International Journal of Genetic Engineering 2023, 11(2): 22-29
DOI: 10.5923/j.ijge.20231102.03

Taxonomic Analysis of Coleoptera, Carabidae Distributed in Agrobiocenoses of Khorazm Region

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Abstract In this article, for the first time, information is presented on the species composition of ground beetles (coleoptera, carabidae) in the agrobiocenosis zones of the Khanka, Bogot, Urgench, Yangibozor and Gurlan regions of the Khorezm region. In these areas, 13 subfamilies, 18 tribes, 31 genera, and 59 species belonging to 31 subgenera have been identified. The highest indicator of the beetle fauna of the region, i.e. the top 10% is represented by representatives of the subfamily Trechinae with 7 species and 12%, Scaritinae with 8 species (14%), Cicindelinae with 9 species (15%), and the most identified species from the representatives of the subfamily Harpalinae prevailed with 15 species with a share of 26%.

Keywords Khorezm, Agrobiocenosis, Beetles, Ground beetles, Trehines, Scaritins, Cycindelins, Harpalins, Taxonomic, Salt marshes, Abiotic, Hydroedaphic, Biotic

1. Introduction

Carabidae family of Coleoptera is one of the largest families with 25,000 to 50,000 species. These beetles are very sensitive to moisture from abiotic factors. Most of the species are adapted to live in humid biotopes with relatively moderate temperatures. The share of mesoxerophilic species among phytophages is quite high, because these species, like other phytophages, compensate for the lack of moisture in the body at the expense of plant tissues. A large group of ground-dwelling beetles is specialized for living in highly saline and brackish soils. Based on this, we set ourselves the goal of studying the fauna of the agrocenosis vizildok beetles in the vicinity of the forest and lake on the shores of the Amudarya in the Khorezm region. (2-3-4 Figures)

It is no secret that they occupy the main positions in the protection of agricultural crops from pests due to their predatory nature, which is a constant control of the number of species that are abundant in all natural and anthropogenic environments and damage agricultural crops, including beetles of the genera calosama, carabus, bembidion and scarits in biological control. is of particular importance.

In addition, some types of weevils damage agricultural crops. For this reason, the study of carabid beetles (Carabidae) from a general biological and faunistic point of view is considered relevant.

In 1868-1871 A.P. Fedchenko entomofauna of the region of the Nurota Mountains and the southern parts of the Kyzylkum Desert [17], in 1957-1959 the entomofauna of the Nurota Mountains and the desert areas adjacent to it were studied by V.V. Yakhontov, [15] A.G. Davleshina, V.M. Vasenkova, studied by P.N. Korshin. [6]

In Uzbekistan, studies on the study of hardy species belonging to the subgenus Adephaga are mainly in South-Western and South-Eastern Kyzylkum (Davleshina et al., 1974, 1975, 1982, 1984) [6] Fergana Valley, Tashkent (D. Dadamirzaev 1972-1976), [5] In the agrocenoses of Jizzakh, Bukhara, Kashkadarya regions (D. Daminova, 2010), it was conducted by, in which the systematics, ecologic-faunistic characteristics of these beetles, and their role in agrocenoses were shown. Nevertheless, for the first time, special studies are being conducted to study the carabid fauna of the agrobiocenosis areas of the Khorezm region.

2. Material and Methods

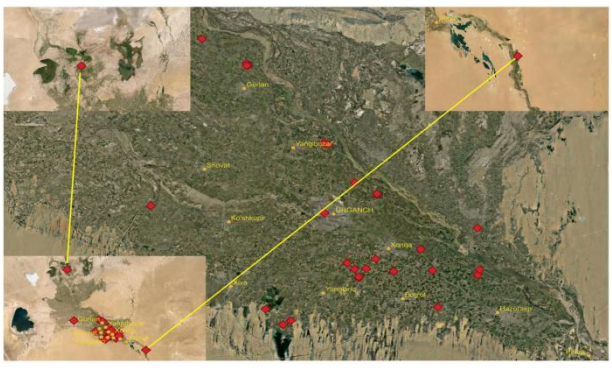

Figure 1. Locations where research was conducted

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Received: Aug. 1, 2023; Accepted: Aug. 21, 2023; Published: Sep. 26, 2023
Published online at http://journal.sapub.org/ijge

