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Articles

The semiaquatic bugs (Heteroptera: Gerromorpha) of Uzbekistan

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The updated list of semi-aquatic hemipteran insects (Heteroptera) of the Gerromorpha infraorder is provided for the first time for the fauna of Uzbekistan, based on collections studied and literature sources. The insects were collected from 2021 to 2023. As a result, 18 species of water striders with two subspecies belonging to 9 genera, 5 families were identified. *Microvelia* (*Microvelia*) *reticulata* (Burmeister, 1835) is recorded for the first time for the fauna of Uzbekistan. The erroneous species records from some areas of the republic have been corrected.

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Keywords

Fauna, Heteroptera, Gerromorpha, Uzbekistan

Introduction

The species of Nepomorpha and Gerromorpha infraorders are aquatic inhabitants that live most of their life cycle in water. As opposed to Nepomorpha living in the water column, Gerromorpha inhabited the surface of the water and shore zone. Imago leaves water bodies only to fly to new habitats or for the overwintering. Representatives of all families of the infraorder are predators, natural enemies of dipterans (Culicidae, etc.), the major components of the gnats. More than 2100 species of Gerromorpha from 8 families are known in the world's fauna (Henry 2009).

The aquatic insect fauna of Uzbekistan has not been sufficiently studied, and aquatic and semi-aquatic bugs have only been recorded in a few publications (Insects of Uzbekistan 1993; VI National Report 2018; Mirzaeva et al. 2021). The following authors have recorded semi-aquatic bugs from some territories of the country: R.A. Alimjanov and Ts.G. Bronstein (1956) – Zaravshan Valley; Yu.A. Popov (1966) and E.J. Shukurov et al. (2005) – Western Tien Shan mountains; N.I. Lebedeva et al. (2022) – southwestern, central, northeastern, southern and eastern regions. Aquatic and semi-aquatic bugs were recorded from the protected areas of the Gissar Reserve by A.V.-A. Kreitzberg (2004); Chatkal State Biosphere Reserve by Y.S. Lynov et al. (1993), E.V. Vashetko & S.O. Chebotarev (2007); Nuratinsky Reserve by D.B. Daminova (2011); Ugam-Chatkal State Natural National Park, Kitab Geological National Park and Surkhan State Mountain Forest Reserve – by N.I. Lebedeva et al. (2022).

Some data from Uzbekistan was published in taxonomic reviews (Tamanini 1958, Kanyukova 1973, 1979, 1982, 1997, 2006).

The purpose of this work is to review of the species composition of the semi-aquatic hemipteran insects (Heteroptera: Gerromorpha) of Uzbekistan and to study their biodiversity in the study area.

Materials and methods

Semi-aquatic bugs were collected using a net from the surface of water bodies and from the surface of aquatic plants during the period from February to September 2021-2023. The following regions of the republic were covered by sampling: south-western (Khorezm region), central (Jizzakh region), north-eastern (Tashkent city, Tashkent region), southern (Kashkadarya, Surkhandarya regions) and eastern (Namangan, Fergana and Andijan regions), with the special attention to protected natural areas: Kitab Geological National Park, Surkhan State Mountain Forest Reserve and Ugam-Chatkal State Natural National Park (Fig. 1).

Besides the material collected, there are listed the material of the Zoological Institute of the Russian Academy of Sciences (St.-Petersburg, Russia) from the territory of Uzbekistan, identified by the second author.

Material collected by N.I. Lebedeva in 2021–2023, is deposited in the funds of the Entomological Collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan, Tashkent.

The species was identified using several identification keys (Kiritsheko 1951; Kershner, Jaczewski 1964; Kanyukova 1973, 1979, 1982, 2006; Shapovalov et al. 2017).

As a result, an annotated list of Gerromorpha of Uzbekistan is provided.

The following abbreviations are used: IZ of AoS of RUz – Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan, ZIN – Zoological Institute of the Russian Academy of Sciences.

