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New species and records of *Quedius* rove beetles (Coleoptera, Staphylinidae, Staphylininae) from Middle Asia

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Abstract. This paper is devoted to the fauna of *Quedius* Stephens, 1829 of Middle Asia. It provides descriptions of two species new to science *Quedius* (*Distichalius*) *gissaricus* sp. nov. from Tajikistan and *Q. (Raphirus)* *viator* sp. nov. from Kyrgyzstan. Two more species are reported as potentially new to science, but not formally described: *Q. (Microsaurus)* sp. from the *mutilatus* group from Tarbagatay Mountains because it is known only from damaged specimens; *Q. (Distichalius)* sp. aff. *gissaricus*, known from a single male found sympatrically with *Q. (D.) gissaricus* sp. nov., remains undescribed because of the possibility of teratology. Earlier records of *Q. umbrinus* from Middle Asia are considered doubtful or assigned to *Q. pseudoumbrinus*. Taxonomic notes on the identity of that species as well as *Q. cohaesus* and *Q. fulvicollis* in Middle Asia are provided. Among new distribution records summarized for several species, *Q. (Velleius)* *dilatatus*, *Q. (Microsaurus)* *tenellus* and *Q. (Raphirus)* *jenisseensis* are recorded from the territory of Middle Asia for the first time.

Keywords. Quediini, *Distichalius*, *Microsaurus*, *Raphirus*, *Velleius*.

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Introduction

Three years ago, we published a revision of the poorly known fauna of *Quedius* Stephens, 1829 of Middle Asia (Salnitska & Solodovnikov 2018a). Back then, in the material from the Zoological Institute in St Petersburg (ZIN), which was one of the main data providers for our revision, we studied some specimens collected by the recently deceased colleague Vitaliy Alexandrovich Kastcheev (1953–2012). V.A. Kastcheev was a well-known entomologist from Kazakhstan who collected extensive material of Staphylinidae Latreille, 1802 from Middle Asia, authored about 130 scientific publications and described

43 species new to science. The main part of his collection of Staphylinidae was acquired by ZIN and made available to us for study after the publication of our revision. Our study of that collection, supplemented by several specimens from the general collection of ZIN and the private collection of Alexander Ryvkin (Moscow) resulted in this paper.

The newly examined material revealed four new species, all represented by singletons requiring additional material to learn more about these species. Nevertheless, we decided to describe two of them, *Q. gissaricus* sp. nov. and *Q. viator* sp. nov., because both are distinctive new species.

Apart from the new species, this paper takes into account our recent molecular-based study of the *Q. umbrinus* complex (Salnitska & Solodovnikov 2021) and provides new distributional records for a number of species in Middle Asia as well as records of some widespread species from Middle Asia for the first time. A few of the new distributional records that provide notable range expansions or are of other significant novelty are included with our respective comments. Finally, the newly examined material provided additional records for species of the subgenus *Quedius* s. str.: for *Q. altaicus* Korge, 1962 and *Q. fuliginosus* (Gravenhorst, 1802) which were previously known from Middle Asia (Salnitska & Solodovnikov 2018a); and for *Q. balticus* Korge, 1960 recorded for the first time in this region. All these records are provided in detail in the revision of this subgenus (Hansen *et al.* 2022 in press).

Material and methods

This paper is based on material from the Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia (ZIN) and the private collection of Alexander Ryvkin, Moscow, Russia (cRyv). The holotypes of the two new species are deposited at ZIN.

Specimens were examined with Lomo MSP-2 ver. 2 and MBS-2 dissecting scopes. Measurements were taken at 4× magnification using an ocular micrometer and are given in mm.

Abbreviations are as follows:

- EL = length of elytra (from humerus to the most distal part of the posterior margin)
- EW = width of elytra (maximum, with elytra closed along suture)
- FB = forebody (from base of labrum to the most distal part of posterior margin of elytra)
- HL = head length (from base of labrum to neck constriction along the head midline)
- HW = head width (maximum, including eyes)
- PL = pronotum length (along midline)
- PW = pronotum width (maximum)
- TL = total length of the body (from base of labrum to apex of abdomen, with extended abdomen)

Photographs of the habitus and genitalia were obtained with the following equipment: Canon EOS 5D Mark IV camera, Canon MP-E 65 mm lens, CANON Macro Twin Lite MT-26EX-RT flash and Cognisys StackShot 3X rail macro photo tripod. They were edited in Photoshop CS5. Illustrations of the aedeagi were made with Adobe Illustrator CS5.1 based on the photos taken from soft preparations of these structures in glycerine after dissecting, maceration in 10% KOH, and rinsing in distilled water. All dissected aedeagi are retained in glycerine in genitalia microvials pinned under their respective specimens.

All labels of the type specimens are cited verbatim in the ‘Material examined’ sections.

The distribution map in Fig. 2 was prepared using QGIS 2.12.0 free software by schematic free hand generalization of the species group distributions based on literature and by plotting geographic coordinates for the new species.

Results

New distribution records

Class Insecta Linnaeus, 1758
Order Coleoptera Linnaeus, 1758
Family Staphylinidae Latreille, 1802
Subfamily Staphylininae Latreille, 1802
Tribe Quediini Kraatz, 1857
Genus *Quedius* Stephens, 1829

Quedius (Microsaurus) capitalis Eppelsheim, 1892

Material examined

KAZAKHSTAN • 1 ♂, 1 ♀; Karatau Mts, Byzhi River, Rynagus stream; 24 Jul. 2010; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 2 ♀♀; Karatau Mts, Khantagi River, rangers hut; 21 Jul. 2010; V.A. Kastcheev leg.; ZIN.

Quedius (Microsaurus) fusicornis Luze, 1904

Material examined

KAZAKHSTAN • 2 ♂♂; Karatau Mts, Byzhi River, Rynagus stream; 24 Jul. 2010; V.A. Kastcheev leg.; ZIN • 6 ♂♂, 3 ♀♀; Kyrgyz-Alatau Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; ZIN.

Quedius (Microsaurus) koltzei Eppelsheim, 1887

Material examined

KAZAKHSTAN • 1 ♂; Karatau Mts, Byzhi River, Rynagus stream; 24 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Kyrgyz-Alatau Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; ZIN.

