



## Fauna and importance of blister beetles (Coleoptera, Meloidae) of the Southern Aral Sea Region (Uzbekistan)

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The territory of the Southern Aral Sea region has suffered the most from the environmental consequences of the drying up of the Aral Sea. That is why monitoring the state of the fauna of the region is very important. The article presents a complete analysis of the fauna of blister beetles of the Southern Aral Sea region and an assessment of its current state. For the first time, a list of blister beetles of the Southern Aral Sea region has been compiled, including 27 species from 2 subfamilies, 6 tribes, and 9 genera. Among them, *Hycleus scabiosae*, *Meloe cicatricosus*, *Lydulus albopilosus*, *Rhampholyssa steveni*, *Zonitis flava* were not found in our survey, while *Epicauta erythrocephala*, *Mylabris coeruleascens*, *Mylabris crocata*, *Hycleus polymorphus*, *Lytta deserti* were recorded for the first time in the Southern Aral Sea basin. Of the four biocoenoses (the Kyzylkum Desert, the Lower Amu Darya Biosphere Reserve, Southern Ustyurt and agrocenoses), the most diverse was the fauna of blister beetles of the Kyzylkum desert, including 19 species. Only 9 species were noted in the Lower Amu Darya Biosphere Reserve. The most similar are the faunas of the Southern Ustyurt and agrocenoses, which have 8 common species. The fauna of blister beetles of the Kyzylkum Desert is the most isolated. Blister beetle larvae (mainly species of the genera *Mylabris* and *Epicauta*) parasitize on eight species of locusts. The infestation of egg pods of *Locusta migratoria migratoria* by blister beetle larvae was 29.2% and that of *Calliptamus italicus italicus* – 32.8%.

**Keywords:** blister beetles; Southern Aral Sea Region; *Locusta migratoria*; *Calliptamus italicus*.

### Introduction

The family Meloidae Gyllenhal, 1810 includes about 3,000 species (Bologna & Pinto, 2018; Pan & Ren, 2020). The life cycle of blister beetles is very complex and they develop by hypermetamorphosis (Shintani et al., 2017). Adult beetles mainly feed on flowers and leaves of plants of the families Fabaceae, Solanaceae, Cucurbitaceae, Asteraceae, Plumbaginaceae, Tamaricaceae, etc., while the larvae feed exclusively on locust eggs or parasitize inside hives (Zakhvatkin, 1931; Bologna & Pinto, 2010; Saul-Gershenz et al., 2018; Bahmer & Lückmann, 2021; Deyrup et al., 2021; Nurjanov et al., 2023; Nurjanov et al., 2024).

The hemolymph and body tissues of almost all members of the family contain the poisonous substance cantharidin, which causes irritation of the skin and mucous membranes (Kolov & Kazenas, 2013). The cantharidin content is the reason for the use of blister beetles in medicine (Evans & Hogue, 2006; Bahmer & Lückmann, 2021).

Although there is much information about the beetles of Uzbekistan (Zokirova, 2022; Khalimov, 2023; Khalimov et al., 2023; Romantsov & Rakhimov 2023; Alimova et al., 2024) blister beetles remain one of the least studied groups, especially in the Southern Aral Sea region. Mention of blister beetles of the desert territories of Uzbekistan is found only in some faunistic works (Davleshina, 1979; Khamraev, 2003). However, in neighboring regions the species composition of blister beetles has been studied quite well (Kuzin, 1953; Kryzhanovskiy, 1965; Aksentyev, 1981, 1988; Mordkovich & Chernyshev, 1999; Nikolaev & Kolov, 2005).

### Materials and methods

The Southern Aral Sea region includes the Khorezm region of Uzbekistan, the Autonomous Republic of Karakalpakstan, and the Tashkhozuz region of Turkmenistan. This region belongs to the Lower Amu Darya agroclimatic region of the Turan agroclimatic province and covers the plain from the Tuyamoyin depression to the Aral Sea basin (Hasanov, 2010).

The collection of materials was carried out in 2021–2024 in various landscapes of the Southern Aral Sea region within Uzbekistan, including the Aral Sea, the Kyzylkum Desert, 12 districts of the Republic of Karakalpakstan (Amu Darya, Beruni, Tortkol, Ellikkalyn, Takhtakopir, Chimboy, Karaozek, Shumanay, Kanlykul, Kongirov and Moinok districts), as well as the Khiva and Yangiariq districts of the Khorezm region (Fig. 1). The research area did not include the Tashkhozuz district of Turkmenistan.