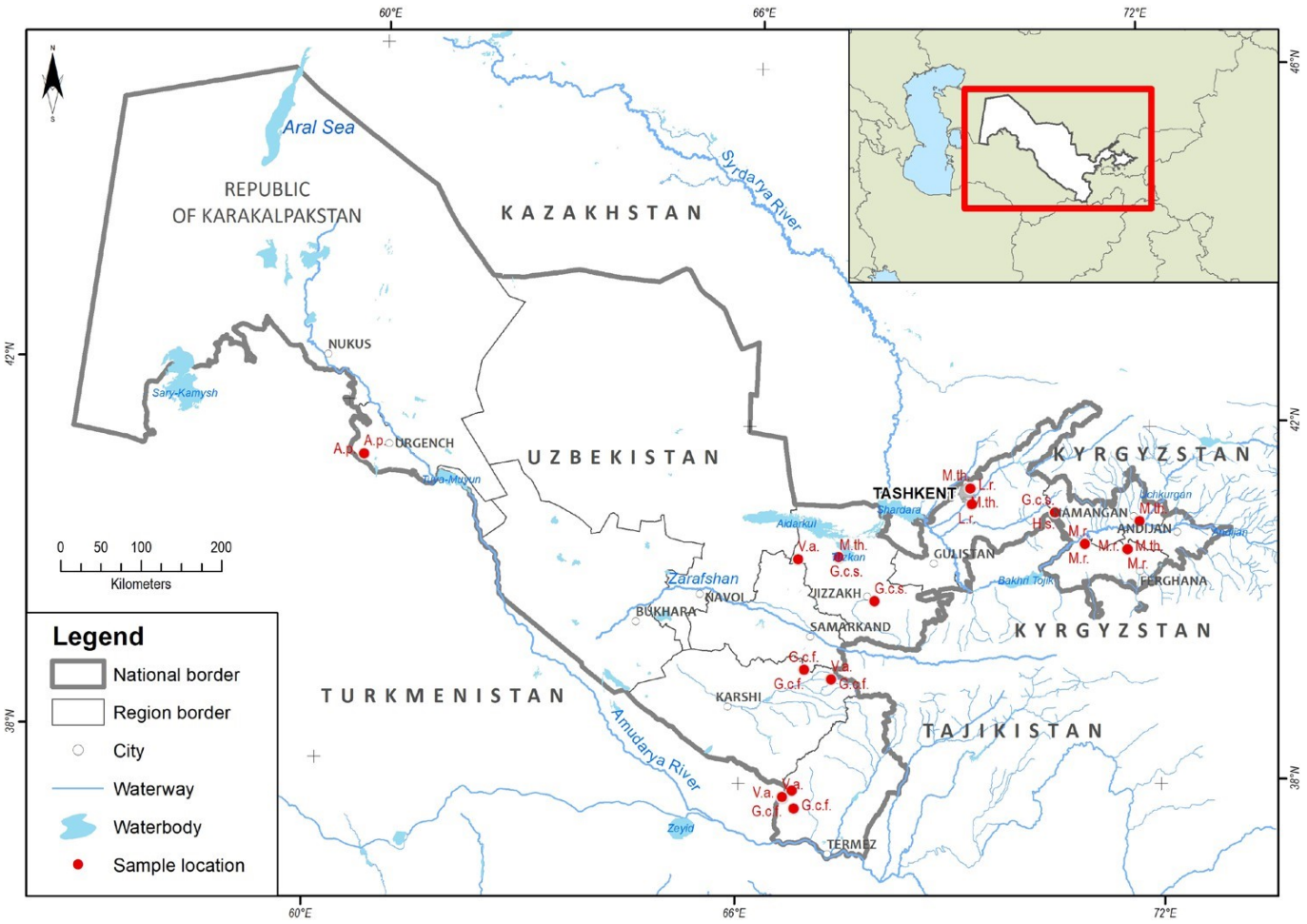

Figure 1. *Sampling sites of the species: M.t. – Mesovelia thermalis; H.s. – Hydrometra stagnorum; M.r. – Microvelia reticulata; V.a. – Velia affinis; A.p. – Aquarius paludum; G.c.f. – Gerris costae fieberi; G.c.s. – Gerris costae sahlbergi; L.r. – Limnoporus rufoscutellatus.*

Result

Infraorder GERROMORPHA Popov, 1971

Family MESOVELIIDAE Douglas & Scott, 1867

Genus *Mesovelia* Mulsant & Rey, 1852

Mesovelia furcata Mulsant & Rey, 1852

Literature records. Khorezm region: Urgench (Kanyukova 1979).

Distribution. Trans-Eurasian species. In Uzbekistan it is reported from the plains of the southwestern region (Kanyukova 1979; Andersen 1995a; Aukema et al. 2013).

Note. The records from Tashkent city and Namangan region (Lebedeva et al. 2022) are erroneous, the material refers to *M. thermalis*.

Habitats. Stagnant water bodies overgrown with duckweed and other floating vegetation.

Mesovelia thermalis **Horváth, 1915**

Literature records. Khorezm (Khiva, Urgench), Samarkand (Chupanata), Syrd-arya (Syrdarya), Surkhandarya (Termez), Fergana (Fergana, Minbulak) and Namangan (Rawat) regions (Kanyukova 1979). Western Tien Shan (Ugam Chatkal National park) (Shukurov et al. 2005); Tashkent city (Lebedeva et al. 2023b).

Material. Collection of IoZ AoS RUz: **Jizzakh region:** Farish district, Tuzkan lake (40°33'9.04" N, 67°23'2.65" E, 234±21 m above sea level (a.s.l.), at the water t = 18oC), 27 Apr. 2023, (N.I. Lebedeva), 1 ♀♀; **Tashkent:** Yunusabad District, lake on the territory of the Botanical Garden named after academician F.N. Rusanov (41°20'41.5" N, 69°18'57.56" E, 480 m a.s.l., at the water t = 18°C), 16 Jun. 2021, (N.I. Lebedeva), 9 exs. (7 nymphae, 2 exuvia); (41°20'40.96" N, 69°18'53.82" E, 483 m a.s.l., at the water t = 18°C), 22 Sep. 2021, (N.I. Lebedeva), 2 exs. (nymphae); (41°20'40.96" N, 69°18'53.82" E), 06 Jun. 2023, (M.N. Valieva), 2 exs. (1 ♀♀, 1 nympha); (41°20'29.54" N, 69°18'43.88" E, 476±22 m a.s.l., at the water t = 25°C), 21 Aug. 2023, (N.I. Lebedeva), 152 exs. (36 ♀♀, 1 macropterous ♀♀, 20 ♂♂, 95 nymphae); **Namangan region:** Naryn District, a hole in the floodplain of the river (40°56'22.31" N, 71°48'30.06" E, 415±17 m a.s.l., at the water t = 18–20°C), 27 Jun. 2021, (N.I. Lebedeva), 2 exs. (nymphae); **Fergana region:** Altynkulsky District, rice checks near the highway (40°37'49.84" N, 71°37'3.36" E, 409 ±12 m a.s.l., at the water t = 38°C); 28 Jun. 2021, (N.I. Lebedeva), 4 exs. (nymphae).

Distribution. Trans-Eurasian species. In Uzbekistan, the species occurs in the floodplains of the Amudarya and Syrdarya rivers, in the west it reaches Khiva, in the north – Samarkand and Jizzakh, in the northeast – to Tashkent, in the east – to Namangan (Kanyukova 1979, 2006; Andersen 1995a; Aukema et al. 2013; Lebedeva et al. 2023b).

Notes. In Uzbekistan, it is more common than the previous species. The specimens from Urgench, Samarkand, Termez and Namangan were mistakenly listed under the name *M. furcata* (Kiritshenko 1964; Lebedeva et al. 2022).

Habitats. From April to September on the plain territory (234–483 m a.s.l.) of the central, north-eastern and eastern regions of the republic. Usually on the above-water part of plants in lakes, ponds in the river floodplain, and rice checks with stagnant water and temperature of 18–38oC. Sometimes it collected sintopically with previous species.

Family HEBRIDAE Amyot & Serville, 1843

Genus *Hebrus* Curtis, 1833

Subgenus *Hebrus* Curtis, 1833

Hebrus (*Hebrus*) *kiritshenkoi* Kanyukova, 1997

Literature records. Bukhara (Bukhara), Kashkadarya (Kitab) and Surkhandarya (Shirabad, Laylakan) regions (Kanyukova 1997).

Distribution. Central Asian species; reported from Uzbekistan, Afghanistan and Tajikistan (Kanyukova 1997, 2006; Kment, Kanyukova 2010). In Uzbekistan recorded from the plains of the central and southern regions.

Note. A.N. Kiritshenko (1964) mentioned it as *H. pusillus* (Fallén, 1807) and *H. montanus* Kolenati, 1857.

Habitats. A.N. Kiritshenko (1964) collected this species on the pebbly, bare banks of the Kafirnigan River (Tajikistan-Uzbekistan bourder) from February 19 to October 21.

***Hebrus* (*Hebrus*) *oxianus* Kanyukova, 1997**

Literature records. Tashkent city (Chirchik river) and Samarcand region (Zeravshan river) (Kanyukova 1997); Uzbekistan (Mirzayeva et al. 2021).

