Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4362- 4376
Received 20 January 2021; Accepted 08 February 2021.

Species Composition and Ecological Features of Staphylinids (Coleoptera, Staphylinidae) in Agrocenoses of Karakalpakstan

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Annotation

The data on the species composition and ecological characteristics of staphylinids in agrocenoses in the conditions of Karakalpakstan is given. The following biotopes: cotton, rice field, alfalfa field, wheat field, corn plantation, vegetable and melon crops, orchard, etc were selected for the study. The greatest number of staphylinids prevails in humid biotopes, along the banks of irrigation canals, along the edges of rice fields; a significantly diverse fauna in alfalfa fields, as well as vegetable crops, and the smallest number of these beetles was found on corn plantations and orchards.

Introduction

In terms of numbers, staphylinids are one of the most numerous representatives of the soil fauna of agrocenoses. They play an important role in natural and modified ecosystems with a wide variety and abundance of food, as a result of human activities.

Irrigation of the fields creates favorable conditions for the existence of staphylinids. Watering during the growing season creates a favorable hydrothermal regime, which is very important for the survival of the majority of staphylinids in agrocenoses. Some researchers note that the number of these beetles on different field crops in the studied region becomes much higher after watering the crops [24, p.118].

The structure of the staphylinid fauna in different crops is determined by the applied agricultural techniques and depends on the previous crops. The least of them are in the fields and under row crops (Kasheev, 2002).

The Republic of Karakalpakstan is located in the central part of the Eurasian continent (between 42°44′ - 45°35′ N and 56° - 62° 29′ East) on the northern border of subtropical and temperate climatic zones. A significant part of the territory of Karakalpakstan belongs to the Aral Sea region. The shrinking of the Aral Sea and the reduction of the Amu Darya runoff to one degree or another affected all components of the region's ecosystem.

At present, due to the drying up of the Aral Sea, the equilibrium of the ecosystem of the Southern Aral Sea region is disturbed, the pressure on the natural complexes here reaches extreme strength, and anthropogenic desertification and aridization are taking place

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4362- 4376
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everywhere. Currently, the Amu Darya delta no longer functions as a normal delta ecosystem [22, p. 183]. The most vulnerable elements of the regional fauna are usually animal species inhabiting wetlands.

Information on the species diversity and ecological features of staphylinids in agrocenoses was fragmentary and incomplete, from 16 to 49 species of staphylinids were registered in the territory of Karakalpakstan, which were indicated in the works of some researchers [1, p. 97; 3, p. 43-46; 4, p. 42-45; 6, p. 35-38; 8, p.142-148; 9, p.23-32; 11, p. 21-22; 12, p.192-202; 16, p.37-43]. After analyzing the literature data on the species diversity of staphylinids, it can be noted that the researchers cited only lists of staphylinids found on the territory of Karakalpakstan and the rove fauna of agrocenoses has not been sufficiently studied because of the degradation of the natural environment of the region under study. This served as the basis for planning this study.

Material and research methods

The anthropogenic landscape has been formed here in the result of centuries-old agricultural development, artificial ecosystems have been created, for example, agrocenoses, the functioning of which is determined and regulated by humans. In addition to Muynak, various agricultural crops are actively cultivated in the regions of the Republic of Karakalpakstan using irrigation.

The studies were carried out in the fields and household plots of agricultural crops sown in the agrobiocenoses of the Republic of Karakalpakstan (Beruni, Ellikala, Hodjeyli, Shumanay, Kalikul, Nukus, Kegeyli, Chimbay, Takhtakupir regions and at the suburbs of Nukus city) in 2011-2019. We prepared the materials on the basis of route and stationary studies.

The following biotopes were selected for the research: cotton, rice field, alfalfa field, wheat field, corn plantation, vegetable and melon crops, orchard, etc. The generally accepted methods of entomological and soil-zoological research were used for preparing the material [13, p. 21-22; 10, p. 18-20; 19, p. 1498-1501; 20, p. 1-190].