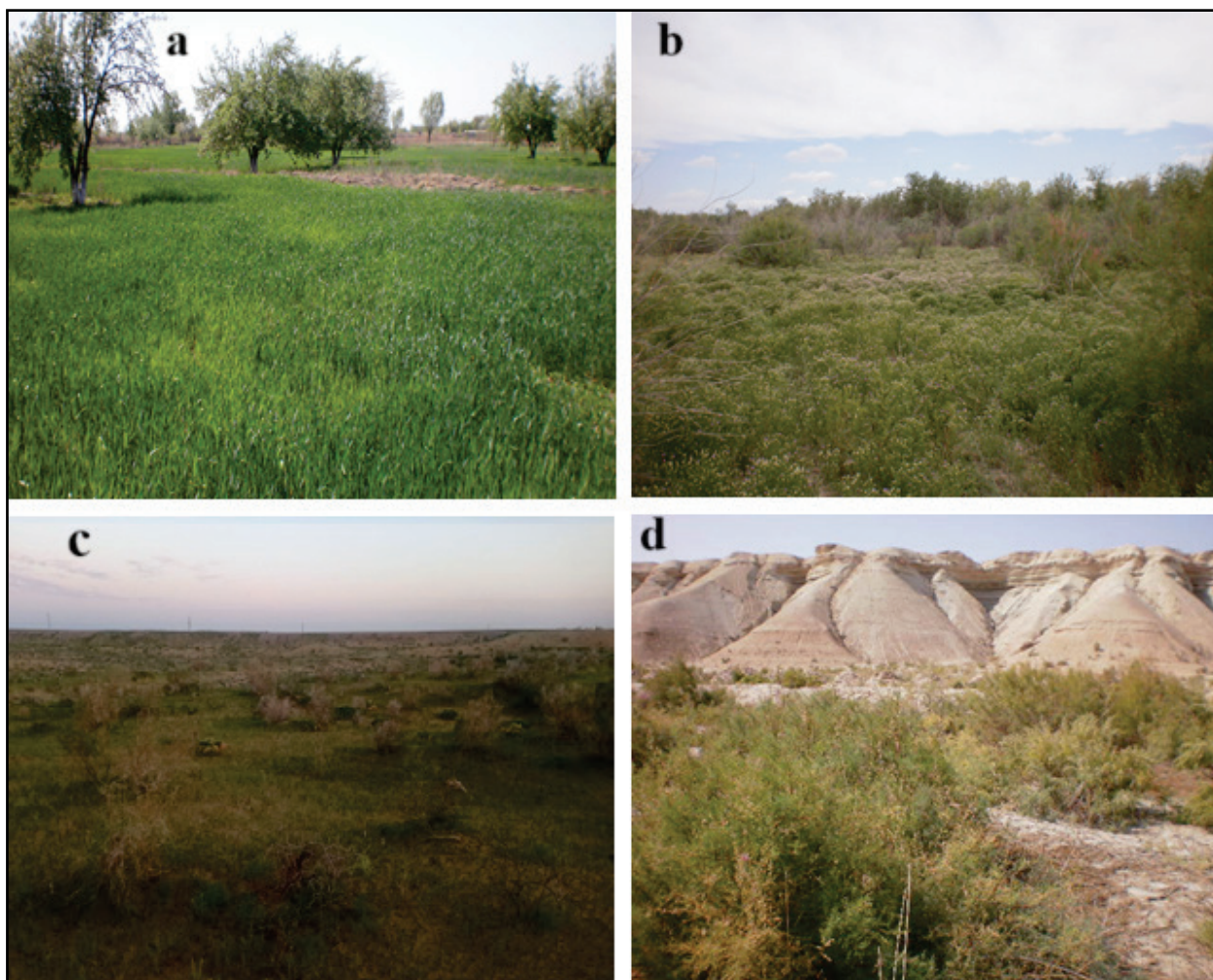
To compare the fauna of blister beetles from different parts of the Southern Aral Sea region, four points were identified: the Kyzylkum Desert, the Lower Amu Darya Biosphere Reserve, Southern Ustyurt, and agrobiocenoses.

