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Review of the subtribe Gyrophaenina Kraatz 1856 (Coleoptera: Staphylinidae: Aleocharinae: Homalotini) of Middle Asia, with emphasis on the fauna of Kazakhstan

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Abstract

A taxonomic and biogeographic review of thirteen species of *Encephalus* Stephens 1832 and *Gyrophaena* Mannerheim 1830 (Aleocharinae: Gyrophaenina) of Middle Asia, with an emphasis on the fauna of Kazakhstan is provided. *Gyrophaena* (s.str.) *aryanamensis* Enushchenko, **sp**. **nov**. from Tajikistan and Kyrgyzstan, and *G.* (s.str.) *hochhuthi* Bernhauer 1908 are re-(described) and illustrated. Several synonymies are established: *Encephalus* (s.str.) *angusticollis* Sahlberg 1880 = *E. solskyi* Heyden 1880 (replacement name of *E. kraatzi* Solsky 1875; not synonym of *G. nitidula* (Gyllenhal 1810)), **resyn**., = *E. torosus* Eppelsheim 1893, **syn**. **nov**.; *G.* (s.str.) *affinis* Mannerheim 1830 = *G. glareicola* Pace 2010, **syn**. **nov**., = *G. kangasi* Rutanen 1994, **syn**. **nov**., = *G. ranongensis* Pace 2005, **syn**. **nov**., = *G. rosskotheni* Wüsthoff 1937, **syn**. **nov**. Illustrations of habitus and sexual characters of *E. angusticollis* are provided. A key to the species of *Gyrophaena* of the *laetula* group of Kazakhstan is given. Several members of Gyrophaenina are recorded for the first time: *E. angusticollis*, *G.* (s.str.) *bihamata* Thomson 1867, *G.* (s.str.) *congrua* Erichson 1837, *G.* (s.str.) *joyi* Wendeler 1924, *G.* (s.str.) *obsoleta* Ganglbauer 1895, *G.* (*Phaenogyra*) *strictula* Erichson 1839 from Kazakhstan and Middle Asia, and *G.* (s.str.) *hochhuthi* from Kazakhstan, Kyrgyzstan, and China.

Key words: Middle Asia, Kazakhstan, fauna, Gyrophaenina, *Encephalus*, *Gyrophaena*, taxonomy, new species, new synonymy

Introduction

The first mention of Gyrophaenina from Middle Asia was the description of *Gyrophaena hochhuthi* from Margelan (Uzbekistan) by Bernhauer (1908). Much later, Kashcheev recorded *G. affinis* Mannerheim 1830, *G. fasciata* (Marsham 1802), *G. gentilis* Erichson 1839, *G. manca* Erichson, 1839 (as *G. angustata* (Stephens 1832)), *G. nitidula* (Gyllenhal 1810), *G. pseudonana* A.Strand 1939 from southern and south-eastern Kazakhstan (Kashcheev *et al*. 1989; Kashcheev & Ishkov 1992; Kashcheev 2001a; Kashcheev & Ishkov 2001a, b). The same author also listed two unnamed *Gyrophaena* spp. from northern Tian-Shan, Trans-Ili and Kungei-Alatau Mountain Ridges and the north-western part of Ketmen Mountain Ridge (Kashcheev 1989). Schülke & Smetana (2015) cited *G.* (*Agaricophaena*) *boleti* (Linnaeus 1758) from Kazakhstan, but the origin of this record is unknown.

The present paper presents an annotated list of thirteen species of *Encephalus* and *Gyrophaena* of Middle Asia (mostly from Kazakhstan), based on material collected by V.A. Kashcheev (ZIN) and other colleagues. This list includes numerous new distributional data for species from several countries of Middle Asia and other territories of Russia and the U.S.A. (*Encephalus angusticollis* Sahlberg 1880 and *G. affinis*). A new species from Tajikistan and Kyrgyzstan is described, and several synonymies both for *Encephalus* and *Gyrophaena* are provided, based on the study of the type and additional material. Previous records of *G. affinis* Mannerheim 1830, *G. fasciata* (Marsham 1802), *G. manca* Erichson 1839 and *G. pseudonana* A. Strand 1939 for Kazakhstan are confirmed by new material, while records of *G. nitidula* (Gyllenhal 1810), and *G. gentilis* Erichson 1839 from the same country are considered as erroneous.

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Material and methods

The present study is based mainly on material collected by Vitaliy A. Kashcheev (1953–2012). His collection was transferred from Alma-Ata Zoological Institute (Kazakhstan) to the Zoological Institute of the Russian Academy of Sciences (ZIN, St.-Petersburg, Russia) in 2014. When preparing the present paper, I examined more than 7000 specimens of Gyrophaenina from Middle Asia, mostly from Kazakhstan.

The examined material is deposited in the following collections (curators are given in parentheses):

cIE	collection of I.V. Enushchenko, Irkutsk, Russia
FMNH	Field Museum of Natural History, Chicago, USA (J. Snyder, M. Thayer)
MZHF	Finnish Zoological Museum of Natural History, Helsinki, Finland, Helsinki (J. Muona)
NHMW	Naturhistorisches Museum Wien, Vienna, Austria (H. Schillhammer)
SZMN	Institute of Animal Systematics and Ecology of Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia (V.K. Zinchenko)
ZIN	Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia (B.A. Korotyaev)
ZMM	Zoological Museum of Moscow University, Moscow, Russia (A.A. Gusakov)
ZMUT	Zoological Museum Biodiversity Unit University of Turku, Finland, Turku (V. Rinne)

Morphological studies were carried out using MBS-9 and MicMed-6 microscopes with a digital camera DCM 510 (USB 2.0) 5Mpixels. All measurements are given in millimeters and taken with a microscope using an ocular micrometer.

Abdominal tergites, sternites and aedeagus were mounted in Canada balsam on plastic microslides pinned under the specimens which they originated from. The type labels are cited in inverted commas and separated from each other by commas. Different lines in labels are separated with '|'; explanations of the type labels and necessary notes within the label are given in square brackets.

In the present study I have followed the classification provided by Schülke & Smetana (2015). I have not cited synonyms of *Gyrophaena* except for taxa where new taxonomic data is provided. In the present paper I used photographs of *E. angusticollis* J. Sahlberg, 1880 (Figs. 4–6), *Gyrophaena kangasi* Rutanen, 1994 (Figs. 13–16) and *G. hochhuthi* Bernhauer, 1908 (Figs. 49–50) which were published in http://mus.utu.fi/ZMUT.TYPE538 (Zoological Museum, Biodiversity Unit, University of Turku; Turku, Finland), http://id.luomus.fi/GL.9014 (Pekka Malinen; Helsinki, Finland) and http://collections-zoology.fieldmuseun.org/list (Kelsey Keaton; Chicago, USA).

Results

Encephalus (*Encephalus*) *angusticollis* J. Sahlberg 1880

(Figs. 1–12)

Encephalus angusticollis J. Sahlberg 1880: 82
Encephalus solskyi Heyden 1880: 68 (replacement name of *Encephalus kraatzi* Solsky 1875: 270; not synonym of *G. nitidula* (Gyllenhal 1810)) **resyn.**
Encephalus torosus Eppelsheim 1893: 39 **syn. nov.**
Encephalus torosus: Pace 1985: 94
Encephalus (s.str.) *torosus*: Pace 1989: 486

Type material examined: Holotype of *Encephalus angusticollis* J. Sahlberg 1880, ♂: 'Jeniseisk', 'J. Sahlb.', 'J. Sahlb. | ind. typ.' <all labels rectangular, printed>, '1135.' <yellow rectangular label, handwritten>, '20' <square label, printed>, '…' <empty square red label>, '*Encephalus* | *angusticollis* | J. Sahlb.' <rectangular label with black frame, handwritten>, 'ZMUT | TYPE538' <rectangular red printed label> (ZMUT) (Figs. 4–6). Labels as in Fig. 6.

Lectotype of *Encephalus torosus* Eppelsheim 1893, ♂ [a plastic plate with a preparation of the aedeagus, VIII male tergite and sternite in Canada balsam]: 'c. Eppelsh. | Steind. d.' [rectangular, printed label], '*torosus* | Epp.' [rectangular, handwritten label], 'Ost-Sibirien. | Auchlyebiet | Ecs Irkut. | Leder 1891' [handwritten label], '♂' [little,

square, handwritten label], '*torosus* | Epp. Deutschient. | Zeit. 1983. p. 39' [handwritten label], 'TYPUS' [red rectangular label, printed], '*Encephalus* | *torosus* Epp. | det. R. Pace 1984 | Lectotypus' [white rectangular label; mostly handwritten] (NHMW) (Figs. 7–9). Labels as in Fig. 9.

Paralectotype of *Encephalus torosus* Eppelsheim 1893, 2 ♀♀: [a plastic plate with a preparation of the spermatheca in Canada balsam]: 'c. Eppelsh. | Steind. d.' [rectangular, printed label], '*torosus* | Epp.' [rectangular, handwritten label], 'Ost-Sibirien. | Auchlyebiet | Ecs Irkut. | Leder 1891' [handwritten label], 'TYPUS' [red rectangular label, printed], '*Encephalus* | *torosus* Epp. | det. R. Pace 1984 |' [white rectangular label; mostly handwritten] (NHMW) (Figs. 10–12). Labels as in Fig. 12.