Laboratory experiments to study the impact of environmental factors on insect species, as well as the bio-ecological conditions of their development, were carried out in the experimental fields of the Karakalpak Scientific Research Institute of Natural Sciences (Nukus). The data of the "Karakalpakstan" meteorological station were also used; long-term climatic and meteorological indicators (air temperature, relative humidity and precipitation, etc.) were analyzed, which are given in Table 1.

Table 1

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Criteria for changes in abiotic factors during the growing season of agrobiocenosis of Karakalpakstan

(Meteorological station of the Republic of Karakalpakstan, 2016-2019)

Indicators	Maximum	Optimal	Minimum
Air temperature, ºC	42-45	24-27	8-12
The sum of the effective temperatures at the threshold 10ºC	2486-2235	1985-2013	1793-1901
Relative humidity, %	74-82	55-68	15-18
Wind speed, m / sec	11-16	5-6	2-3
Precipitation, mm	52,3-69,5	14,3-16,2	1,6-2,1
Soil salinity, %	2,1-1,9	0,3-0,4	0,01-0,02

During the years of research, the average long-term temperature increased by 1-8 ° C in the winter, spring and summer months, and it was slightly lower in autumn of 2016, 2018 and 2019. This process has a significant impact on the development of the beetles, and mild winter weather allows them to overwinter completely. Staphylinids actively developed in the summer months, when the air temperature averaged 24-27 ° C, and the maximum temperature was within 33-35 ° C, when it rose above this level, they migrated to the nearest water stations and daytime species were active during the day only from 06:00 a.m. to 10:00a.m. and from 07:00p.m. to 09:00p.m. In 2015, 2018 and 2019, there was an increase in the maximum air temperature to 40-44 ° C, with average relative humidity to 30-35% and the minimum humidity level to 10-13%, which turned out to be the main factors in the decrease of these beetles in the number.

Research results

Cotton (5.0-56.0 hectares), wheat (0.5-23.0 hectares), rice (1.0-120.0 hectares), vegetables (0.1-9.0 hectares), alfalfa (1.0-43.0 hectares), fruit crops (0.1-3.0 hectares) are cultivated on the main areas of farms in the studied regions of the Republic of Karakalpakstan, vegetables and melons, cereals and legumes (0, 01-1.2 hectares) are cultivated on personal plots.

As a result of studies, 53 species of staphylinids were identified in agrocenoses in the conditions of the Republic of Karakalpakstan, belonging to 30 genera, 7 subfamilies, of which the largest number are representatives of the subfamily Staphylininae (Fig. 1), [12, p. 40-43].

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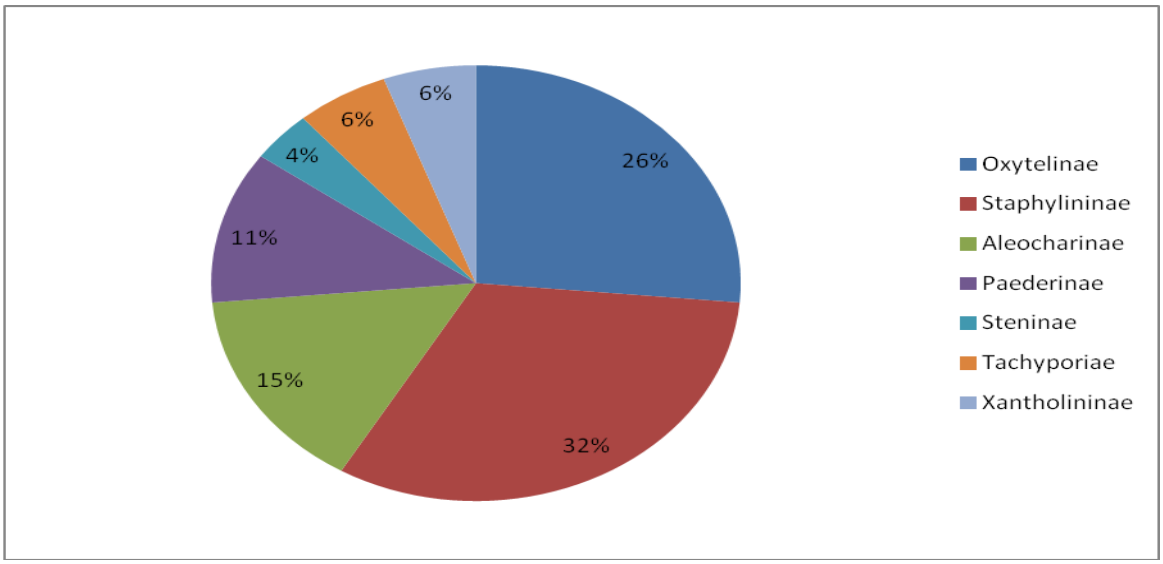