The material was collected according to the generally accepted method, using an entomological net, a forceps, an aspirator, and manual collection. The collected material was stored in plastic containers (in cotton mattresses and 96% alcohol). The species were identified by comparison with specimens from the blister beetle collection of the Institute of Zoology of the Republic of Uzbekistan and using identification guides (Kolov, 2004; Kolov & Kazenas, 2013; Shapovalov, 2016; Ghahari & Campos-Soldini, 2019). A binocular microscope

SMZ-161-TL was also used. The coordinates of the material collection sites were determined using maps.me and ART-GIS.

The calculation of the Jaccard and Ochiai coefficients, as well as the compilation of the dendrogram, were performed using the PAST-

4.0 program (David Harper (University of Copenhagen) and Paul Ryan (National University of Ireland), 2001). The compiled collection of ground beetles is stored in the Entomological Collection of the Institute of Zoology of the Republic of Uzbekistan.



**Fig. 1.** Landscapes of collection points: *a* – Kegeyli district, agrobiocenosis, *b* – Bozатов district, *c* – Ustyurt southern chink, *d* – Northwest Kyzylkum Desert

## Results

For the first time, a list of blister beetles of the Southern Aral Sea region has been compiled, including 27 species from 2 subfamilies, 6 tribes, and 9 genera. Among them, the following species; *Hycleus scabiosae* (Olivier, 1811), *Meloe cicatricosus* Leach, 1815, *Lydulus albopilosus* Semenov, 1893, *Rhampholyssa steveni* (Fischer von Waldheim, 1824), *Zonitis flava* Fabricius, 1775 were not found in our survey, while *Epicauta erythrocephala* (Pallas, 1781), *Mylabris coerulea* Gebler, 1841, *Mylabris crocata* (Pallas, 1781), *Hycleus polymorphus* (Pallas, 1771), *Lytta deserti* Semenov, 1890 were recorded for the first time in the Southern Aral Sea basin.

Family Meloidae Gyllenhal, 1810

Subfamily Meloinae Gyllenhal, 1810

Tribe Epicautini Denier, 1935

Genus *Epicauta* Dejean, 1834

*Epicauta erythrocephala* (Pallas, 1781)

Material examined. 4♀, 2♂, Khodjayli district (42°27.35' N, 59°21.00' E), 7.VIII.2021. 3♂, desert zone of Shumanay district (42°50.97' N, 58°41.88' E) 22.VII.2022. 7♀, Semi-desert zone of Amudarya district (42°3.30' N, 60°14.26' E), 24.06.2021. 6♀, Nazarkhan zone of the Lower Amu Darya State Biosphere Reserve (42°17.47' N, 60°01.58' E), 23.VI.2021. 5♂, Krantau village, Nukus district (42°38.42' N, 59°19.06' E), 23.06.2021.

Distribution: South East Europe, Caucasus, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan, China. Also, Western Siberia (Russia) and Turkey (Tshernyshev, 2014).

Host plants: *Phragmites australis*, *Convolvulus arvensis*, *Cynodon dactylon*, *Tamarix hispida*.

Tribe Mylabrini Laporte, 1840

Genus *Mylabris* Fabricius, 1775

*Mylabris magnoguttata* (Heyden, 1881)

Material examined. 2♂, Takhtakopir district (43°7.64' N, 59°34.39' E), 05.VI.2023.

Distribution: China, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Ferula assa-foetida*.

*Mylabris pusilla* Olivier, 1811

Material examined. 3♀, Kyzylkum desert, Republic of Karakalpakstan (42°44.933830' N, 59°58.426107' E), 28.VII.2022.

Distribution: Italy, Ukraine, Russia, Mongolia, Caucasus, Kazakhstan, Uzbekistan.

Host plant: *Alhagi pseudalhagi*.

*Mylabris quadripunctata* (Linnaeus, 1767)

Material examined. 13♀, 5♂, Kyzylkum Desert, Republic of Karakalpakstan (42°41.37' N, 61°16.58' E), 19.05.2021, (43°13.41' N,

60°24.07' E), 19.05.2021; 8♀, Khorezm region: desert zone of Yangiariq district (41°19.56' N, 60°35.17' E), 29.05.2023, 6♀, 2♂, A populated place in Kegeili district (42°41.48' N, 59°43.42' E), 23.VIII.2022, (42°41.52' N, 59°43.44' E), 23.VIII.2022, 5♀, desert zone of Tortkol district (41°53.69' N, 61°9.22' E), 25.07.2022.

