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On the genus *Anthophagus* Gravenhorst, 1802 (Coleoptera: Staphylinidae, Omaliinae, Anthophagini) in Cisbaikalia, with additional Palaearctic material of *A.* (*Phaganthus*) *caraboides* Linnaeus, 1758

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The species of the genus *Anthophagus* Gravenhorst, 1802 reported from Cisbaikalia are examined. A redescription of *A. (Phaganthus) baikalensis* Iablokoff-Khnzorian, 1974 is presented; the aedeagus is illustrated. A key to the species known from Cisbaikalia is provided. Additional material of *A. (Ph.) caraboides* Linnaeus, 1758 is reported, including new records for the fauna of Kazakhstan and the Republic of Sakha (Yakutia).

Key words: Coleoptera, Staphylinidae, Omaliinae, Anthophagini, *Anthophagus*, Palaearctic, South Siberia, Cisbaikalia, redescription, key.

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INTRODUCTION

The genus *Anthophagus* Gravenhorst (Omaliinae: Anthophagini) is represented by 47 species and subspecies in the Palaearctic region (Smetana, 2004). The genus is subdivided into three subgenera: *Anthophagus* Gravenhorst, 1802 – 17 species and subspecies confined to Europe; *Dimorphoschelus* Blackwelder, 1952 – 15 species and subspecies (nine species and subspecies confined to Europe, two species with a European-Siberian distribution, two species described from Turkey and two species from the Caucasus); *Phaganthus* Mulsant & Rey, 1880 – 8 species and subspecies (six species and subspecies known from Europe, one species with a European-Siberian distribution, and one species described from the Eastern Siberia). One undescribed species is known from the Nearctic region (USA: Northern Carolina) (Moore, 1966; Newton et al., 2000; Herman, 2001).

Four species of two subgenera are known from Cisbaikalia: *A. (Dimorphoschellus) angusticollis angusticollis* (Mannerheim, 1830), *A. (D.) omalinus omalinus* Zetterstedt, 1828, *A.*

(Phaganthus) baikalensis Iablokoff-Khnzorian, 1974 and *A. (Ph.) caraboides caraboides* Linnaeus, 1758.

The first record from Cisbaikalia was reported by Motschulsky (1860): he described *Heterops ruficeps*, now *A. (D.) omalinus omalinus*, from Dauria (type locality: "Sibérie orientale au delà du lac Baical"). Subsequently, this species was recorded from Barguzinskiy nature reserve, Transbaikalia (Ananina, Voincov, 2006). Iablokoff-Khnzorian (1974) described *A. baikalensis* from south-western Cisbaikalia (Listvyanka). For a long time, this species was known only from the female holotype. Recently, however, this species was collected in the Khamar-Daban montain range in 1977 and 1995; the specimens were doubtfully identificied as *A. caraboides* (Shilov, Shilenkov, 1977; Shavrin et al., 1999). *A. caraboides* is known from the south-western part of Irkutsk Territory (Shavrin, 2001) and from the basin of Yenissey River (Veselova, Ryvkin, 1991). The first record of *A. (D.) angusticollis angusticollis* from Cisbaikalia was reported by Shavrin et al. (1999).

The representatives of the genus are mostly montane or alpine. Adults are found in flowers, on foliage, occasionally in marmot nests, and larvae usually near streams; both adults and larvae are active predators, the adults of some species foraging for aphids and other prey on the foliage of shrubs (Newton et al., 2000).

This paper deals with the fauna of the genus *Anthophagus* of Cisbaikalia. A redescription of *A.* (*Ph.*) *baikalensis* is presented, including the male sexual characters, which were previously unknown. In addition, material of *A. (Ph.) caraboides* from the West Palaearctic was examined to study the variation of body coloration and of the shape of aedeagus.

METHODS

All measurements of the entire lengths of beetles are given in millimeters. Measurements of body parts were conducted with a binocular microscope using an eyepiece linear micrometer, so that each unit is equal to $1/70^{th}$ of a millimeter (= 14 microns).

Most specimens were dissected. The genital structures were dehydrated in absolute alcohol and mounted in Euparal on celluloid microslides and pinned with the specimens from which they originated.

The morphological studies were carried out using an Olympus CX31 stereoscopic microscope, an MBS-1 Binocular Microscope with a digital camera (Canon Power Shot A630), and Adobe Photoshop software.

