

Description of a new species and redescription of two little-known species of the genus *Eumerus* Meigen, 1822 (Diptera, Syrphidae) from Uzbekistan

Описание нового вида и переописание двух малоизвестных видов мух-журчалок из рода *Eumerus* Meigen, 1822 (Diptera, Syrphidae) из Узбекистана

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Key words: Central Asia, new species, redescription, male genitalia.

Ключевые слова: Средняя Азия, новый вид, переописание, гениталии самца.

Abstract. Description of a new species *Eumerus sokhibkulovi* Barkalov et Rakhimov, **sp.n.** and redescriptions of *E. stackelbergi* Peck, 1971 and *E. ammophilus* Paramonov, 1927 are given. The new species belongs to the *tricolor* species group, and differs from all the known Asian species in the following characters: eyes connected at one point; abdomen mostly black, with orange abdominal maculae being restricted to tergum II; body broad and covered with thick, protruding white pili; wings translucent, without microtrichia; postpedicel black, with a lighter basal third and transverse sulcus subdividing it on two parts; epandrium of male genitalia with a large membranous area and underdeveloped anterior lobes. Postpedicel, metaleg and male genitalia of all three species are illustrated. Photos of habitus, abdomen and head are presented as well.

Резюме. Дано описание нового вида *Eumerus sokhibkulovi* Barkalov et Rakhimov, **sp.n.** и переописание двух редких видов *E. stackelbergi* Peck, 1971 и *E. ammophilus* Paramonov, 1927. Новый вид относится к группе видов *tricolor* и отличается от всех известных азиатских видов этой группы следующими признаками: глаза соприкасаются в одной точке; брюшко чёрное в большей части, оранжевые пятна представлены только на втором тергите; тело широкое, покрыто густыми, торчащими волосками; крылья прозрачные, без микротрихий; третий членик усика чёрный с более светлой базальной третью, поперечная бороздка делит его на две части; эпандриум гениталий самца с большим мембранозным участком и с неразвитой передней лопастью. Для всех видов даны рисунки гениталий самца, третьего членика усика и задней ноги. Кроме того, представлены фотографии габитуса, головы и брюшка.

Introduction

Among widespread hoverflies (Diptera: Syrphidae) of the Palaearctic Region, two genera, *Eumerus* Meigen, 1822 and *Cheilosia* Meigen, 1822, stand out for their high species diversity. While *Cheilosia* reaches its highest species richness in mountainous areas and temperate plains [Barkalov, 1992], *Eumerus* species tend to inhabit arid landscapes [Gilasian et al., 2022], where they sometimes dominate in terms of abundance compared to other Syrphidae.

This paper presents new information on the Syrphidae fauna of Uzbekistan. Earlier faunistic contributions to Syrphidae of Uzbekistan were made by Daminova [1978, 1987, 1997, 2001, 2004, 2011, 2014] and, more recently, by Rakhimov [2021, 2023, 2024] and his colleagues [Rakhimov, Shodieva, 2022], yielding a total of 169 hoverfly species [Rakhimov, 2024]. The genus *Eumerus* currently accounts for 28 species in Uzbekistan, among which only three species, *E. bilobatus* Barkalov, Mutin, Daminova et Rakhimov, 2020, *E. ryzhik* Barkalov et Mutin, 2022 and *E. gulyaevi* Barkalov et Mutin, 2024, were recently described. The remaining species were either described by Stackelberg [1949, 1952, 1965] or listed in Peck's Catalogue of the Palaearctic Diptera [1988].

There is no information on the morphology of most *Eumerus* species inhabiting Uzbekistan, which makes it difficult to identify their imagoes. This is particularly

true of the structure of male genitalia, which is one of the primary traits used in identification. This work is dedicated to description of a new species, *Eumerus sakhibkulovi* sp.n., and redescription of two poorly known species: *E. ammophilus* Paramonov, 1927 and *E. stackelbergi* Peck, 1971.