Figure: 1. Composition of the population of staphylinids in agrocenoses of Karakalpakstan in subfamilies

In agrocenoses of Karakalpakstan, a certain pattern can be traced in the distribution of staphylinids on biotopes; the similarity of their species composition is shown in Table 2.

Table 2

The value of the coefficients of faunistic similarity (according to Jaccard) between biotopes in agrocenoses, in the conditions of Karakalpakstan (%).

Biotope name	Rice field	Alfalfa field	Winter wheat	Cotton field	Vegetable field	Fruit orchard	Corn field
Rice field	\	18,7	15,3	12	5,5	12,5	4
Alfalfa field	18,7	\	30,4	16,6	15	8	13
Winter wheat	15,3	30,4	\	17,6	15,3	11,7	20
Cotton field	12	16,6	17,6	\	16,6	13,3	14,2
Vegetable field	5,5	15	15,3	16,6	\	8	19
Fruit orchard	12,5	8	11,7	13,3	8	\	7,1
Corn field	4	13	20	14,2	19	7,1	\

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During the growing season the following species: *Anotylus rugosus, Philonthus concinnus, Ph.politus, Ph.fuscipennis, Ph.splendens, Quedius ochripennis, Paederus fuscipes, Tachyporus hypnorun, T.nitidulus* were identified in cotton fields (of Takhtakupir, Beruni, Khodjeyli, Kegeyli, Chimbay regions) located along the banks of irrigation canals. Most of species are found singularly and have no significance in the fauna and flora of the cotton agrobiocenosis; it seems that species listed above are of a random nature. Only *Paederus fuscipes* is found on cotton in mass (8-10 copies/m^2). It destroys eggs and small caterpillars of the cotton bollworm.

We have determined the average number of staphylinids per 1 m² of the soil-bedding layer of the weed environment of cotton fields, and as noted by other researchers [2, p.17], the number of staphylinids depends on the treatment with chemical preparations (with herbicides, pesticides). It seems to us that if the surroundings of cotton fields are treated with chemical preparations, then their number decreases sharply, but their quantity is more on untreated fields (Table 3).

Table 3

Average number of staphylinids per 1m² of the soil-litter layer of the weed environment in the cotton fields of Karakalpakstan

Khojeyli region, Farm "P.Khalmuratov"			Kegeyli region, Farm "B. Karimberdiev"		
Record date	Area not treated with chemicals	Area treated with chemicals	Record date	Area not treated with chemicals	Area treated with chemicals
20.05. 2012.	10,5	9,4	24.05. 2012.	9,7	8,0
21.05. 2012.	9,5	7,2	26.05.2 012.	7,6	6,8
22.05. 2012.	3,2	1,6	28.05.2 012.	4,8	3,9
23.05. 2012.	11,5	9,6	30.05.2 012.	6,9	5,6
03.06. 2012.	9,8	6,3	04.06. 2012.	13,3	4,8
05.06. 2012.	13,2	5,9	06.06. 2012	10,9	3,9
07.06.	11,1	-	08.06.	17,7	-

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2012.			2012		
09.06. 2012.	1,8	-	10.06. 2012.	22	-
11.06. 2012.	36	1,2	12.06. 2012.	31	-
13.06. 2012.	39	0,9	14.06. 2012.	33	-
15.06. 2012.	21	0,7	16.06. 2012.	29	-

The most favorable conditions for the habitat of staphylinids are alfalfa crops. According to V. Tishler's instructions, alfalfa sowing transmits no more than 5% of daylight [25, p.455]. Constant high soil moisture is created under its cover. The process of decomposition of plant residues occurs on alfalfa crops after irrigation. This process is much more active under heaps of green mass. The accumulation of dead leaves and stems on the soil allows the beetles to find convenient shelters for themselves [17, p. 122-123].