ABBREVIATIONS

The abbreviations in the text are as follows: HL – length of head (from base of labrum to neck constriction), HW – width of head across eyes, PL – length of pronotum, PWMax – maximum width of pronotum, PWMin – minimum width of pronotum, EL – maximum length of elytra, EW1 – minimal width of elytra, EW2 – maximal width of elytra; AW – maximal width of abdomen; FB – length of forebody (from base of labrum to apex of abdomen).

The examined specimens are kept in the following collections and museums: cG - private collection of A. Gontarenko (Odessa), cA - private collection of A. Anistschenko (Madrid), cK - private collection of A. Klimenko (Tver'), cS - private collection of A. Shavrin (Irkutsk), IBPC – Institute of Biological Problems of Cryolytozone SB RAS (Yakutsk) (N.N. Vinokurov, S.N. Nogovicyna); ISU - Irkutsk State University (Irkutsk) (V. Shilenkov), NMW - Naturhistorisches Museum (Wien) (H. Schillhammer), SIPBP - Siberian Institute of Physiology and Biochemistry of Plants SB RAS (Irkutsk) (A. Pleshanov, T. Agafonova), SMNS - Staatliches Museum für Naturkunde (Stuttgart) (W. Schawaller), ZIN – Zoological Institute, Russian Academy of Sciences (St. Petersburg) (G. Medvedev).

RESULTS

***Anthophagus (Dimorphoschellus) angusticollis angusticollis* (Mannerheim, 1830)**
=*abbreviatus* (Fabricius, 1779),
=*fascifer* Reitter, 1888,
=*fulvus* (De Geer, 1774),
=*gracilis* Heer, 1841,
=*obscuriceps* Motschulsky, 1860,
=*roubali* C. Koch, 1934

Shavrin, Shilenkov, Vejnberg, 1999:29

Material examined. IRKUTSK Terr., Khamar-Daban Mts., Bolshoy Mamay, 19.08.1980, *Larix* forest, in grass, 1 female, S. Didorenko leg. (ISU).

Additional material examined. KRASNOYARSK Terr., Ermakovskiy distr., 15 km E Ermakovskoe, 26.06.1990, h = 300-350 m, 1 female, V. Logunov leg. (ISU).

Distribution: Europe (including Russia), Ural, Siberia to Dauria.

***Anthophagus (Dimorphoschellus) omalinus omalinus* Zetterstedt, 1828**
=*arpedinus* Hochuth, 1849,
=*arrowi* C. Koch, 1933,
=*homalinus* Fauvel, 1871,
=*ruficeps* (Motschulsky, 1860),
=*ursus* Havelka & R. Dvořák, 1953

Motschulsky, 1860:547 (as Heterops ruficeps); Heyden, 1880:82 (as Heterops ruficeps); Bernhauer & Schubert, 1910:70 (as Amphichroum ruficeps); Hammond, 1970:69; Tikhomirova, 1973:140 (as Amphichroum ruficeps); Veselova, Ryvkin, 1991:182; Herman, 2001:260; Shavrin, 2001:83 (as Anthophagus sp.); Ananina, Voincov, 2006:39.

Material examined. IRKUTSK Terr., Nizhneudinskiy district, 70 km NW Trud, 28.06.1999, 12 specimens, shake down of *Larix* and *Pinus* branches, A. Shavrin, A. Anistschenko, E. Berlov leg. (cS); Tulunskiy distr., Bolshoe Yarmenskoe lake, 21.07.2000, 1 female, V. Shilenkov leg. (cS); **REPUBLIC OF BURYATIA**, East Sayan, upper of Kyngarga river, 18-23.07.1995, 2200-2500 m, 2 specimens, alpine meadow, on the wing (evening), A. Shavrin leg. (cS); same data, 25-30.06.1996, 1 male, A. Shavrin leg. (cS); same data, 1 female, A. Anistschenko leg. (cA).

Additional material examined. PERMSKAYA Terr., Perm', 08.21.?, 1 ex., ? (ZIN).

Distribution: Europe (incl. Russia), Ural, Siberia. New record for Irkutsk Territory.

***Anthophagus (Phaganthus) baikalensis* Iablokoff-Khnzorian, 1974**
Figs. 1-2.

Iablokoff-Khnzorian, 1974:62; Shilov, Shilenkov, 1977:63 (as *A. caraboides L.*); *Shavrin, Shilenkov, Vejnberg, 1999:29* (as *A. caraboides* L.); *Herman, 2001:251; Smetana, 2004:240*

Material examined. IRKUTSK Terr., Slyudyanskiy district, Baikalsk, 16-20.08.1977, 1 female, V. Shilenkov leg. (ISU); **REPUBLIC OF BURYATIA**, Khamar-Daban Mts., Tankhoy, valley of Osinovka (Mishikhinskaya) river, 24.07.1995, 2 males, 2 females, in wet litter, A. Shavrin leg. (cS); same data, upper part of Snezhnaya river, Sobolinnye lakes, 10.07.1977, 1 female, Smolyanskaya leg. (ISU).

