ПЕРЕЖОГИН, Ю.В., ЕРОХИН, Н.Г., ТАРАСОВ, М.С., ТАНАТ, Д.
ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ КЕКІРЕ (OXYTROPIS) ТЕГІНІҢ ЭНДЕМИКАЛЫҚ ТҮРЛЕРІ

Қазақстан Республикасының Кекіре (Oxytropis) тегінің эндемикалық түрлерін зерттеу процесінде «Қазақстан флорасында» байқалған 39 түрдің тек 27-сі ғана эндемик болып табылатыны анықталды. 12 түрі субендемикада жинақталған. Зерттеу нәтижесінде алынған конспект «Қазақстан флорасы» жаңа басылымына арналған эндемикалық өсімдіктер туралы деректерді толықтырады.

Кілт сөздер: *Қазақстан флорасы, эндемикалық өсімдік түрлері, орналасқан жері туралы мәліметтер.*

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ENDEMIC SPECIES OF THE GENUS OXYTROPIS REPUBLIC OF KAZAKHSTAN

In the process of studying endemic species of the genus Oxytropis of the Republic of Kazakhstan, it was revealed that out of 39 species noted in the «Flora of Kazakhstan», only 27 are endemic. 12 species are subendemic. The summary obtained as a result of the research will supplement the data on endemic plants for the new edition of «Flora of Kazakhstan».

Key words: *flora of Kazakhstan, endemic plant species, information on the location.*

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TO THE STUDY OF THE HERPETOBIUM OF MENDYKARA DISTRICT OF KOSTANAY REGION

Abstract

In the work described here the results of a study of herpetobium in four model sites (virgin land, young fallow, old-growth fallow, wheat field) located in the Mendykara district of Kostanay region are presented. The article includes information on the taxonomic composition of herpetobium, dynamic density. The data of a comparative analysis of herpetobium for 2010 and 2019 on virgin and old-age fallow are given.

Key words: *herpetobium, pests, Kostanay region, coleoptera, virgin land, fallow, agrocenosis.*

1 Introduction

Currently, herpetobium include all terrestrial (litter) invertebrates from the superclass of millipedes, crustaceans, arachnids, and postmandibular insects inhabiting the soil surface [1].

The importance, originality and topicality of the research these invertebrate animals is due to their abundance and important role in biocenoses, sensitivity to changes in natural regimes, and insufficient information of their fauna.

Investigates of the herpetobium of the Mendykara district, in our model sites, namely virgin lands and old-growth fallow, were carried out in 2010 by Bragina T.M., Rulyova M.M. [2]. But

gradual changes in the climate and hydrological regime determine us to go on faunistic research this territory.

In addition, in this work, we study the agrocenosis (wheat field), where the basis of herpetobium is agricultural pests.

2 Material and methods

The fundamental for this research was the materials collected in the Mendykara district of the Kostanay region from April to June 2019.

The study of herpetobium was carried out on 4 model sites: virgin land (site 1), fallow 6 years old (site 2), fallow 33 years old (site 3), and wheat field (site 4).

The collection of material was carried out by Barber's soil traps method [3], antifreeze was used as a fixing liquid. At each model site, 10 trapping jars with a volume of 500 ml were installed. Traps were checked and insects were sampled once every 10 days (10 L – days). Additionally, manual collection of insects and the method of mowing with an entomological net were used. Insects were packed on cotton mattresses, after which they were identified using an MBS-9 stereoscopic microscope and a magnifying glass.

3, 4 Results and discussions

An important indicator in conducting faunistic researches of herpetobium is the determination of the dynamic population density. The calculation of the dynamic density was carried out by the following formula V = k / n, where k is the sum of all individuals of the species in all samples, n is the number of studied samples.

The dynamic population density was determined by calculating the number of invertebrates captured in traps, expressed in specimens per 10 trap-days.

Population density is one of the main indicators for accounting for biocenosis components. Many other indicators are calculated based on this data (density).

As can be seen from Table 1, the highest dynamic density of herpetobium was in April on virgin and fallow sites – 5.8 ind./10 – l-days, and the lowest in a wheat field – 2.5 ind./10 – l-days.

Table 1 – Dynamic density at model sites (10 L – days) (2019)

№	Site	April	May	June
1	Virgin land	5,8	8,1	8,8
2	Fallow 6 years	5,8	5,5	6,1
3	Fallow 33 years	4,8	6,7	7,6
4	Wheat field	2,5	8,42	9,2

In May collections, the number of invertebrates increased at three sites and ranged from 6.7 to 8.42 specimens / 10 – l-days. The increase in the number in the wheat field is important, the indicator increased from 2.5 to 9.2 ind./10 – l-days. We associate this with the release of a large number of ground beetles from the soil by June, because their development cycle is inextricably linked with it.