Favorable conditions for staphylinids at the station of the studied region attract species from different ecological groups: eurybionts, coprobionts, stratobionts, epigeobionts, botrobionts, and here the density of species is noted to be much higher (30-40 copies/m^2): *Platystethus cornutus, P.nitens, Philonthus binotatus, Ph.splendens, Ph. quisqularius, Bisnius cephalotes, Rabigus tenuis, Medon ferrugeneus, Scopaeus laevigatus, Paederus fuscipes, Stenus ater, Tachyporus hypnorun, T.nitidulus, Leptacinus sulcifrons.*

The preference to the species of staphylinids of the more humid biotope is associated with rather high hygrophilicity of this kind as a whole (Tikhomirova, 1968). Only the *Tachyporus hypnorun* beetles were a clear exception, and members of this genus can exhibit significant dry tolerance as they spend a lot of time on plants.

According to our observation in 2014-2015, it was in these stations that the development of the larva and pupa took place, this is explained by the fact that the long growing season of the crop, a high degree of soil coverage, the presence of organic matter (rotting leaves), all these favorable conditions characteristic of staphylinids, contribute to living of these beetles, not only in the center, and along the edge of the fields, the station has the richest and most diverse species composition of staphylinids. The following species live here constantly (during the growing season): *Coprophilus pennifer, Carpelimus bilineatus, C. troglodytes, Falagria sulcata, Aleochara tristis.*

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During mowing and prolonged dryness (cessation of irrigation), the moisture content of the soil cover persists for only a few days, which are not optimal for staphylinids, as a result, the number decreases, and all this time staphylinids migrate to the nearest near-water stations.

Vegetable crops are intensively watered and the hydrothermal regime of vegetable fields is more favorable for staphylinids in the studied region, and here the diverse fauna of staphylinids (Table 4) reaches a relatively high abundance (28-34 copies/м^2). The following species are characterized on vegetable crops (of Nukus region, farm "Darbent" in 2011-2018): *Platystethus cornutus, Xantholinus longiventris, Ph.splendens, Rabigus tenuis, Paederus fuscipes, Aleochara bilineata.* This is due to the fact that favorable conditions for the habitation of beetles and the availability of food are created here; they feed with cabbage and onion flies (onion field, carrot field, cabbage field) and also, with eggs and larvae of the Colorado potato beetle on the potato field [12, p. 40-43].

Staphyllinids (from the *Aleocharinae* subfamily) use the natural porosity of the soil or the ready burrows of burrowing invertebrates for movement. A significant part of the complex of staphylinids (27.3%) on loamy soil of potato fields (of Nukus region, farm "Nukus") make up representatives of the subfamily *Staphylininae (Philonthus*) and *Xantholininae (Xantholinus*). Most of the representatives of this subfamily collected in the potato fields belong to the genus Philonthus. Despite the fact that these beetles are well adapted to locomotion in wells (elongated flexible body and strong forelegs with massive thighs), these insects have no obligate connection with the soil and can live in shaded humid places (Tikhomirova, 1973). A representative of the genus *Philonthus*, which is most closely associated with wells, where it spends most of the time - *Ph.dimidiatipennis* was found only in potato fields and on the sides of fields with loose soil rich in humus.