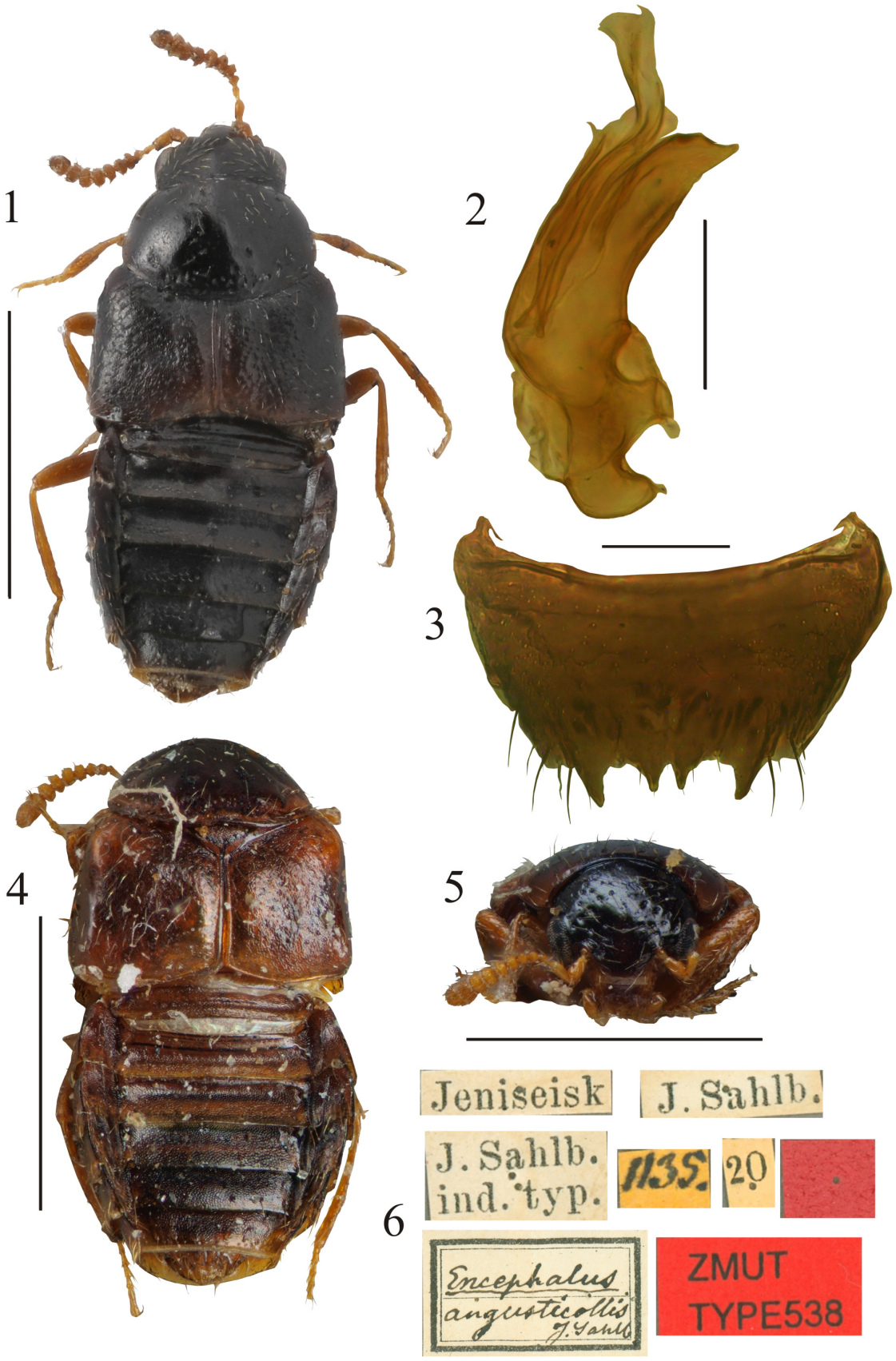
Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 3 ♂♂, 21 ♀♀: Altai Mountains, Ust'-Kamenogorsk [=Oskemen], Rakhmaninovskie Klyuchi, Berel' River, 21.VII.1989, V.A. Kashcheev leg. (ZIN, cIE) (Figs. 1–3).

Additional material examined: RUSSIA: **Khakasia**: Altaiskiy District: ♂: Abakan, left side of Yenisei River, in fungi on the willow trunk, 3.VII.1988, E.M. Veselova leg. (ZMM); **Evenk Autonomous Region**: Balkitskiy District: ♂, 2 ♀♀: Podkamennaya Tunguska River basin, Kochumbek River, 8 km lower the mouth, № 267, 24.VIII.1990, A.B. Ryvkin leg. (cIE); **Krasnoyarsk Territory**: Turukhanskiy District: ♀: Nizhnyaya Sarchikha River, litter under bracket fungus on birch, 11.VII.1992, V.B. Semenov leg. (ZMM); ♀: Bol'shaya Varlamovka River, 6 km lower Malaya River mouth, 25.VIII.1988, A.B. Ryvkin leg. (ZMM); **Tyva**: Tandinskiy District: 2 ♀♀: Durgen, 4.VII.1988, E.M. Veselova leg. (ZMM); **Irkutsk Area**: Slyudyanskiy District: ♀: Baikal'sk, Solzan valley, 24.VI.1978, V.G. Shilenkov leg. (cIE); **Buryatiya**: Tunkinskiy District: 3 ♂♂, 2 ♀♀: Arshan, right side of Kyngyrga River, 26–29.VIII.2009, I.V. Enushchenko leg. (cIE); **Zabaykalsky Krai**: Uletovskiy District: ♂: Lukovaya River (right tributary of Ingoda River) valley, N 49°41'83,8'', E 111°08'59,5'', h=1420 m, 22.VII.2009, A.V. Shavrin & I.V. Enushchenko leg. (cIE); Krasnochikoiskiy District: ♀: valley of Kunalei River, 6 km NW Kunalei, 21.VIII.1998, A.V. Shavrin leg. (cIE); Kyrinskiy District: ♂, 2 ♀♀: Bukukun River, N 49°27'17,6'', E 111°08'15,6'', h=1137 m, 6.VIII.2013, I.V. Enushchenko leg. (cIE); **Khabarovsk Territory**: Verkhnebureinskiy District: ♀: Dublikanskiy Nature Refuge, right side of Dublikan River valley, 1 km N cordon, mosses and plant debris on open sedge hummocky with grasses and bushes, 2.IX.2009, A.B. Ryvkin leg. (ZMM); **Amur Area**: Skovorodinskiy District: ♂, 2 ♀♀: left side of Urka River, ca. 4 km N Yerofei Pavlovich, N 54°00'40,89'', E 121°57'43,75'', h=525 m, 1.IX.2014, A.V. Shavrin & I.V. Enushchenko leg. (cIE); Mazanovskiy District: ♀:, Nora River basin, Sorokavyorstnaya channel, foot of Sosnovaya mountain, 215 m a.s.l., 27.07.2006. E.M.Veselova & A.B.Ryvkin leg. (cIE); MONGOLIA: Tuve [Tzentralnyi] Aimak: ♂, ♀: Zaisan, S slope of Bogdo-Ula Mountain, 4.VII.1967, I.M. Kerzhner leg. (ZIN).

Remarks. J.Sahlberg (1880) described *E. angusticollis* based on a single male from '*...territorio silvoso* prope oppidum Jenisseisk…' (now known as Yeniseysk in Krasnoyarsk Territory, West Siberia). Eppelsheim (1893) described *E. torosus* (Figs. 7–12) from south-western Cisbaikalia, based on '3 oder 4 Stücke'. The author compared this species with *E. angusticollis* and *E. complicans*, from which he distinguished them by the distinctly broader body and coarser microsculpture. Pace recorded *E. torosus* from Nepal (Pace 1985, 1989) and revised types (2 males, 2 females) of *E. torosus* from NHMW (Pace 2006), without designation of a lectotype. I have revised these types and found that, based on the morphological details of the body, these specimens are conspecific with *E. angusticollis*. It is worth noting that the possible synonymy of *E. torosus* with *E. angusticollis* was assumed by Pace (1985). Thus, a new synonymy is proposed here.

After the descriptions of *Encephalus kraatzi* by Hochhuth (1872) from Ukraine and Solsky (1875) from the Baikal Region, there was a very complicated story with these identical names discussed in Enushchenko & Shavrin (2011). *Encephalus solskyi* L.Heyden 1880 (replacement name of *E. kraatzi* Solsky 1875) was synonymized with *G. nitidula* (Gyllenhal 1810), while *E. kraatzi* Hochhuth 1872 was transferred to the genus *Brachida* by Shilov (1977) and synonymized with *B. exigua* Heer 1839 . According to the original description of *E. kraatzi* by Solsky (1875), the species is characterized by transverse antennomeres as in specimens of *Encephalus* ('Antennis crassiusculis, articulis penultimis transcersis…'), whereas European *G. nitidula* can be distinguished by elongate antennomeres. Thus, I propose that *E. solskyi* Heyden 1880 is not the same as *G. nitidula* and should be resynonymized with *E. angusticollis* (Figs. 4–6).

This species is recorded from Kazakhstan and Middle Asia for the first time.



FIGURES 1–6. *Encephalus angusticollis* J. Sahlberg (Figs 1–3: Altai Mountains, Oskemen): 1, 4 (holotype of *E. angusticollis*)—habitus, dorsal view, 5—habitus, frontal view (holotype), 2—aedeagus, lateral view, 3—male abdominal tergite VIII, dorsal view, 6—labels of the holotype. Scale bars: 1 mm (1, 4, 5), 0.1 mm (2).

FIGURES 7–12. *Encephalus angusticollis* J. Sahlberg: 7 (type of *E. torosus* Eppelsheim, male), 10 (type of *E. torosus* Eppelsheim, female)—habitus, dorsal view, 11—habitus, frontal view (female), 8—aedeagus, lateral view, 9—labels of type of *E. torosus* Eppelsheim, male, 12—labels of type of *E. torosus* Eppelsheim, female. Scale bars: 1 mm (7, 10, 11), 0.1 mm (8).

