ZOOSYSTEMATICA ROSSICA

ISSN 2410-0226 [online] 0320-9180 [print]

Zoological Institute, Russian Academy of Sciences, St Petersburg ▪ https://www.zin.ru/journals/zsr/
Vol. 28(2): 258–266 ▪ Published online 6 November 2019 ▪ DOI 10.31610/zsr/2019.28.2.258

RESEARCH ARTICLE

Review of species of the genus *Cercyon* of Russia and adjacent regions. VI. Subgenus *Cercyon*, the *C. shinanensis* group (Coleoptera: Hydrophilidae)

Обзор видов рода *Cercyon* России и сопредельных регионов. VI. Подрод *Cercyon*, группа *C. shinanensis* (Coleoptera: Hydrophilidae)

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Abstract. The *Cercyon shinanensis* species group with two included species is erected within the nominotypical subgenus of *Cercyon* Leach, 1817. This group is compared with other Palaearctic species groups of *Cercyon* s. str. The little-known *C. shinanensis* Nakane, 1965 from Japan (Honshu) is redescribed and its diagnostic features are given. *Cercyon sundukovi* **sp. nov.** is described from the Russian Far East (Kunashir Island).

Резюме. В номинативном подроде рода *Cercyon* Leach, 1817 выделена группа вида *Cercyon shinanensis* в составе двух видов. В статье дается сравнение этой группы с другими палеарктическими группами видов *Cercyon* s. str. Приводится переописание малоизвестного *C. shinanensis* Nakane, 1965 из Японии (Хонсю) с указанием его диагностических признаков. *Cercyon sundukovi* **sp. nov.** описывается с Дальнего Востока России (остров Кунашир).

Key words: water scavenger beetles, taxonomy, Russian Far East, Japan, Coleoptera, Hydrophilidae, *Cercyon*, new species

Ключевые слова: жуки-водолюбы, таксономия, Дальний Восток России, Япония, Coleoptera, Hydrophilidae, *Cercyon*, новый вид

ZooBank Article LSID: urn:lsid:zoobank.org:pub:517E96F2-6BB7-4CA3-B6A1-DC94E80F5C1E

Introduction

This article is the sixth in the series of articles on the genus *Cercyon* Leach, 1817 of Russia and adjacent regions. The previous articles concern species of the subgenera *Clinocercyon* d'Orchymont, 1942 and *Conocercyon* Hebauer, 2003 (Ryndevich, 2007b), *Paracycreon* d'Orchymont, 1942 and *Dicyrtocercyon* Ganglbauer, 1904 (Ryndevich, 2008) and species of several species groups of the subgenus *Cercyon*: the *C. dux* group (Ryndevich, 2001), the *C. lateralis* group (Ryndevich, 2004a), the *C. olibrus* group and the *C. rotundulus* group (Ryndevich, 2007a). Additional data on

species composition, ecology and distribution of *Cercyon* of Russia and the adjacent regions were discussed in several other articles (Hebauer, 1995; Ryndevich, 2004a, 2007c, 2011, 2017; Ôhara & Jia, 2006; Prokin et al., 2008; Jia et al., 2011, 2019; Ryndevich et al., 2019). Recently, two new species of *Cercyon* have been described from the Russian Far East, including Kunashir Island (Ryndevich & Prokin, 2017).

Cercyon shinanensis Nakane, 1965 from Honshu Island (Japan) is known only from the type specimens. The absence of clear diagnostic features and illustrations in the original description of the species did not allow for a long time to assign this little-known species to any species group or even subgenus. The study of *C. shinanensis* type material and similar specimens from the Kuril Islands (Russia) allowed us to describe a new species and erect here the *Cercyon shinanensis* species group for these two species within the subgenus *Cercyon*.

Material and methods

The examined type material is deposited in the following state and private collections: Hokkaido University Museum, Sapporo, Japan (HUMS), Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia (ZIN), and S.K. Ryndevich's collection, Baranovichi, Belarus (CSR).