Distribution: Southern Europe, Ukraine, Russia, Caucasus, Mongolia, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.  
Host plants: *Ferula assa-foetida*, *Tithymalus falcatus*.

*Mylabris sedecimpunctata* Gebler, 1825

Material examined. 1♂, 7♀, Ashshikol suburb of Nukus city (42°30.46' N, 59°38.45' E), 21.V.2023, (42°30.50' N, 59°38.48' E), 21.V.2023. 2♀, Jaykhun village, Kanlikol district (42°54.78' N, 59°11.21' E), 14.V.2023. 1♀, 14♂, Karatereng Lake, Takhtakopir district (43°13.38' N, 60°23.73' E), 28.VI.2022, (43°13.55' N, 60°23.74' E), 28.VI.2022. 2♂, 1♀, Krantau village, Nukus district (42°38.42' N, 59°19.06' E), 20.VIII.2023.

Distribution: Egypt, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan. Also noted in Mongolia (Tshernyshev & Axentiev, 1996).

Host plants: *Glycyrrhiza aspera*, *Phragmites australis*, *Convolvulus arvensis*, *Tithymalus falcatus*, *Alhagi pseudalhagi*.

*Mylabris frolovi* Germar, 1824

Material examined. 9♀, Surroundings of the Aral Sea (44°33.12' N, 58°30.12' E), 18.V.2022. 4♀, Kyzylkum Desert, Republic of Karakalpakstan (42°41.42' N, 61°16.73' E), 31.V.2023. 7♀, Sultan Uwais low hills (41°52.77' N, 60°52.11' E), 10.VII.2021. 11♀, 2♀, Nazarkhan zone of the Lower Amu Darya State Biosphere Reserve (42°15.99' N, 60°3.68' E), 23.VII.2021.

Distribution: China, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan. Also noted in Mongolia (Tshernyshev & Axentiev, 1996).

Host plants: *Ferula assa-foetida*, *Alhagi pseudalhagi*, *Convolvulus arvensis*, *Glycyrrhiza aspera*, *Tithymalus falcatus*.

*Mylabris calida* (Pallas, 1781)

Material examined. 12♀, 3♂, Main zone of the Lower Amu Darya State Biosphere Reserve (41°59.60' N, 60°21.38' E), (42°0.21' N, 60°21.67' E), 19.VIII.2021, 7♂, Bekpay zone (42°19.38' N, 59°48.38' E), 19.VIII.2021, 1♀, 3♂, Botanical Garden of Tulus City (42°25.45' N, 59°34.63' E), (42°24.80' N, 59°34.60' E), 05.V.2022.

Distribution: Greece, Caucasus, Algeria, Tunisia, Egypt, Syria, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plants: *Tamarix hispida*, *Convolvulus arvensis*, *Cynodon dactylon*, *Alhagi pseudalhagi*, *Glycyrrhiza aspera*.

*Mylabris coeruleascens* Gebler, 1841

Material examined. 3♀, Kyzylkum Desert, Republic of Karakalpakstan (42°35.88' N, 60°9.23' E), 28.VII.2022; (42°43.97' N, 61°15.31' E), 01.06.2023.

Distribution: Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan. Also noted in Mongolia (Tshernyshev & Axentiev, 1996).

Host plants: *Tamarix hispida*, *Salsola richteri*.

*Mylabris crocata* (Pallas, 1781)

Material examined. 8♂, Desert zone of Takhtakopir district (43°13.41' N, 60°24.07' E), 28.VI.2022. 2♀, desert zone of Shumanay district (42°27.35' N, 59°21.01' E), 30.IV.2022.

Distribution: Southern and Central Europe, Mongolia, Caucasus, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan. Also noted in the steppes of Western and Eastern Siberia (Russia) and Western China (Tshernyshev, 2014).

Host plants: *Phragmites australis*, *Tamarix hispida*, *Cynodon dactylon*, *Tithymalus falcatus*.

*Mylabris magnoguttata* (Heyden, 1881)

Material examined. 7♀, 2♂, Kyzylkum Desert, Republic of Karakalpakstan (42°43.97' N, 61°15.31' E), 31.V.2023.

Distribution: Afghanistan, China, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Alhagi pseudalhagi*.

*Mylabris schrenki* Gebler, 1841

Material examined. 6♀, Low hills of Sultan Uwais (42°1.15' N, 60°38.80' E), 10.VII.2021.