During 2021-2023, our research was conducted in the following coordinates of agrobiocenoses of Khanka, Bogot, Urganch, Yangibozor and Gurlan districts of Khorezm region. (Figure 1)

Bogot region-41°20'03.0"N 60°54'22.0"E, 41°24'31.9"N 61°00'39.5"E, 41°21'40.5"N 60°47'20.9"E, 41°25'19.6"N 61°00'56.3"E,41°24'33.4"N 61°00'38.8"E. **Khanka region-**41°24'11.0"N 60°41'50.0"E, 41°25'27.5"N 60°43'02.0"E, 41°25'23.0"N 60°41'10.0"E, 41°30'07.8"N 60°52'05.1"E, 41°25'40.0"N 60°43'47.0"E, 41°31'09.0"N 61°00'36.0"E, 41°26'14.0"N 60°40'02.0"E, 41°24'11.0"N 60°41'50.0"E, 41°27'42.5"N 60°57'13.8"E. **Urganch region-** 41°37'32.0"N 60°41'10.0"E, 41°35'48.9"N 60°44'44.9"E, 41°35'56.3"N 60°44'43.6"E, 41°35'49.0"N 60°44'43.5"E. **Yangibozor region-**41°43'01.9"N 60°36'21.6"E, 41°42'50.3"N 60°36'59.5"E. **Gurlan region-**41°57'35.1"N 60°17'04.1"E, 41°53'51.8"N 60°24'23.3"E, 41°53'51.3"N 60°24'07.9"E, 41°54'10.4"N 60°24'09.3"E.

Figure 2. Biotope (A)

Figure 3. Biotope (A)

Figure 4. Biotope (O')

Khorezm region occupies part of the ancient Khorezm lands in the north-western part of the Republic of Uzbekistan, on the left bank of the lower Amudarya. The geographical location of the region is between 60°03'-62°28' east longitude and 40°35'-42°00" north latitude. The region is bordered by Turkmenistan through the Karakum to the south and southwest, by the Republic of Karakalpakstan through the Amudarya to the northwest and north, and by the Bukhara regions to the southeast.

The region stretches for 280 km from northwest to southeast, and 80 km from west to east in the width where the city of Urganch is located. The northernmost point of the region corresponds to the Nuronbabo grove near the village of Olchin, Gurlan district. The southern end point is located a little south of Tuproqkala.

The Karakum and Kyzylkum deserts are the main factors influencing the formation of Khorezm's nature and relief. In addition, the Amudarya and the sediments brought by it play an important role in the uniqueness of its nature and relief. The passage of the Amudarya through the Khorezm region creates the ground for underground water to be close to the surface of the earth [1].

Collecting samples of weevildak beetles was widely used general entomological methods and special methods developed for the genus Hardy (Barber, 1931; Geidman, 1955, 1956) [3].

Many beetles are characterized by a desire for light at night. Some of them fly to ultraviolet rays (Fig. 7). It will be possible to observe flying insects at night by placing a flashlight on a white cloth. A family of beetles living outdoors on plants was caught with a trap. Many beetles live on the ground and in trees, bushes, and gardens. Beetles of this type can be caught mainly by hand (Fig. 5-6), by sifting the soil (Fig. 9) or by the above methods. Odor emitting devices attract many insects well to the odors of organic substances, especially the substances emitted by the insects themselves.

0.5 l glass jars were used as jar holders. The handles were buried in the soil up to the edges, and ¼ volume of fixative liquid was poured into them (Fig. 8-10).

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

As a result of our three-year research, the beetle identifier for processing, identification and species identification of collected materials (G.G. Yakobson V. Martyanov 2017) [16] Catalog of Palaearctic Coleoptera VOLUME 1, [13] and Russia and the pamphlets of the list of ground beetles of the neighboring areas were used (O.L. Kryzhanovski, I.A. Belousov, I.I. Kabak, B.M. Kataev, K.V. Makarov, V.G. Shilenkov 1995) [11] collected collections were transferred to the fund of the entomology unique collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan.

