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[1]Esyunin S.L., [2]Kabdrakhimov A.A.*

[1]Perm State University, Perm, Russia
[2]M.Utemisov West Kazakhstan University, Uralsk, Kazakhstan

***Corresponding author:** Chingiz-han01@mail.ru
E-mail: esyunin.psu@mail.ru, Chingiz-han01@mail.ru

OVERVIEW OF SPIDER DIVERSITY IN SEMI-ARID AREAS OF WEST KAZAKHSTAN REGION

Annotation. Based on the literature data, a taxonomic and zoogeographic analysis of the spider fauna of the semi-arid areas of the West Kazakhstan region (WKR) was carried out. At the moment, there are 223 species in the spider fauna of the semi-arid areas of the West Kazakhstan region, out of 111 genera of 22 families. The greatest species diversity is characterized by 3 families: Gnaphosidae (47 species; 21.0%), Linyphiidae (32 species; 14.4%) and Salticidae (31 species; 13.9%). 5 families Lycosidae and Philodromidae (17 species each; 7.7%), Araneidae and Theridiidae (16 species each; 7.1%) and Thomisidae (15 species; 6.7%) have high species diversity. Faunal taxonomic index of the West Kazakhstan Region: Gna-Lin-Sal-(Ara-The)- (Lyc-Phi)-Tho. The genera Zelotes, Thanatus, Gnaphosa, Attulus, Xysticus and Pardosa have the highest species diversity in the fauna of the West Kazakhstan region. Palearctic (43.5%) and Ancient Mediterranean (40.8%) species are the most numerous in the fauna of the West Kazakhstan region. The endemism of the fauna is not pronounced. The fauna has an allochthonous character.

Key words: spider; fauna; faunal taxonomic index; diversity; semi-arid; West Kazakhstan Region.

Introduction

Research on spiders of the semi-arid areas of the West Kazakhstan region (hereinafter WKR) started in 1976-1977, when, as part of the project "Spiders of the semi-arid areas of the USSR", A.V. Ponomarev conducted training camps in the vicinity of the settlements of Zhanakazan and Taipak. The final results of the processing of materials from this collection have been published recently [12]. The collected collections contained 18 and 22 species of spiders, respectively from Zhanakazan and Taipak. Research on the fauna and ecology of spiders of the Janybek hospital started in 1982 [9, 10]. The processing of the Janibek collection was attended by the leading arachnologists of the USSR - K.G.Eskov, D.V.Logunov, K.G.Mikhalov, V.I.Ovcharenko, A.V.Tanasevich. The results of this work were summed up already in the XXI century [11]. In total, 200 species of spiders were registered at the hospital.

At the present stage, we have been conducting research on the spider fauna of the semi-arid areas since 2022 [5, 13]. At the moment, 223 species from 111 genera of

22 families have been found in the semi-arid areas of the West Kazakhstan region (Table 1). The purpose of this work is to conduct a taxonomic and zoogeographic analysis of the known fauna.

Materials and methods of research

The material for our analysis was previously published lists of species from 19 localities located within the semi-arid areas of the West Kazakhstan Region (Fig. 1). Lists of species from three localities (Janibek, Zhanakazan, Taipak) were critically analyzed by us earlier [6]. Data on species caught in other 17 localities were presented by us earlier [13].

