



A new species of bristletails of the genus *Turquimachilis* (Microcoryphia: Machilidae) from the Crimea

Новый вид щетинохвосток рода *Turquimachilis* (Microcoryphia: Machilidae) из Крыма

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Abstract. *Turquimachilis taurica* **sp. nov.** from the Grand Canyon of Crimea is described and illustrated. It is compared with the only known species of the genus, *T. mendesi* Bach de Roca et al., 2013 from the Ilgaz Mountains (Kastamonu Province, northern Turkey). The new species can be distinguished from the congener by the structure of the compound eyes, maxillary palp, urocoxites, and the number of divisions of the gonapophyses.

Резюме. Описан и проиллюстрирован *Turquimachilis taurica* **sp. nov.** из Большого Каньона Крыма. Приведено сравнение нового вида с единственным другим известным видом рода, *T. mendesi* Bach de Roca et al., 2013, который был описан с горного хребта Ылгаз в провинции Кастамону на севере Турции. Новый вид отличается от него строением сложных глаз, нижне-челюстного щупика, кокситов брюшка и количеством члеников яйцеклада.

Key words: taxonomy, distinguishing features, distribution, the Black Sea region, Microcoryphia, Machilidae, *Turquimachilis*, *Charimachilis*, new species

Ключевые слова: таксономия, диагностические признаки, распространение, регион Черного моря, Microcoryphia, Machilidae, *Turquimachilis*, *Charimachilis*, новый вид

Zoobank Article LSID: [urn:lsid:zoobank.org:pub:A83EE375-51EB-427D-98FA-277577A0B594](https://zoobank.org/pub:A83EE375-51EB-427D-98FA-277577A0B594)

Introduction

The genus *Turquimachilis* Bach de Roca, Fanciulli, Cicconardi, Molero-Baltanás et Gaju-Ricart, 2013 with one known species, *T. mendesi* Bach de Roca, Fanciulli, Cicconardi, Molero-Baltanás et Gaju-Ricart, 2013, was described from the Ilgaz Mountains (Kastamonu Province) situated in the Black Sea region in northern Turkey. The type series of *T. mendesi* was collected at 1800–2300 m above the sea level (Bach de Roca et al., 2013).

In the structure of the genitalia of the male and female, *Turquimachilis* is close to the Mediterranean genus *Charimachilis* Wygodzinsky, 1939, which includes 13 species.

The position of the genera *Charimachilis* and *Turquimachilis* in the system of Microcoryphia is still poorly understood. Based on morphology of the ovipositor, *Charimachilis* was included in an incertae sedis group of genera within the superfamily Machiloidea (Sturm & Bach de Roca, 1993). Based on the arrangement of scales on the body of adults,

Mendes (1990) placed it in the subfamily Machilinae of the family Machilidae. Based on morphological characters of the second and third instar larvae of *Charimachilis caucasica* Kaplin, 1999, as well as on the structure of the male and female genitalia of *Charimachilis* and *Turquimachilis*, Kaplin (2019) has suggested that these genera belong to Machilinae, in which they form the *Charimachilis*-group of genera occupying an isolated position close to the subfamily Petrobiinae.

The females of the genera *Turquimachilis* and *Charimachilis* differ from each other in the number of eversible vesicles on the abdominal coxites and in the terminal end of the gonapophyses (Bach de Roca et al., 2013). In both sexes of *Charimachilis*, urocoxites I–VII have 1 + 1 eversible vesicles, while in *Turquimachilis* urocoxites I and VI–VII have 1 + 1 eversible vesicles and urocoxites II–V, 2 + 2 eversible vesicles. Anterior gonapophyses of *Charimachilis* females are usually supplied in the distal parts with lateral digging spines, which are absent on the gonapophyses of *Turquimachilis* females.

The aim of this article is to describe a second species of *Turquimachilis*, based on the material collected in the Crimea.

Material and methods

The bristletails were collected by the author and stored in 75% ethanol. The holotype was dissected and mounted in Berlese fluid on glass microscope slides. The figures were made using a microscope and a drawing tool. The holotype of the new species is deposited in the collection of the All-Russian Institute of Plant Protection (VIZR), Pushkin, St Petersburg, Russia.

