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A NEW SPECIES OF THE BRISTLETAIL GENUS *CHARIMACHILIS* WYGODZINSKY, 1939 (MICROCORYPHIA: MACHILIDAE) FROM EASTERN UKRAINE

V. G. Kaplin^{1*}, V. V. Martynov²⁾

1) All-Russian Institute of Plant Protection. St. Petersburg, Pushkin, 196608, Russia. *Corresponding author, E-mail: ctenolepisma@mail.ru

2) Donetsk Botanical Garden, Donetsk, 83059, Ukraine.

Summary. *Charimachilis petrophilus* Kaplin, sp. n. is described from Donetsk region of Ukraine. New species is most similar to *C. taurica* Kaplin, 2021 and *C. rostoviensis* Kaplin, 2020 but differs from them by the ratio lengths of contact line and compound eyes, by number of hyaline spines on dorsal surface of 5–7th articles of maxillary palpus, by ratio of lengths of stylus and urocoxites VIII and IX, and by number of divisions in posterior gonapophysis. New species is also similar to *C. ukrainensis* Stach, 1958 and *C. wahrmani* Wygodzinsky, 1959 but distinguishes from them in the ratio of contact line to eye length, the distance between inner margins of ocelli to total width of compound eyes, the lengths of stylus and urocoxite IX, and from *C. wahrmani* also in the number of divisions in gonapophyses VIII and IX.

Key words: bristletails, Machilinae, taxonomy, new species, parthenogenesis, Palaearctic region.

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Резюме. Из Донецкой области Украины описан *Charimachilis petrophilus* Kaplin, **sp. n.** Новый вид наиболее близок к *C. taurica* Kaplin, 2021 и *C. rostoviensis* Kaplin, 2020, но отличается от них относительной длиной линии контакта глаз, количеством бесцветных игловидных хет на дорсальной поверхности 5–7-го члеников нижнечелюстного щупика, соотношением длин грифельков и урококситов VIII и IX, а также числом члеников задних гонапофизов. Новый вид также сходен с *C. ukrainensis* Stach, 1958 и *C. wahrmani* Wygodzinsky, 1959, но отличается от обоих относительной длиной линии контакта глаз; соотношением длин грифельков и урококситов VIII и IX, а от *C. wahrmani* также числом члеников VIII и IX гонапофизов.

INTRODUCTION

Southwestern Palaearctic genus *Charimachilis* Wygodzinsky, 1939 (Microcoryphia: Machilidae, Machilinae) consists of 15 described species: *C. palaestinensis* Wygodzinsky, 1939 (Palestina), *C. wahrmani* Wygodzinsky, 1959 (Turkey), *C. caucasica* Kaplin, 2019 (Russia, Krasnodar region), *C. abchasica* Kaplin, 1999 (Abkhazia), *C. manfredoniae* Kaplin, 1999 (Italy), *C. egatensis* (Bach de Roca, 1983) (Italy), *C. melitensis* (Stach, 1958 (Malta), *C. orientalis* (Silvestri, 1908) (Greece), *C. dentata* Wygodzinsky, 1941 (Greece), *C. relictata* Janetschek, 1954 (Italy, Croatia, Austria, Greece), *C. armata* Stach, 1958 (Bulgaria), *C. ukrainensis* Stach, 1958 (Ukraine), *C. morozovi* Kaplin, 2019 (Russia, Belgorod region), *C. rostoviensis* Kaplin, 2020 (Russia, Rostov region), and *C. taurica* Kaplin, 2021 (Crimea) (Kalin, 2019; Kaplin & Martynov, 2020; Kaplin, 2021). Most species of this genus are parthenogenetic. Only females are known in 13 species. Males were found only in populations of *C. caucasica* Kaplin, 2019 and *C. abchasica* Kaplin, 2017 from the Great Caucasus. This makes it difficult to identify them.