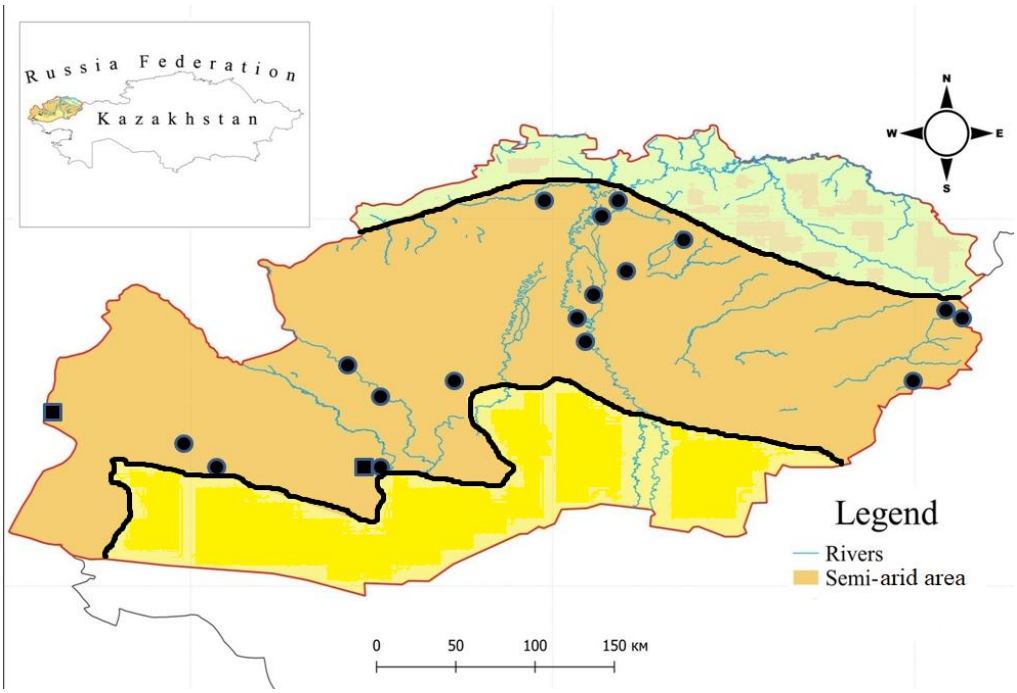

Figure 1 - The collection point of spiders in the semi-arid areas of the West Kazakhstan region.

L.N. Medvedev's faunal taxonomic index (FTI) is very useful in analyzing the taxonomic structure of zonal fauna [8]. When analyzing the zoogeographic structure of the spider fauna, we proceeded from the model of the three-dimensional area of K.B. Gorodkov [2, 3]. However, due to insufficient information about the zonal affiliation of most Central Asian spider species, we limited ourselves to analyzing only the longitude component of the area. The classification of areas generally corresponds to that proposed by K.B. Gorodkov [1]. The types of habitats that are absent in K.B. Gorodkov's classification are given taking into account the zoning of Central Asia proposed by O.L. Kryzhanovsky [7].

Research results and discussion

Taxonomic structure of fauna. At the moment, there are 223 species in the spider fauna of the semi-arid areas of the West Kazakhstan region (Table 1). Three families are distinguished by the highest species diversity: Gnaphosidae, Linyphiidae and Salticidae. Five families Araneidae, Lycosidae, Philodromidae, Theridiidae and Thomisidae have high species diversity. The similar composition and sequence of

spider families with the highest diversity is typical for the West Kazakhstan Region as a whole [6]. However, in the fauna of the region, wolf spiders and sidewalker spiders are more diverse than circle spiders.

The FTI of spiders in the semi-arid areas of the West Kazakhstan region looks like this - Gna-Lin-Sal-(Lyc-Phi)-(Are-The)-Tho. For comparison, the FTI of the West Kazakhstan region is Gna-(Sal, Lin)-Lyc-Tho-Ara-(Phi, The).

The zonal specificity of the fauna is well reflected by the number of genera with the greatest species diversity. For the semi-arids of western Kazakhstan, this sequence is as follows: Zelotes (9), Thanatos (8), Gnaphosa and Attulus (7), Xysticus and Pardosa (6), Alopecosa and Heliophanus (5 species).

Table 1 - Taxonomic structure of the spider fauna of the semi-arid areas of the West Kazakhstan region.

Families	Number of genera	Number of species	Proportion of species (%)
Agelenidae	One	1	0,5
Araneidae	Ten	16	7,1
Cheiracanthidae	One	3	1,3
Clubionidae	One	1	0,5
Dictynidae	Six	7	3,3
Eresidae	One	1	0,5
Gnaphosidae	Fifteen	**47**	**21,0**
Hahniidae	One	1	0,5
Linyphiidae	Twenty-three	**32**	**14,4**
Liocranidae	Two	3	1,3
Lycosidae	Eight	17	7,7
Mimetidae	One	2	0,9
Miturgidae	One	1	0,5
Oxyopidae	One	4	1,8
Philodromidae	Four	17	7,7
Pholcidae	One	1	0,4
Pisauridae	One	1	0,4
Salticidae	Thirteen	**31**	**13,9**
Theridiidae	Ten	16	7,1
Thomisidae	Seven	15	6,7
Titanoecidae	Two	5	2,3
Uloboridae	One	1	0,5
Total	One hundred eleven	223	100,0

Zoogeographic structure of fauna

According to the longitude component of their ranges, the spider species found in the West Kazakhstan Region can be attributed to five groups of ranges (Table 2). The most numerous among them are Palearctic and ancient Mediterranean species. Together

they make up 84.3% of the fauna. Despite its proximity to Europe, the fauna of the West Kazakhstan region contains rare species from the European-Siberian group, including species with a European range.

