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A new species of bristletails of the genus *Charimachilis* Wygodzinsky, 1939 (Microcoryphia: Machilidae) from the Southwestern part of the Crimean Peninsula

Новый вид щетинохвосток рода *Charimachilis* Wygodzinsky, 1939 (Microcoryphia: Machilidae) из юго-западной части Крымского полуострова

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Key words: Southwestern Palaearctic, Sevastohol, Machilinae, *Charimachilis,* taxonomy, species identification.
Ключевые слова: Юго-Западная Палеарктика, Севастополь, Machilinae, *Charimachilis,* таксономия, ключ определения видов.

Abstract. *Charimachilis turbanovi* Kaplin, **sp.n.** from the vicinity of the city Sevastopol is described and illustrated. It is compared with parthenogenetic congeners from the Eastern Europe, namely: *Ch. rostoviensis* Kaplin, 2020, *Ch. petrophilus,* Kaplin, 2022 and *Ch. taurica* Kaplin, 2021. *Ch. turbanovi* Kaplin, **sp.n.**, and differs from these species by the color of compound eyes and paired ocelli, ratios of distance between inner margins of paired ocelli to total width of compound eyes, lengths of contact line of eyes to their length, apical and preceding palpomeres of maxillary palp, length to width of apical palpomere of labial palp, number of hyaline spines on dorsal surface of the 5th palpomere of maxillary palp and the structure of the ovipositor. A key to the species of the genus *Charimachilis* Wygodzinsky, 1939 is also provided.

Резюме. Описан и проиллюстрирован новый вид *Charimachilis turbanovi* Kaplin, **sp.n.** из окрестностей Севастополя. Приведено его сравнение с родственными партеногенетическими видами: *Ch. rostoviensis* Kaplin, 2020, *Ch. petrophilus* Kaplin, 2022 and *Ch. taurica* Kaplin, 2021 из Восточной Европы. *Ch. turbanovi* Kaplin, **sp.n.** отличается от них цветом сложных глаз и парных глазков, отношениями расстояния между внутренними краями парных глазков к общей ширине глаз, длин линии контакта глаз и их длины, апикального и преапикального члеников нижнечелюстного щупика, длины к ширине апикального членика нижнегубного щупика, количеством бесцветных зубьевидных щетинок на дорсальной поверхности 5-го членика нижнечелюстного щупика, строением яйцеклада. Также приведён определительный ключ видов рода *Charimachilis* Wygodzinsky, 1939.

Introduction

The genus *Charimachilis* Wygodzinsky, 1939 [Wygodzinsky, 1939] comprises 16 described species that are distributed in the mountainous landscapes within the subtropical and temperate belts of the Southwestern Palaearctic: between 31° to 50° N (from Israel in the south to the Belgorod Region of Russia in the north) and between 11° and 41° E (from Austria in the west to Abkhazia in the east) [Kaplin, 2019]. The position of this genus in the superfamily Machiliodea is not clear, primarly because of the specific features of its ovipositor morphology [Sturm, Bach de Roca, 1993]. Due to the arrangement of scales on the antennae of adults, Mendes [1990] placed it in the subfamily Machilinae. Bach de Roca et al. [2013] considered this genus as incertae sedis group within the Machilidae. Based on the morphological characters of the second and third instar larvae of *C. caucasica* Kaplin 1999, as well as on the genital areas of male and female of the genus, Kaplin [2019] suggested that *Charimachilis* and *Turquimachilis* Bach de Roca, Fanciulli, Cicconardi, Molero-Baltanás, Gaju-Ricart, 2013 form a group of genera within the Machilinae. Males were found only in populations of *C. caucasica* Kaplin, 1999 and *C. abchasica* Kaplin, 2017 with the largest body sizes (10.6–14 mm) from the Great Caucasus. All other species with a body size of 7–10 mm are parthenogenetic [Kaplin, 1999, 2017, 2019]. Recent collections of bristletails in Crimea (vicinity of the city Sevastopol) has revealed a new species of this genus; its description is given below.