Distribution. Central Asian species; reported from Iran, Turkmenistan, Afghanistan, Tajikistan (Kanyukova 1997, 2006; Kment, Kanyukova 2010; Ghahari et al. 2013). In Uzbekistan recorded from the northeastern and southern regions (Kanyukova 1997; Mirzayeva et al. 2021).

Habitats. All records in Turkmenistan, Uzbekistan, and Tajikistan are from Amu Darya River basin.

***Hebrus* (*Hebrus*) *pilipes* Kanyukova, 1997**

Literature records. Namangan (Namangan) and Fergana (Fergana, Minbulak) regions (Kanyukova 1997).

Distribution. Central Palearctic species. In Uzbekistan in the east (Kanyukova 1997; Kment, Kanyukova 2010; Ghahari et al. 2013; Kanyukova et al. 2016).

Habitats. A.N. Kiritshenko (1964) cited this species as *H. pusillus* and *H. montanus*, from the bank of the Karatag creek. It was collected in Uzbekistan between May 17 and June 22, in Tajikistan from January 19 to August 29, in Turkmenistan – between October 19 and 30 (Kanyukova 1997).

***Hebrus* (*Hebrus*) *pusillus pusillus* (Fallén, 1807)**

Not known from Uzbekistan, replaced by other species.

Distribution. Trans-Palearctic species (Andersen 1995a; Kanyukova 1997; Aukema et al. 2013).

Note. The records of *H. pusillus* from Fergana region: Noviy Margilan (Kiritshenko 1915) and the Karzhantau Range, Western Tien Shan, on the border between Uzbekistan and Kazakhstan (Popov 1966) relates to one of the species listed above. Moreover, all early records of this species from the Crimea, Caucasus and Central Asia (Kiritshenko 1951, 1964, etc.) are erroneous.

Subgenus *Hebrusella* Poisson, 1944

***Hebrus* (*Hebrusella*) *ruficeps* Thomson, 1871**

Literature records. Fergana region (Noviy Margilan and Fergana city) (Kiritshenko 1911, 1915; Kanyukova 1997).

Distribution. Trans-Eurasian species. In Uzbekistan in the plain part of the east of the country (Kiritshenko 1911, 1915; Andersen 1995a; Kanyukova 1997; Aukema et al. 2013).

Habitats. It was collected in Noviy Margilan on 17 May 1908. Usually in peat or sphagnum bogs, or occurs on the outskirts of bogs (Jordan 1952). A.N. Kiritshenko (1915) observed specimens on the "stream drifts". E.V. Kanyukova collected this species in the south of the Russian Far East by netting from water in a small shady pond near the shore (Kanyukova 2006). In Chuvashia (Russia) it was collected in a floodplain sedge swamp (Egorov et al. 2023, and personal report). In the southern regions of Central Asia, species probably prefer other conditions.

Family HYDROMETRIDAE Billberg, 1820

Genus *Hydrometra* Latreille, 1796

***Hydrometra stagnorum* (Linnaeus, 1758)**

=*Hydrometra eremobia* Kiritshenko, 1925

Literature records. Samarkand (Samarkand, Aman-Kutan, Agalyk-noion), Jizzakh (Jizzakh), Tashkent (the mountain system of the Western Tien Shan, Karzhantau, Chatkal), Kashkadarya (Guzar), Surkhandarya (Termez, Laylakan) and Fergana (Fergana) regions (Kiritshenko 1925; Popov 1966; Kanyukova 1973). Samarkand region (Alimzhanov, Bronstein 1956).

Material. Collection of IoZ, AoS of RUz: **Namangan region:** Pap District, Rezak village, mountain river (sai) (41°03'38.84" N, 70°33'40.85" E, 2039 m a.s.l., at the water t = 13oC), 17 Jun. 2023, (M.N. Valieva), 1 exs. (♂♂).

Distribution. Central Palearctic species. In Uzbekistan widespread in the center, south and east (Kiritshenko 1925; Alimzhanov, Bronstein 1956; Popov 1966; Kanyukova 1973; Andersen 1995a; Aukema et al. 2013).

Notes. *H. eremobia* Kiritshenko, 1925 is a light form of *H. stagnorum*, known Western and Central Asia. The Hydrometra sp. from the Hissar Nature Reserve (Kreutzberg 2004) probably refers to the same form of the species. In the Zaravshan Valley it is mentioned (Alimzhanov, Bronstein 1956) under two synonymous names – *H. stagnorum* and *H. eremobia*.

Habitats. Collected from the surface vegetation of the mountain river in the east of the republic, predominantly among thickets on the banks of water bodies, overlooks on the coastal strip of aquatic plants and on the calm surface of the water. D.B. Childibaev et al (1985) indicate that bugs can prey on mosquitoes during the fledging of insects from pupae and also suck the pupae directly (Childibaev, Akhmetbekova 1986).

Family VELIIDAE Brullé, 1836

Subfamily Microveliinae China et Usinger, 1949 (1860)

Genus *Microvelia* Westwood, 1834

Subgenus *Microvelia* Westwood, 1834

***Microvelia* (*Microvelia*) *buenoi* Drake, 1920**

=*Microvelia umbricola* Wroblewski, 1938: 213.

Literature records. Namangan (Namangan) and Ferhana (Min-Bulak - Syr-Darya, Fergana) regions (Kanyukova 2006); Uzbekistan (Mirzayeva et al. 2021).

Distribution. Holarctic species. In Uzbekistan, it is reported in the east (Andersen 1995a; Kanyukova 2006; Aukema et al. 2013).

Notes. Species is geographically variable; apterous individuals with yellow heads, abdominal rims, and legs are presented in material from Uzbekistan and Tajikistan. Sometimes the entire ventral side of the body or most part of the abdomen is yellow. A.N. Kiritshenko (1964) named a series of specimens from Uzbekistan and Tajikistan with similar coloration as *M. incomperta* (nomen nudum). Re-investigation of Kiritshenko material by Kanyukova (2006) established that this is a mixture of *M.* (*P.*) *pygmaea*, *M.* (*M.*) *reticulata* and *M.* (*M.*) *buenoi*. The latter two species are distinguished from *M.* (*P.*) *pygmaea* by a short pronotum and a wide abdomen (Kanyukova 2006).

Habitats. The surface of water and shore vegetation in slowly running water bodies. D.B. Childibaev and R.T. Akhmetbekova (1986) indicate that specimens can attack pupae and imagoes of mosquitoes from the genus *Culex* (Culicidae).

Microvelia (*Microvelia*) *reticulata* (Burmeister, 1835

Literature records. Uzbekistan (Mirzayeva et al. 2021). Namangan and Fergana regions (Lebedeva et al. 2022, 2023a).

