Journal of Academic Research and Trends in Educational Sciences
Journal home page:
http://ijournal.uz/index.php/jartes

HYDROBIOLOGICAL, ALGOLOGICAL ANALYSIS AND ECOLOGICAL FEATURES OF LAKE SARBASK

Eshmurodova Nargiza Sharofovna[1]
Mamarakhimov Oybek Muratovich[2]
Usmonova Bahora[3]
National University of Uzbekistan

KEYWORDS
flora of algae,
the Aral Sea basin,
Lake Sarbas,
species composition,
ecological features,
dominant,
plankton, benthos,
periphyton,
phytobenthos

ABSTRACT
The article presents an analysis of the data on the composition of the species of Lake Sarbas algofloras, one of the Aral basins located in the territory of the Republic of Karakalpakstan. The results of scientific research on the ecological characteristics of algae and the prospects for their use are given.

2181-2675/© 2021 in XALQARO TADQIQOT LLC.
DOI: 10.5281/zenodo.5776316
This is an open access article under the Attribution 4.0 International(CC BY 4.0) license (https://creativecommons.org/licenses/by/4.0/deed.ru)

[1] Associate Professor of the Department of Environmental Monitoring, Faculty of Ecology, National University of Uzbekistan
[2] Heads of the Department of Environmental Monitoring, National University of Uzbekistan
[3] Student of the Department of Ecology and Environmental Protection, National University of Uzbekistan

iJOURNAL Journal of Academic Research and Trends in Educational Sciences (JARTES)
VOLUME 1, ISSUE 1 / ISSN 2181-2675

ГИДРОБИОЛОГИЧЕСКИЙ, АЛГОЛОГИЧЕСКИЙ АНАЛИЗ И ЭКОЛОГИЧЕСКИЕ ОСОБЕННОСТИ САРБАСКОГО ОЗЕРА

КЛЮЧЕВЫЕ СЛОВА:
флора водорослей, бассейн Аральского моря, озеро Сарбас, видовой состав, экологические особенности, доминант, планктон, бентос, перифитон, фитобентос

АННОТАЦИЯ

В статье представлен анализ данных о видовом составе альгофлоры озера Сарбас, одного из Приаральских водоемов, расположенных на территории Республики Каракалпакстан. Приведены результаты научных исследований об экологических свойствах водорослей и перспективах их использования.

САРБАС КЎЛИНИНГ ГИДРОБИОЛОГИК, АЛЬГОЛОГИК ТАҲЛИЛИ ВА ЭКОЛОГИК ХУСУСИЯТЛАРИ

KALIT SO‘ZLAR:
сувўтлари флораси, Оролбўйи сув ҳавзаси, Сарбас кўли, турлар таркиби, экологик хусусиятлари, доминант, планктон, бентос, перифитон, фитобентос

ANNOTATSIYA

Мақолада Қорақалпоғистон Республикаси худудида жойлашган Оролбўйи сув ҳавзаларидан бири бўлган Сарбас кўли альгофлораси турлар таркиби ҳақида маълумотлар таҳлили келтирилган. Сувўтларининг экологик хусусиятлари ва улардан фойдаланиш истиқболлари тўғрисидаги илмий изланиш натижалари берилган.

КИРИШ ВА ДОЛЗАРБЛИГИ/ВВЕДЕНИЕ/INTRODUCTION

At present, the need to ensure the management of fresh water resources is felt in many countries of the world and in all regions. In the conditions of the current shortage of water resources, especially in connection with the expected climate changes, it is of great interest to assess their situation for the foreseeable and long term. The current development of the economy, the demographic situation in Uzbekistan and the identified trends in climate change emphasize the aggravation of water supply problems in the country in the near future.

Determination of biochemical and ecological characteristics of adaptation of plants on arid and saline soils in the world and their use in economic sectors on this basis is one of the pressing problems.

Today it is important to classify the biological resources in the regions in which there is an ecological crisis in the world, to determine the biochemical, physiological and environmental principles of adaptation to stress factors, to use the available resources in the restoration of the lands that have undergone a crisis.

In particular, the justification for the changes in the biochemical, molecular-biological and environmental characteristics of plants in the drained regions of the Aral Sea, the identification and use of them by DNA markers using modern methods is one of the pressing

problems. At the same time, the shortage of clean drinking water and the protection of water bodies are now becoming one of the pressing issues around the world.