Quedius (Microsaurus) ochripennis Ménetries, 1832

Material examined

KAZAKHSTAN • 2 ♂♂, 1 ♀; Kyrgyz-Alatau Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; ZIN • 3 ♂♂, 1 ♀; Karatau Mts, Byzhi River, Rynagus stream; 24 Jul. 2010; V.A. Kastcheev leg.; ZIN • 2 ♂♂; Aksu-Djabagly, Djabagly River, Kshi-Kaindy; 20 May 1997; V.A. Kastcheev leg.; ZIN • 4 ♂♂, 2 ♀♀; Zailijskij Alatau [Trans-Ili Alatau], Krasnogorka [Sulutor]; 28 Jul. 2010; V.A. Kastcheev leg.; ZIN.

KYRGYZSTAN • 1 ♀; near Belovodskoe; 21 Jun. 2983; ZIN • 1 ♀; N slope of “Kyrgyz” ridge, Ala Archa; 900 m a.s.l.; 1 Jun. 1997; M. Rubtsova leg.; ZIN.

TURKMENISTAN • 9 ♂♂, 5 ♀♀; Tedzhen, Teze-El; 17 Jun. 1986; V.A. Kastcheev leg.; ZIN.

Quedius (Microsaurus) puncticollis Thomson, 1867

Material examined

UZBEKISTAN • 3 ♂♂; W part of Hisaar Mts, Yakkabag, Kyzyl-Suu River valley; 2500 m a.s.l.; 17 Jun. 1994; V.A. Gromenko leg. ZIN.

Quedius (Microsaurus) tenellus (Gravenhorst, 1806)

Material examined

KAZAKHSTAN • 1 ♂; Altai, Bukhtarma River, Uryl-Chingistai; 13 Jun. 1987; V.A. Kastcheev leg.; ZIN.

Remarks

This first record of *Q. tenellus* from Middle Asia is not unexpected because it had already been recorded from Altai Mountains in Russia (Salnitska & Solodovnikov 2019) and Mongolia (Smetana 1976).

Quedius (Raphirus) cohaesus Eppelsheim, 1888

Material examined

KAZAKHSTAN • 3 ♂♂, 3 ♀♀; Altai, Burkhat, Tautekeli, Karakoba River; 11–27 Aug. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Saur Mt. Ridge, Uidene River; 1600–1800 m a.s.l.; 15 Jun. 2011; V.A. Kastcheev leg.; ZIN • 1 ♂; Bajankol River, near Karatogan Village; 15 Sep. 1988; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 2 ♀♀; Ile Mts, Batan River, Chin-Turgen; 26 Jun. 1988; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 1 ♀; Kungey-Alatoo, Kul’bastau, pass; 16 Jun. 1987; V.A. Kastcheev leg.; ZIN • 2 ♂♂; Chylik River, Sarybastau; 15 Jun. 1988; V.A. Kastcheev leg.; ZIN • 2 ♂♂; Ketmen Mts, Tuyuk River; 19 Sep. 1988; V.A. Kastcheev leg.; ZIN • 1 ♂; Ketmen Mts, Bolshoi Kyrgisai; 10 Jun. 1998; V.A. Kastcheev leg.; ZIN.

KYRGYZSTAN • 2 ♂♂, 4 ♀♀; environs of Tuyup Village, 4th farm; 1600–1900 m a.s.l.; S.V. Saluk leg.; fir leafletter; cRyv.

Remarks

In our revision (Salnitska & Solodovnikov 2018a), we considered *Q. cohaesus* and *Q. pseudonigriceps* Reitter, 1909 as separate species distinguished by a subtle, hard to express, difference in the aedeagus and by the fact that in Middle Asia *Q. cohaesus* has the apical seam of the palisade fringe on tergite VII and normally developed elytra, while *Q. pseudonigriceps* was brachypterous and without the palisade fringe. Our concept implied that *Q. pseudonigriceps* is a species widely distributed in southern Europe and the south-western part of Asia, brachypterous in Middle Asia. For *Q. cohaesus* it implied that it was a fully winged species distributed only in the Middle East and Middle Asia: Iran, Turkmenistan, Tajikistan and Afghanistan. Assing (2019) synonymized *Q. pseudonigriceps* with *Q. cohaesus* because he (1) considered the concept of a macropterous species (*Q. cohaesus*) replacing the macropterous form of another, wing dimorphic and very similar species (*Q. pseudonigriceps*) implausible; and (2) he did not find in his large collection the discrete differences between the two species mentioned in Salnitska & Solodovnikov (2018a). Thus, Assing (2019) assumed that *Q. cohaesus* is distributed both west and east of the Caspian Sea where it is wing-dimorphic in Middle Asia and wing-monomorphic everywhere else. Here, we follow Assing (2019) since we agree that it may be impossible to distinguish the two ‘species’ using the structure of the aedeagus, and that *Q. cohaesus* (= *Q. pseudonigriceps*) could be wing-dimorphic. However, the case needs further investigation with more data and a molecular approach. It is worth mentioning that in the new material from southern Kazakhstan and northern Kyrgyzstan reported here, there are only wingless specimens that we would have formerly identified as *Q. pseudonigriceps* and that Assing (2019) would identify as the wingless form of *Q. cohaesus* (= *Q. pseudonigriceps*).

Quedius (Raphirus) fulvicollis Stephens, 1833

Material examined

KAZAKHSTAN • 6 ♂♂, 11 ♀♀; Saur Range, Uidene River; 1600–1800 m a.s.l.; 15 Jul. 2011; V.A. Kastcheev leg.; ZIN.

KYRGYZSTAN • 1 ♂; Ala-Archa, Kashkasu; 29 Sep. 2001; S. Ovchinnikov leg.; ZIN.

Remarks

In Middle Asia, *Q. fulvicollis* was hitherto known only from a male specimen from the Chatkal Mountain Range in Uzbekistan (Salnitska & Solodovnikov 2018a). The identification of this specimen was tentative due to the form of its paramere (with very narrow middle portion and shorter and more irregular rows of peg setae), which was somewhat different from other *Q. fulvicollis*. Also, the locality of that specimen was rather remote from the main distribution area of the species. Based on the material examined here, we provide new records of *Q. fulvicollis* from Kazakhstan and Kyrgyzstan. All examined specimens can be identified as *Q. fulvicollis* based on the structure of the aedeagus. Apparently, *Q. fulvicollis* is a boreo-montane species confined to the northern part of the Holarctic and to the mountains in the south. Nevertheless, considering the slightly different shape of the paramere in the mentioned specimen from Uzbekistan and the isolated records of *Q. fulvicollis* from Middle Asia with respect to the main broad latitudinal range of this species, this case needs a more thorough molecular study.