Material. The collection of the IZ, AoS of RUz: **Namangan region:** Naryn District, a pit in the floodplain swamp (40°56'22.31" N, 71°48'30.06" E, 415±17 m a.s.l., at the water t = 18°C), 27 Jun. 2021, (N.I. Lebedeva), 2 exs. (1 ♀♀, 1 ♂♂); Pap District, near the Navbakhor village, rice checks near the highway (40°42'2.05" N, 70°59'29.51" E, 368±18 m a.s.l., at the water t = 40°C), 28 Jun. 2021, (N.I. Lebedeva), 37 exs. (24 ♀♀, 13 ♂♂); **Fergana region:** Altynkul District, rice checks near the highway (40°37'49.84" N71°37'3.36" E, 409±12 m a.s.l., at the water t = 38°C), 28 Jun. 2021, (N.I. Lebedeva), 9 exs. (2 ♀♀, 3 ♂♂, 4 nymphae).

Distribution. Trans-Eurasian species. In Uzbekistan in the flat part in the east (Andersen 1995a; Aukema et al. 2013; Mirzayeva et al. 2021; Lebedeva et al. 2022, 2023a).

Habitats. Collected in June in a pit in the floodplain at the water temperature of 18°C and in rice checks with the standing water at 38–40°C (Fig. 2). It prevails in numbers over other species of the genus *Microvelia*.

Figure 2. *Microvelia (Microvelia) reticulata (Burmeister, 1835): A – macropterous male, B – macropterous female (photo by N.I. Lebedeva).*

Subgenus *Picaultia* Distant, 1913

Microvelia (*Picaultia*) *pygmaea* (Dufour, 1833)

Literature records. Khorezm (Dargan ata, Khiva), Bukhara (Farab, Karatag), Samarkand (Chupan ata), Syrdarya (Hungry Steppe station (Khavast)), Tashkent (Tashkent), Surkhandarya (Termez), Fergana (Fergana), Andijan (Andijan) regions, Fergana Ridge (Oshanin 1908; Kiritshenko 1964; Popov 1966).

Distribution. Central Palearctic species. In Uzbekistan in flat terrains of the western, central, southern, and eastern regions (Oshanin 1908; Kiritshenko 1964; Popov 1966; Andersen 1995a; Aukema et al. 2013).

Habitats. Stagnant reservoirs, rice fields and small floodplain water bodies of Asian rivers (Kiritshenko 1964), macropterous forms collected into the light. A.N. Kiritshenko (1964) suggested that uncountable numbers of these predatory bugs are of considerable importance in the sanitation of rice fields.

Subfamily Veliinae Brullé, 1836

Genus *Velia* Latreille, 1804

Subgenus *Plesiovelia* Tamanini, 1955

***Velia* (*Plesiovelia*) *affinis affinis* Kolenati, 1857**

Literature records. South of Samarkand (Aman-kutan) (Tamanini 1958; Kerzhner, Jaczewski, 1964). Kashkadarya and Surkhandarya regions (Lebedeva et al. 2022).

Material. Collection of IZ, AoS of RUz: **Jizzakh region:** Farishsky District, Nuratinsky State Reserve, Khayet village, bio-station, Hayatsai (40°31'38.5" N, 66°46'37.81" E, 944 m a.s.l., at the water t = 10°C), 2 Apr. 2023, (N.I. Lebedeva), 32 exs. (1 ♀♀, 31 nymphae); **Kashkadarya region:** Kitab district, Kitab Geological National Park, the mountainside spring in a narrow gorge (39°11'32.14" N, 67°17'34.01" E, 1290±4 m a.s.l., at the water t = 14°C), 27 Apr. 2021, (N.I. Lebedeva), 1 ♀♀; **Surkhandarya region:** Sherabad District, Surkhan State Mountain Forest Reserve: mountain river in a narrow gorge (37°51'30.42" N, 66°38'4.24" E, 1676±135 m a.s.l., at the water t = 13oC), 18 exs. (1 ♀♀, 17 nymphae); lagoon of the river (37°50'51.07" N, 66°38'34.08" E, 1560±47 m a.s.l., at the water t = 12°C), 28 May 2022, (N.I. Lebedeva), 10 nymphae.

Distribution. Central Palearctic species. In Uzbekistan in the mountainous territories of the central and southern regions (Alimzhanov, Bronstein 1956; Tamanini 1958; Kerzhner, Jaczewski, 1964; Andersen 1995a; Kanyukova 2006; Aukema et al. 2013; Lebedeva et al. 2022).

Notes. Former published records on different Velia species collected in Uzbekistan probably refers to the same taxon, *V.* (*P.*) *a. affinis*: European *V.* (*P.*) *saulii* Tamanini, 1947 and *Velia* sp. (Kreutzberg 2004) from the Hissar Reserve, as well as the Mediterranean *V.* (*Velia*) *rivulorum* (Fabricius, 1775) (Alimzhanov, Bronstein 1956) from the Zaravshan Valley. Due to color variations, identification based on habitus for the species of the genus is not reliable; they can be identified only by the structure of male genitalia.

Habitats. Collected in April-May on the water surface of the shaded mountain rivers (944–1676 m a.s.l.) at the water t = 10–14°C. Usually in cold springs, brooks, and rivers.

Family GERRIDAE Leach, 1815

Subfamily Gerrinae Leach, 1815

Genus *Aquarius* Schellenberg, 1800

***Aquarius paludum* (Fabricius, 1794)**

Literature records. The Republic of Karakalpakstan (Nukus and Turtkul Districts), Khorezm, Kashkadarya (Shakhrisabz), Bukhara (Bukhara) and Surkhandarya (Termez) regions (Kanyukova 1982). Khorezm (Khiva, Urgench, Koshkupyrsky District) (Lebedeva, Mirzayeva 2023). Tashkent (Lebedeva et al. 2023b).

Material. Collection of the IZ, AoS of RUz: **Khorezm region:** Khorezm District, hauz (dug square hole) on the cemetery territory of the Khiva village (41°24'17.5" N, 60°17'41.35" E, 105 m a.s.l., at the water t = 20–22oC), 05 Aug. 2022, (N.I. Lebedeva), 5 exs. (4 ♀♀, 1 nympha), 14 Sep. 2022, (N.I. Lebedeva), 43 exs. (14 ♀♀, 12 ♂♂, 17 nymphae); **Tashkent:** Yunusabad District, lake on the territory of the Botanical Garden named after academician F.N. Rusanov (41°20'29.54" N, 69°18'43.88 E, 476±22 m a.s.l., at the water t = 25°C), 21 Aug. 2023, (N.I. Lebedeva), 2 exs. (♂♂).