Cercyon males were dissected; their genitalia were placed in water-soluble glue on a plastic plate pinned below the respective specimens. Beetles were examined using a Nikon SMZ-745T and Nikon SMZ-800 stereomicroscopes. Measurements were taken using an ocular micrometer. Total body length was measured from the anterior margins of eyes to the apices of elytra; body width was taken as the maximum linear distance between the outer margins of elytra. Body length was measured in specimens with a deflexed head and a non-inflexed prothorax (i.e., in the natural position). Habitus photographs were taken with a Canon EOS 40D digital camera with a Canon MP-E 65 mm objective and combined using Zerene Stacker 1.04 software. The photographs were edited subsequently in Adobe Photoshop CS5®. Drawings were prepared using the Photoshop CS5® software.

Taxonomy

Order **Coleoptera**

Family **Hydrophilidae**

Subfamily **Sphaeridiinae**

Tribe **Megasternini**

Genus ***Cercyon*** Leach, 1817

Subgenus ***Cercyon*** Leach, 1817

Group of species ***Cercyon* (s. str.) *shinanensis***

Diagnosis. Body elongate oval, length 1.6–2.2 mm, width 1.0–1.4 mm; dorsal surface convex, without microsculpture. Head black; pronotum dark (dark brown), paler near lateral margins; elytra reddish brown to brown; maxillary palpi pale (yellowish), last segment occasionally darkened on apex. Humeral bulge not distinct; mesoventral plate narrowly elongate, about 4.4–5.0 times as long as wide; metaventrite without femoral lines; metaventral median pentagonal area about 0.9–1.0 times as long as wide. Median lobe of aedeagus fairly wide, slightly widened apically, with almost parallel sides and widely rounded apex.

Composition. This group includes two species, *C. shinanensis* and *C. sundukovi* **sp. nov.** The similarity in the structure of the median lobe of aedeagus confirms the affiliation of these species to the same group.

Comparison with other Palaearctic species groups of *Cercyon* s. str. The *C. shinanensis* group is closest to the *C. lateralis*, *C. rotundulus*, *C. olibrus* and *C. ovillus* species groups. All members of these groups share many structural features and are distributed in the Russian Far East and Japan.

Unlike the species of the *C. shinanensis* group, the members of the *C. lateralis* group, which includes *C. lateralis* (Marsham, 1802), *C. inquinatus* Wollaston, 1854, and *C. ustus* Sharp, 1874, have pronotum black or dark brown, with broad pale lateral margins (reddish or reddish brown), maxillary palpi pale, elytra from brownish black to reddish brown, and size larger (body length 2.4–2.8 mm). Pale specimens of *C. lateralis* is somewhat similar in colour to the representatives of the *C. shinanensis* group, but their size is larger.

The species of the *C. rotundulus* group (*C. rotundulus* Sharp, 1884 and *C. saluki* Ryndevich, 1998) differ from the species of the *C. shinanensis* group in having body broadly oval, head paler (yellowish brown or reddish brown to dark brown), and size larger (2.1–2.9 mm)

A single species of the *C. olibrus* group is characterised by total body colour yellowish brown, with anterior and central parts of head darker. The species of the *C. shinanensis* group have black head and darker total colour.

A single species of the *C. ovillus* group is similar to the members of the *C. shinanensis* group in small body size (1.6–2.0 mm), dark head and pronotum, with pale maxillary palpi, but differs from them in having elytra yellow or reddish, with black triangular sutural spot basally and with very strongly conspicuous humeral bulge, and body oval, strongly narrowed posteriorly.

Among other Palaearctic species groups, the *C. shinanensis* group can be recognised as follows. The absence of femoral lines of the metaventrite distinguishes its members from the *C. nigriceps* group, which includes *C. nigriceps* (Marsham, 1802) and *C. paranigriceps* Ryndevich et Hebauer, 2010; from the *C. pygmaeus* group, which includes *C. pygmaeus* (Illiger, 1801), C. *terminatus* (Marsham, 1802), and *C. bellus* Jia, Liang, Ryndevich et Fikáček, 2019; from the *C. melanocephalus* group, which includes *C. melanocephalus* (Linnaeus, 1758), *C. alpinus* Vogt, 1969, *C. haemorrhoidalis* (Fabricius, 1775), *C. strandi* Roubal, 1938, and *C. tatricus* Endrődy-Younga, 1967; and from the monotypic *C. impressus* (Sturm, 1807) group.

