



Catalogue of trachyuropodid mites (Acari: Mesostigmata: Uropodina: Trachyuropodidae) of the world, with the description of *Trachyibana kozari* n. sp. from Singapore

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ABSTRACT

All known trachyuropodid mites (Acari: Uropodina: Trachyuropodidae) are listed together with diagnoses of the family Trachyuropodidae and trachyuropodid genera. A new illustrated key to trachyuropodid genera is also presented. The second species of the genus *Trachyibana* (*T. kozari* sp. nov.) is described and illustrated from Singapore. Forty eight new combinations are also presented: *Arculatatrachys darwini* (Kontschán and Starý, 2013) comb. nov.; *Arculatatrachys newtoni* (Kontschán, 2010) comb. nov.; *Bostocktrachys berleseselnickia* (Hirschmann, 1976) comb. nov.; *B. extremica* (Kontschán and Starý, 2013) comb. nov.; *B. kiewensis* (Hirschmann, 1976) comb. nov.; *B. myrmecophila* (Wiśniewski and Hirschmann, 1992) comb. nov.; *B. plagiata* (Hirschmann, 1976) comb. nov.; *B. zicsii* (Hirschmann, 1976) comb. nov.; *Castritrachys quadriauricularia* (Hirschmann, 1976) comb. nov.; *Cristiceptrachys sinuata* (Berlese, 1904) comb. nov.; *Cephalojanetia multituberculata* (Hirschmann, 1976) comb. nov.; *C. tuberosa* (Hirschmann, 1976) comb. nov.; *C. dentata* (Kontschán, 2007) comb. nov.; *Cephalouropoda alapaducta* (Hirschmann, 1976) comb. nov.; *Excavataatrachys auricularia* (Costa, 1962) comb. nov.; *E. longicornuta*

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(Hirschmann, 1976) comb. nov.; *E. longicornutasimilis* (Hirschmann, 1976) comb. nov.; *E. poppi* (Hirschmann and Zirngiebl-Nicol, 1969) comb. nov.; *E. quadricornuta* (Hirschmann, 1976) comb. nov.; *E. sellnicki* (Hirschmann and Zirngiebl-Nicol, 1969) comb. nov.; *Graecatrachys bali* (Kontschán and Starý, 2013) comb. nov.; *G. endrodyi* (Hirschmann, 1976) comb. nov.; *G. ghanaensis* (Hirschmann, 1976) comb. nov.; *G. mesofovea* (Hirschmann, 1976) comb. nov.; *G. mesofoveasimilis* (Hirschmann, 1976) comb. nov.; *G. represa* (Hirschmann, 1976) comb. nov.; *G. rufipes* (Hirschmann, 1976) comb. nov.; *Magnatrachys dacica* (Huťu, 1973) comb. nov.; *M. imperforata* (Berlese, 1904) comb. nov.; *M. mexicana* (Hirschmann, 1976) comb. nov.; *M. pecinai* (Hirschmann, 1976) comb. nov.; *M. schusteri* (Hirschmann, 1976) comb. nov.; *M. schusterisimilis* (Hirschmann, 1976) comb. nov.; *Trogulotrachys ablesi* (Hirschmann, 1976) comb. nov.; *T. celtica* (Halbert, 1907) comb. nov.; *T. hirschmanni* (Pecina, 1980) comb. nov.; *T. kinsella* (Kontschán et al., 2010) comb. nov.; *T. michaeli* (Ewing, 1909) comb. nov.; *T. wasmanniana* (Berlese, 1903) comb. nov.; *T. willmanni* (Hirschmann and Zirngiebl-Nicol, 1969) comb. nov.; *Urojanetia baloghi* (Hirschmann, 1976) comb. nov.; *U. baloghisimilis* (Hirschmann, 1976) comb. nov.; *U. belunensis* (Lombardini, 1962) comb. nov.; *U. hexaspinosa* (Hirschmann, 1976) comb. nov.; *U. mahunkai* (Hirschmann, 1976) comb. nov.; *U. similicoccinea* (Hiramatsu, 1979) comb. nov.; *Urotrachytes formicariasimilis* (Hirschmann, 1975) comb. nov.; and *Ur. ponticuli* (Karg, 1989) comb. nov.

KEYWORDS

Uropodina, taxonomy, family and generic diagnoses, new species, new combination

INTRODUCTION

The trachyuropodid mites are one of the most characteristic groups of the Uropodina mites (Lindquist et al., 2009). The species belonging to this family can be easily recognized because their bodies are strongly sclerotized and the surface of the idiosoma is usually covered by depressions, ridges and other strongly sclerotized structures (Kontschán, 2007; Lindquist et al., 2009).

The first described trachyuropodid genus was the *Trachyuropoda* Berlese, 1888, which is the type genus of the family Trachyuropodidae Berlese, 1917, and later other trachyuropodid genera were described (like: *Leonardiella* Berlese, 1904; *Urotrachytes* Berlese, 1904; *Cephalouropoda* Berlese, 1913; *Urojanetia* Berlese, 1913; *Cephalojanetia* Willmann, 1951). Hirschmann and co-worker summarized all trachyuropodid genera and species under the genus *Trachyuropoda* and divided it into 18 species groups (Hirschmann, 1976a). Later Hirschmann (1979) reformed this subdivision and erected 18 genera within the family Trachyuropodidae, but later all of the earlier presented genera were completely neglected, and Hirschmann and his co-workers mentioned again all trachyuropodid species belonging to this genus as members of the different *Trachyuropoda* species-groups (see Wiśniewski and Hirschmann, 1993).

Ninety one named species subdivided into 18 *Trachyuropoda* species-groups were listed in the Wiśniewski and Hirschmann's (1993) synthetic work. After this paper, several new faunistic records were published from Slovakia (Mašán, 2001), Poland (Błoszyk, 1999), Hungary and Romania (Kontschán, 2007, 2014), and Iran (Kazemi et al., 2016). In addition, several new species were also described from different regions of the world: e.g., one species are discovered and described in Hungary (Kontschán, 2007); two species from the Afrotropical region



(Kontschán, 2006, 2020); five from Asia (Kontschán, 2015, 2021; Kontschán and Ripka, 2017; Kontschán et al., 2012); one species from the Arab Emirates (Kontschán, 2011); one species from Canada (Kontschán et al., 2010); and 11 species from the Neotropical realm (Kontschán, 2010, 2011; Kontschán and Starý, 2013; Kontschán and Friedrich, 2017; Kontschán and Ermilov, 2021). Thus, 112 trachyuropodid species are currently known.

The aim of this paper is to establish a complete list of all known species and give the diagnosis of the family and the diagnoses of the known genera.

MATERIAL AND METHODS

The herein-used generic subdivision follows Hirschmann (1979) genus conception and all the species are listed which are presented in Wiśniewski and Hirschmann (1993) catalogue and the species which were described after 1993. Only three already described and named species are not presented in this list. Hirschmann (1979) erected a new genus (*Foliatrachys* Hirschmann, 1979) for the species *Trachyuropoda foliitricha* Hirschmann, 1977 and *Trachyuropoda ramitricha* Hirschmann, 1977. Both species are known based on only immatures (proto- and deutonymphs), therefore the adult characteristics are not available, and the taxonomic position of these species are indeterminable and the taxonomic rank of the genus *Foliatrachys* Hirschmann, 1979 is questionable. The taxonomy and the generic position of *Trachyuropoda termitophila* Trägårdh, 1906 are also questionable, because Trägårdh (1906) presented only a very brief description without any illustration.

However, when Hirschmann (1979) mentioned 17 trachyuropodid genera, only the type species were explicitly mentioned as members of these genera, therefore, all of the other trachyuropodid species are presented here as new combinations.

The specimens of the new species were cleared in lactic acid for a week and afterwards, the specimens were investigated on half-covered deep slides with a Leica 1000 microscope. Drawings were made with the aid of a drawing tube on a Leica 1000 microscope. All specimens are stored in ethanol and deposited in the Natural History Museum in Geneva. Abbreviations: *h* = hypostomal setae, *st* = sternal setae. All measurements and the scales in the figures are given in micrometres (µm).

TAXONOMY

Family Trachyuropodidae Berlese, 1917

Trachyuropodini Berlese, 1917: 9.

Diagnosis. Ventral and dorsal idiosoma strongly sclerotized. Female genital shield scuti- or linguliform, male genital shield rounded and situated between coxae III. Pedofossae well developed with separated furrows for tarsi I. Tritosternum with narrow base, tritosternal laciniae divided into two apically pilose central- and two smooth lateral branches. Hypostomal setae *h*₂ close to *h*₃, not situated in a longitudinal row. Setae *h*₁ smooth and needle-like. Internal malae divided into numerous branches with very long apical and lateral hairs, which forming a mustache-like structure. Chelicerae with internal sclerotized node, fixed digit longer than movable digit.



Type genus. *Trachyuropoda* Berlese, 1888b: 209, by inference from the family name.

Notes. The family Trachyuropodidae seems to be a different linkage within the Uropodina. The unique position of setae *h2*, which is similar to the non-Uropodina Mesostigmata, can suggest this hypothesis, as well as the unique T-shaped setation on the idiosoma, which can be a unique neotenic phenomenon. Maybe it was the reason of Hirschmann in his early studies mentioned the Trachyuropodidae as Trachyuropodina, a sister group of Uropodina.

