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Description of new species, *Lethrus* (*Ceratodirus*) *klimenkoi* sp.n. (Coleoptera: Geotrupidae), from Western Kazakhstan

Описание нового вида кравчика *Lethrus* (*Ceratodirus*) *klimenkoi* sp.n. (Scarabaeoidea: Geotrupidae) из Западного Казахстана

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KEY WORDS: Coleoptera, Scarabaeoidea, Geotrupidae, *Lethrus*, *Ceratodirus*, new species, Kazakhstan.
КЛЮЧЕВЫЕ СЛОВА: Coleoptera, Scarabaeoidea, Geotrupidae, *Lethrus*, *Ceratodirus,* новый вид, Казахстан.

ABSTRACT. During the collection of material for a revision of the subgenus *Ceratodirus* Fischer von Waldheim, 1845, a series from Western Kazakhstan was found to be a new species, which is described here as *Lethrus* (*Ceratodirus*) *klimenkoi* **sp.n.**

РЕЗЮМЕ. При обработке материалов по подроду *Ceratodirus* Fischer von Waldheim, 1845 оказалось, что серия экземпляров из Западного Казахстана является новым видом, который описывается ниже как *Lethrus* (*Ceratodirus*) *klimenkoi* **sp.n.**

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Currently, the genus *Lethrus* Scopoli, 1777 is composed nearly 130 species and some subspecies of beetles endemic to the Palaearctic, divided into 11 subgenera [Král, Nikolajev, 2006; Bagaturov, Nikolajev, 2015; Nikolajev et al., 2016; Gusakov, 2017]. Subgenus *Ceratodirus* Fischer von Waldheim, 1845 contains 12 allopatric species including the present described. A series of specimens from Western Kazakhstan was found to have distinct morphological characters and is described in the present article as a new species.

The following abbreviations identify the collections housing the material examined: ZISP — Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; MBCP — Mikhail F. Bagaturov, St. Petersburg, Russia, priv. collection

There are several specimens known with the same collecting data, which were not available to author at the time of description, and are thus not include into type material. Specimens of the newly described species are provided with one red printed label: "*Lethrus* (*Ceratodirus*) *klimenkoi* sp.nov. HOLOTYPUS or PARATYPUS, M. Bagaturov det. 2018".

Lethrus (*Ceratodirus*) *klimenkoi* Bagaturov, **sp.n.**
Figs 1–5.

TYPE MATERIAL. Holotype, ♂: "West Kazakhstan Mangystau Province, 35 km S[outh] of Say-Utyos village, 43°01' N 53°25' E, h. 228 m. April 6–7, 2013. Leg. A. V. Ivanov", "No.INS-COL-0000177" [ZISP]. Paratypes; 10 ♂♂, 11 ♀♀: same labeled as holotype, stored in the collection of author, A.V. Ivanov and ZISP.

DESCRIPTION. **Male**, Holotype (Figs 1–4). Body color black, with bluish sheen especially pronounced from the underside. Head, pronotum and elytra with a shagreened texture formed of coarse longitudinal and transverse wrinkles, while the longitudinal grooves of the elytra are deeply pronounced.

Head enlarged, broad with a medial impression on the forehead, with distinct frontal oblique carinae, very unevenly covered with thick coarse points. Preorbital lobes are elongated and cut off from the sides. Postorbital denticles not developed. The labrum is asymmetrical, with the right lobe noticeably larger than the left one.

The gula has a well-defined concave area. The mandibles elongated, tapering to the apices with rounded outer edges, asymmetrical. The keel on the upper surface of the left mandible is very long, horn-shaped with the apex directed backwards and reaching a notch between the lobes of the labrum.

The appendage on the base of the left mandible directed forward and downwards, appears prominently on the apices of the mandible, visible from above (Fig. 1), and thickens toward the middle. The apex of the appendage is flattened horizontally and never curves upwards. Protrusion on the apex of the left mandible is flattened, rounded, directed more downward, not protruding sideways beyond the lateral side of the mandible.