Quedius (Raphirus) hauseri Bernhauer, 1918

Material examined

KAZAKHSTAN • 1 ♂, 1 ♀; Syrdaria River, Chardara; 18 Jun. 1983; V.A. Kastcheev; ZIN • 1 ♂, 3 ♀♀; Kumkent, Kyzylkol' Lake; 2 Jun. 1983; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Karatau Mts, Byzhi River, Rynagus stream; 25 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Karatau Mts, Babaisu River; 20 Jul. 1983; V.A. Kastcheev leg.; ZIN • 1 ♂; Karatau Mts, Byilikol Lake, sub mountains; 11 Jul. 2010; V.A. Kastcheev leg.; ZIN • 2 ♀♀; near Dzhambul, Talas River; 10 Aug. 1989; V.A. Kastcheev leg.; ZIN • 1 ♂; Kyrgyz-Alatau Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Aksu-Dzhabagly, Taldy-Bulak River; 20 Jun. 2001; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 3 ♀♀; Aksu-Dzhabagly, Dzhabagly River, Kshi-Kaindy; 22 Jun. 1985; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; same locality as for preceding; 20 May 1987; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 8 ♀♀; Aksu-Djabagly, Ulken-Kaindy; 15 Jun. 1991; V.A. Kastcheev leg.; ZIN • 5 ♂♂, 1 ♀; Dzhungarskiy Alatau, Keskenterek River; 23 Aug. 1987; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 2 ♀♀; same locality as for preceding; 25 Aug. 1988; V.A. Kastcheev leg.; ZIN • 3 ♀♀; Dzhungar Mts, Oisaz Chizhe River; 19 Aug. 1987; V.A. Kastcheev leg.; ZIN • 1 ♀; Dzhungar, Kokjota Mts, Pikhtovka; 9–13 Aug. 1987; V.A. Kastcheev leg.; ZIN • 1 ♀; Dzhungar Mts, Usek River; 10 Jul. 2005; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 3 ♀♀; Kungey-Alatau Mts, Kulbastau River; 22 Jul. 1988; V.A. Kastcheev leg.; ZIN • 1 ♂; same locality as for preceding; 16 Jul. 1987; V.A. Kastcheev leg.; ZIN • 1 ♀; Ketmen Mts, Dolayty River; 15 Jul. 1988; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Ketmen Mts, Tuyuk River; 19 Aug. 1988; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Karzhantau Mts, Kyrykkuz; V.A. Kastcheev leg.; ZIN.

TURKMENISTAN • 1 ♂, 2 ♀♀; Kukhtin Pass; 26 Jul. 1892; Glasunov leg.; ZIN.

KYRGYZSTAN • 1 ♂; Terskey-Alatau Mts, Chon- Kyzyl-Suu River; 2500 m a.s.l.; 28 Jun. 1959; V.A. Zaslavsky leg.; ZIN.

TAJIKISTAN • 1 ♂; Zeravshan Mt. Ridge, Chap-Dara River valley; 22–26 Jun. 1983; S.K. Alekseev leg.; ZIN • 1 ♂; Gisaar Mt. Ridge, Es valley; 2000 m a.s.l.; 11–15 Jun. 1983; S.K. Alekseev leg.; cRyv.

Remarks

Quedius hauseri is widely distributed in Middle Asia, where it is known from southern Kazakhstan, through Uzbekistan and Kyrgyzstan, to southern Tajikistan (Salnitska & Solodovnikov 2018a). The newly examined material provides the first record of *Q. hauseri* from Turkmenistan.

Quedius (Raphirus) imitator Luze, 1904

Material examined

KAZAKHSTAN • 1 ♂, 2 ♀♀; Altai Mts, Ulanka River, Ulanskoe; 18 Aug. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Ile Mts, Krasnogorka [Sulutor]; 28 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Kumkent, Kyzykol' Lake; 2 Jun. 1983; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 7 ♀♀; Karatau Mts, Byzhi River, Rynagus stream; 25 Jul. 2010; V.A. Kastcheev leg.; ZIN • 3 ♂♂, 3 ♀♀; Karatau Mts, Byilikol Lake; 11 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂, 3 ♀♀; Karatau Mts, Ashchysai; 19 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Karatau Mts, “Boroldai x Kashrata”; 16 Jul. 2010; V.A. Kastcheev leg.; ZIN • 7 ♂♂, 1 ?; Aksu-Dzhabagly, Dzhabagly River, Kshi-Kaindy; 20 May 1987; V.A. Kastcheev leg.; ZIN • 1 ♂; same locality as for preceding; 16 Jun. 2001; V.A. Kastcheev leg.; ZIN • 3 ♂♂, 1 ♀; Aksu-Djabagly, Koksai River; 2 Jun. 2001; V.A. Kastcheev leg.; ZIN • 1 ♂; Sogety Mts, Kokpek Pass; 13 Jun. 2006; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 1 ♀; Boroldai, Glinkovo; 23 May 1986; V.A. Kastcheev leg.; ZIN • 4 ♂♂, 1 ♀; Kyrgyz-Alatoo Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; 6 ♂♂, 2 ♀♀; Ketmen Mts, Dolaity River; 15 Jul. 1998; V.A. Kastcheev leg.; ZIN • 2 ♂♂, 1 ♀; Ketmen Mts, Bolshoi Kyrgisai; 10 Jun. 1998; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Ketmen Mts, Tuyuk River; 19 Sep. 1988; ZIN • 1 ♂, 1 ♀; Ketmen Mts, Temirlik River; 19 Sep. 1988; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Ketmen Mts, Avat River; 14 Jul. 2009; V.A. Kastcheev leg.; ZIN.

TAJIKISTAN • 1 ♂, Terskey-Alatoo Mts, environs of Barskoon Village; 1600–1800 m a.s.l.; 23–18 Jul. 1993; S.V. Saluk leg.; cRyv.

Quedius (Raphirus) jennisseensis Sahlberg, 1880

Material examined

KAZAKHSTAN • 4 ♂♂; Altai, Bukhtarma River, Uryl'-Chingistai; 13 Jun. 1987; V.A. Kastcheev leg.; ZIN • 1 ♀; Altai, Rakhmanovskie Kluchi, Berel' River; 21 Jul. 1989; V.A. Kastcheev leg.; ZIN.