Materials and methods

The bristletails were collected by I. Turbanov into 75 % alcohol. Holotype was dissected and mounted on glass microscope slides in the Berlese fluid. Figures were made using microscope and a drawing projector. The type of the new species is deposited in the collection of the All-Russian Institute of Plant Protection (VIZR), Russian Academy of Sciences, St. Petersburg.

Nomenclatural acts introduced in the present work are registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:4E49593B-02BB-403B-8C8F-482D57B88A7D

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Results and discussion

Microcoryphia Verhoeff, 1904
Machilidae Grassi, 1888
Machilinae
Charimachilis Wygodzinsky, 1939

Type species: *Praemachilis orientalis* Silvestry, 1908

Charimachilis turbanovi Kaplin, **sp.n.**

Figs 1–13.

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Material. **Crimea peninsula:** Holotype, ♀ (slide-mounted), Sevastopol, Balaklava district, village Rodnikovoye, Baydarskaya Valley, Skelskaya cave, foothill mountain-basin forest-steppe, 269 m a.s.l., 44°27′45″ N, 33°50′50″ E, 1.VI.2021, leg. I. Turbanov (VIZR).

Дать ссылку на таблицу 1 в тексте!

Description. Body length 10.0 mm, width 2.6 mm; cerci 3.8 mm; total eyes width 1.0 mm, eye length 0.43 mm; paired ocelli width and length 0.46 and 0.17 mm, respectively; coxal styli length: 0.55–0.60 mm; ovipositor length 1.2 mm. Antennae are partially broken. General body color (in alcohol) whitish, with brown hypodermal pigment on head (frons, gena, occiput, lateral parts of clypeus). Scales color on upper and lower surface of body brownish. Ratio of length to width of scapus of antenna about 1.6. The chains in the distal part of flagellum divided into 6–8 annuli. Ratio of lengths of cerci and body about 0.38, with about 18–20 divisions. Apex of cercus with two large lateral spikes (Fig. 1).

Compound eyes green, brownish near the edges and towards the contact line (in alcohol). Ratio of length to width of compound eye about 0.86, ratio of contact line to length of eye 0.58 (Fig. 2). Paired ocelli shoe-shaped, dark with bluish tint and narrow white borders. Ratio of distance between inner and outer margins of ocelli to total width of compound eyes, about 0.11 and 0.92, respectively.

Apical palpomere of maxillary palp about 1.05 as long as previous one; ratio of lengths of 5th and 4th palpomeres about 1.50. Dorsal surface of 7th, 6th and 5th palpomeres of maxillary palp with 14–15, 13–14 and 4–5 hyaline spines, respectively (Fig. 3). Apical palpomere of labial palp triangularly oval, 2.2–2.3 times longer than wide, with sensorial cones (Fig. 4). Mandibles with four distal teeth (Fig. 5).

Fore and middle tibia and femur widened (Figs 6–8). Middle legs shorter than fore and hind legs 1.11 and 1.16 times, respectively. Ratios of length to width of femur, tibia and tarsus as shown in Table 1. Ratio of length of 3rd tarsomere of hind tarsus to total its length about 0.29–0.30. Undersurface of femora, tibiae and tarsi with 0–2, 2–8 and 8–17 hyaline spine-like setae, respectively (Table 2). Ratio of length of styli to width of middle and hind coxae about 1.6 and 1.7, respectively.

Urocoxites I–VII with 1 + 1 eversible vesicles. Posterior angle of urosternites II–VI approximately 75–80°, VII about 68°. Length ratios of urosternites and urocoxites II–VII 0.70–0.74. Length ratios of urostyli (not including apical spines) and urocoxites II–VII 0.50–0.55, VIII 0.74 and IX 0.55. Length ratios of apical spines and urostyli II–VII 0.45–0.50, VIII 0.39, IX 0.30. Urocoxite VII with well-developed protruding lobes between eversible vesicles. Ratio of length to width of one lobe about 0.50. All thoracic tergites and urosternites; urotergites I–V and X; urocoxites I–VI without macrosetae. Urotergites VI with 1 + 1, VII with 1 + 2, VIII with 2 + 3, IX with 3 + 3; urocoxites VII with 1 + 1, VIII with 2 + 2 and urocoxite IX with 3 outer and 8 inner sublateral spines (Figs 9–11). Undersurface of distal part of urocoxites IX also with numerous medium-sized relatively long setae.