MATERIAL AND METHODS

The bristletails were collected in Donetsk region and stored in 75% ethanol. The holotype (female) and two paratypes (females) were dissected and mounted in Berlese fluid on glass microscope slides. The figures were made using a microscope and a drawing tool. The types of the new species are deposited in the collection of the All-Russian Institute of Plant Protection (VIZR), Pushkin, St. Petersburg, Russia.

DESCRIPTION OF NEW SPECIES

Family Machilidae Grassi, 1888

Subfamily Machilinae Grassi, 1888

Genus *Charimachilis* Wygodzinsky, 1939

Type species: *Praemachilis orientalis* Silvestri, 1908.

***Charimachilis petrophilus* Kaplin, sp. n.**

<http://zoobank.org/NomenclaturalActs/102AEA04-F2FC-441A-A0CA-23557FE47991>

Figs 1–14

TYPE MATERIAL. Holotype – ♀, **Ukraine**: Donetsk region, near Dmitrievka, 47°56'03" N, 38°56'15" E, 50 m, petrophytic steppe, under stones, 23.III 2020, leg. V. Martynov (VIZR) (in slides). Paratypes: 5♀, same locality, data and collector as for holotype (VIZR) (2♀ in slides; 3♀ in 75% ethanol).

DESCRIPTION. *Female*. Body length 7.6–9.2 mm; body width 2.2–2.3 mm; antennal length 5.0–5.6 mm; cercal length 2.9–3.3 mm; total eyes width 0.89–0.94 mm, eye length 0.43–0.46 mm; paired ocelli width 0.39–0.41 mm, length 0.14–0.16 mm. Coxal styli length 0.51–0.54 mm. Ovipositor length 1.4–1.5 mm.

General body color whitish, with purple-brown hypodermal pigment of faint or medium intensity only on antennal base, frons, gena, labrum, mandible, stipes and galea of maxilla, first article of maxillary palpus, coxa. Color of scales on upper and lower surface of the body brown. Antennae shorter than body. Distal chains of flagellum divided into 6–12 annuli (Fig. 1). Cercus 0.32–0.39 times as long as body length. Apex of cercus with one large and one lateral easily broken spike (Fig. 2). Divisions of cerci, except for apical three, with 1–3 colorless supporting macrochaetae on inner side.

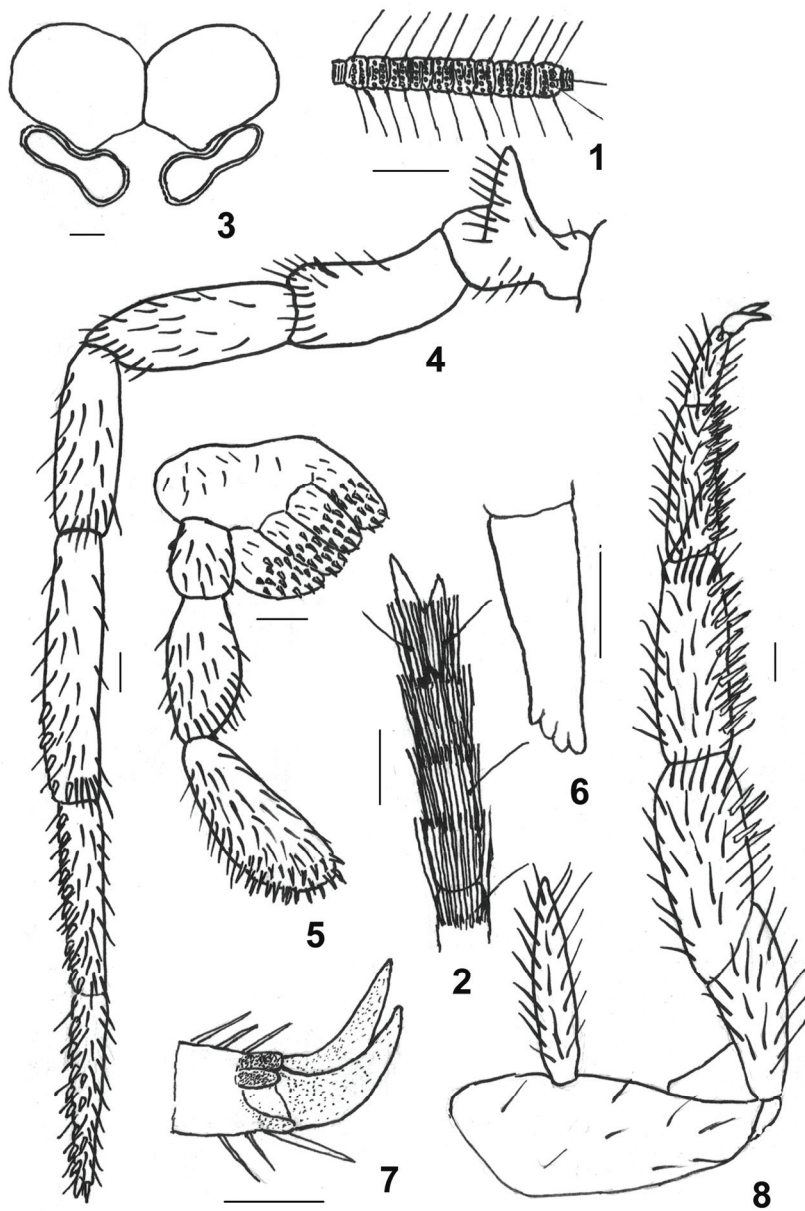
Compound eyes black. Ratio of length to width of compound eye about 0.90–0.94; ratio of contact line length to eye length 0.42–0.47. Paired ocelli shoe-shaped, dark brown with white rim, located in front of eyes. Distance between inner margins of ocelli about 0.14–0.15 and between their outer margins 0.80–0.86 total width of compound eyes (Fig. 3).