Distribution: China, Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Calamagrostis pseudophragmites*.

*Mylabris elegantissima* Zubkov, 1837

Material examined. 11♂, Desert zone of the Kongirot district (43°5.39' N, 58°25.29' E), 23.III.2022.

Distribution: Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plants: *Tamarix pentandra*, *Calamagrostis pseudophragmites*.

*Mylabris triangulifera* Heyden, 1883

Material examined. 1♂, Settlements in the Beruni district (41°40.92' N, 60°47.38' E), 06.VI.2021.

Distribution: Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plants: *Glycyrrhiza aspera*, *Convolvulus arvensis*.

*Mylabris audouini* Marseul, 1870

Material examined. 4♂, Kyzylkum Desert, Republic of Karakalpakstan (42°34.10' N, 61°14.91' E), 31.V.2023. Ustyurt chink.

Distribution: Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Tamarix pentandra*.

*Mylabris koenigi* Dokhtouroff, 1889

Material examined. 2♀, Surroundings of the Aral Sea (44°33.12' N, 58°30.12' E), 18.V.2022.

Distribution: Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Tamarix ramosissima*.

Genus *Hycleus* Latreille, 1829

*Hycleus polymorphus* (Pallas, 1771)

Material examined. 6♂, Bekpay zone of the Lower Amu Darya State Biosphere Reserve (42°19.38' N, 59°48.38' E), 19.VIII.2021.

Distribution: Southern Europe, Algeria, Ukraine, Russia, China, Syria, Algeria, Caucasus, Kazakhstan, Turkmenistan, Uzbekistan (Tshernyshev, 2014).

Host plants: *Alhagi pseudalhagi*, *Calamagrostis pseudophragmites*, *Convolvulus arvensis*.

*Hycleus scabiosae* (Olivier, 1811)

Published records: South-Western Kyzylkum (Davletshina, 1979).  
Distribution: Russia, Caucasus, Kazakhstan, Turkmenistan, Uzbekistan, Mongolia.

*Hycleus tekkensis* (Heyden, 1883)

Material examined. 1♀, Kyzylkum Desert, Republic of Karakalpakstan (42°44.62' N, 60°17.24' E), 11.VI.2021.

Distribution: Afghanistan, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Host plant: *Alhagi pseudalhagi*.

Tribe Meloini Gyllenhal, 1810

Genus *Meloe* Linnaeus, 1758

*Meloe brevicollis* Panzer, 1793

Material examined. 1♀, Kyzylkum Desert, Republic of Karakalpakstan (42°51.90' N, 60°26.76' E), 17.VI.2022.

Distribution: North Africa, Caucasus, Russia, Ukraine, Mongolia, Afghanistan, Kazakhstan, Uzbekistan.

Host plant: *Alhagi pseudalhagi*.

*Meloe cicatricosus* Leach, 1815

Published records: South-Western Kyzylkum (Davletshina, 1979).

Distribution: South-Western Europe, Russia, Afghanistan, Tajikistan, Turkmenistan, Kyrgyzstan, Kazakhstan, Uzbekistan.

Tribe Lyttini Solier, 1851

Genus *Lydulus* Semenov, 1893

*Lydulus albopilosus* Semenov, 1893

Published records: South-Western Kyzylkum (Davletshina, 1979).

Distribution: Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan.

Genus *Lytta* Fabricius, 1775

*Lytta coccinea* Menetries, 1849

Material examined. 8♀, 1♂, Surroundings of the Aral Sea (44°26.52' N, 58°34.14' E), (44°29.72' N, 58°29.31' E) 18.V.2022, 3♂, Desert zone of Khiva district, Khorezm region (41°20.90' N, 60°26.63' E), 30.V.2023. 1♀, 4♂, Ashshiqkol surroundings of Nukus city (42°30.45' N, 59°38.43' E), 05.V.2022, (42°30.49' N, 59°38.47' E), 05.V.2022. 1♀, Desert zone of Kongiroi district (43°5.34' N, 58°21.28' E), 29.IV.2023.

Distribution: Uzbekistan, Turkmenistan, Afghanistan.

Host plants: *Tamarix pentandra*, *Tamarix ramosissima*, *Tithymalus falcatus*, *Alhagi pseudalhagi*.

