

A new species of the genus *Aphodius* from S.E. Kazakhstan (Coleoptera: Scarabaeidae)

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Aphodius dzhungaricus sp. n. from S.E. Kazakhstan (Dzhungar Alatau Mts) is described and compared with the closely related *A. haroldi* D. Kosh. Notes on the biology and distribution for both species are given. The lectotype of *A. haroldi* is designated. The main morphological features of the larvae of the new species are described.

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Introduction

Two allopatric species of the subgenus *Neagolius* inhabit the mountain systems of Dzhungar Alatau and Central and North Tien Shan. One of them is described as new below, another is *A. haroldi* D. Kosh., 1894.

A. haroldi was described from the Ketmen Mts (Koshantschikov, 1894). Among the series of six syntypes of *A. haroldi* deposited in the Zoological Institute, St.Petersburg, the lectotype is designated: male (length 5.4 mm, width of pronotum 2.2 mm, width of elytra 2.3 mm) bearing the labels "Ketmen geb., Issyk-Kul, 13.VI.[18]92, Schmidt" and "*A. haroldi* D. Kosh., W. Koshant.". More specimens of *A. haroldi* var. *orinus* W. Kosh, 1912 described from Kashmir, Himalayas (Koshantschikov, 1912) need to be examined in order to specify the status of this form.

Aphodius (*Neagolius*) *dzhungaricus* sp. n. (Figs 2-13)

Holotype. ♂, Kazakhstan, northern part of Dzhungar Alatau, watershed of Ispul and Tokty rivers, 14.VIII.1991 (I. Kabak).

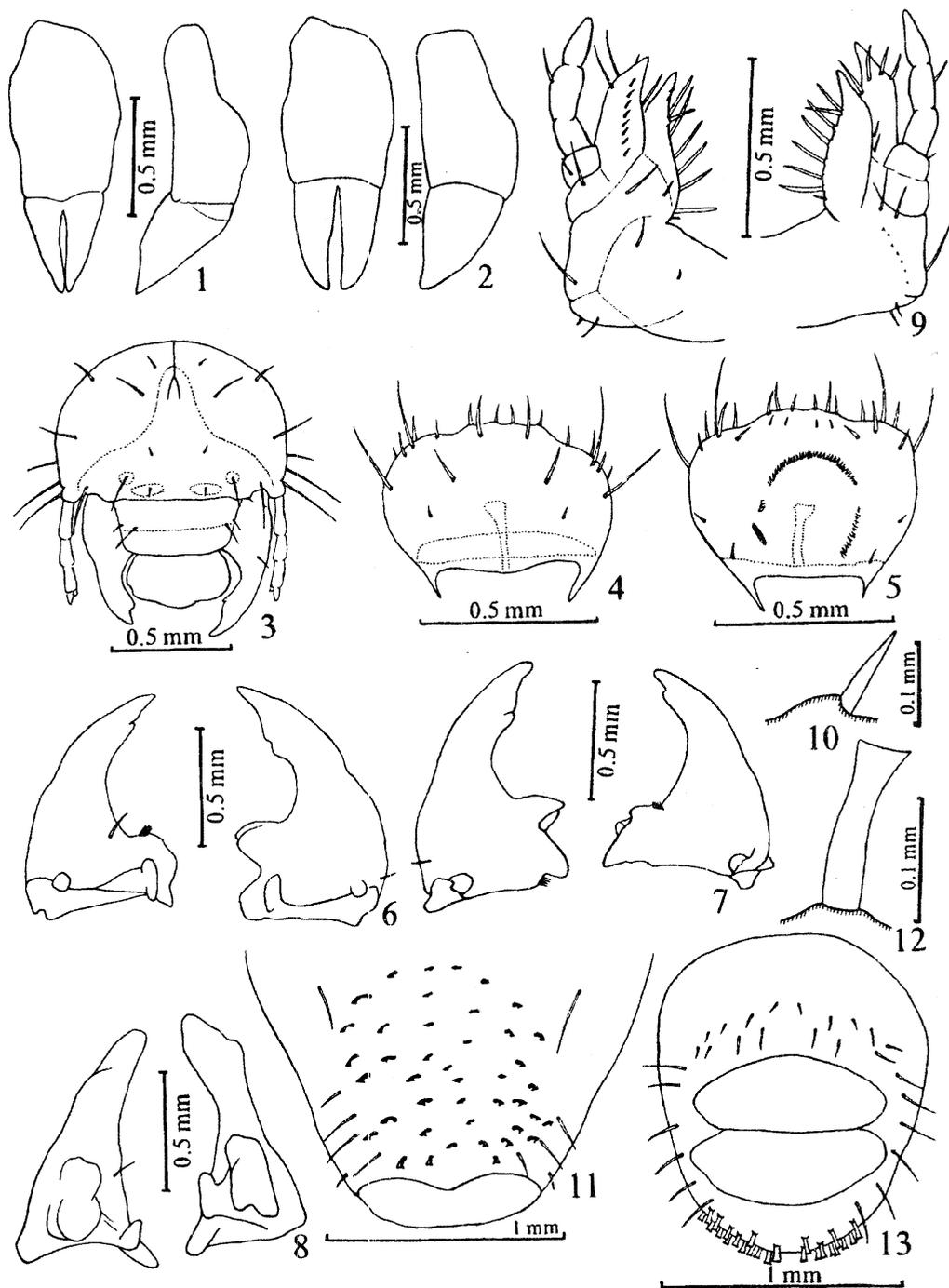
Paratypes (39 specimens). Kazakhstan, northern part of Dzhungar Alatau: 8 spec., Mynshukyr Mt., 10 km of Kapal, 25.IV.1993 (Kosterin); 1 spec., same locality, Kora river, 5.V.1993 (Kosterin); 4 spec., ravine of Karaoi River, 22 km E of Tekeli, 3.VIII.1985 (I. Kabak); 15 spec., upper reaches of Koxsu River, 13-15.VI.1991 (I. Kabak); 2 spec., Kokzhota Mts,

