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**A NEW SPECIES OF THE BRISTLETAIL GENUS *MACHILINUS*
SILVESTRI, 1905 (MICROCORYPHIA: MEINERTELLIDAE) FROM
CRIMEA**

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Summary. A new species *Machilinus crimaeus* Kaplin, **sp. n.** is described from Leninsky district of Crimea. The new species differs from its closest congeners by color, ratios of length to width, contact line length to length of compound eyes, distance between inner margins of paired ocelli to total width of eyes.

Key words: *Machilinus* s. str., taxonomy, new species, distribution, Europe.

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Резюме. Из Ленинского района Крыма описан новый вид щетинохвосток *Machilinus crimaeus* Kaplin, **sp. n.**, который отличается от близких видов рода цветом сложных глаз, отношением их длины к ширине, относительной длиной линии контакта глаз, отношением расстояния между внутренними краями парных глазков к общей ширине глаз.

INTRODUCTION

A lot of new species of the bristletails was described from Ukraine and Southern Russia recently (Kaplin, 2007; Kaplin & Martynov, 2020, 2022a, 2022b; Kaplin, 2022, 2023), of them *Machilinus obscurus* Kaplin, 2020, *M. petrophilus* Kaplin, 2020 and *M. priazovicus* Kaplin, 2022 from the Donetsk Republic and *M. caucasicus* Kaplin, 2007 from environs of Novorossiysk belongs to the subgenus *Machilinus* s. str. which is characterized by 1 + 1 eversible vesicles on urocoxites II–VII, and urostyli with apical spines (Sturm & Bach, 1992). This subgenus includes 24 described species, distributed predominantly in the Mediterranean region with center of its biodiversity in Spain and in southern Eastern Europe. Species of subgenus *Machilinus* s. str. most clearly differ in structure and chaetotaxy of male maxillary palps, number and location of needle-like pigmented setae on external lateral apical apophysis of 2nd and on 3rd articles.

A new species of subgenus *Machilinus* s. str. is described below. Holotype and paratypes are deposited in the All-Russian Institute of Plant Protection, St. Petersburg, Russia (VIZR).

TAXONOMY

Order Microcoryphia Verhoeff, 1904

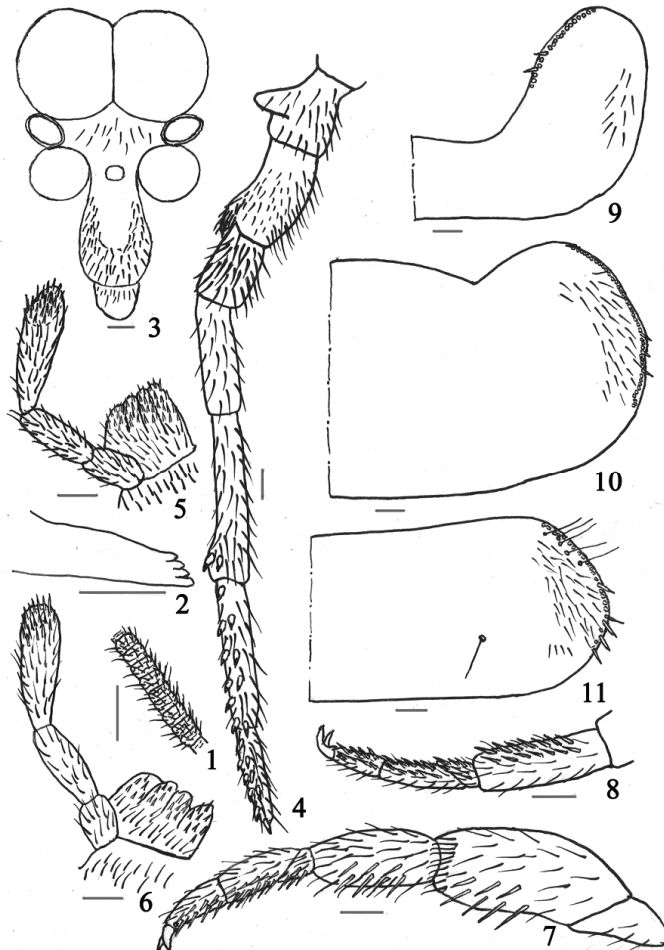
Family Meinertellidae Silvestri, 1905

Genus *Machilinus* Silvestri, 1905

Machilinus (Machilinus) crimaeus Kaplin, sp. n.