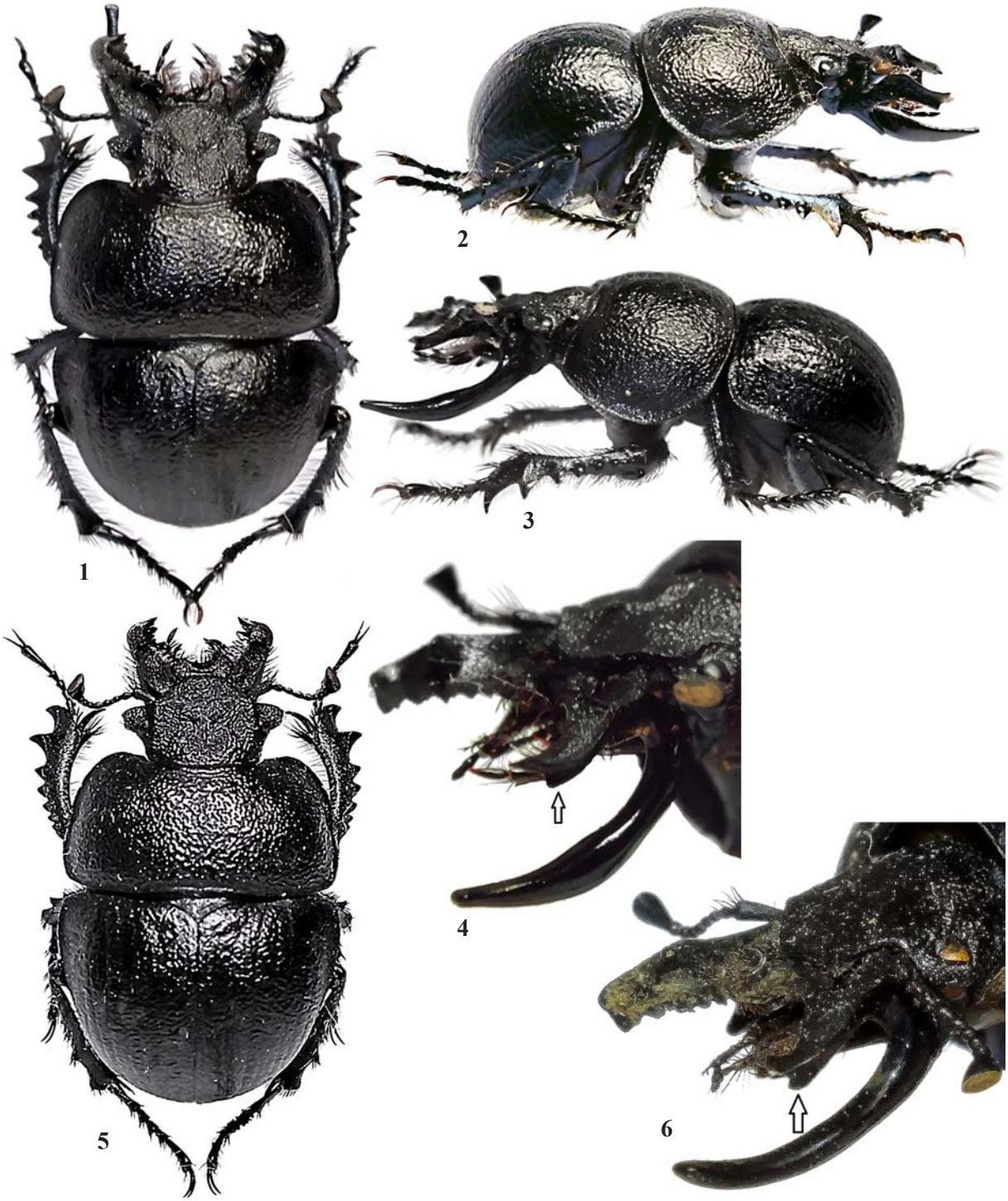
The appendage on the base of the right mandibles is well developed, short, subulate and directed forward and downwards. The protrusion on the apex of the right mandible is weakly pronounced, slightly sharpened and directed downwards and forward.

Pronotum is transverse, convex, without longitudinal median groove, bordered alongside the entire length, and with widely rounded front angles. Punctures of pronotum are dense, deep and irregular, a little smoother on the sides.

Anterior femora without teeth. Anterior tibia serrated, with six teeth along the outer margin diminishing in size, starting from the apex of the tibia. Apical spur of anterior tibiae with an inwardly directed angular projection (denticle) near the base. Tarsus with two claws.

Scutellum small, wide-triangular, with rounded edges, sculptured like the elytra. Elytra semicircular, convex, tightly closed to the very top, slightly extended along the sutural angle; end of epipleurae reaches to sutural angle.

The structure of the male genitalia does not differ from



Figs 1–6. *Lethrus* (*Ceratodirus*) spp.: 1–5 — L. *klimenkoi* **sp.n.**; 6 — *L. karelini*; 1-4, 6 — males; 1–4 — holotype; 5 — female, paratype; 1, 5 — dorsal view; 2–3 — right and left view; 4, 6 — shape of protrusion on the apex of left mandible (noted by arrow).

Рис. 1–6. *Lethrus* (*Ceratodirus*) spp.: 1–5 — L. *klimenkoi* **sp.n.**; 6 — *L. karelini*; 1-4, 6 — самцы; 1–4 — голотип; 5 — самка, паратип; 1, 5 — сверху; 2–3 — справа и слева; 3, 6 — различие в форме предвершинного придатка левой мандибулы (отмечен стрелкой).