Redescription. Measurements: HL: 1.2 – 1.3; HW: 1.4 – 1.6; PL: 1.3 – 1.5; PWMax: 1.4 – 1.7; PWMin: 1.3 – 1.5; EL: 1.7 – 2.2; EW1: 1.0 – 1.3; EW2: 1.2 – 1.4; AW: 1.9 – 2.2; FB: 4.9 – 5.4.

Head, pronotum, elytra reddish brown to brownish black; abdomen darker, black, with yellowish brown paratergites; legs, antennae and mouthparts yellow. Surface with short and sparse pubescence; head weakly pubescent, in dorsal

part mainly; pronotum with short setae; abdomen with sparse setae.

Head large, distinctly narrower than pronotum (0.1-0.4 times shorter than pronotum), temples distinct, smoothly narrowed towards posterior constriction, about as long as length of eyes seen from above. Eyes large, very convex; subocular ridge present. Labrum apically with weak semicircular excision, with microsculpture consisting of fine transverse waves. Clypeus smooth, not punctate, separated from frons by thin archede suture. Punctation dense, coarse, denser on temples, frons and near eyes, interstices approximately 1-1.5 times as wide as diameter of punctures. Neck with coarse isodiametric microsculpture. Ocelli well defined, located at level of posterior margin of compound eyes, diameter similar to that of the nearest punctures. Median furrows distinct. Antennae long, incrassate, almost reaching two thirds of elytra. All antennomeres covered with long yellow setae, oblong; length/width ratios: I – 3; II–IV – 2; V – 1.7; VI–X – 2.2; XI – 2.7.

Pronotum cordiform, convex, margined, with dense punctation, distinctly wider than long, widest in anterior half, interstices approximately as wide as diameter of punctures. Hind angles obtuse, rectangular, hind sides of pronotum parallel.

Scutellum well visible, triangular, without punctures, microsculpture, or pubescence, glossy.

Elytra long, 0.4-0.7 times as long as pronotum in midline; widened posteriad. Epipleural ridge well developed, complete from base of elytra to apex. Punctation dense, similar to that of pronotum, but punctures larger. Wings fully developed.

Abdomen rugosely punctated, with subdued shine, with isodiametric microsculpture, convex, not wider than elytra. Paratergites broad, well developed. III tergite with 2 horizontal oval spots.

Male. Protibia distinctly dilated ventrally; protarsus with basal segments broadly expanded. Tergite VIII and sternite VIII weakly concave posteriorly. Aedeagus (Figs. 1-2) elongate, with median lobe distinctly not extending to level of apex of parameres. Coiled internal sac without visible sclerotized structures inside, apex spade-like, forming three semicircular ridges.

Female. Protibia and protarsus not modified. Tergite VIII and sternite VIII weakly convex posteriorly.

Distribution: Known only from South Cisbaikalia: Baykalskiy (locus typicus: “Baikal, Listvennoe”) and Khamar-Daban mountain ranges.

Remarks. In external characters *A. baikalensis*is similar to *A. caraboides*: the former has smaller and less prominent eyes, sparser pubescence. Also, *A. (baikalensis* can be distinguished by the different shape and internal structures of the aedeagus, as well as by the slightly enlarged male protarsi.

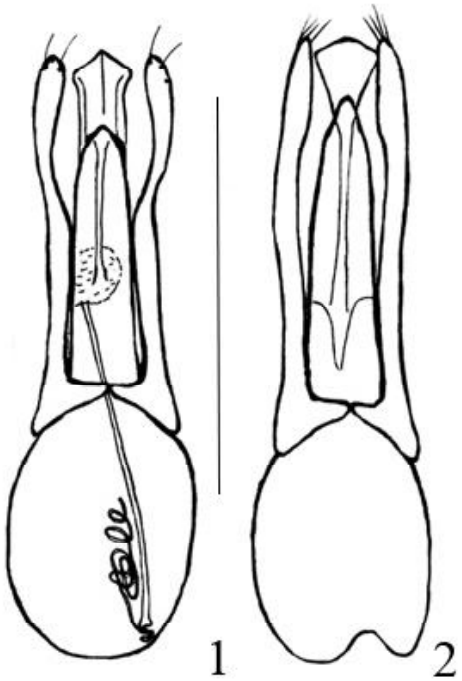
***Anthophagus (Phaganthus) caraboides caraboides* Linnaeus, 1758**
Figs. 3-8.
=*aquilonaris* C. Koch, 1940,
=*hookeri* (Stephens, 1834),
=*maculipennis* Luze, 1902,
=*palustris* Heer, 1841,
=*testaceus* Gravenhorst, 1802.
=*trimaculatus* Luze. 1902