*Lytta deserti* Semenov, 1890

Material examined. 2♀, 6♂, Kyzylkum Desert, Republic of Karakalpakstan (43°12.48' N, 60°28.68' E), 31.V.2023, (42°44.43' N, 60°0.96' E), 31.V.2023. 5♀, Jumurtau zone of the Lower Amu Darya State Biosphere Reserve (42°3.97' N, 60°15.18' E), 23.VI.2021. 9♂, Jambaskala desert zone of Tortkol district (41°53.69' N, 61°9.22' E), 23.VIII.2021. 2♀, 11♂, Akshakol area of the Ellikkala district, (41°53.23' N, 60°51.46' E), 23.VIII.2021, (41°52.62' N, 60°52.24' E), 23.VIII.2021.

Distribution: Southern part of Central Asia.

Host plant: *Salsola arbuscula*, *Tamarix* sp., *Tithymalus falcatus*, *Alhagi pseudalhagi*.

Tribe Cerocomini Leach, 1815

Genus *Cerocoma* Geoffroy, 1762

*Cerocoma schaefferi* (Linnaeus, 1758)

Material examined. 3♀, Kyzylkum Desert, Republic of Karakalpakstan (42°45.49' N, 60°30.67' E), 04.VI.2022.

Distribution: Northern and Southern Europe, Russia, North Africa, North Caucasus, Turkey, Kazakhstan, Uzbekistan.

Host plant: *Tamarix pentandra*.

*Cerocoma schreberi* Fabricius, 1781

Material examined. 1♂, Kyzylkum desert, Republic of Karakalpakstan (42°44.62' N, 60°17.24' E), 08.VI.2022.

Distribution: Southern Europe, Russia Caucasus, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan. Also distributed in western Siberia and Mongolia (Tshernyshev & Axentiev, 1996; Tshernyshev, 2014).

Host plant: *Tamarix pentandra*.

Genus *Rhampholyssa* Kraatz, 1863

*Rhampholyssa steveni* (Fischer von Waldheim, 1824)

Published records: South-Western Kyzylkum (Davletshina, 1979).

Distribution: Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan.

Subfamily Nemognathinae Laporte, 1840

Tribe Horiini Latreille, 1802

Genus *Zonitis* Fabricius, 1775

*Zonitis flava* Fabricius, 1775

Published records: South-Western Kyzylkum (Davletshina, 1979).

Distribution: Northern and Central Europe, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan.

## Discussion

Thus, the Meloidae fauna of the studied region includes 27 blister beetle species belonging to 2 subfamilies, 6 tribes, and 9 genera. Pre-

viously, the list of blister beetles of the region included 22 species (Davletshina, 1979; Khamraev, 2003). 5 blister beetle species *Epicauta erythrocephala*, *Mylabris coerulescens*, *Mylabris crocata*, *Hycleus polymorphus* and *Lytta deserti* were recorded for the Southern Aral Sea region for the first time. However, these species were recorded for Central and Southern Uzbekistan (Yakhontov, 1931; Alimjanov, Bronstein, 1956). In addition, our survey did not reveal 5 blister beetle species (*Hycleus scabiosae*, *Meloe cicatricosus*, *Lydulus albopilosus*, *Rhampholyssa steveni* and *Zonitis flava*), which were previously reported for this region.

We have comparatively analyzed the diversity of blister beetles in 4 types of biocenoses: the Kyzylkum Desert, the Lower Amu Darya Biosphere Reserve, the steep, hard-to-reach ledges of the Southern Ustyurt, and agrocenoses (Table 1).

**Table 1**

Distribution of blister beetles in different landscapes of the Lower Aral Sea region

