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БАЯНДАМАЛАРЫ

ДОКЛАДЫ

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MATERIALS FOR THE FAUNA OF LYGAEIDAE (HEMIPTERA, HETEROPTERA) OF SOUTH-EASTERN KAZAKHSTAN

Abstract. The article presents the results o field research in 2019-2020 in South-Eastern Kazakhstan. Objective: To study the fauna, biology, ecology and distribution of terrestrial hemiptera in the territory of South-Eastern Kazakhstan. Therefore, on the basis of our own research, an inventory and a comprehensive analysis of the fauna of terrestrial hemiptera were carried out and an annotated list was compiled. As a result of the conducted research, 59 species of terrestrial hemiptera from 36 genera were identified. Among them, the following genera are distinguished by species diversity: *Nysius* (7 species), *Cymus, Geocoris* (4 species each), *Spilostethus, Oxycarenus* (3 species each), and in the remaining 31 genera, 1-2 species are known. Hemiptera are characterized by wintering at different stages of development. Hemiptera wintering in the imago stage is 49 species, in the egg stage 6 species overwinter, in the imago and larval stages 4 species overwinter. According to the number of generations per year, all species of terrestrial hemiptera of South-Eastern Kazakhstan can be divided into several groups: 1) monovoltine (49 species), 2) bivoltine (9 species), 3) polyvoltine (1 species). Different species of hemiptera have different requirements for the degree of moisture content of the habitat. On this basis, the following ecological groups of species are distinguished: xerophiles (2 species), meso-xerophiles (31 species), mesophiles (26 species). According to their location, the terrestrial hemiptera of South-Eastern Kazakhstan are divided into several groups: dendrobionts (7 species), dendromnobionts (1 species), hortobionts (26 species), herpetobionts (18 species), and herpetobionts (7 species). According to food connections, zoophages and phytophages are distinguished among ground bugs. Zoophages include 4 species, the rest are phytophages. Phytophages are divided into 4 groups according to the breadth of specialization: a) polyphages (35 species), b) broad oligophages (6 species), c) narrow oligophages (10 species), d) monophages (4 species). *Nysius pilosulus* Horvath, 1904 was recorded for the first time in Kazakhstan.

Keywords: Hemiptera, Heteroptera, Lygaeidae, fauna, south-eastern Kazakhstan.

Introduction. Semi-hard-winged insects as a group with a rich species composition occupy an important place in the life of biocenoses and agrobiocenoses. Depending on the specific diet, hemiptera are divided into useful and harmful species. Useful include predatory species of bedbugs that feed on various insects, their eggs, larvae, and other small invertebrates. Harmful include numerous herbivorous species, which in practice in some cases cause significant harm to forestry and agriculture. In this regard, the study of hemiptera is of scientific and practical interest.

The aim of the research is to identify the biodiversity of terrestrial hemiptera inhabiting the territory of the study, to study the ecological, biological features and distribution of species of hemiptera in the territory of South-Eastern Kazakhstan.

The basis for this work was the authors own collections and field observations. The material was collected in 2019-2020 in various biotopes of South-Eastern Kazakhstan.

Materials and methods of research. The study of insects was carried out according to generally accepted entomological methods [1-3]. Various methods were used to collect insects: catching insects was carried out with a standard entomological net, small insects with an exhauster, manual collection, catching in the light, etc. The most common method of collecting invertebrates from plants is "mowing". The "mowing" not only collected invertebrates, but also quantify: compare the number of specimens of any species caught in net for a certain number of strokes on different parts (or different plants), or conduct surveys changes in abundance, having the same plot (or plant) sampling after a certain period of time. At night, flying insects are attracted by light sources. The ultraviolet part of the spectrum is particularly attractive. In addition to special light traps, headlights or a car carrying lamp, a portable lantern and lighting lanterns are also used for this purpose.

Based on our own research, an inventory and comprehensive analysis of the fauna of terrestrial hemiptera were carried out and an annotated list was compiled.

The results of the study and their discussion. The following is an annotated list of identified species in the study region. For each species, the collection points and dates, the Latin name and brief information on biology and ecology are given.

Apterola lownii (Saunders, 1876). Almaty, botanical garden, fruit garden, 27.06.2020, 4 ♀, 5♂; 15.08.2020, 2♀, 1♂. Herpetobiont (under rocks, under plants), mesophyll (in the foothills and mountains); polyphytophagus (on various herbaceous plants, mainly on sagebrush, feeds on plant seeds) [4]; monovoltine, adults overwinter.

Arocatus roeselii (Schilling, 1829). Almaty city, botanical garden, 27.06.2019, 4♀, 5♂, 25.07.2019, 8♀, 9♂; 05.07.2020, 4♀, 7♂. Dendrobiont (on coniferous trees under the bark, alder Alnus fruits) [4]; mesophyll; polyphytophagus; monovoltine, overwintering imago.

Arocatus melanocephalus (Fabricius, 1798). Almaty, academic town. 27.06.2019, 12♀, 15♂; 19.07.2020, 9♀, 8♂. Dendrobiont (found under the bark of trees (especially oaks), in the crevices of wood, on the leaves of various trees (mainly elm) [4]; mesophyll; polyphitophage; monovoltine, overwintering imago.

Lygaeosoma sibiricum Seidenstucker, 1962. Almaty city, botanical garden, 12.07.2019, 1♀, 2♂; 12.06.2020, 2♀, 2♂; 30.08.2020, 3♀, 2♂. Herpetobiont (under various plants: *Atriplex, Halocnemum, Salicornia*, etc.); meso-xerophile; polyphitophage (seeds of various plants); monovoltine, overwintering imago. Often under Veronica incana [5].

