

# A Review of Scarabs of the Subgenus *Plagiogonus* Mulsant, Genus *Aphodius* Illiger (Coleoptera, Scarabaeidae), of the Fauna of Russia and Neighboring Countries

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**Abstract**—A review of the scarab subgenus *Plagiogonus* Mulsant, genus *Aphodius* Illiger, of the fauna of Russia and adjacent countries is given, with a key to the species and data on their distribution. Two species names, *Aphodius reitteri* D. Koshantschikow, 1894 and *A. burgaltaicus* Csiki, 1901, are restored from synonyms. Two new synonymies are established: *A. chan* Endrödi, 1967 = *A. peregii* Endrödi, 1983, **syn. n.**; *A. reitteri* D. Koshantschikow, 1894 = *A. kricheldorffi* W. Koschantschikov, 1910, **syn. n.** Neotype of *A. culminarius* Reitter, 1900 and lectotype of *A. burgaltaicus* are designated, and redescriptions of these species are given. A secondary sex character of *Plagiogonus* is found.

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The subgenus *Plagiogonus* Mulsant, 1842 is represented by more than 20 species in the world fauna. Seven of them occur in Russia and neighboring countries, and two have been known from the type specimens only. The beetles of this subgenus differ in the structure of the 7th and 9th elytral intervals merging near the elytral apex to form a distinct carina. This character distinguishes *Plagiogonus* species from all the other subgenera of the genus *Aphodius*. However, species of this subgenus are often difficult to identify. Many specimens of *Plagiogonus* in the collection of the Zoological Institute, the Russian Academy of Sciences, St. Petersburg (ZIN), have been found to be misidentified, because the identifications were not based on examination of the paramere structure. This character is not used in available keys. A small size of the beetles of this subgenus and minute structures of the genitalia provide additional difficulties for identification. In addition, the majority of the species considered are rare in collections.

The aim of the present study was to clarify the diagnostic characters of *Plagiogonus* species, nomenclature, and distribution of the species in Russia and neighboring countries.

This study is mainly based on the ZIN material. In this collection, type specimens of *A. reitteri* D. Koshantschikow, 1894 and *A. kricheldorffi* W. Koschantschikov, 1910 and also specimens from the original type series of *A. culminarius* Reitter, 1900

were found. In addition, the material from the Hungarian Natural History Museum, Budapest (HNHM), was examined.

The photographs of the habitus were made with a Leica DFC290 digital camera and a Leica MZ9.5 stereoscopic microscope. The material examined is deposited in ZIN, if not indicated otherwise.

## Genus *APHODIUS* Illiger

### Subgenus *Plagiogonus* Mulsant, 1842

Type species *Aphodius arenarius* (Olivier, 1789).

**Description.** Body small (length 2.5–4.2 mm). Elytra shiny, glabrous, from yellow with darker scutellum, suture, and apices to dark brown. Striae rather deep apically; diameter of punctures in striae exceeding width of striae. 7th and 9th elytral intervals merging apically forming carina. Scutellum small, triangular. Pronotum with irregular punctation. Posterior angles rounded or slightly sinuate. Base of pronotum not bordered. Head rather convex. Frontoclypeal suture indistinct. Clypeus sinuate at middle, with long dense setae dorsally or with very short sparse setae near anterior margin. Apical setae of middle and hind tibiae differing in length. Parameres more or less acute apically, with or without long setae.

The most reliable diagnostic characters of the members of the subgenus are the shape of the parameres and number of setae on their apices, and the coloration.

tion of the pronotum and elytra. Reliable identification of females, especially of single specimens, can be difficult in some cases.

Comparison of a great number of *Plagiogonus* specimens belonging to different species has shown a pronounced sexual dimorphism in the size of the lower spur of the middle tibia. The lower spur of the middle tibia of the male is very short, shorter than, or approximately 1/3 as long as the upper spur; that of the female is longer than the half of the upper spur.

The literature (Iablokoff-Khnzorian, 1964, Medvedev, 1965; Iablokoff-Khnzorian, 1967; Nikolajev and Soyunov, 1991; Isajev, 1995; Zinchenko, 2003), label data, and my findings of adults and larvae suggest that *A. arenarius* (Olivier, 1789) occurs almost exclusively in rodent burrows. According to Iablokoff-Khnzorian (1967), this species was also found in sheep dung. Biology of the other species of *Plagiogonus* is poorly known. There are findings of *A. culminarius* from the cattle and horse dung (Nikolajev, 1979, as *A. burgaltaicus* Csiki, 1901) and *A. praeustus* Ballion, 1870 from cattle dung (Frolov, pers. comm.).

*A Key to the Plagiogonus Species Occurring in Russia and Neighboring Countries*

1. Elytra brown or dark brown ..... 2.  
—Most part of elytra yellow or elytra entirely reddish brown ..... 3.
2. Posterior angles of pronotum slightly emarginate (Fig. 7). Parameres without setae (Figs. 15, 22). Clypeus with sparse and very short setae anteriorly. .... *A. arenarius* (Olivier).  
—Posterior angles of pronotum rounded in dorsal view (Fig. 8). Parameres with row of setae apically (Figs. 10, 17). Clypeus with rather dense, long, pale setae dorsally ..... *A. syriacus* Harold.
3. Most part of elytra yellow; scutellum, suture, and at least part of sutural interval and apices dark ..... 4.  
—Elytra entirely reddish brown. Parameres with fine setae apically (Figs. 12, 19) ..... *A. chan* Endr.
4. Apex of paramere with or without long single seta. Pronotum almost uniformly colored, occasionally with anterior corners slightly paler. 1st segment of hind tarsus as long as, or slightly shorter than 3 succeeding segments combined ..... 5.