Members of the *C. tristis* group, which comprises *C. tristis* (Illiger, 1801), *C. abeillei* Guillebeau, 1896, *C. bononiensis* Chiesa, 1964, *C. convexiusculus* Stephens, 1829, *C. granarius* Erichson, 1837, *C. kryzhanovskii* Shatrovskiy, 1989, *C. korbianus* Kniz, 1911, *C. renneri* Hebauer, 1997, *C. sternalis* (Sharp, 1918), and *C. subsulcatus* Rey, 1885; and the species of the groups that inhabit marine sediments (the *C. algarum, C. depressus, C. dux* and *C. littoralis* groups) have elytral microsculpture that is absent in the members of the *C. shinanensis* group.

Species of the *C. alinae* group, which includes *C. alinae* Ryndevich, 2004 and *C. biltoni* Jia, Liang, Ryndevich et Fikáček, 2019, are distinguished from the species of the *C. shinanensis* group by the broadly oval body, convex elytral intervals, larger size (2.4–2.7 mm), and by the characteristic colour pattern (Ryndevich, 2004b; Jia et al., 2019).

A single species of the *C. borealis* Baranowski, 1985 group differs from all other species of the nominotypical subgenus in the very wide metaventral median pentagonal area which is about 0.7 times as long as wide, and in the larger size (2.3–2.8 mm). In the species of the *C. shinanensis* group, the metaventral median pentagonal area is narrower, about 0.9–1.0 times as long as wide.

The pale maxillary palpi of the members of the *C. shinanensis* group distinguish it from the *C. melanocephalus* group mentioned above; from the *C. marinus* group, which includes *C. marinus* Thomson, 1853, *C. bifenestratus* Küster, 1851, and *C. medvedorum* Shatrovskiy, 1999; from the *C. obsoletus* group, which includes *C. obsoletus* (Gyllenhal, 1808) and *C. castaneipennis* Vorst, 2009; and from the monotypic *C. impressus* and *C. berlovi* Shatrovskiy, 1999 groups.

A single species of the *C. lencoranus* group differs from the members of the *C. shinanensis* group in the almost total black body colour and in the larger size (2.4–2.8 mm).

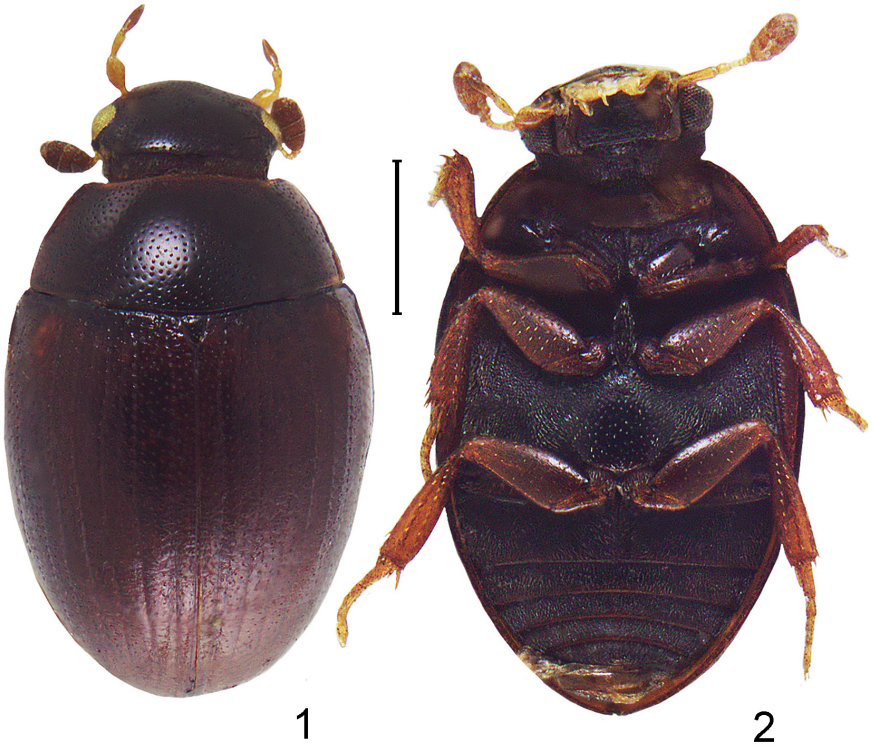
The colour of the pronotum and elytra distinguishes the species of the *C. shinanensis* group from the members of the *C. unipunctatus* group, which includes *C. unipunctatus* (Linnaeus, 1758), *C. emarginatus* Baranowski, 1985, *C. divisus* Hebauer, 2002, *C. kabaki* Ryndevich, 2004, *C. quisquilius* (Linnaeus, 1761), *C. undulipennis* Ryndevich, Jia et Fikáček, 2017, *C. unipustulatus* Nakane, 1982, *C. verus* Shatrovskiy, 1989, *C. flavimarginatus* Ryndevich, Jia et Fikáček, 2017, and *C. kubani* Ryndevich, Jia et Fikáček, 2017. The members of the *C. unipunctatus* group are characterised by the pronotum either pale with a central dark spot or dark with pale lateral margins; their elytra are pale (yellow, reddish or brownish), in some species with the dark sutural interval or with a dark spot on the elytral disc, rarely with the predominance of dark colouration (because of what the elytra appear dark with pale spots: in *C. kabaki* and in the dark form of *C. unipunctatus*).