Remarks

Quedius jennisseensis is a common arctoboreal Asian species, which has already been recorded from the Altai Mountains in Russia (Salnitska & Solodovnikov 2019). Based on the newly examined material here, we provide two new records of *Q. jennisseensis* from the Kazakh part of Altai. These are the first records of the species for Kazakhstan and Middle Asia.

Quedius (Raphirus) limbatus Heer, 1839

Material examined

KAZAKHSTAN • 2 ♂♂; Dzhungar, Kokjota Mts, Pikhtovka; 9–13 Aug. 1987; V.A. Kastcheev leg.; ZIN • 3 ♂♂; Saur Mt. Ridge, Uidene River; 1600–1800 m a.s.l.; 15 Jul. 2011; V.A. Kastcheev leg.; ZIN.

Quedius (Raphirus) novus Eppelsheim, 1892

Material examined

KAZAKHSTAN • 3 ♂♂, 3 ♀♀; Karatau Mts, Byzhi River, Rynagus stream; 24 Jul. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Kyrgyz-Alatoo Mts, Koshirme, horse farm; 9 Jul. 2010; V.A. Kastcheev leg.; ZIN • 8 ♂♂, 2 ♀♀; Aksu-Djabagly, Koksai River; 2–17 Jul. 2001; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Aksu-Djabagly, Ulken-Kaindy River; 15 Jun. 1991; V.A. Kastcheev leg.; ZIN • 4 ♂♂, 1 ♀; Aksu-Djabagly, Dzhabagly River; 1 May 1986; V.A. Kastcheev leg.; ZIN • 1 ♂, 1 ♀; Aksu-Djabagly, Kshi-Kaindy River; 16 Jun. 2011; V.A. Kastcheev leg.; ZIN • 1 ♂; Ketmen Mts, Bolshoi Kyrgisai; 30 Jul. 1987; V.A. Kastcheev leg.; ZIN.

TURKMENISTAN • 8 ♂♂, 2 ♀♀; Kukhtin Pass, 26 Jul. 1892; Glasunov leg.; ZIN.

Remarks

Quedius novus is widely distributed in Middle Asia, where it appears most commonly in southern Kazakhstan, eastern Uzbekistan, western Kyrgyzstan and northeastern Tajikistan (Salnitska & Solodovnikov 2018a). Here, we provide the first record of *Q. novus* from Turkmenistan.

Quedius (Raphirus) pseudoumbrinus Lohse, 1958

Remarks

According to the molecular data, partially supported by the shape of the paramere (Salnitska & Solodovnikov 2021), the former single species *Q. umbrinus* Erichson, 1839 (for example, sensu Salnitska & Solodovnikov 2018a) is divided into three species, *Q. volkeri* Salnitska & Solodovnikov, 2021, *Q. umbrinus* and *Q. pseudoumbrinus*. The first species is a local endemic of the Western Caucasus, while *Q. umbrinus* and *Q. pseudoumbrinus* are widespread West Palaearctic species with largely overlapping distributions. Unfortunately, neither the material of the former ‘*Q. umbrinus*’ from Middle Asia reported in Salnitska & Solodovnikov (2018a), nor the material from this region used in Salnitska & Solodovnikov (2021) are of DNA-grade. Among the material from Middle Asia studied in Salnitska & Solodovnikov (2021), only the male specimens from Chilik River of Kungey Alatau in Kazakhstan can be identified as *Q. pseudoumbrinus* based on the more parallel-sided, not apically rhomboid paramere. The shape of the paramere in males from the Dzhungar Mountains in Kazakhstan and from N of Issyk Kul Lake in Kyrgyzstan in Salnitska & Solodovnikov (2021) does not allow their confident identification as either *Q. umbrinus* or *Q. pseudoumbrinus*. Based on the shape of the paramere, the material reported as ‘*Q. umbrinus*’ in Salnitska & Solodovnikov (2018a) is likely to be *Q. pseudoumbrinus* (Salnitska & Solodovnikov 2021), though this needs to be tested with molecular data. It is noteworthy that all material of ‘*Q. umbrinus*’ from Middle Asia from both of our abovementioned studies with precise bionomic data was collected at higher elevations in the mountains. Thus, the Middle Asian populations of the *Q. umbrinus* complex may be somewhat isolated from the main ranges of *Q. umbrinus* and *Q. pseudoumbrinus*. To properly shed light on the identity of ‘*Q. umbrinus*’ in Middle Asia in view of the data in Salnitska & Solodovnikov (2021), DNA-grade material is needed.

Quedius (Velleius) dilatatus (Fabricius, 1787)

Material examined

KAZAKHSTAN • 1 ♂, 1 ♀; Altai, Bukhtarma River, Zhanaulga; 14 Aug. 2010; V.A. Kastcheev leg.; ZIN • 1 ♂; Stepnyak, Zhukey Lake; 10 Jun. 2002; V.A. Kastcheev leg.; ZIN.

Remarks

Based on the newly examined material, *Q. dilatatus* is recorded for the first time from Middle Asia (Kazakhstan). It is a widely distributed Palearctic species that had already been recorded from several provinces of Russia near the border with Kazakhstan (Salnitska & Solodovnikov 2019). This is the first record of *Q. dilatatus* from the Altai Mountains.

New species

Quedius (Distichalius) gissaricus sp. nov.

[urn:lsid:zoobank.org:act:2C73B7D0-9EEB-4C5D-903C-52786634ADBE](https://zoobank.org/act:2C73B7D0-9EEB-4C5D-903C-52786634ADBE)

Figs 1–2

Diagnosis

Among other members of *Distichalius* Casey, 1915, the new species can be distinguished by the following combination of characters: body relatively small, head with interocular punctures (red arrows in Fig. 1A), elytra with rough and very sparse punctation arranged in irregular rows; median lobe of symmetrical aedeagus simple, without apical lobes, with distinct apex; paramere with several sensory peg setae apically arranged in short rows along parameral margins with apical setae.

Etymology

The species name ‘*gissaricus*’ (latinized adjective) is derived from the mountain range where this specimen was collected.