Dispersal. Trans-Eurasian species. In Uzbekistan in the flat territories of the western, central, northeastern and southern regions (Kanyukova 1982; Andersen 1995a; Aukema et al. 2013; Lebedeva, Mirzayeva 2023; Lebedeva et al. 2023b).

Habitats. Plain water bodies. Collected on the open water of shaded water bodies (hauz, lake) with the water temperature = 20–25°C.

Genus *Gerris* Fabricius, 1794

Subgenus *Gerris* Fabricius, 1794

***Gerris* (*Gerris*) *argentatus* (Schummel, 1832)**

Literature records. The Republic of Karakalpakstan (Chimbai, Nukus, Khojeyli, Kyzyl jar 18 km from Kungrad, Palvankuduk in Kyzylkum Desert), Khorezm (Urgench, Khiva), Bukhara (Old Bukhara), Samarkand (Kumak, Katta-ming), Tashkent (Chatkal Ridge), Surkhandarya (Termez), Namangan (Namangan) and Fergana (Min-bulak, Fergana) regions (Kanyukova 1982). Uzbekistan (Insects of Uzbekistan 1993); Tashkent region: Chatkal State Biosphere Reserve (Vashetko, Chebotarev 2007).

Distribution. West-central Palearctic species. In Uzbekistan in the plain territories of the western, central and southern regions and the mountainous foothill territories of the northeastern and eastern regions (Kanyukova 1982; Insects of Uzbekistan 1993; Andersen 1995a; Vashetko, Chebotarev 2007; Aukema et al. 2013).

Habitats. Small plain and mountainous foothill water bodies.

***Gerris* (*Gerris*) *costae* (Herrich-Schaeffer, 1850)**

The species is geographically variable, divided into four subspecies: two in Western Europe – *G. costae costae* Herrich-Schaeffer, 1850 and *G. costae poissoni* Wagner and Zimmerman, 1955, as well as the Eastern European – *G. costae fieberi* Stichel, 1938 and the Central Palaearctic *G. costae sahlbergi* Distant, 1879. The boundaries of the ranges of the last two subspecies in the republics of Central Asia were established by Kanyukova (1982).

***Gerris* (*Gerris*) *costae fleberi* Stichel, 1938**

Literature records. Samarkand (Alimzhanov, Bronstein 1956); Bukhara (Bukhara, Sium, Karatag East Bukhara, Gorif village, Ulyan na Rue Dene), Samarkand (Aman-Kutan south of Samarkand and Urgut), Kashkadarya (Kzyltam) and Surkhandarya (Baysun) regions (Kanyukova 1982); Kashkadarya region (Kreutzberg 2004; Lebedeva et al. 2022). Uzbekistan (Insects of Uzbekistan

1993; Mirzayeva et al. 2021).

Material. Collection of IZ, AoS of RUz: **Kashkadarya region:** Kitab District, below Kitabsky pass, mountain dam on the river spring from the slope of a wide gorge (39°17'25.87" N, 66°54'9.61" E, 1615±7 m a.s.l., at the water t = 10°C), 26 Apr. 2021, (N.I. Lebedeva), 9 exs. (5 ♀♀, 4 ♂♂); (39°17'25.4" N, 66°54'9.9" E, 1584 m a.s.l., at the water t = 12°C), 2 May 2022, (N.I. Lebedeva), 3 exs. (♀♀); Kitab Geological National Park, mountain river spring from the slope of a narrow gorge (39°11'32.14" N, 67°17'34.01" E, 1290±4 m a.s.l., at the water t = 14°C), 27 Apr. 2021, (N.I. Lebedeva); 5 exs. (3 ♀♀, 2 ♂♂); a branch of the river at the slope of a narrow gorge (39°11'14.5" N, 67°17'36.71" E, 1361± 10 m a.s.l., at the water t = 14°C), 27 Apr. 2021, (N.I. Lebedeva), 5 exs. (3 ♀♀, 2 ♂♂); **Surkhandarya region:** Sherabad district, Surkhan State Mountain Forest Reserve, above the Khadak village, mountain sai spring from the slope of a narrow gorge (37°55'55.13" N, 66°46'6.28" E, 1438±4 m a.s.l., at the water t = 17°C), 01 May 2021, (N.I. Lebedeva), 1 exs. (♀♀); a pond for receiving artesian water coming from a pipe in the mountains on a plateau on the way to the reserve (37°43'52.43" N, 66°48'4.79" E, 853 m a.s.l., at the water t = 12oC), 27 May 2022, (N.I. Lebedeva), 13 exs. (4 ♀♀, 2 ♂♂, 7 nymphae); mountain sai in a narrow gorge (37°51'30.42" N, 66°38'4.24" E, 1676±135 m a.s.l., at the water t = 13°C), 28 May 2022, (N.I. Lebedeva), 1 exs. (♂♂).

Distribution. West-central Palearctic species. In Uzbekistan in the southwestern, central, and southern regions, to the east the range of the subspecies reaches the line Urgut (Samarkand region) – Kzyltam (Kashkadarya) – Baysun (Surkhandarya region). To the east, this subspecies is replaced by *G. costae sahlbergi* (Alimzhanov, Bronstein 1956; Kanyukova 1982; Andersen 1995a; Kreutzberg 2004; Aukema et al. 2013; Mirzayeva et al. 2021; Lebedeva et al. 2022). The range boundaries of the two subspecies are divided by a gap (interval) of about 100 km or more, no transitional forms were found (Kanyukova 1982).

Notes. It is the subspecies was listed as *G. costae* from the Zaravshan Valley (Alimzhanov, Bronstein 1956), the Gissar Reserve (Kreutzberg 2004), southern Uzbekistan (Mirzayeva et al., 2021); in the work of E.V. Kanyukova (1982) as *G. costae costae* Herrich-Schaeffer; in G.S. Mirzayeva et al. (2021) and N.I. Lebedeva et al. (2022) part of the material from the Kashkadarya region was listed as *G.* (*G.*) *lacustris* (Linnaeus, 1758); N.I. Lebedeva et al. (2022) – the material from the Surkhandarya region – as *G.* (*Gerriselloides*) *lateralis* (Schummel, 1832), and from Jizzakh Region as *G. costae fieberi* Stichel, 1938.