However, the using of the leg setation is very limited in the systematic of the Uropodina. Nevertheless, the leg chaetotaxy based by Evans (1972) can also support this separation. However, in the study the *Trachyuropoda* sensu lato species are mentioned in the group “Uropoda-types” together with other investigated “higher-Uropodina” genera. The chaetotaxy of the femora I (1-4/2-1) of the investigated *Trachyuropoda* species absolutely differs from the other investigated groups, except the genus *Oplitis* (family Oplitidae Hirschman and Zirngieble-Nicol, 1964) which has the same chaetotaxy type on femur I. On the other hand, the family Oplitidae has similar internal malae to the Trachyuropodidae, but the two families differ from each other in several characters (like the members of the family Oplitidae do not have strongly sclerotized dorsal and ventral bodies, the setae *h2* is situated in the row *h1-h4*, their body shape is rounded and not oval or oblong).

Majority of species of these two families live in the nest of ants, therefore the similar shape of internal malae and similar leg chaetotaxy on femur I can be an unknown adaptation to this very specific habitat, and these two character states are only homoplasies.

Genus *Arculatatrachys* Hirschmann, 1979

Arculatatrachys Hirschmann, 1979: 67.

Trachyuropoda arculata-group Hirschmann, 1976a: 5, 8; Wiśniewski and Hirschmann, 1993: 85.

Arculatatrachys – Halliday, 2015: 104; Kontschán and Ripka, 2017: 73; Kontschán and Ermilov, 2022: 54.

Diagnosis. Idiosoma triangular or pentagonal, strongly sclerotized. Dorsal shield with two large, kidney-shaped or rounded lateral depressions bordered with numerous setae. Dorsal shield with numerous oval pits. Genital shield of female scutiform, prestigmatid part of peritreme with two bends.

Type species. *Trachyuropoda arculata* Hirschmann, 1975: 102, by original designation.

Distribution. This genus is distributed in the Neotropical and Oriental realms.

LIST OF THE KNOWN SPECIES

Arculatatrachys arculata (Hirschmann, 1975)

Trachyuropoda arculata Hirschmann, 1975: 102.

Arculatatrachys arculata – Hirschmann, 1979: 67; Kontschán and Ermilov, 2022: 54.

Occurrence and biology: Brazil; forest soil (Hirschmann, 1975).

Arculatatrachys darwini (Kontschán & Starý, 2013) comb. nov.

Trachyuropoda darwini Kontschán and Starý, 2013: 7–11.

Occurrence and biology: Galapagos Islands; decaying wood and fern rhizosphere (Kontschán and Starý, 2013).



***Arculatatrachys difoveolata* (Hirschmann, 1975) comb. nov.**

Trachyuropoda difoveolata Hirschmann, 1975: 102–103.

Arculatatrachys difoveolata – Kontschán and Ermilov, 2022: 54.

Occurrence and biology: Brazil; rainforest soil (Hirschmann, 1975).

***Arculatatrachys imitans* (Berlese, 1905)**

Trachyuropoda (Leonardiella) imitans Berlese, 1905: 159.

Arculatatrachys imitans – Kontschán and Ripka, 2017: 73–74; Kontschán and Ermilov, 2022: 54.

Occurrence and biology: Java (Indonesia); biology and habitat are unknown (Berlese, 1905).

***Arculatatrachys newtoni* (Kontschán, 2010) comb. nov.**

Trachyuropoda newtoni Kontschán, 2010: 123–125.

Occurrence and biology: Panama; leaf litter in a rainforest habitat (Kontschán, 2010).

***Arculatatrachys similiarculata* (Hirschmann, 1975) comb nov.**

Trachyuropoda similiarculata Hirschmann, 1975: 102.

Arculatatrachys similiarculata – Kontschán and Ermilov, 2022: 54.

Occurrence and biology: Brazil; nests of insects (Hirschmann, 1975).

***Arculatatrachys pomberoi* Kontschán & Ermilov, 2022**

Arculatatrachys pomberoi Kontschán and Ermilov, 2022: 54.

Occurrence and biology: Paraguay; leaf litter (Kontschán and Ermilov, 2022).

Genus *Bostocktrachys* Hirschmann, 1979

Bostocktrachys Hirschmann, 1979: 67.

Trachyuropoda bostocki-group Hirschmann, 1976a: 5, 7; Wiśniewski and Hirschmann, 1993: 86.

Bostocktrachys – Halliday, 2015: 106.

Diagnosis. Idiosoma oval, strongly sclerotized. Central area of dorsal shield elevated from neighboring regions, its margin strongly sclerotized and forming some C-shaped margins. Elevated part of dorsal shield divided two part with a transversal and deep ditch. Genital shield of female scutiform, prestigmatid part of peritreme hook-shaped.

Type species. *Glyphopsis bostocki* Michael, 1894: 301, by original designation.

Distribution. South America, Europe and Oriental region.

LIST OF THE KNOWN SPECIES***Bostocktrachys berlesesellnickia* (Hirschmann, 1976) comb. nov.**

Trachyuropoda bostocki (Michael, 1894) sensu Berlese, 1903: 249.

Trachyuropoda berlesesellnickia Hirschmann, 1976i: 28.



Occurrence and biology: England, Luxemburg, Austria, the Netherlands; nests of ants (Hirschmann, 1976i).

***Bostocktrachys bostocki* (Michael, 1894)**

Glyphopsis bostocki Michael, 1894: 301–303.

Trachyuropoda bostocki: Hirschmann, 1976i: 28.

Bostocktrachys bostocki – Hirschmann, 1979: 67.

Occurrence and biology: Western and Central Europe; nests of ants (Michael, 1894).

***Bostocktrachys extremica* (Kontschán & Starý, 2013) comb. nov.**

Trachyuropoda extremica Kontschán and Starý, 2013: 12–13.

Occurrence and biology: Colombia; moss and lichens (Kontschán and Starý, 2013).

***Bostocktrachys kiewensis* (Hirschmann, 1976) comb. nov.**

Trachyuropoda kiewensis Hirschmann, 1976i: 28–29.

Occurrence and biology: Ukraine; moss (Hirschmann, 1976i).

***Bostocktrachys micherdzinskii* (Hirschmann, 1976)**

Trachyuropoda micherdzinskii Hirschmann, 1976i: 29–30.

Bostocktrachys micherdzinskii – Kontschán and Ripka, 2017: 74.

Occurrence and biology: Vietnam; moss and soil (Hirschmann, 1976i).

***Bostocktrachys myrmecophila* (Wiśniewski & Hirschmann, 1992) comb. nov.**

Trachyuropoda myrmecophila Wiśniewski and Hirschmann, 1992: 8–15.

Occurrence and biology: Poland, Slovakia, Hungary; nests of different ant species (Hirschmann, 1976i; Maśán, 2001).

***Bostocktrachys plagiata* (Hirschmann, 1976) comb. nov.**

Trachyuropoda plagiata Hirschmann, 1976i: 29.

Occurrence and biology: unknown (Hirschmann, 1976i).

***Bostocktrachys surinensis* Kontschán & Ripka, 2017**

Bostocktrachys surinensis Kontschán and Ripka, 2017: 74–76.

Occurrence and biology: Thailand; mixed evergreen and deciduous forest (Kontschán and Ripka, 2017).

***Bostocktrachys thailandica* Kontschán & Ripka, 2017**

Bostocktrachys thailandica Kontschán and Ripka, 2017: 77–79.

Occurrence and biology: Thailand; soil sample (Kontschán and Ripka, 2017).



***Bostocktrachys tuberculata* (Berlese, 1913)**

Trachyuropoda (*Trachyuropoda*) *tuberculata* Berlese, 1913: 85.

Bostocktrachys tuberculata – Kontschán and Ripka, 2017: 74.

Occurrence and biology: Java and Vietnam; soil (Berlese, 1913).

***Bostocktrachys zicsii* (Hirschmann, 1976) comb. nov.**

Trachyuropoda zicsii Hirschmann, 1976i: 30.

Occurrence and biology: Chile; soil and leaf litter (Hirschmann, 1976i).

Genus *Castritrachys* Hirschmann, 1979

Castritrachys Hirschmann, 1979: 67.

Trachyuropoda castrii-group Hirschmann, 1976a: 4, 7; Wiśniewski and Hirschmann, 1993: 88.

Castritrachys – Halliday, 2015: 108.

Diagnosis. Idiosoma oval, strongly sclerotized. Central area of dorsal shield elevated from neighboring regions, its lateral parts strongly sclerotized on anterior and central areas forming two pairs of separated margins with undulate or C-shaped central parts. Genital shield of female linguliform, prestigmatid part of peritreme hook-shaped.

Type species. *Trachyuropoda castrii* Hirschmann, 1975j: 102, by original designation.

Distribution. South America.

LIST OF THE KNOWN SPECIES***Castritrachys castrii* (Hirschmann, 1975)**

Trachyuropoda castrii Hirschmann, 1975: 102.

Castritrachys castrii – Hirschmann, 1979: 67.

Occurrence and biology: Chile; habitat is unknown (Hirschmann, 1975).

***Castritrachys quadriauricularia* (Hirschmann, 1976) comb. nov.**

Trachyuropoda quadriauricularia Hirschmann, 1976f: 24.

Occurrence and biology: unknown (Hirschmann, 1976f).