—Apex of paramere with bunch of setae (Figs. 11, 18). Sides of pronotum paler than disk. 1st segment of hind tarsus as long as 2 succeeding segments combined ..... *A. culminarius* Reitt.

5. Parameres without setae (Figs. 16, 23). Upper spur of hind tibia shorter than 1st segment of tarsus ..... *A. praeustus* Ballion.

—Apex of paramere with long single seta (Figs. 13, 20). Upper spur of hind tibia as long as, or slightly longer than 1st segment of hind tarsus ..... *A. reitteri* D. Kosh.

*Aphodius (Plagiogonus) arenarius* (Olivier, 1789)  
(Figs. 7, 15, 22)

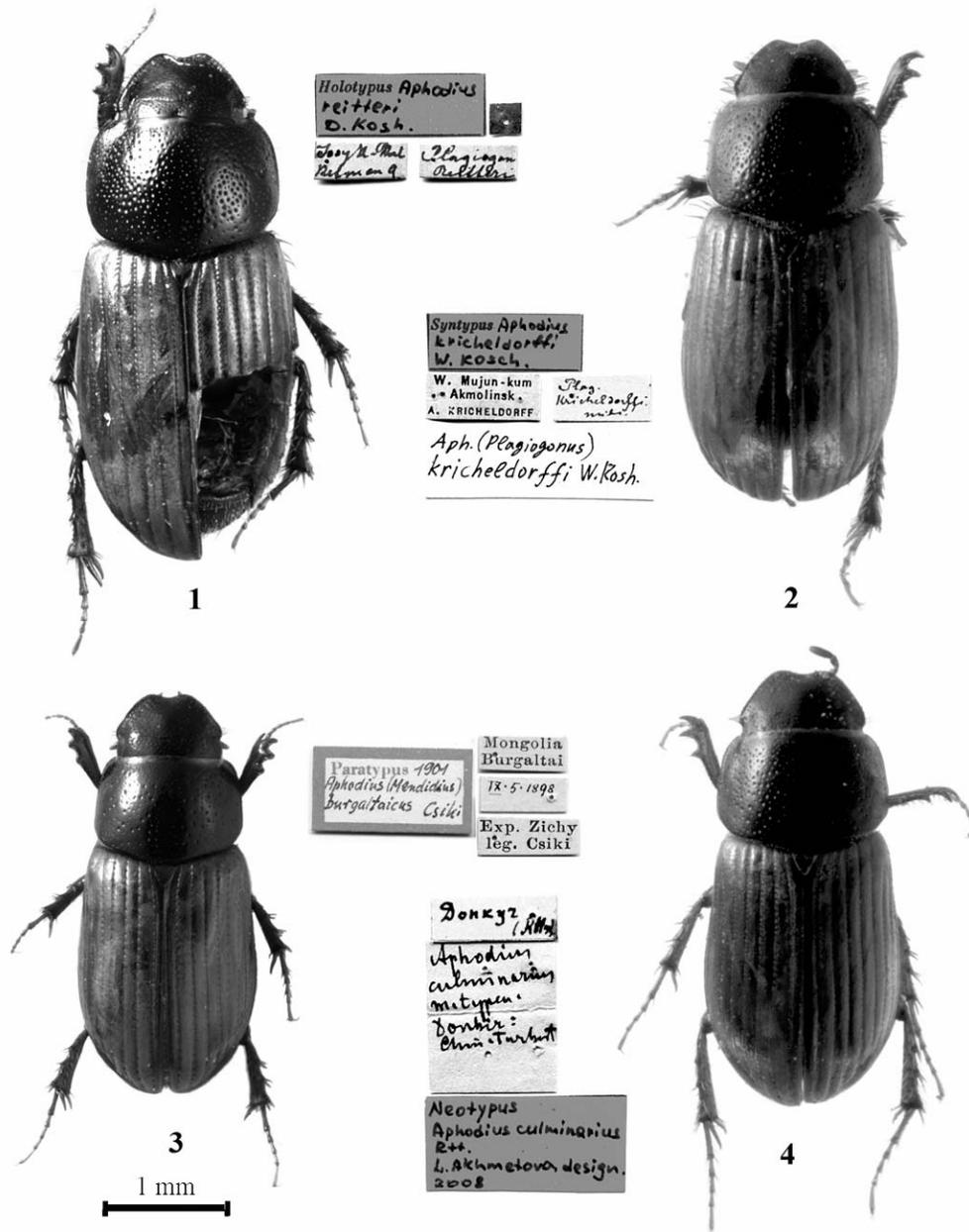
Olivier, 1789 : 96–97 (as *Scarabaeus arenarius*); Balthasar, 1964 : 107, 109; Medvedev, 1965 : 174. —*putridus* (Fourcroy, 1785) (suppressed name); Iablokoff-Khnzorian, 1967 : 81; Nikolajev, 1987 : 98, 112, 113; Nikolajev, Soyunov, 1991 : 14, 20, 23, 26; Isajev, 1995 : 32; M. Dellacasa, G. Dellacasa, 2006 : 135; Frolov, Akhmetova, 2008 : 625.—*avetissiani* Iablokoff-Khnzorian, 1964 : 61 (synonymy by Frolov and Akhmetova, 2008); Iablokoff-Khnzorian, 1967 : 81.

**Differential diagnosis.** The species is most similar to *A. syriacus* Harold, 1863, but can be distinguished from it by the shape of the parameres and absence of setae on their apices, presence of only sparse short setae on the clypeus, shape of the posterior angles of the pronotum, and narrower body.

Body length 2.5–3.5 mm.