Gerris (*Gerris*) *costae sahlbergi* Distant, 1879

Literature records. Tashkent (Sary-Agach station, Kurgan), Namangan (Kokand, Skobelev station, Fergana, Namichi to the east of Garma, Uch-Kurgan) and Fergana (alkaline-sandy steppe Northern Gavi, Kyzyl Unikur, Sergilek) regions (Kanyukova 1982); Jizzakh (Nuratinsky Reserve), Tashkent region (Ugam ridge of the Western Tien Shan, Chatkal State Biosphere Reserve) (Popov 1966; Lynov et al. 1993; Daminova 2011; Vashetko, Chebotarev 2007).

Material. Collection of IZ, AoS of RUz: **Jizzakh region:** Sharaf Rashidov District, hauz near the highway, plain (40°4'23.84" N, 67°54'12.28" E, 368±13 m a.s.l., at the water t = 18°C), 29 May 2022, (N.I. Lebedeva), 1 exs. (♀♀); Farishsky District, shallow excavation in a drying ditch between Lake Tuzkan and rocks, plain (40°33'34.42" N, 67°22'10.7" E, 245±15 m a.s.l., at the water t = 16°C), 28 Apr. 2023, (N.I. Lebedeva), 65 exs. (39 ♀♀, 23 ♂♂, 3 nymphae); **Namangan region:** Rezak village, mountain river (41°03'38.84" N, 70°33'40.85" E, 2039 m a.s.l.), 17 Jun. 2023, (M.N. Valieva), 3 exs. (2 ♀♀, 1 ♂♂).

Distribution. Central Palearctic species. In Uzbekistan, the range of *G. c. sahlbergi* extends to the east of Tashkent (Kanyukova 1982; Andersen 1995a; Aukema et al. 2013; Kanyukova et al. 2016).

Notes. Yu.A. Popov (1966) listed this subspecies as *G. costae*, N.I. Lebedeva et al. (2022) from

Jizzakh region, Ugam Ridge as *G. costae fieberi* Stichel, 1938. N.M. Andersen (Andersen, Chen 1993; Andersen 1995a, 1995b, etc.) distinguished *G. sahlbergi* as an independent species. Later it was downgraded to subspecies level based on molecular studies (Damgaard 2006).

Habitats. Small running mountainous and stagnant plain water bodies. Collected it in April-June on the surface of water in clear mountain rivers (2039–853 m a.s.l.), ponds with the artesian water, and plain (368–245 m a.s.l.) pools with groundwater, and a hauz with stagnant, turbid, polluted with organic matter water with temperature = 10–18°C.

***Gerris* (*Gerris*) *lacustris* (Linnaeus, 1758)**

Not recorded from Uzbekistan. The southern boundary of the range of this species lies in southern (in the lower reaches of the Syr-Darya) and southeastern Kazakhstan (Kanyukova 1982). The records of these species from the mountainous territory of the Kashkadarya region (Mirzayeva et al. 2021; Lebedeva et al. 2022) are erroneous, the specimens belong to *G. costae fieberi* Stichel, 1938.

***Gerris* (*Gerris*) *odontogaster* (Zetterstedt, 1828)**

Literature records. There is a single record of this species from Karzhantau, a mountain range on the border of South Kazakhstan Oblast of Kazakhstan and Tashkent Oblast of Uzbekistan, part of the Western Tien Shan mountain system (Popov 1966).

Distribution. Trans-Eurasian species. In Uzbekistan in the mountainous foothill territories of the northeastern region (Popov 1966).

***Gerris* (*Gerris*) *thoracicus* (Schummel, 1832)**

Literature records. Khorezm (Urgench), Bukhara (Bukhara, Old Bukhara), Navoi (Kanimeh), Samarkand, Tashkent (Tashkent, Chimgan, Vrevskaya station (now Almazar station)), Surkhandarya (Termez, Laylakan), Syrdarya (Hungry Steppe station of Khodzhensky district) regions (Kanyukova 1982). Tashkent region (Chatkal and Ugam ranges of the Western Tien Shan, Chatkal State Biosphere Reserve) (Popov 1966; Vashetko, Chebotarev 2007).

Distribution. West-central Palearctic species. In Uzbekistan in the flat part from the west to the northeast and in the south, it is recorded in the mountains of the northeast (Popov 1966; Kanyukova 1982; Andersen 1995a; Vashetko, Chebotarev 2007; Aukema et al. 2013).

Subgenus *Gerriselloides* Hungerford et Matsuda, 1958

***Gerris* (*Gerriselloides*) *lateralis* Schummel, 1832**

This northern species is not found in Uzbekistan. The records from the Republic of Karakalpakstan are erroneous, the specimens belong to *G.* (*G.*) *costae fieberi*, and the material found in the Jizzakh region belongs to *G.* (*G.*) *costae sahlbergi* (Lebedeva et al. 2022).

Genus *Limnoporus* Stål, 1868

***Limnoporus rufoscutellatus* (Latreille, 1807)**

Literature records. Samarkand region (Katta Kurgan, Agalyk mountain range) (Kanyukova 1982).

Material. Collection of IZ, AoS of RUz: **Tashkent:** Yunusabad District, lake on the territory of the Botanical Garden named after academician F.N. Rusanov (41°20'29.54" N, 69°18'43.88" E, at the water t = 25oC, 06 Jun. 2023, (M.N. Valieva), 1 exs. (nymphae); **Tashkent region:** Urtachirchik District, mahalla (Uzbek quarter) Mustakillik, collector RV5, water comes from the Karasu River

(41o09'49.49"N 69o19'57.26"E, at the water t = 22oC), 28 Jun. 2023, (M.N. Valieva), 1 exs. (♂♂).

Distribution. Holarctic species. In Uzbekistan in the central and northeastern regions of the republic (Kanyukova 1982; Andersen 1995a; Aukema et al. 2013).

Habitats. Collected in June in shaded areas of an overgrown lake and among the shore vegetation of the reservoir (Tashkent city, Tashkent region).

Subfamily Ptilomerinae Bianchi, 1896

Genus *Heterobates* Bianchi, 1896

Heterobates dohrandti **Bianchi, 1896**

Literature records. The Republic of Karakalpakstan: Nukus, Oxus River [= Amu Darya], type locality (Bianchi 1896), Turtkul (Kiritshenko 1952); Surkhandarya: Termez – Surkhan, Shirabad and Kattakurgan rivers and Katta-ming; Kara-chalak of the Amu Darya delta; Julek, Syrdarya Valley, Bukhara, Khatyrchi (Kiritshenko 1952); Samarkand: Zaravshan Valley (Alimzhanov, Bronstein 1956); Kashkadarya: Gissar Reserve (Kreutzberg 2004) regions; Amudarya, Syrdarya, Zeravshan, Surkhandarya rivers (Kanyukova 2006).