Type material

Holotype

TADJIKISTAN • ♂ (left tarsus and tergite VIII damaged, sternite IX, lateral tergal sclerites and the tergite of segment X lost); “TADJIKISTAN, N slope of Gissar Mnt range, 2500 m a.s.l., 19.7.1990, Kuzminih leg./ *Quedius (Quedionuchus)* sp. Klimenko det./ Tadjikistan N slope of Gissar Mnt range 2500 m a.s.l. 19.7.1990 Kuzminih [in Russian]/ A.A. Klimenko collection”; ZIN.

Description

MEASUREMENTS AND RATIOS. HL: 0.82; HW: 0.84; PL: 1.02; PW: 1.07; EL: 1.25; EW: 1.23; FB: 3.09; TL: 6.27; HL/HW: 0.97; PL/PW: 0.96; EL/EW: 0.92; PL/EL: 0.60; PW/EW: 0.87.

COLOURATION. Body black (Fig. 1A) with reddish appendages; head and pronotum completely black; elytra and abdomen black with paler margins.

HEAD. About as wide as long (HL/HW: 0.97), surface with microsculpture of transverse waves on disk and between eyes. Eyes large, moderately convex, temples 1.5 times as long as longitudinal diameter of eye. Head chaetotaxy as in Fig. 1A. Anterior frontal puncture touching anteriomedian margin of eye, with barely visible additional interocular punctures between anterior frontal punctures (red arrows in Fig. 1A); posterior frontal puncture situated closer to posterior margin of eye than to nuchal ridge, pair of smaller basal punctures situated close to nuchal ridge; each temple with two temporal punctures, posterior one situated halfway between posterior margin of eye and nuchal ridge; temples additionally with some fine setiferous punctures bearing short yellowish setae. Antennae moderately long, first segment shorter than second and third segments together; third distinctly longer than second, fourth and fifth slightly longer than wide, sixth to tenth wider than long, gradually increasing in width towards apex of antenna, last fusiform segment distinctly longer than penultimate segment.

PRONOTUM. Barely wider than long (PL/PW: 0.96), widest at about middle; with nearly parallel sides at middle, posterior lateral portions barely explanate. Disk of pronotum with two dorsal rows of punctures, each with three punctures, third (basalmost) puncture situated behind the level of large lateral puncture; sublateral area with three punctures (one additional between dorsal and sublateral row), posterior two of which situated on one line slightly between level of basalmost puncture of dorsal row; basal margin with row of three variably sized setae on each side; microsculpture of transverse waves, sparser than on head.

SCUTELLUM. Impunctate, with faint transverse microsculpture.

ELYTRA. Vaguely widening posteriad, slightly wider than long (EL/EW: 0.92), longer and wider than pronotum (PL/EL: 0.60, PW/EW: 0.87); punctation rough and very sparse, consisting of single widely

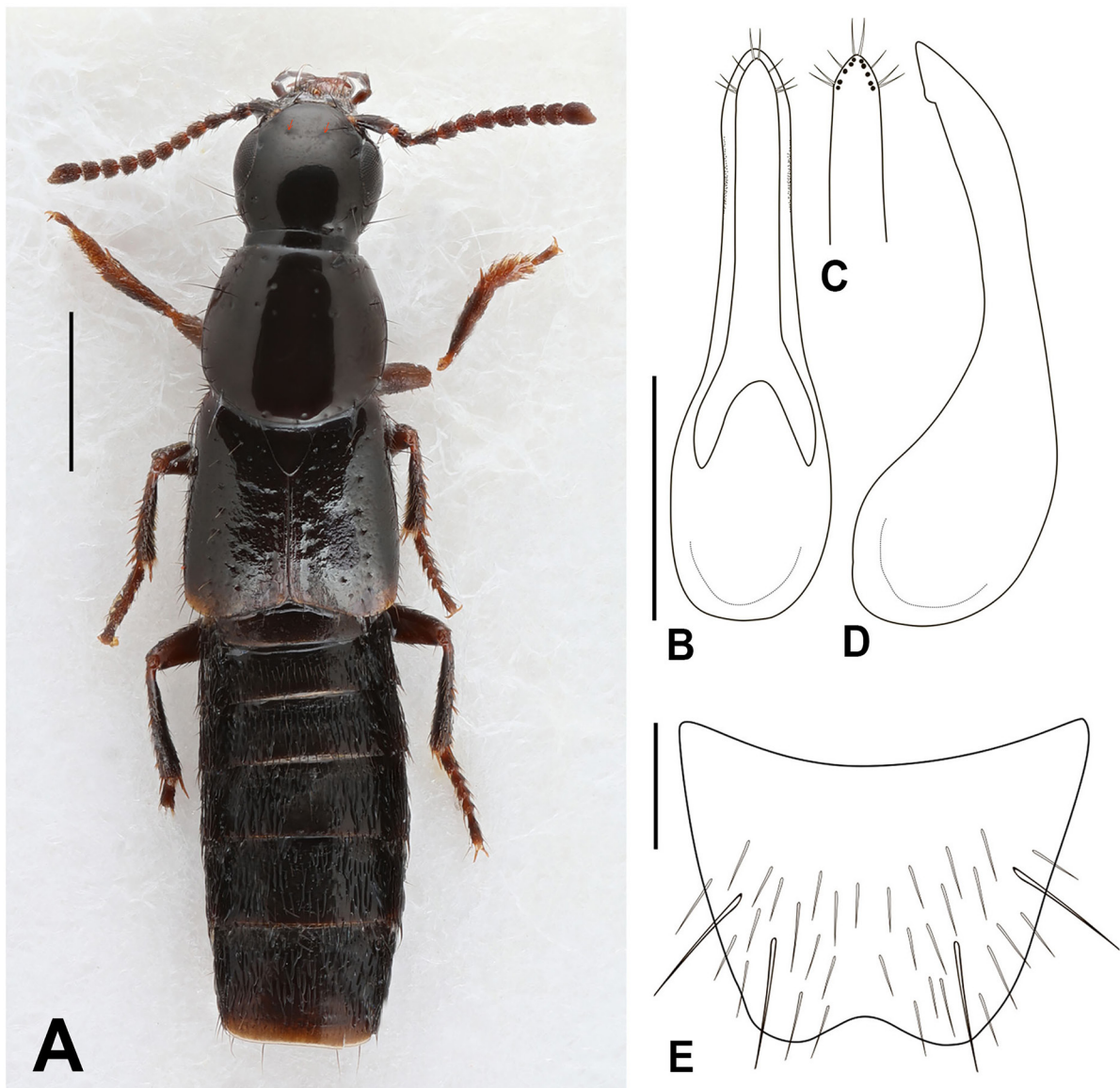


Fig. 1. *Quedius gissaricus* sp. nov., holotype (ZIN). **A.** Habitus (interocular punctures indicated by red arrows). **B–D.** Aedeagus. **B.** From parameral side. **C.** Apical portion of paramere (underside). **D.** Median lobe (laterally). **E.** Sternite VIII. Scale bars: A = 1 mm; B–E = 0.5 mm.

spaced punctures arranged in irregular rows; interspaces without microsculpture; pubescence yellowish to brownish, short, sparse.

