



UDC 595.753.36  
IRSTI 34.33.9  
DOI 10.37238/1680-0761.2022.87(3).128

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## **ECOLOGICAL SIGNIFICANCE OF SPIDERS IN THE ECOSYSTEMS OF THE WEST KAZAKHSTAN REGION**

**Annotation.** The article contains a list of numerous spider species collected in the West Kazakhstan region, 15 spider species common in the region. A brief ecological role of a number of spider species in the ecosystems of the West Kazakhstan region is presented by an annotated list. It has been established which belt the spiders belong to in the ecosystem. In addition to the popularly known krestovik spider, karakurts, mizgir, the ecology of other spiders is shown, their place in the habitat, in addition to typical herpetobionts in our region, dendro-tamnobionts and hortobionts are shown, which live covertly, not often visible to people. The trophic location of each spider species is determined and the specifics of nutrition are recorded. At the same time, the world-class area of their distribution is derived from the frequently updated world catalog of spiders and the main natural environment according to the systematized areal nomenclature is given.

**Keywords:** spiders; ecology; West Kazakhstan region; distribution area; palearctic; herpetobionts; hortobionts; mesophilic; xerophilic; ecosystem; steppe.

### *Introduction*

The history of the study of spiders in the West Kazakhstan region can be divided into two periods. The first stage, studies begun in the 70s of the twentieth century with the mention of the first two species belonging to the genus *Argiope* Audouin, 1826, is distinguished by the absence of its own systematic collection. There is little knowledge about the spiders of the West Kazakhstan region, there is little research of this period. As it was found in the studies, only four species of spiders were identified in this area during this period.

The second stage is distinguished by the fact that studies of the spider fauna of the West Kazakhstan region in four localities are clearly targeted. In the framework of the project "spiders of semi-desert zones of the USSR", A.V. Ponomarev collected spiders in the Akzhaik, Bokeyorda, Zhangala districts in 1976-1977. According to the results of processing of the first Taipak and Zhanakazan collections in 1981 a publication was published. Further on the author described above and on fauna in these works, a complete list of spiders was indicated [1]. Then the results of numerous studies with scientific people, such as K. G. Mikhailov, T. V. Peterkina, were published.

The first complete work on the spider fauna of the West Kazakhstan region was published in the XXI century, where 200 species of spiders, including 91 species, were shown for the first time. After the publication of this work, the research of spiders in the West Kazakhstan region slowed down [2].

Thanks to our work over the past three years, spiders have been collected from different districts of the West Kazakhstan region. The study was conducted at various hospitals and parallel to the expedition route roads. As a result, it was possible to increase the output level of many publications.



The main purpose of this article is to show a brief ecological role of a number of spider species in the ecosystems of the West Kazakhstan region, an annotated list, and to characterize the distribution area.

#### *Material and Methods*

The materials currently disassembled include collections in 2019, 2020, 2021 and 2022. The collections of 2019 and 2020 were partially processed – the species collected by the method of mowing on grass, which was widely practiced during this period, were identified. The main material was obtained by the method of soil traps (Barber traps) with a retainer. In 2019, bushes and low trees were also shaken off on the canopy.

Species names are given according to the World Spider Catalog [3]. The names of the ranges are given according to the hierarchical classification of spider ranges, based on the principles proposed by Gorodkov (1984). The ecological characteristics of the species are given according to the scheme described earlier [4].

An annotated list on the ecology and distribution of spiders of the West Kazakhstan region.

#### Family: *Araneidae*

##### *Araneus diadematus* Clerck, 1758

Distribution area. Europe, Middle East, Turkey, Caucasus, Russia (from Europe to the Far East), Iran, Central Asia, China, Japan. Acclimatized in North America. [3]. Circumgolarctic temperate.

Ecology. Orb-weaver, dendro-thamnobionts, mesophilic.

#### Family: *Araneidae*

##### *Hypsosinga heri* (Hahn, 1831)

Distribution area. Europe, Caucasus, Russia (from Europe to Central Asia, Western Siberia), Israel, Iran, Central Asia, China (SC, 2022). West-Central Palearctic subboreal-semiarid.