Table 1. Length to width ratio of leg segments in female *Charimachilis turbanovi* sp.n.

Таблица 1. Отношения длины и ширины основных сегментов ног самки *Charimachilis turbanovi* sp.n.

Segments	Leg		
	fore	middle	hind
Tarsus	4.86	3.47	4.46
Tibia	2.44	1.58	2.79
Femur	2.22	2.05	2.25
Coxa	2.44	2.64	2.94

Ovipositor sclerotized, thickened, covered by the urocoxites IX, stout, typical of the genus *Charimachilis*. Gonapophysis VIII with 17 divisions. Apical divisions with two small lobules and subterminal needle equal in length to three apical divisions taken together. The first apical division also with about 19–21 sensory short setae and one longer setae. Following two divisions with about 5–6 small sensory setae and 3–4 longer ordinary setae. Third and fourth divisions with 3–4 sensory and 6 long setae. Fifth division with two sensory and seven long setae. Distal divisions, excepting apical one, with 4 lateral digging teeth (Fig. 12). Gonapophysis IX with 16 divisions ending with a somewhat curved apical horn at its end and with a subterminal seta as long as 3 apical divisions combined, also with 4 small sensory and two relatively short simple setae (Fig. 13). All divisions of anterior and posterior gonapophyses also with long setae.

Male unknown.

Comparative remarks. *Charimachilis turbanovi* sp.n. with digging ovipositor and with 1+1 eversible vesicles on urocoxites II–V, belongs to the genus *Charimachilis* Wygodzinsky including 16 species [Kaplin, 2019]. *Charimachilis turbanovi* sp.n. can be compared to three parthenogenetic congeners known from the Eastern Europe, namely *Ch. rostoviensis* Kaplin, 2020; *Ch, petrophilus* Kaplin, 2022 and *Ch. taurica* Kaplin, 2021. It differs from all these species by the color of compound eyes and paired ocelli, ratios of length of contact line of eyes to their length, distance between inner margins of paired ocelli to total width of compound eyes, lengths of apical and preceding palpomeres of maxillary palp, length to width of apical palpomere of labial palp, number of hyaline spines on dorsal surface of the 5th palpomere of maxillary palp (Table 3).

Etymology. The new species is named by a family of its collector I.S. Turbanov.

Table 2. The number of hyaline spine-like setae on the tarsomeres, tibia and femur of female *Charimachilis turbanovi* sp.n.

Таблица 2. Количество игловидных щетинок на члениках лапки, голени и бедре у самки *Charimachilis turbanovi* sp.n.

Segments		Leg		
		fore	middle	hind
Tarsomeres	1st	6–7	6	6
	2nd	10	2	10
	3rd	0	0	0
Tibia		2–3	4	8
Femur		0	1	2

Table 3. Main morphological differences between females of *Ch. turbanovi* sp.n., *Ch. taurica*, *Ch. rostoviensis* and *Ch. petrophilus* [Kaplin, 2021; Kaplin, Martynov, 2020, 2022]

Таблица 3. Основные морфологические различия самок *Ch. turbanovi* sp.n., *Ch. taurica*, *Ch. rostoviensis* и *Ch. petrophilus* [Kaplin, 2021; Kaplin, Martynov, 2020, 2022]

Morphological characters	*C. turbanovi* sp.n.	*Ch. taurica*	*Ch. rostoviensis*	*Ch. petrophilus*
Body length, mm	10	10	10–11	8–9
Color of compound eyes	green, brownish near the edges and contact line	dark brown, almost black	dark brown, almost black with light gray tint in central part and near eyes contact line	black
Color of paired ocelli	dark with a bluish tint	dark brown, almost black	black	dark brown
Ratio of length to width of compound eye	0.86	1.0	0.86	0.90–0.94
Ratio of length of contact line of eyes to their length	0.58	0.52	0.33–0.35	0.42–0.47
Ratio of distance between inner margins of paired ocelli to total width of compound eyes	0.11	0.15	0.08–0.10	0.14–0.15
Ratio of lengths of apical and preceding palpomeres of maxillary palp	1.06	0.98–1.05	1.12–1.14	0.96–1.04
Number of hyaline spines on dorsal surface of the 5th palpomere of maxillary palp	4–5	3–4	8–9	5
Ratio of length to width of apical palpomere of labial palp	2.2–2.3	2.6–2.7	2.3–2.4	2.5–2.7
Namber of outer/inner sub-lateral spines on urocoxites IX	3/8 + 8/3	3/7 + 7/3	1/6 + 6/1	1–2/5–7 + 5–7/1–2

A key to the species of the genus *Charimachilis* Wygodzinsky 1939

1(4) Males.

