagiata, D. depilata, D. distincta, Echoma confluens, Helocassis testudinaria, Metriothiana bilimeki, Omaspides bistrata, Physonotas deruta, Stolas discoides, S. lebasi and S. punicea* How significant these differences are will be possible to establish in the course of further research.

109 species of canestriniids belonging to 29 genera collected from 120 host species belonging to 6 families and 37 genera have been found in Asia (Tables V and VI). Most canestriniids belong to the genera *Melisia* Lombardini, 1944 (15 species), *Photia* Oudemans, 1904 (8), *Apalotacarus* Summers & Schuster, 1981 (7), *Canestrinia* Berlese, 1881(4) and *Canestriniella*
Berlese, 1910 (4). Most host species were of the genus _Carabus_ Linnaeus, 1758 (32), _Dorcus_ MacLeay, 1819 (19) and _Protaetia_ Burmeister, 1842 (6). Canestriniidae were found in 20 countries from known 50 countries. Most canestriniid species were found in Indonesia (47), India (13), China (11) and Vietnam (9). Western Asia (to Iran, Kyrgyzstan and Uzbekistan) has almost all canestriniid genera common with Europe (_Coleopterophagus_, _Ibizzella_, _Percanestrinia_, _Percanestriniella_, _Photia_, _Procericola_) and 2 genera common with Africa (_Camirohylla_, _Coleopterophagus_). Northeast and East Asia have 3 genera common with Europe (_Canestrinia_, _Coleopterophagus_, _Photia_) and South and Southeast Asia have 2 genera common with Europe (_Canestrinia_, _Percanestriniella_). However, all _Canestrinia_ in these parts of Asia need generic revision.

33 species of canestriniids belonging to 17 genera collected from 14 host species belonging to 5 families and 11 genera have been found in Oceania (Tables V and VI). Canestriniidae were found in only 3 countries: Australia (9 species), Papua New Guinea (23) and Solomon Islands (2) (there are known 14 countries). Species belonging to 8 genera were found only in Oceania (_Cnecoderma_, _Cooremania_, _Hypopteryx_, _Mossongia_, _Passalophagus_, _Phaleratus_, _Sajanjophela_, _Tascopeus_). The other 7 genera are also known from Southeast and East Asia.

51 species of canestriniids belonging to 20 genera collected from 62 host species belonging to 5 families and 14 genera have been found in Europe (Tables VII, VIII and XIV). Canestriniidae were found in 29 countries, Crimea and former Yugoslavia. Most canestriniids belong to the genera _Photia_ (12 species), _Pseudocanestrinia_ (7), _Canestrinia_ (2) and _Coleopterophagus_ (4). Most host species were of the genus _Carabus_ (32 species), _Protaetia_ Burmeister, 1842 (7), _Blaps Fabricius, 1775_ (5) and _Chrysolina Motschulsky, 1860_ (4). 10 genera were found only in Europe: _Amansiella Khaustov & Eidelberg, 2001_, _Dicanestrinia Berlese, 1911_, _Lombardiniella Cooreman, 1950_, _Mesophotia Samšiňák, 1971_, _Neophotia Samšiňák, 1971_, _Paracanestrinia Haitlinger & Sundić, 2017_, _Paramansia Cooreman, 1950_, _Paraphotia Khaustov & Eidelberg, 2001_, _Pseudoamansia Cooreman, 1950_, _Pseudocanestrinia Khaustov & Eidelberg, 2001_. 3 genera: _Coleopterophagus_, _Balarella_ gen. nov. and _Peracanestrina_ were found also in Africa or Asia and _Canestrinia_, _Percanestriniella_ and _Procericola_ were found also in Asia. Most canestriniid species were found in Ukraine (18), Poland (14) and Italy (13).

**Host specificity at the generic level**

**Carabidae**

12 genera of canestriniids were found in Carabinae. 8 genera are associated with separate host genera: _Paraphotia_ with _Calosoma_ (C. _auropunctatum_ is the only known host of this genus, from about 167 known species), _Cercidiphota_, _Kuramasenia_, _Mesophotia_, _Midiphotia_, _Neophotia_, _Paracanestrinia_, _Percanestriniella_, _Photia_ and _Procericola_ are associated with _Carabus_ only. _P. howdeni_, collected from Passalidae, is also included in the genus _Photia_ but its inclusion in this genus is unreasonable and needs to be corrected. Genera _Canestrinia_ and _Dicanestrinia_ are also associated with other genera of hosts, including other families (Cerambycidae, Scarabaeidae, Tenebrionidae).

4 genera of canestriniids were found in Harpalinae. The genus _Globosophota_ is known only from genus _Pterostichus_, _Megacanestrinia_ is known only from genus _Tefflus_ (M. _mucronata_ described from unidentified Carabidae probably belonging to the genus _Tefflus_). The genus _Coleoglyphus_ has been found of different genera of hosts.

**Cerambycidae**

2 genera amd 3 species of canestriniids were found in Cerambycinae. The genus _Phriknodora_ is known only from genera _fiuapar_ and _Trachyderes_. _Dicanestrinia_ has also been found on Carabidae. The typical species _Dicanestrinia cerambicus_ is described from _Cerambyx cerdo_. It is the only Canestriniidae species found on the genus _Cerambyx_ among 14 species of _Cerambyx_.

4 genera and 11 species of canestriniids were found in Lamiinae. The genera _Canestriniella_ and _Sumatranella_ are associated exclusively with the genus _Batocera_. _Anaspistes_ is associated with _Sternotomis_ and only _Thopia_ was found on _Lgocheirus_, _Neopychodes_, _Taeoniotes_ and _Cassidinae_.

**Chrysomelidae**

20 genera of canestriniids were found in Cassidinae.13 genera are associated with separate host genera: _Acrotaracus_ with _Physonota_ and _Platyctena_, _Amansiella_ and _Pseudoamansiella_ with _Timarcha_, _Averthiana_ with _Zatrephina_, _Dorynothiana_ with _Doryneta_, _Eunorithiana_ with _Plagiometriona_, _Gasuthiana_ with _Alurnus_, _Coralomethelia_ and _Meristomela_, _Metriothiana_ with _Metriorina_, _Sasbothiana_ with _Charidotis_ and _Charidotella_, _Teklathiana_ with _Acromis_ (also
found in *Ennодithiana* but with different species) and *Thopia* (2 species from 5) with *Polychalca* (*Polychalca punctatissima* common with *Grandiellopsis*). In the remaining 7 genera this specificity is absent. However, each of these genera has been found outside of also common hosts also species of the genera found only in them. *Arrunsithiana* are associated with 6 genera hosts, exclusively collected from *Mesomphalia*. The highest number of host species among Chrysomelidae was found (34) including 28 among *Stolas* (many common to *Grandiella* and *Bibulothiana*). *Bibulothiana* are associated with 4 genera hosts but only they were found on *Chelymorpha* and *Microtenochira*, on *Crambelea* and *Omaspides* only *Ennодithiana* was found. *Grandiella* was found on 10 host genera but exclusively on *Anacassis* (it is also a host for *Olaфithiana*, but a different species), *Botanochara*, *Eumolpus*, *Goniochenia* and *Orexita*. *Grandiellopsis* was collected from 5 host genera, on *Carlobruсhia* and *Discomorpha* (15 species) (*D. conspersipennes* was also found on *Ovarrothiana* no other canestriniids were found. *Olaфithiana* was found on 4 host genera, for *Elytropropha* and *Helocass* only. *Ovarrothiana* was found on 5 host genera; from *Agenysа* and *Miocalaspis* collected exclusively and from *Eugenysа* including *Arrunsithiana* (two hosts are common with *Arrunsithiana*).

77 canestriniid species were collected from 149 chrysomelid species. 122 species of Chrysomelidae are hosts only for one species of Canestriniidae. 22 species of Chrysomelidae are hosts of 2 species of Canestriniidae and 5 species are hosts for 3 to 6 species of Canestriniidae (Table VI). Only 5 species were collected from a larger host species: *Polychalca punctatissima* (3), *Stolas lebasi* (3), *Ecchoma clypeata* (4), *Stolas conspersa* (4) and *S. chalybaea* (6) (Table VI). The greatest number of host species was found for *Arrunsithiana battos* (15) and *Grandiellopsis gambosa* (15). Also, from many hosts were collected *Grandiella ticafannae* (13), *Olaфithiana foliacea* (12), *Grandiella tetracaudata* (9) and *Bibulothiana brevispinata* (6).

**Lucanidae**

7 genera of canestriniids were found in Lucaninae. The genus *Noemiphela* is exclusively associated with genus *Cladognathus*. Genera *Cooremаnіa*, *Haitingeria* and *Rugomipеla* are associated with genus *Dорcus* 3 other genera found on *Dорcus*: *Canestrinia*, *Coleoрerоthagаus* and *Sandrophela* are associated with a few other genera. The genus *Uriрhеla* is exclusively associated with *Hemisorсodus*, *Sandrophela* is associated with *Dорcus*, *Hexathrius* and *Odontolabіs*. *Amboinophеla* is exclusively associated with *Proposоcolіus*. *Coleoрerоthagаus* was found on *Lucanuѕ* but is mainly associated with the genus *Protaеtіа* (*Cetоniiniae*). 3 genera canestriniids: *Canestrinia*, *Sandrophela* and *Vероехіа* are associated with the genus *Odontolabіs* but only *Vероехіа* is exclusively associated with this genus.

**Passalidae**

Knowledge of the host species of Passalidae is very limited. As many as 28 species of canestriniids were collected from unidentified Passalidae. 10 genera of canestriniids were found in 11 genera of Macrolininae.

*Neoderma* is associated only with the genus *Mаstochіlius*, *Pаrаmеlіsiа* with *Pleurarius*, *Lіdіоthеla* and *Passаlоphагa* with *Labіеnus*, *Sаjanоphеla* with *Prolоmосоelіs*, *Toрhуssа* is associated with *Gоnаtas*, *Arрароthоса* with *Labіеnus*, *Меlіsіа* is associated with *Акриауіs* and *Eіsроfеніs*, *Phаlerаtauісuѕ* with *Pleуrаrіuѕ*. With the greatest number of genera is the associated genus *Аpalоtаrасuѕ*: *Асеrауіs*, *Сеlеjіs*, *Lаbіеnus*, *Масоrіnіs*, *Маstосhіlius*, *Реloрраіs*, *Рhаrосhiуіs*, *Pleуrаrіuѕ* and *Prolоmосоelіs*.

One genus of canestriniids (*Меlіsіа*) is associated with one genus (*Pаssаlus*) of Passalinae. 3 genera of canestriniids are associated with 2 genera of Solenocyclinae: *Аpalоtаrасuѕ* (one species) and *Sіllоngіа* are associated with *Lеptаuіlаx* and *Oλgаtіа* is associated with *Dіdіmuѕ*.

**Scarabaeidae**

26 genera of canestriniids were found on 38 genera of Scarabaeidae. 17 genera are associated with 30 genera of hosts in Cetoninae. The 7 genera of canestriniids are associated with only one genus of host. *Bаrbiаngіа* is associated with *Dіlpоnаthа*, *Саnеstrіniа* with *Оxythеrеа* (accidental host), *Dіlpоnаthорhіlіs* with *Rхаbдоtіs*, *Каhооrоrаngіа* with *Dісhіsа*, *Phеlісυlорhеla* with *Gоlіаtіuѕ*, *Pеudорарараgаllеа* with *Cаеlоrхіnа*, *Сорыnорhеla* with *Pеосіlорhеla*, *Таmаrаngіа* with *Раchmоdа* and *Аfроcаnеstrіniа* was found on 2 genera:
Dicronorhina and Smaragdesthes. The rest of the genera have wide relationships with the hosts. Gloharattia (associated with 4 genera of hosts), Paraphagella (5), Albinorattia (6), Boeophila (6), Cetonicola (7).

7 genera of canestriniids are associated with 7 genera of Dynastinae. 5 genera of canestriniids are associated with only one genus of hosts. Hargineilla and Vandeinella are associated with Trichogomphus, Canestrinia with Petodon, Canestriniella is associated with Clyster but it is probably accidental host and Oceogavia is associated with Papuana. Athogavia is associated with Oryctes and Trichogomphus but the main hosts are species of the genus Oryctes. Aurillosongia was found on Chalcosoma and Xelotrupes but the main hosts are species of the genus Xelotrupes. 2 genera of canestriniids are associated with 2 genera of Scarabaenae. Scarabiphotia is associated with undetermined Scarabaenae and Coleoglyphus is associated with Copris and Heliocopris.

Tenebrionidae

14 genera of canestriniids were found in Tenebrionidae. 3 genera are associated with 3 genera of hosts in Laminae. Saniothiana is exclusively associated with Odontopeus, Boleohylla was found on Metallonotus, Domelafontia is associated with Calostegia and Odontopeus.

2 genera canestriniids were found on 2 genera of hosts in the subfamily Pimelinae. Canestrinia is associated with Morica and Boleohylla is associated with Psammodes. The 8 genera of canestriniids are associated with the 5 genera of Tenebrioninae. Camirohylia is associated with Blaps and Dila, Balaarella is associated with Blaps and Gnapton, Ciprus and Ismaeliana with Blaps. Hatohylla was found on Nyctobates and Percansetrinia is mainly associated with Blaps but was collected also from Carabinae.

At the generic level, canestriniids show clear links with certain genera of hosts. Of the 96 genera canestriniids described, as many as 54 are related to only one genus of hosts: Acrotacus, Amansiella, Amboinophila, Anasipste, Arraphosoma, Averthiana, Barbiangia, Bearialedia, Canestrinia, Cercediphotia, Cnecoderma, Coeremania, Dansible, Diplagnostophilus, Dorynothiana, Eunorithina, Globosophotia, Hättlingeria, Hargineilla, Ismaeliana, Javanaellina, Kahoorangia, Kuramasenia, Lidiophila, Mesophotia, Metriothiana, Midiphotia, Noophila, Noemiphila, Oceogavia, Olgatta, Paracanestrinia, Paramelisia, Paraphotia, Passalophagus, Percanestrinia, Phaleratus, Phaleratusellus, Phelipidophila, Photia, Procericola, Pseudoamansia, Rugomiphila, Pseudoparaphagella, Saniothiana, Scarabiphotia, Shillingia, Sorbinophila, Sumatranela, Tamarangia, Teophyssa, Uriophela, Vandeinella, Vereoxia.

The greatest number of canestriniid genera associated with one genus of host has been found in Carabus (13), Dorcus (7) and Stolas (5) (Tables IX, X and XIII).

Discussion

Canestriniidae is one of the least known families of mites among Astigmata. 370 species and 101 genera collected from 361 species of hosts (113 genera) have been described so far. Knowledge of the Canestriniidae fauna on different continents is very varied. In Africa, only 66 species from 31 genera were found on 44 host species. 28 species from 13 genera collected on 30 species of hosts were found in Central America, 78 species from 17 genera collected on 119 species of hosts were found in South America, 109 species from 34 genera collected on 120 species of hosts were found in Asia, 49 species from 20 genera collected on 62 species of hosts were found in Europe and 33 species from 12 genera collected on 15 species of hosts were found in Oceania. Should be regarded as the best known a small area of Europe. The Canestriniidae are the least known in Africa, but they are also very poorly researched elsewhere in the world. For example, canestriniids have not yet been found on Cassidinae in Africa, Asia and Oceania. But 138 Cassidinae species are known from Africa, 157 species are known from Asia and 16 species are known from Australia and Papua New Guinea (Borowiec 2009, 2010). About 2000 Carabidae are known from North America. So far, no Canestriniidae have been collected from them. These examples show great the neglect is in the research of this family. Most species of canestriniids found in Indonesia (47), Brazil (44), Papua New Guinea (23), Ukraine (18), Italy (17), Colombia (15), Panama (14), Poland (14), Ecuador (13), India (13) and Tanzania (13). Considering the size of the diversity and number of potential hosts as relatively best researched can be considered Panama, Ukraine, Italy and Poland.

Canestriniidae were collected from 12 insect families: Blattidae, Carabidae, Cerambycidae, Chrysomelidae, Elateridae, Geotrupidae, Lucanidae, Passalidae, Passandridae, Scarabaeidae, Tenebrionidae and Zopheridae. In addition, one species has been described from the Diplopoda. The presence Ciprusina sellnicki on Typhoeus typhoeus (Geotrupidae) is certainly coincidental. Also, the presence of Colopterophonaghus blattaphagus on Blattidae must be considered as accidental. Whether species belonging to Passandridae and Zopheridae are stable hosts for canestriniids require confirmation. In Elateridae, only some species from the genus Semius are hosts for the
canestriniids. In other insect families many subfamilies have been described. However, Canestriniidae have been found in one to four subfamilies, but usually in one subfamily. Only in Scarabaeidae in the subfamilies Cetoniinae and Dynastinae a similar number of described species of canestriniids was found.

In Canestriniidae at the generic level and species level exist clear host specificity. About 58% of the canestriniid genera are associated with one genus of host and about 60% of canestriniid species are associated with one host species. However, there are canestriniid species with very limited host specificity collected from many hosts: Arrunsitiana battosi collected from 15 host species, Grandiellopsis gambosa (15), Grandiella tacjanne (12), Olafithiana foliacea (12), Photia polymorpha (12), A. quadrata (11), Grandiella tetracudata (10), P. procustis (8), Albinorattia igori (7), Procericola bourgognei (7), Canistra osculati (6), Gioharattia maharae (6), Percanestriniella levis (6), Photia chrysocarabi (6), Stolias chalybaea (6).