Figs 7–8. Head and mandibular appendages *Lethrus* (*Ceratodirus*): 7 — *L. gladiator*; 8 — *L. karelini.*
Рис. 7–8. Голова и мандибулярные придатки *Lethrus* (*Ceratodirus*): 7 — *L. gladiator*; 8 — *L. karelini.*

that of other related species of the group [Nikolajev, 2003].

Female, Paratype (Fig. 5). In general, the appearance of females is the same as in males. The differences are expressed in the following characters: narrower mandibles, absence of mandibular appendages and weakly expressed keels on the surface of mandibles, which are directed at an angle to the lateral margin and are symmetrical. The gula is convex without a deep cavity.

The apices of the elytra are slightly more elongated at the sutural angle. The proportions of the body are similar to those of males, but somewhat broader.

VARIABILITY. Less developed males (hypotelic), the appendage at the base of the left mandible thinner. The taxa in comparison have very similar morphology. However, the characters used for their identification are considered fundamental in the taxonomy study after Nikolajev [2003]. The differences revealed allow the described taxon to be considered as a distinct species.

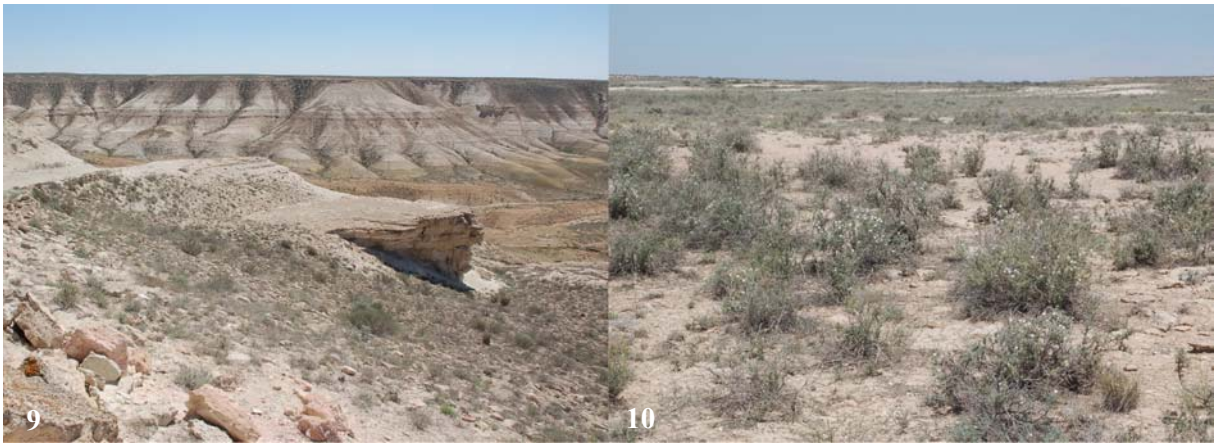
ETYMOLOGY. The species is named in honor of a remarkable entomologist and person, Alexei Klimenko (Tver, Russia), my long time friend and colleague, who dedicated part of his life to researching and studying the habitat of many species of the genus *Lethrus* in the Republics of Middle Asia and Kazakhstan and found a number of species; who tragically died in the summer 2017 during fieldwork far away from his home.

DISTRIBUTION. The species is known only from its type locality in western Kazakhstan, where it occurs in a restricted area (Map), inhabiting xeric clay foothill desert biotopes (Figs 9–10). The possible distribution in other areas (Ustyurt plateau and North Priaralye) requires additional research.