Lygaeus equestris (Linnaeus, 1758). Almaty region, Balkhash district, the village of Miyaly, floodplain of the Ili river, 07.06.2019, 3♀, 4♂; 40 km from Kapchagai downstream of the Ili river, 09.07.2020, 2♀, 2♂; Zhetysu Alatau, Kyzyl-uyz gorge, 22.06.2019, 2♀, 1♂; 14.06.2020. 2♀, 1♂; Taigak gorge, 21.06.2019, 2♀, 4♂; cordon Zhantogay floodplain of the Ili river, 10.07.2020, 1♀, 1♂; cordon Shygan, 08.07.2020, 5♀, 6♂. Herpeto chortobiont (in open places among grasses, under different plants); meso-xerophile; politicii (fallen seeds of many plants and the juice of the green parts [6]; monovoltine species, the adults overwinter [7].

Lygaeus simulans Deckert, 1985. Almaty region, Balkhash district, Bakanas village district, 27.06.2019, 1♀, 3♂; Miyaly village district, 28.06.2019, 2♀, 3♂; 10.07.1920, 1♀, 1♂. Herpetobiont; meso-xerophile; polyphytophagus (fallen seeds of many plants and sap of green parts); monovoltine, adults overwinter [8].

Melanocoryphus albomaculatus (Goeze, 1778). Zhetysu Alatau, mountains Sholak, Taigak gorge, 21.06.2019, 1♀, 1♂; Iley Alatau, Aksai gorge, 17.06.2020, 3♀, 1♂. Herpetobiont (in the litter, in the soil); meso-xerophile (under dry leaves and stones; on sandy soil); polyphytophagus (fallen seeds of many plants); monovoltine, overwintering imago [7].

Spilostethus rubriceps (Horvath, 1899). Zhetysu Alatau, Koyandytau mountains, Uzynbulak gorge, 17.07.2020, 2♀, 1♂; Iley Alatau, Medeu district, 11.06.2019, 5♀, 3♂; 29.07.2020, 4♀, 2♂. Herpetobiont; mesophyll (more often in the mountains); polyphytophagus (fallen seeds of many plants and juice of green parts); monovoltine; winter imago.

Spilostethus saxatilis Scopoli, 1763. Zhetysu Alatau, mountains Koyandytau, Uzynbulak gorge, 17.07.2020, 2♀, 2♂; foothills of Iley Alatau, Aksai gorge, Ushkonyr village district, 17.06.2019, 3♀, 1♂; 24.06.2020, 1♀, 2♂. Herpetobiont; mesophyll (forest edges); polyphytophagus (fallen seeds of many plants and sap of green parts); monovoltine; adults overwinter.

Spilostethus pandurus Scopoli, 1763. Zhetysu Alatau, Taigak gorge, 21.06.2020, 2♀, 3♂; Kyzylauyz gorge, 10.07.2020, 4♀, 2♂; Iley Alatau, Aksay gorge, 25.06.2019, 2♀, 2♂; 30.07.2020, 2♀, 3♂. It is ubiquitous in Kazakhstan. Herpetobiont; mesophyll; polyphytophagus (fallen seeds of many plants and sap of green parts, prefers labiaceae); monovoltine [9]; adults overwinter.

Tropidothorax leucopterus (Goeze, 1778). Almaty region, Balkhash district, the village of Bakanas, 27.06.2019, 1♀, 3♂; the village of Miyaly, 29.07.2020, 2♀, 3♂. Herpetobiont; meso-xerophilus; polyphytophagus (fallen seeds of many plants and juice of green parts); monovoltine; adults overwinter [4].

Nysius cymoides (Spinola, 1837). 40 km from Kapchagai downstream of the Ili river, 27.06.2019, 4♀, 5♂; Zhetysu Alatau, Taigak gorge, 10.07.2019, 2♀, 1♂; Shygan cordon, 12.07.2019, 2♀, 3♂; 17.06.2020, 2♀, 3♂. Hortobiont; meso-xerophile (in steppe, desert biotopes on herbaceous plants and under them among detritus); polyphitophage (seeds and sap of vegetative parts of herbaceous plants); monovoltine; imago overwinter [10].

Nysius graminicola graminicola (Kolenati, 1845). Almaty region, Balkhash district, Miyaly village, Floodplain of the Ili river, 08.06.2019, 7♀, 6♂; 40 km from Kapchagai downstream of the Ili River, 17.07.2019, 5♀, 4♂; Altyn-Emel Nature Park, Zhantogay cordon, floodplain of the Ili river, 21.06.2020, 4♀, 3♂; Maly and Bolshoy Kalkany mountains, 21.06.2020, 3♀, 5♂; 15.07.2020, 9♀, 11♂. In Kazakhstan, it is ubiquitous and common. Hortobiont (on herbaceous plants and under them among detritus); mesoxerophile (in steppe biotopes); polyphitophage (on cereals, complex flowers, etc.); bivoltine; adults overwinter [10].

Nysius ericae ericae (Schilling, 1829). Almaty region, Enbekshikazakh district, Masak village, Chilik river floodplain, 22.06.2019, 4♀, 2♂; 40 km from Kapchagai downstream of the Ili river, 17.07.2020, 2♀, 3♂; Zhetysu Alatau, steppe plateau between Seriktas and Sholak, 07.07.2019, 3♀, 21.07.2020, 1♀, 2♂. Hortobiont; xerophilus (dry places, well warmed by the sun with a sparse vegetation cover); polyphitophage (on compound, cruciferous, euphorbiaceae, haze and other herbaceous plants, feeds on plant seeds); bivoltine; adults overwinter. It flies well and can migrate to other biotopes [11].