Along with the wide use of modern atlases and catalogs in determining the species composition of the collected hardy plants, a number of mature specialists of the world, the employee of the All-Russian Plant Protection Institute of the Russian Academy of Sciences b.f.n. I. I. Kabak, Siberian Branch of the Russian Academy of Sciences "Head of the Department of the collection of ground beetles (Coleoptera, Carabidae) of the Siberian Museum of Zoology, Ph.D. M. V. Nabojenko helped closely. Here we express our gratitude to them.

Table 1. Meeting of species of the Carabidae family in the region

№	Younger family	Триба	A generation	The younger generation	Type	The amount of meetings in the districts					
						Bog'ot	Хонка	Urganch	Yangibozor	Gurlan	term
1	Brachininae Bonelli, 1810	Brachinini Bonelli, 1810	*Brachinus* Weber, 1801	*Brachinus (Brachynolomus)* Reitter, 1919	*Brachinus (Brachynolomus) costatulus* (Motschulsky, 1844)		1♂			1♀	30.06.2021 25.04.2022
			Mastax Fischervon Waldheim, 1828		*Mastax thermarum* (Steven, 1806)			2♂			01.06.2023
2	Broscinae Hope, 1838	Broscini Hope, 1838	*Broscus* Panzer, 1813	*Broscus (Broscus)* Panzer, 1813	*Broscus punctatus* (Dejean, 1828)		5♂ 6♀				30.06.2021 13.05.2023 17.05.2023
					Broscus asiaticus (Ballion, 1871)	1♀	3♀ 2♂	1♂			07.07.2022 14.07.2022 18.07.2022 31.05.2023

3	Carabinae Linnaeus, 1802	Carabini Linnaeus, 1802	*Calosoma* Weber, 1801	*Calosoma (Campalita)* Motschulsky, 1866	*Calosoma auropunctatum dsungaricum* (Gebler, 1833)	2♀					14.05.2023
				Calosoma (Caminara) Motschulsky, 1866	*Calosoma imbricatum deserticola (Semenov, 1896)*					1♀	18.08.2022
4	Cicindelinae Latreille, 1802	Cicindelini Latreille, 1802	*Cylindera* Westwood, 1831	*Cylindera (Eugrapha)* Rivalier, 1950	*Cylindera (Eugrapha) inscripta* (Zoubkoff, 1833)		1♀	10♂ 12♀			30.06.2021 01.06.2023
					Cylindera (Eugrapha) litterifera (Chaud., 1842)		1♀				30.06.2021
					Cylindera (Eugrapha) contorta (Fischer von Waldheim, 1828)			3♀ 7♂			01.06.2023
				Cylindera (Cylindera) Westwood, 1831	*Cylindera obliquefasciata (M. F.* Adams, 1817)		5♀ 6♂	12♂ 14♀			30.06.20211 2.05.2023 23.05.2023 31.05.2023 01.06.2023
			Cephalota Dokhtouroff, 1883	*Cephalota (Taenidia*) Rivalier, 1950	*Cephalota (Taenidia) deserticola* (Faldermann, 1836)		1♂	2♂			30.06.2021 01.06.2023
			Cicindela Linnaeus, 1758	*Cicindela (Calomera)* Motschulsky, 1862	*Cicindela (Calomera) littoralis* (Fabricius, 1787)		2♀				12.05.2023
					Calomera sturmi (Ménétriés, 1832)		1♂				09.07.2022
					Calomera littoralis conjunctaepustulata (Dokht., 1887)		2♀				23.05.2023
		Megacephalini Laporte, 1834	*Grammognatha* Motschulsky, 1850		*Myriochila melancholica* (Fabricius, 1798)		2♀4♂				23.05.2023 31.05.2023
5	Dryptinae Bonelli, 1810	Zuphiini Bonelli, 1810	*Polistichus* Bonelli, 1810		*Polistichus connexus (Geoffroy in* Fourcroy, 1785)			1♀			01.06.2023
6	Harpalinae Bonelli, 1810	Harpalini Bonelli, 1810	*Harpalus (Harpalus)* Latreille, 1802	*Harpalus (Pseudoophonus)* Motschulsky, 1844	*Harpalus (Pseudoophonus) rufipes* (Degeer, 1774)	1♂	10♀ 14♂	2♀			11.07.2021 27.07.2022 18.06.2022 03.07.2022 31.05.2023 01.06.2023
					Harpalus calceatus (Duftschmid, 1812)		1♂				07.08.2020
					Harpalus (Pseudoophonus) griseus (Panzer, 1796)		1♀ 2♂	2♀			31.05.2023 01.06.2023
					Harpalus distinguendus (Duftschmid, 1812*)*	1♂	1♀	1♂	1♀	2♀	20.06.2021 14.06.2022 09.07.2022 11.07.2022 25.07.2022 15.09.2022
			Daptus Fischervon Waldheim,		*Daptus vittatus (Fischer von* Waldheim, 1823)		2♂				21.05.2023 23.05.2023