Material and methods

This study is based on the materials collected by V.Ph. Zaytsev (Saint Petersburg, Russia) and the second author. The studied specimens have been borrowed from or shared between the following institutions: ZIN — Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; SZMN — Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Novosibirsk, Russia; SSU — Samarkand State University, Uzbekistan.

Flies were hand-collected using a 40-cm diameter net, killed using ethyl acetate, and subsequently mounted on entomological pins. Identification was based on the keys of Stackelberg [1961]; Gilasian et al. [2020], the species descriptions provided by Peck [1966, 1969, 1971, 1972], and recent revisions of *Eumerus* from the Asian part of Palearctic [Gilasian et al., 2020, 2022; Smit et al., 2020; Song et al., 2020; Barkalov, Mutin, 2024].

Male genitalia were dissected, macerated in 10 % KOH, rinsed in water, neutralized with 10 % acetic acid, and stored in glycerol in plastic microvials pinned with the respective specimens. Morphological structures were illustrated using an ocular grid at various magnifications (scale indicated below figures), redrawn in ink, scanned, and finalized in Photoshop. Identifications were made using a Stemmi 2000-C binocular microscope. Morphological terminology follows van Steenis et al. [2023].

Nomenclatural act introduced in the present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:5D520645-76A4-4FF2-A324-816E43D7B160

Results

Syrphidae Latreille, 1802

Eristalinae Newman, 1834

Merodontini Edwards, 1915

Eumerus Meigen, 1822

Eumerus sakhibkulovi Barkalov et Rakhimov, **sp.n.**

Figs 1–7.

urn:lsid:zoobank.org:act:ADCD2D33-38EB-4256-A147-419D44D2ABF4

Material. **Uzbekistan:** Holotype, ♂, «25 km NW Ayakguzhumdy, Kyzylkum 18.IV.1965, V. Zaitsev leg.» (ZIN). Paratype: 1♂, the same place and time, V. Zaitsev leg. (SZMN).

Description. Male. Head. Face narrow, with parallel sides, covered with dense silver tomentum and dense silver pili, gena narrow, without tomentum. Frons narrow (Fig. 3), covered with dense, semierect pili, hiding its main colour. Antenna: scape and pedicel black, pedicel with narrowly yellow anterior rim, postpedicel elongated, with distinct antero-ventral angle and

with transverse sulcus (Fig. 2), yellow in basal 1/3; arista black. Eyes connected at one point, densely covered with long, white pili (Fig. 3). Vertex shiny black, without tomentum, covered with dense white pili; ocellar triangle isosceles. Occiput with white pili.

Thorax. Scutum shiny black, with long, dense, erect white pili (Figs 6–7), medially with barely visible, short stripes of grey tomentum. Scutellum and pleurae shiny with white pili. Legs: trochanters and coxae simple, without any growth, femora black with narrowly yellow tips, covered with long white pili, metafemur moderately swollen, with distinct carina in apical 1/3 (Fig. 5); tibia yellow in basal 1/3–1/2 and on tips and black in the rest part, metatibia with short black, procumbent spinules on baso-ventral half (Fig. 5); all tarsi black dorsally and orange ventrally, tarsomeres with short black setulae laterally. Wings translucent, with brown venae, completely without microtrichia.

Abdomen mostly black, only tergum II with orange lateral maculae and tergum IV with narrowly yellow posterior rim (Fig. 4), covered with dense white pili, terga II–IV with sickle-shaped maculae of grey tomentum; terna shiny-black, with white pili; sternum IV slightly protrudes downwards, its posterior rim with shallow incision. Genitalia with underdeveloped anterior lobe of surstylus and surstylus with big membranous area (Fig. 1).

Size: body length 11.7–13.4 mm, wing length 8.8 mm.

Female unknown.

Differential diagnosis. In a number of characters, such as the presence of transverse sulcus on postpedicel, the absence of anterior lobe of surstylus and the relatively large body size (Figs 6–7), *E. sakhibkulovi* sp.n. belongs to the tricolor species group [sensu Grković et al., 2017; Gilasian et al., 2020]. From all the Asian species of this group, the new species differs in the following characters: eyes connected at one point; abdomen mostly black, only tergum II with orange maculae; body broad and covered with thick, protruding white pili; wings translucent, without microtrichia; postpedicel black, with lighter basal third and transverse sulcus subdividing it in two parts (Fig. 2); surstylus with a large membranous area and underdeveloped anterior lobes (Fig. 1).