Nysius helveticus (Herrich-Schaeffer, 1850). Almaty region, 40 km from Kapchagai downstream of the Ili river, 24.06.2019, 4♀, 3♂; 26.06.2019, 2♀, 1♂; Zhetysu Alatau, Kyzylauyz gorge, 11.07.2020, 2♀, 1♂; Shygan cordon, 08.07.2020, 3♀, 5♂; Alakol Reserve, Togyztubek cordon, 12.06.2020, 2♀; 14.06.2020, 2♀, 3♂. Hortobiont; meso-xerophyll (in clearings, edges and dry meadows, on stony slopes; on various soils); polyphitophage (on various herbaceous plants); bivoltine [4]; eggs overwinter.

Nysius pilosulus Horvath, 1904. Ileysky Alatau, Aksai gorge, 25.06.2020, 1♀, 2♂. Hortobiont; mesophyll (on mountain slopes, in meadows); polyphytophagus; bivoltine; adults overwinter [4]. Distribution: Mongolia, Kyrgyzstan (Tien Shan), Kazakhstan (marked for the first time).

Nysius senecionis senecionis (Schilling, 1829). Almaty region, Balkhash district, Bakanas village, floodplain of the Ili river, 21.06.2019, 1♀, 1♂; 23.06.2020, 5♀, 3♂. Hortobiont; mesophyll (on sandy soils along rivers); polyphytophagus; monovoltine; adults overwinter [4].

Nysius thymi thymi (Wolff, 1804). Almaty region, Enbekshikazakh district, Masak village, Chilik river floodplain, 22.06.2019, 1♀, 2♂; Balkhash district, Miyaly village, floodplain of the Ili river, 21.06.2019, 3♀, 1♂; 40 km from Kapchagai downstream of the Ili river, 26.06.2019, 4♀, 2♂; 27.06.2020, 2♀, 1♂. Hortobiont; meso-xerophyll (in floodplains, on edges and glades); polyphytophagus (seeds and juice of vegetative parts, on cruciferous, buckwheat, compound, rosaceae, cereals, on spring ephemera) [4]; monovoltine; eggs overwinter.

Orsillus depressus (Mulsant & Rey, 1852). Zhetysu Alatau, Taigak gorge, 21.06.2020, 2♀, 2♂; 23.06.2020. 2♀, 3♂; Koyandytau, Uzynbulak gorge, 27.06.2020, 4♀, 3♂. Dendrobiont (on coniferous, more often on juniper); mesophyll (subalpine meadow); wide oligophytophagus; monovoltine; overwintering eggs.

Orsillus maculatus Fieber, 1861. Iley Alatau, B. Almatinka gorge, 18.06.2020, 2♀, 3♂; Zhetysu Alatau, Taigak gorge, 21.06.2020, 2♀, 3♂; 23.06.2020. 2♀, 4♂; Koyandytau, Uzynbulak gorge, 27.06.2020, 2♀, 3♂. Dendrobiont (in pine, cypress and juniper cones); mesoxerophile; broad oligophytophagus; monovoltine; eggs overwinter. In Cyprus, it is recorded in cones of *Cupressus sempervirens* [4].

Ortholomus punctipennis (Herrich-Schaeffer, 1838). Almaty city, botsad, 07.07.2020, 1♀, 2♂; Zhetysu Alatau, steppe plateau between Seriktas and Sholak, 21.06.2020, 1♀, 2♂; 07.07.2020, 3♀, 1♂;

Altyn-Emel Nature Park, Shygan cordon, 08.07.2020, 4♀, 2♂; Katutau mountain plumes, Baigetobe cordon, 28.07.2020, 2 ♀ , 1 ♂ ; mountains Koyandytau, Uzynbulak, Kayyndy gorge, 28-30.07.2020, 3♀, 5♂; Maly Kalkan, 10.07.2020, 1♀, 3♂; Alakol Reserve, Tuyuksu cordon, 06.07.2019, 3♀, 4♂; Togyztubek cordon, 02-03.07.2019, 2♀, 3♂; 05.07.2019, 2♂. Hortobiont (inhabitant of various grasses, mainly cereals); meso-xerophile (open dry places, on dry settled meadows and steppes, in the foothills and on the slopes of mountains, on xerophytic stations); polyphitophage; bivoltine; adults overwinter [12].

Kleidocerys resedae resedae (Panzer, 1797). Almaty region, 119 km downstream of the river or from Kapchagai, 19.06.2019, 4♀, 3♂; 10.07.2020, 2♀, 2♂; Enbekshikazakh district, Tabaksovkhoz, 19.06.2020, 1♀; Almaty city, botsad, 23.06.2019, 2♀, 3♂; 07.06.2020, 1♀, 2♂; 26.07.2020, 4♀, 3♂; Zhetysu Alatau, Taigak gorge, 21.06.2019, 2♀, 1♂; Kyzylauyz gorge, 10.07.2020, 3♀; Altyn-Emel Nature Park, Shygan cordon, 08.07.2020, 3♀, 2♂; Uzynbulak cordon, Konakbaysay gorge, 30.07.2020, 1♀, 2♂; Alakol Reserve, Usharala district, 26.08.2019, 1♀, 2 ♂; 15.06.2020, 3♀, 2♂. Tamno-dendrobiont (almost everywhere where there is birch and alder); mesophyll; polyphytophagus; monovoltine; adults overwinter, larvae of V age-under the bark, in hollows, in rolled dry leaves. Mostly on birches, but also on other trees and shrubs. Sometimes it is noted in large populations and then the sucking of pedicels, catkins of birch causes their mass fall and actually destroys the harvest of birch seeds. Damaged leaves bend the edges to the lower side [6].

Cymus aurescens Distant, 1883. Alakolsky Reserve, Togyztubek cordon, Tentek river floodplain, 14.06.2020, 2♀, 2♂; 18.06.2020, 2♀, 2♂. Hortobiont; mesophyll (floodplain, wet and wetlands); polyphytophagus (*Scirpus, Carex, Juncus*, etc.); monovoltine [13]; adults overwinter.