Table 4

Species composition and density of staphylinids of vegetable crops in agrocenoses of Karakalpakstan

Vegetable crops	Species composition	Dominant species	Density
Onion field	*Paederus fuscipes, Xantholinus longiventris, Philonthus splendens, Aleochara bilineata, Platystethus nitens*	*Paederus fuscipes*	4-6 copies/м^2
Carrot field	*Platystethus cornutus, Paederus fuscipes, Scymbalium anale, Rabigus tenuis, Philonthus coruscus Ph. concinnus, Ph. splendens, Dolicaon*	*Philonthus concinnus*	3-7 copies/м^2

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	biguttulus		
Cabbage field	*Xantholinus longiventris, Aleochara bilineata, Paederus fuscipes, Philonthus coruscus*	*Aleochara bilineata*	5-6 copies/м^2
Tomato field	*Paederus fuscipes, Aleochara bilineata, Philonthus dimidiatipennis*	*Paederus fuscipes*	7-8 copies/м^2
Beet field	*Philonthus coruscus, Ph.politus, Ph. dimidiatipennis, Ph. rectangulus, Ph. coprophilus, Rabigus tenuis, Ontholestes murinus, Creophilus maxillosus*	*Philothus dimidiatipennis*	1-4 copies/м^2
Cucumber field	*Oxytelus laqueatus, Platystethus cornutus, Paederus fuscipes*	*Platystethus cornutus,*	1-3 copies/м^2
Potato field	*Paederus fuscipes, Aleochara bilineata, Philonthus coprophilus, Ph.politus, Ph. dimidiatipennis, Xantholinus longiventris Coprophilus pennifer, Oxytelus bernhaueri*	*Paederus fuscipes,*	3-4 copies/м^2

There is always a lot of organic matter (plant detritus) in vegetable fields, so coprobionts *Oxytelus laqueatus, Philonthus politus, Ph. rectangulus*; saprobionts *Philonthus dimidiatipennis, Ph.coprophilus, Ph. coruscus, Creophilus maxillosus, Ontholestes murinus* live there, as well as interesting finds of botrobiont species (probably from nearby rodent burrows) *Coprophilus pennifer, Oxytelus bernhaueri*.

Winter wheat is characterized by early vegetation; vegetation resumes in March and April in spring, and the relatively rapid shading of the soil surface of this station than other crops leads to an increase in moisture, which contributes to favorable conditions in early spring. The peculiarities of the species composition of this station is the development of rove beetles, which takes place only until half of summer, and the formation of the staphylinids fauna here is due to the first generation or overwintered individuals.

The species composition of staphylinids is practically similar (10-20 copies/m^2) during the entire research period from the southern and northern regions of Karakalpakstan, at this time it consists of: *Philonthus quisquilarius, Ph. dimidiatipennis, Ph. fuscipennis, Paederus fuscipes, Tachyporus hypnorum, C.bilineatus*. The dominant species in irrigated fields are *Paederus fuscipes, Tachyporus hypnorum.*

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With the onset of hot days and the cessation of watering leads to a significant decrease in humidity, while the porosity of the soil cover increases, and nidicolous species *Coprophilus pennifer, Oxytelus bernhaueri, Juresekia ashpaltina* appear here, living in burrows, on the side of roads, ravines and near fields.

At the end of June and beginning of July, the soil is still dried up and compacted. Many species that served as food for predators go into deep layers (20-40 cm). Only nidicolous species remain on the soil surface, and they are also active only in the evening during flights. The larvae of these species develop in rodent burrows, which are mainly located at the edges of the field. In piles of rotting straw from moisture-loving geobionts: *Stenus ater, Scopaeus laevigatus and Paederus fuscipes, Tachyporus hypnorum.*

The smallest species composition and minimum abundance (1-3 copies/m^2) were found on corn crops and sorghum plantations, observation was carried out in the fields in 2011-2012 at the suburbs Nukus city (Khozhan-aul) [5, p. 38-44]. These crops have several features that represent the poverty of the staphylinids fauna at these stations: there are no weeds, less litter, and the plants sufficiently shade the soil only in the middle of summer, and at this time a lot of staff members already keep themselves in natural biotopes. For most staphylinids, the conditions of these areas are not useful much, and only the species *Scymbalium anale* and *Dolicaon biguttulus* are recorded here. An increase in the number of species of staphylinids periodically occurs after watering the soil, mainly mobile, well-flying and eurybiontic species inhabit there: *Coprophilus pennifer, Stenus longitarsis, Aleochara bilineata, Paederus fuscipes, Philonthus fuscipennis.* Despite the relative similarity of crops, *Anotylus nitidulus* was found in sorghum crops, in contrast to maize.