***Gyrophaena* (*Gyrophaena*) *affinis* Mannerheim 1830**
(Figs. 13–33)

Gyrophaena affinis Mannerheim 1830: 74
Gyrophaena amabilis Lacordaire 1835: 537
Gyrophaena diversa Mulsant & Rey 1870: 153
Gyeophaena inconspicua Casey 1906: 299
Gyrophaena lacustris Casey 1906: 299
Gyrophaena subpunctata Casey 1906: 299
Gyrophaena rosskotheni Wüsthoff 1937: 141, **syn.nov.**
Gyrophaena kangasi Rutanen 1994: 39, **syn.nov.**
Gyrophaena ranongensis Pace 2005: 256, **syn.nov.**
Gyrophaena glareicola Pace 2010: 141, **syn.nov.**
Gyrophaena affinis: Kashcheev & Iskakov 1992: 40; Kashcheev 1997: 91; Kashcheev 2001a: 154; Kashcheev & Ishkov 2001a: 101, 2001b: 123

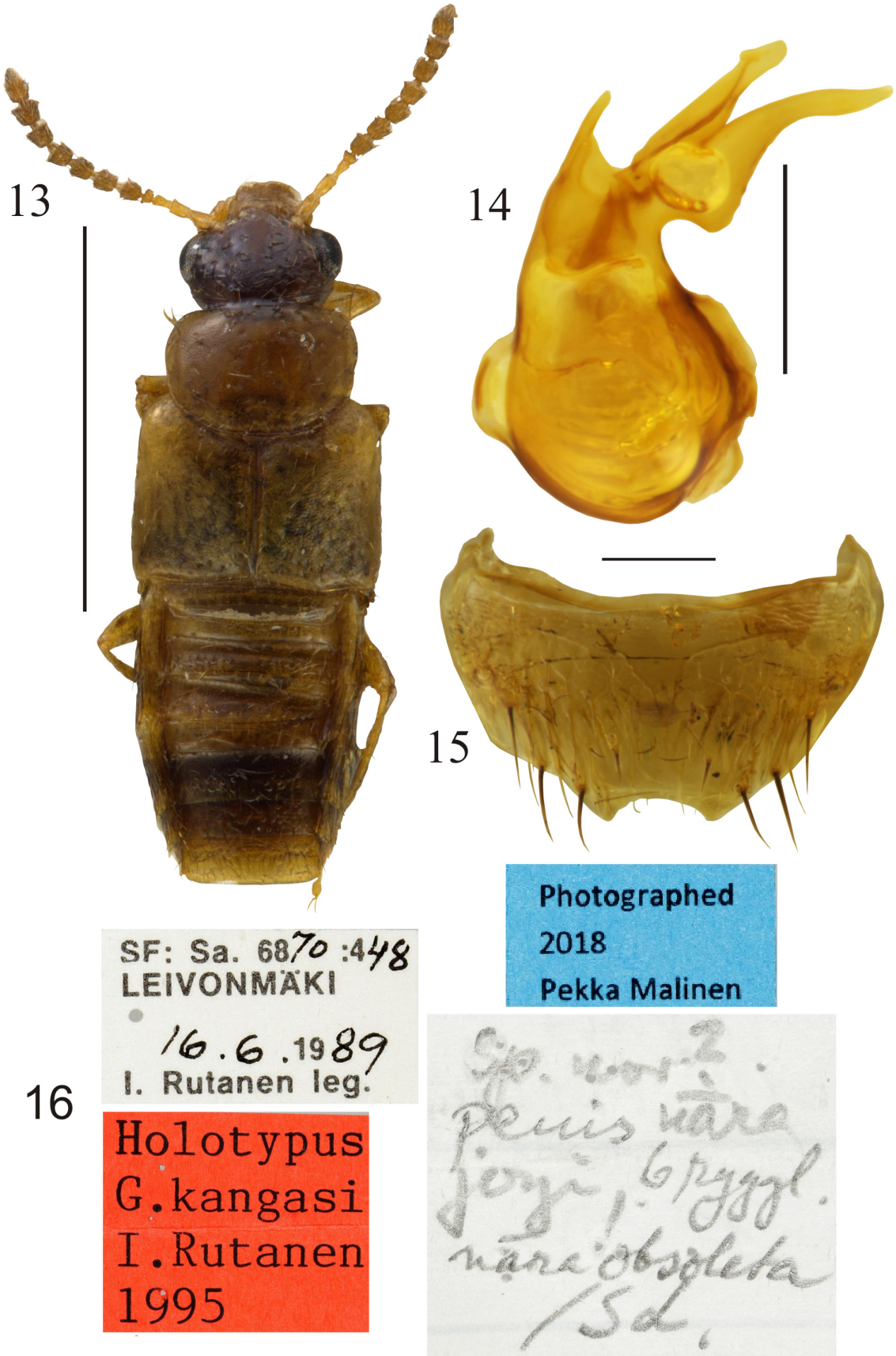
Type material examined: Holotype of *Gyrophaena kangasi* Rutanen 1994, ♂: 'SF: Sa. 6870: 448 | LEIVONMÄKI | 16.6.1989 | I. Rutanen leg.', 'sp. nov. ? | penis nära [near] | *joyi*, 6 ryggl. [tergite] | nära *obsoleta* | /SL [Stig Lundberg]' <handwritten label, in Sweden>, 'Holotypus | *G. kangasi* | I. Rutanen | 1995' <red printed label> (MZHF) (Figs. 13–15). Labels as in Fig. 16.

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: ♂, ♀: Altai, Sarymskaty River, Katon-Karagai, 22.VII.1989, V.A. Kashcheev leg. (ZIN).

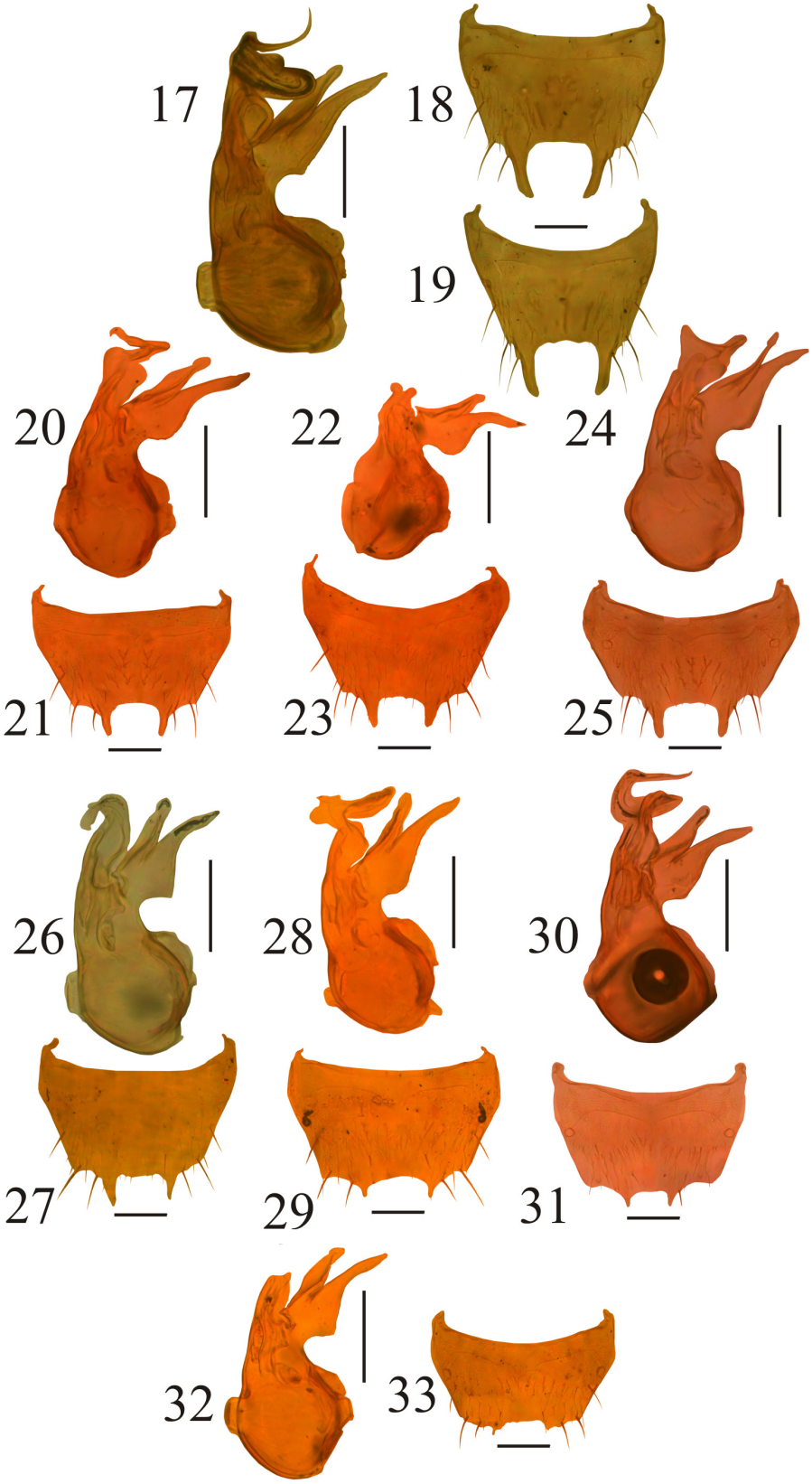
Additional material examined: RUSSIA: **Moscow Area**: Solnechnogorskiy District: 7 ♂♂: environs of Krasnaya Polyana, on *Pluteus atricapillus*, 20.VII.1999, V.B. Semenov leg.; 5 ♂♂ [aberration]: same label; ♂ [aberration]: ibid, 28.VI. 1999, V.B. Semenov leg. / '*Gyrophaena* | *affinis* | генитальные аномалии [genital anomalies] | V.B. Semenov det.' <original rectangular hand written label; initials and surname of collector—printed>; ♂ [aberration]: vicinities of Sheremetjevo, near Nosovo, on mushrooms, 12.VI.1995, V.B. Semenov leg.; Dmitrovskiy District: 2 ♂♂ [aberration]: vicinities of Morozki Station, on Plyporus squamosus (elm), 7.VIII.1999, V.B. Semenov leg. (ZMM); **Maritime Province**: Lazovskiy District: ♀: Lazo, 18.IX.2009, S.A. Shabalin leg. (cIE); MONGOLIA: Selenginskiy Aimak: ♂: vicinities of Delger-Khan somon, *Pinus* forest, 19.VII.1990, E.M. Veselova leg. (cVS); Khentey Aimak: 4 ♂♂, 3 ♀♀: basin of Onon River, left side of Amgalantyn-Gol River, N 43°52'38,4'', E 110°06'19,9'', h=1107m, 13.VIII.2013, I.V. Enushchenko leg. (cIE); USA: 5 ♂♂, ♀: '*Gyrophaena* | *dissimilis* | Erich. | Am.[erica] bor.[ealis]' [green label, handwritten, V.I. Motchulskiy leg.] (ZMM); USA: **Oregon**: ♂, 4 ♀♀: 'OREGON: Silver Falls St. Pk., 6.VII.1956, B. Maklin leg. / C.N.H.M. 1960 Borys Maklin Coleoptera Colln.' (FMNH); **South Dakota**: ♀: 'USA: S.[outh] Dak.[ota], Lawrence Co.[unty], Elmore, Jackass Cilch, Spearfish Conyon, 11.VIII.1981 / FNHD #81–422, squirrel midden edge, u. white mushroom, M. Suter leg.' (FMNH); **Indiana**: 3 m ##, 10 ♀♀: 'Smith Sta.[tion], La Porte Co., IND.[IANA] 25.V.1956 / ex fresh gill fungus / Col. & pres. by D. Kistner' (FMNH); 3 ♂♂: 'Smith, Ind.[iana] V.25.[19]35 fungi / CNHM 1954 Orlando Park General Coleoptera collection' (FMNH); ♂: 'USA: Parke Co. 4 mi W Rockville Hajji Hollow 15–16.VIII.1969 / FMHD #69–168 in flight, late afternoon H.S. Dybas [leg.]' (FMNH); **Ohio**: ♀: 'OHIO: Amer. Lgn. Prk. Marysville, Union Co., sifting, 20.IX.1975, Q.D. Weeber leg.' (FMNH); **Tennessee**: ♂: 'TENNESSEE: Cannon Co., Bradyville, ex mushroom, 1.VI.1965, S. Peck [leg.]' (FMNH); ♀: 'TENN.[ESSI]: 5 mi out of Gatlinburg, Sevier Co., VIII.1948, E.W. Fager leg. / ex mushroom / white gilled' (FMNH); **Georgia**: ♂: 'USA: Ga.[Georgia], Union Co., Brasstown Bald (4300') 8–25.VIII.1965 / FMHD 365–3000, epigean carrion trap, S. & J. Peck' (FMNH).