Due to the initiative of the president of the Republic of Uzbekistan Shavkat Miromonovich Mirziyoyev at the summit of the heads of Central Asian states held in Turkmenbashy (Turkmenistan) on August 24, the attention to the problem of Aral and Aral Sea has sharply increased. The government of Uzbekistan approved a practical action plan (road map) to ensure the implementation of the initiatives and proposals announced at the summit of heads of states of the president of the Republic of Uzbekistan. One of the main tasks set out in this road map is to transform the drained sea and Aral Sea region into a zone of environmental innovation and technology.

To do this, it was decided to sharply increase the number of drought-resistant trees of the Seas, which dried up on an area of 500 thousand hectares: saksaul, cherkez, jingil. In addition, the development of conditions, first of all, water supply infrastructure, drainage, construction of roads, nuclear power plants and communication networks were emphasized [6, 127-129 С].

For 2019, a transparent monitoring of the drained Sea will be established to determine its condition and a continuous monitoring system will be created to monitor the condition of the land surface, soils, plants, groundwater and ponds. According to the experience of Israel and China, the work on the development of greenhouses and hydroponics on the basis of solar energy in the desert is planned [6, 128 С], the development of fisheries, livestock breeding, artemia and licorice production for medical purposes, the establishment of balneological treatment on the basis of available mineral waters and mud.

The variety of plant species of the southern regions, where the Aral Sea water dries up, has not been fully studied to date. Also, scientific research work on the systematic analysis of the species composition of the flora of the South Aralkum waters, seasonal changes, study of environmental characteristics has not been carried out in full.

МЕТОДЛАР ВА ЎРГАНИЛИШ ДАРАЖАСИ /МЕТОДЫ/ METODS

The ecological system of the Aral Sea is not so rich in terms of Biological Diversity. This is due to the high level of mineralization of water. Nevertheless, until the 1960s, it was the largest fishery reservoir in Central Asia, with an annual catch of 15-40 thousand tons of fish (mainly carp). Comparative cereals all water bodies of Uzbekistan (except fish ponds) annually produce about 8 thousand tons of fish. Since 1980 year, the Aral Sea has completely lost its fishing importance.

The most important direct factor that has catastrophically changed the biota of the Aral Sea is the fact that in less than 10 years the mineralization of water bodies has increased several times. Accordingly, we conducted a research work on assessing the possibility of hanging on the mineralization of water, depending on the change in the composition of species in algoflor.

This makes it possible to predict the extent to which the composition of the island sea biota will be present at different levels of mineralization, the data obtained on the salinity of the algae flora.

On the basis of the use of the flora of the waters of the Aral Sea, it is possible to achieve the stability of the water bodies of the Aral Sea. Even for the remains of the island fauna, the drying out of the ponds (almost all the lakes in the island sea are shallow) and their excessive desalination can be devastating. The fact that ecosystems of most lakes of the Aral Sea region (for example, Sudoche, Sarbas lakes) are extremely unstable in conditions of lack of water as a result of drought in the years 2000-2001 poses a risk of extinction of a number of refugiums [4, 154 C].

Another dangerous factor is the increase in anthropogen changes and pollution in the geological regime. For example, a significant decrease in the mineralization level of a significant amount of water from Lake Ayazkul caused the disappearance of most plankton species of the island complex [5, 529-562 C]. Not only is drought dangerous for the fauna of the island, but also a significant decrease in mineralization is explained by the fact that some species are characteristic of saltwater and can not live in fresh water conditions.

Due to the high purity of the Aral Sea and its shallow waters, most of the organic matter was produced not on account of phytoplankton, but by phytobentos. This indicates that the ecosystem of the water basin is different from the ecosystems of other inland seas. In general, the share of phytoplankton biomass reached 90%, while phytoplankton biomass reached only 10% [6, 128 C]. Hara algae accounts for about 75% of the phytobentos biomass and 13% of green algae.

Data on the occurrence of green and red algae from the main Bentos algae are presented [5, 127 s]. In 1990 – 1995 years, almost all of these species disappeared.

In the 1950s and 1960s, phytoplankton diatom algae reigned in the Aral Sea [1, 447 C]. According to Alladin and Kotov (1989), from 1972 to 1983 year, most species of planktonic algae, including dominant species such as blue-green and diatom, disappeared from the Aral Sea. In the 1980s, when salinity reached 24 PT, the eurygeal algae began to die in the Aral Sea [3, 17-47 C].