Table 2 – Zoogeographic composition of the spider fauna of the semi-arid areas of the West Kazakhstan region.

Groups and variants of habitats	Number of species	Percentage of species (%)
1. Cosmopolitan	**2**	**0,8**
1.1. Cosmopolitan	1	0,4
1.2. Subcosmopolitan	1	0,4
2. Holarctic	**13**	**5,8**
2.1. Circumgolarctic	11	4,9
2.2. Transnearctic-West Palearctic	1	0,4
2.3. Greenland-West Siberian	1	0,4
3. Palearctic	**98**	**43,5**
3.1. Transpalearctic	37	16,6
3.2. Amphipalearctic	1	0,4
3.3. West-Central Palearctic	48	21,5
3.4. West Palearctic	11	4,9
4. Ancient Mediterranean	**90**	**40,8**
4.1. WesternCentral Ancient Mediterranean	13	5,8
4.8. Western Ancient Mediterranean	5	2,2
4.6. Eastern European-Central Ancient Mediterranean	15	6,7
4.4. Central Ancient Mediterranean	18	8,1
4.9.Eastern European-Central Eastern Ancient Mediterranean	2	0,9
4.2.Central Eastern Ancient Mediterranean	3	1,3
4.5. European-Kazakh	2	0,9
4.7. Eastern European-Kazakh	9	4,0
4.3. Kazakh	24	10,8
5. European-Siberian	**11**	**4,9**
5.1. East European-Siberian	1	0,4
5.3. European-Central Siberian	1	0,4
5.2. European-West Siberian	4	1,8
5.4. European	5	2,2
Unknown	9	4,0
Total	223	100,0

Holarctic species are almost entirely represented by ecologically plastic polyzonal circumgolarctic species. Most of them are meadow hortobiont species: Tibellus maritimus (Menge, 1875), T.oblongus (Walckenaer, 1802), Philodromus cespitum (Walckenaer, 1802), Phylloneta impressa (L. Koch, 1881), Microlinyphia impigra (O. Pickard-Cambridge, 1871), M.pusilla (Sundevall, 1830), Hypsosinga pygmaea (Sundevall, 1831). Less common among them are species that live on the surface of the soil. Such as Micaria rossica Thorell, 1875, Haplodrassus signifer (C. L. Koch, 1839), and Steatoda albomaculata (De Geer, 1778).

The West-central Palearctic and trans-Palearctic species are the most numerous in the Palearctic group. There are relatively few Western Palearctic species (Table. 1), for the most part they tend to xerophytic habitats. These are such species as Thanatus arenarius Thorell, 1872 T. pictus L. Koch, 1881, Argenna patula (Simon, 1874), Bassanioides robustus (Hahn, 1832), Berlandina cinerea (Menge, 1868) and Eresus kollari F.W. Rossi, 1846,.

For the semi-desert areas , it is necessary to think that the composition of species with an ancient Mediterranean range is most indicative. In this group, the most numerous species are those with Kazakh, Central Ancient Mediterranean and West-central Ancient Mediterranean types of habitats (Table 2). Species with presumably Mediterranean genesis are few: Marinarozelotes malkini (Platnik Et Murphy, 1984), Agraecina lineata (Simon, 1878), Archaeodictyna minutissima (Miller 1958,), Rhyzodromus hierosolymitanus (Levi, 1977), Xysticus marmoratus Thorell, 1875. The species distributed from the Caspian Sea (or Eastern Europe) to the eastern limits of the ancient Mediterranean are also few and many of them belong to monotypic genera. For the latter reason, it is impossible to put forward a plausible hypothesis about their place of origin. Such are “Ero” koreanus Paik, “Araneus” pallasi (Thorell, 1875), 1967, mesazigona mira Tanasevich, 1989, Mustelicosa dimidiata (Thorell, 1875).

There are almost no endemic species for the spider fauna of the semi-arid areas of the WKR. Only two species of spiders (1.4% of the fauna) are known only from the WKR or from the West Kazakhstan Region and the nearest neighboring regions. Apparently, it can be argued that the territory of the WKR was a transit areas for the migration of spiders from west to east and from east to west.

Of the two conditionally endemic species, the Kazakh Devade (Devade kazakhstanica Esyunin et Efimik, 2000) is widespread in the semi-desert biotopes of the West Kazakhstan region, Atyrau and Mangystau regions [4]. Related species are distributed within the Ancient Mediterranean: in southern Europe, North Africa, the Middle East, Central Asia, as well as in Mongolia and China. The second species, Walckenaeria stepposa Tanasevitch et Piterkina, 2007, is an inhabitant of semi-desert landscapes of the West Kazakhstan region and adjacent areas of the Atyrau region, where it is confined to steppe associations and fine-grained sands [14].