Etymology. The new species is named after Karakul Azratkulovich Sokhibkulov, who financially supported the first author's expedition to Central Asia.

Eumerus ammophilus Paramonov, 1927

Figs 8–10, 14–17, 21–22.

Eumerus ammophilus Paramonov, 1927: 323; Stackelberg, 1948: 168; 1961: 187.

Material. **Uzbekistan, Romitan District:** 6♂♂ — ca. 80 km NW Gazli City 40°34'53" N, 62°42'13" E, h~177 m a.s.l., 11–13. IV.2025, desert with barchan sands, M. Rakhimov leg. (3♂♂ — SZMN, 3♂♂ — SSU). **Turkmenistan, Repetek Reserve:** 2♂♂ — 1–4.VI.1969, V. Zaitsev leg. (ZIN).

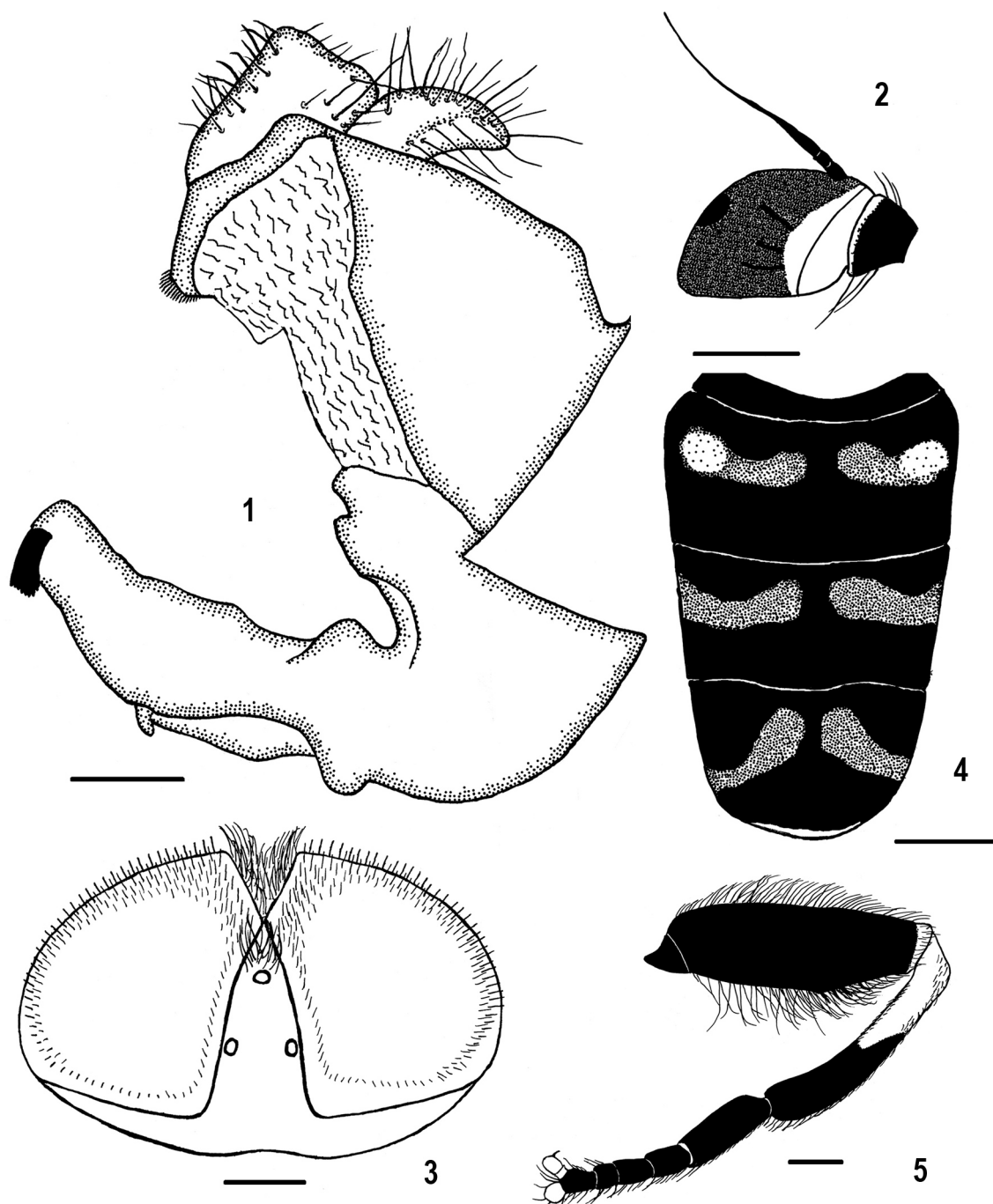
Notes. Stackelberg mentioned this species in the work devoted to the fauna of USSR deserts published in 1948. This species was also listed in the key to the genus *Eumerus* [Stackelberg, 1961]. In the ZIN collection we found a specimen possessing a handwritten label that reads '*Eumerus ammophilus* Par., Stackelberg det.', so confirming our opinion that this species was well known to Stackelberg. A comparison of the genitalia of this specimen with those of other similar specimens, including those from Uzbekistan, confirmed our view that they are identical. The fact that Stackelberg was well acquainted with this species and had probably examined the type dispelled our doubts that we had discovered *E. ammophilus*. Since this species was first described at the beginning of the