**Distribution.** The species is widespread in Europe and Asia (as far in the east as Krasnoyarsk Territory).

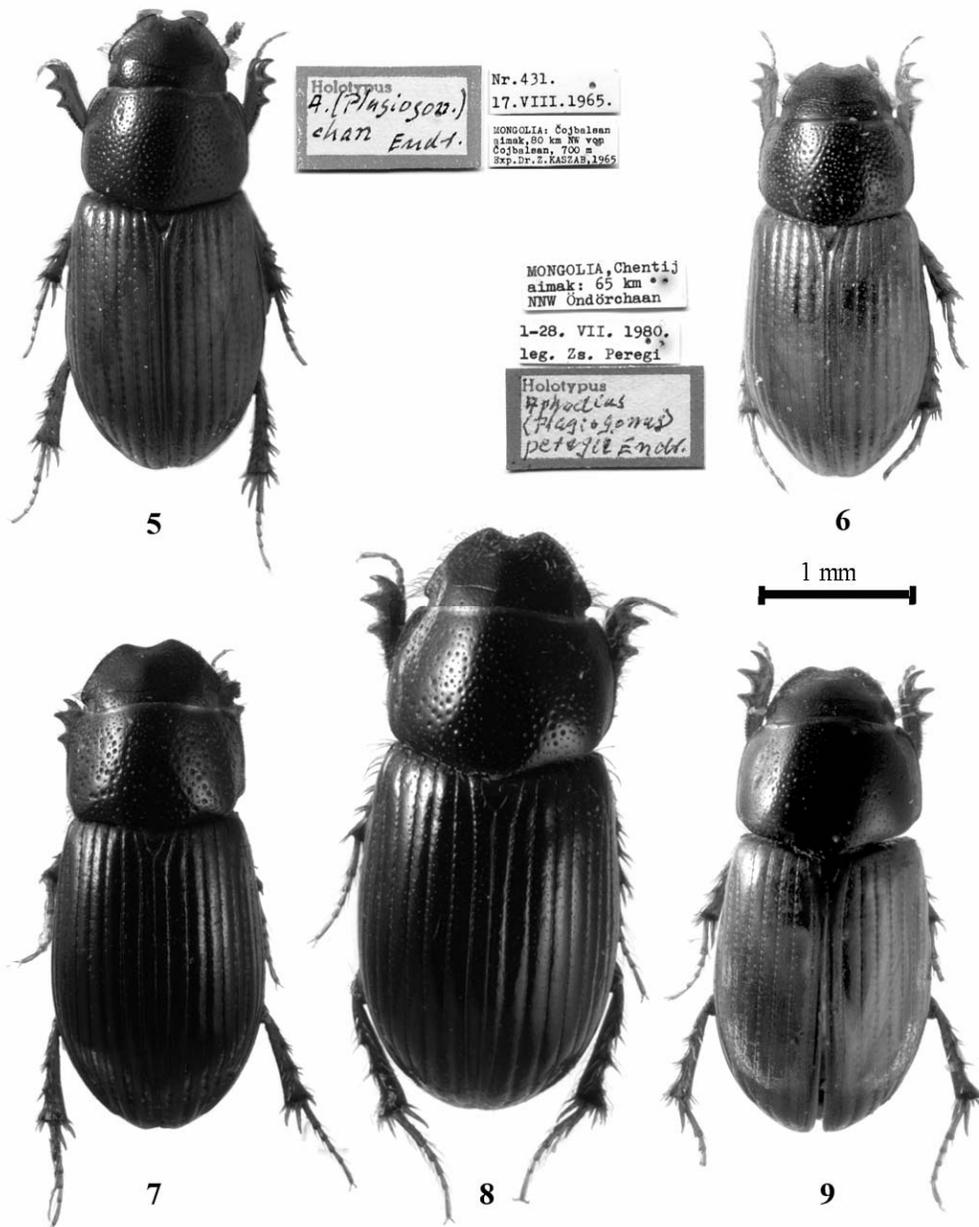
**Material.** Germany. Leipzig, 2 spms. (Schubert). Austria. Styria, 1 spm.; Vienna, 1 spm. (A. Winkler), 3 spms.; Rodaun, 2 spms. (Breit). Czech Republic. Prostějov, 5 spms. (V. Zoufal). Latvia. Riga, 1 spm. (K. Yatsentkovskii). Moldova. Kishinev, 16.IV.1899, 1 spm. Ukraine. Zhabche Vill., 20.IV.1898, 3 spms. (G.V. Olsoufieff); Kherson Prov., Askania Nova, 29.IV.1928, 45 spms. (S.I. Medvedev); Cherkassy Prov., Zolotonosha, IV.1909, 2 spms. (V.A. Kizeritskii), 15.IV.1906, 1 spm. (V.A. Kizeritskii); Vladimir-Volynskii, V.1898, 2 spms., 7.V.1903, 6 spms. (G.V. Olsoufieff). Turkey. Environs of Kars, 29.IV.1915, 2 spms. (G.V. Olsoufieff). Russia. Dagestan: Levashi, 16.VI.1926, 2 spms. (M. Ryabov).



**Figs. 1–4.** Type specimens of *Aphodius* Ill., males, general view and labels: (1) holotype of *A. reitteri* D. Kosh.; (2) syntype of *A. kricheldorffi* W. Kosch.; (3) lectotype of *A. burgaltaicus* Csiki; (4) neotype of *A. culminarius* Rtt. Images of labels are not in scale.

