НАУЧНАЯ СТАТЬЯ

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ЭКОЛОГИЧЕСКИЕ ХАРАКТЕРИСТИКИ РОЮЩИХ ОС (HYMENOPTERA: SPHECIDAE, CRABRONIDAE) ЮЖНОГО ПРИАРАЛЬЯ

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Аннотация. Целью данного исследовательского проекта было выявление экологических групп роющих ос (Sphecidae, Crabronidae) в различных регионах Южного Приаралья. Исследования проводились в период с 2021 по 2023 год. Согласно полученным данным, 28 видов (45,9%) относятся к ксерофильной группе в ее широком понимании. К мезоксерофильной группе относятся 18 видов, что составляет 29,5% от общего числа видов. Менее распространена группа эврибионтов, насчитывающая 15 видов, что составляет 24,6%.

Ключевые слова: Южное Приаралье, Sphecidae, Crabronidae, пустыня Кызылкум

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ORIGINAL ARTICLE

ECOLOGICAL CHARACTERISTICS OF DIGGER WASPS (HYMENOPTERA: SPHECIDAE, CRABRONIDAE) ON THE SOUTH ARAL REGIONS

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Abstract. The purpose of this research project is to identify the ecological groups of digger wasps (Sphecidae, Crabronidae) in the various Southern Aral regions. Studies were conducted between 2021 and 2023. According to our data, 28 species (45.9%)

belong to broad xerophilic groups. There are 18 species in the mesoxerophilic category, accounting for 29.5% of the total. The less common category of eurybionts with 15 species accounts for 24.6%.

Key, words: Southern Aral Sea region, Sphecidae, Crabronidae, Kyzylkum desert

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The extensive study of the local flora and wildlife involves the identification of many ecological groups. With 9,936 known species worldwide (807 species of the Sphecidae family and 9,129 species of the Crabronidae family) , digger wasps are one of the most widespread families of winged insects (Pulawski, 2023). According to the literature analysis and results of our research, the coast of the South Aral region is home to 101 species and subspecies, of which 25 are spread along the Sphecidae family tree and 76 along the Crabronidae family tree. The ecological traits of the 102 species and subspecies that are found in this region are still subject to extensive research.

In this article, we will examine in detail the ecological groups of the families Crabronidae and Sphecidae in the South Aral region.

Materials and research methods

The Khorezm region of the Republic of Uzbekistan, the northwest portion of the Kyzylkum desert, and the Republic of Karakalpakstan are all located along the Southern Aral. This region includes the plain from Tuyamoin to the bottom of Aral Lake and is a part of the Lower Amudarya agro-climatic district of the Turan agro-climatic province. Located in the downstream basin of the Amudarya, to the northwest of the Republic of Uzbekistan, lies the Republic of Karakalpakstan. Its territory includes the Ustyurt plateau, the eastern portion of the Kyzylkum desert, and the Amudarya delta in the southern Aral Sea. It shares boundaries with the state of Turkmenistan to the south and the Khorezm region of the Republic of Uzbekistan to the southeast. The Kyzylkum Desert and Ustyurt Plateau occupy 85% of the territory, which spans 167.5 thousand square kilometers. Consequently, only 14% of the area, mainly found in river valley portions, is suitable for agriculture.One of Central Asia's biggest rivers, the Amudarya, passes through Karakalpakstan. It can be split into three zones based on its natural conditions: the coastal, northern, and southern zones.

Digger wasps (Sphecidae, Crabronidae) were collected in both natural and man-made regions in spring, summer and winter. The main years for conducting field experimental work are 2021–2023. Republic of Karakalpakstan: South Aral Sea region, biosphere reserve "Lower Amu Darya", Takhtakopir, Chimboy, Moinok, Shumanai, Kanlykoul, and Beruniy; Nukus city and district; Biomaterials were collected from settlements, lakeshores, low hills, semi-deserts, forests, agrocenosis, and Urganch Khiva, Yangiariq, Tortkol District, and Khorezm Region.