In 1999-2002, 159 species of peripheral algae and 167 species of plankton were observed. This is the aging half of the previously mentioned phytoplankton variety. According to the analysis, in 1920-ies Kiselyov (1927) recorded the Aral Sea planktonida 375 species, in 1960-ies and 70-ies Pichkili (1981) and Elmuratov (1981) recorded 306 and 278 species [1, 430 s].

In 2002-2005, the phytoplankton variety was stable, but much lower than in the previous period, in 1999-2001, 159 species of algae were observed in the Aral Sea, in 2002-2005 only 81 species were observed. In the aqueduct, almost only sea and galophilic species remained. Not all of the mentioned algae are characteristic of plankton. In shallow waters (2-4 m) most of the algae that are recorded due to it are phytobentos and perifiton algae.

ТАДҚИҚОТ НАТИЖАЛАРИ/
РЕЗУЛЬТАТЫ ИССЛЕДОВАНИЙ/ RESULTS AND DISCUSSIONS

As an object of the study, the species composition of the waters of the Aral Sea water bodies was studied. For laboratory analysis, algological samples were collected in different seasons of 2019-2021 years.

Research methods: algological, gidrobiological, botanical research methods were used. In statistical analysis of materials, identifiers, monographs and articles of classical and foreign authors were used [2, 38-49s]. Along with this, the data on the economic indicators of the Island Basin were analyzed in cooperation with the student of the economic direction.

To date, the volume of the waters of the Aral Sea remains only about 6% of the total volume. Nevertheless, the lake remains an important reservoir with a horizontal length of up to 150 km and a depth of more than 20 m. On a regional scale, the impact on climate and atmospheric circulation continues.

The ecological crisis of the Aral Sea requires an in-depth re-analysis of all components of ecosystems. First of all, the hydrophysical state of water ombor is caused by the conversion from a mixture-strongly stratified, well ventilated-saline, prone to an anoxia and hydrogen sulfide pollution to hyperkalin (Figure 1).

Picture-1. The current state of the Aral Sea basin

The total decline was only around 1 M for the period from the beginning of monitoring (2002) to the present 2021 year, when the decrease in the level of the Aral Sea was about 3 M per year on average. It shows that the growth of mineruvuv in the western basin is still ongoing (picture 2).

Picture-2. Mineralization level indicators based on the samples obtained

The chemical regime of the Aral Sea is closely related to its hydrophysical state. The

ion-salt composition of sea water has changed significantly and continues to change due to the deposition of carbonate and gypsum.

If in the "conditional natural" state the Aral Sea was considered a water reserve of the sulphate type, now the amount of sulfate ion in relation to chlorine is significantly reduced. Especially radical changes affect the structure of the bladder, which almost 7 times reduces.

The reduction of water in relation to calcium can be a limiting factor of the subsequent deposition of gypsum. Without the receipt of mineralization, in the near future, mirabilites begin to fall (especially in low temperatures in winter), which leads to further changes in sodium intake and salt content. The change in the ionic composition of Water leads to a change in all basic physical bonds, such as the dependence of the density on salinity and temperature to 127 (the state equation), the dependence of the freezing heat on salinity (the freezing temperature for the modern Island Sea is around -50), the dependence of electrical conductivity on salinity. The study of these links between the hydrophysics and Hydrochemistry of the Aral Sea is one of the important tasks of further research.

In 1996 a.The e. Elmuratov [1, 447 C] brought 902 species and different algae by the basin of the Aral Sea algoflor. Of them – Cyanophyta – 202, Rhodophyta – 5, Xanthophyta – 2, Chrysophyta – 8, Bacillariophyta – 386, Pyrrophyta – 49, Euglenophyta – 53, Chlorophyta – 197 the example of tadan is quoted.

Based on the analytical results of our conducted research , we determined that the temperature of the Sarbas lake basin in the hot summer months of the year is high, that is, in the range of 2020 July 11 hours 12-1230, the air temperature is 38 C0, the water temperature is equal to 24 C0, there is no current, the color of the water is We identified the obtained algological samples by the numbers № 14, № 15 and № 16, № 17 on the basis of the sequence of samples obtained on the basin routes.