2(3) Parameres of male include 2 divisions. Ratio of length to width of apical palpomere of labial palps about 2.0. — Krasnodar Region ..... *Ch. caucasica* Kaplin, 1999

3(2) Parameres of male include 4 divisions. Ratio of length to width of apical palpomere of labial palps about 2.5–2.7. — Abkhazia ..... *Ch. abchasica* Kaplin, 2017

4(1) Females.

5(11) Anterior gonapophyses without lateral digging spines in its distal part.

6(7) Ratio of length of contact line of eyes to their length about 0.64. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.16. Ratio of length to width of apical palpomere of labial palp about 1.9. Spine macrosetae on uricoxites IX absent. — Greece, Italy..... *Ch. orientalis* (Silvestri, 1908)

7(8) Ratio of length of contact line of eyes to their length less than 0.64. Ratio of distance between inner margins of paired ocelli to total width of compound eyes more than 0.16. Ratio of length to width of apical palpomere of labial palp more than 1.9. Spine macrosetae on uricoxites IX present.

8(9) Ratio of length of contact line of eyes to their length about 0.47. Ratio of distance between inner margins of paired ocelli to total width of compound eyes more than 0.22. Ratio of length to width of apical palpomere of labial palp about 2.0, Uricoxites IX only with 9–11 inner sublateral spines. Posterior angle of urosternites II–VI approximately 105–110°. — Israel, Palestine ..... *Ch. palaestinensis* Wygodzinsky, 1939

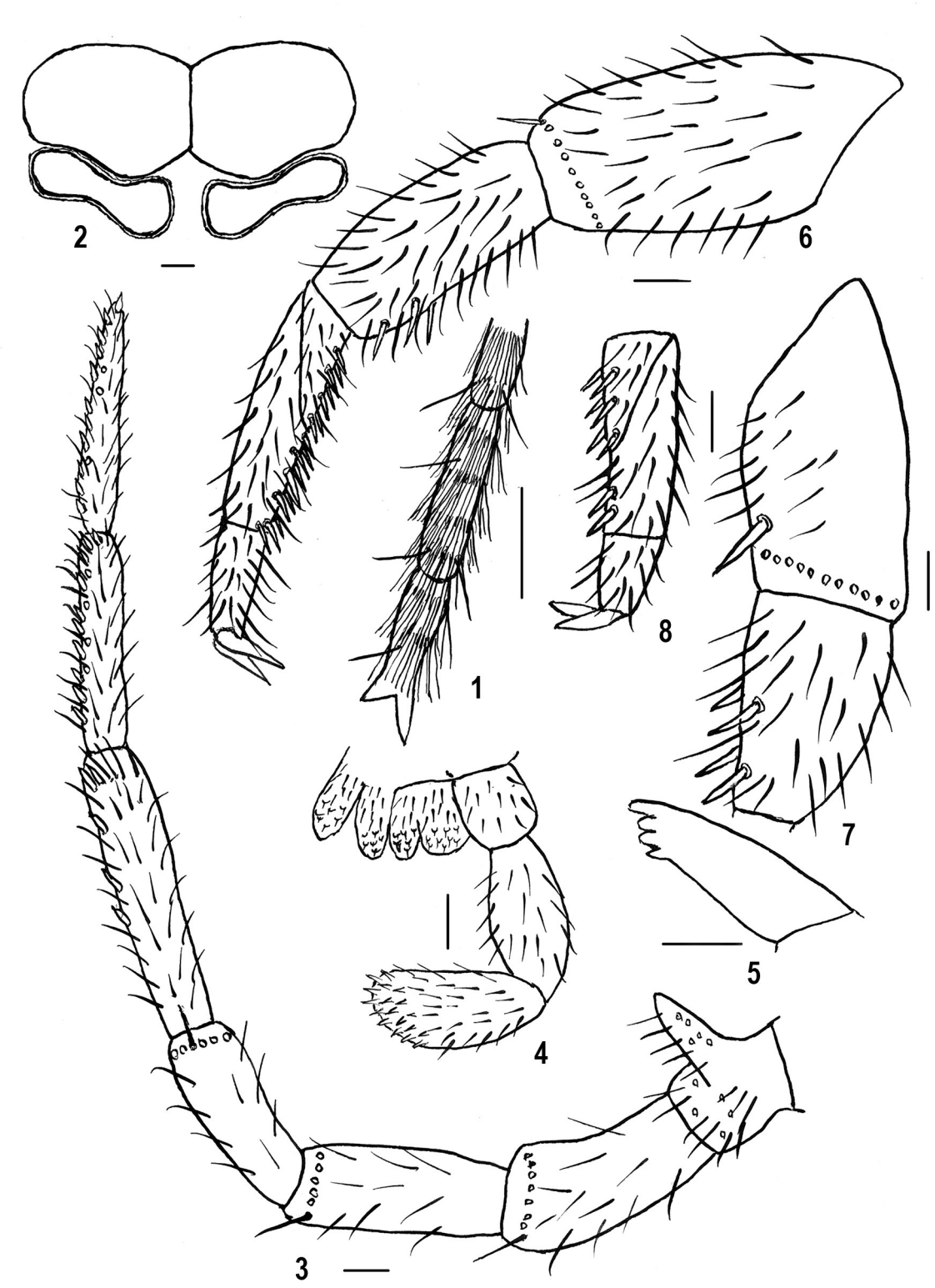
9(10) Ratio of length of contact line of eyes to their length more than 0.47. Ratio of distance between inner margins of paired ocelli to total width of compound eyes less than 0.22. Ratio of length to width of apical palpomere of labial palp more than 2.0, uricoxites IX with inner and outer sublateral spines.