Tools used to collect material included (Golub et al, 2012), Moericke traps yellow plastic containers tweezers, camera and old style entomological trap (Insect net), as well as 15 mm plastic containers (Moericke, 1951) . The collected materials were stored in plastic containers with a diametres of 15 mm, filled with 96% alcohol. . Reference materials (Kazenas, 1978; 1984; Nemkov, 2012; 2016a; 2016b etc.) were used to identify the species.

Results and discussion

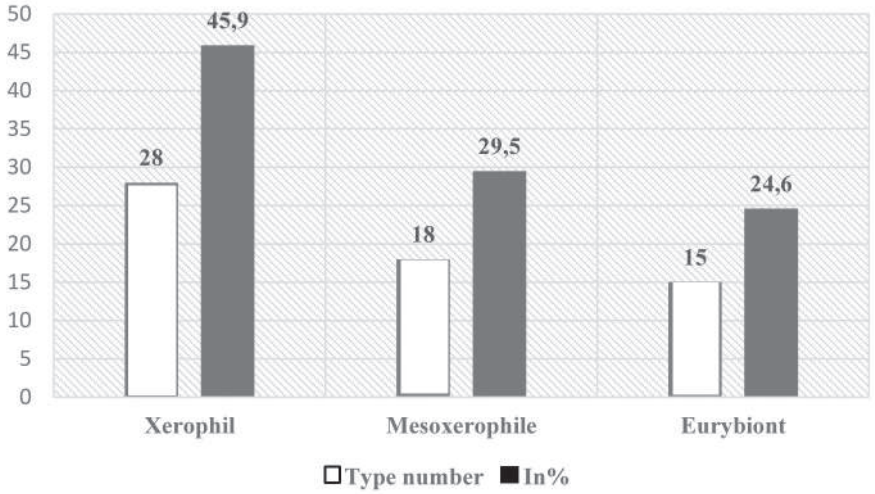
Habitats of Digger wasps in the South Aral region, their interactions in different biotopes, and literature review (Kazenas, 2002; Embergenov, 2023) made it possible to divide the identified species into three groups: xerophilic, mesoxerophilic, and eurybiont (fig., table).

Distribution of digger wasps species by ecological groups in the Southern Aral Sea region

Distribution of digger wasps species by ecological groups

Digger wasps classified as **xerophilous** and are adopted to live in dry, open environments. They are primarily found in sandy and loamy soils, as well as dry steppe and desert regions. The 28 species belonging to this category make up 45.9% of all species and about half of the eximened species.

Mesoxerophilous means that these species prefer humid, somewhat dry environments. They are frequently found in cultural and temperate environments.



Distribution of digger wasps species by ecological groups

Distribution of digger wasps species by ecological groups in the Southern Aral Sea region

Families and species	Xerophile	Mesoxerophile	Eurybiont
Sphecidae	**10**	**4**	**7**
Chalybion turanicum (Gussakovskij, 1935)	–	–	+
Sceliphron destillatorium Illiger, 1807	–	+	–
Sceliphron madraspatanum (Fabricius, 1781)	–	+	–
Palmodes melanarius (Mocsáry, 1883)	+	–	–
Palmodes orientalis (Mocsáry, 1883)	+	–	–
Prionyx niveatus (Dufour, 1854)	+	–	–
Prionyx nudatus (Kohl, 1885)	+	–	–
Prionyx radoszkowskyi (Kohl, 1888)	+	–	–
Prionyx viduatus (Christ, 1791)	+	–	–
Sphex funerarius Gussakovskij, 1934	–	–	+
Ammophila campestris Latreille, 1809	–	–	+
Ammophila elongata Fischer de Waldheim, 1843	+	–	–
Ammophila gracillima Taschenberg, 1896	–	+	–
Ammophila heydeni Dahlbom, 1845	–	–	+
Ammophila sabulosa (Linnaeus, 1758)	–	–	+
Ammophila terminata F.Smith, 1856	+	–	–
Eremochares dives (Brullé, 1833)	–	+	–
Podalonia affinis (W.Kirby, 1798)	–	–	+
Podalonia ebenina (Spinola, 1839)	+	–	–
Podalonia hirsuta (Scopoli, 1763)	–	–	+