Genus *Cephalojanetia* Willmann, 1951

Cephalojanetia Willmann, 1951: 122

Trachyuropoda multituberosa-group Hirschmann, 1976a: 2, 4, Wiśniewski and Hirschmann, 1993: 93.

Cephalojanetia – Halliday, 2015: 108.

Diagnosis. Idiosoma oval, strongly sclerotized. Central area of dorsal shield elevated from neighboring regions. Numerous strongly sclerotized semi-circular rings situated on elevated area. Genital shield of female linguliform, with serrate anterior margins, prestigmatid part of peritreme hook-shaped.



Type species. *Cephalojanetia multituberosa* Willmann, 1951: 122, by original designation
Distribution. Europe.

LIST OF THE KNOWN SPECIES

Cephalojanetia multituberculata (Hirschmann, 1976) comb. nov.

Trachyuropoda multituberculata Hirschmann, 1976e: 24.

Occurrence and biology: Spain and Austria; biology and habitat are unknown (Hirschmann, 1976).

Cephalojanetia multituberosa (Willmann, 1951)

Cephalojanetia multituberosa Willmann, 1951: 122–124.

Trachyuropoda multituberosa – Hirschmann and Zirngiebl-Nicol, 1964: 22.

Cephalojanetia multituberosa – Hirschmann, 1979: 67.

Occurrence and biology: Austria; meadows (Willmann, 1951).

Cephalojanetia tuberosa (Hirschmann, 1976) comb. nov.

Trachyuropoda tuberosa Hirschmann, 1976e: 23–24.

Occurrence and biology: Austria; biology and habitat are unknown (Hirschmann, 1976).

Cephalojanetia dentata (Kontschán, 2007) comb. nov.

Urojanetia dentata Kontschán, 2007: 47–50.

Occurrence and biology: Hungary; pine forest (Kontschán, 2007).

Genus *Cephalouropoda* Berlese, 1913

Cephalouropoda Berlese, 1903: 248.

Trachyuropoda berlesiana-group Hirschmann, 1976a: 5, 7; Wiśniewski and Hirschmann, 1993: 85.

Cephalouropoda – Halliday, 2015: 108.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield with two Y or C-shaped longitudinal furrows on centrolateral part of dorsal shield. A wide and strongly sclerotized U-shaped furrow visible on caudal area of dorsal shield. Ventral shield with a transversal furrow posterior to genital opening. Genital shield of female scutiform, prestigmatid part of peritreme M-shaped.

Type species. *Uropoda berlesiana* Berlese, 1887: 4, by original designation.

Distribution. South America and Europe.

LIST OF THE KNOWN SPECIES

Cephalouropoda alapaducta (Hirschmann, 1976) comb. nov.

Trachyuropoda alapaducta Hirschmann, 1976h: 27.



Occurrence and biology: Brazil; leaf litter (Hirschmann, 1976h).

***Cephalouropoda berlesiana* (Berlese, 1887)**

Uropoda berlesiana Berlese, 1887:19.

Trachyuropoda berlesiana Berlese, 1888b: 209.

Cephalouropoda berlesiana – Berlese, 1904a: 248.

Cephalouropoda berlesiana – Hirschmann, 1979: 67.

Occurrence and biology: Italy; moss (Berlese, 1887).

Genus *Cristicepstrachys* Hirschmann, 1979

Cristicepstrachys Hirschmann, 1979: 67.

Trachyuropoda cristiceps-group Hirschmann, 1976a: 4, 6; Wiśniewski and Hirschmann, 1993: 89.

Cristicepstrachys – Halliday, 2015: 110.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield without any large strongly sclerotized structures, only some bumps visible on lateral areas. Genital shield of female linguliform, prestigmatid part of peritreme M-shaped.

Type species. *Uropoda cristiceps* Canestrini, 1884: 702, by original designation.

Distribution. Europe.

LIST OF THE KNOWN SPECIES

***Cristicepstrachys cristiceps* (Canestrini, 1884)**

Uropoda cristiceps Canestrini, 1884: 693.

Trachyuropoda (*Janetiella*) *cristiceps* – Berlese, 1904b: 354–355.

Urojanetia cristiceps – Schweizer, 1961: 188.

Trachyuropoda cristiceps – Hirschmann and Zirngiebl-Nicol, 1964: 22.

Cristicepstrachys cristiceps – Hirschmann, 1979: 67.

Occurrence and biology: Italy, Germany, Austria, France, Hungary, and Slovakia; nests of different ant species (Wiśniewski and Hirschman, 1993).

***Cristicepstrachys sinuata* (Berlese, 1904) comb. nov.**

Trachyuropoda (*Janetiella*) *coccinea* (Michael, 1891) var. *sinuata* Berlese, 1904: 357.

Trachyuropoda sinuata – Hirschmann, 1979: 51.

Occurrence and biology: Norway, Russia, Luxembourg, the Netherlands, and France; nests of different ant species (Wiśniewski and Hirschman, 1993).

Genus *Excavatatrachys* Hirschmann, 1979

Excavatatrachys Hirschmann, 1979: 67.

Trachyuropoda excavata-group Hirschmann, 1976a: 4–6; Wiśniewski and Hirschmann, 1993: 89.

Excavatatrachys – Halliday, 2015: 110.



Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield with two pairs of large and U-shaped strongly sclerotized structures pitted against each other. Genital shield of female linguliform, prestigmatid part of peritreme hook-shaped.

Type species. *Glyphopsis coccinea* var. *excavata* Wasmann, 1899: 165, by original designation.

Distribution. Western part of Palaearctic realm.

LIST OF THE KNOWN SPECIES

Excavatatrachys auricularia (Costa, 1962) comb. nov.

Trachyuropoda auricularia Costa, 1962: 495.

Occurrence and biology: Israel; nest of Spalacidae (Mammalia) (Costa, 1962).

Excavatatrachys excavata (Wasmann, 1899)

Glyphopsis coccinea Wasmann var. *excavata* Wasmann, 1899: 168–169.

Trachyuropoda (*Janetiella*) *excavata*: Berlese, 1904: 358–360.

Trachyuropoda excavata Hirschmann & Zirngiebl-Nicol, 1964: 2.

Excavatatrachys excavata – Hirschmann, 1979: 67.

Occurrence and biology: Europe; nests of ants (Wiśniewski and Hirschman, 1993).

Excavatatrachys longicornuta (Hirschmann, 1976) comb. nov.

Trachyuropoda longicornuta Hirschmann, 1976d: 22.

Occurrence and biology: Spain; biology and habitat are unknown (Hirschmann, 1976d).

Excavatatrachys longicornutasimilis (Hirschmann, 1976) comb. nov.

Trachyuropoda longicornutasimilis Hirschmann, 1976d: 22–23.

Occurrence and biology: unknown (Hirschmann, 1976d).

Excavatatrachys poppi (Hirschmann & Zirngiebl-Nicol, 1969) comb. nov.

Trachyuropoda poppi Hirschmann and Zirngiebl-Nicol, 1969: 22.

Occurrence and biology: Spain and Poland; moss and soil (Hirschmann and Zirngiebl-Nicol, 1969).

Excavatatrachys quadricornuta (Hirschmann, 1976) comb. nov.

Trachyuropoda quadricornuta Hirschmann, 1976d: 22.

Occurrence and biology: unknown (Hirschmann, 1976d).

Excavatatrachys sellnicki (Hirschmann & Zirngiebl-Nicol, 1969) comb. nov.

Trachyuropoda sellnicki Hirschmann and Zirngiebl-Nicol, 1969: 53–54.

Occurrence and biology: Spain and Poland; moss and soil (Hirschmann and Zirngiebl-Nicol, 1969).



Genus *Graecatrachys* Hirschmann, 1979

Graecatrachys Hirschmann, 1979: 67.

Trachyuropoda graeca-group Hirschmann, 1976a: 2, 7; Wiśniewski and Hirschmann, 1993: 92.

Graecatrachys – Halliday, 2015: 115.

Diagnosis. Idiosoma oval, strongly sclerotized. One pair C-shaped strongly sclerotized dorsal groove situated on central area of dorsal shield, in some case forming a pentagonal form. Genital shield of female linguliform, prestigmatid part of peritreme M-shaped.

Type species. *Trachyuropoda graeca* Sellnick, 1931: 736, by original designation.

Distribution. Africa, Europe and South America.

LIST OF THE KNOWN SPECIES

Graecatrachys bali (Kontschán & Starý, 2013) comb. nov.

Trachyuropoda bali Kontschán and Starý, 2013: 11–12.

Occurrence and biology: Colombia; leaf litter (Kontschán and Starý, 2013)

Graecatrachys endrodyi (Hirschmann, 1976) comb. nov.

Trachyuropoda endrodyi Hirschmann, 1976j: 33–34.

Occurrence and biology: Ghana; compost (Hirschmann, 1976j).

Graecatrachys ghanaensis (Hirschmann, 1976) comb. nov.

Trachyuropoda ghanaensis Hirschmann, 1976j: 33–34.

Occurrence and biology: Ghana; compost (Hirschmann, 1976j).

Graecatrachys graeca (Sellnick, 1931)

Trachyuropoda graeca Sellnick, 1931: 736–743.

Graecatrachys graeca – Hirschmann, 1979: 67.

Occurrence and biology: Greece; sifted material (Wiśniewski and Hirschmann, 1993).

Graecatrachys mesofovea (Hirschmann, 1976) comb. nov.