Cymus claviculus (Fallen, 1807). Almaty region, 40 km from Kapchagai downstream river, 26.06.2019, 1♀, 1♂; Almaty city, Botanical garden, 13.06.2019, 2♀, 1♂; Altyn-Emel Nature Park, cordon Mynbulak, 08.07.2020, 1♀, 1♂; cordon Shygan, 08.07.2020, 4♀, 5♂; 10.07.2020, 2♀, 3♂; 21.08.2020, 2♀, 1♂. Chortobiont (inhabitant of herbaceous plants, mainly on sedge [14]; the species is mesophilous (floodplain damp and marshy places); politicii; monovoltine species; overwinter as adults.

Cymus glandicolor Hahn, 1832. Almaty region, Enbekshikazakh district, Masak village, in the floodplain of the Chilik river, 12.06.2020, 3♀, 2♂; Zhetysu Alatau, Kyzylauyz gorge, 10.07.2020, 2♀, 1♂; Altyn-Emel Nature Park, Shygan cordon, 08.07.2020, 1♀, 2♂; 11.06.2020, 1♀, 2♂. Hortobiont; mesophyll (floodplain wet and swampy places, on wet meadows) [4]; polyphytophagus; monovoltine; adults overwinter.

Cymus melanocephalus Fieber, 1861. Almaty city, Botanical garden, 12.06.2020, 1♀, 2♂, Almaty region, Balkhash district, the village of Miyaly, floodplain of the Ili river, 21.06.2019, 4♀, 3♂; Altyn-Emel Nature Park, cordon Shygan, 08.07.2020, 3♀, 2♂; cordon Zhantogay, floodplain of the Ili river, 29.07.2020, 2♀, 3♂. Chortobiont; the species is mesophilous (floodplain moist and swampy places, wet meadows); politicii (on Cyperaceae and juncaceae); monovoltine species; overwinter as adults.

Blissus putoni Jakovlev, 1875. Altyn-Emel Nature Park, Singing Dune, 21.06.2019, 4♀, 3♂; 28.06.2020, 3♀, 3♂; cordon Zhantogay, 21.06.2019, 3♀, 2♂; 28.06.2020, 1♀, 2♂. Hortobiont; xerophilus (in deserts and sandy steppes); narrow oligophytophagus (on Aristida pennata and under Elymus giganteus); monovoltine; adults overwinter [11, 15].

Dimorphopterus blissoides Baerensprung, 1859. 119 km from Kapchagai, floodplain of the Ili river, 10.07.2019, 1♀, 2♂; 21.06.2020, 3♀, 2♂. Hortobiont; mesophyll (tugai forests on floodplains, on reeds, in leaf axils); monophytophagus (on Phragmites); monovoltine; adults and larvae of older ages overwinter [4].

Ischnodemus caspius Jakovlev, 1871. Altyn-Emel Nature Park, Zhantogay cordon, floodplain of the Ili river, 21.06.2019, 1♀, 2♂; Uzynbulak cordon, Konakbaysay Gorge, 10.07.2019, 2♀, 2♂; 18.07.2020, 3♀, 2♂. Hortobiont; mesophyll (floodplain, in the leaf axils of *Typha angustifolia* [15]; monophytophage (on cattail); monovoltine; adults overwinter.

Ischnodemus sabuleti (Fallen, 1826). Almaty region, Enbekshikazakh district,Masak village, in the floodplain of the Chilik river, 24-26.06.2019, on the floodplain mesophilic grass meadow, it was found in the mass (100 exemplar and more); Zhetysu Alatau, gorge Taigak, 21.06.2020, 4♀, 2♂; the Alakol reserve, cordon Kokpekty floodplain Tentek, 12.06.2020, 7♀, 5♂; cordon Togyztubek, 09.08.2020, 2♀,

3♂. Chortobiont; the species is mesophilous (meadows, floodplains, open areas); politicii (in grasses: *Agropyrum, Glyceria, Elymus*, *Calamagrostis, Pragmites* and other cereals; cattails: *Typha latifolia* [15]; monovoltine species; the species overwinters as adults [16].

Engistus exsanguis exsanguis Stal, 1872. Altyn-Emel Nature Park, cordon Shygan, 08.07.2020, 4♀, 3♂; cordon Mynbulak, 09.07.2020, 2♀, 3♂; Almaty region, Enbekshikazakh district, Masak village, 12.06.2020, 1♀, 2♂. Herpetobiont (on clay soils); meso-xerophile; narrow oligopolies (on lebedovych, eats fallen seeds and juice of the green parts); bivoltine; the adults overwinter.

Henestaris halophilus (Burmeister, 1835). Almaty region, Enbekshikazakh district, Masak village, in the floodplain of the river Chilik, 12-14.06.2020, 6♀, 4♂; 40 km from Kapchagai downstream of the Ili river, 26.06.2019, 5 ♀ , 5 ♂ ; 28.06.2019, 3♀, 2♂, 27.06.2020, 4♀, 3♂; 30.07.2020, 2♀, 3♂; Altyn-Emel Nature Park, cordon Uzynbulak, gorge Konakbaisai, 27.06.2020, 1♀, 3♂; the Alakol reserve, cordon Togyztubek, 12.06.2020, 4♀, 3♂; 14.06.2020, 3♀, 4♂. Chortobiont (on herbaceous plants); meso-xerophile (in saline and alkaline soils, often under annual saltwort); politicii (eats fallen seeds and juice of the green parts) [17]; bivoltine; the eggs overwinter.