last century, and the morphological characters currently used were not illustrated or described at that time, we are presenting a redescription of this species.

Redescription. Male. Head. Face narrow, with parallel sides, covered with dense silver tomentum and dense, comparatively long erect silver pili, gena narrow, without tomentum. Frons narrow (Fig. 17), tomentum and pili as on face. Antenna: scape and pedicel black, postpedicel elongated, with antero-ventral angle and with transverse sulcus (Fig. 9), mostly

black, yellowish in basal 1/3; arista black. Eyes distinctly dichoptic (Fig. 17), distance between eyes in the nearest place approximately equal 1/2 of postpedicel width. Eyes covered with dense, long white pili (Fig. 16). Vertex black, with white pili and fine tomentum, ocellar triangle distinctly isosceles.

Thorax. Scutum and scutellum shiny black, with blueish reflection, densely covered with white erect pili; scutum with two distinct medial stripes of grey tomentum, which almost reach its hind margin (Fig. 14). Postpronotum shiny, without



Figs 1–5. Details of male morphology of *Eumerus sokhibkulovi* sp.n. 1 — genitalia, lateral view; 2 — pedicel and postpedicel, lateral view; 3 — head, dorsal view; 4 — abdomen, dorsal view; 5 — metaleg, lateral view. Scale bars: 1 — 0.31 mm, 2 — 0.36 mm, 3, 5 — 0.45 mm, 4 — 0.86 mm.

Рис. 1–5. Детали строения самца *Eumerus sokhibkulovi* sp.n. 1 — гениталии, сбоку, 2 — второй и третий членики усика, сбоку, 3 — голова, сверху, 4 — брюшко, сверху, 5 — задняя нога, сбоку. Масштаб: 1 — 0,31 мм, 2 — 0,36 мм, 3, 5 — 0,45 мм, 4 — 0,86 мм.

tomentum. Lateral sides of scutum with stripes of grey tomentum. Pleurae shiny black, with dense long white pili (Fig. 16). Legs: femora black with narrowly yellow tips, covered with dense white pili, very dense and long posteriorly. Metafemur simple, without any lamina and tubercle, ventrally covered with long, dense white pili (Fig. 10). Tibiae yellow to brown in basal halves/thirds and black in remaining parts; pro- and mesotibia apically with comparatively strong black setae; metatibia narrow in basal half and broadened in apical half, covered with long white pili. Protarsus dorsally black and ventrally yellow, each segment with short but strong apicoventral black setulae; mesotarsus completely black, with black pili and with black apicoventral setulae; metatarsus dorsally black and ventrally brown, densely covered with short recumbent pili ventrally and semierect black pili dorsally, metabasitarsus length exceeds the total length of segments 2–4. Wings without microtrichia in basal third and with dense microtrichia in apical two-third; veins yellowish basally and black apically, big black spot in the middle (Fig. 14, 16) vein R_{4+5} distinctly curved. Halteres completely yellow, calypters white with white cilia.