Distribution. Central Asian species. In Uzbekistan in the western, central and southern regions of the republic; large Asian rivers: Amudarya, Syrdarya, Zeravshan, Surkhandarya (Bianchi 1896; Kiritshenko 1952; Alimzhanov, Bronstein 1956; Kanyukova 1982; Andersen 1995a; Kreutzberg 2004; Kanyukova 2006; Aukema et al. 2013).

Habitats. Fast running rivers. It forms large flocks sliding against a very strong current (Kiritshenko 1952). The type material was collected 03–15 September 1874; the ZIN material is dated from May 28 to September 27 (Kiritshenko 1952).

Conclusion

As a result of the study of semi-hard-winged insects of the Gerromorpha infraorder of Uzbekistan, taking into account literary and proprietary data, the composition of semiaquatic bugs of the fauna of Uzbekistan was established. The Uzbekistan fauna of the infraorder cuurently includes 18 species with 2 subspecies, belonging to 9 genera of 5 families. One species is recorded for the fauna of Uzbekistan for the first time: *Microvelia* (*Microvelia*) *reticulata* (Burmeister, 1835). Three species are excluded from fauna: *Hebrus* (*Hebrus*) *pusillus pusillus* (Fallén, 1807), *Gerris* (*Gerris*) *lacustris* (Linnaeus, 1758) and *Gerris* (*Gerriselloides*) *lateralis* (Schummel, 1832).

Most of the species are characterised by a broad ranges. The trans-Eurasian range is characteristic for 6 species (33.3%), the Central Palaearctic for 4 species and one subspecies (27.8%), the West Central Palaearctic for 2 species and one subspecies (16.7%), the Holarctic for 2 species (11.1%). Only two species (11.1%) have a restricted range of a Central Asian type.

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References

Alimdzhanov RA, Bronstein TsG (1956) Invertebrate animals of the Zeravshan Valley. Izdatel'stvo

Akademii Nauk Uzbekskoi SSR, Tashkent, Samarkand, 348 pp. [In Russian]

Andersen NM (1995a) Infraorder Gerromorpha Popov, 1971 – Semiaquatic bugs. Aukema B, Rieger Chr (Ed.) Catalogue of the Heteroptera of the Palaearctic Region. Netherlands Entomological Society, Amsterdam 1: 77–114. https://www.researchgate.net/publication/254899169

Andersen NM (1995b) Cladistics, historical biogeography, and a check-list of gerrine water striders (Hemiptera, Gerridae) of the World. Steenstrupia 21: 93–123.

Andersen NM, Chen P (1993) A taxonomic review of the pondskater genus *Gerris* Fabricius in China, with two new species (Hemiptera, Gerridae). Entomologica Scandinavica 24: 147–166. https://catpalhet.linnaeus.naturalis.nl/linnaeus_ng/app/views/literature2/reference.php?id=132

Aukema B, Rieger C, Rabitsch W (2013) Catalogue of the Heteroptera of the Palaearctic Region. Vol. 6. Supplement. The Netherlands Entomological Society, Amsterdam, 629 pp. https://www.researchgate.net/publication/328828873

Bianchi V (1896) On two new forms of the heteropterus family Gerridae. Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St. Pétersbourg 1: 69–76. https://www.biodiversitylibrary.org/item/36003#page/8/mode/1up

Childibaev DB, Akhmetbekova RT (1986) On the regulation of the number of bloodsucking dipterans by water bugs in floodplain water bodies. On regulation of bloodsucking Diptera number by Hemiptera-Heteroptera in the flood reservoires. Trudy Instituta Zoologii, Alma-Ata 43: 99–107. [In Russian]

Childibaev DB, Kasheev VA, Akhmetbekova RT (1985) Fauna of entomophages of the main breeding sites of bloodsucking Diptera in the floodplain of the Ili River. Works of Institute of Zoology of the Academy of Sciences of the Kazakh SSR 42: 59–77. [In Russian]

Damgaard J (2006) Phylogeny and mtDNA phylogeography of two widespread European pond skater species (Hemiptera-Heteroptera: Gerridae: Gerris Fabricius). Insect Systematics and Evolution 37: 335–350. http://dx.doi.org/10.1163/187631206788838554

Daminova DB (2011) Entomofauna of the Nuratinsky Reserve. Works of nature reserves of Uzbekistan. Tashkent, Chinor ENK 7: 101–155. [In Russian]

Ghahari H, Moulet P, Ostovan H, Linnavuori RE (2013) An annotated catalog of the Iranian Dipsocoromorpha, Enicocephalomorpha, Gerromorpha, Leptopodomorpha and Nepomorpha (Hemiptera: Heteroptera). Zootaxa 3641(4): 301–342. http://dx.doi.org/10.11646/zootaxa.3641.4.1

Henry TJ (2009) Biodiversity of the Heteroptera. In: Foottit RG, Adler PH (Eds) Insect Biodiversity: Science and Society. Wiley-Blackwell, Oxford, England, 223–263. https://doi.org/10.1002/9781118945568.ch10

Insects of Uzbekistan (1993) Asimova DA, Bekuzina AA, Davletshina AG, Kadyrova MK (Eds) Fan, Tashkent, 340 pp. [In Russian]

Jordan KHC (1952) Wasserläufer. Noue Brehm-Bücherei 52, 32 pp.

Kanyukova EV (1973) On the distribution of the Hydrometridae (Heteroptera) of the fauna of the USSR. Zoologicheskii Zhumal 52: 1253–1254. https://www.researchgate.net/publication/371535456 [In Russian]

Kanyukova EV (1979) Water striders of the family Mesoveliidae (Heteroptera) of the USSR fauna.

In: Terrestrial Arthropoda of the Far East. Akademiya Nauk SSSR, Vladivostok, 19–23. [In Russian]

Kanyukova EV (1982) Water-striders (Heteroptera, Gerridae) of the fauna of the USSR. Trudy Zoologicheskogo lnstituta, Akademiya Nauk SSSR 105: 62–93. [In Russian]

Kanyukova EV (1997) Hebridae of Russia and adjacent countries (Heteroptera). Zoosystematica Rossica 6(1/2): 223–236. https://www.researchgate.net/publication/354946386

Kanyukova EV (2006) Aquatic of true bugs (Heteroptera: Nepomorpha, Gerromorpha) of the fauna of Russia and neighboring countries. Dal'nauka Publ., Vladivostok, 297 pp. [In Russian]

Kanyukova EV, Luo Zh, Vinokurov NN (2016) Studies of true bugs of Xinjiang, North-western China. III. Water Bugs and Semiaquatic Bugs (Heteroptera: Nepomorpha, Gerromorpha). Entomological Review 96(6): 701–709. http://dx.doi.org/10.1134/S001387381606004X