Cercyon* (s. str.) *shinanensis Nakane, 1965
(Figs 1–7)

Cercyon (s. str.) *shinanensis* Nakane, 1965: 54.
Cercyon shinanensis: Hansen, 1999: 289, 2004: 64; Ryndevich, 2007c: 283; Fikáček et al., 2015: 69.

Material examined. Holotype. **Japan**, *Nagano Pref.*, Honshu, Mt. Jonen, 11.VI.1960, leg. K. Kamimura, male (HUMS).

Paratypes. Same data as for holotype, but 9.VII. 1960, 1 male, and 23.VI.1960, 2 males (HUMS).

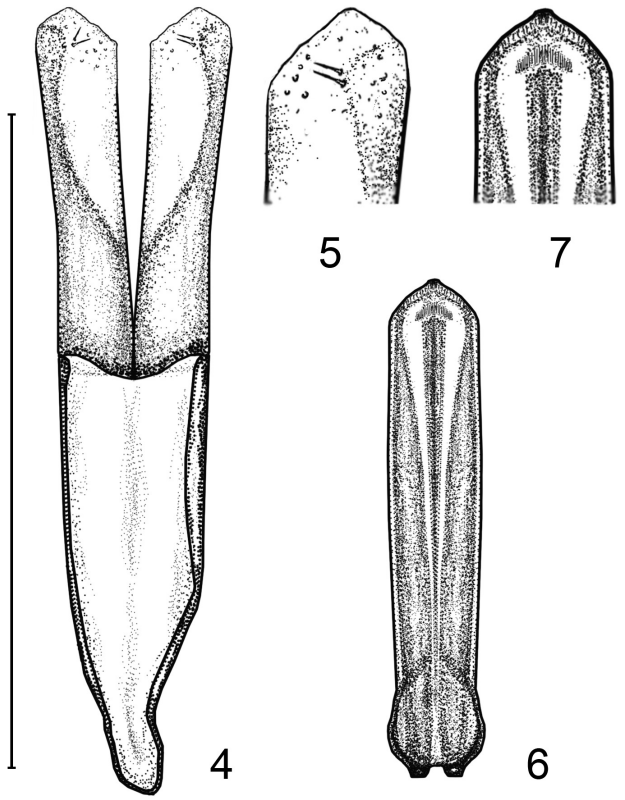


Figs 1–3. *Cercyon shinanensis*. **1**, holotype, habitus in dorsal view; **2**, paratype, habitus in ventral view; **3**, meso- and metaventrites. Scale bars: 0.5 mm.

Redescription. Form and colour. Body elongate oval (Fig. 1), length 1.8–2.2 mm, width 1.2–1.4 mm. Maximum body width in middle of elytra. Head black, with very small brownish preocular spots; pronotum dark brown, with narrow reddish brown lateral margins and very narrow reddish brown or yellowish brown anterior margin; scutellum brown to dark brown; elytra light brown or reddish brown, with lateral parts paler and with humeral bulge reddish (Fig. 1). Antennae yellowish except for darker club. Maxillary palpi yellowish, with apical segment darkened at apex. Ventral surface black, mesoventral plate and metaventral median pentagonal area brown to dark brown, posterior margins of abdominal ventrites reddish brown. Legs reddish yellow or reddish brown, tarsi yellow (Figs 2, 3).