Conclusion

Thus, the fauna of the West Kazakhstan region consists mainly of widespread species. This is reflected not only in the predominance of species from the Palearctic and ancient Mediterranean groups and species with West-central Palearctic and trans-Palearctic types of habitats, but also in a high proportion of species with the most extensive types of habitats: Kazakh, Central Ancient Mediterranean, West Central

ancient Mediterranean. There is no practical endemism of the spider fauna of the semi-arid areas of the WKR. Apparently, the territory of the WKR is not a center of speciation either in the historical past or now. The fauna of the region is distinctly allochthonous.

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С.Л. Есюнин, Ә.А. Қабдрахимов

БАТЫС ҚАЗАҚСТАН ОБЛЫСЫНЫҢ ЖАРТЫЛАЙ ШӨЛЕЙТТІ АЙМАҚТАРЫНДАҒЫ ӨРМЕКШІЛЕРДІҢ ӘРТҮРЛІЛІГІНЕ ШОЛУ

Аңдатпа. Әдеби деректер негізінде Батыс Қазақстан облысының жартылай шөлейтті аймақтарындағы өрмекшілер фаунасына таксономиялық және зоогеографиялық талдау жүргізілді. Қазіргі уақытта Батыс Қазақстан облысының жартылай шөлейтті аймақтарында 22 тұқымдастан тұратын 111 туысқа жататын 223 түр бар. Ең көп түр алуандылығымен үш тұқымдас ерекшеленеді: Gnaphosidae (47 түр; 21,0%), Linyphiidae (32 түр; 14,4%) және Salticidae (31 түр; 13,9%). Сонымен қатар, Lycosidae және Philodromidae отбасыларында (әрқайсысы 17 түр; 7,7%), Araneidae және Theridiidae отбасыларында (әрқайсысы 16 түр; 7,1%) және Thomisidae тұқымдасы (15 түр; 6,7%) жоғары түр алуандылығы байқалады. Батыс Қазақстан облысының фаунасының таксономиялық индексі: Gna-Lin-Sal-(Ara-The)-(Lyc-Phi)-Tho. Zelotes, Thanatus, Gnaphosa, Attulus, Xysticus және Pardosa

туыстары Батыс Қазақстан облысының фаунасында ең көп түр алуандылығымен ерекшеленеді. Батыс Қазақстан облысының фаунасында палеарктикалық (43,5%) және ежелгі Жерорта теңізі (40,8%) түрлері ең көп. Фаунаның эндемизмі айқын емес. Фауна аллохтонды сипатқа ие.

Кілт сөздер: өрмекші; фауна; фауналық таксономиялық индекс; әртүрлілік; жартылай шөлейтті аймақ; Батыс Қазақстан облысы.

С.Л. Есюнин, А.А. Қабдрахимов

ОБЗОР РАЗНООБРАЗИЯ ПАУКОВ В ПОЛУПУСТЫННЫХ РАЙОНАХ ЗАПАДНО-КАЗАХСТАНСКОЙ ОБЛАСТИ

Аннотация. На основе литературных данных проведен таксономический и зоогеографический анализ паучьей фауны полупустынных районов Западно-Казахстанской области (ЗКО). В настоящее время в паучьей фауне полупустынных районов Западно-Казахстанской области насчитывается 223 вида, относящихся к 111 родам 22 семейств. Наибольшим видовым разнообразием характеризуются три семейства: Gnaphosidae (47 видов; 21,0%), Linyphiidae (32 вида; 14,4%) и Salticidae (31 вид; 13,9%). Высокое видовое разнообразие также отмечается у пяти семейств: Lycosidae и Philodromidae (по 17 видов; 7,7%), Araneidae и Theridiidae (по 16 видов; 7,1%) и Thomisidae (15 видов; 6,7%). Фаунистический таксономический индекс фауны Западно-Казахстанской области: Gna-Lin-Sal-(Ara-The)-(Lyc-Phi)-Tho. Роды Zelotes, Thanatus, Gnaphosa, Attulus, Xysticus и Pardosa обладают наибольшим видовым разнообразием в фауне Западно-Казахстанской области. В фауне Западно-Казахстанской области наиболее многочисленны палеарктические (43,5%) и древнесредиземноморские (40,8%) виды. Эндемизм фауны не выражен. Фауна имеет аллохтонный характер.

Ключевые слова: паук; фауна; фаунистический таксономический индекс; разнообразие; полупустынный регион; Западно-Казахста