Rostov Prov.: Novocherkassk, 28.III–7.IV.1912, 42 spms. (V.A. Kizeritskii), 14.IV.1912, 2 spms. (V.A. Kizeritskii); environs of Novocherkassk, 7.IV.1950, 2 spms. (Stepanov). Volgograd Prov.: environs of Elton Vill., 16.IV.1996, 1 spm. (K.A. Grebennikov); Lake Elton shore, 1996–1997, 2 spms. (A.V. Popov); Nikolaevsk, 2 spms.; environs of Kotluban' Vill., 4.IV.1993, 2 spms. (K.A. Grebennikov). Kursk Prov.: Kursk, 30.IV.1901, 1 spm. Nizhniy Novgorod Prov.: Volchikha, 4–9.V.1894, 1 spm. (G.G. Jacobson). Chuvash Republic: Batyrevskii

Distr., 20.V.1996, 4 spms. (L.V. Egorov). Saratov Prov.: Saratov, 1 spm. Ul'yanovsk Prov.: Teren'ga, 22.V.1988, 5 spms. (A.Yu. Isajev). Samara Prov.: Volzhskii Distr., Kurumoch Vill., 17–19.V.2008, 73 spms. (L.A. Akhmetova). Krasnoyarsk Terr.: environs of Minusinsk, 17–19.V.1916, 1 spm. (V.D. Koshantschikov). Republic of Altai: Ongudai Vill., 11.VI.1989, 8 spms. (S.V. Saluk). Armenia. Salyut Vill., 16.VI.1966, 1 spm. (A.I. Goncharov); Ashotsk, 25.VI.1966, 3 spms. (A.I. Goncharova). Georgia. Bogdanovskii Distr., Rodionovka Vill., 16.VII.1975,



**Figs. 5–9.** *Aphodius* Ill., general view: (5) holotype of *A. chan* Endr., male with labels; (6) holotype of *A. peregii*, male with labels; (7) *A. arenarius* (Olivier); (8) *A. syriacus* Harold; (9) *A. praeustus* Ballion. Images of labels are not in scale.

2 spms. (N. Darskaya); Bogdanovskii Distr., VII.1975, 1 spm. (N. Darskaya). Kazakhstan. Chelkar, 28.IV.1984, 6 spms. (G.V. Nikolajev); Akmolinsk Prov., 10 km N of Lake Zharkol' (southern), 2.VI.1957, 7 spms. (L.V. Arnoldi). Turkmenia. Dash-toi Canyon, 4.V.1867, 10 spms. (N.A. Zarudnyi [?]).

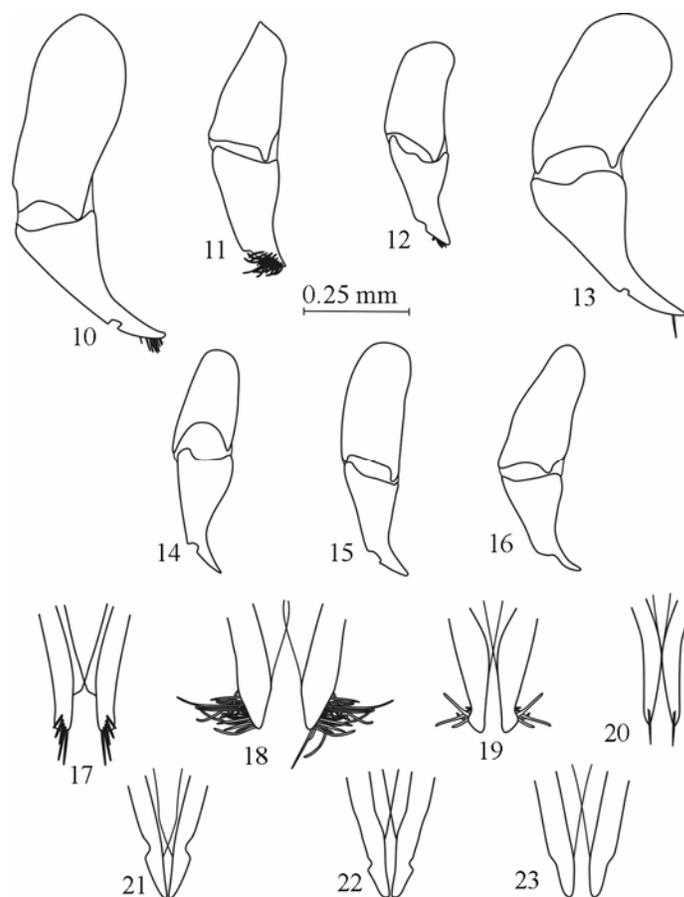
*Aphodius (Plagiogonus) syriacus* Harold, 1863  
(Figs. 8, 10, 17)

Harold, 1863 : 389; Olsoufieff, 1918 : 61; Balthasar, 1961 : 364; 1964 : 108, 112; Iablokoff-Khnzo-

rian, 1967 : 82; M. Dellacasa, G. Dellacasa, 2006 : 135.

**Differential diagnosis.** The species is most similar to *A. arenarius*, but clearly differs in the shape of the parameres and presence of setae on their apices, in the dense, relatively long setae on the clypeus, the rounded posterior angles of the pronotum, and the narrower body.

Body length 3–4 mm.



**Figs. 10–23.** *Aphodius* Ill., structure of aedeagi: (10–16) aedeagus, lateral view; (17–23) apices of parameres (dorsal view; not in scale); (10, 17) *A. syriacus* Harold; (11, 18) *A. culminarius* Rtt.; (12, 19) *A. chan* Endr.; (13, 20) *A. reitteri* D. Kosh.; (14, 21) *A. burgaltaicus* Csiki; (15, 22) *A. arenarius* (Olivier); (16, 23) *A. praestus* Ballion.