10(9) Ratio of length of contact line of eyes to their length 0.52–0.55. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.18–0.20. Ratio of length to width of apical palpomere of labial palp about 2.4–2.5. Uricoxites IX with 5–7 inner and 2–3 outer sublateral spines. — Russia, Belgorodskaya Oblast .... *Ch. morozovi* Kaplin, 2019

11(14) Anterior gonapophyses with 3–4 lateral digging spines in its distal part.

12(13) Ratio of length of contact line of eyes to their length about 0.6. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.12–0.13. Length ratios of urostyli (not including apical spines) and urocoxites IX about 0.4–0.5. Gonapophyses VIII with 13 divisions. — Malta ..... *C. melitensis* (Stach, 1958)

13(12) Ratio of length of contact line of eyes to their length about 0.4. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.10–0.11. Length ratios of urostyli (not including apical spines) and urocoxites IX about 0.75. Uricoxites IX with 6–7 inner and 1 outer sublateral spines. Gonapophyses VIII with 15 divisions. — Ukraine, near Kyiv ..... *Ch. ukrainensis* Stach, 1958



Figs 1–8. Detais of morphology of the *Charimachilis turbanovi* sp.n. holotype female. 1 — distal part of cercus; 2 — eyes and paired ocelli, front view; 3 — maxillary palpus; 4 — labial palpus, with labium (part); 5 — distal part of mandible; 6 — part of fore leg (tarsus, tibia and femur); 7 — part of middle leg (tibia and femur); 8 — tarsus of middle leg. Scale bar: 0.1 mm.

Рис. 1–8. Детали морфологии самки голотипа *Charimachilis turbanovi* sp.n. 1 — дистальная часть церок; 2 — глаза и парные глазки, вид спереди; 3 — нижнечелюстные щупики; 4 — нижнегубные щупики с нижней губой (часть); 5 — дистальная часть нижней челюсти; 6 — часть передней ноги (лапка, голень и бедро); 7 — часть средней ноги (голень и бедро); 8 — лапка средней ноги. Масштаб: 0,1 мм.