Rice crops have several features that have a significant impact on the species composition of staphylinids. The channels through which water flows for the bay of rice fields are typical coastal fauna [15, p.180-182]. And therefore, the population of these beetles in the rice field consists mainly of ripikols that live in the supralittoral (40-60 copies/m^2) and they are able to live in waterlogged areas. This biotope is convenient because here rove beetles feed on soil algae and plant debris, and zoophages feed on saprophages directly.

According to our observation on rice agrocenoses (farm "Shortanbay" in Nukus in 2011-2014 , farm "Sary altyn" in Kanlykul region), mainly burrowing species are *Bledius bicornis, B. fracticornis, Carpelimus bilineatus, C.corticinus, Platystethus alutaceus*, and large predatory beetle - Platyprosopus elongatus, as well as small *Aleocharinae Tachyusa sp., Myllaena sp., Hygropora sp., Ocalea sp., Falagria sulcata.* It is important to note these species are forced to migrate following the filling of the field with water and its periodic drainage, and here the whole cycle of their development goes on. Most of them dig burrows in the soil of check dividers.

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The species composition of the rice field staphylinids consists mainly of hygrophilous and mesohygrophilous species, but in this biotope there are also occasional species that are ecologoplastical – *Tachyporus pussilus, T. nitidulus* in the circumference of xerophytic stations, and also eurybiont species are added to them: *Platystethus nitens, Platyprosopus elongates, Philonthus dimidiatipennis, Heterothops niger, Scopaeus laevigatus, Paederus fuscipes, Stenus ater.*

In 2012-2013, eurybiont species (5-6 copies/m^2) of *Paederus fuscipes, Anotylus rugosus, Philonthus quisqularius, Bledius fracticornis, Carpelimus exigous, Platyprosopus elongates,Xantholinus longiventris* were found under licorice in the fruit garden (of the Hero of Uzbekistan A. Uteniyazov) in the Nukus region , and *Scopaeus asiaticus* were first recorded in this biotope in the study region.