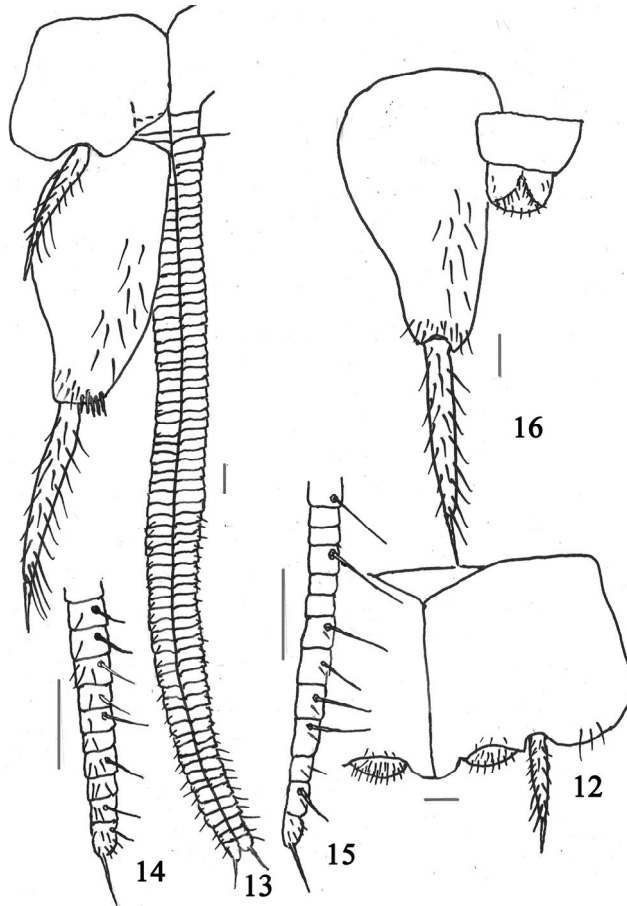
<https://zoobank.org/NomenclaturalActs/7C5B7C94-EFE8-4DEE-9886-2F79412A7CBF>

Figs 1–16



Figs 1–11. *Machilinus crimaeus* Kaplin, sp. n., holotype ♂ (1–5, 7–11) and paratype ♀ (6). 1 – distal chain of flagellum; 2 – apex of mandible; 3 – compound eyes, ocelli, clypeus and upper lip; 4 – maxillary palpus; 5, 6 – labial palpus; 7 – tarsus, tibia, femur and trochanter of fore leg; 8 – tarsus and tibia of hind leg; 9 – pronotum; 10 – mesonotum; 11 – metanotum. Scale bars = 0.1 mm.

MATERIAL. Holotype: male (slide mounted, VIZR), **Russia**: Crimea, Leninsky district, near the village Osoviny, 45°26'N, 36°36'E, h~65 m, petrophytic steppe, shell rock scree, under stones, 17.VI 2022 (leg.V.V. Martynov). Paratypes: 7 ♂, 14 ♀ (1♂, 2 ♀ in slides), (VIZR), the same locality and date (leg.V.V. Martynov).



Figs 12–16. *Machilinus crimaeus* Kaplin, sp. n., holotype ♂ (16) and paratype ♀ (12–15). 12 – urosternite and urocoxites VII; 13 – urocoxites VIII and IX with gonapophyses; 14 – urocoxites VIII and IX with gonapophyses; 14 – distal part of anterior gonapophyse; 15 – distal part of posterior gonapophyse; 16 – urocoxite IX, with penis. Scale bars = 0.1 mm.

