

Contributions to the knowledge of the genus *Aphodius* from North Palaearctic. II. *A. circassicus* and *A. lederi* (Coleoptera: Scarabaeidae)

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Aphodius circassicus Reitter and *A. lederi* Harold, closely related species from the Caucasus, were known by single specimens so far. Redescriptions of these rare species are given. The taxonomic position of the species is discussed.

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In spite of numerous works, the beetles of the genus *Aphodius* from the Caucasus are barely studied so far. Many species are known by single finds or by types only. *A. circassicus* Reitter and *A. lederi* Harold were described from the Caucasus. Original descriptions of these species are incomplete, many important characters, which allow to determine the taxonomic status of the species more exactly, not mentioned. Female of *A. circassicus* was unknown so far. In our work (Kabakov & Frolov, 1996) the subgenus *Serraphodius* Kabakov was established for these species and *A. leisteri* Medvedev, but, because of limited size of the paper, full redescriptions were not included. The purpose of this article is to fill this gap. The material examined was briefly mentioned in the above paper.

***Aphodius* (*Serraphodius*) *circassicus* Reitter** (Figs 1-7)

Male (Fig. 1). Head black medially, reddish brown towards lateral margins and apex of clypeus; anterior margin of clypeus feebly emarginate medially, anterolateral angles broadly rounded; genae auriculate, rounded. Head lacking frontoclypeal suture and any trace of tubercles, densely punctured, punctures separated by to once a diameter medially, becoming deeper towards anterior margin. Clypeus with long yellowish grey hairs.

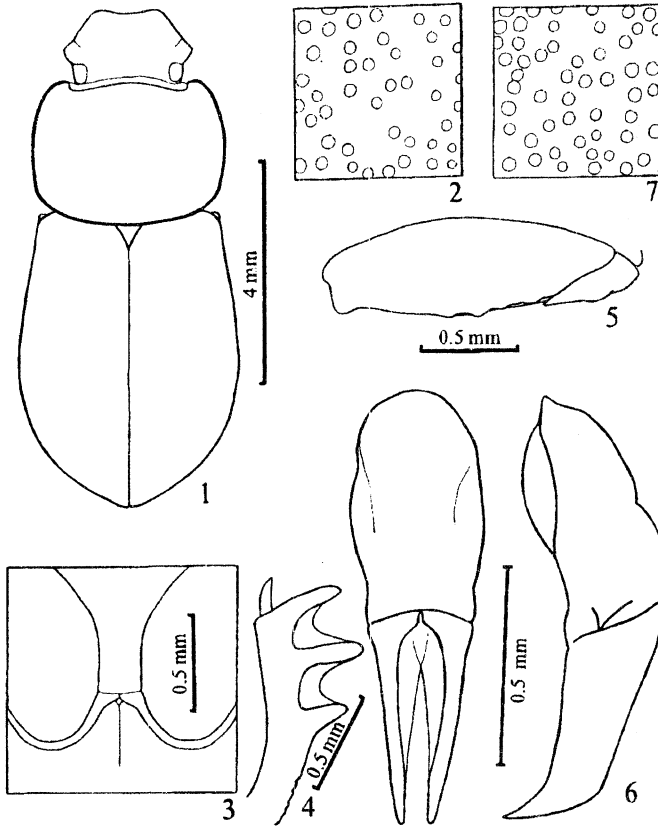
Pronotum shiny, convex, black; anterior angles and lateral margins reddish brown; anterior margin unbordered, base and lateral margins bordered; punctures on disc dense, of same diameter, separated by to once a diameter (Fig. 2), becoming denser laterally; anterior and hind angles with small flattened areas more distinct in large specimens; hind angles rounded.

Scutellum triangular, moderately elongate, with rounded apex; anterior part feebly punctate, hind smooth.

Elytra shiny, brightly chestnut, suture and sutural intervals not darkened; striae simple, lightly impressed, striae punctures deep; intervals nearly flat, with fine netted microsculpture, sparsely punctured, punctures separated by to twice a diameter; elytra laterally and apically sericeous with very short, feebly visible setae; shoulder teeth strongly developed; maximum width of elytra in hind half.

Dorsum of body chestnut, densely coarsely punctate (except abdomen), punctures separated by a diameter; prosternal process angulate, not tubercle-shaped, without long hairs; mesosternal process broad, flat, with rounded margins, without striae and carinae (Fig. 3); border around middle coxae relatively broad and elevated, situated in the same plane with hind mesosternal process and anterior metasternal process.