Abdomen. Abdomen broad, black with blueish reflection on tergum II, densely covered with white erect pili; lateral sides of tergum II with big yellow macula; terga II–IV with big pruinose maculae (Figs 21–22); hind side of tergum IV with narrow yellow stripe; all sternum with white pili; sternum IV with deep incision. Genitalia with beak-shaped posterior side of rear part of surstylus (Fig. 8) and with undeveloped anterior part.

Differential diagnosis. As with the previous species, based on such characters as the presence of transverse sulcus on postpedicel, the absence of anterior lobe of surstylus, and the relatively large body size, *E. ammophilus* belongs to the *tricolor* species group [sensu Grković et al., 2017; Gilasian et al., 2020]. From all the Asian species of this group, the new species differs in the following characters: eyes distinctly dichoptic; abdomen mostly black, only tergum II with big triangular yellow macula; body broad, densely covered with white erect pili; wings with bright black macula; postpedicel black, with lighter basal third and transverse sulcus subdividing it in two parts (Fig. 9); posterior lobe of surstylus with a pointed outgrow, anterior lobe undeveloped (Fig. 8).

Variation. This species is characterised by considerable variation in abdominal and postpedicel colouration. Yet, these characters are used as stable criteria in dividing the genus into species groups. When studying material collected from various parts of the area at hand, it was found out that the postpedicel colour can vary from completely black-brown to bright orange. The abdominal colouration varies from reddish orange on most of the surface (Fig. 21) to almost entirely black with slightly reddish anterior corners of the tergum II (Fig. 22). All other features, including the structure of genitalia, remain stable.

Eumerus stackelbergi Peck, 1971

Figs 11–13, 18–20.

Eumerus stackelbergi Peck, 1971: 702; Peck, 1974: 11; van Steenis et al., 2023: 82.

Material. Uzbekistan, Namangan region: 2 ♂♂ — Mingbulak district, 40°43'30" N, 71°23'06" E, h~380 m a.s.l., sand dunes, *Cistanche* sp., 19.V.2024, M. Rakhimov leg. (1 ♂ — SZMN, 1 ♂ — SSU).

Note. Peck described *E. stackelbergi* from Kyrgyzstan (Tien Shan, Sary-Bulun) on the basis of three specimens [Peck, 1974]. In this paper, she provided data on this species based solely on the type locality and stated that Kyrgyzstan would be the only region where it occurs. Later, in the Catalogue of Palaearctic Syrphidae [Peck, 1988], the distribution of this



Figs 6–7. External appearance of male of *Eumerus sokhibkulovi* sp.n. 6 — lateral view; 7 — dorsal view. Scale bar: 2 mm.

Рис. 6–7. Внешний вид самца *Eumerus sokhibkulovi* sp.n. 6 — сбоку, 7 — сверху. Масштаб: 2 мм.

species was extended to include Tajikistan. It would appear that Peck's material on this species from Tajikistan was never published, as it is not mentioned in any of her works, except for the catalogue.

In 2024, one of us (MRR) collected specimens in Uzbekistan, on the opposite side of the mountain range from where the species *E. stackelbergi* was originally described. Although the Uzbek specimens show some differences from the original description, they undoubtedly belong to *E. stackelbergi*. Given the limited range of this species and the observed variation in its external morphology, above we have provided additional morphological data to account for this variation.