DESCRIPTION. Body length: male 5.8–7.0 mm, female 6.8–7.5 mm. Body width: male 1.8–2.0 mm, female 1.9–2.2 mm. Antennal length: 3.2–4.0 mm in male, 3.2–4.3 mm in female (broken); cercal length 1.8–2.2 mm in male, 2.1–2.3 mm in female; total eyes width: 0.66–0.77 mm in male, 0.66–0.80 mm in female; eye length: 0.37–0.46 mm in male, 0.40–0.47 mm in female; paired ocelli width: 0.16–0.17 mm in both sexes; paired ocelli length:

0.09–0.10 mm in both sexes. Ovipositor length 2.2–2.9 mm. Thoracic coxal styli absent. Head including antennae, maxillary and labial palpi, clypeus, labrum, labium, and legs without scales; rest of body with scales. The scales are brownish and brown, darker on underside of body.

Table 1. Ratios of lengths to widths of main leg articles in *Machilinus crimaesus* sp. n.

Leg articles and sex		Pair of legs		
		fore	middle	hind
Tarsus	male	4.85	4.50	5.21
	female	4.78	4.08	5.45
Tibia	male	1.96	2.34	3.38
	female	1.81	1.90	3.50
Femur	male	2.06	2.40	2.85
	female	1.87	2.18	2.60
Coxa	male	2.29	2.43	2.57
	female	2.19	2.37	2.57

Table 2. Number of spines on legs in *Machilinus crimaesus* sp. n.

Segments and sex			Pair of legs		
			fore	middle	hind
Tarsomeres	1st	male	4	5–6	9
			10	8–10	10–12
			8	8	8
	2nd	female	5	5	8
			9–10	8	10
			6–8	6	8
Tibia	male	7	6–7	14	
	female	8	8–9	14	
Femur	male	7	10–14	9–10	
	female	8	7	8–9	

General body color light whitish. Areas of head around eyes, ocelli, antennae, labrum, labium, mandibles, maxillae, legs, dorsal part of thorax and abdomen with a brownish-violet pigment of predominantly weak and medium intensity. Ratio of length to width of scapus about 1.7 in male and 1.7–1.8 in female. Antennae in both sexes shorter than body. Apices of cerci with 2 easily breakable supporting spines: one well developed and the other considerable smaller. Distal chains of flagellum with 8 or 9 annuli (Fig. 1). Two or three distal chains of antennal flagellum broken. Apices of mandibles 4-lobed (Fig. 2).

Eyes in alcohol dark, with bluish tint without spots. Ratio of length to width of compound eye about 1.1–1.2 in both sexes; ratio of contact line length to eye length 0.64–0.66 in both sexes. Paired ocelli oval, sublateral, white with narrow border; 1.6–1.7 times as wide as long in male and in female (Fig. 3). Distance between inner margins of ocelli 0.58–0.60 and between their outer margins 0.92–0.95 times total width of compound eyes, in both sexes. Clypeus of male with black, relatively numerous short simple setae, slightly longer and less numerous on frons. Cercus approximately 0.26–0.30 times as long as body length in male and 0.28–0.32

times in female. Cerci with 9–10 clear articles and 18–20 articles with clear and unclear boundaries between them in male and in female with two or four rows of scales. Articles of cerci, except for apical one, with two rows, including 1–3 supporting spines on inner side. In male, 12–14 rows of articles with indistinct boundaries from the base of the cerci also with 1–3 supporting spines on ventral side.

Table 3. Ratios of lengths of some abdominal structures in *Machilinus crimaesus* sp. n.

Urites	Urosternite / urocoxite		Stylus / urocoxite		Apical spine / stylus	
	male	female	male	female	male	female
II	0.20	0.21	0.58	0.51	0.37	0.40
III	0.19	0.19	0.52	0.48	0.33	0.42
IV	0.18	0.20	0.49	0.49	0.35	0.44
V	0.15	0.15	0.46	0.46	0.36	0.43
VI	0.16	0.14	0.45	0.45	0.37	0.43
VII	0.11	0.12	0.46	0.48	0.36	0.43
VIII	0.10	-	0.57	0.70	0.33	0.42
IX	-	-	0.64	0.74	0.26	0.25

Remark. Apical spines are not included in stylus length.