Veselova, Ryvkin, 1991:182; *Shavrin, 2001:83*; *Herman, 2001:253; Smetana, 2004:240*

Material examined. IRKUTSK Terr., Kazachinsko-Lenskiy distr., mouth of Mogol River, Kirenga River, ? [without date], 2 females, A. Pleshanov leg. (SIPBP); Tayshetskiy district, valley of Biryusa River, Staro-Shelekhovo, 27.06.1998, 1 female, in litter, A. Shavrin leg. (cS); same data, Patrikha, 24.06.1998, 2 males, in litter, A. Shavrin leg. (cS); same data, 3 km N Akulshet, 3.07.1999, 2 specimens, in litter of *Salix-Populus*

forest, A. Shavrin leg. (cS); Tulunskiy distr., 10 km SSW Belaya Zima, valley of Belaya Zima R., 21.07.2000, 1 male, 1 female, V. Shilenkov leg. (IGU).

Additional material examined. **AUSTRIA**, Eisenkappel, 1 male, (NMW); Wildshut., 1 male, (NMW); Admont Steierm., 2 males, 3 females (NMW); **UKRAINE**, Transcarpathian obl., Rakhov distr., 26.09.2006, vic. Lug. Kuziy, A.V. Gontarenko leg., mow on the grass, 1 male, 1 female (cG); **KAZAKHSTAN**, E Kazakhstan, S Tarbagatay Mts., 4 km NE Petrovskoe, 22.06.2001, h=1100 m, W. Schawaller leg. (SMNS); **RUSSIA**: **MOSCOW Terr**., Pustchino, 8.06.1986, 1 female, D.V. Stchepotkin leg. (cK); **CHELYABINSK Terr**., 17 km E Karabash, 18.08.1987, mowing on meadow, 1 female, V. Olifer leg. (cK); **REPUBLIC OF SAKHA (YAKUTIA)**, SW Yakutia, mouth of Bystraya river, 20 km up from mouth of Vitim River, right tributary of Lena river, 13.08.1992, lighttrap, mixed forest, 1 female, S.N. Nogovicyna leg. (IBPC).



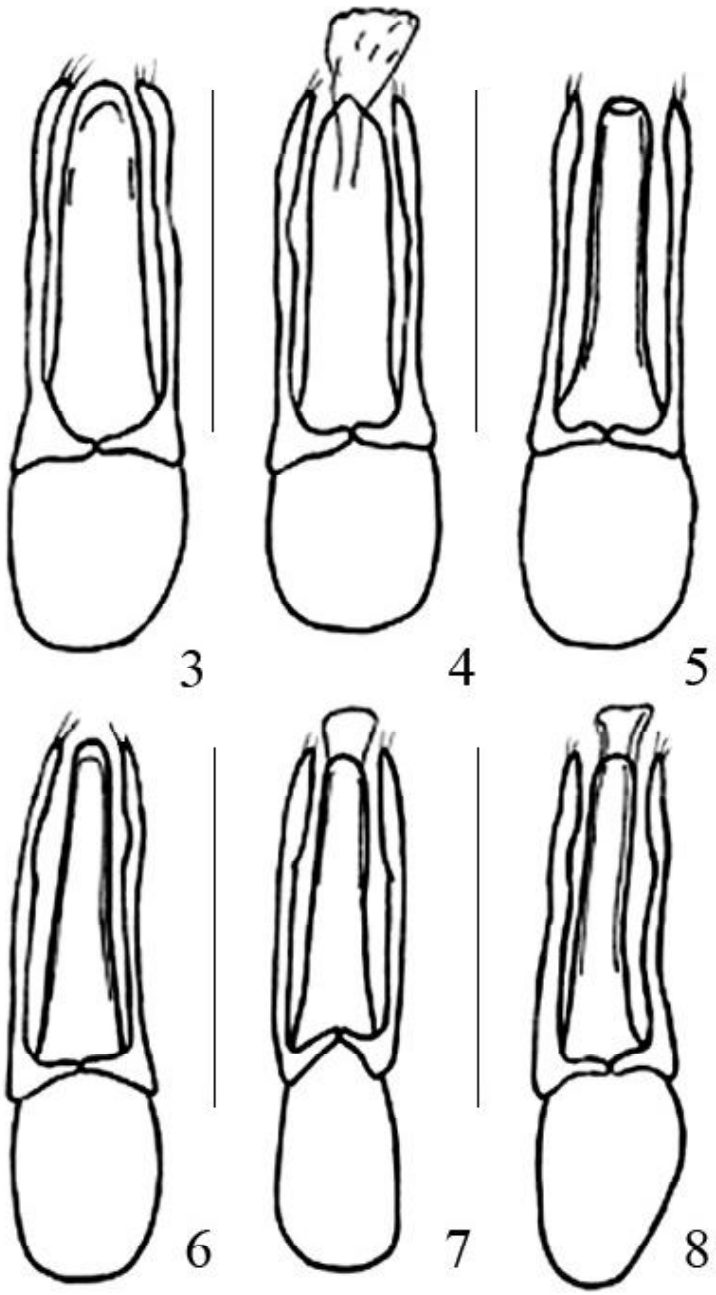
Figs. 1-2: Aedeagus of *Anthophagus baikalensis* in ventral view. Scale 0.5 mm.