Ecology: Orb-weaver, hortobiont, hygrophilous (in Europe confined to the shores of reservoirs).

#### Family: *Araneidae*

##### *Hypsosinga pygmaea* (Sundevall, 1831)

Distribution area. North America, Europe, Turkey, Israel, Caucasus, Russia (from Europe to the Far East), Iran, Central Asia, China, Korea, Japan [3]. Circumgolarctic polyzonal.

Ecology: Orb-weaver, hortobiont, mesophilic.

#### Family: *Araneidae*

##### *Mangora acalypha* (Walckenaer, 1802)

Distribution area. Madeira, Europe, North Africa, Turkey, Middle East, Caucasus, Russia (from Europe to Southern Siberia), Central Asia, China (SC, 2022). West-Central Palearctic subboreal.

Ecology: Orb-weaver, hortobiont, xerophilic.

#### Family: *Araneidae*

##### *Singa hamata* (Clerck, 1758)

Distribution area. Europe, Turkey, Russia (from Europe to the Far East), from the Caucasus to Central Asia, China, Korea, Japan [3]. Trans - Palearctic temperate.

Ecology: Orb-weaver, hortobiont, mesophilic.



Family: *Araneidae*

*Singa nitidula* C. L. Koch, 1844

Distribution area. Europe, Turkey, Russia (from Europe to the Far East), from the Caucasus to Central Asia [3]. Trans-palaearctic subboreal.

Ecology: Orb-weaver, hortobiont, mesophilic.

Family: *Cheiracanthidae*

*Cheiracanthium erraticum* (Walckenaer, 1802)

Distribution area. Europe, Turkey, Caucasus, Russia (from Europe to the Far East), Iran, Central Asia, China, Korea, Japan [3]. Trans-Palaearctic temperate.

Ecology: Walking hunter, hortobiont, xerophilic.

Family: *Cheiracanthidae*

*Cheiracanthium montanum* L. Koch, 1878

Distribution area. Europe, Turkey, Caucasus, Iran [3]. West Palearctic Subboreal

Ecology: Walking hunter, hortobiont, xerophilic.

Family: *Clubionidae*

*Clubiona reclusa* O. Picard-Cambridge, 1863

Distribution area. Europe, Turkey, Russia (from Europe to Southern Siberia), Kazakhstan [3]. Trans-Palaearctic temperate.

Ecology: Walking hunter, hortobiont, mesophilic.

Family: *Gnaphosidae*

*Callilepis nocturna* (Linnaeus, 1758)

Distribution area. Europe, Turkey, Caucasus, Russia (from Europe to the Far East), Kazakhstan, Iran, China, Japan [3]. Trans-Palaearctic temperate.

Ecology: Walking hunter, herpetobiont, xerophilic.

Family: *Lycosidae*

*Pardosa agrestis* (Westring, 1861)

Distribution area. Europe, Caucasus, Russia (from Europe to the Far East), Iran, Central Asia, China [3]. West Palearctic polyzonal.

Ecology: the running hunter, herpetobiont, mesophilic.

Family: *Lycosidae*

*Pardosa plumipes* (Thorell, 1875)

Distribution area. Sweden, Finland, Eastern Europe, Caucasus, Russia (from Europe to the Far East), Kazakhstan, Central Asia, China, Japan [3]. North European-Siberian polyzonal.

Ecology: the running hunter, herpetobiont, mesophilic.

Family: *Theridiidae*

*Latrodectus tredecimguttatus* (P. Rossi, 1790)

Distribution area. Mediterranean, Ukraine, Caucasus, Russia (from Europe to Southern Siberia), Kazakhstan, Iran, Central Asia, China [3]. West-central Palearctic, subboreal semi-desert-steppe.

Ecology. cobweb spiders, herpetobiont, xerophilic.