A total of 327 insect specimens were collected, 21 species were identified in Table 2.

Table 2 – The number of herpetobium in the model sites (2019)

Group	Amount spec.	Site 1	Site 2	Site 3	Site 4
Araneae	155	13,5%	5,6%	25,8%	0,58%
Insecta: ***Hemiptera***: *Lygaeidae*	6	-	1,8%	-	-
Coleoptera:					
Carabidae	114	1,17%	10,8%	-	21,5%
Tenebrionadae	11	1.5%	0.87%	0.58%	0,29%

Histeridae	3	-	0.87%	-	-
Eleteridae	14	1,5%	2,6%	-	-
Scarabidae	15	2,6%	1,17%	0,58%	-
Silphidae	7	-	1,8%	0,29%	-
Curculionidae	2	-	0,58%	-	-

All four sites were dominated by representatives of the class Araneae, the total number of spiders was 155 (45.5% of the total).

Coleoptera dominated among insects. The most represented family is Carabidae. In total, 114 specimens (33.5%) were found in the sites. A large number of ground beetles were recorded in a wheat field and young fallow land. Among them are such species as *Cicindela sylvatica, Carabus coriaceus, Zabrus tenebrioides, Harpalus affinis*. The second largest family is the Scarabidae family – 15 specimens (4.5%). Identified species such as Onthophagus similis, *Aphodius melanostictus, Serica brunnea*.

The total number of collected click beetles (Eleteridae) was 14 specimens (4.1%), with the absolute dominance of *Selatosomus latus*.

Among the darkling beetles, one species dominated – *Opatrum sabulosum*, and among the hister beetle two species – *Hister quadrimaculatus, Margarinotus arrow*.

From the family of burying beetles, only one species, *Silpha carinata*, has been described. The family Lygaeidae from the order Hemiptera is represented by one species, *Rhyparochromus pini*.

As noted earlier, the studies were carried out in 2010 on virgin and old-aged fallow lands.

The number of herpetobium of the red-stipa virgin steppe on ordinary medium-humus chernozems of the Mendykara district in 2010 averaged 2.5 ind./10 – l-days during the growing season. But it should be noted that in 2010 the studies were conducted from April to October.

The largest number of individuals have been registered in September (4.0 specimens / 10 – l-days), the smallest in June (1.3 specimens / 10 – l-days). 26 species have been identified as part of herpetobium. In terms of species, beetles from three families predominated: Scarabaeidae (5 species), Silphidae (5 species), Dermestidae (3 species). Silphidae dominated in numbers – 18.5% of the total number of invertebrates. Among the burying beetles were identified: *Necrophorus germanicus*, transpalaearctic species *N. vespillo*, *N. investigator, N. vestigator*. All these species belong to the group of necrophages; they feed on carrion both in the imago and larval stages. Among the burying beetles, a variable species dominated – *Silpha carinata*.

Scarabaeidae beetles accounted for 16.8%. Over 90% of which accounted for the genera Aphodius and Onthophagus (*Onthophagus marginalis, O. gibbulus*). Of the Troxes, the *Trox hispidus* was common.

Among the invertebrates caught in soil traps, there were species from other orders: Hymenoptera (13.6%), Orthoptera (11.3%), Diptera (9.9%), etc. The defining element of the environment for herpetobium is, first of all, the soil with which they are most closely associated and the habitat conditions to which they are best adapted. In this regard, biotopic allocation to certain plants is of lesser importance for them, which is the reason for the presence of a large number of polyphages and wide oligophages among herpetobium. Moisture, soil structure and composition, food resources, and microclimate determine the presence or absence of a particular species.

The largest number of individuals was registered in June (8.8 specimens / 10 – l-days), the smallest in April (5.8 specimens / 10 – l-days). 10 species were identified in the composition of herpetobium in the virgin site in 2019.

The class Spiders (Araneae) dominated in numbers and percentages. The number of spiders in the virgin site is 88, in a percentage ratio is 25.8% of the total number of researchable insects of the site.

In terms of species, coleoptera from three families predominated: Scarabaeidae (2 species), Silphidae (1 species), Tenebrionidae (1 species), as well as the family Lygaeidae from hemiptera (1

species). Lamellar beetles accounted for 4.4%. Among lamellar beetles (Scarabaeidae), the following were identified: Onthophagus similis, Serica brunnea. Of the burying beetles, the dominant species was *Silpha carinata*, and from the family of darkling beetles *Opatrum sabulosum*.