Taxonomic notes. *Gyrophaena affinis* is the most common Holarctic species of the *affinis* group (Seevers 1952) and distributed in North Africa (Jakobson 1909), Europe (Sahlberg 1876, Joy 1912, Strand 1935, Wüsthoff 1937, Seevers 1952, Likovský 1993, Glotov *et al*. 2011, Enushchenko & Shavrin 2012a), the European parts of Russia and the Caucasus (Nikitskiy *et al*. 1998, Dedyukhin *et al*. 2005, Voitenkova 2009, Goreslavetz 2010, Semenov 2014, Enushchenko & Semenov 2016); Iran (Assing 2011, Enushchenko & Semenov 2016), Turkey (Assing 2013), Siberia (Enushchenko & Shavrin 2011, 2012b), the Russian Far East (Enushchenko & Semenov 2016), Mongolia, North Korea (Paśnik 2001); North America (Seevers 1952, Klimaszewski *et al*. 2009; etc.).

Pace (2005) described *G. ranongensis* based on one male from Thailand ('Ranong prov., Ranong: Hot Springs') and compared it with *G. zhagaensis* Pace 2003 from China. However, based on the structure of aedeagus and the male tergite VIII, *G. zhagaensis* and *G. ranongensis* belong to different species groups (see Pace 2003: 664,



FIGURES 13–16. *Gyrophaena kangasi* Rutanen (Holotype): 13—habitus, dorsal view, 14—aedeagus, lateral view, 15—male abdominal tergite VIII, dorsal view, 16—labels of the holotype. Scale bars: 1 mm (13), 0.1 mm (14, 15).



FIGURES 17–33. Aedeagus (Figs. 17, 20, 22, 24, 26, 28, 30, 32) and abdominal tergite VIII (Figs. 18-19, 21, 23, 25, 27, 29, 31, 33) of *Gyrophaena affinis* Mannerheim (Figs. 17–19, 24–29: Krasnaya Polyana (RUSSIA: Moscow Area), 20–23: Sheremetjevo, 30–31: Morozki, 32, 33 –Nosovo): 17—aedeagus (lateral view), 20, 22, 24, 26, 28, 30, 32—aberrative aedeagus (lateral view), 18, 19—male abdominal tergite VIII (dorsal view), 21, 23, 25, 27, 29, 31, 33—aberrative male abdominal tergite VIII (dorsal view). Scale bars: 0.1 mm.

Figs.76–80 and Pace 2005: 257, Figs. 11–14). As the male genitalia and terminalia of *G. ranongensis* are quite identical to those of *G. affinis*, I consider *G. ranongensis* a junior synonym of *G. affinis*.

Later Pace (2010) described *G. glareicola* Pace, 2010 from southern Shaanxi (China) and compared it with *G. daxuemontis* Pace, 2003 (western Sichuan), which belongs to a different species group (Pace 2003: 642, Figs. 63–66). As the aedeagus and the terminalia of both sexes of *G. glareicola* (Pace 2010: 179, Figs. 114–118) are identical to those of *G. affinis*, I consider it this name a junior synonym of the *G. affinis*.

Among more than 300 males of *G. affinis* from Krasnaya Polyana of the Moscow area, V.B. Semenov found a single aberrant specimen with a reduced dorsal projection of the internal sac of the aedeagus and extremely short lateral teeth on the apical margin of tergite VIII (see Nikitskiy *et al*. 1998: 56, Figs. 1, 2). Similar specimens were described as *G. rosskotheni* Wüsthoff 1937 from Aachen (Germany) and *G. kangasi* Rutanen 1994 (Figs. 13–16) from Finland. The single specimen of *G. rosskotheni* was also recorded from Zhigulevskiy Nature Reserve (Samara Area) by Goreslavetz (2010). Semenov was the first to suggest a possible synonymy of these species with *G. affinis* (Nikitskiy *et al*. 1998). In ZMM I found males of *G. affinis* with varying degrees of reduction of the dorsal projection of the internal sac of the aedeagus, as well as lateral teeth of abdominal tergite VIII with different combinations of these features (Figs. 17–33). Concequently, the following new synonymies are established here: *G. affinis* = *G. rosskotheni* **syn**. **nov**., *G. kangasi* **syn**. **nov**. For illustrations of the aedeagus and the male tergite VIII of this species see Wüsthoff (1937: Figs. 5–7).

Remarks. The species was recorded from Aksu-Dzhabagly Nature Reserve (Tlassky Mountaun Ridge) by Kashcheev & Ishkov (1992, 2001a, 2001b) and from Trans-Ili Alatau Mountain Ridge (SE Kazakhstan) by Kashcheev (2001a).

Gyrophaena aryanamensis Enushchenko, sp. nov.

(Figs. 34–40)

Type material examined: Holotype [The specimen was reglued on a white rectangular plate; a plastic plate with a preparation of the aedeagus, VIII male tergite and sternite in Canada balsam] ♂: '50. ТАДЖИКИСТАН | Шарак, в грибе | 10.V.1969. В. Янушев [50. TAJIKISTAN | Sharak [N 38°42'11.160'', E 70°30'43.920'', h=1625 m], in mushroom | 10.V.1969, V.[V.] Yanushev]' <handwritten label>, 'HOLOTYPE | *Gyrophaena* | *aryanamensis* sp.n. | Enushchenko I.V. | 2019 des.' <red printed label>' (ZMM).

Paratypes: KYRGYZSTAN: 25 ♂♂, 13 ♀♀: 'KYRGYZSTAN, Dzalal- | Abad Area, Chatkalskiy | distr.[ict], Dzhany-Bazar, | 41°40,261' N, | 70°49,053' E, 08.VI.2016, | Palatov D.M. leg.' <white printed labels>, 'PARATYPE | *Gyrophaena* | *aryanamensis* sp.n. | Enushchenko I.V. | 2018 des.' <red printed label>' (ZMM: 4 ♂♂, 2 ♀♀; ZIN: 2 ♂♂, 2 ♀♀; MZHF: 2 ♂♂, ♀♀; NHMW: 2 ♂♂, 2 ♀♀; FMNH: 4 ♂♂, 2 ♀♀; cIE: 13 ♂♂, 5 ♀♀); TAJIKISTAN: **Kuhistoni Badakhshon Area**: 4 ♂♂, 7 ♀♀ [The specimens was reglued on a white rectangular plate; a plastic plate with a preparation of the aedeagus in Canada balsam; labels scanned and printed]: same data as the holotype, 'PARATYPE | *Gyrophaena* | *aryanamensis* sp.n. | Enushchenko I.V. | 2019 des.' <red printed label>' (ZMM: ♂, 2 ♀♀; ZIN: ♂, ♀♀; NHMW: ♂, 2 ♀♀; cIE: 2 ♂♂, 2 ♀♀).