			1823		*Daptus pictus (Fischer von* Waldheim, 1823)			1♀			01.06.2023
		Stenolophini Kirby, 1837	*Stenolophus* Dejean, 1821	*Stenolophus (Egadroma)* Motschulsky, 1855	*Stenolophusmarginatus(Dejan, 1829)*		3♀ 3♂	1♂		8♂ 11 ♀	25.04.2022 23.05.2023 01.06.2023
					Stenolophus bajaurae (Andrewes, 1924)					1♂	31.05.2023
					Stenolophus sp		2♀				12.05.2023 31.05.2023
			Loxoncus Schmidt-Goebel, 1846	*Loxoncus (Loxoncus) Schmidt*-Goebel, 1846	*Loxoncus procerus* (Schaum, 1858)		3♂				31.05.2023
			Idiomelas Tschitscherine, 1900	*Idiomelas (Idiomelas)* Tschitscherine, 1900	*Idiomelas morio* (Ménétriés, 1832)			4♀ 6♂			01.06.2023
			Dicheirotrichus Jacquelin du Val, 1855	*Dicheirotrichus (Dicheirotrichus)* Jacquelin du Val, 1855	*Dicheirotrichus (Dicheirotrichus) ustulatus* (Dejean, 1829)		8♂ 6♀				21.05.2023
				Dicheirotrichus (Trichocellus) Ganglbauer, 1891	*Dicheirotrichus discolor* (Faldermann, 1836)		3♀ 5♂				20.05.2023
					Dicheirotrichus hauseri (Reitter, 1894)			3♀			01.06.2023
					Dicheirotrichus sp			1♂			01.06.2023
7	Lebiinae Bonelli, 1810	Lebiini Bonelli, 1810	*Cymindis* Latreille, 1805	*Cymindis (Arrhostus)* Motschulsky, 1864	*Cymindis andreae* (Ménétriés, 1832)		1♀				30.06.2021
			Platytarus Fairmaire, 1850		*Platytarus faminii* (Dejean, 1826)		1♂				12.05.2023
			Dromius Bonelli, 1810		*Dromius sp*			1♂			01.06.2023
8	Licininae Bonelli, 1810	Chlaeniini Brullé, 1834	*Chlaenius* Bonelli, 1810	*Chlaenius (Chlaenites)* Motschulsky, 1860	*Chlaenius spoliatus spoliatus* (P.Rossi, 1792)					1♀	25.04.2022
					Chlaenius (Chlaenites) inderiensis (Motschulsky, 1849)					1♀	25.04.2022
				Chlaenius (Trichochlaenius) Seidlitz, 1887	*Chlaenius (Trichochlaenius) stevenii* (Quensel, 1806)		1♂			4♀ 2♂	25.04.2022 23.05.2023
				Chlaenius (Chlaenius) Bonelli, 1810	*Chlaenius (Chlaenius) festivus*(Panzer, 1796)				1♀		12.08.2022
9	Platyninae Bonelli, 1810	Platynini Bonelli, 1810	*Agonum (Agonum)* Bonelli, 1810	*Agonum* Bonelli, 1810	*Agonum (Agonum) menetriesii* (Faldermann, 1839)					3♂	25.04.2022
			Anchomenus Bonelli, 1810		*Anchomenus.sp*			4♂			01.06.2023
		Sphodrini	*Dolichus*		*Dolichus halensis*		5♂				31.05.2023