Trachyuropoda mesofovea Hirschmann, 1976j: 32.

Occurrence and biology: Paraguay; soil and leaf litter (Hirschmann, 1976j).

Graecatrachys mesofoveasimilis (Hirschmann, 1976) comb. nov.

Trachyuropoda mesofoveasimilis Hirschmann, 1976j: 31–32.

Occurrence and biology: unknown (Hirschmann, 1976j).

Graecatrachys represa (Hirschmann, 1976) comb. nov.

Trachyuropoda represa Hirschmann, 1976j: 32.

Occurrence and biology: Brazil; forest habitat (Hirschmann, 1976j).



***Graecatrachys rufipes* (Hirschmann, 1976) comb nov.**

Trachyuropoda rufipes Hirschmann, 1976j: 33.

Occurrence and biology: unknown (Hirschmann, 1976j).

Genus *Leonardiella* Berlese, 1904

Trachyuropoda (*Leonardiella*) Berlese, 1904b: 367.

Trachyuropoda arcuata-group Hirschmann, 1976a: 5, 8; Wiśniewski and Hirschmann, 1993: 87.

Leonardiella – Halliday, 2015:118; Kontschán, 2021: 82.

Diagnosis. Shape of idiosoma triangular or pentagonal. Dorsal shield with lateral incision at level of coxae IV. Dorsal shield with strongly sclerotized straight, undulate or ring-like grooves. One pair of transversal furrows bordered by setae situated posterior to coxae IV on ventral idiosoma. Genital shield of female scuti- or linguliform. Leg I with claws.

Type species. *Uropoda canestriniana* Berlese, 1891: 4, by original designation.

Distribution. The members of this genus occur in all realms.

LIST OF THE KNOWN SPECIES***Leonardiella athiasae* (Hirschmann, 1975)**

Trachyuropoda athiasae Hirschmann, 1975: 103.

Leonardiella athiasae – Kontschán, 2011a: 32; Kontschán, 2021: 82.

Occurrence and biology: Chad; gallery forest (Hirschmann, 1975).

***Leonardiella canestriniana* (Berlese, 1891)**

Uropoda canestriniana Berlese, 1891: (without page number).

Leonardiella canestriniana – Kontschán, 2021: 82.

Occurrence and biology: Italy, France and Great Britain; nests of ants (Wiśniewski and Hirschmann, 1993).

***Leonardiella cistulata* (Hirschmann, 1975)**

Trachyuropoda cistulata Hirschmann, 1975: 103–104.

Leonardiella cistulata – Kontschán, 2011a: 32; Kontschán, 2021: 82.

Occurrence and biology: Sri Lanka; biology and habitat are unknown (Hirschmann, 1975).

***Leonardiella constricta* (Banks, 1916)**

Trachyuropoda constricta Banks, 1916: 231.

Leonardiella constricta – Kontschán, 2011a: 32; Kontschán, 2021: 82.

Occurrence and biology: Australia; together with ants (Wiśniewski and Hirschmann, 1993).

***Leonardiella cubana* Kontschán, 2011**

Leonardiella cubana Kontschán, 2011b: 211–213.



Leonardiella cubana – Kontschán, 2021: 82.

Occurrence and biology: Cuba; leaf litter of a coffee plantation (Kontschán, 2011a).

***Leonardiella harteni* Kontschán, 2011**

Leonardiella harteni Kontschán, 2011a: 29–31.

Leonardiella harteni – Kontschán, 2021: 83.

Occurrence and biology: United Arab Emirates; leaf litter of a garden (Kontschán, 2011b).

***Leonardiella koreana* Kontschán, Park, Yoon & Choi, 2012**

Leonardiella koreana Kontschán, Park, Yoon and Choi, 2012: 173–175.

Leonardiella koreana – Kontschán, 2021: 83.

Occurrence and biology: North Korea; soil (Kontschán et al., 2012).

***Leonardiella machadoi* Kontschán, 2006**

Leonardiella machadoi Kontschán, 2006: 4–7.

Leonardiella machadoi – Kontschán, 2021: 83.

Occurrence and biology: Angola; biology and habitat are unknown (Kontschán, 2006).

***Leonardiella matsuurai* (Hiramatsu, 1980)**

Trachyuropoda matsuurai Hiramatsu, 1980: 25.

Leonardiella matsuurai – Kontschán, 2011a: 32; Kontschán, 2021: 83.

Occurrence and biology: Japan; forest soil (Hiramatsu, 1980).

***Leonardiella riccardiana* (Leonardi, 1895)**

Uropoda riccardiana Leonardi, 1895: 318

Leonardiella riccardiana – Kontschán, 2021: 83.

Occurrence and biology: Austria, Romania, Czech Republic, Slovakia, Italy, Hungary, and Iran; nests of ants (Wiśniewski and Hirschmann, 1993; Arjomandi and Kazemi, 2014).

***Leonardiella septentrionalis* (Berlese, 1904)**

Trachyuropoda (*Leonardiella*) *canestriniana* (Berlese, 1891) var. *septentrionalis* Berlese, 1904: 369.

Leonardiella athiasae – Kontschán, 2021: 83.

Occurrence and biology: Russia; nests of ants (Wiśniewski and Hirschmann, 1993).

***Leonardiella similiathiasae* (Hiramatsu, 1979)**

Trachyuropoda similiathiasae Hiramatsu, 1979: 106.

Leonardiella similiathiasae – Kontschán, 2011a: 32; Kontschán, 2021: 83.

Occurrence and biology: Japan; forest soil (Hiramatsu, 1979).

***Leonardiella whitkombi* (Hirschmann, 1975)**

Trachyuropoda whitkombi Hirschmann, 1975: 103.



Leonardiella whitkombi – Kontschán, 2011a: 32; Kontschán, 2021: 83.
Occurrence and biology: Brazil; nests of ants (Hirschmann, 1975).

Leonardiella pappi Kontschán, 2021

Leonardiella pappi Kontschán, 2021: 83–87.
Occurrence and biology: Hong Kong; soil under *Machilus* sp. (Kontschán, 2021).

Genus *Lindquisttrachys* Hirschmann, 1979

Lindquisttrachys Hirschmann, 1979: 67.

Trachyuropoda lindquisti-group Hirschmann, 1976a: 5, 8; Wiśniewski and Hirschmann, 1993: 91.

Lindquisttrachys – Halliday, 2015: 118.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield without any strongly sclerotized humps, groove or furrows, ventral and dorsal body covered by large irregular pits. Genital shield of female linguliform with irregular pits on its surface, prestigmatid part of peritreme hook-shaped.

Type species. *Trachyuropoda lindquisti* Hirschmann, 1976m: 45, by original designation

Distribution. Central America.

LIST OF THE KNOWN SPECIES

Lindquisttrachys lindquisti (Hirschmann, 1976)

Trachyuropoda lindquisti Hirschmann, 1976m: 44–45.

Lindquisttrachys lindquisti – Hirschmann, 1979: 67.

Occurrence and biology: Mexico; leaf litter (Hirschmann, 1976m).

Genus *Magnatrachys* Hirschmann, 1979

Magnatrachys Hirschmann, 1979: 66.

Trachyuropoda magna-group Hirschmann, 1976a: 2, 6; Wiśniewski and Hirschmann, 1993: 92.

Magnatrachys – Halliday, 2015: 119.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield without any strongly sclerotized humps, groove or furrows, ventral and dorsal body covered by oval pits or dotted. Genital shield of female scutiform, prestigmatid part of peritreme M-shaped.

Type species. *Uropoda magna* Leonardi in Berlese, 1895: 316, by original designation.

Distribution. Europe, Central and South America.

LIST OF THE KNOWN SPECIES

Magnatrachys dacica (Huțu, 1973) comb. nov.

Trachyuropoda dacica Huțu, 1973: 50–51.

Occurrence and biology: Romania; moss (Huțu, 1973).



***Magnatrachys imperforata* (Berlese, 1904) comb. nov.**

Trachyuropoda cristiceps Canestrini, 1884 var. *imperforata* Berlese, 1994a: 271.

Trachyuropoda imperforata – Hirschmann and Zirngiebl-Nicol, 1964: 22.

Occurrence and biology: Italy; moss (Wiśniewski and Hirschmann, 1993).

***Magnatrachys magna* (Leonardi, 1895)**

Uropoda magna Leonardi, 1895 in Berlese, 1895: 316.

Trachyuropoda (Janetiella) magna – Berlese, 1904b: 363–364.

Magnatrachys magna – Hirschmann, 1979: 66.

Occurrence and biology: Italy, Slovakia and Czech Republic; nests of ants (Wiśniewski and Hirschmann, 1993).

***Magnatrachys mexicana* (Hirschmann, 1976) comb. nov.**

Trachyuropoda mexicana Hirschmann, 1976b: 16–17.

Occurrence and biology: Mexico, it was collected from leaf litter (Hirschmann, 1976b).

***Magnatrachys pecinai* (Hirschmann, 1976) comb. nov.**

Trachyuropoda cristiceps (Canestrini, 1884) sensu Pecina, 1970.

Trachyuropoda pecinai – Hirschmann, 1976b: 16.

Occurrence and biology: Czech Republic; nests of ants (Hirschmann, 1976b).

***Magnatrachys schusteri* (Hirschmann, 1976) comb. nov.**

Trachyuropoda schusteri Hirschmann, 1976b: 17.