Geocoris arenarius (Jakovlev, 1867). Almaty region, Balkhash district, Miyaly village, Floodplain of the Ili river, 07.08.2020, 2♀, 1♂; 40 km from Kapchagai downstream of the Ili river, 11-27.06.2020, 2♀, 1♂; Altyn-Emel Nature Park, Mynbulak cordon, Kyzylauyz cordon, 08.07.2020, 3♀, 2♂; 10.07.2020, 2♀. All over Kazakhstan. Herpetobiont (on the ground, under plants, stones); mesoxerophile (in steppes, semi-deserts, deserts, in wet stations, lowland places;); zoophage (small invertebrates); bivoltine; imago overwinter. This species is noted for cannibalism (it sucks its eggs) [18].

Geocoris ater (Fabricius, 1787). Almaty region, 40 km from Kapchagai downstream river, 26.06.2019, 1♀, 1♂; Balkhash district, the village of Miyaly, floodplain of the Ili river, 21.06.2019, 2♀, 1♂; Altyn-Emel Nature Park, cordon Mynbulak, 08.07.2020, 1♀, 3♂; cordon Zhantogay, 10.07.2020, 2♀; plumes Katutau mountains, cordon Biglobe, 28.07.2020, 2♀, 1♂; 13.08.2020, 3♀, 4♂. Herpetobiont (on soil between rocks and under them, under Artemisia); meso-xerophile (on dry meadows, fields, flood meadows under herbaceous plants common on sand cascade); soofi (small insects and invertebrates); up to 3 generations per year [4, 15]; the adults overwinter.

Geocoris dispar (Waga, 1839). Altyn-Emel Nature Park, near the spring of Ch. Valikhanov, 08.07.2019, 2♀, 3♂; 13.06.2020, 3♀, 4♂. Herpetobiont (on the ground, under various plants); meso-xerophile (in the steppes, in various meadows, forest edges); zoophage (small insects); monovoltine [19]; eggs overwinter.

Geocoris grylloides (Linnaeus, 1761). Altyn-Emel Nature Park, Shygan cordon, 08.07.2020, 1♂; Uzynbulak cordon, Konakbaysay Gorge, 10.07.2019, 2♂; Zhantogay cordon, Floodplain of the Ili river, 29.07.2020, 1♀, 1♂. Herpetobiont (on the ground, under plants); meso-xerophile (in dry open places, on different plants); zoophage (small insects and invertebrates); monovoltine; adults overwinter.

Artheneis alutacea Fieber, 1861. Almaty region, Enbekshikazakh district, Masak village, in the floodplain of the Chilik river, 22.06.2019, 3♀, 2♂; 40 km from Kapchagai downstream of the Ili River, 26.06.2019, 4♀, 4♂; 27.06.2020, 3♀, 5♂. Dendrobiont (on *Tamarix*, in inflorescences); meso-xerophyll; narrow oligophytophagus (feeds on seeds of tamarisk, myricaria, sometimes on willow [4]; monovoltine; adults overwinter.

Artheneis intricata V.G.Putshkov, 1969. Almaty region, Enbekshikazakh district, Masak village, Chilik River floodplain, 21-24.06.2020, 4♀, 6♂; Altyn-Emel Nature Park, Uzynbulak cordon, Konakbaysay Gorge, 08.06.2019, 15♀, 12♂; 18.07.2020, 6♀, 7♂; 40 km from Kapchagai downstream of the Ili River, 26.06.2019, 10♀, 12♂; Alakolsky Reserve, Tuyuksu cordon, 03-06.07.2019, 13♀, 17♂; Togyztubek cordon, 02-03.07.2019, 5♀, 7♂; 10.08.2020, 8♀, 9♂, caught in the light. Dendrobiont (on *Tamarix, Myricaria, Salix alba*, in inflorescences); mesophyll; broad oligophytophagus (feeds on seeds); monovoltine [4]; adults overwinter.

Chilacis typhae (Perris, 1857). Almaty region, 40 km from Kapchagai downstream of the Ili River, 26.06.2019, 3♀, 4♂; 27.06.2020, 3♀, 2♂. Hortobiont; mesophyll (floodplain); narrow oligophytophagus (on cattail inflorescences of *Thypha latifolia, T. angustifolia* after the end of their fruiting [4]; monovoltine; adults overwinter.

Holcocranum diminutum diminutum Horvath, 1898. Zhetysu Alatau, Konakbaysay Gorge, 10.07.2019, 1♀, 2♂; 18.07.2020, 2♀, 1♂; Almaty region, 40 km from Kapchagai downstream of the Ili

River, 26.06.2019, 3♀, 4♂. Hortobiont (on cattail inflorescences *Typha minima*); mesophyll (floodplain biotopes); monophytophage; monovoltine; adults overwinter [4].

Cymophyes ochroleuca Fieber, 1870. Almaty region, 40 km from Kapchagai downstream of the Ili River, 27.06.2020, 3♀, 4♂; Altyn-Emel Nature Park, Shygan cordon, 12.07.2019, 2♀, 3♂; 08.07.2020, 2♀, 1♂; cordon Mynbulak, 08.07.2020, 3♀, 1♂. Herpeto-hortobiont (on selina Aristida pennata, A. carelini, Panicum turgidum); meso-xerophilus (on solonets on Aeluropus litoralis); narrow oligophytophagus; bivoltine; winter imago.

Heterogaster cathariae (Geoffroy, 1785). Almaty city, botanical garden, 27.06.2019, 2♂; 25.07.2019, 3♀, 2♂; 05.07.2020, 4♀, 2♂; 22.07.2020, 2♀, 3♂. Hortobiont (inhabitant of various grasses, more often on mint, less often on sage); mesophyll (in parks, gardens, forest belts, in open clearings); narrow oligophytophagus (the main food plants are catnip Nepeta catharia; monovoltine; adults overwinter.