**Distribution.** Transcaucasia and Asia Minor.

**Material.** Armenia. Yerevan, 16.IV.1927, 1 spm. (M. Mischenko). Georgia. 1 spm.; Tbilisi: E. Koenig, 1 spm.; 20.IV.1912, 1 spm. (E. Koenig). Israel. Khaifa, 3 spms. (E. Reitter), 3 spms. (Simon). Turkey. Environs of Kars, 12.IV.1915, 1 spm., 22.IV.1915, 1 spm., 5.IV.1916, 1 spm. (G.V. Olsoufieff), 30.III.1916, 1 spm. (G.V. Olsoufieff). “Gallia,” 3 spms. “Caucasus,” 1 spm. “Syria,” 1890, 2 spms. (E. Reitter).

*Aphodius (Plagiogonus) chan* Endrödi, 1967  
(Figs. 5, 6, 12, 19)

Endrödi, 1967 : 138; Nikolajev, Puntsagdulam, 1984 : 133, 144; Nikolajev, 1987 : 113.—*peregii* Endrödi, 1983 **syn. n.**; M. Dellacasa, G. Dellacasa, 2006 : 136.

**Differential diagnosis.** The species differs from the other species of *Plagiogonus* in the coloration of the elytra, shape of the parameres, and number and location of setae on their apices.

Body length 2.5–2.8 mm.

**Distribution.** Mongolia.

**Type material.** *A. chan*: holotype, male with labels “Holotypus *A. (Plagiogon.) chan* Endr.,” “Mongolia: Čojbalsan aimak, 80 km NW von Čojbalsan, 700 m Exp. Dr. Z. Kaszab, 1965” and “Nr. 431. 17.VIII.1965.” (HNHM). *A. peregii*, holotype, male with labels “Holotypus *Aphodius (Plagiogonus) peregii* Endr.,” “Mongolia, Chentij aimak: 65 km NNW Öndörchaan” and “1–28.VII.1980. leg. Zs. Peregi.”

**Notes.** Comparison of the type specimens of *A. chan* and *A. peregii* has shown that they do not differ in the main diagnostic characters and, in my opinion, they belong to the same species.

*Aphodius (Plagiogonus) culminarius* Reitter, 1900  
(Figs. 4, 11, 18)

Reitter, 1900 : 156; Balthasar, 1964 : 108, 110; Nikolajev, 1987 : 113, 1989 : 299; Berlov, 1989 : 392 (as

*A. burgaltaicus* Csiki, 1901); M. Dellacasa, G. Dellacasa, 2006 : 135.

**Differential diagnosis.** The species is most similar to *A. praeustus* and *A. reitteri*, but differs in the shape of the parameres, presence of a bunch of setae on their apices, paler sides of the pronotum, and length of the 1st segment of the hind tarsus. The species also differs from *A. praeustus* in the paler color of the body. It differs from *A. reitteri* in the smaller average size of the body.

Body length 2.5–3.8 mm.

**Distribution.** The species is known only from a few locations in southern Primorskii Terr. and from China.

**Type material.** Neotype (designated here), male with the labels: “Donkyr (Rtt.)” and “*Aphodius culminarius* m. typen. Donkir: Chin. Turkest.”

**Additional material.** Russia. Southern Primorskii Terr., Ussuriiskii Nature Reserve, 11.IX.1972, 4 spms. (B.A. Korotyayev); Luk’yanovka Vill., 4.IX.1992, 3 spms. (A.V. Frolov). China. Nanshan, 2.VIII.1908, 1 spm. (P.Ya. Napalkov); Zhangjiakou, 17 spms. (HNHM); Huangyuan, 5 spms. (J. Holderer) (2 spms. HNHM); Chikuanshan, 1 spm. (S. Endrödi) (HNHM).

**Description. Neotype. Male** (Fig. 4). Disc of head dark brown, almost black, with paler lateral and anterior sides. Frontoclypeal suture indistinct. Frons not tuberculate. Clypeus slightly sinuate at middle, with rounded anterior angles; with very short pale setae on anterior margin. Genae rounded, indistinctly separated from lateral margins of clypeus, slightly protruding beyond eyes.

Pronotum with irregular punctation, neighboring punctures clearly differing in size. Sides of pronotum bordered, base without border, posterior angles rounded in dorsal view. Coloration of pronotum from pale brown to dark brown; sides always paler, pale brown, sometimes almost yellow.

Scutellum dark brown, triangular. Elytra without humeral teeth, glabrous, shiny, darkish yellow with brown suture and darker apices. Elytra of most specimens rather translucent, appearing darker because of adjoining wings. Striae deep, diameter of punctures in striae exceeding width of stria. Elytral intervals strongly convex apically, very finely and sparsely punctate.

Underside dark brown, almost black. Sternites of abdomen with long yellow setae. Legs pale brown,

almost yellow. Outer teeth of fore tibia relatively long. Upper spur of middle tibia considerably shorter than 1st segment of tarsi, acute and slightly curved apically; lower spur approximately 1/3 as long as upper spur, acute and curved apically. 1st segment of hind tarsus longer than upper spur and approximately as long as 2 succeeding segments combined. Adjacent apical setae of middle and hind tibiae strongly differing in length.

Parameres tapering apically, acute and slightly curved. In lateral view, parameres as long as basal sclerite, with small angular groove on dorsal side and bunch of fine setae on apices.

Body length 3.1 mm.

**Notes.** It is obvious from the original description that the author had at his disposal a few specimens, but the exact number of them is not specified. Two specimens of this species from the original type series are deposited in HNHM. The labels “Holotypus [...]” and “Paratypus [...]” were attached to these specimens much later by the staff of HNHM and do not indicate holotype and paratypes.