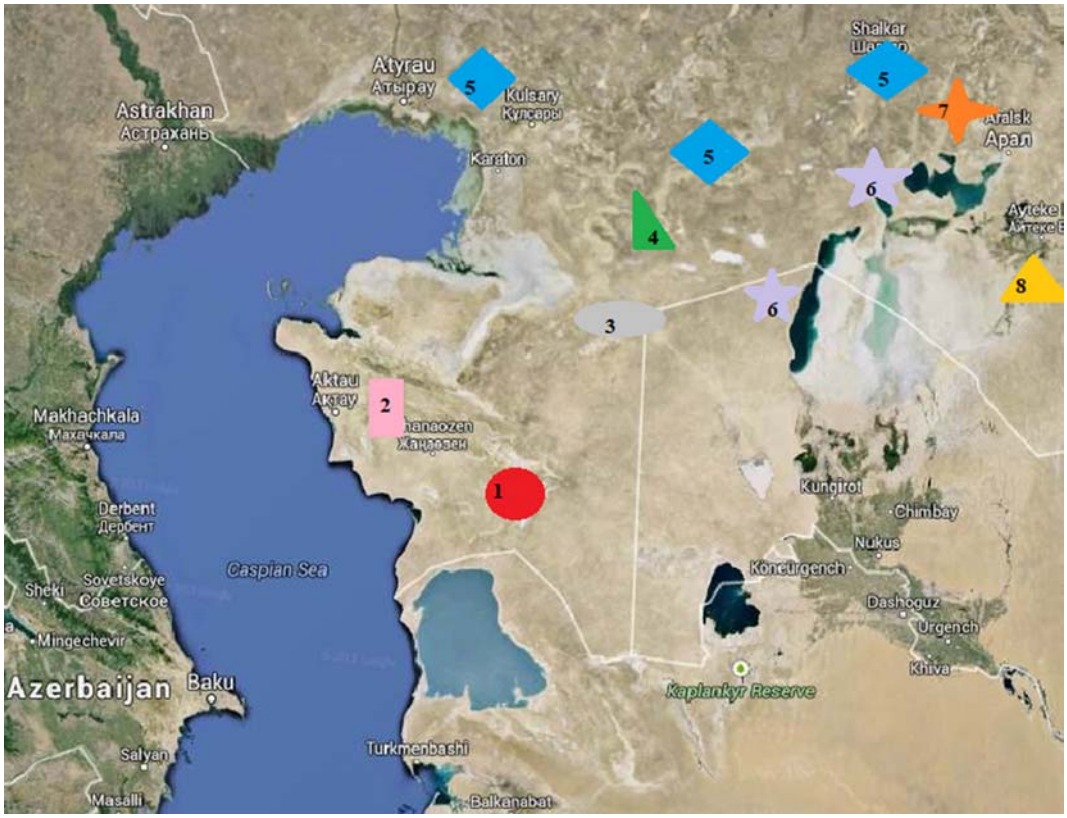
DIFFERENTIAL DIAGNOSIS. The described species is very similar to other species of the subgenus, currently *Lethrus* (*Ceratodirus*) *karelini* Gebler, 1845 from which it is differs in the structure of the mandibular appendages of the males as well as structures of body integuments and significantly separated area of distribution from its morphologically closest species.

L. klimenkoi **sp.n.** is closely related to *L. karelini* and *Lethrus* (*Ceratodirus*) *gladiator* Reitter, 1897. Reliably differs from both species by the characteristic shagreened texture, which is smoother in both aforementioned species. In *L. karelini* the protrusion near the apex of the left mandible is sharpened and directed more forwards, whereas it is developed in the form of a shorter, flatter lobate protuberance directed downwards and then sideways and forward in *L. gladiator* and *L. karelini*. (Figs 4–6, 7–8). In addition, in larger males of *L. klimenkoi* **sp.n.** the appendage at the base of the left mandible is never bent after the middle part to the side or/and upwards.

The new species reliably differs from *L. gladiator* in the form of the appendage at the base of the left mandible. In *L.*



Figs 9–10. Habitat of *L. klimenkoi* **sp.n.** (picture by P. Gorbunov).
Рис. 9–10. Места обитания кравчика *L. klimenkoi* **sp.n.** (фото П. Горбунова)



Map. Distribution range of species of the subgenus *Ceratodirus* in Western Kazakhstan: 1 — *L. klimenkoi* **sp.n.**; 2 — *L. dostojewskii*; 3 — *L. lamellifer*; 4 — *L. aequidentatus*; 5 — *L. cephalotes*; 6 — *L. aralicus*; 7 — *L. mugodzharicus;* 8 — *L. karelini*.

Карта. Распространение видов подрода *Ceratodirus* в Западном Казахстане: 1 — *L. klimenkoi* **sp.n.**; 2 — *L. dostojewskii*; 3 — *L. lamellifer*; 4 — *L. aequidentatus*; 5 — *L. cephalotes*; 6 — *L. aralicus*; 7 — *L. mugodzharicus;* 8 — *L. karelini*.

klimenkoi **sp.n.** it is bent in the middle and never thickened to the top, nor is it flattened on the vertical face; in *L. gladiator* it is directed straight forward. Differences from other species are presented in the keys to the species of the subgenus below.

Differences between females are expressed only in a different texture of the integument, which in *L. karelini* and *L. gladiator* is never so rough.

It should also be noted that from species of this subgenus with a similar "shagreened" sculpture, which share a similar area of distribution with *L. klimenkoi*, **sp.n.** (*L. dostojewskii* (Semenov, 1899), *L. lamellifer* Nikolajev, 1976) it is morphologically differentiated by the structure of the mandibular appendages near the apex of the left mandible, which never protrude from the side of the mandible as in *L. klimenkoi*, **sp.n.**

REMARKS. It is possible that specimens of *L. karelini* from Ustyurt plateau area (Seneka village) and North Priaralye (Ak-Espe) known from males only, which are remarkable in "having more developed bumps in the places of protrusions on the apex of mandible" [Nikolajev, 2003], also belong to *L. klimenkoi*, **sp.n.** [Nikolajev, personal communications]. However, these specimens were not available for investigation by the author.

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