Occurrence and biology: Brazil; bushy habitat (Hirschmann, 1976b).

***Magnatrachys schusterisimilis* (Hirschmann, 1976) comb. nov.**

Trachyuropoda schusterisimilis Hirschmann, 1976b: 18.

Occurrence and biology: unknown (Hirschmann, 1976b).

Genus *Origmatrachys* Hirschmann, 1979

Origmatrachys Hirschmann, 1979: 67.

Trachyuropoda origmophora-group Hirschmann, 1976a: 5, 7; Wiśniewski and Hirschmann, 1993: 94.

Origmatrachys: Halliday, 2015: 123; Kontschán, 2015: 277; Kontschán, 2020: 421.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield with two eye-like transversal furrows bordered with numerous setae. Genital shield of female scutiform, prestigmatid part of peritreme M-shaped.

Type species. *Trachyuropoda origmophora* Hirschmann, 1976a by original designation (Hirschmann 1979).

Distribution. Neotropical and West-African realms.



LIST OF THE KNOWN SPECIES

Origmatrachys angusticulata (Hirschmann, 1976)

Trachyuropoda angusticulata Hirschmann, 1976l: 41–42.

Origmatrachys angusticulata – Kontschán, 2020: 421.

Occurrence and biology: Peru; biology and habitat are unknown (Hirschmann, 1976l).

Origmatrachys boliviensis (Hirschmann, 1976)

Trachyuropoda boliviensis Hirschmann, 1976l: 41.

Origmatrachys boliviensis – Kontschán, 2020: 421.

Occurrence and biology: Bolivia; leaf litter (Hirschmann, 1976l).

Origmatrachys dicarinata (Hirschmann, 1976)

Trachyuropoda dicarinata Hirschmann, 1976l: 40–41.

Origmatrachys dicarinata – Kontschán, 2020: 421.

Occurrence and biology: Peru; biology and habitat are unknown (Hirschmann, 1976l).

Origmatrachys dicarinatasimilis (Hirschmann, 1976)

Trachyuropoda dicarinatasimilis Hirschmann, 1976l: 43.

Origmatrachys dicarinatasimilis – Kontschán, 2020: 421.

Occurrence and biology: Peru; biology and habitat are unknown (Hirschmann, 1976l).

Origmatrachys dictyoeides (Hirschmann, 1976)

Trachyuropoda dictyoeides Hirschmann, 1976l: 44.

Trachyuropoda dictyoeides – Kontschán, 2020: 421.

Occurrence and biology: Bolivia; forest habitat (Hirschmann, 1976l).

Origmatrachys gracilis (Hirschmann, 1976)

Trachyuropoda gracilis Hirschmann, 1976l: 43.

Origmatrachys gracilis – Kontschán, 2020: 422.

Occurrence and biology: Paraguay; soil and leaf litter (Hirschmann, 1976l).

Origmatrachys origmophora (Hirschmann, 1976)

Trachyuropoda origmophora Hirschmann, 1976l: 40.

Origmatrachys origmophora – Hirschmann, 1979: 67; Kontschán, 2020: 422.

Occurrence and biology: Peru; biology and habitat are unknown (Hirschmann, 1976l).

Origmatrachys reticulata (Hirschmann, 1976)

Trachyuropoda reticulata Hirschmann, 1976l: 43.

Origmatrachys reticulata – Kontschán, 2020: 422.

Occurrence and biology: Brazil; soil and leaf litter (Hirschmann, 1976l).



***Origmatrachys woelkei* (Hirschmann, 1976)**

Trachyuropoda woelkei Hirschmann, 1976l: 42.

Origmatrachys woelkei – Kontschán, 2020: 422.

Occurrence and biology: Brazil; forest habitat (Hirschmann, 1976l).

***Origmatrachys chimboensis* (Kontschán, 2011)**

Trachyuropoda chimboensis Kontschán, 2011b: 213–214.

Origmatrachys chimboensis – Kontschán, 2020: 422.

Occurrence and biology: Ecuador; soil and leaf litter (Kontschán, 2011b).

***Origmatrachys ecuadorica* (Kontschán, 2011)**

Trachyuropoda ecuadorica Kontschán, 2011b: 214–216.

Origmatrachys ecuadorica – Kontschán, 2020: 422.

Occurrence and biology: Ecuador; soil (Kontschán, 2011b).

***Origmatrachys pesici* (Kontschán, 2011)**

Trachyuropoda pesici Kontschán, 2011b: 216–218.

Origmatrachys pesici – Kontschán, 2020: 422.

Occurrence and biology: Saint Lucia; rotten debris from under bark of large trees (Kontschán, 2011).

***Origmatrachys costaricana* (Kontschán, 2011)**

Trachyuropoda costaricana Kontschán, 2011b: 216–218.

Origmatrachys costaricana – Kontschán, 2020: 422.

Occurrence and biology: Ecuador; leaf litter (Kontschán, 2011).

***Origmatrachys mahnerti* Kontschán, 2020**

Origmatrachys mahnerti Kontschán, 2020: 422–425.

Occurrence and biology: Ivory Coast; decaying wood (Kontschán, 2020).

***Origmatrachys peruensis* Kontschán & Friedrich, 2017**

Origmatrachys peruensis Kontschán and Friedrich, 2017: 361–369.

Origmatrachys peruensis – Kontschán, 2020: 422.

Occurrence and biology: Peru; biology and habitat are unknown (Kontschán and Friedrich, 2017).

Genus *Trachyibana* Kontschán, 2015

Trachyibana Kontschán, 2015: 273.

Diagnosis. Idiosoma lemon-shaped. Dorsal shield setae T-shaped or robust spine-like, marginal setae simple, smooth or serrate. Dorsal shield ornamented by irregular pits or smooth. Metapodal region with a deep opisthogastric furrow bordered by several distally ramose setae.



Other ventral setae smooth and needle-like. Genital shield of female large and linguliform, without anterior process.

Type species. *Trachyibana sarawakiensis* Kontschán, 2015

Distribution. Oriental region.

LIST OF THE KNOWN SPECIES

Trachyibana sarawakiensis Kontschán, 2015

Trachyibana sarawakiensis Kontschán, 2015: 273–277.

Occurrence and biology: Malaysia, Sarawak; primary forest (Kontschán, 2015).

Trachyibana kozari sp. nov.

(Figs 1–13)

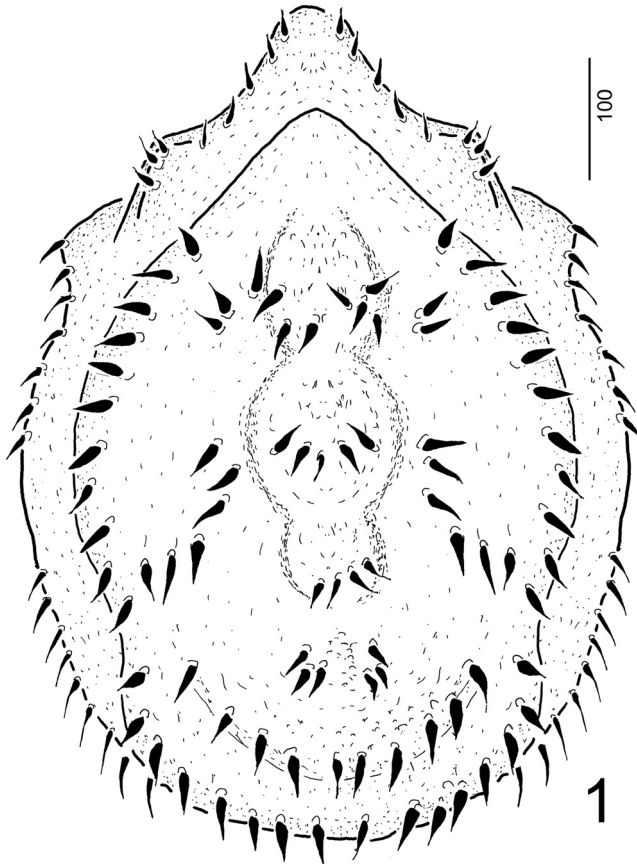


Fig. 1. *Trachyibana kozari* sp. nov., female, holotype, dorsal view



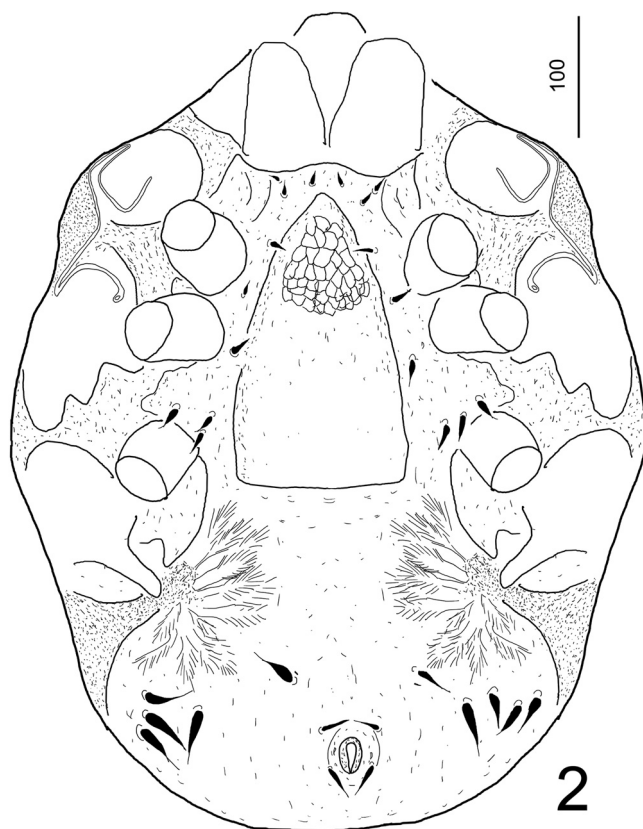


Fig. 2. *Trachybana kozari* sp. nov., female, holotype, ventral view

Diagnosis. Idiosoma oval, central area of dorsal shield elevated from neighboring areas and its margins strongly sclerotized. All dorsal setae robust and spine-like, dorsal shield without sculptural pattern. Sternal and ventral shields without sculptural pattern, genital shield of female scutiform and with reticulate ornamentation.