Heterogaster urticae Fabricius, 1775. Almaty city, botanical garden, 27.06.2019, 2♂; Altyn-Emel Nature Park, Mynbulak cordon, 08.07.2020, 3♂, 2♀; Shygan cordon, 10.07.2020, 4♀, 2♂. Hortobiont (on *Urtica*); mesophyll (in mesophilic biocenoses); monophytophagus (*Urtica dioica, U. igeps*) [4]; monovoltine; winter imago.

Platyplax salvia (Schilling, 1829). Altyn-Emel Nature Park, near the spring of Ch. Valikhanov, 08.07.2019, 2♂ ; cordon Mynbulak, 08.07.2020, 3♂, 2♀; 40 km from Kapchagai downstream of the Ili River, 26.06.2019, 1♀, 3♂; 27.06.2020, 4♀, 3♂. Hortobiont (lives on Salvia sage), mesophilus (in mesophilic biotopes, found everywhere where the forage plant grows); narrow oligophytophagus (on sage); monovoltine; adults overwinter. It harms forage grasses [4].

Auchenodes conspersus (Jakovlev, 1885). Almaty region, Balkhash district, Miyaly village, 21.06.2019, 1♂, 2♀; Altyn-Emel Nature Park, Shygan cordon, 08.07.2019, 3♂, 3♀; Mynbulak cordon, 08.07.2019, 2♂, 3♀; 119 km from Kapchagai downstream of the Ili River, 21.06.2020, 4♀, 3♂. Hortobiont (on herbaceous plants); polyphitophage; meso-xerophile; monovoltine; adults overwinter.

Bogdiana myrmica Kerzhner, 1964. Altyn-Emel Nature Park, near the spring of Ch. Valikhanov, 08.07.2019, 1♀, 2♂; 40 km from Kapchagai downstream of the Ili River, 21.06.2019, 3♀, 2♂; Almaty region, Balkhash district, Miyaly village, Floodplain of the Ili river, 26.06.2019, 3♀, 2♂. Herpeto-hortobiont (on grass and on soil near rivers and lakes in meadows); meso-xerophyll; polyphytophagus (among cereals – *Phragmites, Agropyron, Elymus* and annuals solyanok - *Suaeda spp*. [4]; monovoltine species; overwinter as adults.

Jakowleffia setulosa (Jakovlev, 1874). Altyn-Emel Nature Park, Shygan cordon, 08.07.2019, 4♀, 3♂; Mynbulak cordon, 08.07.2019, 2♀, 3♂; Almaty region, Balkhash district, Miyaly village district, 26.06.2019, 5♀, 2♂; 26.06.2019, 2♀, 2♂. Herpeto-hortobiont (on *Artemisia*, under *Atriplex, Halocnemum, Anabasis*); meso-xerophyll (in steppe, semi-desert on sandy and saline biotopes); narrow oligophytophagus (on solyanka); monovoltine; adults overwinter.

Leptodemus minutus (Jakovlev, 1874). Zhetysu Alatau, Kyzylauyz gorge, 11.07.2019, 2♀; 11.07.2020, 2♀, 1♂; gorge Taigak, 11.07.2020, 4♀, 3♂; Altyn-Emel Nature Park, cordon Shygan, 08.07.2020, 4♀, 4♂; cordon Mynbulak, 08.07.2020, 2♀, 3♂; Almaty, the territory of the Institute of Zoology, 17.05.2019, 2♀, 1♂. Herpeto chortobiont (on the wormwood, at least on Plantago and grasses); meso-xerophile (in the steppe, semi-desert, on the salt marsh, b.h. on the sandy soils); politicial [4]; monovoltine species; the adults overwinter and larvae of different stages.

Macroplax fasciata fasciata (Herrich-Scaeffer, 1835). Zhetysu Alatau, Koyandytau, Kayyndy gorge, 30.07.2020, 1♀, 2♂; Altyn-Emel Nature Park, Mynbulak cordon, 08.07.2019, 2♀, 2♂, 22.06.2020, 3♀, 2♂. Hortobiont; meso-xerophyll (foothills and mountains up to 1800-3200 m above sea level, forest edges, dry meadows and other open areas with low vegetation); polyphitophage [4]; monovoltine; adults overwinter.

Metapoplax origani (Kolenati, 1845). Altyn-Emel Nature Park, cordon Mynbulak, 08.07.2019, 2♂; cordon Uzynbulak, gorge Kavakbasi, 10.07.2019, 2♀, 2♂; the Alakol reserve, cordon Kokpekty floodplain Tentek, 14.06.2020, 3♀, 2♂. Chortobiont (on Asteraceae); meso-xerophile (in the desert, in the floodplain of the river, the salt marshes, glades, in sparse forests, Sands cascade); wide oligopolies (on Compositae: *Anthemis, Achillea, Helichrysum, Tanacetum*, etc.) [4]; monovoltine species; overwinter as adults.

Microplax albofasciata Costa, 1847. Altyn-Emel Nature Park, Uzynbulak cordon, Konakbaysay gorge, 10.07.2019, 2♀, 2♂. Herpeto-hortobiont; mesoxerophile (steppes, on dry sunny places with low-growing herbaceous vegetation); polyphytophagus; monovoltine; winter imago.

Microplax interrupta (Fieber, 1837). Altyn-Emel Nature Park, cordon Mynbulak, 08.07.2019, 2♀, 3♂; cordon Kyzylauyz, 11.07.2019, 4♀, 2♂. Herpeto-hortobiont (on sagebrush, yarrow and other complex-colored plants and under them); mesophyll (in floodplains, in clearings of sparse forests, foothills and mountain slopes); wide oligophytophagus (on complex-colored plants); monovoltine; adults overwinter.