G.V. Nikolajev designated as the lectotype of *A. culminarius* one of the two syntypes deposited in ZIN collection and placed the name *A. burgaltaicus* in synonyms of *A. culminarius* based on comparison of this specimen with the original description of *A. burgaltaicus* (Nikolajev, 1987). In spite of thorough search, the lectotype and the paralectotype designated by G.V. Nikolajev were not found. They were probably lost. Instead four other specimens from the original type series were found.

Comparison of *A. burgaltaicus* types with these specimens has shown that they belong to different species because they differ in the structure of the aedeagus, coloration of the body, and punctation of the pronotum. In order to insure stability of the nomenclature, I designate as the neotype of *A. culminarius* one of the four specimens from the original type series deposited in ZIN.

***Aphodius (Plagiogonus) praeustus* Ballion, 1870**  
(Figs. 9, 16, 23)

Ballion, 1870 : 333; D. Koshantschikow, 1894 : 109; W. Koschantschikov, 1910 : 18; Olsoufieff, 1918 : 61; Balthasar, 1964 : 108, 116; Iablokoff-Khnzorian, 1967 : 82; Nikolajev, 1987 : 99, 113; Nikolajev, Soyunov, 1991 : 14; Zinchenko et al., 2002 : 203; M. Dellacasa, G. Dellacasa, 2006 : 136.

**Differential diagnosis.** The species is most similar to *A. reitteri*, but differs in the shape of the parameres, absence of setae on their apices, length of the upper spur of the hind tarsus, and darker coloration and smaller average size of the body.

Body length 2.5–3.8 mm.

**Distribution.** The species is widespread in Middle Asia as far southward as Afghanistan.

**Material.** Kazakhstan. Chimkent, Turtkul', 6.V.1988, 1 spm. (Egorov); Kabul-Say Station, V.1910, 5 spms. (E. Fischer); 8 km W of Andreevka, sands, 18.V.1981, 1 spm. (G.V. Nikolajev); left bank of Syr Darya, near Chardara, 18.IV.1980, 10 spms. (G.V. Nikolajev); Koshkarata, 8.V.1906, 2 spms. (E. Fischer). Afghanistan. Farakh, 30.III.1971, 1 spm. (O.N. Kabakov); NE Kabul, 10.IV.1970, 1 spm. (O.N. Kabakov); Samti, 5.IV.1971, 1 spm. (O.N. Kabakov); Lataband Pass, E. Kabul, 4.IV.1970, 1 spm. (O.N. Kabakov); Kabul, 20.IV.1973, 1 spm., 5.V.1970, 2 spms., 1.V.1970, 1 spm. (O.N. Kabakov); Gerat, NW Adraskan, 20.XI.1971, 1 spm. (O.N. Kabakov). Turkmenia. Kelyata Gorge, 19.IV.1974, 6 spms. (G.S. Medvedev); Ashkhabad 1.IV.1950, 3 spms. (Stepanov), 23.III.1903, 1 spm. (Ivanov); 20 km N of Guzularbat, 5.IV.1952, 1 spm. (Il'ichev); environs of Ashkhabad, 25.III.1952, 3 spms. (O.L. Kryzhanovskij), 28.III.1952, 4 spms. (Romadina), 20.IV.1933, 1 spm. (Bondarenko), 30.III.1956, 3 spms., 25.III–1.IV.1960, 4 spms. (Stepanov); Karabil' Upland, 13.IV.1961, 1 spm. (N.A. Filippova); Mary, 18.III.1900, 11 spms. (K.O. Anger). Uzbekistan. Gulistan Station, 1903, 2 spms., III.1903, 1 spm. (Ivanov), 6 spms. (Ivanov), 30.III.1903, 10 spms., 9.IV.1903, 2 spms., 3.IV.1903, 2 spms., 15.IV.1903, 1 spm., 20.IV.1903, 1 spm., 24.IV.1903, 1 spm., 26–28.IV.1903, 4 spms. (G.G. Jacobson); Andizhan, 1 spm. (K. Aris); Babatag Mts., Akmechet Vill., 29.IV.1995, 7 spms. (A.V. Frolov); Dzhizak, 4.IV.1995, 1 spm. (A.V. Frolov), 27.III.1903, 1 spm. (G.G. Jacobson); Kashkadar'inskaya Prov., Guzar, 28.IV.1897, 1 spm. (Kaznakov); Bol'shaya Mikhailovka Vill., 10–15.V.1925, 3 spms. (F.G. Dobrzhanskij); Samarkand, 11.V.1904, 6 spms. (G.G. Suvorov), 1 spm.; Samarkand Prov., Kattakurganskii Distr., Dzham, 18.V.1904, 1 spm. (G.G. Suvorov). Tajikistan. Chilichor-Chashma W of Shaartuz, 21.IV.1962, 1 spm. (O.L. Kryzhanovskij); Sebiston Vill., 28.IV.1992, 1 spm. (A. Lukashuk), 29.IV.1992, 1 spm. (V. Karasev). Kyrgyzstan. Issyk Kul, 20 km SE of Pokrovka,

22.V.1988, 1 spm. (Egorov); Alayskii Range, upper Kirgizata River, 15.V.1983, 1 spm. (B.M. Kataev); Talas, 7.V.1907, 1 spm. (E. Fischer).

*Aphodius (Plagiogonus) reitteri* D. Koshantschikow, 1894 (restored name) (Figs. 1, 2, 13, 20)

D. Koshantschikow, 1894 : 97–98; W. Koschantschikow, 1910 : 18; Balthasar, 1964 : 107, 115; Nikolajev, Soyunov, 1991 : 14; M. Dellacasa, G. Dellacasa, 2006 : 135.—*putridus* Fourc. (= *arenarius* Oliv.); Nikolajev, 1987 : 98, 113.—*kricheldorffi* W. Koschantschikow, 1910 : 18, **syn. n.**; Nikolajev, 1987 : 98, 113.