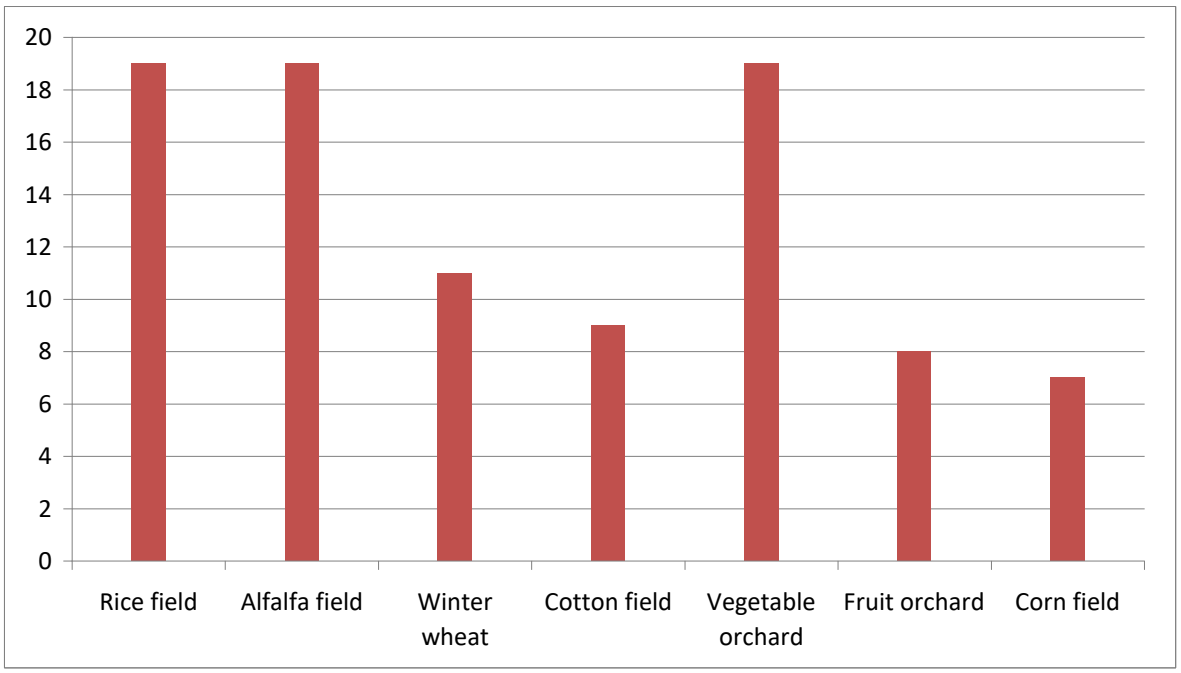

Fig. 2. The population of staphylinids in the agrocenoses of Karakalpakstan by biotope

In Karakalpakstan highest number of the Rove (number) prevails in moist habitats along the banks of irrigation canals, the edges of rice fields; greatly diverse fauna of alfalfa fields and vegetable crops, and the smallest amount of data bugs discovered in the fruit garden and corn plantations (Fig.2).

The largest number of staphylinids in the conditions of Karakalpakstan (abundance) prevails in humid biotopes, along the banks of irrigation canals, along the edges of rice fields; a significantly diverse fauna in alfalfa fields, as well as vegetable crops, and the smallest number of these beetles was found in the fruit orchard and on corn plantations (Fig. 2).

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Table 5

The magnitude and specificity of biotopes for staphylinids in agrocenoses of Karakalpakstan

Biotope types	The number of species included in only one biotope	The number of species included in two biotopes	The number of species included in three or more biotopes	Total number of species in the biotope	Biotope specificity (%)*
Rice field	9	2	8		47,3
Alfalfa field	6	4	9	19	31,5
Winter wheat	1	2	8	11	9
Cotton field	1	4	4	9	11
Vegetable field	6	9	4	19	31,5
Fruit orchard	2	3	3	8	25
Corn field	2	2	3	7	28,5

* Evaluated as a percentage of species included only in this group.

There are no staphylinids on sparsely irrigated fields occupied by crops (for example, sesame), which is associated with aridity characteristic of the Southern Aral Sea region. Quite many species of staphylinids have been found in agrocenoses under various shelters in a wet area, but most of them are also found in other types of habitats. The size and specificity of biotopes for staphylinids in agrocenoses of Karakalpakstan are shown in Table 5. The occurrence of these beetles in many biotopes is due to the fact that here most of the species find refuge staying there in an inactive state and waiting for more favorable conditions. Favorable factors for staphylinids in agrocenoses are:

- Irrigation
- Application of organic fertilizers (manure) on crops

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• Soil treatment (cultivation)

The determining factor of the daily rhythm for staphylinids is the temperature regime. The majorities of species have a diurnal rhythm of activity to inhibit flight activity and general locomotion of beetles on the substrate with two peaks in the temperature range from 25 ° C to 30 ° C, temperatures above 33 ° C and below 16 ° C. Beetles use the microclimatic features of the substrate to maintain an active state and make vertical migrations. Daytime activity is typical for species of the *Paederus*, *Ontholestes* genus, part of *Philonthus, Platystethus*. The conducted surveys showed that in the morning beetles fly mainly from 6 a.m. to 10 a.m., the second, more massive flight is observed in the afternoon from 7 p.m. and lasts until dusk. In the result of carried out studies, it was found that the majority of staphylinids is characterized by a twilight-night period of activity. This is mainly typical for representatives of the genera: *Carpelimus, Oxytelus, Bledius, Philonthus*. It was noted that nocturnal flight occurs approximately between 10 – 11p.m. at night.