Table 4. Distribution of sublateral mesochaetae and relatively thin chaetae on urocoxites in *Machilinus crimaesus* sp. n.

Urites	Urocoxites	
	Male	Female
I	≈ (16–20 + 16–20)	≈ (18–26 + 18–26)
II	≈ (14–22 + 14–22)	≈ (15–18 + 15–18)
III	≈ (14–20 + 14–20)	≈ (14–16 + 14–16)
IV	≈ (10–12 + 10–12)	≈ (15–20 + 15–20)
V	5–8 + 5–8	9–10 + 9–10
VI	4–6 + 4–6	6–9 + 6–9
VII	2 + 2	2–3 + 2–3
VIII	3 + 3	2 + 2
IX	(12 ¹ + 9 ²) + (16 ¹ + 5 ²)	[(5* + 12–13) ¹ + 10–11 ²] + [(5–7* + 4–5) ¹ + 8–9 ²]

Remark. Relatively short thickened pigmented* and more thing and long posterior chaetae near stylus¹ and chaetae in main part of urocoxites IX².

Apical article of maxillary palpus of male 0.68 and female 0.64 times as long as preceding one (Fig. 4). Dorsal surface of 7th, 6th and 5th articles of maxillary palpus with 8–10, 8–10, and 2–3 hyaline spines in male, and 8–10, 12 and 3 spines with darkened tops in female, respectively. 5th article of maxillary palpus 1.4 times as long as 4th article in male and in female. Second article of male maxillary palpus noticeably curved with external lateral apical apophysis, which absent in female maxillary palpus. Apophysis surpassing distal end of 2nd

article. Outer side of apophysis with about 12–16 dark, almost black, thickened, noticeably curved setae of medium length, without needle-like spines. Inner part of second article with many relatively long, weakly pigmented setae and very small setae on its ventral surface. Shortened third article of male maxillary palp with many relatively evenly distributed darkened, thickened and elongated setae, absent on 3rd article of female maxillary palp. Third article of maxillary palps shorter than its fourth article 1.4–1.5 times in male and 1.5–1.6 times in female. Ventral surface of 1st, 2nd and 3rd articles of male maxillary palp with numerous relatively long thickened setae. The last article of labial palp elongated-oval, with 21–25 apical sensory cones in male and 18–20 in female. Its length in males and females 3.5 times greater than width (Figs. 5, 6).

Fore and middle tibia of male and female widened (Fig. 7). Ratios of their lengths to widths 1.8–2.3 as shown in Table 1. Ratio of length of 3rd tarsomere to total length of tarsus 0.36–0.37 in male and in female (Fig. 8). Middle legs shortest. Ratio of total length of middle and hind legs to length of fore leg 0.90 and 1.08 in males, respectively, and 0.98 and 1.13 in females. Ventral surface of femora, tibiae and tarsi with spines as shown in Table 2.

Pronotum with deep notch in both sexes as shown in Fig. 9. Inner margins of its lateral expansions with about 10–22 + 10–22 macrochaetae in male and in female. Lateral margins of mesonotum with 50–52 + 50–52 metanotum with 20–25 + 20–25 macrochaetae in both sexes (Fig. 10, 11). Lateral parts of pronotum also with 8–12 + 8–12, meso- and metanotum with 30–40 + 30–40 macrochaetae long and thin chaetae in both sexes. Near macrochaetae along lateral margins in anterior part of metanotum in male and in female 4–5 long sensory setae. Single long sensory setae also found in posterior parts of metanotum, significantly spaced from lateral margins. Abdominal tergites without macrochaetae.