No.	Species	Kyzylku Desert	Lower Amu Darya Biosphere Reserve	South Ustyurt	Agrobiocenoses
1.	<i>Epicauta erythrocephala</i>	–	+++	+++	+++
2.	<i>Mylabris magnoguttata</i>	–	–	–	+
3.	<i>M.s pusilla</i>	+	–	–	–
4.	<i>M. quadripunctata</i>	+++	++	+++	+++
5.	<i>M. sedecimpunctata</i>	–	++	++	+++
6.	<i>M. frolovi</i>	+++	++	+++	+++
7.	<i>M. calida</i>	++	+++	++	+++
8.	<i>M. coerulescens</i>	++	–	–	–
9.	<i>M. crocata</i>	+++	–	–	–
10.	<i>M. magnoguttata</i>	++	–	–	–
11.	<i>M. schrenki</i>	++	+	–	–
12.	<i>M. elegantissima</i>	–	–	++	+
13.	<i>M. triangulifera</i>	–	–	–	++
14.	<i>M. audouini</i>	–	+	++	–
15.	<i>M. koenigi</i>	–	–	+	–
16.	<i>Hycleus polymorphus</i>	–	+	–	–
17.	<i>H. scabiosae</i>	+	–	–	–
18.	<i>H. tekkensis</i>	+	–	–	–
19.	<i>Meloe brevicollis</i>	++	–	–	–
20.	<i>M. cicatricosus</i>	++	–	–	–
21.	<i>Lydulus albopilosus</i>	++	–	–	–
22.	<i>Lytta coccinea</i>	++	–	++	++
23.	<i>L. deserti</i>	+++	+++	++	+++
24.	<i>Cerocoma schaefferi</i>	++	–	–	–
25.	<i>C. schreberi</i>	+++	–	–	–
26.	<i>Rhampholyssa steveni</i>	++	–	–	–
27.	<i>Zonitis flava</i>	++	–	–	–
Total		19	9	10	10

Note: + – rare, ++ – common, +++ – numerous.

The most diverse fauna of blister beetles was found in the Kyzylkum Desert, including 19 species, and the least rich is the fauna of the Lower Amu Darya Biosphere Reserve – 9 species. *Mylabris quadripunctata*, *M. frolovi*, *M. calida*, and *Lytta deserti* were noted in all study areas. The most similar are the faunas of Southern Ustyurt and agrocenoses, which have 8 common species (Jaccard coefficient – 0.67, Ochiai coefficient – 0.8, Table 2). 13 species of blister beetles were noted only in the Kyzylkum Desert, which shows the most isolation of the fauna of this region (Fig. 2). In addition, 17 species of blister beetles were noted only in one section of the studied territories.

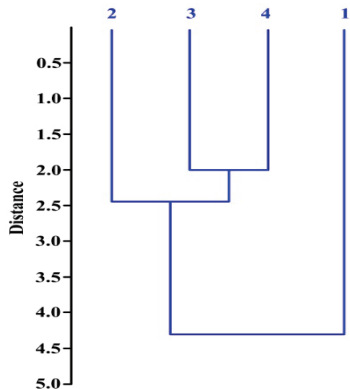
**Table 2**

Similarity of the species composition of blister beetles in four areas of the Southern Aral Sea region (Jaccard index\Ochiai index)

Sites	Kyzylkum Desert	Lower Amu Darya Biosphere Reserve	South Ustyurt	Agrobiocenoses
Kyzylkum Desert	–	0.38	0.36	0.36
Lower Amu Darya Biosphere Reserve	0.22	–	0.74	0.63
South Ustyurt	0.21	0.58	–	0.80
Agrobiocenoses	0.21	0.46	0.67	–

A study of the trophic relationships of blister beetle larvae showed that the larvae parasitize eight species of locusts (Table 3).

There are about 300 species of locusts distributed in the territories of the Republic of Uzbekistan, of which 3 species (*Locusta migratoria*, *Calliptamus italicus italicus* and *Dericorys albidula*) are gregarious species. In the Aral Sea region, mass invasions of *Locusta migratoria* are often observed, since this region is one of the foci of this species. The infestation of Asian locusts with blister beetle larvae was studied (Table 4). The density of *Locusta migratoria* egg pods was, on average, 4.9 per 1 m<sup>2</sup>. 270 egg pods of Asian locusts were analyzed, and the average number of eggs per egg pod was 43.7. The number of egg pods infected with blister beetles was 79 (29.2%).



**Fig. 2.** Dendrogram of similarities of the fauna of blister beetles in different landscapes of the Lower Aral Sea region: 1 – Kyzylkum Desert; 2 – Lower Amu Darya Biosphere Reserve; 3 – South Ustyurt; 4 – agrobiocenoses