The host relationships of many species and genera of mites have been discussed in detail above. Some species of mites mentioned in the text and tables require generic revision. There are problems with some canestriniid genera. Of the 23 described species of the genus Canestrinia 6 were transferred to the genus Pseudocanestrinia, 5 to the genus Kuramasenia one to the genus Pseudocanestriniella and one to the genus Balearella, one to the genus Javanellina (Khaustov & Eidelberg 2001; Haittinger and

---

Table XIV. List of canestriniids and their hosts in the world.

| Mite species          | Hosts                                                                 | Distribution                   | References                      |
|-----------------------|-----------------------------------------------------------------------|--------------------------------|---------------------------------|
| Acrotaricus alutaceus | Physionota alutacea Boheman, 1854, P. giganteae Boheman, 1854, Platycyclus deruta Boheman, 1854 (Chrysomelidae: Cassidinae) | Mexico, Trinidad & Tabago     | Turk (1948), Summers & Schuster (1979) |
| A. crataepecus Summers & Schuster, 1979 | Physionota dilatata Kirsch, 1876 (Chrysomelidae: Cassidinae) | Locality unknown             | Summers & Schuster (1979)    |
| A. mabrilis Banks, 1915 | Physionota alutacea, Physionota sp. (Chrysomelidae: Cassidinae) | Costa Rica, Guatemala, Mexico | Banks (1915), Summers & Schuster (1979) |
| Afrocanestrinia rufinae Haittinger, 1995 | S. africana (Drury, 1773) (Scarbareae: Cetoniinae) | Tanzania                      | Haittinger (1995b)           |
| A. samsoni Haittinger, 1995 | S. africana (Drury, 1793) (Scarbareae: Cetoniinae) | Senegal                       | Haittinger (1995b)           |
| A. strzeleini Cooreman, 1955 | Dicronorhina micans (Drury, 1793) (Scarbareae: Cetoniinae) | Democratic Republic of Congo  | Cooreman 1955)               |
| Albinorattia igori Haittinger, 989 | Heterorhina sexmaculata dohrni Lansberge, 1883 (Coryphocera dohrni L.)*, Ischiopsophia latirellei (Gory & Perscheron, 1833), I. olivacea (Thomson, 1860), Lethosestes nigerrima Van Vollenhoven, 1864, Lomaptera kaestneri Schürhoff, 1935, Myncanthophallus sp. (Scarbareae: Cetoniinae) | Batjan Isl., Moluccas, Sumatra (Indonesia), Papua New Guinea | Haittinger (1989d) |
| Anansiella trilobata Khaustov & Eidelberg, 2001 | Timarcha tenebrosa (Fabricius, 1885) (Chrysomelidae: Chrysomelinae) | Crimea                         | Khaustov & Eidelberg, 2001), Trach (2006) |
| Ambilohylla favosa Haittinger, 1990 | Damatrix formosus Laporte de Castelnau & Brullé, 1831 (Tenebrionidae) | Madagascar                    | Haittinger (1990a, 2000)     |
| Ambinophila bernae Haittinger, 1993 | Prospocodium bison (Olivier, 1789) Metapodotonus bison Fabre)*, P. bison cinctor (Montouzier, 18577 M. cinctor)* (Lucanidae: Lucaninae) | Moluccas (Indonesia), Papua New Guinea | Haittinger (1993b) |

(Continued)
Table XIV. (Continued).

| Genus and Species | Host Plant(s) | Location(s) | References |
|-------------------|---------------|-------------|------------|
| Anaspistes unguiculatus | *Sternotomis bohernani* (Chevrolet, 1844) (Cerambycidae: Lamiinae) | Tanzania | Summers & Schuster (1982) |
| Apalotacarus aristatus | *Acerius grandis* (Burmeister, 1847) (Passalidae: Macrolininae) | Taiwan | Summers & Schuster (1981b) |
| A. cidaris | *Protomocoleus australis* (Boisduval, 1835) (Passalidae: Macrolininae) | Papua New Guinea | Summers & Schuster (1981b) |
| A. echinatus | *Pharochilus dilatus* (Dalman, 1817) (Phauctolus dilatus)*, *Pleuranus brachyphyllus* Stoliczka, 1873, Passalidae undet. (Passalidae: Macrolininae) | India | Summers & Schuster (1981b) |
| A. fulgens | *Peopides tridentis* (Wiedemann, 1823) (Passalidae: Macrolininae) | Java (Indonesia) | Summers & Schuster (1981) |
| A. fusculus | *Labienus ptox* (Kaup, 1888) (Passalidae: Macrolininae) | Papua New Guinea | Summers & Schuster (1981) |
| A. fusciculus | *Pharochilus nitidulus* MacLeay, 1871 (Passalidae: Macrolininae) | Australia | Summers & Schuster (1981), Corpusz-Raros (2001) |
| A. glaber | *Protomocoleus triumphator* (Zang, 1904) (Passalidae: Macrolininae) | Solomon Islands | Summers & Schuster (1981) |
| A. gracilis | Passalidae undet. | Australia | Summers & Schuster (1981) |
| A. luroris | *Nastochilus australasicus* (Percheron, 1841), *M. quaestionis* (Kuvert, 1891) (Macrolininae), *Pharochilus dilatus* (Dalman, 1817) (Phauctolus dilatus)*, *P. nitidulus* (MacLeay, 1871) (Passalidae: Macrolininae) | Australia | Summers & Schuster (1981) |
| A. paxillus | Passalidae undet. | Papua New Guinea | Summers & Schuster (1981) |
| A. petitus | *Celejus punctithorax* Zang, 1903, *Protomocoleus australis* (Passalidae: Macrolininae) | Bouganville Island (Papua New Guinea) | Summers & Schuster (1981) |
| A. protensus | *Macrolinus nicobaricus* Gravely, 1914 (Passalidae: Macrolininae) | India | Summers & Schuster (1981) |
| A. rigescens | Passalidae undet. | Papua New Guinea | Summers & Schuster (1981) |
| A. scaurus | *Macrolinus weberi* Kaup, 1868 (Passalidae: Macrolininae) | Philippines | Summers & Schuster (1981), Corpusz-Raros (2001) |
| A. scissus | *Plurarius brachyphyllus* (Passalidae: Macrolininae) | India | Summers & Schuster (1981) |
| A. sayanae | *Pelopides tridentis* (Wiedemann, 1823) (Eriocnemis tridentis)* (Passalidae: Macrolininae) | Java (Indonesia), Haitlinger (1990d) | |
| A. trullus | *Leptaulax bicolor* (Fabricius, 1801) (Passalidae: Solenocyclinae) | Taiwan | Summers & Schuster (1981) |
| Arraphosoma minax | *Labienus conpergus* Boisduval, 1835 (*Labiens conpergus)* (Passalidae: Macrolininae) | Papua New Guinea, Philippines | Summers & Schuster (1981), Corpusz-Raros (2001) |
| A. paramina | *Labienus gigas* (Kaup, 1875) (*Labiens gigas)* (Passalidae: Macrolininae) | Moluccas (Indonesia) | Summers & Schuster (1981) |
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

| Species                        | Host Mites                                                                 | Geographic Location | Reference                      |
|--------------------------------|---------------------------------------------------------------------------|---------------------|--------------------------------|
| *Arrunsithiana arcuada* (Fain, 1987) | *Stolas decemguttata* (Sturm, 1828), *S. sexsignata* (Boheman, 1850) (S. exignata)* (Chrysomelidae: Cassidinidae) | Brazil              | Fain (1987), Haitlinger (1991d) |
| *A. artemoni* Haitlinger, 1991    | *Stolas latevittata* (Boheman, 1862) (Chrysomelidae: Cassidinidae)           | Ecuador             | Haitlinger (1991d)             |
| *A. battosi* Haitlinger, 1991     | *Mesomphalia gibbona* (Fabricius, 1781), *S. chalybaea* (Germar, 1824), *S. conspersa* (Germar, 1824), *S. cruentata* (Erichson, 1847), *S. erichsoni* (Weise, 1902), *S. funebris* (Boheman, 1850), *S. huanocensis* (Spaeth, 1901), *S. ignita* (Boheman, 1850), *S. inexculta* (Boheman, 1862), *S. lenis* (Boheman, 1850), *S. niobe* (Spaeth, 1919), *S. obita* (Boheman, 1950), *S. paranensis* Spaeth, 1928, *S. pieurosticha* (Erichson, 1847), *S. scoparia* (Erichson, 1847) (Chrysomelidae: Cassidinidae) | Bolivia, Brazil, Ecuador, Peru | Haitlinger (1991d) |
| *A. erinnae* Haitlinger, 1991    | *Stolas pectinata* (Baly, 1872) (Chrysomelidae: Cassidinidae)                  | Ecuador             | Haitlinger (1991)              |
| *A. escaudata* (Lombardini, 1939) | *Canistra sp.*, *Echoma clypeata* (Panzer, 1798) (=*Omoaplata marginata* L.)*, *Stolas lebasii* (Boheman, 1850) (S. lebesi)**, *S. punicea* (Boheman, 1850), *Stolas sp.*, *Cassidinae sp.* (*Phanaeus sp.*) (Chrysomelidae: Cassidinidae) | Bolivia, Brazil, Costa Rica, Fr4ench Guiana, Guatemala, Mexico | Lombadini (1939), Summers & Schuster (1979), Haitlinger (1991d) |
| *A. ilosi* Haitlinger, 1991      | *Cyrtontota dissecta* (Boheman, 1850) (Chrysomelidae: Cassidinidae)            | Colombia            | Haitlinger (1991d)             |
| *A. laticeps* (Fain, 1989)       | *Stolas inegualis* (Linnaeus, 1758) (Chrysomelidae: Cassidinidae)              | South America       | Fain (1989), Haitlinger (1991d) |
| *A. quadrata* (Fain, 1987)       | *Eugenysa columbiana* (Boheman, 1850), *Stolas bipunctata*, *S. aenea* (Olivier, 1790), *S. chalybaea*, *S. conspersa*, *S. demissa* (Boheman, 1856), *S. funebris*, *S. indigacea* (Boheman, 1850), *S. inequalis* (Linnaeus, 1758.), *S. mannerheimi* (Boheman, 1850) (S. imitans)*, *S. rettenbacheri* (Boheman, 1850), *S. thoreyi* (Boheman, 1862) (Chrysomelidae: Cassidinidae) | Brazil, French Guiana, Peru | Fain (1987), Haitlinger (1991d) |
| *A. spicantis* (Summers & Schuster, 1979) | *Canistra* (*Canistrella*) *rubiginosa* (Guérin, 1844) (*Canistra plagiosa* Boheman)**, *Stolas chalybaea*, *S. conspersa* (Chrysomelidae: Cassidinidae) | Brazil              | Summers & Schuster (1979), Fain (1987), Haitlinger (1991d) |
| *A. squarrosa* (Summers & Schuster, 1979) | *Eugenysa grossa* (Linnaeus, 1758), *Stolas labesii*, *Stolas sp.* (Chrysomelidae: Cassidinidae) | Peru                | Summers & Schuster (1979), Haitlinger (1991d) |
| *Athogavia arhybasi* Haitlinger, 1989 | *Dyastinae undet.* (Scarabaeidae)                                         | Papua New Guinea    | Haitlinger (1989d)             |
| *A. assimica* Haitlinger, 1989    | *Trichogomphus martabani* (Guérin-Méneville, 1834) (T. martolani)* (Scarabaeidae: Dyastinae) | India               | Haitlinger (1989c)             |

(Continued)
| **Table XIV.** (Continued). |
|---------------------------------|---------------------------------|-----------------|-----------------|
| **A. borneoica** Haitlinger, 1989 | *Oryctes rhinoceros* (Linnaeus, 1758) (Scarabaeidae: Dynastinae) | Borneo (Indonesia) | Haitlinger (1989c) |
| **A. gamana** Haitlinger, 1989 | *Oryctes monoceros* (Olivier, 1789) (Scarabaeidae: Dynastinae) | Tanzania | Haitlinger (1989c) |
| **A. nosiana** Haitlinger, 1989 | *Oryctes pyrrhus* (Burmeister, 1847) *(O. pyrrhus)* (Scarabaeidae: Dynastinae) | Madagascar | Haitlinger (1989c) |
| **A. scagana** Haitlinger, 1989 | *Oryctes sp.* (Scarabaeidae: Dynastinae) | Borneo (Indonesia) | Haitlinger (1989c) |
| **A. tanzanica** Haitlinger, 1989 | *Oryctes monoceros* (Scarabaeidae: Dynastinae) | Tanzania | Haitlinger (1989c) |
| **Aurillossongia bolanica** Haitlinger, 1989 | *Xylotrupes gideon asperulus* (Minck, 1920) (Scarabaeidae: Dynastinae) | Papua New Guinea | Haitlinger (1989b) |
| **A. dioni** Haitlinger, 1989 | *Chalcosoma atlas* (Linnaeus, 1758). *(Chalcosomatidae: Dynastinae)* | Sulawesi *(Indonesia)* | Haitlinger (1989d) |
| **A. fileasi** Haitlinger, 1989 | Dynastinae undet. | Papua New Guinea | Haitlinger (1989d) |
| **A. guarana** Haitlinger, 1989 | *Xylotrupes sp.* (Scarabaeidae: Dynastinae) | New Britain *(Papua New Guinea)* | Haitlinger (1989b) |
| **A. hoaria** Haitlinger, 1989 | *Xylotrupes sp.* (Scarabaeidae: Dynastinae) | Borneo (Indonesia) | Haitlinger (1989b) |
| **A. norae** Haitlinger, 1989 | *Xylotrupes gideon* (Linnaeus, 1767) *(Dynastes gideon)* *(Scarabaeidae: Dynastinae)* | Bougainville Isl. *(Papua New Guinea)* | Haitlinger (1989d) |
| **Averithiana anoni** Haitlinger, 1999 | *Zatirephina lineata* (Fabricius, 1787) *(Chrysomelidae: Cassidinae)* | French Guiana | Haitlinger (1999a) |
| **Balearella asilahica** *(Haitlinger & Šundić, 2018)* | Tenebrionidae undet. | Morocco | Haitlinger & Šundić (2018) |
| **B. balearica** *(Haitlinger & Šundić, 2016)* | *Blaps sp.* *(Tenebrionidae: Tenebrioninae)* | Balearic Islands *(Spain)* | Haitlinger & Šundić (2016) |
| **B. samsinaki** *(Beron, 1975)* | *Blaps sp., Gnaptor sp.* *(Tenebrionidae: Tenebrioninae)* | Bulgaria, Cyprus | Beron (1975), Haitlinger (2000, 2001b) |
| **Barbiangia alvari** Haitlinger, 1993 | Cetoniinae undet. | Zanzibar (Tanzania) | Haitlinger (1993a) |
| **B. elongata** Khaustov, 2006 | *Diplognatha gagates* *(Forster, 1771)* *(Scarabaeidae: Cetoniinae)* | Etiopia | Khaustov (2006) |
| **B. ethiopica** *(Haitlinger, 1990)* *(Diplognathophilus ethiopicus)* | Cetoniinae undet. | Etiopia | Haitlinger (1990a, 1993a) |
| **Beeriphota volkeri** Haitlinger, 1994 | *Carabus sp. (C. anguicollis)* *(Carabidae)* | China | Haitlinger (1994b), Fan et al. (2010) |
| **Biblothiana albertae** Haitlinger, 1994 | *Chelymorpha comata* *(Boheman, 1854)* *(Chrysomelidae: Cassidinae)* | Costa Rica | Haitlinger (1994a) |
| **B. brevispinata** *(Summers & Schuster, 1979)* | *Microctenochira bifenesistrata* *(Boheman, 1855)* *(S. bifenesistrata)* *(S. discoides)* *(Linnaeus, 1758)* *(S. bipustulata)* *(S. coerulescens)* *(Boheman, 1850)* *(S. epippium)* *(Lichenstein, 1795)* *(S. plagiata)* *(Boheman, 1850)* *(S. lineaticollis)* *(Bohemann, 1850)* *(Chrysomelidae: Cassidinae)* | Bolivia, Brazil, Colombia, Ecuador, Honduras, Panama | Summers & Schuster (1979), Haitlinger (1993d) |
| **B. cyriaki** Haitlinger, 1993 | *Chelymorpha infecta* *(Boheman, 1854)* *(C. nigricollis)* *(Boheman, 1854)* | Brazil, Mexico | Haitlinger (1993d) |

(Continued)
### Table XIV. (Continued)

|                | Species and Description                                                                 | Location                  | Author(s) and Year(s) |
|----------------|-----------------------------------------------------------------------------------------|---------------------------|-----------------------|
| B. everittae   | *Chelymorpha inflata* Boheman, 1854 (Chrysomelidae: Cassidinae)                           | Brazil, Peru              | Haitlinger (1993d)    |
|                | *S. rufoguttata* Spaeth, 1909 (Chrysomelidae: Cassidinae)                                |                           |                       |
| B. oswaldi     | *Stolas plagicollis* (Boheman, 1850) (Chrysomelidae: Cassidinae)                         | Brazil                    | Haitlinger (1993d)    |
|                | *Haitlinger, 1993*                                                                      |                           |                       |
| B. vatica      | *Cyrtonea tristigma* (Boheman, 1840) (Chrysomelidae: Cassidinae)                        | Mexico                    | Summers & Schuster (1979), Haitlinger (1993d), O'Connor (2004) |
|                | *Grandiella vatica*                                                                     |                           |                       |
| Bircadicola bertrami | *Tenebrioniidae undet.* Haitlinger, 2000                                               | Tunisia                   | Haitlinger (2000)     |
| Boetophela cassiniae | *Cetoniinae undet.* Haitlinger & Chmielewski, 2004                                      | Republic of South Africa  |                       |
|                | *Cetoniinae undet.* (Scarabaeidae)                                                      |                           |                       |
| B. ephrainsi   | *Mecynorhina savagei* Harris, 1844 (Chelarrhina savagei)* (Scarabaeidae: Cetoniinae)    | Ghana                     | Haitlinger (1993a)    |
|                | *Haitlinger, 1993*                                                                      |                           |                       |
| B. erhardi     | *Eudicella smithi* (Mac Leay, 1838) (Scarabaeidae: Cetoniinae)                           | Republic of South Africa  | Haitlinger (1989d, 1993a) |
|                | *Batocera rubus* (Linnaeus, 1758)*                                                      |                           |                       |
| B. ginae       | *Dicronorhina derbyana oberti* (Scarabaeidae: Cetoniinae)                               | Tanzania                  | Lavoipierre (1958),  |
|                | *Haitlinger, 1991*                                                                      |                           | Haitlinger (1993a)    |
|                | *Deyrolle, 1876* (D. oberti)*                                                           |                           |                       |
| B. robertsoni  | *Anisorrhina laeviplaga* (Raffray, 1877) (Gynodonta laeviplaga)* (Scarabaeidae: Cetoniinae) | Tanzania                  | Haitlinger (1991c)    |
|                | *Haitlinger, 1991*                                                                      |                           |                       |
| B. silvanae    | *Goliathus albosignatus* Boheman, 1857 (Scarabaeidae: Cetoniinae)                        | Tanzania                  | Haitlinger (1991c)    |
|                | *Haitlinger, 1991*                                                                      |                           |                       |
| B. sybillae    | *Elyaschelion heterosplia* Gerst b (Scarabaeidae: Cetoniinae)                           | Tanzania                  | Haitlinger (1991c)    |
|                | *Haitlinger, 1991*                                                                      |                           |                       |
| B. werneri     | *Placiorrhiina mihondana* Oberthür, 1880 (Scarabaeidae: Cetoniinae)                     | Burundi                   | Haitlinger (1993a)    |
|                | *Haitlinger, 1993*                                                                      |                           |                       |
| Boleohylla garcia | *Metalonotus metallicus* (Fabricius, 1801) (Tenebrionidae: Lagriinae)                   | Ghana                     | Haitlinger (1991f, 2000) |
| B. kiogana     | *Psammodes carbonarius* Gerstaecker, 1954 (Tenebrionidae: Pimeliminae)                   | Uganda                    | Haitlinger (1991f, 2000) |
|                | *Haitlinger, 1991*                                                                      |                           |                       |
| Camirohylina fessiana | *Blaps appendiculata* Motschulsky, 1851 (Blaps appendiculata)*, Blaps sp (Tenebrionidae: Tenebrioninae) | Morocco, Baleurs Island (Spain) | Haitlinger (1991f, 2001b, 2000) |
|                | *Haitlinger, 1991*                                                                      |                           |                       |
| Dila sp.       | *Dila* (Tenebrionidae: Tenebrioninae)                                                    | Iran                      | Arzehir et al. (2016) |
| Canestrinia dorcicola | *Doris paralellopedus* (Linnaeus, 1758) (Lucaniidae: Lucaniinae), Oxytherea funesta (Poda, 1761) (Scarabaeidae: Cetoniinae) | Crimea, England, Holland, Italy, Poland, Ukraine | Berlese (1881, 1897), Buitendijk (1945), Cooreman (1954), Turk (1953), Theodorides (1955), Hyatt (1990), Haitlinger (1988c, 1991b, 2004, 2008a, |
|                | *Berlese, 1881*                                                                         |                           |                       |