WINGS. Fully developed.

ABDOMEN. Punctated more densely than elytra, punctuation becoming sparser toward apex; tergite II with very fine and distinct punctures; posterior margin of tergite VII with whitish palisade fringe.

Male

First four protarsomeres markedly dilated, each densely covered with modified pale setae ventrally; second segment as wide as, or slightly narrower than apex of tibia. Sternite VIII with two long setae on each side; apical margin with weak triangular medio-apical emargination (Fig. 1E).

Aedeagus (Fig. 1B–D) rather small (0.9 mm), median lobe (in parameral or anteparameral view) symmetrical, parallel-sided along most of its length, with evenly narrowed apical portion; (in lateral view) with fine short longitudinal subapical carina (Fig. 1D), with obtusely pointed and gradually narrowed apex and minute subapical tooth. Paramere (in parameral view) nearly reaching apex of median lobe, distinctly narrower than median lobe, symmetrical, vaguely narrowed to obtusely pointed apex (Fig. 1B); (underside) apically with two longitudinal rows of five peg setae at each lateral margin (Fig. 1C). Internal sac without large sclerotized structures.

Female

Unknown.

Remarks

In addition to the holotype of *Q. gissaricus* sp. nov., there was another specimen of *Distichalius* collected at the same locality, but some days earlier (for details see *Q. (D.)* sp. aff. *gissaricus* below). That specimen differs from the holotype of *Q. gissaricus* sp. nov. by the distinctly paler pronotum, elytra and appendages, lacking interocular punctures between frontal punctures, less regular punctuation of elytra, tergite II with fine and shallow punctuation, and median lobe of the aedeagus with smaller subapical tooth located considerably further away from the apex. Given the co-occurrence of the two specimens and their subtle difference from each other, they may be considered either as variants of one morphologically variable species, or one of them could be an aberrant specimen, or they may represent closely related sympatric species. Since a firm conclusion is impossible until more material is examined, we tentatively identify the second specimen as a separate species and list it below.

Ecology

Quedius gissaricus sp. nov. is hitherto known only from the Gissar Mountain Range in Tajikistan where it was collected at an elevation of 2500 m (Fig. 2).

Comparison

Without a complete revision of species currently in *Distichalius* it is impossible to place *Q. gissaricus* sp. nov. in a species group. It differs from other smaller Western Palearctic *Distichalius* (e.g., *Q. punctatellus* (Heer, 1839) and allied ones with which it shares the sparse punctuation of the elytra arranged in rows) by the presence of interocular setae on the head and by a smaller number of sensory peg setae on the paramere, which do not extend behind the apical setae towards the parameral base. As can be judged from Smetana (2017), it is distinct from any of the Chinese species at least as follows: it differs from the *Q. ladas*, *Q. bipictus* and *Q. daedalus* groups by a sparse irregular punctuation of the elytra which form rows; from the *Q. annectens* group by the aedeagus without apical lobes; from the *Q. laetipictus* group at least by a uniform dark body colouration; from the *Q. regularis* group by a pointed, not widely arcuate apex of the aedeagal median lobe. Our new species differs from all Far Eastern and Japanese species by a smaller body size and the shape of the aedeagus.

Quedius (Raphirus) viator sp. nov.

[urn:lsid:zoobank.org:act:E8908FE4-FD2B-42CC-B9AA-E679AA9B6213](https://doi.org/10.21203/rs.3.rs-1000000)

Figs 2–3

Diagnosis

Among other species of *Raphirus* Stephens, 1829, *Q. viator* sp. nov. is most closely related to *Quedius coloratus* Fauvel, 1875 and all allied species, from which it can easily be distinguished by the structure of the aedeagus, namely by the wider apical portion of the median lobe with a sharper apex, rows of peg setae converging with each other in the middle portion (not parallel-sided), and the apex of the paramere almost reaching the apex of the median lobe (Fig. 3B–D) (for more details see section ‘Comparison’).

Etymology

The name is the Latin noun ‘viator’ (= ‘traveller’) that refers to the fact that the newly described species, presumably closely related to a group of Mediterranean species, appears far away, in Middle Asia (Fig. 2).

Type material

Holotype

KYRGYZSTAN • ♂ (segments 5–11 of left antennae lost, base of the median lobe of the aedeagus damaged); “Kyrgyzskiy ridge, S Tokmak nr Kegety Pass, left tributary of Tuyuk River, 3000 m, 42°24'43" N, 75°00'52" E, 13.V.1986, I.A. Belousov leg./ Kyrgyzskiy ridge S Tokmak near Kegety Pass left tributary of Tuyuk River 3000 m 13.V.1986, I.A. Belousov leg. [in Russian]”; ZIN.

Description

MEASUREMENTS AND RATIOS. HL: 1.25; HW: 1.39; PL: 1.5; PW: 1.68; EL: 2.02; EW: 1.93; FB: 4.75; TL: 8.84; HL/HW: 0.90; PL/PW: 0.88; EL/EW: 1.05; PL/EL: 0.73; PW/EW: 0.87.



Fig. 2. Distribution map showing the type localities of *Quedius gissaricus* sp. nov. (red circle) and *Q. viator* sp. nov. (violet circle).

COLOURATION. Body mainly dark brown (Fig. 3A) with paler appendages; head piceous-black, abdomen dark brown, pronotum and elytra brownish with paler lateral margins; antennae and legs uniformly light brown.