Distribution: Georgia, Europe (including Russia), Ural, Siberia to Yakutia. New records for Kazakhstan and Yakutia.

Remarks. The examination of material of *A. caraboides* from Europe, European Russia, Kazakhstan and from West (Chelyabinsk Territory) and East (Irkutsk Territory, Yakutia) Siberia revealed some variation in body coloration and in the shape of aedeagus. Specimens from Europe and from European Russia are more light-coloured: head, pronotum, elytra and abdomen are yellow or brownish yellow. Siberian and Middle Asian specimens, in contrast, have a darker head (brown to black), a brown pronotum, yellowish brown elytra, and a black abdomen with yellowish brown paratergites. Specimens from Cisbaikalia are darker and similar to *A. baikalensis*: head, pronotum, elytra are brownish black, and the abdomen is black, with yellowish brown paratergites. An examination of the geographic variability of the shape of aedeagus (Figs. 3-8) of males gave the following results: European males have a more massive aedeagus with a broad basis, with semicircular (Fig, 3; and see Zanetti, 1987), cone-like (see Toth, 1982) or slightly cone-like (Fig. 4) apex; specimens from Kazakhstan (Fig. 6) and Siberia (Fig. 7-8) have a narrow aedeagus with semicircular apex. It seems likely that there are all possible transitional conditions in the shape of the aedeagus from the west to the east of the Palaearctic region (see, for example, Fig. 5 for the aedeagus of a specimen from Ukraine).

Key to the Cisbaikalian species of the genus *Anthophagus* Gravenhorst

1 Head and pronotum with well visible microsculpture between punctures. Anterior angles of pronotum weakly marked. *Dimorphoschelus* Blackwelder.……...…….....2.



Figs. 3-8. Aedeagus of *Anthophagus caraboides* in ventral view (3-4 – Austria, 5 – Ukraine, 6 – Kazakhstan, 7 – Chelyabinsk Territory, 8 – Irkutsk Territory). Scale 0.5 mm.

- Head and pronotum with very shallow microsculpture between punctures. Anterior angles of pronotum completely rounded. *Phaganthus* Mulsant & Rey. …….....…….…..3.

2 Pronotum slender, as long as wide, not wider than head across eyes. Yellowish brown; head and abdomen brown. Aedeagus (see Zanetti, 1987: 400). Body larger: 4.0 – 5.0 mm. Europe (incl. Russia), Siberia…… .....*angusticollis angusticollis* (Mannerheim)

- Pronotum transverse, wider than head across eyes. Brownish yellow, head and pronotum darker; abdomen black. Aedeagus (see Zanetti, 1987: 400). Body smaller: 2.5 – 3.5 mm. Europe (incl. Russia), Siberia..... .....*omalinus omalinus* Zetterstedt

2 Pubescence sparser. 4.9 – 5.4 mm. Aedeagus (Fig. 1-3). Cisbaikalia…. .....……*baikalensis* Iablokoff-Khnzorian

- Pubescence denser. 4.5 - 5.5 mm. Aedeagus (Fig. 3-8). Europe (incl. Russia), Siberia, Kazakhstan…..*caraboides caraboides* Linnaeus

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