Description. Body somewhat subparallel, yellow-brown to dark-brown; body length 1.86–2.28 mm. Habitus as in Fig. 34. Head dark-brown to black; pronotum slightly paler than head, red-brown to dark-brown; disc of elytra golden-brown with shoulders and posterolateral portions dark-brown to black; abdomen dark-brown or yellow-brown to red-brown except of abdominal segments V–VI dark-brown to black; antennomeres 1–3 yellow-brown, remaining antennomeres darkish-brown; mouthparts brown; legs yellow-brown to red-brown. Body with distinct reticulate microsculpture. Head 1.3 times as wide as long, with distinct reticulate microsculpture and groups of large (about 0.02 mm diam.), distinct punctures in lateroposterior portions of head behind eyes; middle portion impunctate. Antennomeres 1–3 elongate, antennomere 4 trapezoidal to subquadrate, antennomeres 5–10 slightly transverse, 1.5 times as wide as long; apical antennomere elliptic to ovoid, 1.2 times as long as wide. Pronotum with distinctly narrowing anterior angles, 1.5 times as wide as long and 1.35 times as wide as head; microsculpture as that on head, with numerous small (about 0.01 mm diam.) and scattered punctures, not forming longitudinal rows, and two large (0.03 mm diam.) median punctures near base of head; basal portion of pronotum with weakly defined punctation. Elytra about twice as wide as long, 1.3 times as wide as pronotum, with distinct reticulate microsculpture; each elytron with oblique rows of tubercles (distance between each of them 0.01–0.04 mm) stretching from

posterior angles to shoulders; median area without tubercles. Microsculpture of abdomen distinctly weaker than on other parts of body.

Male. Abdominal tergite VII with two round median tubercles and longer, almost parallel, elongated lateral elevations from each sides of median tubercles. Apical margin of abdominal tergite VIII with four teeth rather equal in length: two widely separated, stout and slightly curved inwards lateral teeth and two moderately small, straight medial teeth (Fig. 38); sometimes one of them may be reduced as in Fig. 36. Ventral plate of aedeagus rather short, wide and blunt apically, with somewhat long and curved apical projection; lower edge of ventral plate distinctly angled (Figs. 35, 37); dorsal projection of internal sac approximately as long as ventral plate, bent dorsally, regularly elongate and sharply widening to apex.

Female. Surface of abdominal tergite VII rather flat, with several small round tubercles along apical margin; tergite VIII truncate apically, rather narrowly trapezoid (Fig. 39); sternite VIII rather narrowly rounded, more or less ovoid apically (Fig. 40).

Comparative notes. In the coloration and microsculpture of the body, the general shape of the aedeagus, and the male abdominal tergite VIII, *G. aryanamensis* **sp.nov**. is similar to *G. hochhuthi* Bernhauer 1908 (Figs. 41–49), from which it can be distinguished by the irregular punctation of the pronotum (punctures on the pronotum of *G. hochhuthi* forming longitudinal rows), features of the elytral microsculpture, details of the structure of the aedeagus and the shape of the male abdominal tergite VIII (see the key below). Based on the shapes of the antennomeres, the arrangement of pronotal and elytral punctures and microsculpture, as wel1 as on the structure of the aedeagus and the male tergite VIII, *G. aryanamensis* **sp**. **nov**. belongs to the *laetula* species group, established by Seevers (1951). This Holarctic group contains the North American *G. laetula* Casey 1906 and six Euroasiatic species: *G. congrua*, *G. hanseni* A. Strand 1946, *G. hochhuthi*, *G. minima* Erichson 1837, *G. munsteri* A. Strand 1935 and *G. poweri* Crotch 1865. For illustration of these species see Klimaszewski *et al*. (2009: Figs. 46–52) and Enushchenko & Semenov (2016: Figs. 11–14, 21–24, 40–42, 43–45, 55–57).

Etymology. The name is derived from '*Aryânam Vaeja*' (ancient Iranian '*aryanam*' and Avesta '*airyanam*' (Aryan land)), as ancestors of native Tajiks called their country.

Remark. It was collected in Kyrgyzstan (Dzhany Bazar) in mushrooms together with *G. hochhuthi*.

Key to the *Gyrophaena* species of the *laetula* group of Kazakhstan

1 Pronotum with several small, scattered punctures not forming longitudinal rows and two rather large punctures near base of pronotum. Elytra between cells of microsculpture without micropunctures, but with several distinct tubercles. Medial teeth of male abdominal tergite VIII quite wide and long (Figs. 36, 38). Ventral plate of aedeagus markedly wider and short, distinctly angled near the base, quite blunted apically (Figs. 35, 37) . . . . . *G. aryanamensis* **sp**. **nov**.

- Pronotum with two longitudinal rows of punctures, usually with several additional punctures closer to lateral margins of pronotum. Elytra between cells of microsculpture with sparse, small shallow punctation and few tubercles only on external posterior angles. Median teeth of male abdominal tergite VIII narrower and rather small. Ventral process of aedeagus more elongated, arched, quite acute apically (Figs. 42, 47 and Enushchenko & Semenov (2016: Figs. 12, 13)) 2

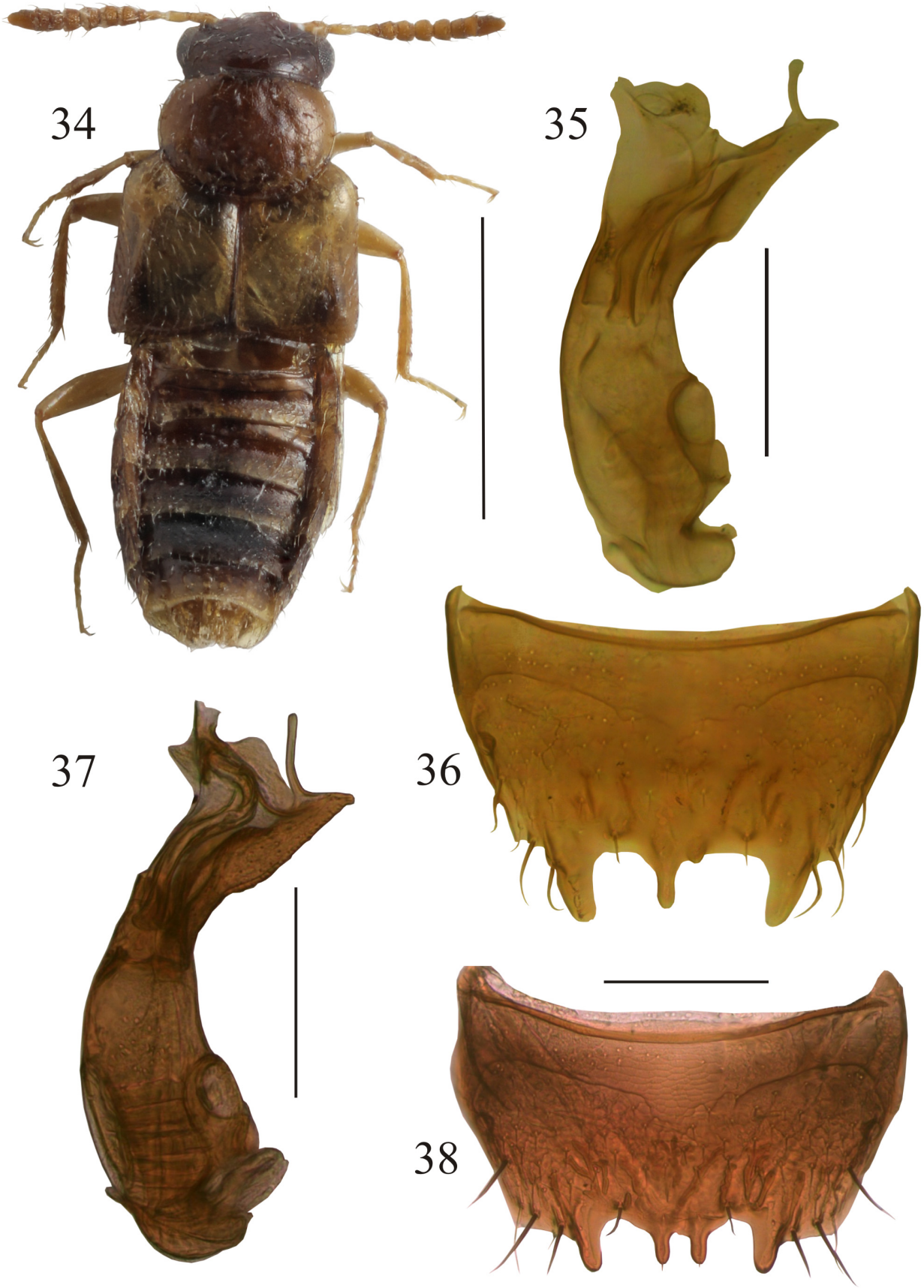
2 Elytra with indistinct, sparse, and small punctation. Median teeth of male abdominal tergite VIII rather thin and small (Figs. 43–44, 48). Lower edge of ventral process of aedeagus somewhat flat; dorsal projection of internal sac irregularly elongate, slightly widening to apex (Figs. 42, 47) . . . . . *G. hochhuthi*

- Punctation of elytra markedly dense. Median teeth of male tergite VIII stout, wide, and obtuse (Enushchenko & Semenov 2016: Figs. 14); lower edge of the ventral plate slightly angular in outline; dorsal projection of internal sac regularly elongate (Enushchenko & Semenov 2016: Figs. 12, 13) . . . . . *G. congrua*

Gyrophaena bihamata Thomson 1867

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 2 ♂♂, 7 ♀♀: Altai, Sarymskaty River, Katon-Karagai, 16.VII.1989, V.A. Kashcheev leg. (ZIN, cIE); ibid: 2 ♂♂, 4 ♀♀: 22.VII.1989, V.A. Kashcheev leg. (ZIN, cIE); ibid: 152 ♂♂, 162 ♀♀: N 49°34′35,8″ E 86°18′46,7″, 25.VIII.2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE); ♂, 2 ♀♀: Chingistai, N 49°11′33″ E 85°57′06,8″, h=896 m, 2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE); Zyryanovskiy District: ♂, 2 ♀♀: Altai, Bukhtarma River, near Dzhambul, 27.VII.1991, V.A. Kashcheev leg. (ZIN); **Alma-Ata Area**: Raiymbekskiy District: ♂: Kungei Alatau, Chilik River basin, vicinities of Kurmetty, № 509, 5.VII.1987, V.A. Kashcheev leg. (ZIN, cIE); 2 ♀♀: ibid, 17.VII.1987, V.A. Kashcheev leg. (ZIN).