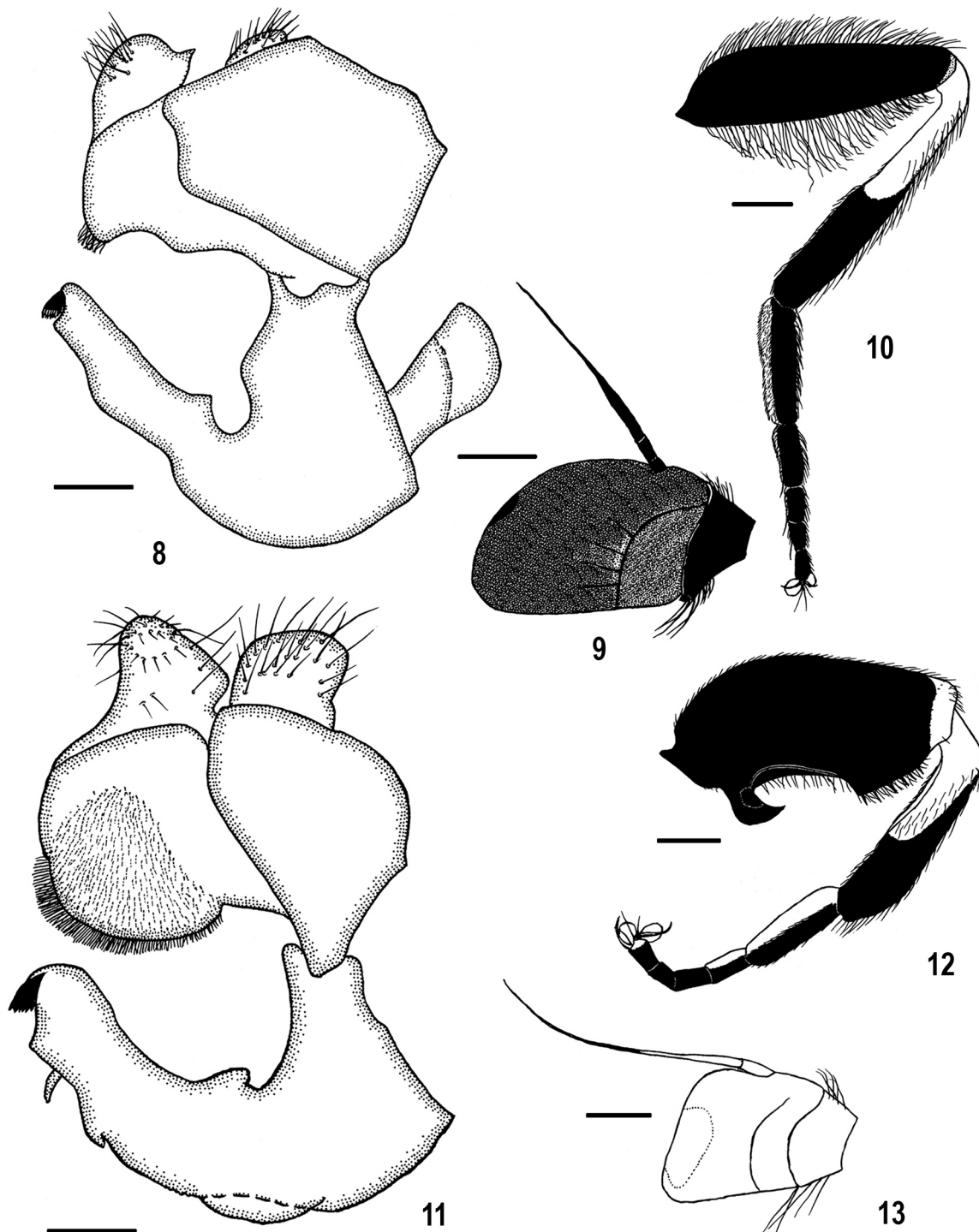
Description. Male. Head. Eyes are briefly in contact at a distance less than a third of the length of frons. Scape and pedicel of antenna yellow, arista black, postpedicel yellow, shiny in basal 1/3 (to the transverse furrow) and light brownish in apical 2/3, densely covered with white tomentum (Fig. 13).