Apical article of maxillary palpus 0.96–1.04 times as long as preceding one. Dorsal surface of 7th, 6th, and 5th articles of maxillary palpus with 13, 11, and 5 hyaline spines, respectively (Fig. 4). Apical article of labial palpus triangularly oval, 2.5–2.7 times as long as wide (Fig. 5). Mandibles with four distal teeth (Fig. 6).

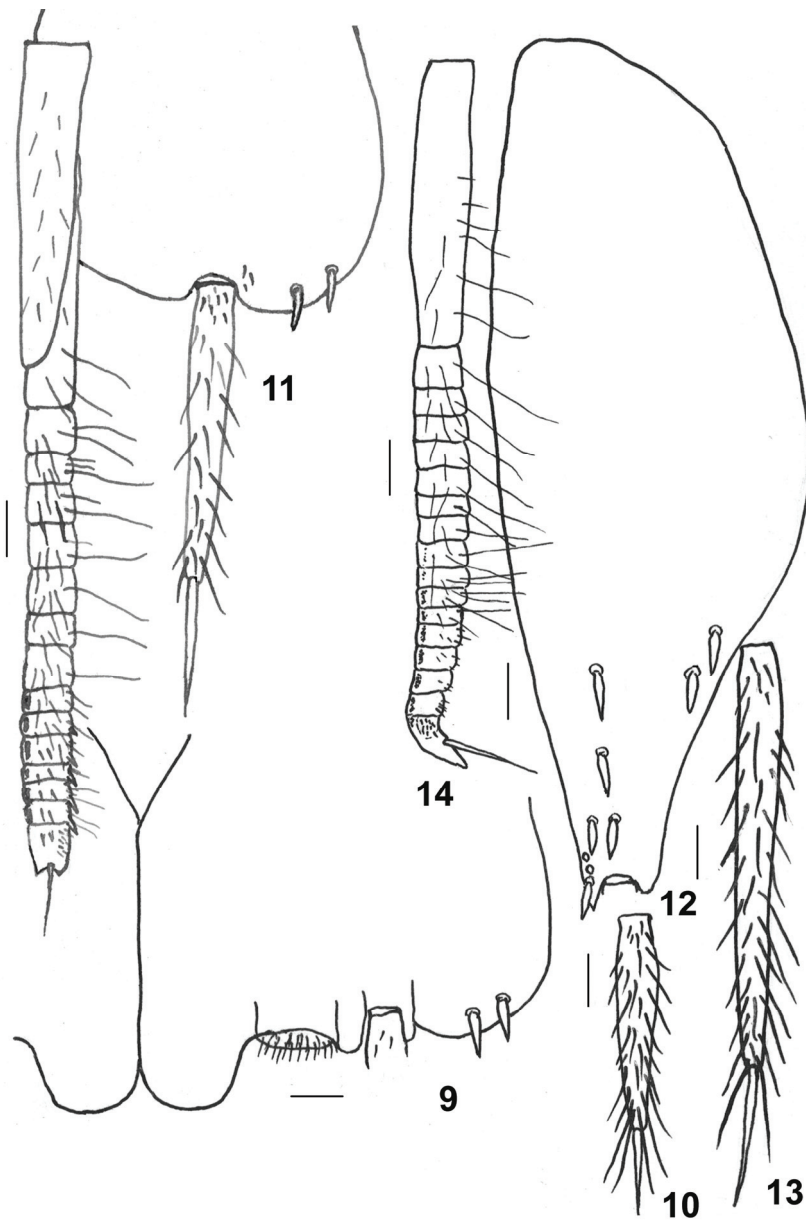
Fore and middle femur and tibia widened. Ratios of lengths to widths of femur, tibia and tarsus as shown in Table 1. Ratio of length of 3rd tarsomere to total length of tarsus 0.32–0.34. Pretarsus with well developed claws and with two support protrusions (Fig. 7). Ventral surface of femora, tibiae and tarsi with spine-like chaetae as shown in Table 2. Middle and hind legs with coxal styli (Fig. 8). Ratio of styli length to width of middle and hind coxae about 1.6–1.8.