HEAD. Slightly transverse (HL/HW: 0.90), surface with microsculpture of transverse waves on disk and isodiametric between eyes. Eyes moderately large and convex, 1.87 times as long as temples. Anterior

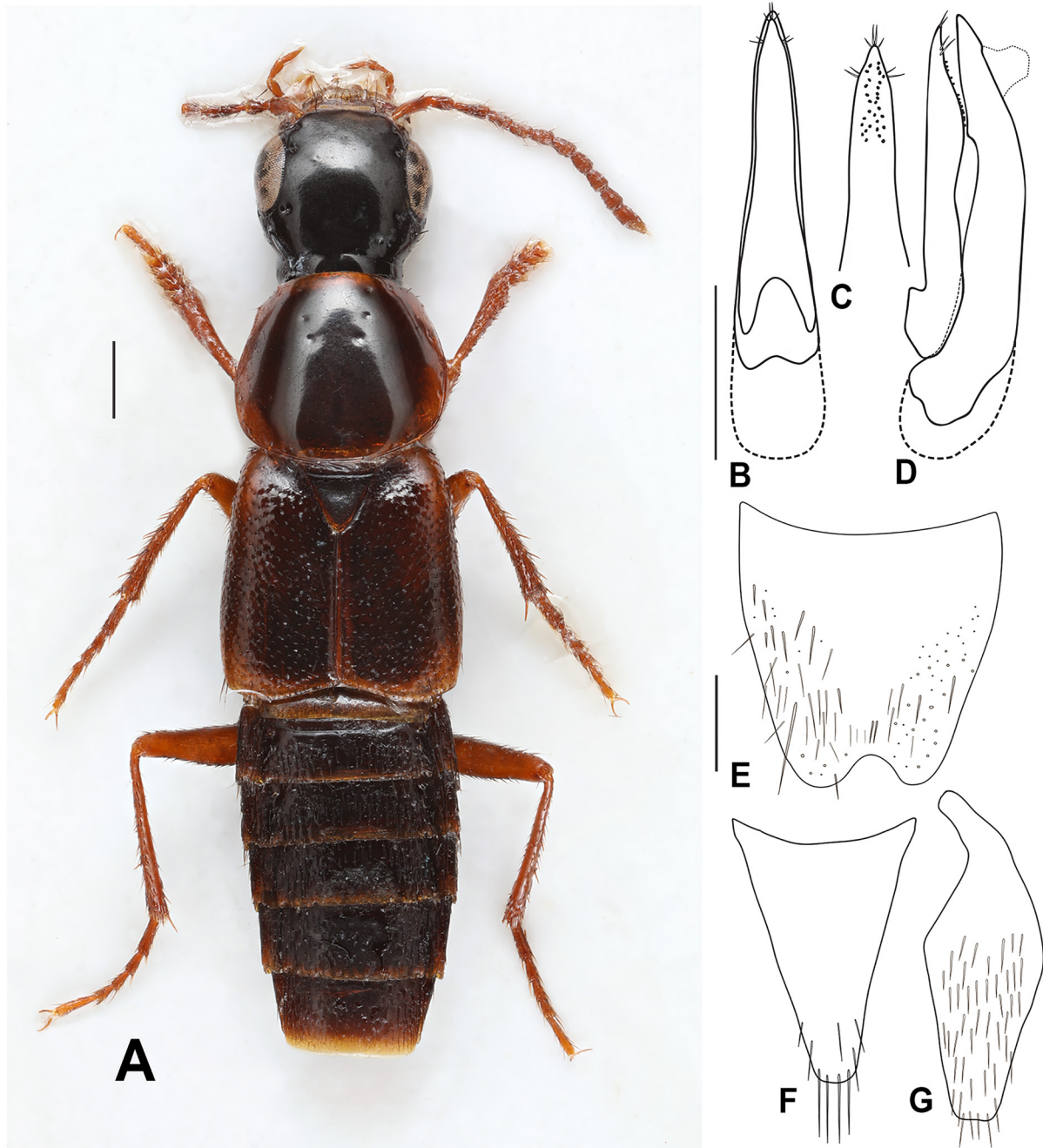


Fig. 3. *Quedius viator* sp. nov., holotype (ZIN). **A.** Habitus. **B–D.** Aedeagus. **B.** From parameral side. **C.** Apical portion of paramere (underside). **D.** Lateral view. **E.** Sternite VIII. **F.** Tegite X. **G.** Sternite IX. Scale bars: A = 1 mm; B–G = 0.5 mm..

frontal puncture situated at inner margin of eye; fine posterior frontal puncture situated closer to posterior margin of eye than to nuchal ridge, one basal puncture situated close to nuchal ridge; each temple with one temporal puncture; temples additionally with some shallow setiferous punctures bearing short yellowish setae. Antennae moderately long, first segment slightly shorter than second and third segments together; third distinctly longer than second, fourth to tenth longer than wide, gradually increasing in width towards apex of antenna, last segment distinctly longer than preceding segments.

PRONOTUM. Transverse, distinctly wider than long (PL/PW: 0.88), widely rounded basally, widest at about middle, posterior lateral portions vaguely explanate. Disk of pronotum with two dorsal rows of punctures, each with three punctures, third (basalmost) puncture situated far behind the level of large lateral puncture; sublateral area with two punctures at right side and without punctures at left side; basal margin with row of 2–3 setae on each side; microsculpture of transverse waves as on head.

SCUTELLUM. Impunctate, with faint transverse microsculpture.

ELYTRA. Parallel-sided vaguely widening posteriad, barely longer than wide (EL/EW: 1.05), longer and wider than pronotum (PL/EL: 0.73; PW/EW: 0.87); punctation fine and moderately dense; surface glabrous with shallow indistinct microsculpture; pubescence yellowish to brownish, sparse.

WINGS. Fully developed.

ABDOMEN. Densely punctate, punctation becoming sparser toward apex; posterior margin of tergite VII with whitish palisade fringe.

Male

First four protarsomeres markedly dilated, each densely covered with modified brown setae; second protarsomere as wide as, or slightly narrower than apex of tibia. Sternite VIII with a long seta on each side; apical margin with distinct triangular medio-apical emargination (Fig. 3E). Sternite IX moderately elongate (Fig. 3G), asymmetrical, basal portion narrow and glabrous, apical portion wider with obtuse almost square apex and finely setose. Tergite X triangular (Fig. 3F), narrowing apicad, with four strong setae at apical margin and with very few smaller setae at apical portion.