Remarks. The species is reported from Middle Asia for the first time.



FIGURES 34–38. *Gyrophaena aryanamensis*, **sp. nov**. (Figs 34: Holotype, TAJIKISTAN, Sharak; 35–38: Paratype, KYRGYZSTAN, Dzhany-Bazar): 34—habitus, dorsal view, 35, 37—aedeagus, lateral view, 36, 38—male abdominal tergite VIII, dorsal view. Scale bars: 1 mm (34), 0.1 mm (35–38).

Gyrophaena congrua Erichson 1837

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: ♂: Narym River, Topkain, 14.VIII.1986, V.A. Kashcheev leg. (ZIN); 112 ♂♂, 127 ♀♀: Katon-Karagai, 49°34′35,8″ E 86°18′46,7″, 25.VIII.2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 90 ♂♂, 94 ♀♀: Chingistai, N 49°11′33″ E 85°57′06,8″, h=896 m, 2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE); Zyryanovskiy District: 10 ♂♂, 13 ♀♀: Altai, Bukhtarma River, near Dzhambul, 27.VII.1991, V.A. Kashcheev leg. (ZIN, cIE).

Remarks. The species is recorded for the fauna of Middle Asia for the first time.

Gyrophaena fasciata (Marsham 1802)

Gyrophaena fasciata: Kashcheev *et al*. 1989: 36; Kashcheev 2001a: 150

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 3 ♀♀: Altai, Sarymskaty River, Katon-Karagai, 16.VII.1989, V.A. Kashcheev leg. (ZIN); 5 ♀♀: ibid, 22.VII.1989, V.A. Kashcheev leg. (ZIN, cIE); Zyryanovskiy District: ♂, 2 ♀♀: Altai, Bukhtarma River, near Dzhambul, 10.VIII.1988, V.A. Kashcheev leg. (ZIN, cIE); 15 ♀♀: ibid, 27.VII.1991, V.A. Kashcheev leg. (ZIN, cIE).

Remarks. *Gyrophaena fasciata* was recorded from the north-western part of Ketmen Mountain Ridge of northern Tian-Shan by Kashcheev *et al*. (1989) and from Trans-Ili Alatau Mountain Ridge by Kashcheev (2001a).

[*Gyrophaena gentilis* Erichson 1839]

Gyrophaena gentilis: Kashcheev *et al*. 1989: 36; Kashcheev 2001a: 150

Remarks. The species was recorded from northern Tian-Shan, Ketmen, and Dzhungar Mountain Ridges (Kashcheev *et al*. 1989), Trans-Ili Alatau (Chon-Kemina, Turganskiy, Zhinishke Canions) and Kungey Alatau (Chilik River; 'about 200 specimens of *G. gentilis* were collected from the single *Russula*') (Kashcheev 2001a). The new material does not confirm the presence of this species in Kazakhstan. It is possible that previous records of this species provided by Kashcheev are based on misidentifications.

Gyrophaena hochhuthi Bernhauer 1908
(Figs. 41–50)

Gyrophaena hochhuthi Bernhauer 1908: 324

Type material examined: Holotype of *Gyrophaena hochhuthi* Bernhauer 1908: ♀: 'Osch' <white printed label>, 'Hochhuthi Brh | Typus.' <white handwritten label>, 'Chicago NHMus | M. Bernhauer | Collection' <white printed label>, 'HOLOTYPE | *Gyrophaena* | *hochhuthi* | Bernhauer. 1908 | S. Glotov des. 2010' <red printed label>, '*Gyrophaena* | *hochhuthi*' <yellow handwritten label>, 'Photographed | Kelsey Keaton 2014 | Emu Catalog' <blue printed label>, 'FMNH|NS | 0000 127 081' <white printed label> (FMNH) (Fig. 49). Labels as in Fig. 50.

Material examined: KAZAKHSTAN: **North Kazakhstan Area**: Alakolskiy District: ♀: Dzhungarian Alatau, Kapal River, 1620 m, 4.VIII.1984, V.A. Kashcheev leg. (ZIN); 2 ♂♂, 4 ♀♀: Dzhungarian Alatau, Koksu River, Rudnichnyi, 30.VII.1984, V.A. Kashcheev leg. (ZIN, cIE); Taiynshinskiy District: 2 ♂♂, 2 ♀♀: Koktal River, Chkalovo, 1.VI.1984, V.A. Kashcheev leg. (ZIN); **East Kazakhstan Area**: Kokpektinskiy District: 13 ♂♂, 6 ♀♀: Pikhtovka River, Kokzhota, 9.VIII.1987, № 538, V.A. Kashcheev leg. (ZIN, ZMM, cIE); **Alma-Ata Area**: Karatalskiy District: ♀: Balkhash, Karatal River, 1.VI.2004, V.A. Kashcheev leg (ZIN); Yeskeldinskiy District: 3 ♂♂, ♀: Dzhungar Alatau, Burkhan-Bulak, 12.VI.2004, V.A. Kashcheev leg. (ZIN, cIE); Talgarskiy District: 4 ♂♂, 4 ♀♀: SE Kazakhstan, Zailiyskiy Alatau Mts., Left Talgar Riv., N 43°06'62''; E 77°09'14'', h=2370 m, 27-29.VIII.2013, Kolov (cIE); ♂, 2 ♀♀: right inflow of Chilik River, 12 km from inflow of Taldy River, 6.VII.1987, № 510, V.A. Kashcheev leg (ZIN, ZMM, cIE); 111 ♂♂, 144 ♀♀: [Kegenskiy distr.] Taldy River, Chilik River, floodplain for-

est, 9.VII.1987, № 510, M. K. Childebayev leg. (ZIN, ZMM, NHMW, FMNH, cIE); 50 ♂♂, 58 ♀♀: Taldy River, floodplain forest, leaf litter, 10.VII.1987, № 514, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 1062 ♂♂, 1390 ♀♀: Kungei-Alatau Mountain Ridge, Kilbastau Gorge, 14.VII.1987, № 521, V.A. Kashcheev leg. (ZIN, ZMM, NHMW, FMNH, cIE); 43 ♂♂, 37 ♀♀: ibid, 15.VII.1987, № 516, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 334 ♂♂, 464 ♀♀: ibid, 17.VII.1987, № 517, V.A. Kashcheev leg. (ZIN, ZMM, cIE); ♂, 2 ♀♀: ibid, window trap, 17.VII.1987, № 522, V.A. Kashcheev leg. (ZIN); 5 ♂♂, ♀: ibid, 28.VIII.1987, V.A. Kashcheev leg. (ZIN, cIE); 3 ♀♀: ibid, 9.VIII.1988, V.A. Kashcheev leg. (ZIN, cIE); Uigurskiy District: 4 ♂♂, 7 ♀♀: Ketmen-Tau, Malyi Kirgisai Gorge, 26.VII.1987, № 528, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 3 ♂♂, 2 ♀♀: ibid, 28.VII.1987, V.A. Kashcheev leg. (ZIN, cIE); 11 ♂♂, 10 ♀♀: ibid, 28.VII.1987, № 529, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 11 ♂♂, 22 ♀♀: Ketmen-Tau, Bolshoi Kirgisai Gorge, 29.VII.1987, V.A. Kashcheev leg. (ZIN, ZMM, FMNH, cIE); 6 ♀♀: ibid, 30.VII.1987, V.A. Kashcheev leg. (ZIN, cIE); 30 ♂♂, 48 ♀♀: ibid, 31.VII.1987, № 533, V.A. Kashcheev leg. (ZIN, ZMM, NHMW, FMNH, cIE); 2 ♂♂, 3 ♀♀: ibid, 13.VII.2009, V.A. Kashcheev leg. (ZIN, cIE); 2 ♂♂, 5 ♀♀: Ketmen-Tau, Temirlik River, 19.VIII.1988, V.A. Kashcheev leg (ZIN, cIE); Raiymbekskiy District: 23 ♂♂, 25 ♀♀: [Kechenskiy District] Kungei-Alatau Mountain Ridge, Saty, Taldy River, 10.VII.1987, № 513, V.A. Kashcheev leg. (ZMM, ZIN, NHMW, FMNH, cIE); ♂ 2 ♀♀: Kungei Alatau, Chilik River, Taldy River, 6.VII.1987, V.A. Kashcheev leg. (ZIN); 3 ♂♂, 13 ♀♀: [Kechenskiy District] floodplain of Chilik River, behind Saty, 9.VII.1987, № 511, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 2 ♂♂, ♀: Kungei-Alatau Mountain Ridge, Kurmetty, floodplain forest, leaf litter, 12.VII.1987, № 514, V.A. Kashcheev leg. (ZIN); 100 ♂♂, 79 ♀♀: Chilik River basin, Kurmetty, 5.VII.1987, № 509, V.A. Kashcheev leg. (ZMM, ZIN, NHMW, FMNH, cIE); 72 ♂♂, 79 ♀♀: Kungei-Alatau Mountain Ridge, Kurmetty Gorge, spruce belt, h=2400 m, 9.VII.1987, № 511, V.A. Kashcheev leg. (ZIN, ZMM, NHMW, FMNH, cIE); 21 ♂♂, 64 ♀♀: NW Tian-Shan, Trans-Ili Alatau, mixed forest belt, 8.VI.1986, № 499, M. K. Childebayev leg. (ZIN, ZMM, NHMW, FMNH, cIE); KYRGYZSTAN: **Talas Area**: Talasskiy District: 8 ♂♂, 5 ♀♀: valley of Oshibulag River (right inflow of Chychkan River), vicinities of Oshibulag, 42°05,765’ N; 72°48,192’ E, H=1629 m, 2.VI.2016, D.M. Palatov leg. (cIE, ZMM, ZIN); **Dzhalal-Abad Area**: Chatkalskiy District: 672 ♂♂, 838 ♀♀: Dzhany-Bazar, 41°40,262’ N; 70°49,053’ E, 8.VI.2016, D.M. Palatov leg. (cIE, ZMM, ZIN); Suzakskiy District: 14 ♂♂, 9 ♀♀: Kara-Alma River basin, inflow Kugartsu, Ferg.[anskiy Mountain Ridge], 6.V.[19]25, Dobrzhansk[iy leg.] (ZIN, ZMM); **Issyk-Kul Area**: Dzhen-Aguzskiy District: 3 ♂♂: Terskei-Alatau Ridge, gorge of Chon-Kyzyl-Su River, 2450 m, 27.VIII.1988, V.V. Yanushev leg. (ZMM).

