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Lower Algae in the Kunji Qal'a Sewer of the Bukhara City

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Abstract: This article provides information about the geographical location of the Kunji Qal'a reservoir flowing through the city of Bukhara, the chemical composition of the water, as well as about micro algae and higher algae found in the reservoir. In the first months of the summer and autumn season, when sunlight will be abundant, there will be favorable conditions for the development and reproduction of algae common in the reservoirs of the Bukhara. The water level in the reservoir rises mainly in the process of land irrigation, as a result of the leaching of salty soils in the fields, in particular in the Bukhara region in 1978, the volume of collector waters amounted to 1,494 million m3.

Keywords: indicator, saprobe, micro algae, algoflora, ecology, dominant.

Scientists around the world pay special attention to algoflora when studying the plant world. One of the main reasons for this is that algae make up the first level of the food chain. Therefore, the vital activity of all living organisms both in the aquatic ecosystem and on land is considered to be directly related to the development of algae. Reservoirs in Uzbekistan account for 10% of the total area. These reservoirs (lakes, rivers, streams, canals, sewers, underground drains) are unevenly distributed. The main part of the reservoirs are lakes and storage reservoirs. In Uzbekistan, also in recent years, many scientists have been conducting scientific research in the field of studying reservoirs and aquatic organisms. This allows us to obtain new data in the field of science. A good example is the ongoing research work on the study of the species composition of aquatic plants

common in canals and reservoirs of our republic. In particular, M.Yuldashova and D.Saminjonov (2022) conducted a systematic analysis of bottom aquatic plants common in the Katta Ferghana, Northern and Southern Ferghana channels of the Ferghana Valley. Y.Sh.Tashpo'latov and X.Alimjanova (2019) carried out extensive work on the study of the algaflora of the middle reaches of the Zarafshan River, types of saprobic indicators that determine the ecological and sanitary state of water. Aquatic plants common in the waters of the Bukhara oasis have been studied by N.E.Rashidov (2007, 2020), M.I.Mustafayeva (2020) and many other scientists. The work on studying the hydrochemical state of reservoirs flowing through the city of Bukhara, determining the species composition of microscopic algae and their significance for assessing the ecological and sanitary state of water is relevant. In this regard, it is advisable to determine the species composition of bottom lower algae of the Kunji Qal'a sewer flowing through the city of Bukhara.

Algoflora of the ditch waters of the Bukhara region was first studied by A.Ergashov. According to the research, a total of 365 algae species and subspecies of algae have been identified. Of these, 2 belong to Charophyceae , 4 to Pyrophites, 12 to Euglenas, 78 to blue-green algae, 42 to green algae, 157 to the section of diatoms. Recently, a lot of work has also been carried out in the Bukhara region on the study of reservoirs and the study of hydroorganisms.The Kunji Qal'a collector, located in the city of Bukhara, was chosen as the object of the study. The Kunji Qal'a collector is adjacent to the collector which is called Parallel, and Kunji Qal'a collector starts near to the knitting factory in Bukhara and flowing through the territory of O'rta Novmetan. The collector was created on January 1, 1952. The length is 13 km, the depth is on average 1.0-1.5 m, the volume of water is 3 m3, the amount of water is collected in the collector and pumped into a parallel collector. The water flow is low, the water level rises mainly in the winter and spring months during the leaching of saline lands.

The Kunji Qal'a sewer in Bukhara is divided into upper, middle and lower parts in accordance with geomorphological features. Observation points were mapped to collect algological samples along the sewer stream. The ongoing research work on the study of the species composition of aquatic plants common in the canals and reservoirs of our republic is largely justified. The algoflora of the Kunji Qal'a sewer has been studied as an object for scientific research. In these collector streams, the temperature, gas regime, transparency, mineralization, as well as the amount of nutrients vary depending on the season. Environmental factors are the main factor in the development and spread of algae. In the Kunji Qal'a sewer, a decrease in the amount of sunlight and a decrease in water temperature to 15-22 °C degrees in the autumn period creates favorable conditions for the vital activity of growing algae.

The research method.