Head. Dorsal surface, including clypeus, with dense, moderately coarse punctures, without microsculpture on interstices. Anterior margin of clypeus with narrow bead. Frontoclypeal suture undetectable. Eyes small, interocular distance about 7.0–7.1 times as wide as eye in dorsal view (Fig. 1). Mentum glabrous, about 1.6–1.7 times as wide as long. Antennae with nine antennomeres, scapus about 1.3 times as long as antennomeres 2–5 combined, club compact. Maxillary palpomere 2 strongly swollen, palpomere 4 almost symmetrical, equal to palpomere 3 in length.

Thorax. Elytra and pronotum without hairs and microsculpture. Pronotum about 2.3 times as wide as long. Pronotal punctation similar to that on head. Lateral margins of pronotum with narrow bead



Figs 4–7. *Cercyon shinanensis*, male genitalia in dorsal view. **4**, tegmen; **5**, apex of right paramere; **6**, median lobe; **7**, apex of median lobe. Scale bar: 0.5 mm.

extending over pronotal anterior and posterior angles; anterior and posterior margin without bead. Prosternum with strong longitudinal carina medially; antennal groove distinct, moderately large, rounded laterally. Mesoventral plate narrowly elongate, about 4.6–5.0 times as long as wide, widest posteriorly (Fig. 3). Metaventrite with raised, glabrous, sparsely punctate median pentagonal area; this area about 0.9 times as long as wide; femoral lines absent (Fig. 3). Elytra with nine punctate striae; intervals flat, with ground punctures on intervals very fine; interval 2 widest, with four or five matted rows of punctation; remaining intervals with no more than three matted puncture rows. Humeral bulge not distinct. Epipleuron flat, horizontal. Femora with sparse and shallow punctures ventrally, each with distinct tibial groove. Front femora with strongly obliterate microsculpture, hind and middle femora with distinct microsculpture (consisting of transverse meshes). Tarsi with densely arranged whitish setae ventrally, metatarsomere 1 about as long as metatarsomeres 2 and 3 combined.

Abdomen. Five exposed ventrites; ventrite 1 longest, about twice as long as ventrite 2, bearing distinct median longitudinal carina; ventrite 5 not emarginate apically.

Male genitalia (Figs 4–7). Phallobase asymmetrical basally, about 1.2 times as long as paramere. Parameres almost parallel-sided, sharply tapering at very apex, with apical part membranous and with two very short setae subapically. Median lobe almost parallel-sided, only slightly widened subapically, widely rounded at apex, and with short apodemes basally; gonopore large, situated subapically.

Note. All median projections of the sternite 9 of the examined type specimens were lost when mounted by Nakane.

Comparison. Cercyon shinanensis is most similar in colouration to the Japanese species *C. ustus*, *C. olibrus* and *C. verus*. *Cercyon ustus* differs from *C. shinanensis* in the larger size (2.6–2.9 mm). *Cercyon olibrus* differs from *C. shinanensis* in the pale head and pronotum. *Cercyon verus* differs from *C. shinanensis* in the larger size (2.6–2.9 mm) and in wider (about 3.3–4.0 times as long as wide) mesoventral plate; in addition, its pronotum is black to dark brown, with the lateral margins widely pale (reddish), anterior margin very narrowly pale, and posterior margin very narrowly pale near the posterolateral angles.

Distribution. Japan (Honshu). This species is known only from the type locality (Mount Jonen).

Bionomics. The specimens were collected in a mountain evergreen forest.

Cercyon (s. str.) *sundukovi* sp. nov.
(Figs 8–18)

Holotype. **Russia**, *Sakhalin Prov.*, Kuril Is., Kunashir I., lower reaches of Saratovskaya Riv., 44°15′46′′N 146°06′13′′E, 12–18.VII.2014, leg. Yu. Sundukov, male (ZIN).

Paratype. **Russia**, *Sakhalin Prov.*, Kuril Is., Kunashir I., cordon Alekhinskiy, 43°57′17′′N 145°35′34′′E, 11–14.IX.2014, leg. Yu. Sundukov, female (CSR).