The A.The A. According to the classification of alekin, the waters of the island sea belong to the III-th type of the natrian group of the chloride class. In the conditions of the natural regime of the sea, chlorine and sulfate ions predominate among anions. On average, 35 and 32%, respectively, sodium ions-20% and magnesium -7%. kaltsium content 4% and bicarbonate content 1%.equal to. When the algological samples were analyzed systematically, the leadership weight of Representatives of the waters of the Nostalgia and Microcystis studied the weight of leadership.

The ongoing changes in the physico-chemical regimes of the Aral Sea also affect the current state of its biological systems. It should be noted that, despite the huge losses in terms of biodiversity species diversity during the ecological crisis, modern biological communities of the Aral Sea can not be called Dead or dying. At sea, a very clear, but very active ecosystem developed, consisting on account of plankton and and bentos species. Their general biomass is very important. Even from the dominant species of zooplankton of the greater Aral Sea, Sea-Buckthorn Artemesia should be at the center of further research, mainly the evolution of biological communities, which is determined by changes in the physico-chemical regime of the sea.

ХУЛОСАЛАР/ВЫВОДЫ/CONCLUSION

In the coming years, it is necessary to continue the program of large-scale monitoring of the Aral sea ecosystems in Russia and science. The main emphasis in this should be placed on the interaction of the hydrophysical, hydrochemical, Meteorological and biological components of the ecosystem. It would be desirable if the task of using monitoring data for modeling and forecasting ecosystems of environmental conditions in the region was also determined.

The data obtained as a result of the study can not only serve to solve specific social, economic and environmental problems in the Aral Sea region, but also be useful from a general point of view. To study the reaction of the Aral Sea water ecosystems to the anthropogenic impacts that occur in many other regions of the planet, the study as a "model object" is important in solving the problem of the Aral crisis, which is among the most common problems. At the same time, the necessary research and monitoring activities of the Aral Sea countries (Uzbekistan and Kazakhstan) are also very necessary for the participation of the international scientific community.

The dried up part of the Aral Sea and the study of the Aral Sea itself should have a multidisciplinary character, which, on the one hand, makes it possible to deeply study and integrate each part of the ecosystem: geography, soil, vegetation, animal world, to determine their interaction with each other. On the other hand, the study of the ecosystem should also include the lives of people in this region, changing their way of life after moving away from settlements on the seashore and their adaptation to new conditions. The socio-economic aspect makes it possible to assess the losses resulting from the deterioration of the ecological balance and to identify ways to improve the management of the system in order to change the situation, improve the lives of the people in the region.

ИҚТИБОСЛАР/СНОСКИ/REFERENCES

[1]. Ельмуратов А. Е. Фитопланктон южной части Аральского моря и озер Приаралья в условиях антропогенного евтрофирования (систематичес-кая часть) : Дис. … докт. биол. наук. – Ташкент, 1977. – 447 с.

[2]. Жукинский В.Н., Оксиюк О.П., Олейник Г.Н., Кошелова С.И. Принципы и опыт построения экологической классификации качества поверхностных вод суши // Гидробиол. журн. – Киев, 1981. Т. XVII. № 12. – С. 38 - 49.

[3]. Аладин Н., Плотников И. Изменения уровня Аральского моря: палеолимиологические и археологические доказательства. В сб.: Биологические и природоведческие проблемы Аральского моря и Приаралья: Труды Зоологического института РАН, том 262, часть 1. - СПб, 1995. - С. 17-47 .

[4]. Южное Приаралье - новые перспективы. Под ред. проф. В.А. Духовного и Ю. де Шуттера.- Ташкент: «Нори», 2003 - 154 с.

[5]. Мониторинг состояния физических, химических и биологических систем Аральского моря в условиях экологического кризиса / П.О. Завьялов, Е.Г. Арашкевич, С.Н. Дикарев, Т.В. Кудышкин, А.К. Курбаниязов, А.А. Ни, Ф.В. Сапожников, Д.М. Соловьев, В.М. Хан // В кн: Современные проблемы аридных и семиаридных экосистем России /

Г.Г. Матишов (ред). - Ростов: ЮНЦ РАН, 2006. - С. 529-562.

[6]. Аральское море и Приаралье. Обобщение работ НИЦ МКВК по мониторингу состояния и анализу социально- экономической и социально-экономической ситуации в данном ареале с 1994 по 2018 годы. Издательство «Complex Pint», г. Ташкент, 127-129 с.