Aedeagus (Figs 3B–D): median lobe (in parameral or anteparameral view) symmetrical, with distinct constriction medially, gradually narrowing anteriorly, with obtusely pointed apex; (in lateral view) with obtusely pointed and gradually narrowed apex, minute tooth located far basad from apex (Fig. 3D). Paramere (in parameral view) wider than median lobe, symmetrical, gradually narrowing apicad to moderately sharp apex (Fig. 3B); (underside) apical portion with 13–17 peg setae (Fig. 3C) arranged in two longitudinal irregular rows converging with each other closer to parameral midline; (in lateral view) almost reaching apex of median lobe (Fig. 3D). Internal sac without large sclerotized structures.

Female

Unknown.

Distribution and bionomics

Quedius viator sp. nov. is known only from the holotype, which was collected in the Kyrgyz-Alatoo Mountains at an elevation of 3000 m (Fig. 2), most likely under stones (I.A. Belousov, pers. com.). Assuming the phylogenetic affiliation of *Q. viator* sp. nov. with *Q. coloratus* and allied species is correct, the geographic disjunction between our new species, and *Q. coloratus* and allied confined to the Mediterranean is noteworthy.

Comparison

As a large species of *Raphirus* with moderately large eyes and characteristic structure of the aedeagus, *Q. viator* sp. nov. appears similar to *Q. coloratus* and allied species (sensu Assing 2017) and to some extent to *Q. boluensis* Korge, 1971. The obtusely pointed and slightly curved apex of the median lobe and lanceolate paramere with two irregular longitudinal groups of peg setae situated closer to the parameral midline enforce such a resemblance. We assume that *Q. viator* sp. nov. is phylogenetically closer to *Q. coloratus* and allied species rather than to *Q. boluensis*. An affiliation of *Q. viator* sp. nov. to *Q. coloratus* and allied species is additionally supported by the colouration of the body and ecological preference. According to Assing (2017), *Q. coloratus* and allied species are subterranean, rare in collections and mainly collected by carabidologists from under stones. The single known specimen of *Q. viator* sp. nov. was also collected in this. Within the complex of species affiliated with *Q. coloratus* in Assing (2017), *Q. viator* sp. nov. is most similar to *Q. coloratus* based on the head chaetotaxy without additional punctures near the posterior frontal puncture and the structure of the aedeagus (for distinguishing characters see section ‘Diagnosis’).

According to the identification key for species of *Raphirus* from China (Smetana 2017), *Q. viator* sp. nov. falls within the *Q. kalganensis* group and in fact its habitus is very similar to that of *Q. wanyan* Smetana, 1996 from that group. This group consists of two species currently known only from female specimens. One of them is described from Hebei Province, another from Qinghai Province of China. To prove the monophyly of the *Q. kalganensis* group and its affinity to *Q. viator* sp. nov. despite remote distributions, better knowledge of the Asian *Quedius* fauna, or at least males of *Q. kalganensis* group are needed.

Presumed new species

Quedius (Distichalius) sp. aff. gissaricus

Fig. 4

Material examined

TAJIKISTAN • 1 ♂; “Tajikistan N slope of Gissar Mnt range Kanchoch [river] 2500 m a.s.l. 11.7.1990 Kuzminih/ A.A. Klimenko collection [in Russian]”; ZIN.

Remarks

Presumably this is a new species, which is not described here for reasons given in the comments on *Q. (Distichalius) gissaricus* sp. nov. above. More material is needed to confirm its identity and, if appropriate, describe the new species.

Quedius (Microsaurus) sp. ex. mutilatus group

Material examined

KAZAKHSTAN • 2 ♂♂; Tarbagatay Mts, Karakol River; 23 Aug. 1989; V.A. Kastcheev leg.; ZIN.

Remarks

Prior to this study, the northernmost record for the peculiar *mutilatus* group was presented by three specimens from the Dzhungarian Alatau (Salnitska & Solodovnikov 2018b). However, at that time we considered that record as questionable, possibly based on mislabelling, because of its very distant location from the core distribution area for this group. The specimens examined here come from a locality even further northwards. Thus, it can be argued that the formerly questioned record from Dzhungarian Alatau was in fact not erroneous. These findings show that the distribution of the *mutilatus* group



Fig. 4. *Quedius* sp. aff. *gissaricus* (ZIN). **A.** Habitus. **B–D.** Aedeagus. **B.** Lateral view. **C.** From parameral side. **D.** Paramere (underside). Scale bars: A = 1 mm; B–D = 0.5 mm.

extends significantly northwards. Unfortunately, as in the case of the material from Dzhungarian Alatau (Salnitska & Solodovnikov 2018b), both male specimens from the Tarbagatay Mountains reported here are damaged by dermestids and their aedeagi are lost. Based on the external morphology, both specimens clearly belong to the *Q. mutilatus* group, but a more precise identification at the moment is not possible.

Discussion

This is the first supplement to our revision of the fauna of *Quedius* of Middle Asia (Salnitska & Solodovnikov 2018a). It shows the relative completeness of that revision as far as the fauna of the lower elevations areas is concerned. Despite the fact that quite extensive material was examined here, only three species, *Q. dilatatus*, *Q. tenellus* and *Q. jennisensis*, are recorded for Middle Asia for the first time. Two new species described here, *Q. gissaricus* sp. nov. and *Q. viator* sp. nov., were in fact already mentioned but not described in the revision (Salnitska & Solodovnikov 2018a). Our study of the additional collections confirms that material of *Quedius* from the higher elevations of the mountains of Middle Asia is biogeographically very interesting, but unfortunately very fragmentary and represented by singletons only. Apart from the new species, the most interesting finds are a considerable extension northwards for the distribution of the *mutilatus* group and additional data corroborating *Q. fulvicollis* as a boreo-montane species (or potential species complex) that occurs in Middle Asia. Our understanding of *Q. fulvicollis* would greatly benefit from molecular data, which are almost absent but highly desirable for *Quedius* in Middle Asia. A similar situation is that of the *Q. umbrinus* complex where molecular data provided by Salnitska & Solodovnikov (2021) clarified the previously morphologically blurred species limits, but where, again, the highly interesting Middle Asian material is non-DNA-grade.

As a result of the present study, there are 33 species of *Quedius* currently known in Middle Asia. This is likely to be close to the real fauna at least for the better-known lowlands. Targeted expeditions aimed at collecting Staphylinidae and fresh material for DNA sequencing would undoubtedly yield more new species, especially from the highlands. As shown here by *Q. gissaricus* sp. nov. and *Q. viator* sp. nov., such species may have unexpected biogeographic connections to be explored.

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