14(15) Anterior gonapophyses of the female ovipositor with 5–6 lateral digging spines in its distal part. Uricoxites IX with 3 inner and without outer sublateral spines. — Türkiye, Bursa .... *Ch. wahrmani* Wygodzinsky, 1959

15(20) Anterior gonapophyses with 4 lateral digging spines. Gonapophyses VIII and IX with 12 and 13 divisions, respectively.

16(17) Ratio of length of contact line of eyes to their length about 0.75. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.15. Posterior angle of urosternites II–VI ≥ 90°. — Italy, Sicily ..... *Ch. egatensis* (Bach, de Roca, 1983)

17(16) Ratio of length of contact line of eyes to their length about 0.5–6. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.24–0.28. Posterior angle of urosternites II–VI acute (70–80°).

18(19) Ratio of length to width of apical palpomere of labial palp about 2.1– 2.3. — Italy, Puglia .... *Ch. manfredoniae* Kaplin, 2010

19(18) Ratio of length to width of apical palpomere of labial palp about 0.9. — Austria, Croatia, Italy..... ..... *Ch. relicta* Janetschek, 1954

20(23) Anterior gonapophyses with 5 lateral digging spines. Gonapophyses VIII and IX with 14–20 divisions. Ratio of distance between inner margins of paired ocelli to total width of compound eyes 0.12–0.22.

21(22) Gonapophyses VIII and IX with 15 and 14 divisions, respectively. Ratio of distance between inner margins of paired ocelli to total width of compound eyes 0.12–0.14. — Krasnodarskii Krai .... *Ch. caucasica* Kaplin, 1999

22(21) Gonapophyses VIII and IX with 17 and 19–20 divisions, respectively. Ratio of distance between inner margins of paired ocelli to total width of compound eyes 0.18–0.22. — Abkhazia ..... *Ch. abchasica* Kaplin, 2017

23(20) Anterior gonapophyses with 4–5 lateral digging spines in its distal part. Uricoxites IX with 1–3 outer and 5–8 inner sublateral spines.

24(25) Eyes widened. Ratio of length to width of compound eye about 0.70. Gonapophyses VIII and IX with 18 and 17 divisions, respectively. — Bulgaria .... *Ch. armata* Stach, 1958

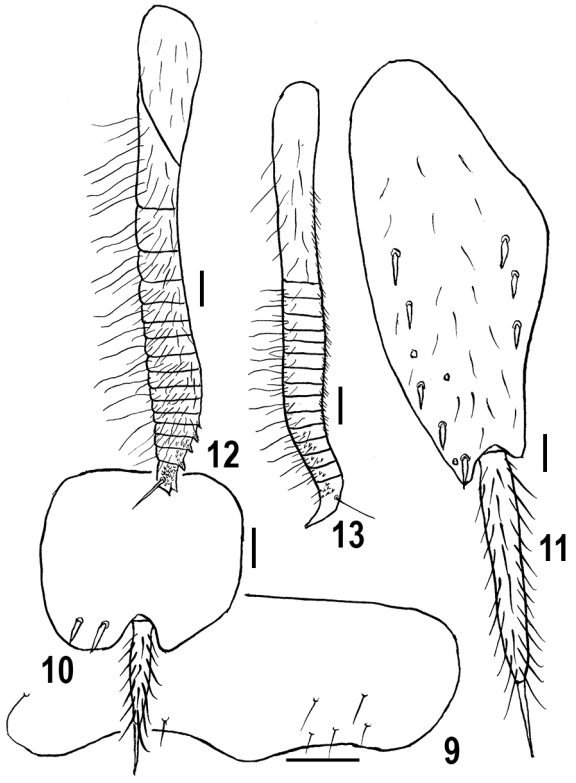
25(24) Eyes rounded. Ratio of length to width of compound eye 0.9–1.0. Gonapophyses VIII and IX with 17 and 15–16 divisions, respectively.

26(31) Ratio of length to width of compound eye 0.9.

27(30) Ratio of length of contact line of eyes to their length about 0.33–0.47.