Taxonomy

Order **Microcoryphia** Verhoeff, 1904

Family **Machilidae** Grassi, 1888

Subfamily **Machilinae** Grassi, 1888

Genus ***Turquimachilis*** Bach de Roca, Fanciulli, Cicconardi, Molero-Baltanás et Gaju-Ricart, 2013

Type species: *Turquimachilis mendesi* Bach de Roca, Fanciulli, Cicconardi, Molero-Baltanás et Gaju-Ricart, 2013

***Turquimachilis taurica* sp. nov.**

(Figs 1–14)

Holotype. Female (slide-mounted); *Republic of Crimea*, Grand Canyon of Crimea, 44°31'40"N, 34°01'00"E, 500–600 m, under stones, 7.IX.2020, V. Kaplin leg.

Description. Body length: 9.6 mm; body width: 2.0 mm; length of antenna: about 7.5 mm; length of cerci: 3.4 mm; total width of eyes: 1.00 mm; length of eye: 0.44 mm; width of paired ocellus: 0.36 mm; length of paired ocellus: about 0.13 mm; length of coxal styli of legs: about 0.4 mm; length of ovipositor: 1.45 mm.

General body colour (in ethanol) light brownish, with dark brown scales on upper and lower sides of body. Frons, clypeus, occiput, mandibles, maxillae, maxillary and labial palps, and legs with reddish brown or reddish violet pigment. Head, maxillary palps and coxae most pigmented. Scapus, pedicellus and flagellum of antennae without pigment.

Antennae shorter than body. Distal chains of flagellum divided into 9–11 annuli (Fig. 1). Cercus approximately 0.36 times the body length. Apex of cercus (Fig. 2) with two lateral spikes. Articles of cerci, except for apical two, with colourless supporting macrochaetae on inner side.

Compound eyes dark brown (in ethanol). Ratio of compound eye length to its width 0.89; ratio of contact line length to eye length 0.61 (Fig. 3). Paired ocelli black with narrow white rim, shoe-shaped, subinferior to compound eyes. Frons slightly swollen between paired ocelli. Distance between inner margins of ocelli about 0.21 times and between their outer margins 0.92 times the total width of compound eyes.