Description. Form and colour. Body elongate oval (Fig. 8), length 1.6–1.7 mm, width

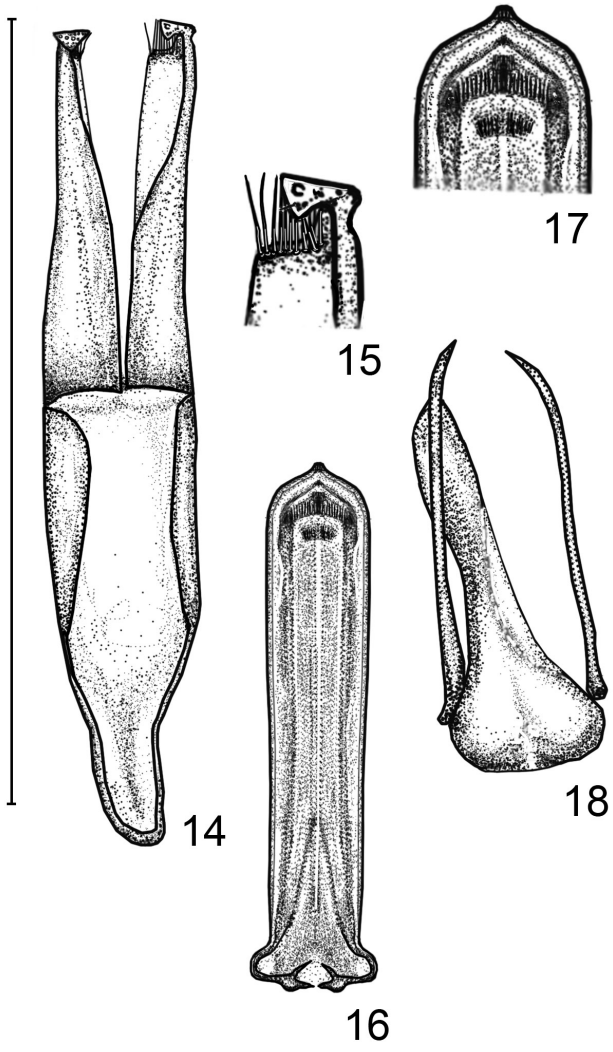
1.0–1.1 mm. Maximum body width in anterior part of elytra, almost at their base. Head black, with very small brownish preocular spots; pronotum dark brown, paler near lateral margins; scutellum brown to dark brown; elytra reddish brown to brown (Figs 8–11). Antennae yellowish except for darker club. Maxillary palpomeres yellowish. Ventral surface black or dark brown, mesoventral plate and metaventral pentagonal area brown to dark brown, posterior margin of abdominal ventrites brownish. Legs reddish brown, tarsi yellow.

Figs 8–10. *Cercyon sundukovi* **sp. nov.**, habitus. **8**, holotype, dorsal view; **9**, paratype, ventral view; **10**, holotype, lateral view. Scale bar: 0.5 mm.

Head. Dorsal surface, including clypeus, with dense, moderately coarse punctures, without microsculpture on interstices. Anterior margin of clypeus with narrow bead. Frontoclypeal suture undetectable. Eyes small, interocular distance about 6.3 times as wide as eye in dorsal view (Figs 8, 11). Mentum glabrous, about 1.6 times as wide as long. Antennae with nine antennomeres, scapus about 1.4 times as long as antennomeres 2–5 combined, club compact. Maxillary palpomere 2 strongly swollen, palpomere 4 almost symmetrical, equal to palpomere 3 in length (Fig. 9).

Thorax. Elytra and pronotum without hairs and microsculpture Pronotum about 2.7 times as wide as long. Pronotal punctation similar to that on head. Lateral margins of pronotum with narrow bead extending over the anterior and posterior corners; anterior and posterior margins without bead. Prosternum with strong longitudinal carina medially; antennal groove distinct, moderately large, rounded laterally. Mesoventral plate narrowly elongate, about 4.4–4.5 times as long as wide, widest at middle (Figs 9, 13). Metaventrite with raised, glabrous, sparsely punctate median pentagonal area; this area about 0.9 times as long as wide; femoral lines absent (Fig. 12). Elytra with nine punctate striae; intervals flat, with ground punctures on intervals very fine; interval 2 widest, with four or five matted rows of punctation; remaining intervals with no more than three matted puncture rows. Humeral bulge not distinct. Epipleuron flat, horizontal. Femora with sparse and shallow punctures ventrally, each with distinct tibial groove. Front femora with strongly obliterate microsculpture, mid femora with indistinct microsculpture, hind femora with distinct microsculpture (consisting of transverse meshes) (Fig. 13). Tarsi with densely arranged whitish setae ventrally, metatarsomere 1 about as long as metatarsomeres 2 and 3 combined.