28(29) Ratio of length of contact line of eyes to their length about 0.33–0.35. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.08–0.10. Gonapophyses IX with 15 divisions. — Rostov-on-Don. Botanical Garden .... *Ch. rostoviensis* Kaplin, 2020

29(28) Ratio of length of contact line of eyes to their length about 0.42–0.47. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.14–0.15. Gonapophyses IX with 16 divisions. — Donetskaya Oblast, near Dmitrievka ... . *C. petrophilus* Kaplin, 2022



Figs 9–13. Genitalia structures of *Charimachilis turbanovi* sp.n. holotype female. 9 — urotergite X (part); 10 — urocoxite VIII with stylus; 11 — urocoxite IX with stylus; 12 — anterior gonapophysis; 12 — posterior gonapophysis. Scale bar: 0.1 mm.

Рис. 9–13. Строение гениталий голотипа самки *Charimachilis turbanovi* sp.n. 9 — уротергит X (часть); 10 — урококсит VIII со стилусом; 11 — урококсит IX со стилусом; 12 — передний гонапофиз; 12 — задний гонапофиз. Масштаб: 0,1 мм.

30(29) Ratio of length of contact line of eyes to their length about about 0.58. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.11. Gonapophyses IX with 16 divisions. — Sevastopol ..... *Ch. turbanovi* sp.n.

31(28) Ratio of length to width of compound eye about 1.0. Ratio of distance between inner margins of paired ocelli to total width of compound eyes about 0.15. Gonapophyses IX with 16 divisions. — Staryi Krym ..... *Ch. taurica* Kaplin, 2021

References

Bach de Roca C., Fanciulli P.-P., Cicconardi F., Molero-Baltanás R., Gaju-Ricart M. 2013. Description of a new genus and a new species of Machilidae (Insecta: Microcoryphia) from Turkey // Soil Organisms. Vol.85. No.1. P.31–39.

Kaplin V.G. 1999. New Species of Bristletails of the Families Machilidae and Lepismatidae (Thysanura) from European Russia and Uzbekistan // Entomological Review. Vol.79. No.3. P.310–324.

Kaplin V.G. 2017. New species of the bristletail family Machilidae (Insecta, Microcoryphia) from Abkhazia // Entomological Re view. Vol.97. No.2. P.207–229. https://doi.org/10.1134/S0013873817020075

Kaplin V.G. 2019. A Review of the Distribution and Phylogenetic Relationships of Bristletails of the Genus *Charimachilis* Wy godz. (Archaeognatha, Machilidae) with Descriptions of Larvae of *Ch. caucasica* Kapl. and of a New Species from Belgorod Province

// Entmological Review. Vol.99. No.1. P.91–115. https://doi.org/10.1134/S0013873819010135

Kaplin V.G. 2021. A new species of bristletails of the genus *Charimachilis* (Microcoryphia: Machilidae) from Crimea // Russian Entomological Journal. Vol.30. No.2. P.123–128. https://doi.org/10.15298/rusentj.30.2.01

Kaplin V.G., Martynov V.V. 2020. Three new species of bristletails of the families Meinertellidae and Machilidae (Archaeognatha) from Ukraine and Southern Russia // Acta Entomologica Musei Nationalis Pragae. Vol.60. No.2. P.463–474. https://doi.org/10.37520/aemnp.2020.30

Kaplin V.G., Martynov V.V. 2022. A new species of the bristletail genus *Charimachilis* Wygodzinsky, 1939 (Microcoryphia: Machilidae) from Eastern Ukraine // Far Eastern Entomologist. No.449. P.1–8. https://doi.org/10.205221/fee.449.1

Mendes L.F. 1990. An Annotated List of Generic and Specific Names of Machilidae (Microcoryphia, Insecta) with Identification Keys for the Genera and Geographical Notes // Estudos, Ensaios e Documentos, Instituto de Investigação Cientifica Tropical, Lisboa. Vol.155. P.1–127.

Sturm H., Bach de Roca C. 1993. On the Systematics of the Archaeognatha (Insecta) // Entomologia Generalis. Vol.18. Nos 1–2. P.55–90.

Wygodzinsky P. 1939. Beitrag zur Kentnis der Thysanuren Palaestigas // Bulletin de la Société Fouad 1er d'Entomologie. Vol.23. P.73–85.

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