Legs: femora black with narrowly yellow tips; profemur simple, mesofemur basally with small antero-ventral tubercle; metafemur swollen, basally with big pointed tubercle (Fig. 12), in apical 1/3 with two laminae on which are located chitinized dens; pro- and mesotibia yellow in basal 1/4 and narrowly on tips and black on the rest parts, sometimes all ventral part of protibia yellow, metatibia squeezed from the sides basally and broadened apically (Fig. 12), light brown in basal half and black in apical half; pro- and mesotarsi brown dorsally and yellow ventrally, each segment of these tarsi with small black setulae at the top of its ventral side; metatarsus black dorsally and yellow ventrally, dorsal pili black, ventral pili golden, each segment with small black setulae.

Abdomen broad, the broadest part on the middle of tergum I (Fig. 18), colour varies — tergum I black, tergum II black medially, on sides and on posterior quarter yellowish brown

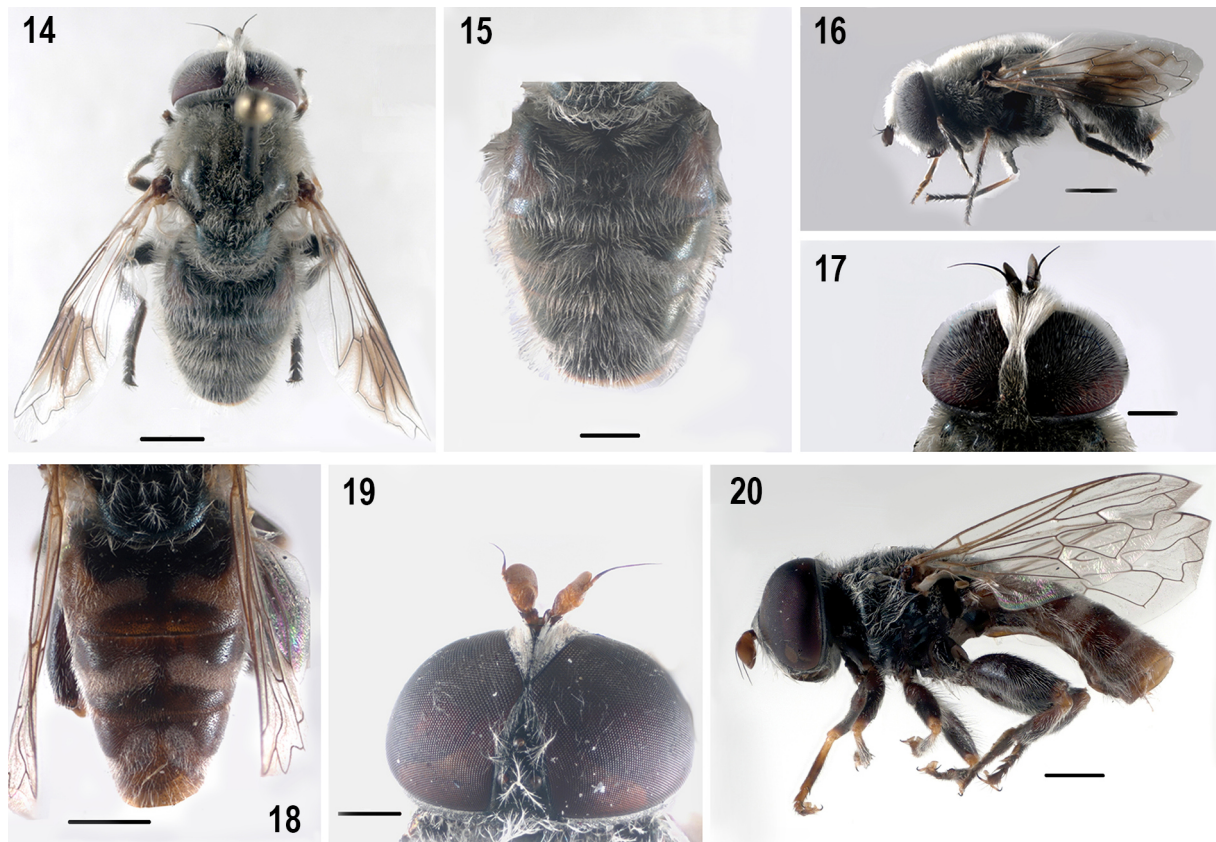
(Figs 18, 20); terga III–IV black with broad yellow stripes on posterior margins; terga II–IV with big, contrast grey spots, pili white long, erect laterally and short depressed medially; sterna with long white pili, sternum IV with deep incision. Genitalia as on Fig. 11.