Among the invertebrates caught in soil traps were both species and families of Lygaeidae (*Rhyparochromus pini*)

In the old-growth fallow, the soil cover is represented by ordinary thin low-humus chernozems, the relief is gently undulating. Tyrsa-wormwood-fescue community (*Festuca valesiaca* + *Artemisia dracunculus* + *Stipa capillata*). In 2010, the number of herpetobium on average during the growing season was 2.5 ind./10 – l-days. The largest number of individuals was in July – 2 specimens / 10 – l-days, the smallest in September – 2.3 specimens / 10 – l-days.

The low number of herpetobium was caused not only by the unfavorable conditions prevailing on the site due to overgrazing, but also by a significant factor bar to collection of invertebrates – cattle grazing, knocking out soil traps.

The herpetobium was dominated by Aranei – 49.8%, among insects Hymenoptera – 17.6%, Orthoptera – 16.5%. Coleoptera from the following families were also found in soil traps: Carabidae, Coccinellidae, Chrysomelidae and Meloidae.

A dangerous pest of agricultural crops from the Carabidae family, *Zabrus tenebrioidae*, was common. Other representatives of this family were also found (4 species).

Specimens of the Sylphide family were absent or extremely rare (4 individuals over the entire study period).

In 2019, the number of herpetobium on average for the growing season was 1.9 ind./10 – l-days. The largest number of individuals was in June – 7.6 specimens / 10 – l-days, the smallest in April – 4.8 specimens / 10 – l-days.

Comparative analysis revealed that 14 species were identified as part of herpetobium in the virgin site researched in 2010, and 10 species were identified in the same site in 2019. At the same time, there are only 6 common species. These are *Nerophorus vestigator*, *N. investigator*, *N. vespillo, N. humator, Silpha carinata* and *Serica brunnea*.

In 2010, 10 species have been registered on the old-growth fallow, and in 2019 – 11 species. There are 2 common species (*Zabrus tenebrioidae, Silpha carinata*).

5 Conclusions

In summing up the results of this investigation it should be noted that Coleoptera dominate among 327 captured invertebrates (48.6%). Codominants are Aranei – 7.2% and Hymenoptera – 10%. The highest dynamic density of herpetobium was in April in the virgin and fallow sites, and the lowest in the wheat field. The largest numbers are in June.

The comparative analysis showed that 14 species were identified in the herpetobium in the virgin site investigated in 2010, and 10 species were identified in the same site in 2018. At the same time, there are only 6 common species. 10 species were registered in the old-growth fallow in 2010, and 11 species in 2019. There are only two common types.

The number of herpetobium in the sites in 2019 was higher than in 2010. This may be due to more rainfall and higher temperatures in the spring.

Among the coleoptera in the model sites, such dangerous pests of agricultural crops were identified as: *Zabrus gibbus, Hemicrepidius niger, Serica brunnea, Opatrum sabulosum*.

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ҚОСТАНАЙ ОБЛЫСЫ МЕҢДІҚАРА АУДАНЫНЫҢ ГЕРПЕТОБИЯСЫН ЗЕРТТЕУ ТУРАЛЫ СҰРАҚҚА

Көрсетіліп отырған мақалада Қостанай облысының Мендіқара ауданында орналасқан төрт модульдік тілімдерде (тыңайған жер, жас тыңайған жер, ескі жастағы тыңайған жер, бидай алқабы) герпетобияның зерттеу нәтижесі келтірілген. Мақалада герпитобияның токсономиялық құрамы, динамикалық тығыздығы туралы ақпарат бар. 2010 және 2019 жылдардағы герпитобияның тың және ескі жастағы тың шөгінділерде салыстырмалы талдау деректері келтірілген.

Кілт сөздер: *герпетобий, зиянкестер, Қостанай облысы, қатты қанаттылар, тың игеру, тыңайған, агроценоз.*

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К ВОПРОСУ ОБ ИЗУЧЕНИИ ГЕРПЕТОБИЯ МЕНДЫКАРИНСКОГО РАЙОНА КОСТАНАЙСКОЙ ОБЛАСТИ

В данной статье приведены результаты исследования герпетобия на четырех модельных участках (целина, молодая залежь, старовозрастная залежь, пшеничное поле), расположенных в Мендыкаринском районе Костанайской области. Статья включает в себя сведения о таксономическом составе герпетобия, динамической плотности. Приводятся данные сравнительного анализа герпетобия за 2010 и 2019 года на целине и старовозрастной залежи.

Ключевые слова: *герпетобий, вредители, Костанайская область, жесткокрылые, целина, залежь, агроценоз.*