The seasonal dynamics of staphylinids is determined by changes in the temperature regime, which makes it possible for them to manifest the activity of the physiological state, the rate of development. This phenomenon can be traced in all groups of staphyllinidae with varying degrees of clarity in conditions of Karakalpakstan. Staphyllinidae appear at the end of March and are active until October. High numbers of some beetles are observed in late spring and early summer, for example, *Oxytelus*. As we observed in the overwhelming majority of the species seasonal activity manifests from spring to autumn with two peaks in abundance in mid June - early July and in late July - early August. The first peak in numbers is formed by overwintered individuals and beetles of a new generation which appeared from them, and after the withering away of overwintered individuals after a while, the second peak of numbers is formed by beetles of new generations, which go to wintering.

Discussion

In the conditions of the region, irrigated soils are salinized to varying degrees, subject to deflation, and a strong tendency towards desertification. In the southern Aral Sea, soil salinization (mainly sulfate and chloride) is a widespread and progressive process. So, 43% of the irrigated land was salinized in 1975, 80% in 1985 and 94% in 1997. The soils of the lower reaches of the Amu Darya accumulate more than 1 million tons of salts annually.

Due to the increase in water intake for irrigation and as a result of a sharp decrease in river runoff, the self-cleaning capacity of the Amu Darya river has been minimized. In addition, more than 3 billion m^3 of collector-drainage and untreated industrial and domestic water saturated with toxic chemicals are discharged from the territory of Uzbekistan and Turkmenistan into the Amu

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4362- 4376
Received 20 January 2021; Accepted 08 February 2021.

Darya, which saturate drinking water with residual amounts of pesticides and heavy metals, making it unusable [21, p. 238-242; 22, p. 183; 23, p.26-28].

A change in the flood regime and a decrease in the water content of rivers disrupt the composition, structure and functioning of the ecotonic systems of floodplains and river deltas, significantly affect the life of hygrophilous plants and animals, including the studied beetles. In 1970-80, 33 species of staphylinids were found in cotton fields [14, p.194-198], which the modern fauna of this biotope consists of only 9 species [5, p.38-44], most of them are random species, and also in those periods the fauna of staphylinids in the rice field was investigated, which consists of 16 species [6, p.35-38], many of them have not been encountered by us, the modern fauna of this biotope has 19 species (12, p.40-43) most of them consist of random species expecting favorable factors from neighboring biotopes.

Due to the degradation of the natural environment of the region, the largest population of the family is made up of ecologically plastic species, as well as halophilic species living both in the littoral zone, and on salt marshes and along the shores of salt lakes. Representatives of the genus *Bledius, Carpelimus*, and some *Philonthus* are characteristic of the studied region as indicators of high soil salinity.

Thus, in the conditions of Karakalpakstan, the greatest number of staphylinids prevails in humid biotopes, along the banks of irrigation canals, along the edges of rice fields; a significantly diverse fauna in alfalfa fields as well as vegetable crops, and the smallest number of these beetles was found in corn plantations. In the studied region, the limiting factors for staphylinids in the above biotopes are:

- Moisture deficiency
- Frequent processing with equipment
- Strong salinity
- Chemical treatment with pesticides, herbicides has a detrimental effect on staphylinids, as well as a decrease in humus and plant residues leads to a significant impoverishment of the population of these beetles.

Based on the foregoing, there is a peculiar, ecologically different fauna of staphylinids in agrocenoses of the studied region. In the arid conditions of the region, staphylinids are distributed mosaically over biotopes and stations with sufficient humidity, the largest number of representatives of the subfamily *Staphylininae* prevails in humid biotopes and they play an important role in pest control of field crops and in soil formation. A comprehensive study of the species composition and their ecological characteristics is relevant, and a detailed study of the biology and ecology of prospective species will allow in the future outlining the ways of their practical use.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4362- 4376
Received 20 January 2021; Accepted 08 February 2021.

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