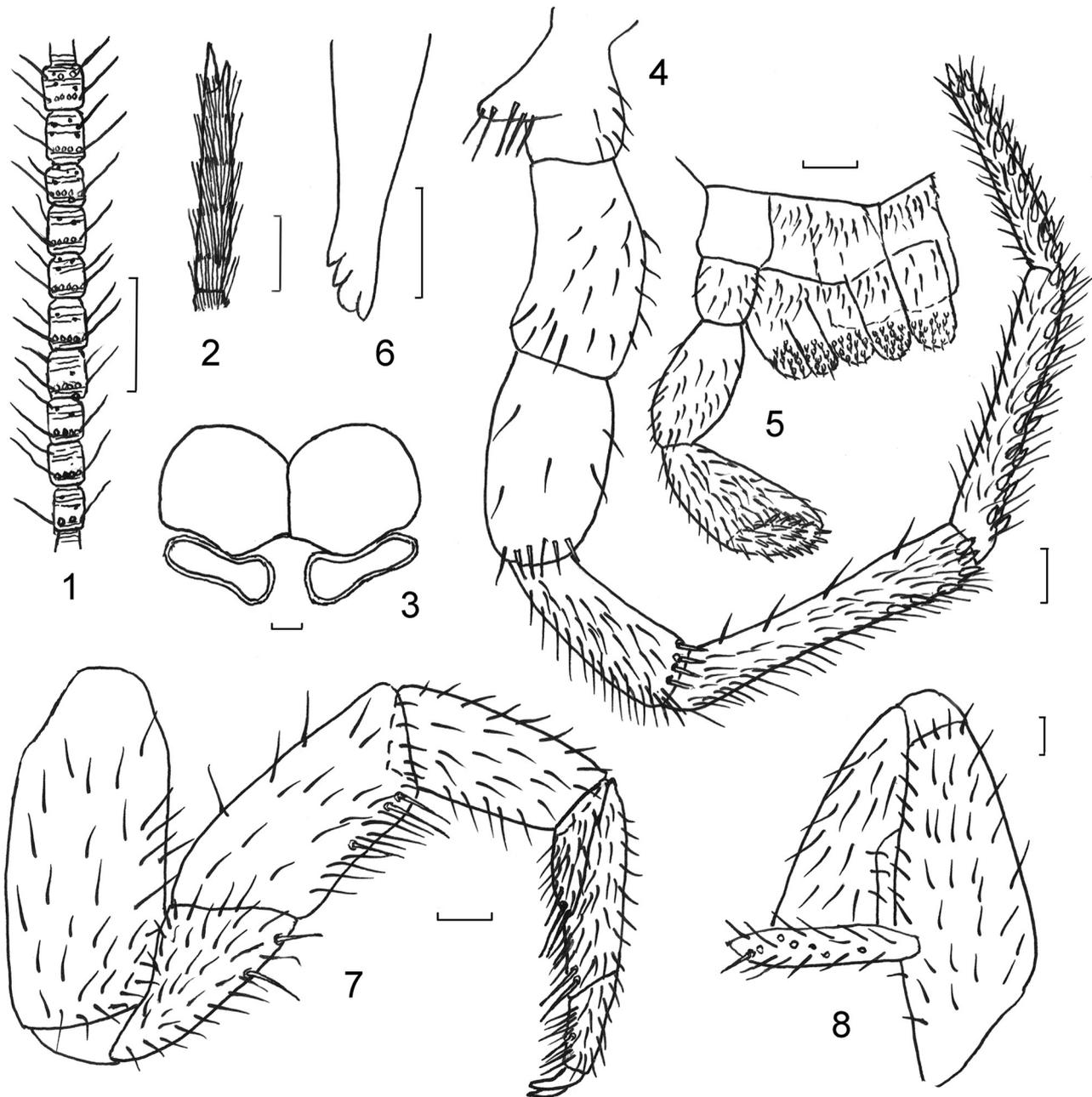
Maxillary palp (Fig. 4): apical palpomere 0.84 times as long as preceding one; ratio of lengths of 5th and 4th palpomeres about 1.64; dorsal surface of 7th, 6th and 5th palpomeres with 17–18, 16–18 and 5–6 hyaline spines, respectively. Labial palp (Fig. 5): apical palpomere triangular oval, 2.1–2.2 times as long as wide, with about 21–25 sensorial cones. Mandible with four well-developed distal teeth (Fig. 6).

Fore and middle femur and tibia widened (Fig. 7). Fore and hind legs 1.09 and 1.16 times as long as middle legs, respectively. Ratios of length to width of femur, tibia and tarsus as in Table 1.