Abdominal segments I–VII with 1 + 1 eversible vesicles. Posterior angle of urosternites sharp, about 60–80°. Ratios of lengths of urosternite and urocoxite II–VI 0.65–0.70; urostylus (without apical spine) and urocoxite II–VII 0.46–0.55, VIII – 0.86, IX – 0.50; apical spine and urostylus (without apical spine) II–VIII 0.44–0.46, IX – 0.31 (Figs 9–13). Inner posterior lobes of urocoxites VII protruding; ratio of length to width of one lobe about 0.66 (Fig. 10).

Urocoxites IX with 1–2 + 1–2 outer and 5–7 + 5–7 inner sublateral, VIII with 2–3 + 2–3, VII with 1–2 + 1–2 sublateral spines (Figs 9, 11, 12). Urocoxites I–VI without sublateral spines.



Figs 1-8. *Charimachilis petrophilus* Kaplin, sp. n., holotype ♀ (2, 4-8) and paratype ♀ (1, 3). 1 - chain of distal part of flagellum; 2 - apex of cercus; 3 - compound eyes and paired ocelli (front view); 4 - maxillary palpus; 5 - labium (part) and labial palpus; 6 - distal part of mandible; 7 - pretarsus; 8 - hind leg. Scale bars = 0.1 mm.



Figs 9-14. *Charimachilis petrophilus* Kaplin, sp. n., holotype ♀. 9 – urosternite and urocoxites VII (part); 10 – stylus of urocoxite VII; 11 – coxite VIII with anterior gonapophysis; 12 – coxite IX; 13 – stylus of urocoxite IX; 14 – posterior gonapophysis. Scale bars = 0.1 mm.

Ovipositor weakly sclerotized, thickened, completely concealed by urocoxites IX, typical of genus *Charimachilis*. Anterior and posterior gonapophyses with respectively 16 and 17 divisions (Figs 11, 14). Ultimate division of anterior gonapophysis with preapical spine and 2 small apical lateral projections, one of which is pointed and sclerotized. Apical spines as long as 2 apical divisions combined. Anterior gonapophysis with 4 or 5 lateral digging spikes. Posterior gonapophyses with well developed, sclerotized curved apical horn and preapical spine, as long as 3 or 4 apical divisions combined. Distribution of sensory and simple chaetae on divisions of anterior and posterior gonapophyses as in Figs 11 and 14.