**Differential diagnosis.** The species is most similar to *A. praeustus*, but differs in the shape of the parameres, presence of seta on their apices, length of the upper spur of the hind tarsus, and greater average size and paler coloration of the body.

Body length 3.5–4.2 mm.

**Distribution.** Middle Asia.

**Type material.** *A. reitteri*, holotype, male with the labels "Josyk-kul Ketmen g." and "*Plagiogon. Reitteri*." 3 syntypes of *A. kricheldorffi* with the labels "W. Mujun-kum Akmolinsk A. Kricheldorff," "*Plag. kricheldorffi mihi*." and "*Aph. (Plagiogonus) kricheldorffi* W. Kosch."

**Additional material.** Kazakhstan. Malay Sary Station, 19.V.1982, 2 spms. (G.V. Nikolajev); Taraz, 4.VI.1907, 8 spms. (G.G. Sumakov), 1 spm. (E. Fischer); Alma-Ata Prov., Dzharkentskii Distr., Ili River, Panfilov, 1906, 4 spms. (V. Ryukbeil'); 17 km NW of Karatau, flood-plain of Koktal River, 29.V.1983, 5 spms. Kyrgyzstan. Talas, 7.V.1907, 1 spm. (E. Fischer). Uzbekistan. Karaalma, 10.V.1925, 1 spm. (F.G. Dobrzhanskij).

**Description. Holotype. Male** (Fig. 1). Head brown. Frontoclypeal suture indistinct. Frons not tuberculate. Clypeus sinuate at middle, with rounded anterior angles and pale short setae on anterior side. Genae rounded, not separated from lateral margins of clypeus, slightly protruding beyond eyes.

Pronotum shiny, brown with slightly paler sides, with irregular punctation (neighboring punctures clearly differing in size), large punctures separated by 1.0–1.5 own diameters, small punctures separated by 1–2 own diameters. Small longitudinal area in middle of pronotum impunctate. Sides of pronotum bordered,

base without border, posterior angles rounded in dorsal view. According to original description, base of pronotum bordered, but this must be erroneous.

Scutellum brown with darker lateral margins, triangular. Elytra without humeral teeth, glabrous, shiny, yellow with brown suture and pale brown apices. Striae deep, diameter of stria punctures exceeding width of stria. Elytral intervals very finely and sparsely punctate, strongly convex apically.

Underside dark brown. Sternites of abdomen with long pale yellow setae. Legs brown. Length of outer teeth of fore legs typical of the genus *Aphodius*. Upper spur of middle tibia slightly shorter than 1st segment of tarsus, acute and slightly curved apically; lower spur approximately 1/3 as long as upper spur, acute and curved apically. 1st segment of hind tarsus as long as upper spur and approximately as long as 3 succeeding segments combined. Adjacent apical setae of middle and hind tibiae sharply differing in length.

Parameres tapering apically, acute, curved. In lateral view, parameres with small angular groove on dorsal side and with one long seta each.

Body length 3.8 mm.

**Notes.** The name *A. reitteri* was placed in synonyms of *A. arenarius* by Nikolajev (1987). However, *A. reitteri* differs from this species in coloration of the elytra, shape of the parameres and presence of setae on their apices, and in the rounded posterior angles of the pronotum. In the original description of *A. kricheldorfii* W. Koschantschikov wrote that this species differed from *A. reitteri* in the flat intervals of the elytra and fine punctuation on the head. Comparison of the types of these species has shown that they have no considerable differences in the mentioned characters. The shape of the parameres of these specimens is also similar.

***A. (Plagiogonus) burgaltaicus* Csiki, 1901**  
(restored name) (Figs. 3, 14, 21).

Csiki, 1901 : 107; Endrödi, 1967 : 138; Nikolajev, 1979 : 100; Nikolajev, Puntsagdulam, 1984 : 133, 143–144; Nikolajev, 1987 : 113; Berlov, 1989 : 392.

**Type material.** Lectotype (designated here): male with the labels: “Paratypus 1901 *Aphodius (Mendidius) burgaltaicus* Csiki,” “Mongolia Burgaltai IX.5.1898,” and “Exp. Zichy leg. Csiki” (HNHM). Paralectotypes: 8 specimens with labels as in the lectotype (HNHM).

**Notes.** As seen from the original description of *A. burgaltaicus*, the author had at his disposal several specimens, but the exact number is not specified. I have examined 9 specimens from the type series, deposited in HNHM. Similarly to *A. culminarius*, all these specimens have labels “Paratypus [...]” which were attached by the staff of HNHM and do not indicate paratypes.

In order to insure stability of the nomenclature, I designate as lectotype one of the above specimens. Types of *A. burgaltaicus* are considerably similar to *A. praeustus*; however, an insufficient number of specimens of the former (only type series is known) species does not allow me to clarify its taxonomic position with reliability. For the same reason, I did not include this species in the key. Berlov (1989) included *A. burgaltaicus* in the key to *Aphodius* species of the Russian Far East and recorded it for the Far East and Mongolia. However, this record is probably based on misidentified specimens of *A. culminarius*.