Diagnosis. As with the previous species, *E. stackelbergi* is similar to representatives of the tricolor species group, from which it differs in the presence of a curved tubercle on the lower part of metafemur and in the structure of male genitalia.



Figs 8–13. Details of male morphology of two *Eumerus* species: *E. ammophilus* (8–10) and *Eumerus stackelbergi* (11–13). 8, 11 — genitalia, lateral view; 9, 13 — pedicel and postpedicel, lateral view; 10, 12 — metafemur, lateral view. Scale bars: 8 — 0.31 mm, 9, 11, 13 — 0.23 mm, 10, 12 — 0.45 mm.

Рис. 8–13. Детали строения самцов двух видов рода *Eumerus*: *E. ammophilus* (8–10) и *Eumerus stackelbergi* (11–13). 8, 11 — гениталии сбоку; 9, 13 — второй и третий членики усика сбоку; 10, 12 — задняя нога, сбоку. Масштаб: 8 — 0,31 мм, 9, 11, 13 — 0,23 мм, 10, 12 — 0,45 мм.



Figs 14–20. External appearance of male of *Eumerus*: *E. ammophilus* (14–17) и *E. stackelbergi* (18–20). 14 — general view dorsally; 15, 18 — abdomen, dorsal view; 16, 20 — general view laterally; 17, 19 — head, dorsal view. Scale bars: 14, 16 — 2 mm, 15, 17–20 — 1 mm.

Рис. 14–20. Внешний вид самцов двух видов рода *Eumerus*: *E. ammophilus* (14–17) и *E. stackelbergi* (18–20). 14 — общий вид сверху; 15, 18 — брюшко сверху; 16, 20 — общий вид сбоку; 17, 19 — голова сверху. Масштаб: 14, 16 — 2 мм, 15, 17–20 — 1 мм.

Discussion

Thus, following the description of the above-mentioned species, the fauna of Uzbekistan now comprises 31 species of the genus *Eumerus*, compared to 29 species currently known from the neighboring Tajikistan. The vast majority of these species are distributed throughout Central Asia, but yet there are species that are restricted to only in one of the Central Asian countries. Given the species that have not yet been recorded from Uzbekistan but are known from Tajikistan, it can be speculated that the list of *Eumerus* species in Uzbekistan could be expanded by at least six more species, bringing the total to 37. It is also possible that new species will be discovered in the high-altitude and desert regions of Uzbekistan. Based on the above, it can be assumed that 43–45 species of the genus *Eumerus* may be found in the Republic of Uzbekistan.

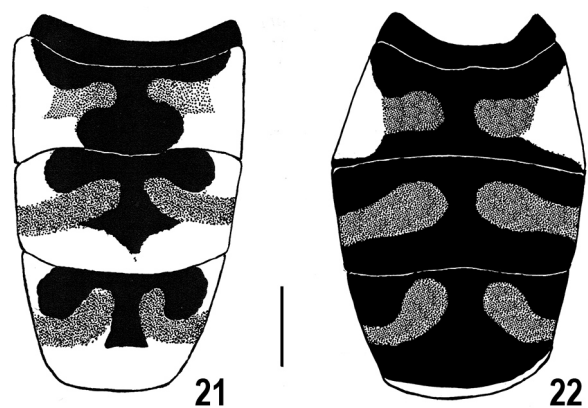
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Figs 21–22. *Eumerus ammophilus* abdomen, dorsal view. Scale bar: 0.86 mm.

Рис. 21–22. Брюшко *Eumerus ammophilus* сверху. Масштаб: 0,86 мм.

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