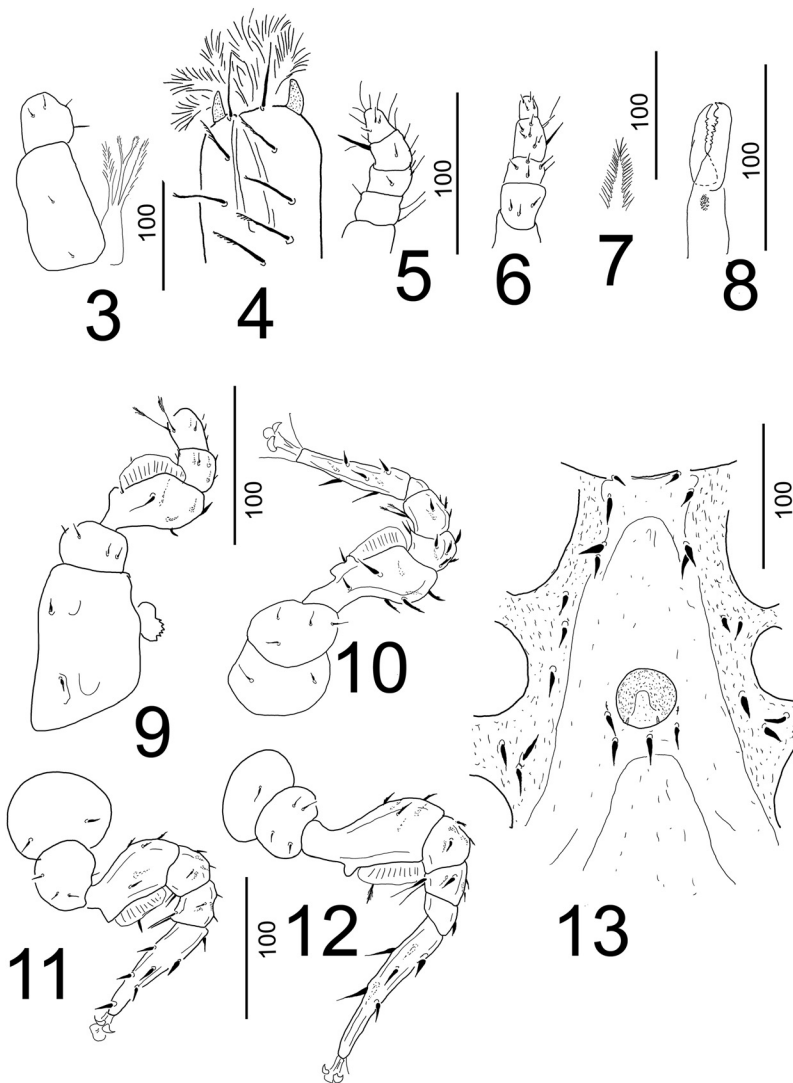
Material examined. *Holotype.* Female. Singapour: Labrador Hill, forêt sèche, prélèvement de sol sous plusieurs arbres à faibles contreforts, env. 40 m; 21.XI.1987; leg. B. Hauser (Berlese à Bogor, Java)" = Singapore: Labrador Hill, dry forest, soil sample from under several trees with weak buttresses, about 40 m [altitude]; leg. B. Hauser (Berlese [extraction of the soil sample] in Bogor, Java). Five females and three males, with same collection data as those for the holotype.

Description. Female ($n = 1$)

Idiosoma reddish-brown, 665–675 long and 475–480 wide, its shape oval.

Dorsal idiosoma (Fig. 1). Dorsal and marginal shields completely separated. Dorsal shield 535–545 long and 390–400 wide. Central part of dorsal shield elevated from the neighboring area. Margin of elevated area strongly sclerotized. All dorsal setae robust and smooth, spine-like





Figs 3–13. *Trachyibana kozari* sp. nov., female, holotype. 3. Tritosternum and coxae and trochanter of leg I. 4. Ventral view of gnathosoma. 5. Lateral view of palp. 6. Dorsal view of palp. 7. Epistome. 8. Chelicera. 9. Lateral view of leg I. 10. lateral view of leg II. 11. Lateral view of leg III. 12. Lateral view of leg IV. 13. Intercoxal area of male paratype

and ca 27–34 long. Majority of surface of dorsal shield smooth, only some oval pits situated posterior to elevated area and close to caudal margin of dorsal shield. Surface of marginal shield smooth, setae on marginal shield ca 24–31 long, spine-like, but narrower than dorsal setae.

Ventral idiosoma (Fig. 2). Base of tritosternum narrow, its laciniae divided into two marginally pilose lateral and two apically pilose central branches (Fig. 3). Nine pairs of sternal setae



smooth and robust, first tree pairs of them shorter (*ca* 11–12), the other six pairs longer (*ca* 18–24), sternal shield without sculptural pattern.

Genital shield scutiform, *ca* 240–255 long and *ca* 142–146 wide on its basis, its surface with reticulate sculptural pattern on anterior area. Metapodal region with a deep opisthogastric furrow bordered by several long (*ca* 55–67) and distally ramose setae. Five pairs of ventral setae robust, smooth and *ca* 37–48 long. One pair of ventral setae situated anterior to anal opening, other four pairs lateral to anal opening. Anal opening small, *ca* 25–28 long and *ca* 17–19 wide. Two pairs of adanal setae smooth, narrow and *ca* 24–27 long. Postanal seta absent. One pair of lyriform fissures situated between first and second adanal setae. Stigmata situated close to coxae III, post-stigmatid part of peritreme absent, prestigmatid part long and with two bends. Pedofossae well developed, their surface smooth, with separate groove for tarsi IV.

Gnathosoma (Fig. 4). Corniculi horn-like, internal malae mustache-like and longer than corniculi. Hypostomal setae *h1* smooth, *ca* 62–65 long, *h2* apically bifurcated (*ca* 46–49), *h3* (*ca* 52–54) and *h4* (*ca* 55–57) marginally serrate. Ventral setae of palptrochanter *v2* marginally serrate, *v1* smooth, *v2* two times longer than *v1*. All setae on palp smooth and needle-like, except on robust and long setae on palp tibia (Figs 5–6). Epistome apically serrate (Fig. 7). Chelicerae with several teeth on both digits, fixed digit a little longer than movable digit, internal sclerotized node present (Fig. 8).

Legs (Figs 9–12). Legs I 275–280, legs II 270–272, legs III 277–282, and legs IV 305–312 long. Legs I with tarsal claws, but it smaller than others on tip of legs II–IV. Majority of leg setae smooth and needle-like, except some serrate dorsal setae. Ventral setae of leg I–IV with long ventral setae, these setae apically pilose on legs I and II and smooth on legs III and IV. Femora of all legs bear flap-like ventral prolongation.

Male (*n* = 1)

Idiosoma. 670–678 long and 470–477 wide,

Dorsal idiosoma. As in female.

Ventral idiosoma. Surface of sternal shield smooth. All setae on sternal shield smooth, robust and *ca* 13–18 long. Genital shield oval, *ca* 40–42 wide and *ca* 42–45 long, without sculptural pattern and without eugenital setae. A shallow ditch situated around genital opening.

Other characters as in female.

Nymphs and larvae unknown.

Etymology. We dedicate the new species to Dr. Ferenc Kozár, the well-known scale insect specialist who passed away ten years ago.

Remarks. Till today only one *Trachyibana* species is described. There are several differences between the new and the already-known species. The most important differences are the following: the *Trachyibana sarawakiensis* has T-shaped dorsal setae, in contrast, it is spine-like in the new species, and the dorsal shield of *T. sarawakiensis* was covered by irregular pits, contrary to the new species where it is smooth.

Genus *Trachyuropoda* Berlese, 1888

Trachyuropoda (*Trachyuropoda*) Berlese, 1888b: 209.

Trachyuropoda (*Michaeliella*) Berlese, 1904b: 307.

Trachyuropoda festiva-group Hirschmann, 1976a: 5, 7; Wiśniewski and Hirschmann, 1993: 90.



Trachyuropoda – Halliday, 2015: 110.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield with one pair of horizontal furrow on the caudal area of dorsal shield. Dorsal furrows separated from each other on central region and the border of furrows bearing long setae. Genital shield of female scutiform, prestigmatid part of peritreme M-shaped.

Type species. *Trachyuropoda festiva* Berlese, 1888b, 209, designated by Berlese (1917: 11).