Bessemas River, 4.VIII.1994 (I. Kabak & A. Frolov); 1 spec., Zheldykaragai Mts, 2700 m, 9.VIII.1994 (I. Kabak & A. Frolov); 2 spec., upper Aksu River, 17.VIII.1994 (I. Kabak & A. Frolov); 2 spec., Saldatsai River, 19.VIII.1994 (I. Kabak & A. Frolov); 2 spec., Tastau Ridge, Karaungur River, 40 km S of Glinovka, 6-8.VIII.1991 (I. Kabak); 2 spec., Ispul Mt., 7.VI.1990 (I. Kabak).

The holotype and several paratypes are deposited in the Zoological Institute, St.Petersburg, paratypes also in the Biological Institute, Novosibirsk, and in collections of O.N. Kabakov, G. Dellacasa and the authors.

Diagnosis. The morphological characters and biology of the new species are very similar to those of *A. haroldi*. Males can be separated by the shape of aedeagus: the apices of the parameres are rounded in dorsal and lateral view (Fig. 2), whereas in *A. haroldi* they have a slight and shallow, but distinct hollow (cutting off) (Fig. 1). Females of the new species can be identified by the more convex body and by the distinctly transversally rugose elytral interstices.

Description of the holotype. Elongately oval, moderately convex, shiny. Colour black, anterior clypeal margin, anterior angles of pronotum, tibiae and tarsi brownish black. Strial punctures of elytra fine, forming light incisions on margins of interstices. Anterior tibiae with three teeth on lateral margin, with acute tooth on ventral surface. Outer spur of middle tibiae truncate apically. First segment of hind tibia longer than



Figs 1-13. 1, *Aphodius haroldi* D. Kosh., aedeagus; 2-13, *A. dzhungaricus* sp. n.: 2, aedeagus; 3-13, III instar larva (3, head; 4, labrum, dorsal side; 5, labrum, ventral side; 6, mandibles, dorsal view; 7, mandibles, ventral view; 8, mandibles, lateral view; 9, right maxilla; 10, seta on dorsum of abdominal segments I-V; 11, raster; 12, teggilar seta of raster; 13, anal sclerite).

two next combined. Aedeagus as in Fig. 2. Length of body 5.3 mm, width of pronotum 2.10 mm, width of elytra 2.15 mm.