		Laporte, 1834	Bonelli, 1810		(Schaller, 1783)		7♀				
10	Pterostichinae Bonelli, 1810	Pterostichini Bonelli, 1810	*Poecilus* Bonelli, 1810	*Poecilus (Poecilus)* Bonelli, 1810	*Poecilus subcoeruleus* (Quensel, 1806)		2♂	2♀		2♂ 4♀	25.04.2022 12.05.2023 01.06.2023
			Pterostichus Bonelli, 1810		*Pterostichus* (Phonias) sp		5♂ 4♀				17.05.2023 21.05.2023
11	Scaritinae Bonelli, 1810	Scaritini Bonelli, 1810	*Scarites* Fabricius, 1775	*Scarites (Scarites)* Fabricius, 1775	*Scarites (Scarites) angustus* (Chaudoir, 1855		3♂ 4♀				30.06.2021 12.05.2023
					Scarites salinus (Dejean, 1825)	2♂		2♀			07.06.2021 01.06.2023
					Scarites procerus eurytus (Fischer von Waldheim, *1828)*			8♀ 7♂			01.06.2023
				Scarites (Parallelomorphus) Motschulsky, 1849	*Scarites (Parallelomorphus) terricola* (Bonelli, 1813)		5♀ 7♂	3♂	1♀		12.08.2022 12.05.2023 13.05.2023 31.05.2023 01.06.2023
					Scarites (Parallelomorphus) subcylindricus (Chaudoir, 1843)		3♂				28.08.2021
			Distichus Motschulsky, 1858	*Distichus (Distichus)* Motschulsky, 1858	*Distichus planus* (Bonelli, 1813)					1♀	13.08.2022
		Dyschiriini Kolbe, 1880	*Dyschirius* Bonelli, 1810	*Dyschirius (Dyschiriodes)* Jeannel, 1941	*Dyschirius (Dyschiriodes) cylindricus* (Dejean, 1825)			1♂ 2♀			01.06.2023
		Clivinini Rafinesque, 1815	*Clivina* Latreille, 1802	*Clivina (Clivina)* Latreille, 1802	*Clivina ypsilon* (Dejan, 1830)		1♂				12.05.2023
12	Siagoninae Bonelli, 1813	Siagonini Bonelli, 1813	*Siagona* Latreille, 1804		*Siagona europaea* (Dejean, 1826)		1♀	2♂ 2♀			30.06.2021 01.06.2023
13	Trechinae Bonelli, 1810	Bembidiini Stephens, 1827	*Bembidion* Latreille, 1802	*Bembidion (Asioperyphus)* Vysoky, 1986	*Bembidion (Asioperyphus) ustum* (Quensel, 1806)		1♀				12.05.2023
					Bembidion (Asioperyphus) amnicola (J.Sahlberg, 1900)		2♂				21.05.2023
					Bembidion pamiricola (Lutshnik, 1930)			2♂ 4♀			01.06.2023
				Bembidion (Emphanes) Motschulsky, 1850	*Bembidion (Emphanes) latiplaga* (Chaudoir,1850)			1♀			01.06.2023
				Bembidion (Notaphus) Dejean, 1821	*Bembidion (Notaphus) varium* (*G.* A. Olivier 1795)		1♀				31.05.2023
		Pogonini Laporte, 1834	*Pogonus* Dejean, 1821	*Pogonus (Pogonus)* Dejean, 1821	*Pogonus (Pogonus) gilvipes* (Dejean, 1828*)*		2♂				21.05.2023 23.05.2023
					Pogonussp		1♂				31.05.2023
total						**5**					