Continuation of the table

Podalonia tydei (Le Guillou, 1841)	+	–	–
Crabronidae	**18**	**14**	**8**
Psenulus laevis Gussakovskij, 1928	–	+	–
Pemphredon lethifer (Shuckard, 1837)	–	–	+
Pemphredon tridentata Gussakovskij, 1952	–	–	+
Astata boops (Schrank, 1781)	–	–	+
Astata kashmirensis Nurse, 1909	–	–	+
Astata minor Kohl, 1885	+	–	–
Larra anathema (Rossi, 1790)	–	+	–
Liris niger (Fabricius, 1775)	–	–	+
Tachysphex consocius Kohl, 1892	–	+	–
Tachysphex costae (De Stefani, 1881)	–	+	–
Tachysphex desertorum F.Morawitz, 1894	+	–	–
Tachysphex erythropus (Spinola, 1838)	+	–	–
Tachysphex fulvitarsis (Costa, 1867)	–	+	–
Tachysphex julliani Kohl, 1883	–	+	–
Tachysphex panzeri (van der Linden), 1829	–	–	+
Tachysphex persa Gussakovskij, 1933	+	–	–
Palarus variegatus (Fabricius, 1781)	+	–	–
Palarus sp.	+	–	–
Trypoxylon scutatum Chevrier, 1867	–	+	–
Oxybelus lamellatus Olivier, 1811	+	–	–
Bembix oculata Panzer, 1801	+	–	–
Bembix portschinskii Radoszkowski, 1884	+	–	–
Bembix planifrons F. Morawitz, 1891	+	–	–
Bembix rostrata (Linnaeus, 1758)	–	+	–
Bembix transcaspica Radoszkowski, 1893	+	–	–
Stizus annulatus (Klug, 1845)	+	–	–
Stizus handlirschi Radoszkowski, 1893	–	+	–
Stizus fasciatus (Fabricius, 1781)	–	+	–
Stizus koenigi F.Morawitz, 1888	+	–	–
Stizus ruficornis (J.Forster, 1771)	–	+	–
Stizus rufiventris Radoszkowski, 1877	+	–	–
Stizoides tridentatus (Fabricius, 1775)	–	+	–
Philanthus triangulum (Fabricius, 1775)	–	–	+
Philanthus venustus Rossi, 1790	+	–	–

End of the table

Philanthus variegatus Spinola, 1838	+	–	–
Cerceris arenaria (Linnaeus, 1758)	–	+	+
Cerceris argentosa Shestakov, 1912	+	–	–
Cerceris bupresticida Dufour, 1841	–	+	–
Cerceris deserticola F.Morawitz, 1890	+	–	–
Cerceris straminea Dufour, 1853	+	–	–
Total	**28**	**18**	**15**

Mesoxerophiles can tolerate seasonal variations in humidity to some extent. With 18 species in this group, 29.5% of all species are included in the total.

Eurybiont: these organisms are found practically everywhere. With 15 species, this group accounts for 24.6% of all digger bee species.

Conclusion

According to the collected data, it can be said that a variety of environmental analysis depend on temperature, humidity and how dry the climate is. The habitat of species in an ecosystem is determined by these three criteria.

The area surrounding the South Island is almost entirely desert, and the results of our study showed that the main species of the xerophilic group are located in the desert. It was noted that the eurybiont category contained the fewest species. According to the collected data, the distribution of digger wasps within ecosystems is mainly influenced by their habitat.

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