Legs brown chestnut. Anterior tibiae lightly curved medially, their outer teeth strong and long, carinate from above (Fig.



Figs 1-7. *Aphodius circassicus* (1-6, ♂; 7, ♀): 1, habitus; 2, 7, punctures on disc of pronotum (side of square 0.43 mm); 3, mesosternal process; 4, anterior tibia; 5, hind femur; 6, aedeagus.

4); apical spur wide, acuminate, as long as first tarsal segment, slightly curved and slightly turned down. Middle tibiae with lower spur truncate, half the length of upper. Hind margin of hind femora tuberculate in male (Fig. 5). Hind tibiae with upper spur $4/5$ to $5/6$ the length of first tarsal segment. Hind tarsi with basal segment slightly longer than next two together. Middle tarsi slightly longer than tibiae, anterior and hind as long as tibiae. Apex of middle and hind tibiae fringed with relatively short, unequal spines.

Aedeagus as in Fig. 6.

Width of pronotum 2.5-3.3 mm; width of elytra 3.0-3.9 mm; length of pronotum 1.8-2.6 mm, length of elytra 3.4-4.6 mm.

Female. May be separated from male by the following: elytra more widened towards hind; pronotum comparatively small, with maximum width in hind half, more densely punctate (Fig. 7); outer teeth of anterior tibiae less strong, not carinate from above; middle tibiae with lower spur relatively slender and apically acuminate; hind margin of hind femur smooth.

Width of pronotum 2.6-2.9 mm; width of elytra 3.1-3.4 mm; length of pronotum 1.9-2.0 mm, length of elytra 3.7-4.6 mm.

***Aphodius* (*Serraphodius*) *lederi* Harold**
(Figs 8-14)

Male (Fig. 8). Head brown-black medially, reddish towards lateral margins and apex of clypeus; anterior margin of clypeus feebly emarginate medially, anterolateral angles broadly rounded; genae broadly rounded. Head with frontal suture as fine striae, lacking any trace of tubercles, densely punctate, punctures unequal, separated by a diameter medially, becoming deeper towards anterior margin. Clypeus with long yellowish grey hairs.

Pronotum shiny, with distinct bronze tint, convex; color brown-black, anterior angles reddish. Anterior margin unbordered, base and lateral margins bordered. Punctures dense, unequal (large punctures four times bigger than little ones), large punctures separated by about to 3 times a diameter on disc

Table. Differences of *Aphodius circassicus* and *A. lederi*

<i>A. circassicus</i>	<i>A. lederi</i>
Elytra unicolourous, brightly chestnut	Elytra brownish yellow with brown spots
Genae auriculate	Genae broadly rounded, not auriculate
Pronotum on disc densely punctate; punctures equal, separated by 0.5 to 1.5 times a diameter	Pronotum on disc coarsely punctate; punctures unequal, large punctures separated by about to 3 times a diameter
Elytra on disc punctate; punctures separated by twice a diameter	Elytra on disc smooth
Frontal suture invisible in both sexes	Fine frontal suture visible in both sexes
Apex of protibial spur not curved medially	Apex of protibial spur strongly acuminate and curved medially
Ventrum of the body densely coarsely punctate (except abdomen), punctures separated by a diameter	Ventrum of the body with single coarse punctures
Border around middle coxae separated from the rest of metasternum by deep and wide furrow	Border around middle coxae not separated from the rest of metasternum by furrow

(Fig. 9), becoming denser laterally; anterior angles with small flattened areas.

Scutellum triangular, moderately elongate, smooth, brown.

Elytra shiny, brightly yellow-brown with brown spots, sutural intervals not darkened; striae simple, moderately impressed, stria punctures deep, twice greater than width of stria, separated by 1/3 to 1/2 a diameter; intervals smooth, feebly, towards apex more convex, with fine netted microsculpture; shoulder teeth strongly developed; maximum width of elytra in hind half.

Dorsum of body brown, with single coarse punctures; prosternal process angulate, not tubercle-shaped, without long hairs; mesosternal process broad, flat, with rounded margins, without striae and carinae; border around middle coxae relatively broad and elevated, situated in the same plane with hind mesosternal process and anterior metasternal process; this border separated from the rest of metasternum by deep and wide furrow (Fig. 10).