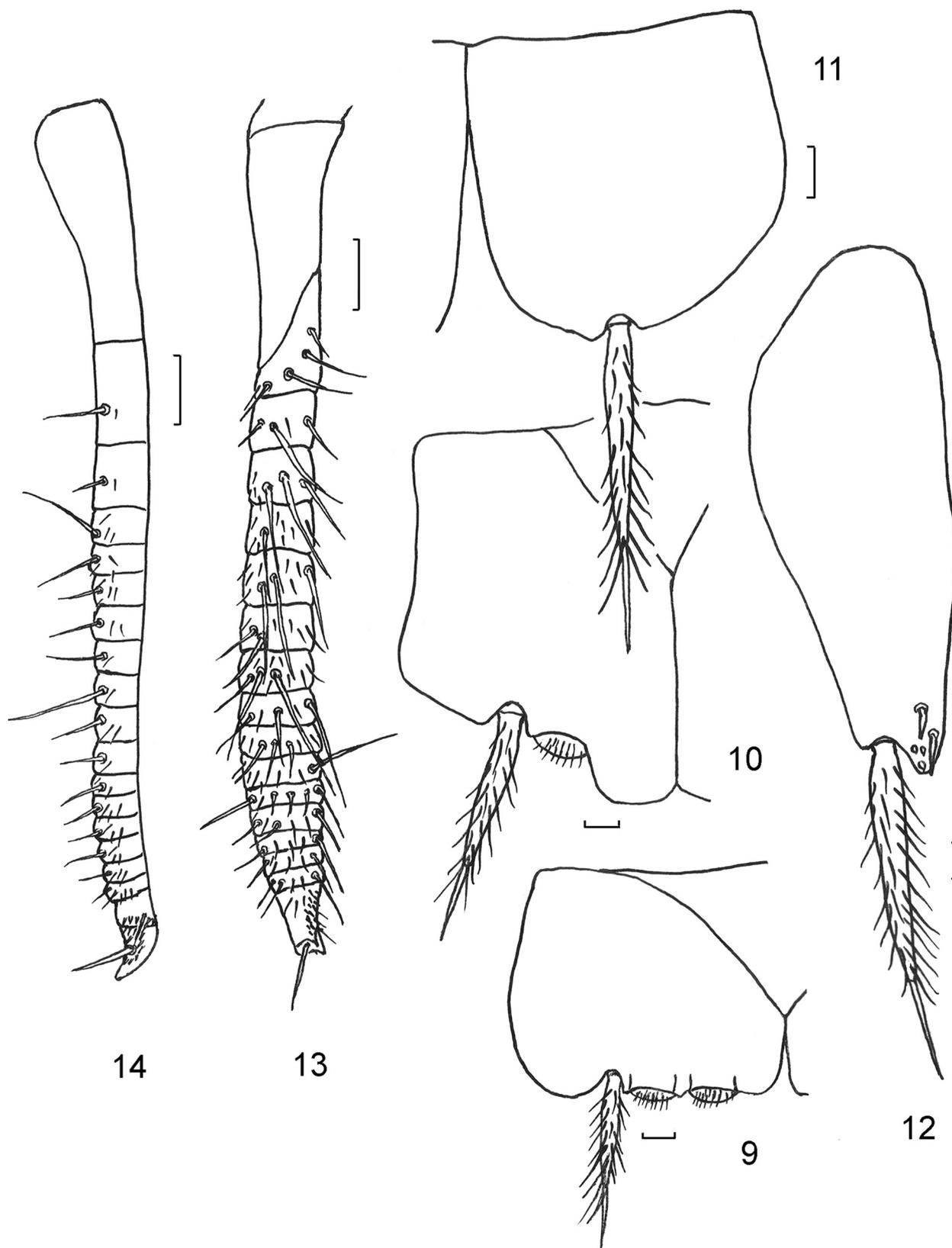
Ratio of length of 3rd tarsomere of hind tarsus to its total length about 0.39. Ventral surfaces of coxae, femora, tibiae and tarsi without hyaline spine-like chaetae. Ratio of coxal stylus length to width of middle and hind coxa about 1.7 (Fig. 8).

Urocoxites I and VI–VII with 1 + 1 ever-sible vesicles; urocoxites II–V with 2 + 2 ever-sible vesicles. Posterior angle of urosternites

II–VI approximately 82–86°, that of uroster-nite VII about 74°. Ratios of lengths of uroster-nites and urocoxites II–VI 0.67–0.69. Ratios of lengths of urostyli (without apical spine) and urocoxites II–VII 0.50–0.54. Ratio of length of urostylus and urocoxite VIII 0.68, IX 0.45. Ratios of lengths of apical spines and urostyli II–VIII 0.55–0.62 (Figs 9–11). Urocoxite VII (Fig. 10)



Figs 1–8. *Turquimachilis taurica* sp. nov., holotype (female). 1, distal chain of flagellum; 2, apex of cercus; 3, compound eyes and paired ocelli; 4, maxillary palp; 5, labial palp; 6, apex of mandible; 7, fore leg; 8, hind leg (coxa and a part of trochanter). Scale bars: 0.1 mm.



Figs 9–14. *Turquimachilis taurica* sp. nov., holotype (female). **9**, urosternite and urocoxite V; **10**, urosternite and urocoxite VII; **11**, urocoxite VIII; **12**, urocoxite IX; **13**, gonapophysis VIII; **14**, gonapophysis IX. Scale bars: 0.1 mm.