Addition material examined: CHINA: **Sintszyan-Uigursky Autonomous Region**: Chantszi-Khueyskiy Autonomous District: 37 ♂♂, 33 ♀♀: Bogdo-Ula Mountain Ridge, Daong River, *Picea tianschanica* forest, 43°51’22.88”N, 88°09’39.58”E, on *Lactarius* sp., 08.07.2017, D.M. Palatov leg. (ZIN, cIE).

Redescription. Body red-brown to dark-brown; body length 1.50–2.30 mm. Habitus as in Figs. 41, 49. Head and antennomeres 4-11 dark-brown; pronotum slightly paler than head, red-brown; disc of elytra golden-brown, with posterolateral angles dark-brown; abdomen red-brown except of segments V–VI dark-brown; antennomeres 1-3 yellow-brown; mouthparts brown; legs yellow-brown to red-brown. Body with distinct reticulate microsculpture. Head 1,4 times as wide as long, with distinct reticulate microsculpture and more than 8 rather large (about 0,01 mm diam.), distinct punctures forming rows behind eyes; median portion of head impunctate. Antennomeres 1–3 elongate, antennomere 4 subquadrate to slightly elongate, antennomeres 5–10 subequal in length, subquadrate to slightly transverse; apical antennomere conical, 1.4 times as long as wide. Pronotum somewhat flat, 1.4 times as wide as long and 1.3 times as wide as head; microsculpture as that on head, with two median rows consisting of small, irregular punctures and with similar punctures on sides of each row near margins of pronotum; median portion impunctate; basal portion with slightly defined punctation. Elytra 1.6 times as wide as long and 1.4 times as wide as pronotum, with distinct reticulate microsculpture; each elytron with indistinct, sparse, small punctation and few weakly defined tubercles on posterior angles. Abdomen wedge-shaped, with microsculpture as that on head and pronotum.

Male. Abdominal tergite VII with two elliptic median tubercles obliquely turned towards each other, and with two pairs of longer lateral elevations from each of median tubercle. Apical margin of abdominal tergite VIII with four teeth: two widely separated, moderately wide and markedly elongate, slightly curved toward rounded apices and two very short and narrow medial teeth (Figs. 43–44, 48). Ventral plate of aedeagus narrowly elongate, arc-shaped (if see laterally), ventral margin even in outline (without bulging on the middle part and not angled bent near the base), acute apically (lower edge of the ventral plate even); apical projection short (Figs. 42, 47); dorsal projection of internal sac equal to ventral plate, inclined to it, twisted into narrow tube, rather regularly elongate in shape.

Female. Surface of abdominal tergite VII somewhat flat, with a number of small round tubercles on apical margin; tergite VIII widely trapezoid, truncate apically (Fig. 45); sternite VIII rounded apically, blunt-pointed (Fig. 46).

Comparative notes. Based on the punctation, microsculpture, and coloration of the body, *G. hochhuthi* is similar to *G. congrua*, which is distributed in Europe, the European part of Russia, Caucasus, Siberia and the Russian Far East (Schülke & Smetana 2015). It can be distinguished by the shape of middle teeth on the apical margin of male abdominal tergite VIII (these teeth are significantly longer in *G. congrua*), and the morphology of the aedeagus (lower margin of the ventral process of *G. congrua* slightly angled; dorsal projection of the internal sac of the aedeagus narrowly elongate and sinuate).

Remarks. Bernhauer (1908) described *G. hochhuthi* (Figs. 49–50) based on the single female from Margilan, south-eastern part of Fergana Valley (Uzbekistan). It is noteworthy that the author compared this species with *G. fasciata*, which I interpret as *G. congrua*, because these species (*G. fasciata* and *G. congrua*), as well as *G. laevipennis* Kraatz 1856 were confused with each other in nineteenth and twentieth centuries (Bruge 2005, Enushchenko & Semenov 2016).

Among large series of *G. hochhuthi* from Kazakhstan and Kyrgyzstan, I found several specimens that are slightly different from other specimens in the shape of aedeagus and the male abdominal tergite VIII (Figs. 47–48). Lateral teeth on apical margin of its abdominal tergite VIII rather long, thin and weak, slightly acute and curved inwards (medial teeth of abdominal tergite VIII of *G. hochhuthi* often shorter, rather stout and obtuse); median teeth short, blunt and weak as that in *G. hochhuthi*. Ventral plate of aedeagus narrowly elongate, with distinct convex ventral margin, acute apically; apical projection rather long and curved, blunt; dorsal projection of the internal sac equal to the ventral plate, inclined to it, twisted into a rather wide tube, slightly broadened apically, irregularly elongate in the shape. Based on the characters of the body, it corresponds with other studied specimens of *G. hochhuthi*. I suppose, that is an example of aberrant variability of this species.

Gyrophaena joyi Wendeler 1924

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 2 ♀♀: Altai, Sarymsakty River, Katon-Karagai, 16.VII.1989, V.A. Kashcheev leg. (ZIN); ♂: ibid, 22.VII.1989, V.A. Kashcheev leg. (ZIN); **Pavlodar Area**: Pavlodarskiy District: ♂: Ural River, Bogatskoye, 16.X.1980, V.A. Kashcheev leg. (ZIN).

Remarks. The species is recorded from Kazakhstan and Middle Asia for the first time.

Gyrophaena manca Erichson 1839

Gyrophaena angustata: Kashcheev *et al*. 1989: 36; Kashcheev 2001a: 150

Material examined: KAZAKHSTAN: **Alma-Ata Area**: Raiymbekskiy District: 7 ♂♂, 8 ♀♀: Chilik River, Taldy River, 6.VII.1987, V.A. Kashcheev leg. (ZIN); 30 ♂♂, 18 ♀♀: Kungei-Alatau Mountain Ridge, [Kechenskiy District] Saty, Taldy River, 10.VII.1987, № 513, V.A. Kashcheev leg. (ZIN, ZMM, cIE).

Remarks. This species was recorded from northern Tian-Shan by Kashcheev *et al*. (1989) and Trans-Ili Alatau (without citing of exact localities) by Kashcheev (2001a).

[*Gyrophaena* (*Gyrophaena*) *nitidula* (Gyllenhal 1810)]

Gyrophaena nitidula: Kashcheev *et al*. 1989: 36; Kashcheev 2001a: 150; Kashcheev & Ishkov 2001a: 101, 2001b: 123

Remarks. This species was recorded from south-eastern Kazakhstan, northern Tian-Shan, Ketmen, and Dzhungarian mountain ridges by Kashcheev *et al*. (1989), Trans-Ili Alatau (Chon-Kemina, Turganskiy, Zhinishke Canions) and Kungey Alatau (Chilik River) by Kashcheev (2001a), and Aksu-Dzhabagly Nature Reserve by Kashcheev & Ishkov (2001a, 2001b). These records are based on misidentification. *Gyrophaena nitidula* is a common European species. Examined records of *G. nitidula* from Siberia belong to *E. angusticollis* (see above and Enuschenko &

Shavrin 2011). It is possible that *G. nitidula* was confused with the closely related *G. pseudonitidula* Semenov, 2015, which is widely distributed from the European part of Russia (Chuvash Republic) to the Russian Far East (Semenov *et al*. 2015).

Gyrophaena obsoleta Ganglbauer 1895

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 15 ♂♂, 3 ♀♀: Katon-Karagai, N 49°34'35,8'' E 86°18'46,7'', 25.VII.2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE); 12 ♂♂, 3 ♀♀: Chingistai, N 49°11'33,0'' E 85°57'06,0'', h=896 m, 2010, V.A. Kashcheev leg. (ZIN, ZMM, cIE).

Remarks. This species is recorded from Middle Asia and Kazakhstan for the first time.

Gyrophaena pseudonana A. Strand 1939

Gyrophaena pseudonana: Kashcheev *et al*. 1989: 36; Kashcheev 2001a: 150 [cited with misprints]

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: ♀: Altai, Sarymsakty River, Katon-Karagai, 16.VII.1989, V.A. Kashcheev leg. (ZIN); ♂: Chingistai, N 49°11'33,0'' E 85°57'06,0'', h=896 m, 2010, V.A. Kashcheev leg. (ZIN); ♀: Bukhtarma River, near Dzhambul, 10.VIII.1988, V.A. Kashcheev leg. (ZIN); ♂: ibid, 27.VII.1991, V.A. Kashcheev leg. (ZIN); ALMA-ATA AREA: Raiymbekskiy District: ♀: [Kechenskiy District] floodplain of Chilik River, behind Saty, 9.VII.1987, № 511, V.A. Kashcheev leg. (ZIN); Uigurskiy District: 8 ♂♂, 3 ♀♀: Ketmen-Tau, Bolshoi Kirgisai Gorge, 7.IX.1987, № 560, V.A. Kashcheev leg. (ZIN, ZMM, cIE); Beskaragaiskiy District: 4 ♂♂, 9 ♀♀: Mashan Mts., 49,06° N; 78,36° E, h=900 m, 22.VI.2013, V.K. Zinchenko leg. (SZMN, cIE).