Family: *Lycosidae*



*Lycosa singoriensis* (Laxmann, 1770)

Distribution area. Central to eastern Europe, Turkey, Caucasus, Russia (Europe to South Siberia), Iran, Central Asia, China, Korea [3]. West-central Palearctic, subboreal semi-desert-steppe.

Ecology. burrowing spiders, herpetobiont, xerophilic.

Family: *Thomisidae*

*Xysticus luctator* L. Koch, 1870

Distribution area. Europe, Caucasus, Russia (Europe to South Siberia), Kazakhstan [3]. European-West Siberian subboreal.

Ecology: Ambush grabbing, herpetobiont, mesophilic. [3],[5].

*Research results*

A number of spiders mentioned above are obligate predators, many of them try to hide in the environment like real hunters, so many spiders do not have a popular name, except for some spiders, and now that we care about their ecology, we can make sure that their place in the ecosystem is huge.

Most spiders, as indicated in the annotated list, are herpetobionts that hunt prey on the ground and are adapted to creating spider traps. At the same time, a number of them are hortobionts, spiders living in grassy valleys. Obviously, there are dendronobionts living in tree-shrub ecosystems, but they are difficult to notice and, as is known, there are few tree-shrub ecosystems in our region.

Most of them are located in the northern part of the West Kazakhstan region and are represented in a small amount by the forests of the Bokeyorda district. Most of the region is occupied by semi-desert, desert-steppe lands [4].

For this reason, most of the spider species listed in the list are xerophiles, that is, predators capable of surviving in arid areas.

1-Table - Species diversity of spiders

<i>Family</i>	<i>Genus</i>	<i>Species</i>
<i>Araneidae</i>	4	6
<i>Cheiracanthidae</i>	1	2
<i>Clubionidae</i>	1	1
<i>Gnaphosidae</i>	1	1
<i>Lycosidae</i>	2	3
<i>Theridiidae</i>	1	1
<i>Thomisidae</i>	1	1
<i>total</i>	11	15

Two spider genera (Singa and Callilepis) have a lower species diversity than the background indicators. Species from these genera live in the vegetation itself or on the surface of the soil, that is, they are hortobionts. For the study of hortobiont spiders, the method of mowing on grass is used. There were no samples obtained by this method in the studied collection. With a sufficient degree of confidence, it can be assumed that with the widespread use of the method of mowing on grass and soil traps, new species from these and other genera of spiders living in the litter will be discovered.

*Conclusion*

Thus, spiders maintain a natural balance in their environment, feeding on invertebrates and destroying insect pests, acting as a consumer of the second order among invertebrates in their ecosystem. In accordance with the natural belts of our West Kazakhstan region, predators of the



invertebrate world - spiders - are necessarily found in every ecosystem and biotopes. They have yet to be found completely, to define a species, or to describe an existing species.

#### *Acknowledgements*

The author expresses gratitude to the Dr. of biological sciences S.L. Esyunin for providing significant material for research.

#### REFERENCES

- [1] Ponomarev, A.V. (1981) K faune i ekologii paukov semeystva Gnaphosidae (Aranei) polupustynnoy zony yevropeyskoy chasti SSSR // Fauna i ekologiya nasekomykh [To the fauna and ecology of spiders of the family Gnaphosidae (Aranei) of the semidesert zone of European part of the USSR] // Fauna and ecology of insects. Perm: Perm University Press. p.54–68. [In Russian].
- [2] Piterkina, T.V. & Mikhailov, K.G. (2009) Annotirovannyi spisok paukov (Aranei) Dzhanibekskogo stacionara // Zhivotnyye glinistoy polupustyni Zavolzh'ya (konspekty faun i ekologicheskoye kharakteristiki) [Chapter III. Annotated list of spiders (Aranei) of the Dzhanibek Station] Animals of the clay semi-desert of the Volga region (summaries of faunas and ecological characteristics) // Moscow: KMK Scientific Press. p.62–88. [In Russian].
- [3] Mirovoy katalog paukov [World Spider Catalog] (2022) Retrieved from <https://wsc.nmbe.c/WSC>. [In Russian].
- [4] Esyunin, S.L., Agafonova, O.V. & Ruchin, A.B. (2021) Fauna paukov (Aranei) Mordovskogo zapovednika [Spider fauna (Aranei) Mordovian Nature Reserve] // Trudy Mordovskogo gosudarstvennogo prirodnogo zapovednika imeni P.G. Smidovicha: Proceedings of the Mordovian State Nature Reserve named after P.G. Smidovich, 27, 133. [In Russian].
- [5] Zapadno-Kazakhstanskaya oblast' // Kazakhstan. Natsional'naya entsiklopediya. [West Kazakhstan region // Kazakhstan. National Encyclopedia] (2005) Almaty: Kazakh entsiklopediyasy. — Almaty: Kazakh Encyclopedia. Vol. II. — ISBN 9965-9746-3-2. (CC BY-SA 3.0) [In Russian].