Note. *Trachyuropoda* (*Michaeliella*) Berlese, 1904 is an objective synonym of *Trachyuropoda* (*Trachyuropoda*) Berlese, 1888 (see Halliday, 2015: 130).

Distribution. Neotropical region.

LIST OF THE KNOWN SPECIES

Trachyuropoda borinqueni Fox, 1957

Trachyuropoda borinqueni Fox, 1957: 67–69.

Occurrence and biology: Puerto Rico; rodents (Fox, 1957).

Trachyuropoda elegantula Trägårdh, 1952

Trachyuropoda elegantula Trägårdh, 1952: 83–85.

Occurrence and biology: Polynesia; leaf litter (Trägårdh, 1952).

Trachyuropoda festiva (Berlese, 1888)

Uropoda festiva Berlese, 1888a: 39.

Trachyuropoda festiva – Berlese, 1904b: 364–365.

Trachyuropoda festiva – Hirschmann, 1979: 67.

Occurrence and biology: Paraguay; tree debris and under tree bark (Berlese, 1888a).

Trachyuropoda margaritaensis Hirschmann, 1979

Trachyuropoda margaritaensis Hirschmann, 1979: 52.

Occurrence and biology: Venezuela; soil (Hirschmann, 1979).

Trachyuropoda nicolae Hirschmann, 1976

Trachyuropoda nicolae Hirschmann, 1976k: 34.

Occurrence and biology: Brazil; leaf litter (Hirschmann, 1976k).

Trachyuropoda santaluciana Kontschán, 2011

Trachyuropoda santaluciana Kontschán, 2011b: 220–222.

Occurrence and biology: Saint Lucia; rotten debris under bark (Kontschán, 2011b).

Trachyuropoda quadricarinata Hirschmann, 1976

Trachyuropoda quadricarinata Hirschmann, 1976k: 38.

Occurrence and biology: Bolivia; plant debris (Hirschmann, 1976k).



***Trachyuropoda transversaria* Hirschmann, 1976**

Trachyuropoda transversaria Hirschmann, 1976k: 35–36.

Occurrence and biology: Bolivia and Paraguay; soil and leaf litter (Hirschmann, 1976k).

***Trachyuropoda trinidadis* Hirschmann, 1976**

Trachyuropoda trinidadis Hirschmann, 1976k: 37–38.

Occurrence and biology: Trinidad; soil and leaf litter (Hirschmann, 1976k).

***Trachyuropoda tuberculatotransversaria* Hirschmann, 1976**

Trachyuropoda tuberculatotransversaria Hirschmann, 1976k: 36–37.

Occurrence and biology: unknown (Hirschmann, 1976k).

***Trachyuropoda vulgaris* Hirschmann, 1976**

Trachyuropoda vulgaris Hirschmann, 1976k: 38–39.

Occurrence and biology: Bolivia; decaying plant debris and soil (Hirschmann, 1976k).

Genus *Trogulotrachys* Hirschmann, 1979

Trogulotrachys Hirschmann, 1979: 67.

Trachyuropoda troguloides-group Hirschmann, 1976a: 2, 7; Wiśniewski and Hirschmann, 1993: 94.

Trogulotrachys – Halliday 2015: 132.

Diagnosis. Idiosoma oval, strongly sclerotized. Dorsal shield with two longitudinal strongly sclerotized grooves, which separated into three parts. Genital shield of female scutiform, prestigmatid part of peritreme M-shaped.

Type species. Type species *Argas troguloides* Gervais, 1844: 231, by original designation

Distribution. Holarctic.

LIST OF THE KNOWN SPECIES***Trogulotrachys ablesi* (Hirschmann, 1976) comb. nov.**

Trachyuropoda ablesi Hirschmann, 1976g: 25–26.

Occurrence and biology: USA; nests of ants (Hirschmann, 1976g).

***Trogulotrachys celtica* (Halbert, 1907) comb. nov.**

Trachyuropoda celtica Halbert, 1907: 67.

Occurrence and biology: Lambay Island (Ireland); biology and habitat are unknown (Halbert, 1907).

***Trogulotrachys hirschmanni* (Pecina, 1980) comb. nov.**

Trachyuropoda hirschmanni Pecina, 1980: 373–376.



Occurrence and biology: Czech Republic, Slovakia and Hungary; nests of ants (Wiśniewski and Hirschmann, 1993).

***Trogulotrachys kinsella* (Kontschán, Proctor & Newton, 2010) comb. nov.**

Trachyuropoda kinsella Kontschán, Proctor and Newton, 2010: 212–218.

Occurrence and biology: Canada; soil (Kontschán et al., 2010).

***Trogulotrachys michaeli* (Ewing, 1909) comb. nov.**

Glyphopsis michaeli Ewing, 1909: 115–116.

Trachyuropoda michaeli – Hirschmann, 1976: 4–9.

Occurrence and biology: USA; nests of ants and decaying wood (Ewing, 1909).

***Trogulotrachys troguloides* (Canestrini & Fanzago, 1877)**

Trachynotus troguloides Canestrini and Fanzago, 1877: 62.

Uropoda lamellosa – Canestrini and Berlese, 1884: 6.

Glyphopsis lamellosa – Michael, 1894: 309.

Trachyuropoda (Janetiella) laminosa – Berlese, 1904b: 360.

Trachyuropoda troguloides – Hirschmann and Zirngiebl-Nicol, 1964: 22.

Trogulotrachys troguloides – Hirschmann, 1979: 67.

Occurrence and biology: Western and Central Europe; nests of ants and under stones (Wiśniewski and Hirschmann, 1993).

***Trogulotrachys wasmanniana* (Berlese, 1903) comb. nov.**

Trachyuropoda wasmanniana Berlese, 1903: 249–250.

Trachyuropoda (Janetiella) wasmanniana – Berlese, 1904b: 362–363.

Trachyuropoda wasmanniana – Hirschmann and Zirngiebl-Nicol, 1964: 22.

Occurrence and biology: Europe; nests of ants in steppe meadows (Wiśniewski and Hirschmann, 1993).

***Trogulotrachys willmanni* (Hirschmann & Zirngiebl-Nicol, 1969) comb. nov.**

Trachyuropoda willmanni Hirschmann and Zirngiebl-Nicol, 1964: 22.

Occurrence and biology: Spain and Poland; leaf litter (Wiśniewski and Hirschmann, 1993).

Genus *Urojanetia* Berlese, 1913

Trachyuropoda (Urojanetia) Berlese, 1913: 85.

Trachyuropoda coccinea- group Hirschmann, 1976a: 4, 6; Wiśniewski and Hirschmann, 1993: 88.

Urojanetia – Halliday, 2015: 132.

Diagnosis. Idiosoma oval, strongly sclerotized. Some small c-shaped strongly sclerotized grooves situated on central area on dorsal shield, and three pairs of c-shaped grooves which in some cases merging into a longer groove in caudal part of dorsal shield. Genital shield of female linguliform. Peritreme M-shaped.



Type species. *Uropoda coccinea* Michael, 1891: 646. (Note: type species of *Janetiella* Berlese, 1904, designated by Berlese (1904b: 352). *Trachyuropoda* (*Janetiella*) Berlese, 1904 is a junior homonym of *Janetiella* Kieffer, 1898 (Diptera), and was replaced by *Trachyuropoda* (*Urojanetia*) Berlese, 1913 (see Halliday, 2015: 132).

Distribution. South America, Japan and Europe.

LIST OF THE KNOWN SPECIES

Urojanetia baloghi (Hirschmann, 1976) comb. nov.

Trachyuropoda baloghi Hirschmann, 1976c: 20–21.

Occurrence and biology: Chile; forest habitat (Hirschmann, 1976c).

Urojanetia baloghisimilis (Hirschmann, 1976) comb. nov.

Trachyuropoda baloghisimilis Hirschmann, 1976c: 20.

Occurrence and biology: Chile; soil and leaf litter (Hirschmann, 1976c).

Urojanetia belunensis (Lombardini, 1962) comb. nov.

Urodinychus belunensis Lombardini, 1962: 202–203.

Trachyuropoda belunensis (Lombardini, 1962)

Occurrence and biology: Italy; biology and habitat are unknown (Lombardini, 1962).

Notes: This species was presented under “not classified” species in the list of Wiśniewski and Hirschmann (1993). However, the presence of strongly sclerotized three rings on caudal part of dorsal shield (Lombardini, 1962: Fig. III. 3) suggest that this species belongs to the genus *Urojanetia*.

Urojanetia coccinea (Michael, 1891)

Uropoda coccinea Michael, 1891: 646.

Trachyuropoda (*Janetiella*) *coccinea* – Berlese, 1904b.

Trachyuropoda coccinea – Halbert, 1915: 93.

Urojanetia coccinea – Berlese, 1917: 85.

Urojanetia coccinea – Hirschmann, 1979: 67.

Occurrence and biology: Europe; nests of ants, soil, under stones, and decaying woods (Wiśniewski and Hirschman, 1993).

Urojanetia hexaspinosa (Hirschmann, 1976) comb. nov.

Trachyuropoda hexaspinosa Hirschmann, 1976c: 19.

Occurrence and biology: Chile; biology and habitat are unknown (Hirschmann, 1976c).

Urojanetia mahunkai (Hirschmann, 1976) comb. nov.