(Continued)
| Species | Host | Location | Notes |
|---------|------|----------|-------|
| *C. javensis* Oudemans, 1923 (*Photia javensis*) | Host unknown | Java (Indonesia) | Oudemans (1923), Buitendijk (1945), Cooreman (1954), Nesbitt (1976) |
| *C. kacperi* Haitlinger, 1998 | *Carabus formosus subformosus* Semenov, 1887 (*Carabidae: Carabinacae*) | China | Haitlinger (1998), Fan et al. (2010) |
| *C. manicata* Berles, 1910 | *Doryphora tessellata* Olivier, 1807 (*Chrysomelidae: Cassidinae*) | Brazil | Berles (1910) |
| *C. microdisca* Berles, 1910 | *Dorcas saiga* MacLeay, 1819 (*Lucanidae: Lucaninae*) | Java (Indonesia) | Berles, 1910 |
| *C. nepalensis* Berles, 1910 | *Dorcas nepalensis* (Hopee, 1831) (*Lucanidae: Lucaninae*) | Java (Indonesia) | Berles (1910) |
| *C. pentodontis* Berles, 1898 (*C. dorcicola var. pentodontis*) | *Pentodon idiotus* (Herbst, 1789) (*Scarabaeidae: Dynastinae*) | Italy, Romania | Berles (1898), Lila (2014) |
| *C. remigans* Berles, 1910 | *Morica planata* (Fabricius, 1801) (*Tenebrionidae: Tenebrioninae*) | Africa | Berles (1910), Vitzthum (1924) |

*Canestrinia* near *spectanda*.

| Species | Host | Location | Notes |
|---------|------|----------|-------|
| *Canestrinia sp.* | *Odontolabis alces* (Fabricius, 1775) (*Lucanidae: Lucaninae*) | Philippines | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Odontolabis dalmanii* (Hope & Westwood, 1845) (*Lucanidae: Lucaninae*) | Indonesia | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Dorcas curvidens* (Hope, 1840) (*Lucanidae: Lucaninae*) | Thailand | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Dorcas parryi* Thomson, 1862 (*Lucanidae: Lucaninae*) | Sumatra (Indonesia) | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Dorcas titanus* (Boisdruval, 1835) (*Lucanidae: Lucaninae*) | Sumatra (Indonesia) | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Dorcas tetanus* | Sulwesi (Indonesia) | Okabe & Goka (2008) |
| *Canestrinia sp.* | *Dorcas titanus, D. mirabilis* (Parry, 1864) (*Lucanidae: Lucaninae*) | Sumatra, Sulawesi (Indonesia), Mindanao (Philippines) | Okabe & Goka (2008) |
| Canestriniidae undet. | *Figulus sp. (Fugulus honinensis)* (*Lucanidae: Lucaninae*) | Japan | Okabe & Goka (2008) |
| Canestriniidae undet. | *Dorcas rectus* (Motschulsky, 1857) (*Lucanidae: Lucaninae*) | Japan | Okabe & Goka (2008) |
| Canestriniidae undet. | *Dorcas rubrofemoratus* (Snellen van Vollenhoven, 1865) (*Lucanidae: Lucaninae*) | Japan | Okabe & Goka (2008) |
| Canestriniidae undet. | *Dorcas rubrofemoratus, D. montivagus* (Lewis, 1883), *D. titanus* (*Lucanidae: Lucaninae*) | Japan | Okabe & Goka (2008) |
| Canestriniidae undet. | *Cyclus semigranosus* Palliardi, 1825 (*Carabidae: Carabinae*) | Moldova | Trach (2006) |

(Continued)
Table XIV. (Continued).

| Taxon                         | Host Mite Species          | Host Taxa                      | Location                  |
|-------------------------------|----------------------------|--------------------------------|---------------------------|
| *Canestriniella amplexans*    | *Batocera maculata*        | Java (Indonesia)               | Berlese (1910a), Summers & Schuster (1982) |
| Berlese, 1910                 | *Batocera celebiana*       | Java, Sulawesi (Indonesia)     | Haitlinger (1989d)        |
| *C. physsana* Haitlinger, 1989| *Batocera lineolata*       | Bornéo, Java (Indonesia), Malaysia | Berlese (1910a), Summers & Schuster (1982), Haitlinger (1989d) |
| *C. togata* Berlese, 1910     | *Batocera procera*         | Democratic Republic of the Congo | Cooreman (1955)           |
| *Cetonicola hispidus*         | *Dicronorrhina micans*     | Cameroon                       | Haitlinger (1991c)        |
| Cooreman, 1955                | *Mecloriahina savagei*     | Republic of the Congo          | Haitlinger (1991c)        |
| *C. isadoreae* Haitlinger, 1991| *Stephanorrhina guttata*  | Ghana, Liberia                 | Haitlinger (1991c)        |
| *C. maritae* Haitlinger, 1991 | *Timesorda irisi*          | Tanzania                       | Haitlinger (1990a)        |
| *C. orestesii* Haitlinger, 1991| *Euphoria hebracea*       | Tanzania                       | Haitlinger (1990a)        |
| *C. vatus* Haitlinger, 1990   | *Carabus lusitanicus brevis* | Spain                          | Samšiňák (1971)           |
| *Cercidophia latissima*       | *Carabus lusitanicus latus* | Kenya                          | Summers & Schuster (1982) |
| (Samšiňák, 1971)              | *Carabus morbillosus*      | Corsica (France), Sardinia, Sicily (Italy), Tunisia | Vitzhun (1924), Buitendijk (1945), Cooreman (1954), Samšiňák (1971) |
| *Chelinochroa dictyophora*    | *Blaps gibba*              | Cyprus                         | Haitlinger (1992a, 2000)  |
| Summers & Schuster, 1982      | (Tenebrionidae: Tenebrioninae) |                               |                           |
| *Ciprusenia carabica*         | *Blaps sp.* (Tenebrionidae: | Tunisia                        | Samšiňák (1970, Haitlinger, 2000) |
| (Berlese, 1882)               | Tenebrioninae)             |                               |                           |
| (Canestriniia carabica,       | *C. coriaceae, C. violaceus* | Bulgaria, Czech Republic, England, Holland, Hungary, Moldova, Poland, Romania, Slovakia, Ukraine, Yugoslavia (?) | Samšiňák (1964), Beron (1971), Haitlinger (1988b, 1991b, 1999b, 2008a, 2012), Trach (2006) |
| C. sardica Vitzhun, 1924,      | *Typhoeus typhoeus*        |                               |                           |
| *Percanestriniia carabica*)   | (Linnaeus, 1758)           |                               |                           |
| *C. sellnicky* (Samsinak,     | *Geotrupidae: Geotrupinae)  |                               |                           |
| 1964) (Canestriniia          |                           |                               |                           |
| sellnicky, *Percanestriniia   |                           |                               |                           |
| sellnicky)                    |                           |                               |                           |
| *C. viviannae* Haitlinger,    | *Tenebrionidae undet.*     | China                          | Haitlinger (1992a, 2000), Fan et al. (2010) |
| 1992)                         |                           |                               |                           |
| *Cnecoderma dolichopoda*      | *Mastochilus australasicus* | Australia                      | Summers & Schuster (1981) |
| Summers & Schuster, 1981      | (Percheron, 1841) *M.     |                               |                           |
|                               | australasicus*             |                               |                           |

(Continued)
Table XIV. (Continued).

| Species                          | Genus/Species                  | Country/Region                          |
|----------------------------------|---------------------------------|-----------------------------------------|
| *C. ovalis* Summers & Schuster, 1981 | Passalidae undet.              | Australia                               |
| *Coleoglyphus fuscipess* Berlese, 1910 | *Copris (C. longitarsus), Heliocopris hamadryas* (Fabricius, 1775) (Scarabaeidae: Scarabaeinae), *Tefflus meyerlei* (Fabricius, 1801) (Carabidae: Harpalinae) | Africa                                   |
| *C. simplex* Berlese, 1910       | Host unknown (Mitrocephala humboldti)* | ?Africa (Equatore)                       |
| *C. ultrajubae* Lombardini, 1939 | Host unknown                    | ?Africa                                  |
| *Coleopterophagus albini* Haitlinger, 1990 | *Protaetia speciosissima* (Scopoli, 1788) (Potosia aeruginosa)*, *P. metallica* Herbst, 1782, *P. marmorata* (Fabricius, 1792), *Protaetia sp.* (Potosia sp)* (Scarabaeidae: Cetoninae) | Austria, Czech Republic, Estonia, Germany, Norway, Poland, Romania, Ukraine |
| *C. baali* Haitlinger, 1990       | *Protaetia speciosa* (Adamas, 1817) (Potosia speciosa)* (Scarabaeidae: Cetoninae) | Iran                                     |
| *C. belzebubi* Haitlinger, 1990   | *Protaetia orientalis* (Gory & Percheron, 1833) (Potosia aerata)*, *P. funebris* (Gory & Percheron, 1833) (Potosia funebris)* (Scarabaeidae: Cetoninae) | China, Japan, Taiwan                     |
| *C. berlesei* Kishida, 1924      | *Dorcus rectus* (Motschulsky, 1857), *Lucanus sp.* (Lucanidae: Lucaninae) | Japan                                    |
| *C, near berlesei*               | *Dorcus curvidens* hopei (Saunders, 1854), *D. curvidens* (Hope, 1840), *D. titanus* pilifer (Vollenhoven, 1961) (Lucanidae: Lucaninae) | China, Japan                            |
| *C. blattophagus* (Banks, 1914) (Canestria blattophaga) | *Periplaneta americana* (Linnaeus, 1758) (Blattoidea: Blattidae: Blattnae) | Panama                                  |
| *C. dionizi* Haitlinger, 1990    | *Protaetia metallica* Herbst, 1782 (P. cuprea)* (Scarabaeidae: Cetoninae) | Syria                                   |
| *C. donaldi* Haitlinger, 1990    | *Protaetia affinis* Andersch, 1797 (Potosia affinis)* (Scarabaeidae: Cetoninae) | Italy, Ukraine                          |
| *C. maroni* Haitlinger, 1990     | *Protaetia speciosissima* (Potosia aeruginosa)*, *P. speciosa* (Potosia speciosa)* (Scarabaeidae: Cetoninae) | England, Romania, Syria, Ukraine         |
| *C. megnini* (Berlese, 1881) (Dermoglyphus megnini, Coleopterophagus cetoniae Oudemans, 1923) | *Cetonia aurata* (Linnaeus, 1758), *Protaetia affinis, P. cuprea cuprea* (Fabricius, 1775), *P. cuprea ignicollis* (Gory & Percheron, 1833), *P. cuprea obscura* (Andersch, 1797), *P. cuprina* (Motschulsky, 1849), *P. fiebri Kraatz, 1880) (Potosia fiebri)*, *P. metallica* Herbst, 12782, *Protaetia sp.* (Scarabaeidae: Cetoninae) | Crimea, Croatia, Czech Republic, England, Holland, Hungary, Italy, Poland, Serbia, Turkey, Ukraine, Yugoslavia |

(Berlese (1881), Oudemans (923), Buitendijk (1945), Turk (1953), Cooreman (1954), Haitlinger (1988d, 1990b, 1991b, 2008a, 2002), Khaustov & Eidelberg &
| Mite Species | Host Type | Host Details | Year(s) | Ref. |
|--------------|-----------|--------------|---------|------|
| Augosoma centaurus (Febricius, 1775) (Scutaria centaurus) (Scutariidae: Dynastinae) | Africa | Berlese (1920) | *C. neglectus Berlese, 1920 |
| Oryctes rhinoceros (Scarabaeidae: Dynastinae) | India | Berlese (1910) | C. procerus Berlese, 1910 |
| Porphyronota cinnamomea (Aitchison, 1819) (Scarabaeidae: Cetoniinae) | Democratic Republic of the Congo | Cooreman (1955) | *C. pulcher Cooreman, 1955 |
| Cetoniinae undet. (Scarabaeidae) | Sudan | Trägårdh (1904) | C. quadrisetosus Trägårdh, 1904 |
| Protaeta breviscr (Lewis, 1879) (Scarabaeidae: Cetoniinae) | China | Haitlinger (1990a, 1990b), Fan et al. (2010) | C. rudolfi Haitlinger, 1990 |
| Passalidae undet. | Sumatra (Indonesia) | Haitlinger (1990d) | Contramelisia daniela Haitlinger, 1990 |
| Passalidae undet. | Vietnam | Samšiňák (1968) | C. vietnamensis Samšiňák, 1968 |
| Dorcus arfakianus (Lansberge, 1880) (Eurycalix arfakianus) (Lucanidae: Lucaninae) | Papua New Guinea | Nesbitt (1976) | Cooremania wauensis Nesbitt, 1976 |
| Lucanidae undet. | Bougainville Island (Papua New Guinea) | Haitlinger & Šundić (2020) | C. kietaensis Haitlinger & Šundić, 2020 |
| Semiotus furcatus Fabricius, 1792 (Elateridae: Dendrometridae) | Colombia, Ecuador | Haitlinger (1991e) | Danaithiana archidonaica Haitlinger, 1991 |
| Semiotus virgatus Erichson, 1847 (Elateridae) | Colombia, Ecuador | Haitlinger (1991e) | D. ayyacca Haitlinger, 1991 |
| Semiotus imperialis Guerin, 1844 (Elateridae) | Costa Rica, Cuba, Peru | Haitlinger (1991e) | D. chanchamayocio Haitlinger, 1991 |
| Semiotus furcatus Fabricius, 1792 (Elateridae) | Ecuador | Haitlinger (1991e) | D. ecuadorica Haitlinger, 1991 |
| Cerambyx cerdo Linnaeus, 1758 (Cerambycidae:Cerambycinae) | Italy | G. Canestrini Vitzthum (1924), Khaustov & Eidelberg (2001) | Dicanestrinia cerambicyc (G. Canestrini, 1878 (Dermaleichus cerambicyc) |
| Carabus variolosus Fabricius, 1787 (Carabidae: Carabinae) | Byelorussia, Poland | Haitlinger (1994b, 2008a), Khaustov & Eidelberg (2001) | D. huberti Haitlinger, 1994 |
| C. variolosus (Carabidae: Carabinae) | Bosnia and Herzegovina, Italy, Poland, Ukraine | Samšiňák (1971), Haitlinger (1988d, 1981,1991b, 2008a, 2012), Trach (2006) | D. knobi Samšiňák, 1971 |
| Rhabdotis sobrina (Gory & Percheron, 1833) (Scarabaeidae: Cetoniinae) | Democratic Republic of the Congo | Cooreman (1955) | Diplognathophilus africanus Cooreman, 1955 |
| Carapax variolosus Fabricius, 1787 (Carabidae: Carabinae) | Kenya, Republic of South Africa | Fain (1987) | Diplopodocopites transkeiensis Fain, 1987 |

(Continued)
| Donnelafontia calostegis | Calostegia crassicornis (Westwood, 1843) (Calostega crassicornis)* (Tenebrionidae; Lagriinae) | Cameroon | Lavoipierre (1958), Haitlinger (2000) |
|-------------------------|---------------------------------------------------------------------------------|---------|-------------------------------|
| D. suatoka (Haitlinger, 1990) Farahanelha suatoha | Odontopeus cupreus Fabricius, 1792 (Tenebrionidae; Lagriinae) | Democratic Republic of the Congo | Haitlinger (1990a, 2000, 2001a) |
| Dorynthonia delmari Haitlinger, 2008 | Dorynota sp. (Chrysomelidae: Cassidinae) | Brazil | Haitlinger (2008b) |
| D. jurandi Haitlinger, 1999 | Dorynota pugionata (Germar, 1824) (Chrysomelidae; Cassidinae) | Brazil | Haitlinger (1999a) |
| Ennodihiana conula (Summers & Schuster, 1975) (Grandiella zonula, Teklathiana conula) | Omaspides bistriata Boheman, 1862 (Chrysomelidae; Cassidinae) | Panama | Summers & Schuster (1975), Haitlinger (1993c, 1999a), O'Connor (2004) |
| E. maniusi Haitlinger, 1993 | Omaspides basilica Boheman, 1856, Coptocyla contenta (Boheman, 1855) (Psalidonota contenta)*, C. dorsoplagaia Champion, 1894 (Psalidonota dorsoplagaia)* (Chrysomelidae; Cassidinae) | Brazil, Mexico | Haitlinger (1993c) |
| E. medoni Haitlinger, 1993 | Acromis spinifex (Linnaeus, 1763) [Acromis spinifera, A. nebulosa (Boheman, 1854)]* (Chrysomelidae; Cassidinae) | Brazil | Haitlinger (1993c) |
| E. megesi Haitlinger, 1993 | Crambelea illudens (Boheman, 1854) (Crombelea illudens)* (Chrysomelidae; Cassidinae) | Brazil | Haitlinger (1993c) |
| E. melindae Haitlinger, 1993 | Coptocyla dorsopunctata (Klug, 1829) (Psalidonota dorsopunctata)*, C. leprosa (Boheman, 1855) (P. leprosa)* (Chrysomelidae; Cassidinae) | Costa Rica, Cuba | Haitlinger (1993c) |
| E. penelopa Haitlinger, 1993 | Acromis spinifex (Acromis nebulosa)*, Echoma clypeata (Panzer, 1798) (Eihoma marginata (L.).)* (Chrysomelidae; Cassidinae) | Brazil, Surinam | Haitlinger (1993c) |
| E. platsysma (Summers & Schuster, 1975) (Grandiella platsysma) | Coptocyla sp. (Chrysomelidae: Cassidinae) | Panama | Summers & Schuster (1975), Haitlinger (1993c), O'Connor (2004) |
| Eunorphiana aidae Haitlinger, 1999 | Plagiometriona phoebe (Boheman, 1855), P. vigens (Boheman, 1855) (Chrysomelidae; Cassidinae) | Brazil, Colombia | Haitlinger (1999a) |
| E. heliodori Haitlinger, 1999 | Plagiometriona ludcira (Boheman, 1855), P. punctatissima (Boheman, 1855) (P. punctipennis)* (Chrysomelidae; Cassidinae) | Brazil | Haitlinger (1999a) |
| Gasuthiana abapoica Haitlinger, 1989 | Alurnus elysianus Thomson, 1856 (Chrysomelidae: Cassidinae) (Alurnus elysianus) (Chrysomelidae: Hispineae)* (Chrysomelidae: Cassidinae) | Brazil | Haitlinger (1989a) |
| G. abufarica Haitlinger, 1989 | Coraliomela brunea (Thunberg, 1821) (Meristomala nigripes Gmer.)* (Chrysomelidae: Hispineae)* (Chrysomelidae: Cassidinae) | Boliwia | Haitlinger (1989a) |