Legs brown. Anterior tibiae lightly curved medially, their outer teeth strong and long, carinate from above; apical spur conical, acuminate, its apex curved medially (Fig. 11). Middle tibiae with lower spur truncate, shortened, 1/4 the length of upper. Hind

margin of hind femur in male tuberculate (Fig. 12). Hind tibiae with upper spur 5/6 to 6/7 the length of first tarsal segment. Hind tarsi with basal segment longer than next two together. Apex of middle and hind tibiae fringed with relatively short, unequal spines.

Aedeagus as in Fig. 13.

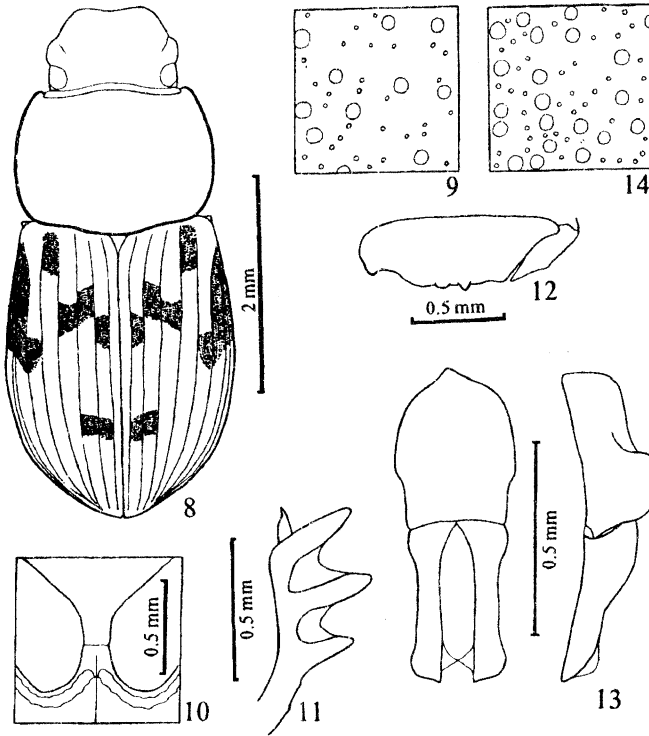
Width of pronotum 1.7-1.9 mm; width of elytra 2.0-2.2 mm, length of pronotum 1.3-1.5 mm; length of elytra 2.6-2.8 mm.

Female. May be separated from male by the following: elytra more widened towards hind; pronotum comparatively small, with maximum width in hind half, more densely punctate (Fig. 14); outer teeth of anterior tibiae less strong, not carinate from above; middle tibiae with lower spur relatively slender and longer, 1/3 the length of upper; hind margin of hind femur smooth.

Width of pronotum 1.6-1.8 mm; width of elytra 2.1-2.3 mm; length of pronotum 1.3-1.5 mm, length of elytra 2.6-2.8mm.

Discussion

A. circassicus and *A. lederi* constitute a group of very peculiar species from the Caucasus (according to G. Dellacasa, personal communication, *A. lederi* is distributed in Turkey also). Some characters allow to con-



Figs 8-14. *Aphodius lederi* (8-13, ♂; 14, ♀): habitus; 9, 14, punctures on disc of pronotum (side of square 0.43 mm); 10, mesosternal process; 11, anterior tibia; 12, hind femur; 13, aedeagus.

consider these species related to species of subgenus *Nimbus*: 1) shape of body (maximum width of elytra in hind half, even in large males; apices of elytra not rounded together very broadly), 2) clypeus with long hairs, 3) shape of aedeagus similar, 4) middle tibiae in males with lower spur shortened and more or less truncate, 5) anterior tibiae distinctly curved medially and 6) most of species of these groups occur in autumn in dung of cattle. *A. lederi* is more similar to *Nimbus* in the type of coloration of elytra and the type of punctures of pronotum (pronotum in most *Nimbus* species sparsely and finely punctate, but in some little species punctures coarse and unequal). The similarity of *A. circassicus* with some species of the subgenus *Amidorus* Mulsant (e.g. with *A. obscurus*), on the grounds of which the species has been origi-

nally placed in this subgenus, must be considered as convergent.

The distinguishing characters of the two species are given in the Table.

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References

- Kabakov, O.N. & Frolov, A.V. 1996. A review of the beetles of the genus *Aphodius* Ill. (Coleoptera, Scarabaeidae) considered to be close to the subgenus *Acrossus* Muls. of Russia and adjacent countries. *Entomol. Obozr.*, 74(4): 865-883. (In Russian).

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