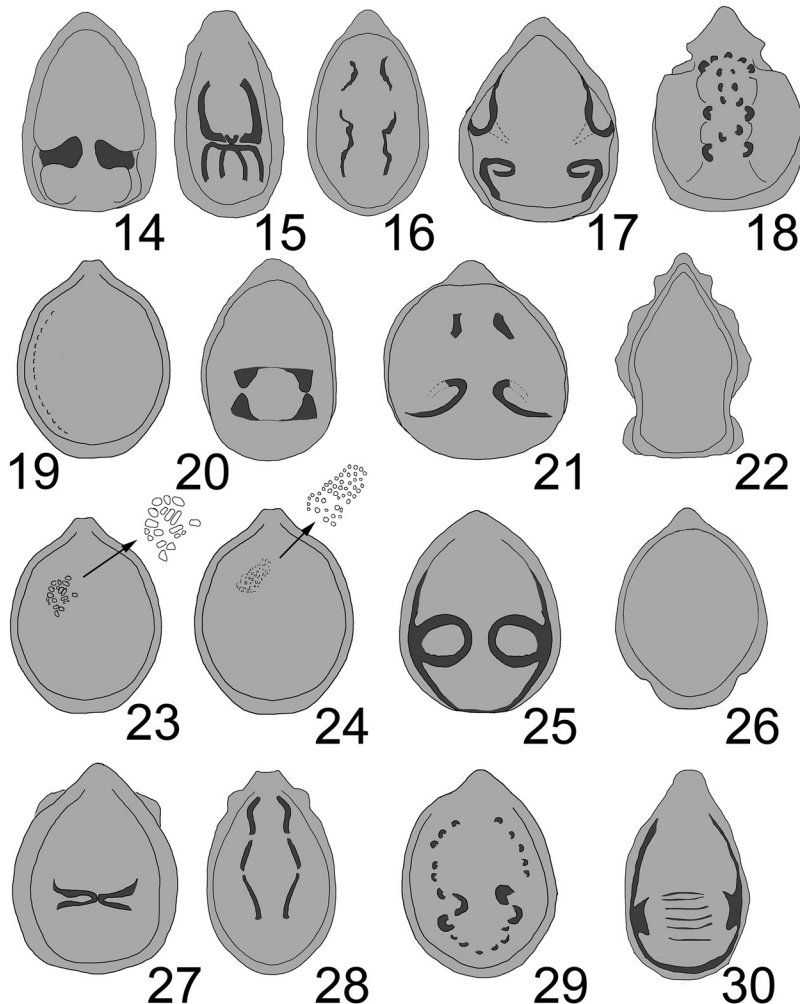
Trachyuropoda mahunkai Hirschmann, 1976c: 19–20.

Occurrence and biology: Chile; biology and habitat are unknown (Hirschmann, 1976c).



Urojanetia similicoccinea* (Hiramatsu, 1979) comb. nov.Trachyuropoda similicoccinea* Hiramatsu, 1979: 106–107.

Occurrence and biology: Japan; nest of ant sample (Hiramatsu, 1979).

Genus *Urotrachytes* Berlese, 1904*Urotrachytes* Berlese, 1904a: 271.

Figs 14–30. Schematic illustration of trachyuropodid genera. 14. *Arculatatrachys*, 15. *Bostocktrachys*, 16. *Castritrachys*, 17. *Cephalouropoda*, 18. *Cephalojanetia*, 19. *Cristicepstrachys*, 20. *Excavatatrachys*, 21. *Graecatrachys*, 22. *Leonardiella*, 23. *Lindquisttrachys*, 24. *Magnatrachys*, 25. *Origmatrachys*, 26. *Trachybana*, 27. *Trachyuropoda*, 28. *Trogulotrachys*, 29. *Urojanetia*, 30. *Urotrachytes* (arrows show the sculptural pattern in higher magnification)



Trachyuropoda formicaria-group [Hirschmann, 1976a](#): 5, 8; [Wiśniewski and Hirschmann, 1993](#): 91.

Urotrachytes – [Halliday, 2015](#): 135.

Diagnosis. Idiosoma oval, strongly sclerotized. Parallel strongly sclerotized grooves situated between two strongly sclerotized anvil-like lateral structures at level of coxae IV on dorsal shield. Genital shield of female linguliform or rectangular, with serrate anterior margins, prestigmatid part of peritreme hook-shaped.

Type species. *Uropoda formicariae* Michael, in [Lubbock, 1881](#): 386, by original designation

Distribution. Palaearctic region.

LIST OF THE KNOWN SPECIES

Urotrachytes formicaria ([Lubbock, 1881](#))

Uropoda formicaria [Lubbock, 1881](#): 386.

Glyphopsis formicariae – [Michael, 1891](#): 314–319.

Urotrachytes formicarius – [Berlese, 1904b](#): 382–384.

Trachyuropoda formicaria – [Hirschmann and Zirngiebl-Nicol, 1964](#).

Trachyuropoda formicaria – [Hirschmann, 1979](#): 67.

Occurrence and biology: Europe; nests of ants, soil and leaf litter ([Wiśniewski and Hirschmann, 1993](#)).

Urotrachytes formicariasimilis ([Hirschmann, 1975](#)) comb. nov.

Trachyuropoda formicariasimilis [Hirschmann, 1975](#): 104.

Occurrence and biology: Russia, Slovakia and Hungary; nests of ant species ([Wiśniewski and Hirschmann, 1993](#)).

Urotrachytes ponticuli ([Karg, 1989](#)) comb. nov.

Trachytes ponticuli [Karg, 1989](#): 155–156.

Occurrence and biology: Central Europe; soil of meadows.

Notes: This species was presented under “not classified” species in the list of [Wiśniewski and Hirschmann \(1993\)](#). However, the presence of parallel strongly sclerotized grooves situated at level of coxae IV on dorsal shield ([Karg, 1989](#): Fig. 124a–c) suggest that this species belongs to the genus *Urotrachytes*.

Key to the Trachyuropodidae genera

- 1. Opisthogastric region of ventral idiosoma with a pair of deep furrows..... 2
 - Opisthogastric region of ventral idiosoma without deep furrows..... 3
- 2. Idiosoma subtriangular or pentagonal, anterior area of marginal shield broad ([Fig. 22](#))
.....*Leonardiella* [Berlese, 1903](#)
- Idiosoma oval, lemon-shaped or oval, anterior area of marginal shield narrow ([Fig. 26](#))
..... *Trachyibana* [Kontschán, 2015](#)
- 3. Dorsal shield with strongly sclerotised lines, rings and other structures..... 6
 - Dorsal shield without sclerotised lines, rings and other structures..... 4
- 4. Margins of dorsal shield with some bulbs ([Fig. 19](#)) *Cristicepstrachys* [Hirschmann, 1979](#)



- Bulbs absent 5
- 5. Dorsal shield covered by oval pits (Fig. 24) *Magnatrachys* Hirschmann, 1979
- Dorsal shield covered by large irregular pits pattern (Fig. 23) *Lindquisttrachys* Hirschmann, 1979
- 6. Dorsal shield with line-like (grooves) strongly sclerotised structures 7
- Dorsal shield with circular, semi-circular or subtriangular strongly sclerotised grooves.. 10
- 7. Strongly sclerotised grooves parallel with the axis of body 8
- Strongly sclerotised grooves not parallel with the axis of body 9
- 8. Strongly sclerotised grooves divided into two parts (Fig. 16) *Castritrachys* Hirschmann, 1979
- Strongly sclerotised grooves divided into three parts (Fig. 28) *Trogolotrachys* Hirschmann, 1979
- 9. Dorsal shield with deep horizontal furrow covered by two sclerotised grooves (Fig. 15) *Bostocktrachys* Hirschmann, 1979
- Deep horizontal furrow absent, only numerous, narrow sclerotised horizontal grooves present (Fig. 30) *Urotrachytes* Berlese, 1903
- 10. Dorsal shield with one pair of strongly sclerotised structures 13
- Dorsal shield with more than one pair of strongly sclerotised structures 11
- 11. Dorsal shield with two pairs of subtriangular strongly sclerotised structures (Fig. 20) *Excavataatrachys* Hirschmann, 1979
- Dorsal shield with more than two pairs of semicircular strongly sclerotised structures... 12
- 12. Dorsal shield with three pairs of semicircular strongly sclerotised structures on central part and many semicircular strongly sclerotised structures on lateral parts (Fig. 29) *Urojanetia* Berlese, 1903
- Dorsal shield with numerous (more than three pairs) semicircular strongly sclerotised structures situated on central area (Fig. 18) *Cephalojanetia* Willmann, 1951
- 13. Dorsal shield strongly sclerotised structure circular (eye-like) (Fig. 25) *Origmatrachys* Hirschmann, 1979
- Dorsal shield strongly sclerotised structure not circular 14
- 14. Dorsal shield strongly sclerotised structure U-shaped (Fig. 27) *Trachyuropoda* Berlese, 1888
- Dorsal shield strongly sclerotised structure C-shaped 15
- 15. C-shaped strongly sclerotised structure situated on anteriolateral margins of dorsal shield (Fig. 17) *Cephalouropoda* Berlese, 1903
- C-shaped strongly sclerotised structure situated on central area of dorsal shield 16
- 16. Idiosoma oval, C-shaped dorsal strongly sclerotised structure large (Fig. 14) *Arculataatrachys* Hirschmann, 1979
- Idiosoma rounded, C-shaped dorsal strongly sclerotised structure small (Fig. 21) *Graecatrachys* Hirschmann, 1979

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