Variability. Length of body vary from 4.3 mm to 5.8 mm. In some specimens brown colour prevails. Females can be separated from males by the more convex body, more strongly punctured clypeus, pronotum and elytral interstices (strial punctures distinctly form incisions on margins of interstices); outer spur of middle tibia not truncate apically; first segment of hind tarsi as long as two next combined.

Larva. Cranium light yellowish brown, surface smooth. Head dimensions: I instar: width 0.81-0.84, length (except clypeus) 0.66-0.70; II instar: width 1.17-1.24, length 0.99-1.09; III instar: width 1.63-1.70, length 1.41-1.54 mm. Frons (Fig. 3) with 10 setae, frontal depressions indistinct. Pleural sternites with 7 long and some short setae each, among which 3 setae near base of antennae. Clypeus with 3 setae on each side. Labrum (Figs 4-5) lightly three-lobed on distal margin, slightly asymmetrical. Two longest setae near margin on each side; 2 shorter setae medially on frontal (upper) side; other short setae: 12 on distal margin, 2 on frontal side, 4 on down side. Mandibles as in Figs 6-8. Maxillae (Fig. 9) symmetrical, in total with 27 setae each. Cardo with 1 long and 3 short setae; stipes with 5 setae; lacinia with 7 long and 1 short; galea with 8 short ventral, 4 long distal and 2 short dorsal setae; 1 seta on palpifer; palpus maxillaris with 3 setae (1 on first and 2 on third segments). Lacinia with a tooth near apex slightly displaced ventrally. Stridulatory teeth (about 7) barely visible. Setae on dorsum of abdominal segments I-V modified: short, spine-like, situated on anterior margin of risen areas (Fig. 10). Raster (Fig. 11) with about 40 spine-like, curved, apically flattened and widened setae (Fig. 12) not divided into two groups. Lower anal lobe not emarginate (Fig. 13).

Discussion

The biology of both species is similar. They inhabit the upper border of coniferous woodland to alpine zone. Probably *A. haroldi* is saprophagous, but one specimen was found in cow dung. All other finds are from soil traps, under stones and in the air. The females in most cases were collected under stones. All specimens of *A. dzhungaricus* sp. n. were collected under stones. Both species

were found in May to August. According to Protsenko (1968), *A. haroldi* feed on horse dung. It is possible that the beetles can feed on humus. The larvae were found with the beetles, usually on alpine meadows with thick humus horizon, which was formed on relatively flat plots. The larvae were attributed to *A. dzhungaricus* sp. n. on the basis of indirect data. All larvae collected for rearing of adults died. However, in our opinion, the larvae collected can belong only to the species of subgenus *Neagolius*. In addition to the *Neagolius* species, there is only one alpine *Aphodius* species in these mountain systems, *A. grombczewskyi* D. Kosh., but its larvae are considerably larger, with dark epicranium, and were found in the spring in a marmot's burrow. The fact that the larvae of all three ages and adults were collected in the same time suggests that mating and egg laying periods are not narrowly fixed. It is unknown whether imago hibernates or not (hibernation of pupae is not registered in scarabaeids). Perhaps, the II instar larvae may hibernate.

The larvae of *A. dzhungaricus* sp. n. are strongly different from other known larvae of *Aphodius* in the shape of setae on dorsum of I-V abdominal segments, shape of teggilar setae and not emarginate lower anal lobe. *A. dzhungaricus* sp. n. shares the last mentioned character with the representatives of the genus *Aegialia*.

According to material examined, the distribution of these vicarious species is limited to Dzhungar Alatau (*A. dzhungaricus* sp. n.) and to several ridges of Tien Shan from ridge Ketmen in the north, to Terskey Alatau in the east and Moldotau in the south (*A. haroldi*).

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