(Continued)
| Species                  | Host                          | Country                        | Author(s)          |
|-------------------------|-------------------------------|--------------------------------|--------------------|
| G. coarica Haitlinger, 1989 | *Meristemella marginata* (Thunberg, 1721) (Chrysomelidae: Cassidinae) | Brazil                         | Haitlinger (1989a) |
| G. melilae Haitlinger, 1995 | *Tenebrionidae undet.*          | Brazil                          | Haitlinger (1995b) |
| G. oleraiaca Haitlinger, 1989 | *Alurnus bipunctatus* Olivier, 1792 (Chrysomelidae: Cassidinae), *A. boucardii* Rosenberg, 1898 (A. boucardii)* (Chrysomelidae: Hispinae)* | Colombia, French Guiana | Haitlinger (1989a) |
| G. haratitna caroe Haitlinger, 1989 | *Heterorrhina elegans* (Fabricius, 1781), *Heterorrhina* sp. (Coryphocera sp.)* (Scarabaeidae: Cetoninae) | Sri Lanka                      | Haitlinger (1989b, d) |
| G. maharae Haitlinger, 1989 | *Chalcotrocha symagrina* (Gory & Percheron, 1833), *Chalcotrocha neglecta* Ritsema, 1882, *Coelodera diardii* (Gory & Percheron, 1833) (Cogliceridae diaroi)* *Pseudochalcotrocha pomaica* (Bates,1889), *P. auripes* Weswood, 1874, *Thaumastopoeus cupripes* (Waterhouse, 1841), *T. nigritus* (Frölich,1792), (Scarabaeidae: Cetoninae) | Borneo, Sumatra (Indonesia), Hongkong (China), Malaysia, Philippines | Haitlinger (1989b, d), Corpuz-Raros (2001), Fan et al. (2010) |
| *G. bettinae* Haitlinger, 1991 | *Pterostichus globosus* (Fabricius, 1792) (Carabidae: Harpalinae) | Morocco                         | Haitlinger (1991f) |
| *Grandiella cooremant Fain, 1989* | *Canistra osculati* Guérin, 1855 (Chrysomelidae: Cassidinae) | Ecuador                         | Fain (1989), Santiago-Blay & Fain (1994) |
| *G. decemcaudata* Lombardini, 1939 | *Echecma clypeata* (Omo-plata marginata)*, *Stolas* sp. (Chrysomelidae: Cassidinae) | Bolivia, Paraguay               | Lombardini (1950), Santiago-Blay & Fain (1994) |
| *G. eucuadorensis* Fain, 1989 | *Canistra osculatii* (Chrysomelidae: Cassidinae) | Ecuador                         | Fain (1989), Santiago-Blay & Fain (1994) |
| *G. longini* (Haitlinger, 1999) (Grandiellina longini) | *Goniochena flavoparsa* (Boheman, 1856) (Baranaosa flavosparsa)* (Chrysomelidae: Cassidinae) | Bolivia                         | Haitlinger (19991d) |
| *G. marinae* (Haitlinger, 1999) (Grandiellina marinae) | *Echocma coflons* (Spaeth, 1926) (Eiochma conflens)* (Chrysomelidae: Cassidinae) | Mexico                          | Haitlinger (1901d) |
| *G. minor* Fain, 1989 | *Canistra dohmi* Spaeth, 1905 (Chrysomelidae: Cassidinae) | Brazil                          | Fain (1989), Santiago-Blay & Fain, 1994 |
| *G. octocaudata* Lombardini, 1939 | *Stolas chalybas* (Germar, 1824) (Chrysomelidae: Cassidinae) | Brazil                          | Lombardini (1939), Santiago-Blay & Fain, 1994 |
| *G. pentagona* (Lombardini, 1950) | Cassidinae undet.             | Venezuela                       | Lombardini (1950), Santiago-Blay & Fain, 1994 |
| *G. rogeri* (Haitlinger, 1991) (Grandiellina rogeri) | *Goniochena haroldi* (Wagener, 1877) (Baranaosa heroldi, B. decolor Spaeth, 1914)* (Chrysomelidae: Cassidinae) | Peru                            | Haitlinger (1991d) |

(Continued)
| Species | Host and Source | Location | Authors |
|---------|----------------|----------|---------|
| *G. sicula* Summers & Schuster, 1979 | *Orexta wagneri* (Boheman, 1862) (Coptocyclo nigropunctata, *C. wagneri*)* (Chrysomelidae: Cassidinae), *Stolas* sp. | Colombia | Summers & Schuster (1979), Santiagi-Blay & Fain, 1994, Haitlinger, 1991d |
| *G. soniae* (Haitlinger, 1991) (*Grandiellina soniae*) | *Cyrtonota textilis* (Boheman, 1850), *Stolas coelata* (Boheman, 1862), *S. coerulescens* (Boheman, 1850), *S. erichsonii* (Weise, 1902), *S. placida* (Spaeth, 1911), *S. punicea* (Boheman, 1850) (Chrysomelidae: Cassidinae) | Colombia, Ecuador, Mexico, Peru | Haitlinger (1991d) |
| *G. tacjannae* (Haitlinger, 1991) (*Grandiellina tacjannae*) | *Anacassis fusca* (Klug, 1829), *Botanochora angulata* (German, 1824), *B. bonariensis* (Boheman, 1850), *B. convexiuscula* (Spaeth, 1922), *B. duodecimverrucata* (Boheman, 1850), *B. impressa* (Panzer, 1798) (*B. nervosa*, *B. texta*), *B. maculata* (Boheman, 1850), *B. regina* (Boheman, 1962), *B. ruforeticulata* (Boheman, 1850), *B. sanguinea* (Spaeth, 1909), *B. sedecimpustulata* (Fabricius, 1781), *B. tessellata* (Burmeister, 1870) (Chrysomelidae: Cassidinae) | Argentina, Brazil, Paraguay, Peru | Haitlinger (1991d) |
| *G. tertia* (Lombardi, 1942) | Cassidinae Undset. | Brazil | Lombardini (1942) ?1938 |
| *G. tetracaudata* (Lombardi, 1939) | *Botanochora subnervosa* (Boheman, 1850) *Coptocyclo adamanitana* (German, 1824), *Cyrtonota cyanee* (Linnaeus, 1758.), *C. tigrina* (Boheman, 1850), *C. thalassina* (Boheman, 1850), *Echoma clypeata* (Panzer, 17980  (*Omoiplata marginata*), *Stolas chalybaea*, *S. lacordairei* (Boheman, 1850) (*S.subrugosa*), *Stolas* sp. (Chrysomelidae: Cassidinae), *Eumolpus fulgidus* Weber, 1801 (*Chrysomelidae: Eumolpinae*) | Argentina, Brazil, Colombia, French Guiana, Peru | Lombardini (1939, 1950), Fain (1987a, 1989), Haitlinger (1991d), Santiagi-Blay & Fain (1994) |
| *G. tetracaudata omoiplata* Fain, 1987 | *Echoma clypeata* (*Omoiplata marginata*), *Echoma clypeata* (*Omoiplata marginata*) (Chrysomelidae: Cassidinae) | French Guiana | Fain (1987a), Santiagi-Blay & Fain (1994) |
| *Grandiellopsis alani* Haitlinger, 1992 | *Canistra osculatii* (Chrysomelidae: Cassidinae) | Ecuador | Haitlinger (1992b) |
| *G. ariani* Haitlinger, 1992 | *Carlobruchia carbonaria* (Klug, 1829) (*Canistra carbonaria*), *C. tricostata* (Spaeth, 1907) (*Canistra tricostata*) (Chrysomelidae: Cassidinae) | Argentina, Brazil | Haitlinger (1992b) |
| *G. canistra* Fain, 1989 | *Canistra osculati* (Chrysomelidae: Cassidinae) | Ecuador | Fain (1989) |
| *G. cyclosoma* Fain, 1989 | *Cyclosoma palliata* (Fabricius, 1787) (Chrysomelidae: Cassidinae) | French Guiana | Fain (1989) |
| *G. gambosa* (Summers & Schuster, 1979) | *Discomorpha bateri* (Boheman, 1856), *D. biplagiata* (Guérin, 1844), *D. breiti* (Spaeth, 1907) (*D. breiti*), *D. conspersipennis* | Belize, Brazil, Colombia, French Guiana, Guatemala, Nicaragua, Panama | Summers & Schuster (1979), Fain (1989), Haitlinger | (Continued) |
Table XIV. (Continued).

| Mite Family                                      | Host Order | Country | Author(s) |
|-------------------------------------------------|------------|---------|-----------|
| (Boheman, 1850) (Dolichotoma conspersipennis)*, D. depliata (Boheman, 1850), D. distincta (Baly, 1869), D. dromedarius (Boheman, 1850), D. grayi (Boheman), D. instabilis (Baly, 1872), D. languinos (Boheman, 1850), D. minuta (Boheman, 1840), D. salivin (Baly, 1864), D. schusteri (Spaeth, 1907), D. specandta (Boheman, 1862), D. varigeta (Linnax, 1758), Discomorpha sp. (Chrysomelodeae: Cassidinae) | (Boheman, 1850) (Dolichotoma conspersipennis)*, D. depliata (Boheman, 1850), D. distincta (Baly, 1869), D. dromedarius (Boheman, 1850), D. grayi (Boheman), D. instabilis (Baly, 1872), D. languinos (Boheman, 1850), D. minuta (Boheman, 1840), D. salivin (Baly, 1864), D. schusteri (Spaeth, 1907), D. specandta (Boheman, 1862), D. varigeta (Linnax, 1758), Discomorpha sp. (Chrysomelodeae: Cassidinae) | (1992b), Santiago-Blay & Fain (1994), O’Connor (2004) |
| G. odiosi Haitlinger, 1992                      | Polychalca punctatissima (Wolf, 1818) (Chrysomelodeae: Cassidinae) | Brazil | Haitlinger (1992b) |
| G. orsenae Haitlinger, 1992                     | Cyclosoma mirabilis (Boheman, 1856) (Chrysomelodeae: Cassidinae) | Peru | Haitlinger (1992b) |
| G. violae Haitlinger, 1992                      | Canistra procrea Bohema, 1850 (C. cruentata Kirsch, 1876) (Chrysomelodeae: Cassidinae) | Bolivia | Haitlinger (1992b) |
| Haitlingeria longilobata Kim W., Lee, Choi J., Sim, Kim J., Choi Y. & Kim K., 2006 | Dorcus titanus castanicolor (Motschulsky, 1861) (Serrognathus platynetus castanicolor)* (Lucanidae: Lucaninae) | Japan, South Korea | Kim et al. (2006), Okabe & Goka (2007) |
| Hargeinella papuana Haitlinger, 1989             | Trichogomphus bronchus (Herbst, 1879) (Trichogomphus milon)* (Scarabaeidae: Dynastinae) | Sumatra (Indonesia) | Haitlinger (1989b) |
| Hatothylla baniana Haitlinger, 1990              | Nyctobates maxima (German, 1824) (N. maximus)* (Tenebrionidae: Tenebrioninae) | Brazil | Haitlinger (1990c, 2000) |
| H. bibiannae Haitlinger, 1990                    | Tenebrionidae undet. | Brazil | Haitlinger (1990c, 2000) |
| H. morrata Haitlinger, 1990                      | Nyctobates gigas (Linnax, 1767) (Tenebrionidae: Tenebrioninae) | Brazil | Haitlinger (1990c, 2000) |
| H. rosacostai ((Lombardini, 1939) (Coleoglyphus rosacostai, Grandiella rosacostai) | Nyctobates sp. (Tenebrionidae: Tenebrioninae) | Venezuela | Lombardini (1939), Haitlinger (1990c, 1999, 2000), Santiago-Blay & Fain (1994), O’Connor (2004) |
| Hypopteryx collaris Summers & Schuster, 1981    | Passalidae undet. | Australia | Summers & Schuster (1981) |
| Irmongia Helga Haitlinger, 1990                  | Passalidae undet. | Tanzania | Haitlinger (1990d) |
| Ismaeilena egypti (Bishlavy & Allan, 2003)      | Blaps ppolychresta (Forskål, 1775) (B. polycherstar)* (Tenebrionidae: Tenebrioninae) | Egipt | El Bishlavy & Allan (2003) |
| I. maroccana (Cooreman, 1953)                    | Blaps mucronata, B. pinguis Allard, 1880, Blaps sp. (B. producta)* (Tenebrionidae: Tenebrioninae) | Corsica (France), Italy, Morocco | Cooreman (1953), Theodoreides (1955), Haitlinger (1992a, 2000) |
| Javanellina macgillavryi (Oudemans, 1923)        | Host unknown | Java (Indonesia) | Oudemans (1923), Buitendijk |

(Continued)
Table XIV. (Continued).

| Species                              | Genus                                      | Subdivision                      | Country                              | Authors                        |
|--------------------------------------|--------------------------------------------|-----------------------------------|--------------------------------------|--------------------------------|
| Jowitella barbara                   | Jowitella                                   |                                    |                                      | Raju (1973)                    |
| R. Haitlinger, 1990                  |                                            | Brazil                            |                                      |                                |
| Jullongia izae                      | Jullongia                                   |                                    |                                      | Raju (1973)                    |
| R. Haitlinger, 1990                  |                                            | Papua New Guinea                  |                                      |                                |
| Kahooringa albae                    | Kahooringa                                   |                                    |                                      | Raju (1973)                    |
| R. Haitlinger, 1991                  |                                            | Republic of South Africa           |                                      |                                |
| Kuramasenia illegalis               | Kuramasenia                                 |                                    | Taiwan                               | Samšiňák (1971)                |
| (Samšiňák, 1971)                    |                                            |                                    |                                      |                                |
| K. paavoi                           | K. paavoi                                   |                                    | China                                | Haitlinger (1994b), Fan et al. (2010) |
| R. Haitlinger, 1994                  |                                            |                                    |                                      |                                |
| K. pekingensis                      | K. pekingensis                              |                                    | China, Tibet                         | Samšiňák (1971), Fan et al. (2010) |
| (Samšiňák, 1971)                    |                                            |                                    |                                      |                                |
| K. pictura                          | K. pictura                                  |                                    | Japan                                | Samšiňák 91971                 |
| R. Haitlinger, 1971                  |                                            |                                    |                                      |                                |
| K. ramoni                           | K. ramoni                                   |                                    | China                                | Haitlinger (1994b), Fan et al. (2010) |
| R. Haitlinger, 1994                  |                                            |                                    |                                      |                                |
| Lidiophila aruica                   | Lidiophila                                  |                                    | Aru island                           | Haitlinger (1999d)              |
| R. Haitlinger, 1990                  |                                            |                                    | Indonesia                            |                                |
| L. bogiae                           | L. bogiae                                   |                                    | Batjan Island                        | Haitlinger (1999d)              |
| R. Haitlinger, 1990                  |                                            |                                    | Indonesia                            |                                |
| L. celinae                          | L. celina                                   |                                    | Ambon Island                         | Haitlinger (1999d)              |
| R. Haitlinger, 1990                  |                                            |                                    | Indonesia                            |                                |
| L. igae                             | L. igae                                     |                                    | Moluccas                             | Haitlinger (1999d)              |
| R. Haitlinger, 1990                  |                                            |                                    | Indonesia                            |                                |
| L. pauliana                         | L. pauliana                                 |                                    | Australia                            | Haitlinger (1991f, 2000)        |
| R. Haitlinger, 1991                  |                                            |                                    |                                      |                                |
| L. pecki                            | L. pecki                                    |                                    | Papua New Guinea                     | Nesbitt (1976), Haitlinger (1999d) |
| (Coleopterphagus pecki)              |                                            |                                    |                                      |                                |
| R. Haitlinger, 1990                  |                                            |                                    |                                      |                                |
| L. pelagiae                         | L. pelagiae                                 |                                    | Moluccas                             | Haitlinger (1999d)              |
| R. Haitlinger, 1990                  |                                            |                                    | Indonesia                            |                                |
| Lombardiniella gentilis             | Lombardiniella                              |                                    | France, Italy                         | Lombardini (1944), Cooreman (1950), Theodorides (1955), Khaustov & Eidelberg (2001) |
| (Lombardini, 1944)                  |                                            |                                    |                                      |                                |
| Lombardiniella gentilis             | Lombardiniella                              |                                    |                                      | Lombardini (1944), Cooreman (1950), Theodorides (1955), Khaustov & Eidelberg (2001) |
| (Percanestrinia gentilis)            |                                            |                                    |                                      |                                |

(Continued)
**Table XIV. (Continued).**

| **Megacanestrinia beloniana** Haitlinger, 1990 | *Tefflus purpureipennis* Quedenfeldt, 1883 (Carabidae: Harpalinae) | Tanzania | Haitlinger (1990a) |
| **M. mucronata** Trägårdh, 1906 | Carabidae undet. | Republic of South Africa | Trägårdh (1906) |
| **Melisia anomala** Samšiňák, 1963 | *Epsiphenus indicus* (Stoliczka, 1873), *Epsiphenus indicus**, Epsiphenus sp. (E. stoliczkae)* (Passalidae: Macrolininae) | India | Samšiňák (1963) |
| **M. ariadnae** Haitlinger, 1990 | *Acerius laevicollis* (Illiger, 1800) (Passalidae: Macrolininae) | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. baloghi** Samšiňák, 1968 | Passalidae undet. | Vietnam | Samšiňák (1968) |
| **M. gabriellae** Haitlinger, 1990 | *A. laevicollis* | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. helenae** Haitlinger, 1990 | Passalidae undet. | Vietnam | Haitlinger (1990d) |
| **M. hieronimae** Haitlinger, 1990 | Passalidae undet. | Sumatra (Indonesia), Thailand, Vietnam | Haitlinger (1990d) |
| **M. ingeborgeae** Haitlinger, 1990 | Passalidae undet. | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. irenae** Haitlinger, 1990 | *Acerius grandis* (Passalidae: Macrolininae) | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. jadwigae** Haitlinger, 1990 | Passalidae undet. | Vietnam | Haitlinger (1990d) |
| **M. klapaleki** Samšiňák, 1963 | *Epsiphenus indicus* (Epsiphenus indicus)* (Passalidae: Macrolininae) | India | Samšiňák (1963) |
| **M. leptinotarsa** Summers & Schuster, 1982 | Passalidae undet. | Australia | Summers & Schuster (1982a) |
| **M. lombardinii** Samšiňák, 1963 | *Passalus sp.* (Padsalidae: Passalinae) | Sumatra (Indonesia) | Samšiňák (1963) |
| **M. mahunkai** Samšiňák, 1968 | Passalidae undet. | Vietnam | Samšiňák (1968) |
| **M. mariettae** Haitlinger, 1990 | *Acerius grandis* (Passalidae: Macrolininae) | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. melaniae** Haitlinger, 1990 | *Acerius laevicollis* (Illiger, 1800) (*Acerius meyeri)* (Passalidae:Macrolininae) | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. melisii** Lombardini, 1944 | *Passalus sp.* (Passalidae: Passalinae) | ?America | Lombardini (1944), Samšiňák (1963) |
| **M. occidii** Samšiňák, 1968 | Passalidae undet. | Vietnam | Samšiňák (1968) |
| **M. ratae** Haitlinger, 1990 | Passalidae undet. | Vietnam | Haitlinger (1990d) |
| **M. salomeae** Haitlinger, 1990 | *Acerius laevicollis* (Passalidae: Macrolininae) | Sumatra (Indonesia) | Haitlinger (1990d) |
| **M. samsinaki** Vomero, 1972 | Passalidae undet. | Cambodia | Vomero (1972) |
| **M. sentosa** Summers & Schuster, 1982 | Passalidae undet. | Hainan Isl. (China) | Summers & Schuster (1982a), Fan et al. (2010) |
| **M. superba** Summers & Schuster, 1982 | *Acerius grandis* (*A. grandis hirsutus* Kuwert)* (Passalidae: Macrolininae) | Taiwan | Summers & Schuster (1982a) |
| **Mesophoria penicillata peniciliata** Samšiňák, 1971 | *Carabus melancholicus costatus* German, 1824 (Carabidae: Carabinae) | Spain | Samšiňák (1971) |

(Continued)
Table XIV. (Continued).