#### **Қабдрахимов Ә.А.**

#### **БАТЫС ҚАЗАҚСТАН ОБЛЫСЫНЫҢ ЭКОЖҮЙЕЛЕРІНДЕГІ ӨРМЕКШІЛЕРДІҢ ЭКОЛОГИЯЛЫҚ МАҢЫЗЫ**

**Аңдатпа.** Мақалада Батыс Қазақстан облысында жиналған көптеген, аймақта кең таралған өрмекшілердің 15 түрінің тізімі келтірілген. Батыс Қазақстан облысының экожүйелеріндегі бір қатар өрмекшілердің түрлерінің қысқаша экологиялық рөлі аннотацияланған тізім арқылы көрсетілген. Экожүйедегі өрмекшілердің қай белдемге жататындығы анықталған. Халық арасында белгілі крестті өрмекші, қарақұрт, мизгирь бүйісінен басқада өрмекшілердің экологиясы, олардың тіршілік ортасындағы орны, әдеттегі біздің аймақтағы көп кездесетін герпетобионттардан бөлек, адамдарға жиі көріне бермейтін, жасырын тіршілік ететін дендро-тамнобионттар және хортобионттар көрсетілген. Әр өрмекші түрінің трофикалық орны анықталып, қоректенудегі ерекшелігі жазылған. Сонымен бірге жиі жаңартылып отыратын өрмекшілердің әлемдік каталогынан әлемдік деңгейдегі олардың таралу аймағы алынған және жүйеленген ареалдық номенклатура бойынша негізгі табиғи ортасы келтірілген.

**Кілт сөздер:** өрмекшілер; экология; Батыс Қазақстан облысы; таралу аймағы; палеарктикалық; герпетобионт; хортобионт; мезофильді; ксерофильді; экожүйе; дала.

#### **Қабдрахимов А.А.**

#### **ЭКОЛОГИЧЕСКОЕ ЗНАЧЕНИЕ ПАУКОВ В ЭКОСИСТЕМАХ ЗАПАДНО-КАЗАХСТАНСКОЙ ОБЛАСТИ**

**Аннотация.** В статье приведен список из многочисленных видов пауков собранных в Западно-Казакхстанской области, 15 видов паука общераспространенных в регионе. Краткая экологическая роль ряда видов пауков в экосистемах Западно-Казакхстанской области



представлена аннотированным списком. Установлено, к какому поясу относятся пауки в экосистеме. Кроме известных в народе паука крестовика, каракуртов, мизгирь показана экология других пауков, их место в среде обитания, помимо типичных герпетобионтов в нашем регионе, показано дендро-тамнобионты и хортобионты, которые, живут скрытно, не часто видимые людям. Определяется трофическое место каждого вида паука и фиксируется специфика питания. В то же время из часто обновляемого мирового каталога пауков выведена область их распространения мирового уровня и приведена основная природная среда по систематизированной ареальной номенклатуре.

**Ключевые слова:** пауки; экология; Западно-Казахстанская область; ареал распространения; палеарктический; герпетобионт; хортобионт; мезофильный; ксерофильный; экосистемный; степной.