Oxycarenus lacteus Kiritshenko, 1914. Zhetysu Alatau, Taigak gorge, 21.05.2019, 1♀, 1♂; gorge Kyzylauyz, 11.07.2019, 3♀, 1♂; Altyn-Emel Nature Park, cordon Shygan, 08.07.2020, 2♀, 3♂. Herpetobiont; mesophyll (among detritus, under bushes of various plants); polyphytophagus (fallen seeds and juice of basal parts) [4]; monovoltine; winter imago.

Oxycarenus modestus Fallen, 1829. Zhetysu Alatau, Sholak village, Kyzylauyz gorge, 11.07.2019, 2♀, 3♂; Koyandytau, Uzynbulak Gorge, 10.07.2019, 3♀, 3♂; Almaty, botsad, 27.06.2020, 1♀, 2♂; 15.08.2020, 3♀, 4♂. Dendrobiont (trophically related to alder *Alnus*); mesophyll (in the mountains up to 1500 m); narrow oligophytophagus (on *Alnus glutinosa, A. incana*); monovoltine; adults and larvae of different ages overwinter [4].

Oxycarenus pallens (Herrich-Schaeffer, 1850). Almaty region, Enbekshikazakh district, Masak village, Chilik River floodplain, 26.06.2019, 3♀ , 2♂; Kyzyltan forestry, floodplain of the Ili river, 27.06.2020, 4♀, 5♂; Almaty, botsad, 27.06.2020, 2♀, 2♂; 15.08.2020, 2♀, 1♂; Zhetysu Alatau, Taigak gorge, 21.05.2019, 1♀, 1♂; gorge Kyzyluy, 11.07.2019, 3♀, 2♂; Almaty region, Balkhash district, the village of Miyaly, floodplain of the Ili river, 10.07.2019, 2♀, 4♂ ; the Alakol reserve, cordon Kokpekty, 12.06.2020, 3♀, ♂. Chortobiont; meso-xerophile (steppe, semidesert, in different habitats, floodplains, meadows) [20]; wide oligopolies (on Asteraceae *Centaurea*, the *Spiraea*, eat seeds); monovoltine species; overwinter as adults.

Philomyrmex insignis R.F. Sahlberg, 1848. Iley Alatau, Medeu district, 29.07.2020, 2♀, 2♂; Almaty city, botanical garden, 27.06.2020, 2♀, 3♂. Herpetobiont (on the soil surface, under plants, in the litter of pine forests, in pine cones); mesophyll (forest zone); narrow oligophytophagus; monovoltine; adults overwinter.

Tropidophlebia costalis (Herrich-Schaffer, 1850). Altyn-Emel Nature Park, cordon Mynbulak, 08.07.2019, 1♀ , 1♂ ; cordon Kyzylauyz, 11.07.2019, 2♀ , 5♂ . Herpetobiont (in dry places in detritus under various plants); meso-xerophile (steppe, on sandy places); polyphytophagus (on various plant families, spring ephemera); monovoltine; winter imago [7].

Tropistethus fasciatus Ferrari, 1874. Alakolsky Reserve, Karamoyyn cordon, 19.08.2019, 2♀ , 1♂; Talapker gorge, 20.08.2019, 2♂; Togyztubek cordon, 24.08.2019, 2♀ , 2♂. Herpetobiont (on the ground, at the roots of herbaceous plants); mesophyll (forest-steppe, steppe); polyphytophagus (fallen seeds and sap of the basal parts); monovoltine [4]; imago hibernate.

Tropistethus holosericus (Scholtz, 1846). Zhetysu Alatau, Koyandytau, Uzynbulak gorge, 10.07.2019, 2♀, 2♂; Alakol Reserve, Togyztubek cordon, 03.07.2019, 3 ♀ ; Kokpekty cordon, Tentek river floodplain, 18.06.2020, 3♂ , 2♀. Herpetobiont (feed on the juice of the basal parts of herbaceous plants); meso-xerophile (in moderately dry biotopes, among moss and detritus, on dry meadows; in the mountains up to 1300 m); polyphytophagus (fallen seeds and sap of the basal parts); monovoltine; adults overwinter.

Conclusion. As a result of studies of 36 genera of ground bugs, 59 species were identified. Among them, the species diversity is dominated by the following genera: Nysius (7 species), Cymus, Geocoris (4 species each), Spilostethus, Oxycarenus (3 species each), in the remaining 54 genera 1-2 species were identified.

They are characterized by wintering at different stages of development. Hemiptera, wintering in the imago stage, is 49 species, in the egg stage 6 species overwinter, in the imago stage and larvae can overwinter 4 species.

According to the number of generations per year, all species of terrestrial hemiptera of South-Eastern Kazakhstan can be divided into several groups: 1) monovoltine (49 species), 2) bivoltine (9 species), 3) polyvoltine (1 species).

Different species of hemiptera have different requirements for the degree of moisture content of the habitat. On this basis, the following ecological groups of species can be distinguished: xerophiles (2 species), meso-xerophiles (31 species), mesophiles (26 species).

According to their location, the terrestrial hemiptera of South-Eastern Kazakhstan are divided into several groups: dendrobionts (7 species), dendromnobionts (1 species), hortobionts (26 species), herpetobionts (18 species), and herpetobionts (7 species).

According to food relations among ground bugs, predators and herbivorous species are distinguished. Predatory bedbugs include 4 species, the rest are phytophages. Herbivorous bedbugs are divided into 4 groups according to the breadth of specialization: a) polyphages (35 species), b) broad oligophages (6 species), c) narrow oligophages (10 species), d) monophages (4 species).