Remarks. *Gyrophaena pseudonana* was recorded from northern Tian-Shan and Dzhungarian Alatau by Kashcheev *et al*. (1989) and from Trans-Ili Alatau by Kashcheev (2001a).

Gyrophaena (*Phaenogyra*) *strictula* Erichson 1839

Material examined: KAZAKHSTAN: **East Kazakhstan Area**: Katon-Karagaiskiy District: 6 ♀♀: Sarymsakty River, Katon-Karagai, 22.VII.1989, V.A. Kashcheev leg. (ZIN, cIE).

Remarks. This species is recorded from Middle Asia for the first time.

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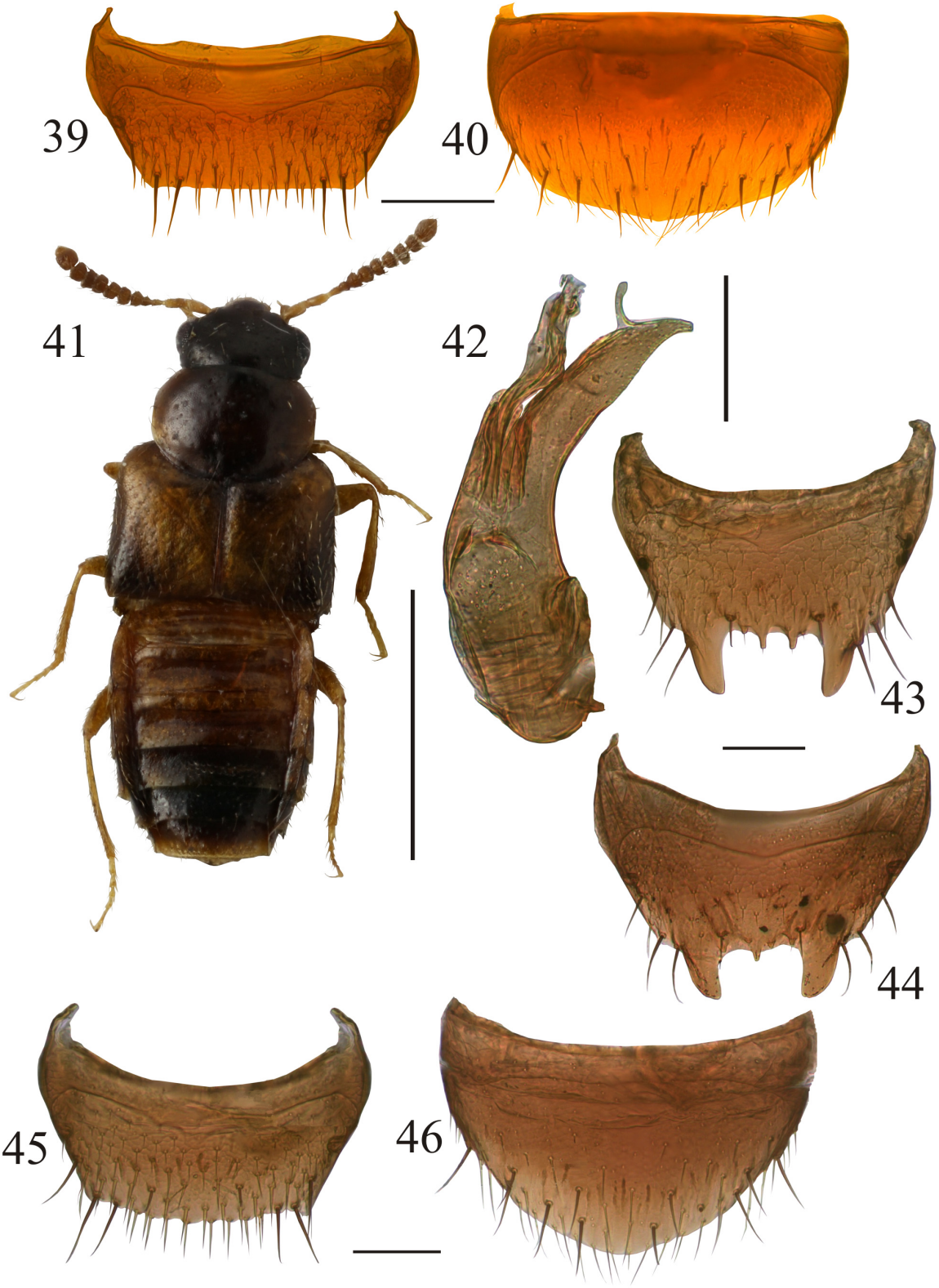
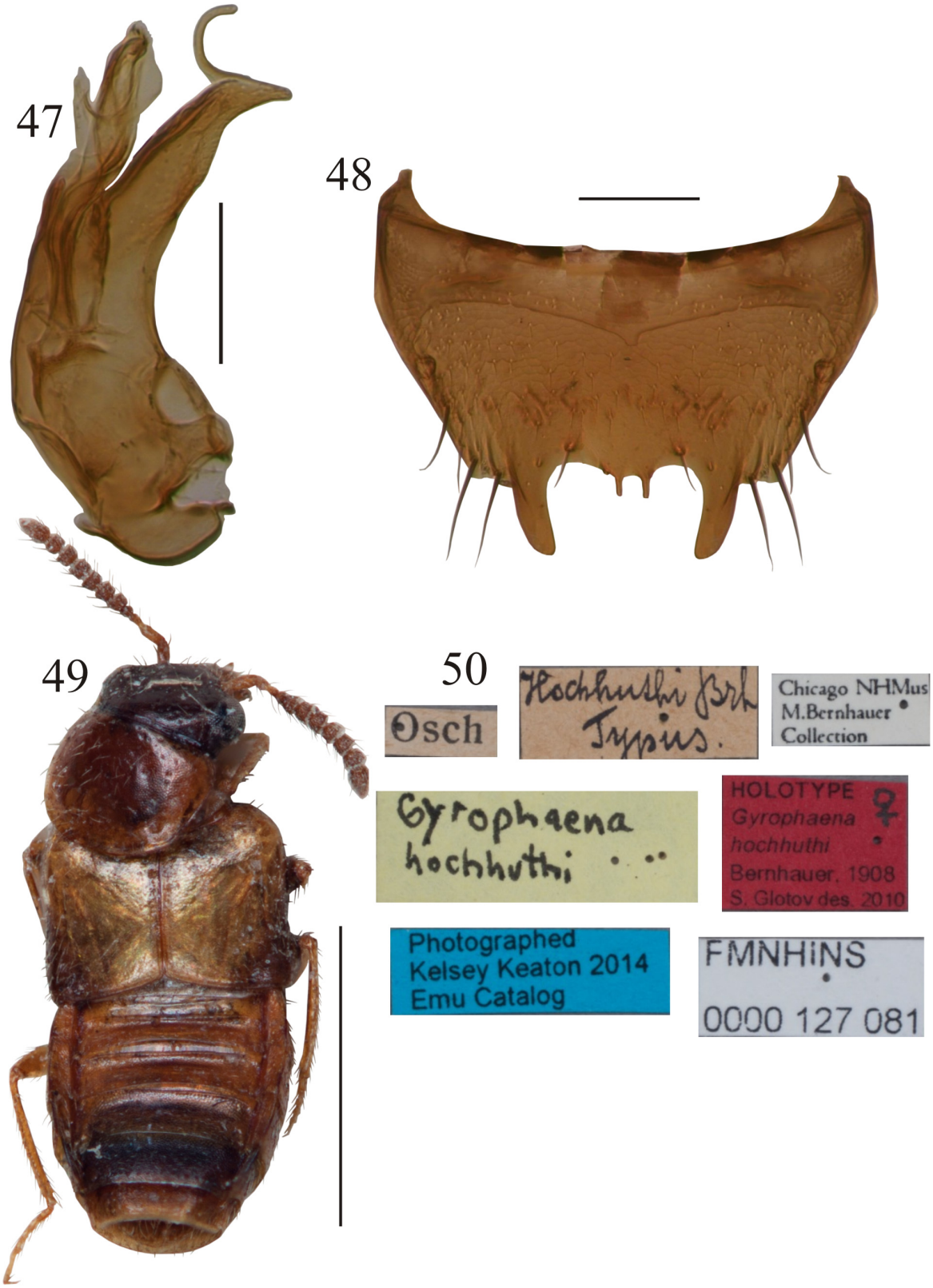


FIGURES 39–46. *Gyrophaena aryanamensis*, **sp. nov**. (Figs. 39, 40: KYRGYZSTAN, Dzhany-Bazar) and *Gyrophaena hochhuthi* Bernhauer (Figs. 41–46: KYRGYZSTAN, Dzhany-Bazar): 41—habitus, dorsal view, 42—aedeagus, lateral view, 43, 44—male abdominal tergite VIII, dorsal view, 39, 45—female abdominal tergite VIII, dorsal view, 40, 46—female abdominal sternite VIII, dorsal view. Scale bars: 1 mm (41), 0.1 mm (39, 40, 42–46).



FIGURES 47–50. *Gyrophaena hochhuthi* Bernhauer: 47—aedeagus, lateral view, 48—male abdominal tergite VIII, dorsal view (Figs. 47, 48: *G. hochhuthi*, KYRGYZSTAN, Terskei-Alatau), 49—habitus of holotype, dorsal view, 50—labels of holotype. Scale bars: 1 mm (49), 0.1 mm (47, 48, 50).

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