Figs 11–13. *Cercyon sundukovi* **sp. nov. 11**, head and pronotun in frontal view; **12**, hind femur; **13**, meso- and metaventrites. Scale bars: 0.3 mm.



Figs 14–18. *Cercyon sundukovi* **sp. nov.**, male genitalia in dorsal view. **14**, tegmen (right paramere is slightly turned for displaying the ventral side); **15**, apex of right paramere; **16**, median lobe; **17**, apex of median lobe; **18**, sternite 9. Scale bar: 0.5 mm.

Abdomen. Five exposed ventrites; ventrite 1 longest, about twice as long as ventrite 2, bearing distinct median longitudinal carina; ventrite 5 not emarginate apically.

Male genitalia (Figs 14–18). Phallobase asymmetrical basally, about 1.2 times as long as paramere. Parameres narrowing towards apex, their ventral side membranous, with long setae subapically. Apices of parameres strongly bent in dorsal direction, with very short setae subapically. Median lobe almost parallel-sided, only slightly widened apically, widely rounded at apex, with short apodemes basally; gonopore large, situated subapically. Median projection of sternite 9 narrow; its apex without setae, pointed apically, median portion shorter than lateral struts, base almost direct.

Comparison. This new species differs from *C. shinanensis* in the darker elytra and in coarser (deeper and larger) punctures on the metaventral median pentagonal area (Figs 3, 9). In addition, *C. shinanensis* has the slightly narrower mesoven-

tral plate, about 4.6–5.0 times as long as wide (*vs.* 4.4–4.5 times in *C. sundukovi* **sp. nov.**). The new species also easily differs from *C. shinanensis* in the paramere narrowing towards the apex, with long setae on ventral side subapically, and the apex strongly bent in the dorsal direction.

Among the South Kuril species, *C. sundukovi* **sp. nov.** is similar in colour to *C. olibrus* Sharp, 1874, *C. rotundulus* Sharp, 1884, and *C. saluki* Ryndevich, 1998. *Cercyon olibrus* differs in the paler head and pronotum, as well as in yellowish brown elytra. *Cercyon rotundulus* and *C. saluki* have the broadly oval body, paler head (yellowish brown or reddish brown to dark brown) and the larger size (2.1–2.9 mm).

Cercyon sundukovi **sp. nov.** is similar to the Palaearctic species *C. tristis*, *C. convexiusculus*, *C. sternalis* and *C. subsulcatus* in size, colouration and body form, but it can be distinguished from them by the absence of the elytral microsculpture.

Within the genus, the new species also differs from other species in the characteristic structure of the male genitalia: its paramere with long setae subapically and with apex strongly bent in the dorsal direction; the median lobe is almost parallel-sided, only slightly widened apically and widely rounded at the apex.

Etymology. This species is named after the entomologist Yuri Sundukov (Vladivostok, Russia), who collected the type specimens.

Distribution. Kunashir Island, southern Kurils, Russian Far East.

Bionomics. Unknown.

Acknowledgements

We are very grateful to K.V. Makarov (Moscow Pedagogical State University, Moscow, Russia) and Yu.N. Sundukov (Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia) for the loan of the material, to M. Ôhara (Hokkaido University Museum, Sapporo, Japan) for the opportunity to examine the type specimens of *C. shinanensis*, to A.V. Kovalev (Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia) for the habitus photographs of the new species, and to R.B. Angus (Natural History Museum, London, UK) and M. Fikáček (National Museum, Praha, Czech Republic) for valuable comments on the manuscript.

The study of A.A. Prokin was performed in the frame of the Russian state research project No. AAAA-A18-118012690105-0.

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Received 2 July 2019 / Accepted 11 October 2019. Editorial responsibility: B.M. Kataev