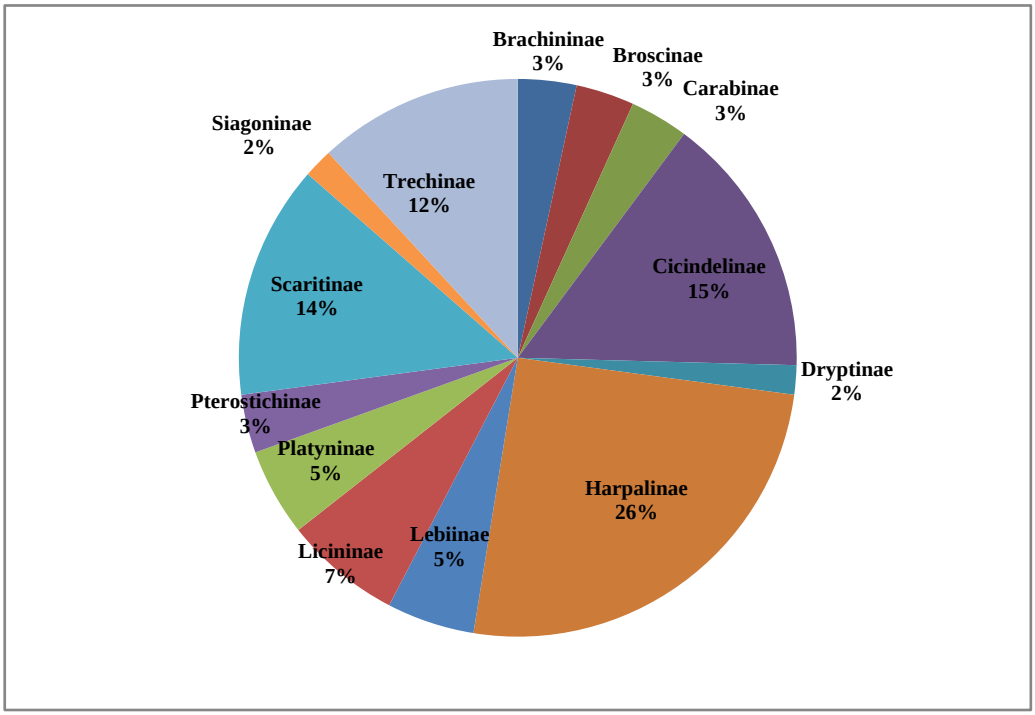

Figure 11. Proportion of species of Carabidae family by subfamilies

3. Results and Discussion

During the research, more than 720 samples of vizildok beetles were collected and analyzed. 13 subfamilies, 18 tribes, 31 genera, and 59 species belonging to 31 subgenera were identified in the riverside agrobiocenoses of Khorezm region. (Table 1)

4. Conclusions

The analysis of the number of species in the agrobiocenosis areas of the identified weevil beetles shows that the highest number belongs to the Harpalinae subfamily and made up 15 species (26%), and the lowest number belongs to the Sigonninae subfamily. Formed 1 type (2%) (**Figure - 11**).

REFERENCES

[1] Allabergenov, T. Kh. Physical-geographical zoning of the Khorezm oasis and adjacent territories: Abstract of the thesis. for the academic degree cand. geogr. Sciences / Kazan. state un-t im. V. I. Ulyanov-Lenin. Kazan: [b. and.], 1966. - 20 p. (Russian)

[2] Aleksandrovich O.R. 1993. Ecological and faunistic review of ground beetles (Coleoptera, Carabidae) in the west of the forest zone of the Russian Plain: Manuscript dep. in NPO "Veras" 21.10.92, N 150. - Minsk: NPO "Veras". 1993, 82 p. (Russian)

[3] Soboleva-Dokuchaeva, I.I. Some factors determining the effectiveness of Barber traps I.I. Soboleva-Dokuchaeva, T.A. Soldatova Nauch. report higher school Biol. Sciences. 1980. No. 11. S. 96–101. (Russian)