Male. Unknown.

Table 1. Ratios of lengths to widths of main leg articles in *Charimachilis petrophilus* sp. n.

Segments	Pair of legs		
	fore	middle	hind
Tarsus	4.72	4.17	4.53
Tibia	2.09	2.02	3.00
Femur	2.07	2.38	3.08
Coxa	2.16	2.66	2.78

Table 2. Number of spines on the legs of female *Charimachilis petrophilus* sp. n.

Segments		Pair of legs		
		fore	middle	hind
Tarsomeres	1st	4	6	8–10
	2nd	8	7–8	9–11
	3rd	0	0	0
Tibia		2–3	5–6	10–12
Femur		0–1	1	2–4

DIFFERENTIAL DIAGNOSIS. *Charimachilis petrophilus* sp. n. most closely resembles *C. taurica* and *C. rostoviensis* in ratio of lengths of apical article of maxillary palpus and the preceding one; posterior angle of urosternites II–V; ratio of lengths of stylus (without apical spine) and urocoxite II–VII; number of inner sublateral spines on urocoxite IX; divisions and lateral digging spikes on anterior gonapophyses (Table 3). New species differs from *C. taurica* and *C. rostoviensis* by the ratio of contact line length to eye length; number of hyaline spines on dorsal surface of 5th, 6th and 7th articles of maxillary palpus; ratio of lengths of stylus (without apical spine) and urocoxites VIII and IX; number of divisions in posterior gonapophysis. *C. petrophilus* sp. n. differs from *C. ukrainensis* and *C. wahrmani* by

Table 3. Differences between *Chariumachilis petrophilus* sp. n., *C. rostoviensis*, *C. taurica*, *C. ukrainensis*, and *C. wahrmani*.

Morphological characters	Species					
	<i>petrophilus</i>	<i>rostoviensis</i>	<i>taurica</i>	<i>ukrainensis</i>	<i>wahrmani</i>	
Ratio lengths of cercus and body	0.32–0.39	0.42–0.47	?	0.27	?	
Ratio of compound eye length to width	0.90–0.94	0.86	1.0	0.82	0.9	
Ratio of contact line length to eye length	0.42–0.47	0.33–0.35	0.52	0.40	0.45	
Ratio of distance between inner margins of ocelli to total width of compound eyes	0.14–0.15	0.08–0.10	0.15	0.10–0.11	0.17	
Number of hyaline spines on dorsal surface of articles of maxillary palpus	7 th	13	17	15–16	?	?
	6 th	11	13–14	16	?	?
	5 th	5	8–9	3–4	?	?
Ratio of length to width of apical article of labial palpus	2.5–2.7	2.3–2.4	2.6–2.7	?	?	
Ratio of lengths of stylus (without apical spines) to urocoxite	II–VII	0.46–0.66	0.48–0.53	0.47–0.50	0.62–0.68	0.40
	VIII	0.86	0.95	0.74	0.9	0.55
	IX	0.50	0.46	0.55	0.75	0.45
Number of sublateral spines in urocoxite VIII	2–3	2–3	3	1–2	?	
Number of sublateral spines in urocoxite IX	outer	1–2	1	3	1	0
	inner	5–7	6	6–7	6–7	3
Number of gonapophyses divisions	VIII	16	17	17	15	15
	IX	17	15	16	17	12–13
Number of lateral digging spikes on anterior gonapophyses	4–5	4–5	4–5	3–4	5–6	

the ratios of contact line to eye length, distance between inner margins of ocelli to total width of compound eyes, lengths of stylus (without apical spine) and urocoxite IX; and from *C. wahrmani* in the number of divisions in gonapophyses VIII and IX (Table 3). The new species is probably parthenogenetic, similar to most its congeners.

ETYMOLOGY. The new species is named after the predominant habitat type.

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