Kerzhner IM, Jaczewski T (1964) Order Hemiptera (Heteroptera). In: Bei-Bienko GYa (Ed.) Opredelitel' nasekomykh evropeiskoi chasti SSSR [Keys to the insects of the European part of the USSR] 1: 655–845. https://www.biodiversitylibrary.org/bibliography/46334 [In Russian]

Kiritshenko AN (1911) Notices sur les Hemipteres-Heteropteres de la faune russe. Russkoe Entomologicheskoe Obozrenie 11(1): 40–43. https://www.biodiversitylibrary.org/item/44809#page/27/mode/1up [In Russian]

Kiritshenko AN (1915) The fauna of Hemiptera-Heteroptera of the Veliko-Anadol woodland and Mariupol' experimental forestry, Ekaterinoslav Prov. Zapiski Novorossiiskogo Obshchestva Estestvoispytateley 41: 247–263. [In Russian]

Kiritshenko AN (1925) Hemiptera – Heteroptera turanica nova, IV. Russkoe Entomologicheskoe Obozrenie 19: 1–6.

Kiritshenko AN (1951) True bugs of the European part of the USSR (Hemiptera): Key and bibliography. Opredeliteli po Faune SSSR 42: 1–423. https://catpalhet.linnaeus.naturalis.nl/linnaeus_ng/app/views/literature2/reference.php?id=3660&epi=1 [In Russian]

Kiritshenko AN (1952) New and little known bugs (Hemiptera-Heteroptera) of Tajikistan. Trudy Zoologicheskogo Instituta Akademii Nauk SSSR 10: 140–198. [In Russian]

Kiritshenko AN (1964) Bugs (Hemiptera-Heteroptera) of Tadzhikistan. Institute of Zoology and Parasitology. Dushanbe, 258 pp. [In Russian]

Kment P, Kanyukova EV (2010) New faunistic records of Hebridae (Hemiptera: Heteroptera) from the Mediterranean and the Near and Middle East. Acta Musei Moraviae, Scientiae biologicae (Brno) 95(2): 11–18.

Kreutzberg AV-A (2004) Review of the state and functioning of the main entomocomplexes of the Gissar Reserve. The state and prospects of the network of protected areas in Central Asia. Proceedings of Nature Reserves of Uzbekistan 4/5: 259–272. [In Russian]

Lebedeva NI, Mirzayeva GS (2023) New findings of the *Aquarius paludum* (Fabricius, 1794) in the reservoirs of Uzbekistan. Interpretation and Research 1(1): 363–369. https://interpretationandresearches.uz/index.php/iar/article/view/492 [In Russian]

Lebedeva NI, Mirzayeva GS, Kholmatov BR, Musaev DM, Akhmedov AG, Valieva MN (2022) Fauna and taxonomy of near-water and aquatic bugs (Heteroptera: Nepomorpha, Gerromorpha) Uzbekistan. Uzbek Biological Journal 3: 23–27. [In Russian]

Lebedeva NI, Musaev DM, Mirzayeva GS, Valieva MN (2023a) The first finds of the squashbug *Microvelia* (*M*.) *reticulata* (Burmeister, 1835) in the reservoirs of Uzbekistan. Bulletin of the Khorezm Academy of Mamun. Maxis son, Khiva, 84–87. [In Russian]

Lebedeva NI, Valieva MN, Mirzayeva GS (2023b) Monitoring of aquatic and near-aquatic bedbugs (Nepomorpha: Gerromorpha) in Tashkent Botanical Garden named after F.N. Rusanov. Materials of the V Republican Scientific and Practical Conference. "Zoological science of Uzbekistan: modern problems and development prospects", dedicated to the 85th anniversary of the birth of the Academy of Sciences. November 16, 2023. Tashkent, 60–62. [In Russian]

Lynov YuS, Savich OV, Dustov D, Chinov VYu, Kadyrov N, Pogrebnyak AD (1993) Chatkal State Nature Reserve. Chronicle of Nature for 1992, Parkent, 46–51. [In Russian]

Mirzayeva GS, Musaev DM, Lebedova NI, Musaeva MK, Valieva MN (2021) Species of water bugs (Heteroptera, Nepomorpha, Gerromorpha) distributed in southern Uzbekistan. Zoological Institute of the Academy of Sciences of the Republic of Uzbekistan, materials of the III Republican scientific and practical conference "Zoological science: problems and prospects of development of the present". Science, Tashkent, 58–60. [In Uzbek]

Oshanin B (1908) Verzeichnis der Paläarktischen Hemipteren, mit besonderer Berücksichtigung ihrer Verteilung im Russischen Reiche. I. Heteroptera. II Lieferung: Tingididae-Acanthiidae. St. Peretsburg, 395–586 p. https://www.biodiversitylibrary.org/item/45730#page/10/mode/1up

Popov YuA (1966) Specific composition and distribution of true bugs (Heteroptera) of the Western Tien-Shan. In: Narzikulov MN, Luppova EP (Eds) Fauna i zoogeografiya nasekomykh Srednei Azii [Fauna and zoogeography of insects of Middle Asia]: 79–114. [In Russian]

Shapovalov MI, Saprykin MA, Prokin AA (2017) Aquatic and semiaquatic bugs (Heteroptera: Nepomorpha, Gerromorpha) of the North-West Caucasus: fauna, zoogeography and ecology. KMK Scientific, Moscow, 186 pp. [In Russian with English title and abstract] https://www.researchgate.net/publication/323345243

The VI National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity (2018) Tashken, 169–213, 210–256. http://dx.doi.org/10.13140/RG.2.2.35147.34081 [In Russian]

Shukurov EJ, Mitropolsky OV, Talskikh VN, Zholdubaeva LY, Shevchenko VV (2005) Atlas of Biological Diversity of the Western Tien Shan – The Central Asian transboundary project of the GEF/World Bank for the conservation of biodiversity of the Western Tien Shan. Regional Department of project implementation. Astana-Bishkek-Tashkent, 101 pp. https://s3.eu-central-1.amazonaws.com/biom/lib/book/atlas_biodiv_west_tian_shan.pdf [In Russian]

Tamanini L (1958) Alcune osservazioni sulle Velia della Russia e descrizione di una nuova specie. XIV Contributo allo studio del genere *Velia* Latr. (Heteroptera, Veliadae). Doriana 2 (83): 1–8.

Vashetko EV, Chebotarev SO (2007) A preliminary review of invertebrate species of the Chatkal State Biosphere Reserve. Proceedings of the Chatkal State Biosphere Reserve. Tashkent 6: 132–177. [In Russian]