| Species | Common Name | Location |
|---------|-------------|----------|
| *M. penicillata similis* Samšiňák, 1971 | *C. melancholicus costatus* | Spain | Samšiňák (1971) |
| *M. penicillata tercia* Samšiňák, 1971 | *C. melancholicus Fabricius, 1798* | Morocco | Samšiňák (1971) |
| *Metriothiana bolebori* Haitlinger, 1999 | *Metriionella bilimeki* (Spaeth, 1932) (Chrysomelidae: Cassidinae) | Honduras | Haitlinger (1999a) |
| *Midiphotia hispanica* (Samšiňák, 1971) | *Carabus galicianus Gory, 1839, C. guadarramus La Ferté-Sénéctère, 1847, C. melancholicus Fabricius, 1798 (Carabidae: Carabinae)* | Morocco, Portugal, Spain | Samšiňák (1971) |
| *M. jurecekii* (Samšiňák, 1971) | *Carabus pyrenaeus Audinet-Serville, 1821 (Carabidae: Carabinae)* | France | Samšiňák (1971) |
| *Mossongia bissaina* Haitlinger, 1989 | Scarabaeidae: Dynastinae undet. (*Scapanus salmonensis)* | Bougainville Island (Papua New Guinea) | Haitlinger (1989b) |
| *M. savina* Haitlinger, 1989 | Scarabaeidae: Dynastinae undet. (*Scapanus australis)* | Papua New Guinea: New Britain Island | Haitlinger (1989b) |
| *Neophotia drvotoka* Samšiňák, 1971 | *Carabus luetgensii Beuthin, 1886 (C. amplipennis), C. guadarramus La Ferté, 1874 (Carabidae: Carabinae)* | Portugal, Spain | Samšiňák (1971) |
| *Noemiphele barryi* Haitlinger, 1991 | *Dorcus taurus* (Fabricius, 1801) (*Serrognathus taurus)* (*Eurytrachelus purpurascens)*, *Dorcus sp.* (*Eurytrachelus sp.)* (Lucanidae: Lucaninae) | Sumatra (Indonesia) | Haitlinger (1991a) |
| *N. izabelae* Haitlinger, 1991 | *Claodgnathus griffa* Fabricius, 1794 (Lucanidae: Lucaninae) | Sulawesi (Indonesia) | Haitlinger (1991a) |
| *Oceogavia ubaldi* Haitlinger, 1989 | *Papuanus woodlarkiana* (Montrouzier, 1855) (Scarabaeidae: Dynastinae) | Localities unknown | Haitlinger (1989d) |
| *Olaithiana adelinae* Haitlinger, 1993 | *Anacassis cribrum* (Klug, 1829) (Chrysomelidae: Cassidinae) | Brazil | Haitlinger (1993d) |
| *O. foliacea* (Fain, 1987) *(Grandiella foliacea)* | *Stolas areolata* (Germar, 1824), *S. chalybaea, S. conspersa* (Germar, 1824), *S. festiva* (Klug, 1829), *S. impexa* (Boheman, 1850), *S. implaviata* (Boheman, 1850), *S. lacunosa* (Boheman, 1850), *S. lenis* (Boheman, 1850), *S. nudicollis* (Boheman, 1850), *S. oblita* (Boheman, 1850), *S. paranensis* (Spaeth, 1928), *S. subreaticula* (Boheman, 1850) (Chrysomelidae: Cassidinae) | Argentina, Brazil, Panama | Fain (1987), Haitlinger (1993d), O'Connor (2004) |
| *O. ivetiae* Haitlinger, 1994 | *Helocassis testudinaria* (Boheman, 1855) (*Metriionta testudinacea)* (Chrysomelidae: Cassidinae) | Costa Rica | Haitlinger (1994a) |
| *O. joliveti* (Fain, 1987) *(Grandiella joliveti)* | *Elytroephaera xanthophyga* Stål, 1858 (Chrysomelidae: Chrysomelinae) | Brazil | Fain (1987), Haitlinger (1993d), O'Connor (2004) |
| *O. multifida* (Fain, 1987) *(Grandiella multifida)* | *Stolas antiqua* (Sahlberg, 1823), *S. inexculata* (Boheman, 1862 (*S. aurosetosa)*, *S. cruenta* (Er ichson, 1847) (Chrysomelidae: Cassidinae) | Bolivia, Brazil, Ecuador | Fain (1987), Haitlinger (1993d), O'Connor (2004) |
| *Oligatta usequaica* Haitlinger, 1990 | *Didimus sansibaricus* Harold, 1880 (*Eumelasomus sansibaricus)* (Passalidae: Macroliinae) | Tanzania | Haitlinger (1990d) |
| Species | Genus and Species | Host | Reference |
|---------|-------------------|------|-----------|
| Ovarrothiana echinoderma (Summers & Schuster, 1979) (Gandiella echinoderma) | Eugenysa columbiana (Boheman, 1850), Eugenysa sp. (Chrysomelidae: Cassidinae) | Colombia, Panama | Summers & Schuster (1979), Haitlinger (1993c), O'Connor (2004) |
| O. erazmi Haitlinger, 1993 | Eugenysa bacchus (Baly, 1869), E. grossa (Linnaeus, 1758), E. venosa (Fabricius, 1798) (Chrysomelidae: Cassidinae) | Brazil, French Guiana | Haitlinger (1993c) |
| O. kmnseyi (Summers & Schuster, 1979) | Discomorpha conspersipennis (Boheman, 1862) (Dichotoma conspersipennis)*, Discomorpha sp. (Chrysomelidae: Cassidinae) | Colombia, Panama | Summers & Schuster (1979), Haitlinger (1993) |
| O. leopoldi Haitlinger, 1993 | Mlocalaspis gentilis (Erichson, 1847) (Chrysomelidae: Cassidinae) | Bolivia | Haitlinger (1993c) |
| O. ludomiri Haitlinger, 1993 | Cyclosoma tristis (Guérin, 1844) (Chrysomelidae: Cassidinae) | Bolivia | Haitlinger (1993c) |
| O. nikodemi Haitlinger, 1993 | Eugenysa delicata (Boheman, 1862), E. divalis (Boheman, 1862) (Chrysomelidae: Cassidinae) | Brazil, Peru | Haitlinger (1993c) |
| O. ozannae Haitlinger, 1993 | Agenysa caedemadens (Lichtenstein, 1795), A. crasscornis Spaeth, 1905, Eugenysa regalis (Boheman, 1850)*E. andicola)* (Chrysomelidae: Cassidinae) | Brazil, Ecuador, Peru | Haitlinger (1993c) |
| Paracanestrinia denmarkica Haitlinger & Šundić, 2017 | Carabus sp. (Carabidae) | Denmark | Haitlinger & Šundić (2017) |
| Paramansiis bicornis Khaustov & Eidelberg, 2001 | Chrysolina fastuosa (Scopoli, 1783), C. herbacea (Duftschmidt, 1925) (C. menthastri)*, C. polia (Linnaeus, 1758) (Chrysomelidae: Chrysomelinae) | Crimea, Ukraine | Khaustov & Eidelberg (2001), Trach (2006) |
| P. menthastri Cooreman, 1950 | Chrysolina herbacea (C. menthastri)* (Chrysomelidae: Chrysomelinae) | France | Cooreman (1950), Theodorides (1955) |
| Paramelisia alatus Summers & Schuster, 1982 | Pleurarius brachyphylalus Stoliczka, 1873 (P. brachyphyllus)* (Passalidae: Passalinae) | India | Summers & Schuster (1982a) |
| P. lacuna Summers & Schuster, 1982 | Pleurarius brachyphylalus (Passalidae: Passalinae) | India | Summers & Schuster (1982a) |
| Paraphagella eudicellae Cooreman, 1950 | Eudicella euthalia bertherandi Fairmaire, 1891 (E. smithi bertherandi)*, E. gralli mechowi Quedenfeld, 1880, (Scarabaeidae: Cetoninae) | Democratic Republic of Congo | Cooreman (1950) |
| P. grimaldi Haitlinger, 2011 | Mecynorrhina polyphemus (Fabricius, 1771) (Chelarrhina polyphemus)* (Scarabaeidae: Cetoninae) | Cameroon | Haitlinger (2011) |
| P. ingridae Haitlinger, 1991 | Timesorrhina iris Fabricius, 1781 (Scarabaeidae: Cetoninae) | Liberia | Haitlinger (1991c) |
| P. indirae Haitlinger, 1991 | Mecynorrhina savagei Harris, 1844 (Chelarrhina savagei)* (Scarabaeidae: Cetoninae) | Cameroon | Haitlinger (1991c) |
| P. minor Cooreman, 1950 | Eudicella euthalia bertherandi (Scarabaeidae: Cetoninae) | Democratic Republic of Congo | Cooreman (1950) |
| P. odae Haitlinger, 1991 | Stephanorrhina guttata (Olivier, 1789) (Scarabaeidae: Cetoninae) | Republic of the Congo | Haitlinger (1991c) |

(Continued)
Table XIV. (Continued).

| Species                  | Genus                                      | Location                        | Authors                                      |
|--------------------------|--------------------------------------------|----------------------------------|----------------------------------------------|
| *P. princeps* Cooreman, 1950 | *Dicronorrhina micans* (Drury, 1773), *Smaragdesthes africana* (Drury, 1773) (Scarabaeidae: Cetoniinae) | Democratic Republic of Congo      | Cooreman (1950)                             |
| *Paraphotia calosomae* Khaustov & Eidelberg, 2001 | *Calosoma auropunctatum* (Herbst, 1784) (*Calosoma punctatum*) (Carabidae: Carabinae) | Crimea, Ukraine                    | Khaustov & Eidelberg (2001), Trach (2006)   |
| *Passalophagus georlei* Nesbitt, 1976 | *Labienus* sp., Passalidae undet.          | Papua New Guinea                  | Nesbitt (1976)                              |
| *Percanestrinia blaptis* (Canestrini & Berlese, 1880) (*Alloptes blaptis*, *Canestrinia blaptis*, *Percanestrinia blaptis racciae*) | *Blaps gibba* Laporte, 1840 (*Blaps gibbosa*), *B. lethifera* Marsham, 1802, *B. mucronata* Latreille, 1804, *B. occulta* Seidlitz, 1893, *Blaps sp.* (*B. punctata*) (Tenebrionidae: Tenebrioninae), *Sphodrus leucophthalmus* (Linnaeus, 1758) (Carabidae: Harpalinae) | Bulgaria, England, Georgia, Germany, Hungry, Sardinia, Sicily (Italy), Poland, Ukraine | Canestrini & Berlese (1880), Poppe (1907), Vitzthum (1924), Boitendijk (1945), Turk (1953), Cooreman (1954), Samšiňák (1965, 1970), Rack (1968), Haitlinger (1992a, 2000, 2008a), Khaustov & Eidelberg (2001), Trach (2006), |
| *P. norodomii* Haitlinger, 1992 | *Blaps holconota* Fischer von Waldheim, 1844 (*B. kejconota*) (Tenebrionidae: Tenebrioninae) | Uzbekistan                        | Haitlinger (1992a, 2000)                     |
| *Percanestriniella caucasia* Khaustov & Eidelberg, 2001 | *Carabus sp.* (Carabidae)                  | Caucasus (Russia)                  | Khaustov & Eidelberg (2001)                  |
| *P. levis* (Samšiňák, 1971) | *Carabus akinini musartianus* Gottwald, 1987, *C. balassogloi* Dohrn, 1882 (*C. blassogloi*), *C. cicatricosus* Fischer von Waldheim, 1844, *C. sturowskyi* Solsky, 1874, *C. tanypedilus* Morawitz, 1886, *C. turcomannorum* Thieme, 1881 (Carabidae: Carabinae) | Kyrgyzstan, Uzbekistan             | Sanšíňák (1971), Khaustov & Eidelberg (2001) |
| *P. vlachiana* (Samšiňák, 1971) | *Carabus boysi* Tatum, 1851, *C. stoliczkanus* Bates, 1878 (Carabidae: Carabinae) | India                             | Samšíňák (1971), Khaustov & Eidelberg (2001) |
| *Peruthiana briannae* Haitlinger, 2008 | *Cassidinae undet.* (Hispinae undet.) (Chrysomelidae) | Peru                              | Haitlinger (2008b)                          |
| *Phaleratusellus alatus* (Summers & Schuster, 1982) | *Pleururus brachyphylus* Stoliczka, 1873 (Passalidae: Passalinae) | India                             | Summers & Schuster (1982a)                  |
| *Phaleraus fentoni* Nesbitt, 1976 | *Passalidae undet., Protomocoleus triumphator* (Zang, 1904) (Passalidae: Passalinae) | Papua New Guinea, Solomon Islands | Nesbitt (1976), Summers & Schuster (1982a) |
| *Pheliculophela roaldi* Haitlinger, 1993 | *Goliathus goliathus* Linnaeus, 1771 (Scarabaeidae: Cetoniinae) | Cameroon                          | Haitlinger (1993a)                          |
| *Phottia adolfinae* Haitlinger, 1994 | *Carabus glabratus* Paykull, 1790, *C. exaratus* Quensel, 1806, *C. gyllenathi* Fisher, 1827 (Carabidae: Carabinae) | Belorussia, Crimea, Poland, Russia   | Haitlinger (1994b, 2012), Khaustov & Eidelberg (2001), Trach (2006) |
| *P. bardoica* Haitlinger, 1988 | *Carabus nemoralis* O. F. Müller, 1874 (Carabidae: Carabinae) | Austria, Poland                    | Haitlinger (1988a, b, 1991b)                 |
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

Table XIV. (Continued).

| Species | Hosts | Location | References |
|---------|-------|----------|------------|
| *P. bilkorum* Samšiňák, 1971 | *Carabus komarovi* (Reitter, 1882), *C. plasoni* Gniglbauer, 1888, *C. protensus* Schaum, 1864, *C. steveni* schamylí Hampe, 1852 (Carabidae: Carabinae) | Abkhasia, Georgia, Russia | Samšiňák (1971), Khaustov & Eidelberg (2001) |
| *P. chrysocarabi* Cooreman, 1950 | *Carabus auratus* Linnaeus, 1761, *C. auronitens* Fabricius, 1792, *C. irregularis* Fabricius, 1792, *C. nemoralis* O. F. Müller, 1784, *C. problematicus* Herbst, 1786, *C. scheidleri* Fabricius, 1792 (Carabidae: Carabinae) | Austria, Belgium, Czech Republic, France, Germany, Poland, Slovakia, Turkey, Ukraine | Cooreman (1950), Thedodorides (1955), Samšiňák (1971), Haitlinger (1988a, b, 1991b, 1995, 2008a, 2012), Fain et al. (1995), Trach (2006), Zamec and Fenda (2013) |
| *P. graeca* Cooreman, 1958 | *Carabus coriaceus* foudrasi Dejean, 1829, *C. coriaceus* impudicus Gautier des Cottes, 1866, *C. coriaceus* kindermannii Waldi, 1738 (Carabidae: Carabinae) | Greece, Turkey | Cooreman (19558) |
| *P. heijniana* Samšiňák, 1971 | *Crabidae alpestris* hoppii Germain, 1824 (C. alpestris hoppel)*, *C. auronitens*, *C. coriaceus*, *C. croaticus* Dejean, 1826, *C. violaceus* Linnaeus, 1758 (Carabidae: Carabinae) | Austria, Croatia, Czech Republic, Moldova, Poland, Slovakia, Slovenia, Ukraine | Samšiňák (1971), Haitlinger (1988a, b, 1991b, 1995a, 2008a, 2012), Trach (2006), Zamec & Fenda (213) |
| *P. hermelangidae* Haitlinger, 1988 | *Carabus linnaei* Panzer 1810 (Carabidae: Carabinae) | Poland, Ukraine | Haitlinger (1988a, b, 1991b, 2008a, 2012), Trach (2006) |
| *P. howdeni* Nesbitt, 1976 | Passalidae undet, | Papua New Guinea | Nesbitt (1976) |
| *P. lopatini* Khaustov & Eidelberg, 2001 | *Carabus lopatini* Morawitz, 1886 (Carabidae: Carabinae) | Sakhalin (Russia) | Khaustov & Eidelberg (2001) |
| *P. lusitanica* Samšiňák, 1971 | *Carabus amplipennis* Lapouge, 1924, *C. lusitanicus breuningi* Csiki, 1927, *C. lusitanicus helluo* Dejean, 1826, *C. lusitanicus castiliianus* Dejean, 1826, *C. lusitanicus schaumi* Gauhil, 1849 (Carabidae: Carabinae) | Portugal, Spain | Samšiňák (1971) |
| *P. melchiori* Haitlinger, 1998 | *Carabus sp.* (Carabidae) | China | Haitlinger (1998), Fan et al. (2010) |
| *P. pacifica* Khaustov & Eidelberg, 2001 | *C. kolbei* Roeschke, 1881 (Carabidae: Carabinae) | Siberia (Russia) | Khaustov & Eidelberg (2001) |
| *P. polymorpha* Samšiňák, 1971 | *Carabus blaptoides* (Kollar, 1836), *C. blaptoides capito* (Lewis, 1881), *C. blaptoides rugipennis* Motschulsky, 1750, *C. constricticollis* (Kraatz, 1886), *C. exaratus* Quensel, 1806, *C. gehinii* Fairmaire, 1876, *C. gyllenhalii*, *C. hungaricus* Fabricius, 1792, *C. imperialis* Fischer von Waldheim, | Crimea, Iran, Japan, Korea, Russia (European part, Siberia) | Samšiňák (1971) |

(Continued)
| Species                                      | Location                          | Location                          | Authors                                    |
|----------------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------------|
| 1823, *C. persianus* Roeschke, 1896, *C. schönherri* Fischer von Waldheim, 1822, *C. schrenki* Motschulsky, 1860, *C. vietinghoffi fulgidus* Fischer-Waldheim, 1827 (Carabidae: Carabinae) | Bulgaria, Italy, Slovenia,         | Berlese (1911), Cooreman (1950), Samšiňák (1964), Beron (1971) |
| *P. procera procera* (Berlese, 1911) (Canestrinia procera) | Carabus gigas Creutzer, 1799 (Procerus gigas)*, *C. scabrosus* Oliver, 1795, *(P. scabrosus)*, (Carabidae: Carabinae) | Turkey                          | Samšiňák (1964)                  |
| *P. procera adanaensis* Samšiňák, 1964 | Carabus scabrosus transversalis Csiki, 1927 Carabidae: Carabinae | Lebanon                          | Samšiňák (1964)                  |
| *P. procera marani* Samšiňák, 1964 | Carabus syriacus Kolar, 1834 (Procerus syriacus)* (Carabidae: Carabinae) | Lebanon                          | Samšiňák (1964)                  |
| *P. procera turcica* Samšiňák, 1964 | C. scabrosus amasicus Csiki, 1927, C. scabrosus audouini Brullé, 1835, C. scabrosus caucasicus Adams, 1817, C. scabrosus scabrosus Oliver, 1795 (Carabidae: Carabinae) | Turkey                          | Samšiňák (1964)                  |
| , *P. procustidis* (Berlese, 1881) (Canestrinia procustidis, C. procrusti Phota procrusti, Eucanestrinia procrusti, E. procrustidus) | Carabus anatolicus anatolicus Chaudoori, 1857, *C. banoni* banoni Dejean, 1829, *C. coriaceus cerisyi* Dejean, 1826 (C. coriaceus impudicus)*, *C. coriaceus excavatus* Charpentier, 1825, *C. coriaceus kindermanni* Wall, 1838, C. coriaceus mediterraneus Born, 1906 (C. coriaceus albanicus)*, *C. impressus carmelita* Lapouge, 1907, *C. multisanthinus multisantianus* Morawitz, 1886, C. pafafa White, 1845 (C. pafafa)*, C. punctatus Castelnau, 1835 (Carabidae: Carabinae) | Albania, Cyprus, Greece, Israel, Italy, Lebanon, Slovakia, Turkey, Yugoslavia | Samšiňák (1964), Zamec & Fenda (2013) |
| *P. saetolata* (Cooreman, 1950) (Percanestrinia saetolata) | Carabus coriaceus, *C. violaceus* (Carabidae: Carabinae) | Belgium, Czech Republic, England, France, Germany, Holland | Cooreman (1950, 1954), Evans et al. (1951), Samšiňák (1964, 1971), Haitlinger (1992), Fain et al. (1995) |
| *P. sibirica* Khaustov & Eidelberg, 2001 | Carabus schoenherri (Carabidae: Carabinae) | Siberia (Russia)                  | Khaustov & Eidelberg (2001) |
| *Photia* sp. | Carabus besseri Fischer von Waldheim, 1820, *C. excellens* Fabricius, 1798, *C. ulrichi* Germain, 1824 (Carabidae: Carabinae) | Moldova, Ukraine                  | Trach (2006)                          |
| *Phriknodora avae* Haitlinger, 1994 | *Stolas lebasi* (Chrysomelidae: Cassidinae) | Costa Rica                        | Haitlinger (1984a)                    |
| *P. pustulosa* Summers & Schuster, 1982 | *Juiaparuns batus* (Linnaeus, 1758) (Brazilianus batus)*, *J. mexicanus* Thomson, 1860 (B. mexicanus)* (Cerambycidae) (Cerambycidae:Cerambycinae) | Mexico, Panama                    | Summers & Schuster (1982) |
| *P. scabra* Summers & Schuster, 1982 | *Trachyderes succintus* (Linnaeus, 1758) (Trachyderes succintus)* (Cerambycidae: Cerambycinae) | Panama                            | Summers & Schuster (1982) |
Table XIV. (Continued).