[4] Agroecological atlas. Russia and neighboring countries: economically significant plants, their pests, diseases and weeds. 2008, http://www.agroatlas.ru/en/content/related/Lonicera_edulis/ (Russian)

[5] Guseva O.G., Koval A.G. Peculiarities of complexes of ground beetles (Coleoptera, Carabidae) in agrocenoses of the Leningrad region with different soil conditions / Bulletin of Plant Protection. No. 4. pp. 3–11. (Russian)

[6] Guseva O.G., Koval A.G. Ground beetles (Coleoptera, Carabidae) in agrocenoses of field crops and surrounding biotopes / Science, production, business. Materials of the international scientific and practical conference, Almaty, April 4–5, 2019. Volume 1. Almaty. P.241. (Russian)

[7] Guseva O.G. 2018. Distribution of ground beetles of the genus Poecilus Bonelli, 1810 (Coleoptera, Carabidae) in agricultural landscapes of the North-West of Russia / Acta Biologica Sibirica. Volume 4. No. 3. P.102–107. (Russian)

[8] Dadamirzaev A., Davleshina A.G., Ground beetles in gardens of Uzbekistan. Protection of plants. 1982. No. 9. S. 32. (Uzbek)

[9] Davletshina. A.G., Dadamirzaev A.A., "On the species composition and distribution of ground beetles (family Carabidae) in various objects of the Tashkent region." Problems of Soil Zoology, vol. Vilnius, 1975, pp. 136-137. (Uzbek)

[10] Dedyukhin S.V. Principles and methods of ecological and faunistic studies of terrestrial insects (educational manual). (Russian)

[11] Izhevskii S.S., Lobanov A.L., Sosnin A.Yu. Life of wonderful beetles. Publishing house "Kodeks". Moscow. 2014. pp. 73-75. (Russian)

[12] Kasandrova L. I., Sharova I. Kh. Development of field beetles Amara ingenua, Anisodactylus signatus and Harpalus distinguendus (Coleoptera, Carabidae) Zoological Journal. 1971. V. 50, no. 2. S. 215-221. (Russian)

[13] Kryzhanovsky O.L. Ground beetles of Central Asia of the genus Carabus. 1953 (Russian)

[14] Kryzhanovskii O.L., Belousov I.A., Kabak I.I., Kataev B.M., Makarov K.V., Shilenkov V.G. A checklist of the ground-beetles of Russia and adjacent lands (Insecta, Coleoptera, Carabidae). Pensoft Series Faunistica, N 3. Sofia-Moscow: Pensoft Publishers. 1995. 271 p.

[15] Kryzhanovsky O.L. Family Ground beetles-Carabidae. Key to harmful and beneficial insects and mites of grain crops in the USSR. (Kopaneva L.M. ed.). L.: Kolos. 1980. S. 103-109. (Russian)

[16] Catalogue of Palaearctic Coleoptera VOLUME 1 2017 (Archostemata-Myxophaga-Adephaga *Revised and Updated Edition* Volume 1 *Edited by* I. Löbl D. Löbl). ISBN 978-90-04-33028-3 (hardback).

[17] Lopatin I.K. Leaf beetles of Central Asia and Kazakhstan. Publishing house "Science" of the Leningrad branch. Leningrad. 1977 pp. 243-245.

[18] Yakhontov V.V. Entomological collection. To the 60th anniversary of the birth of V.V. Yakhontov. Tashkent, 1960.

[19] Yakobson G. G. Determinant of beetles. Edition 2 supplemented by Ogloblin D.A. State publishing house of agricultural and collective farm-cooperative literature. Moscow-1931-Leningrad.

[20] Yunusov M.M., Khabibullaev F.N., Yulbarsova I.I. Collecting hardy birds and making collections from them. "SCIENTIFIC PROGRESS" Scientific Journal ISSN: 2181-1601 Volume: 1, ISSUE: 4.

[21] Fedchenko A.P. Brocknaus and Efron's encyclopedic dictionary in 86 volumes. St. Petersburg. 1890-1907. (Uzbek)