In both sexes, abdominal segments II–VII with 1 + 1 eversible vesicles. Posterior angle of urosternites about 120–160°. Ratios of lengths of urosternite, urocoxite and stylus (without apical spine) on urites II–IX as shown in Table 3. Inner posterior lobes of urocoxites VII of female protruding; ratio of length to their total width about 0.44 (Fig. 12). Anterior part of urocoxites I with 16–20 + 16–20 chaetae in male and with 18–26 + 18–26 chaetae in female. External posterior part of urocoxites II–VIII near styli with relatively thin setae of medium length. Their number as shown in table 4. Urocoxites IX near the styli in males and in females with setae. Among them, in female 5–7 setae near the styli noticeably thickened and pigmented (Fig. 13). Typical needle-shaped spines not found on urocoxites in male and in female.

Ovipositor slender, elongate, extending much further than apex of styli IX. Length of ovipositor 2.2–2.4 mm. Anterior and posterior gonapophyses with 61–63 and 66–68 divisions, respectively. About 28 basal divisions of anterior gonapophyses and 45 proximal divisions of posterior gonapophyses glabrous. Apical spines of gonapophyses as long as 3.0 apical divisions combined. Distal divisions of anterior and posterior gonapophyses with long chaetae as shown in Figs 14, 15.

Male genitalia without parameres. Penis significantly does not attain the apex of urocoxites IX (Fig. 16). Ratio of lengths of apical and basal divisions of penis about 1.0.

DIFFERENTIAL DIAGNOSIS. In *Machilinus caucasicus*, *M. obscurus*, *M. petrophilus*, *M. priazovicus*, and *M. crimaeus* sp. n. second article of maxillary palp with well-developed apical apophysis protruding beyond apex of this article. In male of *M. petrophilus* ventral part of apophysis and adjacent part of 2nd article with about 12–16 dark almost black, short spiniform chaetae (spines). 3rd article of male maxillary palpus also with about 25 almost black short lateral spines. In males of *M. obscurus*, *M. priazovicus* and *M. crimaeus* **sp. n.** outer side of apophysis with about 12–15 dark lateral chaetae and several longer simple chaetae in upper part of apophysis, without spiniform chaetae. 3rd article of male maxillary palpus with numerous dark brown relatively long thick chaetae, without spines (Kaplin, 2007;

Kaplin & Martynov, 2020, 2022a). The main morphological differences between *M. crimaeus* sp. n. and its closest congeners are shown in Table 5. First of all, new species differs from its closest congeners by color, ratios of length to width, contact line length to length of compound eyes, distance between inner margins of paired ocelli to total width of eyes.

DISTRIBUTION. Russia (Crimea).

ETYMOLOGY. The new species is named after the type locality.

Table 5. The main morphological differences between *Machilinus crimaeus* sp. n. and its closest congeners (after Kaplin, 2007; Kaplin & Martynov, 2020, 2022).

Morphological characters	<i>Machilinus caucasicus</i> Kaplin, 2007	<i>Machilinus obscurus</i> Kaplin, 2020	<i>Machilinus priazovicus</i> Kaplin, 2022	<i>Machilinus petrophilus</i> Kaplin, 2020	<i>Machilinus crimaeus</i> sp. n.
Color of compound eyes	Dark, with bluish tint and inconspicuous brown spots	Unicolorous, dark or almost black	Dark, with bluish tint and inconspicuous brown spots	Light gray with brown speckles	Unicolorous, dark, with bluish tint and without spots
Ratio of length to width of compound eye	1.3–1.4	1.2–1.3	1.2–1.3	1.2–1.3	1.1–1.2
Ratio of contact line length to length of eyes	0.66–0.72	0.66–0.70	0.70	0.70–0.76	0.64–0.66
Ratio of distance between inner margins of paired ocelli to total width of compound eyes	0.45–0.50	0.56–0.58	0.60	0.68–0.70	0.58–0.60
Distribution	Krasnodar region, near Novorossiysk	Donetsk region, near Starobeshevo	Donetsk region, Priazovsky district, Khomutovskaya steppe	Donetsk region, near Amvrosievka	Republic of Crimea, Leninsky district

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