| Procericola bourgognei (Oudemans, 1923) | Carabus auratus, C. chevrolati chevrolati Cristophoris & Jan, 1837 (Procrustes chevrolati)*, C. clypeatus clypeatus (P. clypeatus)*, C. coriaceus coriaceus (P. coriaceus, C. coriaceus pseudogyrifer, C. coriaceus subrugosus)*, C. coriaceus banaticus Redtenbacher, 1849, C. coriaceus excavatus Charpentier, 1825 (C. excatus)*, C. coriaceus foutrasoi Dejman, 1829, C. coriaceus kindermannii, C. coriaceus rugifer (Kraatz, 1877), C. gigas duponcheli Dejean, 1831 (Procerus duponcheli)*, C. piafa White, 1845 (C. paryafa)* (Carabidae: Carabinae) | Albania, Belgium, Bulgaria, Caucasus, Czech Republic, France, Germany, Greece, Hungary, Italy, Moldova, Poland, Romania, Slovakia, Sweden, Turkey, Ukraine | Oudemans (1923), Buitendijk (1945), Cooreman (1950, 1954), Samšiňák (1964), Beron (1971), Lundquist (1985), Haitlinger (1988b, 1991b, 2008a, 2012), Fain et al. (1995), Khaustov & Eidelberg (2001), Trach (2006), Zamec & Fenda (2013) |
| --- | --- | --- | --- |
| P. ichthyoides ichthyoides Cooreman, 1950 | Carabus gigas (Procerus gigas), C. scabrosus (Carabidae: Carabinae) | Italy, Slovenia | Cooreman (1950), Samšiňák (1864), Beron (1971) |
| P. ichthyoides scabricola Samšiňák, 1964 | Carabus scabrosus scabrosus (Procerus s. scabrosus)*, C. scabrosus colchicus Motschulsky, 1844, C. scabrosus sommeri Mannerheim, 1844 | Bulgaria, Georgia, Russia, Turkey | Samšiňák (1964), Beron (1971) |
| P. ichthyoides transversicola Samšiňák, 1964 | C. scabrosus transversalis Csiki, 1927 (Carabidae: Carabinae) | Turkey | Samšiňák (1964) |
| Pseudoamansia chrysomelina (C. L. Koch, 1841) | Timarcha atlantica Bechyně, 1944, T. balearica (Gory, 1829), T.goettingensis (Linnaeus, 1758) (Timarcha gochinesnus)*, T. interstitalis Faarmaire, 1862, T. tenebrocosa (Fabricius, 1875), Timarcha sp. (Chrysomelidae: Chrysomelinae) | Algeria, Balearic Islands (Spain), Belgium, France, Italy, Morocco | Cooreman (1950), Jolivet (1952), Theodorides (1955), Santiago-Blay & Fain (1994) |
| P. decorata Trach & Khaustov, 2007 | T. goettingensis (Chrysomelidae: Chrysomelinae) | Ukraine | Trach & Khaustov (2007) |
| Pseudoamansia sp. | T. goettingensis (Chrysomelidae: Chrysomelinae) | Ukraine | Trach (2006) |
| Pseudocanestrinia berndi (Haitlinger, 1995) | Carabus catenulatus plattensis Born, 1907 (C. latenulatus plattensis)*, C. gylenhalli (Carabidae: Carabinae) | Bosnia & Herzegovina, Crimea | Haitlinger (1995a), Khaustov & Eidelberg (2001, 2006), Trach (2006) |
| P. carabi Khaustov & Eidelberg, 2001 | Carabus bessarabicus Fischer von Waldheim, 1823 (Carabidae: Carabinae) | Crimea | Khaustov & Eidelberg (2001, 2006), Trach (2006) |
| P. damiani (Haitlinger, 1989 (Canestrinia damiani) | Pentodon idiota (Herbst, 1789) (Scarabaeidae: Dynastinae) | Crimea, Hungary, Ukraine | Haitlinger (1989c), Khaustov & Eidelberg (2001, 2006), Trach (2006) |
| P. mahunkai (Samšiňák, 1971) (Canestrinia mahunkai) | Carabus coriaceus, Carabus sp. (Carabidae: Carabinae) | Hungary, Poland | Samšiňák (1971), Haitlinger (1988b, 1991b, 2008a, 2012) |

(Continued)
Table XIV. (Continued).

| Species                                      | Species Name                                                                 | Location       | Author(s)                  |
|----------------------------------------------|-----------------------------------------------------------------------------|----------------|---------------------------|
| P. occidentalis (Samšiňák, 1971)             | Carabus aurontiun (Carabidae: Carabinae)                                    | France         | Samšiňák (1971)           |
| P. orientalis (Samšiňák, 1971)               | Carabus caelatus Fabricius, 1848, C. croaticus (Carabidae: Carabinae)       | Italy, Slovenia| Samšiňák (1971)           |
| P. roberti (Haitlinger, 1990)                | Pentodon bidens (Pallas, 1771) (Scarabaeidae: Dynastinae)                   | Italy          | Haitlinger (1989c)        |
| (Canestrinia roberti)                        |                                                                             |                |                           |
| Pseudocanestrinia sp.                       | Carabus excellens Fabricius 1798, C. ulrichi Germar, 1824 (Carabidae: Carabinae) | Moldova        | Trach (2006)              |
| Pseudoparaphagella gerardi Haitlinger, 2010  | Coelorhina thoreyi Schaum, 1841 (Scarabaeidae: Cetoniinae)                  | Guinea         | Haitlinger (2010)         |
| Rugoniphela marloni Haitlinger, 1991         | Dorcus antaeus Hope, 1842 (Eurytrachelus antaeus)*, Dorcus bucephalus (Perty, 1831) (Eurytrachelus bucephalus)*, D. euryccephalus (Burmeister, 1847) (E. euryccephalus)* (Lucanidae: Lucaninae) | Borneo, Java, Sumatra (Indonesia) | Haitlinger (1991a) |
| Sabothiana boi Haitlinger, 1993              | Charidotis sp. (Chrysomelidae: Cassidinae)                                  | Brazil         | Haitlinger (1993d)        |
| S. reidari Haitlinger, 1993                  | Charidotella kessel Borowiec, 1989 (Chrysomelidae: Cassidinae)              | Brazil         | Haitlinger (1993d)        |
| S. riccardoi Haitlinger, 1993                | Charidotis furcunculus (Bohemian, 1855) (Chrysomelidae: Cassidinae)         | Brazil         | Haitlinger (1993d)        |
| Sajanophela alfredae Haitlinger, 1990        | Protomocerus australis (Boisduval, 1835) (Protomocerus australis)* (Passalidae: Macrominiinae) | Papua New Guinea | Haitlinger (1990d)       |
| Sandrophela amarac Haitlinger, 1994          | Dorcus bucephalus (Serrognathus bucephalus)*, D. reichei clypeatus Benesh, 1950 (Dorcos clypeatus)*, D. euryccephalus Burmeister, 1847, D. taurus (Fabricius, 1801), D. titanus (Lucanidae: Lucaninae) | Java, Sumatra (Indonesia) | Haitlinger (1994b)     |
| S. near amarac                               | Dorcus alcides Vollenhoven, 1865 (Lucanidae: Lucaninae)                     | Sumatra (Indonesia) | Okabe & Goka (2008)     |
| S. diita Haitlinger, 1991                    | Colydiom sp. (Coleoptera: Zopheridae: Colydiinae)                           | Borneo (Indonesia) | Haitlinger (1991c)       |
| S. hugoni Haitlinger, 1994                   | Dorcus euryccephalus, Odontolabis lacordeirei (Vollenhoven, 1861), O. wollastoni Parry, 1854 (Lucanidae: Lucaninae) | Java, Sumatra (Indonesia) | Haitlinger (1994b), Goka & Okabe (2013) |
| S. near hugoni                               | Dorcus reichei Gangbauer, 1886, Odontolabis castelnaudi Parry, 1862, O. eremicola Mollenkamp, 1905 (O. cypria=O. somneri var. cypria Didier & Seguy, 1953)*, O. spectabilis Boileau, 1902 (Lucanidae: Lucaninae) | Borneo, Sumatra (Indonesia) | Okabe & Goka (2008)     |
| S. kokodaica Haitlinger, 1990                | Passandra trigema Newman, 1839 (Passandridae)                               | Papua New Guinea | Haitlinger (1990a)       |
| S. rodioni Haitlinger, 1993                  | Dorcus titanus, D. titanus platymalus Saunders, 1854 (Eurytrachelus platymalus)* (Lucanidae: Lucaninae) | Vietnam        | Haitlinger (1993b)       |
| S. sophiae Haitlinger, 1994                  | Hemisodorcus sp. (Hemisodorcus chevriti) (Lucanidae: Lucaninae)            | India          | Haitlinger (1994b)       |
| S. spectanda (Berlese, 1910) (Canestrinia spectanda) | Dorcus bucephalus                                                              | Java, Sumatra (Indonesia) | Berlese (1910), Haitlinger (1994b) |
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

| **S. near spectanda** | *Dorcus bucephalus, D. titanus palawanicus* (Lacroix, 1984) *D. t. parawanicus*, *Hexathrius mandibularis* Deyrolle, 1881 (Lucanidae: Lucaninae) | Philippines, Sumatra (Indonesia) | Okabe & Goka (2008) |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------|
| **Sandrophela sp.**   | *Dorcas amamianus kabotai* (Fujita & Ichikawa, 1985) | Japan                           | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D. metacostatus*Kikuta, 1985 | Japan                           | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D striatipennis* (Motschulsky, 1861) | Japan                           | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D. antaeus* Hope, 1842 | Laos                            | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D. titanus okinawanus*(Krieshe, 1922) | Japan                           | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D. t. sakishimanus* (Nomura, 1964) | Japan                           | Okabe & Goka (2008) |
| **Sandrophela sp.**   | *D. t. tokunoshimaensis*(Fujita & Ichikawa, 1985) | Japan                           | Okabe & Goka (2008) |
| **Saniothiana barumbaica** Haitlinger, 1990 | *Odontopoeus cupreus lucens* Geb (Tenebrionidae) | Cameroon                        | Haitlinger (1990a, 2000) |
| **S. psynosa** Haitlinger,1990 | *Pycnorhynchus* sp. (Zopheridae: Zopherinidae) | Africa                          | Haitlinger (1990a, 2000) |
| **Scarabiphostia vaginata** Haitlinger, 1994 | *Scarabaeinae undet. (Scarabaeus variolosus* Fabricius, 1787)* (Scarabaeidae) | Java                            | Vihnupriya & Mohanasundaram (1988), O'Connor (2004) |
| **Skilongia marzenae** Haitlinger, 1990 | *Leptaulus dentatus* (Fabricius, 1792) *Leptaulus indicus* (Passalidae: Solenocyclinae) | India                           | Haitlinger (1990d) |
| **Sorbinophela sandyi** Haitlinger, 1993 | *Poeicilea maculatissima* Boheman, 1860 (Scarabaeidae: Cetoniinae) | Botswana                        | Haitlinger (1993a) |
| **Sumatranella batocerae** (Vishnupriya & Mohanasundaram, 1988) (Grandiellia batocerae, Canestriniella batocerae) | *Batocera rufomaculata* (De Geer, 1775) (Cerambycidae: Lamiinae) | India                           | Vihnupriya & Mohanasundaram (1988), O'Connor (2004) |
| **Sumatranella, elae** (Haitlinger, 1989) (Canestriniella elae) | *Batocera numitor* ferruginea/Thomson, 1858, *B. rubus* (Linnaeus, 1758) (Cerambycidae: Lamiinae) | Sumatra (Indonesia)             | Haitlinger (1989d) |
| **S. phoeiniae** Haitlinger, 1995 (Canestriniella phoeiniae) | *Batocera albofasciata* Stebbing, 1914 (Cerambycidae: Lamiinae) | Java (Indonesia)                | Haitlinger (1995b) |
| **Tamarangia ethiopica** Khausost, 2006 | *Pachnoda abysinica* Reiche, 1847 (Scarabaeidae: Cetoniinae) | Ethiopia                        | Khausost (2006) |
| **T. fabiolae** Haitlinger, 1991 | *Pachnoda marginata* (Drury, 1773) (Scarabaeidae: Cetoniinae) | Sierra Leone                    | Haitlinger (1991c) |
| **T. flavianii** Haitlinger, 1991 | *P. marginata* | Sierra Leone                    | Haitlinger (1991c) |
| **T. nimfae** Haitlinger, 1991 | *Pachnoda thoracica* (Fabricius, 1775) | Ethiopia                        | Haitlinger (1991c) |
| **Tamarophela batjanica** Haitlinger, 1990 | Passalidae undet. | Moluccas (Indonesia) | Haitlinger (1990d) |
| **Taseopus playthrix** Summers & Schuster, 1982 | Passalidae undet. | Australia                        | Summers & Schuster (1982a) |
| **Tekthianna onnai** Haitlinger, 1999 | *Acromis sparsa* (Boheman, 1854) (Chrysomelidae: Cassidinae) | Bolivia, Colombia               | Haitlinger (1999a) |

(Continued)
Šundić 2016, this paper). Of the 17 species listed in Table XIV, 5 species require generic revision: *C. kacperi*, *C. manicata*, *C. microdisca*, *C. nepalensis* and *C. remigans*. According to Khaustov and Eidelbeg members of the genus *Canestrinia* are associated with lucanid beetles and scarabaeid beetles of the genus *Pentodon*. However, 2 species associated with the genus *Pentodon* have now been transferred to the genus *Pseudocanestrinia* (*P. damiani*, *P. roberti*). Moreover, *C. microdisca*, *C. nepalensis* and *Coleopterophagus berlesi* are associated with Lucanidae. However, it is currently impossible to establish their generic identity due to the lacunous description and no drawings. *C. manicata* caught in Brazil on Chrysomelidae and *C. remigans* caught in Africa on Tenebrionidae. Both of these species probably do not belong to *Canestrinia*. Hosts have not been established for *C. javensis*. It remains to be decided whether they belong to the genus *Canestrinia* and that indeed no species of *Cnestria* is associated with Carabidae. Also belonging to the genus *Coleopterophagus* *C. blattophagus* collected from Blattidae in Panama, *C. pulcher* and *Photia howdeni* are unbelievable. The presence of canestriniids on Blattidae is certainly accidental. In addition, species of the genus *Coleopterophagus* in America they do not occur (species whose genus is questionable are marked with an asterisk in the tables). Based on current knowledge, the main hosts of Canestriniidae should be considered Cassidinae (Chrysomelidae) (42 described canestriniid species were collected from 143 species of hosts), Cetoniinae (Scarabaeidae) (48 vs. 50), Carabinae (42 vs. 74), Macroliniinae (Passalidae) (35 vs. 18) and Dynastinae (Scarabaeidae) (20 vs. 12).

| Species                      | Host                      | Geographical Location | Authors                                      |
|------------------------------|---------------------------|-----------------------|----------------------------------------------|
| *T. rugosita* (Summers & Schuster, 1979) | *Acromis sparsa* | Panama | Summers & Schuster (1979) |
| *Teophyssa beatae* Haitlinger, 1990 | Passalidae undet. | Sumatra (Indonesia) | Haitlinger (1990d) |
| *T. honorata* Haitlinger, 1990 | *Gonatas naviculator* (Percheron, 1844) (Passalidae: Macrolininae) (G. noviculator)* | Sumatra (Indonesia) | Haitlinger (1990d) |
| *T. teresae* Haitlinger, 1990 | Passalidae undet. | Sumatra (Indonesia) | Haitlinger (1990d) |
| *Thopia amedae* Haitlinger, 1993 | *Polychalca dentipennis* (Boheman, 1850) (Chrysomelidae: Cassidinae) | French Guiana | Haitlinger (1993d) |
| *T. boguwalae* Haitlinger, 1993 | *Polychalca punctatissima* (Wolf, 1818) (Chrysomelidae: Cassidinae) | Brazil | Haitlinger (1993d) |
| *T. bulboidea* Summers & Schuster, 1982 | *Notyphodes trilineatus* (Linnaeus, 1771) (Cerambycidae: Lamiinae) | Panama | Summers & Schuster (1982) |
| *T. corinnae* Haitlinger, 1993 | *Polychalca dentipennis* (Boheman, 1850) (Chrysomelidae: Cassidinae) | Brazil | Haitlinger (1993d) |
| *T. pannucca* Summers & Schuster, 1872 | *Lagocheirus faveolatus* Dillon, 1957 (Cerambycidae: Lamiinae) | Panama | Summers & Schuster (1982) |
| *T. tenax* Summers & Schuster, 1982 | *Taeniotes scalaris* (Gmelin, 1790) (T. scalaris) (Cerambycidae: Lamiinae) | Panama | Summers & Schuster (1982) |
| *Uriophila arieli* Haitlinger, 1991 | *Hemisodorus rubrofemoratus* (Vollenhoven, 1865) (Macrodora rubrofemoratus) (Lucanidae) | Russia | Haitlinger (1991a), Khaustov & Eidelbeg (2001) |
| *Vandineillia adriassae* Haitlinger, 1989 | *Trichogomphus brongius* (Herbst, 1785) (T. milon) (Scarabaeidae: Dynastinae) | Sumatra (Indonesia) | Haitlinger (1989b) |
| *V. oppressa* Haitlinger, 1989 | *T. lunicollis* Burmeister, 1847 | Borneo (Indonesia) | Haitlinger (1989b) |
| *Vereoxia bogerii* Haitlinger, 1995 | Lucanidae undet., *Odontolabis dalmani* (Hope & Westwood, 1845) (Lucanidae: Lucaninae) | Indonesia | Haitlinger (1995b), Okabe & Goka (2008) |
A key to the European genera of canestriniid mites for males
In genus Cercediphotia gen. nov. and Paracanestrinia Haitlinger & Šundić, 2017 males are unknown