**Table 3**  
Trophic relationships of blister beetle larvae with locust species

Blister beetle species	Species of locust that is parasitized by the blister beetle larva
<i>Epicauta erythrocephala</i>	<i>Locusta migratoria migratoria</i> L., 1758, <i>Calliptamus italicus italicus</i> L., 1758, <i>Calliptamus turanicus</i> Serg. Tarb., 1930, <i>Calliptamus barbarus cephalotes</i> (Costa, 1836)
<i>Mylabris magnoguttata</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Mylabris pusilla</i>	<i>Calliptamus italicus italicus</i> L., 1758
<i>Mylabris quadripunctata</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Mylabris sedecimpunctata</i>	<i>Calliptamus italicus italicus</i> L., 1758, <i>Calliptamus turanicus</i> Serg. Tarb., 1930, <i>Calliptamus barbarus cephalotes</i> (Costa, 1836), <i>Oedaleus decorus</i> (Germ., 1817)
<i>Mylabris frolovi</i>	<i>Calliptamus italicus italicus</i> L., 1758, <i>Calliptamus turanicus</i> Serg. Tarb., 1930, <i>Calliptamus barbarus cephalotes</i> (Costa, 1836)
<i>Mylabris calida</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Mylabris coerulea</i>	<i>Calliptamus italicus italicus</i> L., 1758
<i>Mylabris crocata</i>	<i>Doclostaurus (s.str.) tartarus</i> (Stshelk., 1909)
<i>Mylabris magnoguttata</i>	<i>Oedaleus decorus</i> (Germ., 1817)
<i>Mylabris schrenki</i>	<i>Doclostaurus (s.str.) tartarus</i> (Stshelk., 1909)
<i>Mylabris elegantissima</i>	<i>Oedaleus decorus</i> (Germ., 1817), <i>Leptopternis gracilis</i> (Ev., 1848)
<i>Mylabris triangulifera</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Mylabris audouini</i>	<i>Calliptamus turanicus</i> Serg. Tarb., 1930, <i>Doclostaurus</i> sp.
<i>Mylabris koenigi</i>	<i>Euthystira brachyptera</i> (Ocsk., 1826)
<i>Hycleus polymorphus</i>	<i>Calliptamus italicus italicus</i> L., 1758, <i>Calliptamus turanicus</i> Serg. Tarb., 1930, <i>Calliptamus barbarus cephalotes</i> (Costa, 1836)
<i>Hycleus scabiosae</i>	–
<i>Hycleus tekkensis</i>	<i>Calliptamus turanicus</i> Serg. Tarb., 1930
<i>Meloe brevicollis</i>	<i>Doclostaurus (s.str.) tartarus</i> (Stshelk., 1909)
<i>Meloe cicatricosus</i>	–
<i>Lydulus albopilosus</i>	–
<i>Lyta coccinea</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Lyta deserti</i>	<i>Locusta migratoria migratoria</i> L., 1758
<i>Cerocoma schaefferi</i>	<i>Doclostaurus (s.str.) tartarus</i> (Stshelk., 1909)
<i>Cerocoma schreberi</i>	<i>Doclostaurus (s.str.) tartarus</i> (Stshelk., 1909)
<i>Rhampholyssa steveni</i>	–
<i>Zonitis flava</i>	–

The infestation of Italian locust (*Calliptamus italicus italicus*) eggs by blister beetles was also studied in the Keigeli area. In this area, the population density of *Calliptamus italicus italicus* was the highest and amounted to 15 egg pods per 10 m<sup>2</sup>. The damage to the egg pods of Italian locusts by blister beetles was 32.8%. The main parasites of *Calliptamus italicus italicus* are blister beetles of the genus *Mylabris* and *Epicauta*.

**Table 4**  
Infestation of Asian locusts (*Locusta migratoria migratoria*) with blister beetle larvae

Research points	Number of egg pod		
	total	infected with blister beetle larvae	
		things	%
Sudoche, Khozha Koltik	75	23	30.7
Karamush-1 and Karamush-2	126	39	30.9
Muynak Bay	12	4	33.3
Zhaltirbas	57	13	22.8
Total	270	79	29.2

## Conclusion

In summary, 27 species of the blister beetles belonging to 2 sub-families, 6 tribes, and 9 genera are distributed in the Southern Aralsea basin. *Epicauta erythrocephala*, *Mylabris coerulea*, *Mylabris crocata*, *Hycleus polymorphus*, and *Lyta deserti* have been recorded for the Southern Aral Sea region for the first time. The composition of blister beetles varies significantly between different parts of the region. The fauna of blister beetles in Kyzylkum is the most diverse. Blister beetles play a significant role in reducing the number of dangerous harmful locusts, such as *Locusta migratoria migratoria* and *Calliptamus italicus italicus*.

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