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#### REFERENCES

1. Ballion, E., “Eine centurie neuer Käfer aus der Fauna der russischen Reiches,” Bull. Soc. Imp. Nat. Mosc. **43**, 320–353 (1870).
2. Balthasar, V., “Neue Arten der Gattung *Aphodius* Ill. aus der palaearktischen Region,” Sbor. Ent. Odd. Nar. Mus. **34**, 359–381 (1961).
3. Balthasar, V., “Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalischen Region. Coleoptera Lamellicornia. Aphodiidae,” Verl. Tsch. Akad. Wiss. Praha 3, 1–652 (1964).
4. Berlov, E.Ya., *Subfamily Aphodiinae. A Key to the Insects of the Far East of the USSR*, Ed. by Ler, P.A. (Nauka, Leningrad, 1989), Vol. 3, Part. 1, pp. 387–402 [in Russian].
5. Csiki, E., “Coleopteren,” *Dritte Asiatische Forschungsreise des Grafen Eugen Zichy* (Budapest, Leipzig. 1901), Vol. 2, pp. 75–120.

6. Dellacasa, M. and Dellacasa, G., "Aphodiini," in *Catalogue of Palaearctic Coleoptera*, Ed. by Löbl, I. and Smetana, A. (Apollo Books, Stenstrup, 2006), Vol. 3, pp. 105–143.
7. Endrödi, S., "Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei (Coleoptera). 103. Lamellicornia der III. Expedition," *Reichenbachia* **9**, 135–144 (1967).
8. Frolov, A.V. and Akhmetova, L.A., "On the Synonymy of Two Species Names of the Genus *Aphodius* Ill. (Coleoptera, Scarabaeidae) Described by S.M. Iablokoff-Khnzorian," *Entomol. Obozr.* **87** (3), 624–626 (2008) [in Russian] [*Entomol. Rev.* **88** (7), 831–832 (2008)].
9. Harold, E., "Beiträge zur Kenntnis einiger coprophagen Lamellicornien. (Fünftes Stück)," *Berl. Ent. Zeits. Chr.* **7**, 327–389 (1863).
10. Iablokoff-Khnzorian, S.M., "New Dung Beetle Species from the Armenian SSR," *Doklady Akad. Nauk ArmSSR*, **39**, 61–63 (1964).
11. Isajev, A.Yu., "Contribution to the Knowledge of the Fauna of Scarab Beetles (Coleoptera. Lamellicornia: Lucanidae, Trogidae, Scarabaeidae) of Ul'yanovsk Province," in *Insects of Ul'yanovsk Province* (Branch of MSU, Ul'yanovsk, 1995), pp. 28–45 [in Russian].
12. Koshantschikow, D., "Zur Scarabaeiden-Fauna der Umgegend von Issyk-kul," *Horae Soc. Entomol. Ross.* **28**, 96–99 (1894).
13. Koschantschikov, W., "Beitrag zur Kenntnis der Aphodiini (Coleoptera, Lamellicornia)," *Rev. Russ. Entomol.* **10**, 18–20 (1910).
14. Medvedev, S.I., "Scarabaeidae" in *Keys to the Insects of the European Part of the USSR* (Nauka, Moscow, 1965), Vol. 2, pp. 166–208 [in Russian].
15. Nikolajev, G.V., "New and Rare Scarab Beetle Species (Coleoptera, Scarabaeidae) of the Fauna of Primorskii Territory," in *Beetles of the Far East and Eastern Siberia (New Data on the Fauna and Systematics)* (Acad. Sci. USSR, Vladivostok, 1979), pp. 99–101 [in Russian].
16. Nikolajev, G.V. and Puntsagdulam, Zh., "Scarab Beetles (Coleoptera, Scarabaeoidea) of the People's Republic of Mongolia, in *Insects of Mongolia* (Nauka, Leningrad, 1984), Vol. 9, pp. 90–294 [in Russian].
17. Nikolajev, G.V., "Contributions to the Fauna and Synonymy of Species of the Subfamilies Silphidae, Agyptidae, and Scarabaeidae (Coleoptera) of the People's Republic of Mongolia and Adjacent Areas of Siberia," in *Insects of Mongolia* (Nauka, Leningrad, 1989), Vol. 10, pp. 296–300 [in Russian].
18. Nikolajev, G.V., *Scarab Beetles (Coleoptera, Scarabaeoidea) of Kazakhstan and Middle Asia* (Nauka, Alma-Ata, 1987) [in Russian].
19. Nikolajev, G.V. and Soyunov, O.S., "Characteristics of the Fauna of Scarab Beetles (Coleoptera, Scarabaeidae) in the Main Ecosystems of Northern Kara Kum and Prisarykamyshe (Prometheus, Moscow, 1991), p. 27 [in Russian].
20. Olivier, M., "Coléoptères," in *Entomologie, ou Histoire naturelle des Insectes* (Paris, 1789), Vol. 1, pp. 1–190.
21. Olsoufieff, G.V., "Les Coprophages de la Caucasic," *Mem. Mus. Caucase* **7**, 1–92 (1918).
22. Reitter, E., "Coleoptera gesammelt in Jahre 1898 in Chin. Central-Asien von Dr. Holderer in Lahr.," *Wien. ent. Zeit.* **29**, 153–166 (1900).
23. Iablokoff-Khnzorian, S.M., *Coleoptera. Scarab Beetles* (Acad. Sci. ArmSSR, Yerevan, 1967), Vol. 6, pp. 1–225 [in Russian].
24. Zinchenko, V.K., Chernenko, A.V., and Chernenko, R.V., "Rare and Little-known Scarab Beetle Species (Coleoptera, Scarabaeidae) of the Fauna of Eastern Kazakhstan," *Evraziat. Entomol. Zh.* **1** (2), 201–205 (2002).
25. Zinchenko, V.K., "The Structure of Species Composition of Nidicolous and Coprophilous Beetles (Coleoptera) from Marmot Burrows in Kemerovo Province," *Evraziat. Entomol. Zh.* **2** (4), 279–280 (2003).