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ОҢТҮСТІК-ШЫҒЫС ҚАЗАҚСТАННЫҢ ЖЕРҮСТІ ЖАРТЫЛАЙ ҚАТТЫ ҚАНАТТЫЛАРЫ (HETEROPTERA, LYGAEIDAE) ФАУНАСЫНА МАТЕРИАЛДАР

Аннотация. Мақалада 2019-2020 жж. Оңтүстік-Шығыс Қазақстандағы далалық зерттеулердің нәтижелері келтірілген. Зерттеудің мақсаты: Оңтүстік-Шығыс Қазақстан аумағындағы жерүсті жартылай қатты қанаттылардың фаунасын, биологиясын, экологиясын және таралуын зерттеу. Сондықтан өз зерттеулеріміздің негізінде жерүсті жартылай қатты қанаттылар фаунасын зерттеліп, кешенді талдау жүргізілді, сөйтіп аннотациялық тізімі жасалды. Жүргізілген зерттеулер нәтижесінде 36 туысқа жататын жерүсті жартылай қатты қанаттылардың 59 түрі анықталды. Олардың ішінде түрлердің әртүрлілігі жағынан келесі ұрпақтарға бөлінеді: *Nysius* (7 түр), *Cymus, Geocoris* (4 түрден), *Spilostethus, Oxycarenus* (3 түрден), ал қалған 31 туыстан 1-2 түрден белгілі болды. Жартылай қатты қанаттылар үшін әртүрлі даму сатысында қыстау тән. Ересектер сатысында қыстайтын жартылай қатты қанаттылар 49 түрді құрайды, жұмыртқа сатысында 6 түр, ересектер мен дернәсілдер сатысында 4 түр қыстайды. Жылына ұрпақ беру саны бойынша Оңтүстік-Шығыс Қазақстанның жер жартылай қаттықанаттылар түрлерін бірнеше топқа бөлуге болады: 1) моновольтинді (49 түр), 2) бивольтинді (9 түр), 3) поливольтинді (1 түр). Жартылай қаттықанаттылардың әр түрі мекендейтін ортасының ылғалдылығына байланысты әртүрлі ортаға бейімделген. Осы негізде түрлердің келесі экологиялық топтары анықталды: ксерофилдер (2 түр), мезо-ксерофилдер (31 түр), мезофилдер (26 түр). Оңтүстік-Шығыс Қазақстанның жерүсті жартылай қатты қанаттылары мекендейтін ортасына байланысты бірнеше топқа бөлінеді: дендробионттар (7 түр), дендро-тамнобионттар (1 түр), хортобионттар (26 түр), герпетобионттар (18 түр), герпето-хортобионттар (7 түр). Қоректік байланысы бойынша жерүсті жартылай қатты қанаттылары жыртқыштар және өсімдікқоректілер болып бөлінеді. Жыртқыш жартылай қатты қанаттыларға 4 түр жатады, қалған түрлер өсімдікқоректілерге жатады. Өсімдікқоректілер қоректенуіне қарай 4 топқа бөлінеді: а) полифагтар (35 түр), б) кең олигофагтар (6 түр), в) тар олигофагтар (10 түр), г) монофагтар (4 түр). *Nysius pilosulus* Horvath, 1904 Қазақстан аумағында алғаш рет кездесті.

Түйін сөздер: фауна, жерүсті жартылай қатты қанаттылары, Lygaeidae, Heteroptera, Оңтүстік-Шығыс Қазақстан.

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МАТЕРИАЛЫ К ФАУНЕ НАЗЕМНЫХ ПОЛУЖЕСТКОКРЫЛЫХ (HETEROPTERA, LYGAEIDAE) ЮГО-ВОСТОЧНОГО КАЗАХСТАНА

Аннотация. В статье приводятся результаты полевых исследований 2019-2020 гг. в Юго-Восточном Казахстане. Цель исследований: изучение фауны, биологии, экологии и распространение наземных полужесткокрылых на территории Юго-Восточного Казахстана. На основе собственных исследований проведены инвентаризация и комплексный анализ фауны наземных полужесткокрылых и составлен аннотированный список. В результате проведенных исследований выявлено 59 видов наземных полужесткокрылых из 36 родов. Среди них видовым разнообразием выделяются следующие роды: *Nysius* (7 видов), *Cymus*, *Geocoris* (по 4 вида), *Spilostethus*, *Oxycarenus* (по 3 вида), а в остальных 31 рода известны по

1-2 вида. Для полужесткокрылых характерна зимовка на разных стадиях развития. Полужесткокрылые, зимующие в стадии имаго, составляют 49 видов, в стадии яйца зимуют 6 видов, в стадиях имаго и личинки зимуют 4 вида. По числу поколений в год все виды наземных полужесткокрылых Юго-Восточного Казахстана можно разделить на несколько групп: 1) моновольтинные (49 видов), 2) бивольтинные (9 видов), 3) поливольтинные (1 вид). Разные виды полужесткокрылых имеют различные требования к степени увлажненности местообитания. По этому признаку выделены следующие экологические группы видов: ксерофилы (2 вида), мезо-ксерофилы (31 вид), мезофилы (26 видов). По приуроченности к местам обитания наземные полужесткокрылые Юго-Восточного Казахстана подразделяются на несколько групп: дендробионты (7 видов), дендро-тамнобионты (1 вид), хортобионты (26 видов), герпетобионты (18 видов), герпето-хортобионты (7 видов). По пищевым связям среди наземных клопов выделяются хищники и растительноядные виды. К хищным клопам относятся 4 вида, остальные фитофаги. Растительноядные клопы по широте специализации разделены на 4 группы: а) полифаги (35 видов), б) широкие олигофаги (6 видов), в) узкие олигофаги (10 видов), г) монофаги (4 вида). *Nysius pilosulus* Horvath, 1904 отмечен впервые на территории Казахстана.

Ключевые слова: фауна, наземные полужесткокрылые, Lygaeidae, Heteroptera, Юго-Восточный Казахстан.

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