1. Setae vi, c2, d2, and e2 bifurcated................................. Ismaielienia gen. nov.
   – These setae are not bifurcated..............................2
2. Adanal suckers absent ........................................3
   – Adanal suckers present ......................................4
3. Dorsum reticulated. Opisthosoma very poorly narrowed........... Coleopterophagus Berlese, 1882
   – Dorsum not reticulated. Opisthosoma strongly narrowed........ Procericola; Cooreman, 1950
4. Opisthosoma with lobes ........................................5
   – Opisthosoma without such lobes..............................7
5. Opisthosoma with three lobes........................................ Amansiella Khaustov & Eidelberg, 2001
   – Opisthosoma with two lobes* ..................................6
6. Opisthosoma broad with large lobes having several large and thick setae............................ Camirohylla Haitlinger, 1991
   – Opisthosoma narrowed with small lobes without thick setae........ Paramansia; Cooreman, 1950
7. Sejugal furrow absent..................................................8
   – Sejugal furrow present ..........................................10
8. Tarsus IV with distinctly enlarged ambulacrual claw ...... Paraphotia Khaustov & Eidelberg, 2001
   – Tarsus IV without enlarged ambulacrual claw...................9
9. Posterior margin of idiosoma straight, tarsi I–IV >60 μm.......... Lombardiniella Cooreman, 1950
   – Posterior margin of idiosoma rounded, tarsi I–IV <60 μm .................. Balearella gen. nov.
10. Posterior part of opisthosoma with well sclerotised and forming caudal capsule ........................................ Photia Oudemans, 1904
    – Posterior part of opisthosoma without such caudal capsule ..........................11
11. Setae c1 shifted beyond the level of setae d2, setae d1 located near setae c1, setae e2 and setae d2 thicker than setae c1 and d1 ........................................ Pencanestrinia; Berlese, 1911
    – Setae c1 are at or slightly below setae c2..........................12
12. Opisthosoma narrow ..................................................13
    – Very weakly narrowed opisthosoma ............................16
13. Opisthosoma concave in the middle part ............................. Ciprusenia gen. nov.
    – Opisthosoma not concave in the middle part..................14
14. Leg IV much thicker than legs I–III..........................15
    – Leg IV the same thickness....................................16
    Peninsula Khaustov & Eidelberg, 2001
15. Only 2 pairs of caudal setae are long (h1 and h2), adanal suckers are located close to the anal opening....................... Midiphotia gen. nov.
    – Only setae h2 are long, adanal suckers are located relatively far from the anal opening......................... Neophotia Samšiňák, 1971
16. Caudal setae very short (h1, h2)................................ Pseudoamansia Cooreman, 1950
    – Caudal setae long..................................................17
17. Dorsal surface with long setae, c1 > 50, c2 > 30 .................. **Dicanestrinia Berlese, 1911
    – Dorsal surface with short setae c1 < 15, c2 < 3018
18. Propodosomal plate completely reduced .................... Canestrinia, 1881
    – Propodosomal plate present ....................................19
19. Dorsum with cell-shaped ornamentation, setae e1 of similar length to setae e2................................. Mesophotia Samšiňák, 1971
    – Dorsum with different ornamentation (cell-shaped and lines), setae e1 longer than setae e2.............. Pseudocanestrinia Khaustov & Eidelberg, 2001

* Percanestrinia norodomi has also 2 lobes, but genu III with short and enlarged seta
** based on D. huberti and D. knobi, *** based on the description of .......... C. dorcicola; Haitlinger (1988c)

A key to the European genera of canestriniid mites for females
In genera Camirohylla Haitlinger, 1991 and Lombardiniella; Cooreman, 1950 females are unknown

1. A sickle-shaped structure present in the space between setae d1–e1 .... Photia Oudemans, 1904
   – Such structure is absent........................................2
2. Posterior margin of idiosoma concave in the middle, setae vi and some of the dorsal setae are bifurcated....................... Ismaielienia gen. nov.
   – Posterior margin of idiosoma is not concave, setae vi not bifurcated........................................3
3. Setae d1, c1, e2 enlarged.....Cercediphotia gen. nov.
   – These setae are thin...........................................4
4. Hysterosoma and the ventral part of opisthosoma covered by denticles
   
   5. Sejugal furrow absent
   6. Setae ve absent
   7. Idiosoma ornamented, setae e₁ placed far from setae e₂, posterior margin of idiosoma narrow
   8. Idiosoma in the posterior part strongly narrowed, propodosomal plate absent
   9. Setae h₁ placed on dorsum, setae e₂ are outside setae h₁
   10. Posterior part of the idiosoma very narrow
   11. Sejugal furrow developed only medially
   12. Hysterosoma with 6 pairs of short setae (seta f₂ on ventral side of idiosoma
   13. Setae d₁ are located near setae e₁ or at least half the distance between c₁ and e₁
   14. Dorsal surface of idiosoma not ornamented
   15. Posterior part of idiosoma with numerous cuticular spines
   16. All setae c, d and e series are short and not exceeding 35 μm in length
   17. Dorsum is ornamented with cell-shaped structures, setae h₁ short
   18. Setae c₁ shifted beyond the level of setae d₂, setae d₁ located near setae c₁, setae c₂ and setae d₂ thicker than setae c₁ and d₁
   19. Setae e₁ longer than setae e₂
   20. Setae c₁, d₁, c₂ and d₂ not very long, the longest of them does not exceed 85 μm, TaIV below 75 μm
   21. Setae c₁, d₁, c₂ and d₂ very long (94–184 μm), TaIV 128–156 μm long

A key to the Asian and Oceanic genera of canestriniid mites for males

Genera which are already in the keys for Europe are not included in these keys.

In genera: Cneocodema Summers & Schuster, 1981, Hypopteryx Summers & Schuster, 1981, Noemiphela Haitlinger, 1991, Paramelisia Summers & Schuster, 1982, Shillongia Haitlinger, 1990 and Taseopus Summers & Schuster, 1982 males are unknown

1. Posterior margin of idiosoma with lobes
   2. Posterior margin of idiosoma without lobes
   3. No adanal suckers
   4. Setae c₂ very long, posterior margin of idiosoma with small protuberance

*based on D. knobi and D. huberti

R. Haitlinger
- Setae c₂ very short, posterior margin of idiosoma without protuberance ........................................5

5. Seta w on tarsi III and IV with strongly enlarged base, seta f₂ simple, seta vi less than 65 μm long .......................................Albinorattia Haitlinger, 1989

- Seta w on tarsi III and IV with not such base, seta f₂ bifurcate, seta vi over 150 μm long ...............................................................Oceogavia Haitlinger, 1989

6. The space between the caudal lobes in the form of a narrow slit, at the anal slit and outside of the adanal suckers after a pair of thick setae ..........Mossongia Haitlinger, 1989

- The space between the caudal lobes bigger, all setae at anal slit and outside of adanal suckers normal ..................................................7

7. Setae vi 100–125..........................Haitlingeria; W. Kim, Lee, J. Choi, Sim, J. Kim, Y. Choi, K. Kim, 2006

- Setae vi < 70...............................8

8. Caudal lobes widely spaced but short, setae vi 56–68..................Aurilossongia Haitlinger, 1989

- Caudal lobes widely spaced but long, setae vi 36–52 ....................Canestriniella Berlese, 1910

9. Most of dorsal setae barbed or serrated .........10

- Dorsal setae are not barbed or serrated, only exceptionally with 1 or 2 spikelets on long setae ..........................................................11

10. Most dorsal setae distinctly barbed; setae se, d₂, h₁ each with the prominent spikelets near mid-length ..............................Melisia Lombardini, 1944

- Dorsal setae serrate, setae se, d₂, h₁ without the prominent spikelets, exceptionally with one pair or two pairs of barbs at bases of these setae .........Lidiophela Haitlinger, 1990

11. Adanal suckers absent .................................12

- Adanal suckers present ........................................21

12. Gnathosoma very long having about ½ length of idiosoma, tarsus IV contains 4 stout subterminal setae ................Vereoxia Haitlinger, 1995

- Gnathosoma short, tarsus IV without such setae .................................................................13

13. The dorsal surface of idiosoma contains, among others, very wide flabelliform oplumose setae ......................................................14

- The dorsal surface does not contain such setae .................................................................16

14. The dorsal surface with plumose setae ..........Pheralerus Nesbitt, 1976

- The dorsal surface with flabelliform setae ......15

15. Tarsi III–IV relatively long and thin, 3 pairs of flabelliform setae ....Phaleratusellus gen. n.

- Tarsi III ans IV short and thick, 2 pairs of flabelliform setae...Passalophagus Nesbitt, 1976

16. Se jugal furrow present ................................17

- Se jugal furrow absent .....................................19

17. Dorsum with heterogenous ornamentation, 3 pairs of long caudal setae (h₁, h₂, h₃).................................Beiriphila Haitlinger, 1994

- Dorsum without ornamentation, 2 pairs of long caudal setae ..................................................................................................18

18. Setae se, cp, h₁ and h₂ with 1–2 spikelets, φ₁ about twice as long as φ₁ .................................................Rugoniphela Haitlinger, 1991

- All setae nude, φ₁ not much longer than φ₁ ....Urothila Haitlinger, 1991

19. Tarsi IV without ambulacra ..........................20

- Tarsi IV with ambulacra .......................................21

20. Tarsi IV without thick setae, length of dorsal setae c₁ < 14 μm, d₁ < 18 μm .................................................Vandeinella Haitlinger, 1989

- Tarsi IV with 2 thick setae (s, w), length of dorsal setae c₁ 30–74, d₁ 44–80 ..................................................Athogavia Haitlinger, 1989

21. Hysterosoma with cuticular formation oval or divided into two parts ..................................................Contramelisia Samšiñák, 1968

- Hysterosoma without such cuticular formation ................................................................................22

22. Setae 2a, 3a, 4a, c₁ and g peg-like ..................Cooreanema Nesbitt, 1976

- These setae are thin ........................................23

23. Tarsi III and IV without ambulacra ..................Sumatanella gen. n

- Tarsi III and IV with ambulacra ..........................24

24. Se jugal furrow present ..................................25

- Se jugal furrow absent .....................................27

25. At least setae cp and h₂ with spikelets, tarsi IV long 106–224 μm ..................................................Sandrophela Haitlinger, 1990

- All long setae without spikelets ......................26
26. Hysterosoma and opisthosoma without ornamentation, opisthosoma narrow and very short; its length is about ¼ the length of the hysterosoma…………………… Javanellina gen. nov.
- Hysterosoma and opisthosoma fully or partially ornamented by cell-shaped structures or lines, opisthosoma narrow and its length is about ½ or ⅔ the length of the hysterosoma……………………. Kuramasenia gen. nov.

27. Opisthosoma carries a broad deep fossa above, in front of, or between closely grouped lumbar setae ……. Arraphosoma Summers & Schuster, 1981
- Opisthosoma without a broad deep fossa ……. 28

28. Setae se, cp, h₁ and h₂ with spikelets………………. Hargeinella Haitlinger, 1989
- None of the setae have spikelets ……. 29

29. Three pairs of long caudal setae (h₁, h₂, h₃), opisthosoma only slightly narrowed in the posterior part, tarsi IV > 150 μm……………………. Teophyssa Haitlinger, 1990
- Two pairs of long caudal setae (h₁, h₂), opisthosoma is clearly narrowed in the posterior part, tarsi IV < 130……………………. 28

30. Posterior part of opisthosoma is very narrow, setae h₁ and h₂ are close together, tarsus IV < 70 μm …….. Jullongia Haitlinger, 1990
- Posterior part of opisthosoma narrow, setae h₁ and h₂ are seated relatively far apart, tarsus IV > 80 μm …….. Sajanophela Haitlinger, 1990

4. Two pairs of flabelliform setae, tarsi III and IV short and thick ……. Passalophagus Nesbitt, 1976
- The dorsal surface with plumose setae …….. Phaleratus Nesbitt, 1976

5. Hysterosoma with cuticular formation oval or divided into two parts……………………. Contramelisella Samšínák, 1968
- Hysterosoma without such cuticular formation……………………. 6

6. Most of dorsal setae barbed or serrated ……. 7
- Dorsal setae are not barbed or serrated, only exceptionally with 1 pair or 2 pairs of spikelets on long setae …….. 9

7. Dorsal seta with small barbs, medial and posterior parts of idiosoma with numerous protuberance ……. Tamophela Haitlinger, 1990
- Medial and posterior parts of idiosoma without protuberance……………………. 8

8. Most dorsal setae distinctly barbed; setae se, d₂, h₁ with the prominent spikelets near mid-length ……. Melissa; Lombardini, 1944
- Dorsal setae serrate, setae se, d₂, h₁ without the prominent spikelets, exceptionally with one pair or two pairs of barbs at bases of these setae….. Lidiophela Haitlinger, 1990

9. Gnathosoma very long having about ⅔ length of idiosoma, tarsi IV without amulacra …….. Vereoxia Haitlinger, 1995
- Gnathosoma short, tarsi IV with ambulacra …….. 10

10. Idiosoma with postanal fossa …….. Paramelisella Summers & Schuster, 1982
- Idiosoma without postanal fossa …….. 11

11. Posterior margin of opisthosoma with 3 small lobes, posterolateral margins of opisthosoma with denticles……. Albinorattia Haitlinger, 1989
- Posterior margin of opidiosoma without lobes, posterolateral margins of opisthosoma without denticles……………………. 12

12. Sejugal furrow present …….. 13
- Sejugal furrow absent …….. 20

13. Setae se, cp, h₁, h₂ with spikelets……….. 14
- These setae without spikelets …….. 16

14. Setae c₁ reduced, setae d₁ shifted towards the posterior part of the idiosoma …….. Noemiphela Haitlinger, 1991
- Setae c₁ and c₂ placed on the same level …….. 15

A key to Asiatic and Oceanic genera of canestrinid mites for females
In genera: Hargeinella Haitlinger, 1989, Phaleratosellus gen. n., Sajanophela Haitlinger, 1990, Shillongia Haitlinger, 1990, Uriophela Haitlinger, 1991 females are unknown

1. Setae 2a, 3a, 4a, 4b, c₁ peg-like …….. Cooremania Nesbitt, 1976
- These setae are thin …….. 2

2. The dorsal surface of idiosoma contains, among others, very wide flabelliform, plumose setae or extended, barbed or serrated setae …….. 3
- The dorsal surface of idiosoma does not contain such setae …….. 5

3. Setae se, vi, c₂, d₂, h₁, h₂, h₃ extended, barbed or serrated …….. Tassopus Summers & Schuster, 1982
- These setae in a different form …….. 4
A review of host-commensal associations between canestrinid mites (Astigmata: Canestriniidae) and Insecta

15. Setae vi 100–140, TaII 102–180, TaIII 126–214 .................................. Sandrophela Haitlinger, 1990
   – Setae vi 64–76, TaII 72–90, Ta III 84–102..........................
   – Rugoniphela Haitlinger, 1991
16. Idiosoma not ornamented, opisthosoma with two oval cuticular structures .................................. Oceogavia Haitlinger, 1989
   – Idiosoma ornamented, opisthosoma without oval cuticular structures .................................. 17
17. Opisthosoma narrow, covered with shell-shaped and oval structures ............. Javanella gen. nov.
   – Opisthosoma wide. Hysterosoma and opisthosoma or only hysterosoma covered with shell-shaped structures or transverse and longitudinal lines .................................. 18
18. Opisthosoma more than twice as narrow as hysterosoma, setae c₂ many times longer than c₁ (40–60 vs. 5–10) ............................................................. Haithingeria Kim W. J., Lee, Choi J., Sim, Kim J., 2006
   – Opisthosoma not much narrower than hysterosoma, between setae c₁ and c₂ there is not much differences .................................. 19
19. Setae h₃ relatively long, hysterosoma and opisthosoma with 7 pairs of short setae .......... Canestriniella Berlese, 1910
   – Setae h₃ short, hysterosoma and opisthosoma with 6 pairs of short setae Kuramasenia gen. nov.
20. Long dorsal setae with spikelets .................................. 21
   – These setae without spikelets .................................. 22
21. Dorsal side of the idiosoma without setae d₁, d₂ and e₁ .................................. Mossongia Haitlinger, 1989
   – Dorsal side of idiosoma with setae d₁, d₂ and e₁ .................................. Vandelnella Haitlinger, 1989
22. Dorsum with heterogeneous ornamentation (longitudinal, transverse lines, c ell-shaped, shell-shaped), cI not much shorter than φI.................................. Beerrhopota Haitlinger, 1994
   – Dorsum without ornamentation or if exist it is in a different form, cI is clearly shorter than φI .................................. 23
23. Tarsi IV with 2 thick setae (s, w) .................................. Athogavia Haitlinger, 1989
   – Tarsi IV without thick setae or with only one thick seta (s) .................................. 24
24. Posterior margin of opisthosoma concave, seta s on tarsi I, II with concave tip ..................
   – Rugoniphela Haitlinger, 1991
   – Posterior margin of idiosoma is not concave and also the tip of setae s is not concave ............ 25
25. All body setae except se short or minute .......... Hypopteryx Summers & Schuster, 1981
   – More than one pair of long setae on the body ........................................................................ 26
26. Opisthosoma carries a broad, deep fossa above ........................................ Arraphosoma Summers & Schuster, 1981
   – Opisthosoma without deep fossa .................. 27
27. Setae d₂ displaced to the middle or posterior part of idiosoma, usually many times longer than the setae d₁. Tarsi with strong empodial claw .......... Apalotacarus Summers & Schuster, 1981
   – Setae d₂ not displaced to the middle or posterior part of idiosoma. Tarsi without strong empodial claw .................................. 28
28. Setae c₁ and d₁ many times longer than setae c₂ and d₂ .................................. Cucoderma Summers & Schuster, 1981
   – These setae of similar length .................. 29
29. Setae e₁ and e₂ situated on the same level or almost on the same level and both pairs of these setae are located close to each other .................................. Aurillosongia Haitlinger, 1989
   – Setae e₁ and e₂ located at different levels ...... 30
30. Almost the entire dorsal side of the idiosoma is ornamented; setae e and d on tarsi III and IV are very long .................................. Sumatranella gen. nov.
   – The idiosoma is not ornamented or only partially ornamented; only setae d on tarsi IV are very long .................................. 31
31. Tarsi I–IV very long (TaI 126–132, TaII 120–130, TaIV 160–180) Teophyssia Haitlinger, 1990
   – Tarsi I–IV very short (TaI 48–60, TaII 40–60, TaIV 56–70) .................................. 32
32. Dorsal side of idiosoma with 6 pairs of short or minute setae, posterior margin of idiosoma in the middle concave Fullongia Haitlinger, 1990
   – Dorsal side of idiosoma with 3 pairs of short setae, posterior margin of idiosoma slightly rounded .......................... Gioharattia Haitlinger, 1989
Acknowledgements

Thank you Prof. Dr. L. Borowiec (University of Wrocław) for the correct names for some Cassidinae and Prof. Dr. D. Iwan (Polish Academy of Sciences, Warsaw) for the correct names for some Tenebrionidæ.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Ryszard Haitlinger © http://orcid.org/0000-0002-5661-7099

References

Ardeshir F, Hasanvand I, Haitlinger R, Shahriar J. 2016. *Camiloxylla* (Acari: Astigmat: canestriniidæ), a new mite genus to fauna of Iran. Persian Journal of Acarology 5:159–160.

Banks N. 1914. New Acarina. Journal of Entomology and Zoology 6:61–62.

Banks N. 1915. A new genus of Canestriniidæ. Entomological News 26:152–153.

Berlese A. 1881. Sopra un nuovo genere di acari parasiti degli insetti. Atti del Reale Istituto veneto di scienze, lettere ed arti 7:747–752.

Berlese A. 1897. Acari, Myriopoda et Scorpiones hucusque in Italia. Reperta 1(9):1. Padova.

Berlese A. 1910a. Lista di nuovi specie e nuovi generi di Acari. Redia 6:242–281.