Table 1. Ratios of length to width of leg segments in the holotype (female) of *Turquimachilis taurica* sp. nov.

Segments	Pair of legs		
	fore	middle	hind
Tarsus	4.80	4.20	5.30
Tibia	2.26	2.02	2.83
Femur	2.12	2.42	2.55
Coxa	2.49	2.84	2.86

with well-developed lobes protruding between styli; ratio of length to width of one lobe about 0.75. Thoracic tergites, urosternites, urocoxites I–VIII, and urotergites I–VI and X without macrochaetae. Urocoxites IX (Fig. 12) with 3–5 inner sublateral spines (spiniform chaetae), without outer sublateral spines. Urotergites VII with 1 + 1, urotergites VIII and IX with 2 + 2 sublateral spines.

Ovipositor weakly sclerotised, thickened, covered by urocoxites IX, stout, similar to that of *T. mendesi*.

Gonapophysis VIII (Fig. 13) with 17 divisions; its apex with two small spine-like lobules and a subterminal chaeta between them; chaeta being a little longer than apical division; apical division with about 15 sensory spines and 2–3 relatively long thin chaetae in preapical part and with two curved chaetae in basal part. Remaining divisions of gonapophysis VIII with a row of setae, some of which, mainly those on inner and outer sides of gonapophysis, long and ciliary. Basal division without chaetae. Gonapophysis VIII without digging teeth.

Gonapophysis IX (Fig. 14) with 19 divisions, a somewhat curved horn at apex and a subterminal chaeta being slightly longer than apical division. Apical division also with a group of 11–12 tiny sensory spines; these spines present also on preceding 5–6 divisions, but number of spines decreasing towards base. Each of these divisions also with about 2–4 chaetae; chaetae on outer side longer. Basal division without chaetae.

Comparison. According to the structure of the female gonapophyses and 2 + 2 eversible vesicles on urocoxites II–V, the new species belongs to the genus *Turquimachilis* (Bach de Roca et al., 2013), which was monotypic, with the only species *T. mendesi*. The main morphological differences between *T. taurica* sp. nov. and *T. mendesi* are given in Table 2. The new species differs from *T. mendesi* in the structure of the compound eyes, maxillary palp, urocoxites, and the number of divisions of gonapophyses. The ratio of lengths of contact line and compound eye in female of *T. taurica* sp. nov. is about 0.6, while in female of *T. mendesi* it is about 0.5. The numbers of hyaline spines on the dorsal surface of the 6th and 7th palpomeres of maxillary palps are 16–18 and 9–12, respectively. The ratios of length to width of hind tibia are about 2.8 and about 2.6, respectively; the ratios of lengths of urostyli and urocoxites II–V are 0.50–0.52 and 0.38–0.43; the number of divisions of gonapophyses are 17–19 and 15–16, respectively. The urocoxites of *T. mendesi* have no spiniform chaetae, whereas urocoxites IX of *T. taurica* sp. nov. bear 3–5 inner sublateral spines.

Etymology. The species name is a Latin adjective referring to Chersonesus Taurica, an ancient name of the Crimea, where the holotype was collected.

Table 2. Main morphological differences between the females of *Turquimachilis taurica* sp. nov. and *T. mendesi*.

Morphological characters		<i>T. taurica</i> sp. nov.	<i>T. mendesi</i>
Ratio of lengths of contact line and compound eye		0.61	0.48
Number of hyaline spines on dorsal surface of palpomeres of maxillary palps	7th	17–18	9–10
	6th	16–18	10–12
Ratios of length to width of hind tibia		2.83	2.61
Number of spiniform chaetae on urocoxite IX		3–5	0
Ratios of lengths of urostyli and urocoxites II–V		0.50–0.52	0.38–0.43
Number of divisions of gonapophysis	VIII	17	15–16
	IX	19	15–16

Habitat. The holotype of *T. taurica* sp. nov. was collected in a forest (*Carpinus*, *Fagus*, *Fraxinus excelsior*, *Quercus robur*) among the stones.

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Received 2 February 2021 / Accepted 8 May 2021. Editorial responsibility: N. Ju. Kluge, A.A. Przhiboro