Plankton sampling consists of two types: qualitative and quantitative samples. Samples were taken using an Apstein plankton net in the initial and middle parts of the reservoir to determine the types of algae. The size of the Apstein net is No. 76, the diameter of the water intake is 20 cm. The collection of the material and its processing were carried out in accordance with the generally accepted style. After collecting the samples, a few drops of 4% formalin were dropped into it and preserved. To determine the types of algae common in the reservoir, a reference books of O.V.Anisomova and M.A.Gololobova were used. The water temperature was determined using a mercury thermometer, and the degree of transparency of the water was determined using a Secchi disk. In spring, summer and autumn, algological samples were taken and recorded from the reservoir, and the species composition was determined in the laboratory.

Seasonal samples were collected to identify microscopic algae species. The research was conducted in the field and laboratory conditions in 2021-2022. With an increase in air temperature, the process of activation of algae begins. To indicate the quality and quantity, samples from different parts of the collector water were collected by passing 10 meters and passing 250 liters of water through an Upstein grid. In the season when the study is conducted, the average air temperature is 19-22 C. The average oxygen dissolved in water is 8 mg/l. The growth dynamics of microscopic algae varies depending on the water temperature.

Algae cause a change in the color of the water, forming a large biomass, mainly in spring and summer. From April to October, phytoplankton develops and multiplies. Phytoplankton begin to develop and multiply in April, when the air temperature reaches 25-26 °C. At a water temperature of 20-22 °C, that is, from June to August, the development of phytoplactones reaches a maximum. As the air temperature decreases towards the end of the autumn months, the water temperature also decreases. Because of this, the development of phytoplankton slows down. Water of a sewer has a high content of nutrients, which leads to an increase in the amount of phytoplankton, which is demanding of nutrients. The change in the amount and biomass of algae cells in the water during the year depends on the water and the nutrients contained in it. As a result of the conducted research, a total of more than 97 samples from the reservoir were collected and analyzed. As a result of the analysis, a total of 62 species and subspecies were identified. It should be noted that the identified species belong to 4 departments, namely: Bacillariophyta, Chlorophyta, Cyanophyta, Euglenophyta.

The results of the study.

The Kunji Qal'a sewer in Bukhara is divided into upper, middle and lower parts in accordance with geomorphological features. Observation points were mapped to collect algological samples along the sewer stream. The results of the study.

Studies have shown that there are many different higher aquatic plants in the reservoir, as well as microscopic algae. Microscopic algae such as Lyngbya Aestuari, Oscillatoria curviceps, O. irrigua, O. princeps, Spirulina major, S.jenneri, Cyclotella comta, Navicula exigua, Synedra ulna, S.amphicephala, Cymbella affinis, C. ventricosa, Gyrosigma spenceri, Hantzchia amphioxyc are found in large numbers. The seasonal distribution of species of Phytoplanktons were also analyzed. Accordingly, representatives of the Diatoms prevailed in all seasons. The most widespread species of diatoms are Melosira varians Ag., M. granulate (Ehr) Ralfs, Stephonodiscus astraea (Ehr) Grun, Cyclotella comta (Ehr) Kutz, C. opeculota Kutz, Diatoma vulgare Bory, D. var. tenuis (Ag), Synedra acus Kutz, S. tabulate Kutz, S. minuscula Grun, Nitzschia communis Rabenh, N. dissipata (Kutz) Grun, Navicula cincta Kutz, N. bicapitellata Hust, N. cari Her, N. radiosa Kutz, N. minima Grun, N. pusilla W. Sm, Pinnularia. molaris Grun, Cyrosigma spenceri Cl, Mastogloia smithii Thw, M. apiculata W.Sm. We conducted a taxonomic analysis of the reservoir waters of Kunji Qal'a and, came to the conclusion that Bacillariophytas are very rich in species. Bacillariophytas include 46 species and subspecies and accounts for 46% of the total number of algae. The Chlorophyta division consisted of 19 species and subspecies, accounting for 27%. The Cyanophyta division consisted of 15 species and subspecies, accounting for 21%. There are 4 species of the Euglenophyta division, an average of 6% of the total number of algae.

As a result of the conducted research work on the study of algae species common in reservoir waters located near the city of Bukhara, 62 species of phytoplankton were identified in the Kunji Qal'a reservoir flowing through the city, and their seasonal distribution was studied.

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