Berlese A. 1910b. Brevi diagnosi e specie nuovi di Acari. Redia 6:346–399.

Berlese A. 1911. Alcuni Acari entomofil di nuovi. Redia 7:183–186.

Berlese A. 1920. Centuria quinta di Acari nuovi. Redia 14:143–195.

Beron P. 1971. Sur les Acaridiens tyglophoïdes vivant en association phorétique sur les mammifières et les insectes en Bulgarie. Bulletin de l’Institut de Zoologie et Musée 33:203–207.

Beron P. 1975. *Canestrinia saminahis* sp. n. (Acariformes, Glycyphagidæ) – en nouvel Acarien, vivant sous les élytres des Coleoptères de la famille Tenebrionidæ. Acta Zoologica Bulgarica 2:83–89.

Borowiec L. 2009. New records of Asian and Australapuan tortoise beetles (Coleoptera: Chrysomelidae: Cassidinae). Genus 20:435–448.

Borowiec L. 2010. A monograph of the Afrotopical Cassidinae. Supplement 1 (Coleoptera: Chrysomelidae). Genus 21:535–578.

Bouchard P, Lawrence JF, Davies AE, Newton AE. 2005. Synoptic classification of the world Tenebrionidæ (Insecta: Coleoptera) with a review of family-group names. Annales Zoologici 55:495–530.

Boyane SS, Subba B, Priyadarsanam DR, Ghate HV. 2020. First illustrated report of *Batocera lineolata* Chevolot, 1852 (Cerambycidae, Lamiinae, Batocerini) from India. Check List 16:1609–1613. DOI: 10.15560/16.6.1609.

Buitendijk AM. 1945. Voorleping catalogus van de Acari in de collectie-Oudemans. pp. 110.

Canestrini G. 1878. Nuovi speci del genere *Dermaleichus*. Atti del Reale Istituto veneto di scienze, lettere ed arti 5:44–69.

Canestrini G, Berlese A. 1880. Nuovi Acari osservati da Giovanni Canestrini e Antonio Berlese. Atti della Società Veneto-Trentina di Scienze Naturali 8:1–148.

Cooreman J. 1950. Etude de quelques Canestriniidæ (Acari) vivant sur des Chrysomelidæ et sur des Carabidæ (Insecta, Coleoptera). Bulletin de l’Institut Royal des Sciences Naturelles de Belgique 26:1–24.

Cooreman J. 1953. Notes et observations sur les Acariens. V. – Sur le genre *Ceclidopus KIRSCH* (Erythraeidae) et sur une espèce nouvelle du genre *Percanestronia BERLESE* (Canestriniidæ). Bulletin de l’Institut Royal des Sciences Naturelles de Belgique 29:1–12.

Cooreman J. 1954. Acarini Canestriniidæ de la collection A. C. Oudemans, a Leiden. Zoologische Mededelingen 33:83–90 (planche V–XVIII).

Cooreman J. 1955. Exploration du Parc National Albert, Mission G. F. Witte 1933–1935. Institut des parcs nouveaux du Congo belge 85:1–43.

Cooreman J. 1958. Notes et observations sur les Acariens. VII. – *Photia gressa* n. sp. (Acaridiae, Canestriniidæ) et Lorryia formosa n. sp. (Stomatostigma, Tydeidae). Bulletin de l’Institut Royal des Sciences Naturelles de Belgique 34:1–10.

Corupz-Raros LA. 2001. A checklist and host index of Philippine mites (Acari) associated with arthropods. Philippine Entomologist 15:45–66.

El Bishlavy SMO, Allam SFM. 2003. A new canestriniid mite (Acari, Astigmatidæ, Canestriniidæ) associated with *Blaps polychestra* Forsk. (Insecta, Coleoptera, Tenebrionidæ). Insect Pathogens et Insect Paasitic Nematodes 1:267–271.

Evans GO, Sheals JG, MacFarlane D. 1961. The terrestrial Acar of the British Isles I. London.

Fain A. 1974. Deux nouveaux hypopodes vivant en association phorétique sur des Hyménoptères africains (Acarna: Sarcopiformes). Revue de Zoologie Africaine 88:421–426.

Fain A. 1987a. Observations sur les Canestriniidæ (Acari) de la région néotropicale I. Nouvelles espèces du genre *Grandella* Lombardini. Bulletin de l’Institut Royal des Sciences Naturelles de Belgique, Entomologie 57:93–110.

Fain A. 1987b. Notes on mites associated with Myriapoda I. Three new astigmatic mites from Afrotropical Myriapoda (Acari, Astigmatida). Bulletin de l’Institut Royal des Sciences Naturelles de Belgique, Entomologie 57:161–172.

Fain A. 1989. Observations sur les Canestriniidæ (Acari) de la région néotropicale. II. Description de nouveaux taxa. Bulletin de l’Institut Royal des Sciences Naturelles de Belgique, Entomologie 58:67–70.

Fain A, Noti MI, Dufrène M. 1995. Observations on the mites (Acari) associated with Carabidæ (Coleoptera) in Belgium. I. Annotated list of the species. International Journal of Acarology 21:107–122. DOI: 10.1080/01647959508844051.

Fan Q-H, Yan C, Wang Z-Q. 2010. Acaridia (Acari: Astigmatina) of China: A review of research progress, 225–259. In: Zhang Z-Q, Hong X-Y, Fan Q-H, Xin J, editors. Progress in Chinese acarology. Zoosystema. Vol. 4, pp. 1–345.

Flinte V, Abejanella A, Daccordi M, Monteiro RF, Macedo MV, 2017. Chrysomelidæ species (Coleoptera, Chrysomelidæ) and new biological data from Rio de Janeiro, Brazil. ZooKeys 720:5–22. DOI: 10.3897/zookeys.720.13963.
A review of host-commensal associations between canestriniid mites (Astigmata: Canestriniidae) and Insecta

Haitlinger R. 2011d. Canestriniid mites (Acar, Astigmata, Canestriniidae) occurring on Chrysomelidae (Insecta, Coleoptera) in Neotropical region. I. Genera Grandellina Fain, Armisthiana n. gen. Wiadomosci Parazytologiczne 37:381–399.

Haitlinger R. 2011e. New canestriniid mites (Acar, Astigmata, Canestriniidae) connected with Elateridae (Insecta, Coleoptera). Zeszty Naukowe Akademii Rolniczej we Wroclawiu, Zootechnika XXXV 206:253–263.

Haitlinger R. 2011f. New canestriniid mites (Acar, Astigmata, Canestriniidae) associated with some Tenebrionidae and Carabidae (Insecta, Coleoptera). Zeszty Naukowe Akademii Rolniczej we Wroclawiu, Zootechnika XXXV 206:273–281.

Haitlinger R. 2012a. The genus Pernacarina Berlese, 1911 (Acar, Astigmata, Canestriniidae) with descriptions of three new species. Zoologischer Jahrbaruch fuer Systematik 119:535–542.

Haitlinger R. 2012b. A preliminary description of new species of Grandellus Fain, 1891 (Acar, Astigmata, Canestriniidae) associated with Cassidinae (Insecta, Coleoptera, Chrysomelidae) from Neotropical region. Bolletino del Museo regionale di Scienze naturali, Torino 10:51–61.

Haitlinger R. 2013a. New genera and species of Afrotopical Canestriniidae (Acar, Astigmata). Spixiana 16:5–17.

Haitlinger R. 2013b. New genus and two new species of canestriniid mites (Acar, Astigmata) associated with Lycanidae (Insecta, Coleoptera). Mitteilungen aus dem Zoologischen Museum in Berlin 69:339–344. DOI: 10.1002/mmz.1993060212.

Haitlinger R. 2013c. Canestriniid mites (Acar, Astigmata, Canestriniidae) occurring on Chrysomelidae (Insecta, Coleoptera) in Neotropical region. II. Genera Ovarothina n.gen., Enothina n. gen. Wiadomosci Parazytologiczne 39:59–73.

Haitlinger R. 2013d. Canestriniid mites (Acar, Astigmata, Canestriniidae) occurring on Chrysomelidae (Insecta, Coleoptera) in Neotropical region. III. Genera Thopia Summers et Schuster, Sabothina n. gen., Olothina n. gen., Bibolothina n. gen. Wiadomosci Parazytologiczne 39:265–283.

Haitlinger R. 2014a. New canestriniid mites (Acar, Astigmata) from Costa Rica. Brenesia 41–42:81–93.

Haitlinger R. 2014b. New species of mites (Acar, Astigmata, Canestriniidae) associated with Lycanidae, Carabidae and Scarabaeidae (Insecta, Coleoptera). Wiadomosci Parazytologiczne 40:193–213.

Haitlinger R. 2015a. New mites (Acar, Astigmata: Canestriniidae; Prostigmata: Erythraeidae, Trombidiidae, Microtrombidiidae) for the fauna of Austria, Germany and Herzegovina with descriptions of four new species. Länzer Biologische Beitrage 27:259–272.

Haitlinger R. 2015b. New species of mites collected on Tenebrionidae, Scarabaeidae, Cerambycidae and Lycanidae with the description of new subfamily Veroxiniaceae (Acar, Astigmata, Canestriniidae). Wiadomosci Parazytologiczne 41:79–91.

Haitlinger R. 1998. Four new species of canestriniid and heterocoptid mites from China (Acar, Astigmata, Canestriniidae, Heterocoptidae). Spixiana 21:1–10.

Haitlinger R. 1999a. New canestriniid mites (Acar, Astigmata, Canestriniidae) from Neotropical region. Zeszty Naukowe Akademii Rolniczej we Wroclawiu 45:35–56.

Haitlinger R. 1999b. Mites (Acar) occurring on Geotrupes stercoreus, G. mutator and Typhoeus typhoeus (Coleoptera: Scarabaeidae) in Poland. Polskie Pismo Entomologiczne 68:319–336.

Haitlinger R. 2000. A new canestriniid mites, Bicercilia bertrami n. g., n. sp. (Acar: Astigmata: Canestriniidae) parasitic on tenebrionid beetles (Coleoptera: Tenebrionidae) from...
Jolivet P, Verma KK. 2008. Eumolpinae – A widely distributed and much diversified subfamily of leaf beetles (Coleoptera, Chrysomelidae). Terrestrial Arthropod Review 1:3–37. DOI: 10.1163/187498308X345424.

Khustov AA. 2006. Two new species of mites of the family Canestriniidae (Acari: Astigmata) associated with beetles of the subfamily Cetoninae (Coleoptera, Scarabaeidae) from Ethiopia. Acarina 14:79–84.

Khustov AA, Eidelberg MM. 2001. A review of the family Canestriniidae (Acarina: Astigmata) of the Eastern Palearctic. Acarina 9:23–46.

Kim W, Lee S, Choi J, Sim H, Kim J, Choi Y, Kim K. 2006. A new canestriniid mite, HAITLINGERIA longiglobata n. g., n. sp. (Acari: Astigmata: Canestriniidae), parasiatizing Serrognathus platymeles castanicolor Motschulsky (Coleoptera: Lucanidae) from South Korea. Systematic Parasitology 65:13–18. DOI: 10.1007/s11230-006-9035-9.

Kishida K. 1924. On a new canestriniid mite from Japan. Annotaciones Zoologique Japonenses 10:363–364.

Lavoipierre MM. 1958. Notes acarologiques. I. Deux nouveaux genres et quatre nouvelles especes d’acariens (Acarina, Mesostigmata et Sarcophtiformes) de l’Afrique occidentale et orientale. Annales de Parasitologie 33:603–618.

Lila G. 2014. Contributions to the knowledge of research on beetle parasite fauna (insects) note 2. Studii si Comunicari. Stiintele Naturi 30:105–120.

Lombardini G. 1939a. Acari nuovi I. Memorie della Societa Entomologica Italiana 17:44–46.

Lombardini G. 1939b. Acari nuovi II. Memorie della Societa Entomologica Italiana 17:118–120.

Lombardini G. 1939c. Coleophyus ulrrajabae Lomb L. Agricultura coloniale 33:294–296.

Lombardini G. 1942. Acari Grandiella testia n. sp. L’Agricolture coloniale 36:46–49.

Lombardini G. 1944. Acari. Un nuovo genere della famiglia Tyroglyphidae. Redia 30:21–24.

Lombardini G. 1950. Canestriniidae dell’ America del Sud (Acarina). Arthropoda 1:279–290.

Lundquist L. 1985. Procericola bourgouei (Oudemans, 1923) (Acari: Canestriniidae) on carabid beetles in south Sweden. Acarologia 26:381–384.

Nesbitt HHJ. 1976. Five new canestriniids (Acarina: Astigmata) from Papua New Guinea. Zoological Journal of the Linnean Society 58:219–236. DOI: 10.1111/j.1096-3642.1976.tb00829.x.

O’Connor BM. 2004. Taxonomic comments of the genus Grandiella Lombardini, 1939 (Acari: Canestriniidae). International Journal of Acarology 30:119–121. DOI: 10.1080/01647950408863479.

Okabe K, Goka K. 2008. Potential impacts on Japanese fauna of canestriniid mites (Acarina: Astigmata) accidentally introduced with pet lucanid beetles from Southeast Asia. Biodiversity and Conservation 17:71–81. DOI: 10.1007/s10531-007-9231-1.

Okabe K, Masuya H, Kanazaki N. 2017. Unintentional introductions of microscopic organisms associated with forest insects. Biological Invasions 19:3229–3242. DOI: 10.1007/s10530-017-1507-0.

Oudemans AC. 1923. Acarologische Aanteekeningen LXXIII. Entomologische Berichten Nederland 6:201–208.

Poppe A. 1907. Nachtrag zur Milbe fauna der Umgegend Bremens (mit Beiträgen von Dr. A.C. Oudemans). Abhandlungen des Naturwissen schaftlichen Vereins zu Bremen 19:47–67.

Rack G. 1968. Milben als Hausungeziefer u. Vorrats schädlinge in Nordwestdeutschland. Entomologische Mitteilungen aus dem
A review of host-commensal associations between canestriniid mites (Astigmata: Canestrinidae) and Insecta

Zoologischen Staatstierenkundlichen Museum Hamburg 3:249–268.
Saha S, Özdikmen H, Biswas MK, Raychaudhuri D. 2013. Exploring fast faced longhorn beetles (Coleoptera: Cerambycidae: Lamiae) from the Reserve Forest of Dooars West Bengal, India. International Scholarly Research Notices 2013:IC737193.

Samišták K. 1963. *Melisia* Lombardini, 1944 – eine auf insektiden lebende gattung der unterfamilie Glycyphagininae (Acari). Casopis Ceskoslovenské Spolecnosti Entomologické 60:252–262.

Samišták K. 1964. Die auf Procerus lebenden formen der gattungen Procericola Cooreman, 1950 und Photia Oudemans, 1904. Vestník Ceskoslovenské Spolecnosti Zoologické 28:34–43.

Samišták K. 1965. Die auf Pruroctus (Col. Carab.) lebenden milben (Acari) und ihre bedeutung für die zoogeographie. Mitteilungen aus dem Zoologischen Museum in Berlin 41:137–155. DOI: 10.1002/mmnz.19650410202.

Samišták K. 1968. Zoologische Ergebnisse der Forschungen von Dr. T. Pocs in der Demokratischen Republik Vietnam Acari: Acaridae. Zoologischer Anzeiger 182:407–416.

Samišták K. 1970. Die auf Blaps (Col. Tenebrionidae) lebenden Milbender Gattung *Canestrinia* Berlese, 1881 (Acari). Entomologische Mitteilungen aus dem Zoologischen Museum in Berlin 4:71–78.

Samišták K. 1971. Die auf Carabus-Arten (Coleoptera, Adepagha) der palarktischen Region lebenden Milben der Unterordnung Acariformes (Acari); ihre Taxonomie und Bedeutung für die Lösung zoogeographischer, entwicklungsfechichtlicher und parasitophylacterischer Fragen. Entomologische Abhandlung Staatsliches Museum für Tierkunde in Dresden 38:145–234.

Santiago-Blay JA, Fain A. 1994. Phoretic and ectoparasitic mites (Acari) of the Chrysomelidae. In: editors, Jolivet PH, Cox ML, Petitpierre E. Nouvel aspects of the biology on the Chrysomelidae. Serie Entomologica, Vol. 50, pp. 407–417.

Siepel H, Gremers H, Vierbergen B. 2016. Provisional checklist of the astigmatid mite of the Netherlands. Nederlandse Faunistische Mededelingen 47:49–88.

Summers FM, Schuster RO. 1979a. Eleven new species of *Grandidilla* Lombardini (Acarina: Canestrinidae). International Journal of Acarology 5:325–350. DOI: 10.1080/01647957908683179.

Summers FM, Schuster RO. 1979b. Revision of *Aerotracarus* Banks (Acari: Canestrinidae). Proceedings of the Entomological Society of Washington 81:475–485.

Summers FM, Schuster RO. 1981a. *Apalotracarus*, a new genus of canestriniid mites from passalid beetles. International Journal of Acarology 7:17–38. DOI: 10.1080/01647958108683240.

Summers FM, Schuster RO. 1981b. Three new genera of canestriniid mites associated with passalid beetles. International Journal of Acarology 7:39–46. DOI: 10.1080/01647958108683241.

Summers FM, Schuster RO. 1982a. The Melissinae, new sub-family of mites in the Canestrinidae associated with passalid beetles. International Journal of Acarology 8:23–31. DOI: 10.1080/01647958208683274.

Summers FM, Schuster RO. 1982b. New canestriniid mites from beetles of the family Cerambycidae. International Journal of Acarology 8:33–46. DOI: 10.1080/01647958208683275.

Theodorides J. 1955. Inventaire hôtes-parasites et phorétiques. Vie et Milieu 7:192–200.

Theodorides J. 1960. Parasites et phorétiques de Coléoptères et de Myriapodes de richelieu (Indre-et-Loire). Annales de Parasitologie 35:488–503.

Trach VA. 2006. The host-parasite associations of the mites family Canestrinidae (Acari: Astigmata) in Ukraine and Moldova. Vestnik Zoologii 11:174–180 (In Ukrainian).

Trach VA, Khaustov AA. 2011. A review of the genus *Coleoptrophagus* Berlese, 1882 (Acari: Astigmata: Canestrinidae) of Ukraine. Acarina 19:213–230.

Trägårdh I. 1901. Acariden aus Ägypten und dem Sudan. Results of the Swedish zoological expedition to Egypt and the White Nile. Vol. 20. Upsala. pp. 124.

Trägårdh I. 1906. Neue Acariden aus Natal und Zululand. Zoologischer Anzaiger 30:870–887.

Turk A. 1948. Insecticolous acari from Trinidad. Proceedings of the Zoological Society, London 118:82–125. DOI: 10.1111/j.1096-3642.1948.tb00367.x.

Turk A. 1953. A synonymic catalogue of British Acari. Part II. Annals and Magazine of Natural History 12 Series 62 (6):81–99. DOI: 10.1080/00222935308654402.

Vishnupriya R, Mohanasundaram M. 1988. Mites associated with insects in Tamil Nadu, India. Entomon 13:247–257.

Vintern G. 1924. Acarologische Beobachtungen. 8 Reihe. Archiv für Naturgeschichte 90:1–86.

Vomero V. 1972. Una nuova specie del genere *Melisia* Lombardini 1944 associate acoleotteri passalidi (Acarina-Sarcoptiformes). Acarologia 14:94–107.

Zamec R, Fenda P. 2013. Phoretic and commensal mites associated with Carabidae. 12th Central European Workshop on Soil Zoology, 8–11 April, České Budějovice. pp. 59.