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ECOLOGICAL AND SYSTEMATIC CHARACTERISTICS OF BACILLARIOPHYTA IN THE WATER BODIES OF THE CITY OF CHIRCHIK

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Abstract:

This article deals with the issues of species diversity, ecological and systematic characteristics of **Bacillariophyta - Diatoms** in the reservoirs of Chirchik, the formation of theoretical knowledge and practical skills in conducting research in the field of taxonomy, ecology of algae, studying the cycles of their development, the formation of skills for conducting field and laboratory algological research, the use of high-tech laboratory equipment in the course of solving scientific tasks in the field of algology, the formation of professional training for independent scientific, research and pedagogical activities, the essence of modern methods of collecting quantitative and high-quality samples of plankton, periphyton and benthic algae, office processing of material, taxonomic and morphometric processing of samples.

Keywords: questions of methodological features of the study of the section of taxonomy Bacillariophyta - Diatoms, the formation of theoretical **knowledge and practical skills, theoretical principles, methods and methodological approaches to the study of populations and communities of macro- and microalgae, methods of collection and primary processing of micro- and macroscopic organisms, their taxonomic, biometric processing.**

INTRODUCTION

In recent years, the study of the algal flora of large megacities has attracted more and more attention of researchers, since it is in cities that water systems experience the strongest anthropogenic pressure. This is due to the violation of the historically established hydrographic network and varying degrees of pollution of the preserved aquatic ecosystems. Therefore, there is a need for hydrobiological monitoring of water bodies, including observations of changes in the qualitative and quantitative composition of algae, which makes it possible to assess the degree of anthropogenic eutrophication of water bodies. Diatoms are the most common group of algae in continental water bodies, widely represented in various biotopes and sensitive to changes in habitat. The diatom complex is associated with the chemical composition of water, which makes it possible to use diatoms as bioindicators. The study of the species composition of diatoms of various biotopes can be carried out in close connection with the study of their ecological and geographical characteristics, such as their relationship to mineralization, to the pH of the environment, to study the distribution, etc.

The study of algae in water bodies within Uzbekistan began relatively recently. However, to date, a fairly extensive literature has accumulated on this issue. A number of works indicate the species composition, development, distribution and formation of algae.

The algae flora of natural reservoirs of Central Asia was first studied by K.E. Hirn (1900), O.A. Fedchenko (1903), C.H. Ostenfeld (1908), Strom (1920), J. Petersen (1930), I.A. Kiselev (1926, 1930, 1931), E.M. Kiseleva (1930, 1939), N.N. Voronikhin (1934) and others.

The algal flora of various reservoirs of Central Asia has been studied by A.M. Muzaffarov since 1937 (1947, 1949, 1960, 1961), who noted the role of algae as weeds of irrigation and drainage canals, their importance in the formation of irrigation ditch sludge and its enrichment with organic compounds. The author (1953) found out the influence of various environmental factors (the degree of water transparency, changes in

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chemical composition, level fluctuations, temperature, flow rate) on the development and distribution of algae. A.M. Muzaffarov (1956) established a regular distribution of algae flora along the belts. The results of his long-term research were published in three monographs in 1958, 1960 and 1965. They show the general and floristic state of the surveyed water bodies, the influence of various factors on the development and seasonal change of algae flora, the belt distribution of flora, comparative data on the algae flora of mountain and arctic reservoirs of the CIS and water bodies of Central Asia, a list of about 3000 species and varieties of algae is compiled.

The algal flora of the Kairakkum reservoir on the Syr Darya River was studied by S.A. Andrievskaya (1963). It indicates 136 algae taxa for the Kairakkum reservoir on the Syr Darya River (golden - 3, dinophyte - 3, euglenic - 5, bluegreen - 18, diatoms - 50, green - 57).

A.A. Temirov (1992-1996) studied the algal flora of the Kairakkum and Kattasai reservoirs and During the study period, 445 species, varieties and forms of algae were discovered. Of these, 95 are blue-green, 20 are euglenic, 15 are dinophyte, 10 are golden, 141 are diatoms, 2 are yellow-green, and 162 are green.

The algal flora of the Chardara reservoir on the Syr Darya River was studied by A.E. Ergashev and S. Khalilov (1968); S. Khalolov (1968, 1970, 1971, 1976).

The algal flora of the Andijan reservoir was studied in 2006-2009 by Ergashev H.E. A comparative analysis of the algal flora of the Andijan reservoir and the rivers flowing into it was compiled: Karadarya, Tar, Karakulja, Yassi, Kurshab. Systematic analysis showed that the species composition of algal flora contains 418 species, forms and variations. They belong to 6 divisions, 12 classes, 20 orders, 49 families, 116 genera, 400 species, 9 forms and 9 variations.

Alimzhanova H.A. studied the patterns of algae distribution in the Chirchik river basin and their importance in determining the ecological and sanitary condition of water bodies. - Tashkent, Fan. 2007. - 265 p

The collection and study of diatoms lasted from November 2021 to December 2022.

During the research period, more than 150 samples of algae were collected, of which 90 were qualitative, more than 40 were quantitative, 20 samples of fouling and benthos. The collection and study of diatoms was carried out by the same methods that are applied to algae of other systematic groups. The algae were collected together with the substrate. Scraped plaque, pieces of substrates with algae, plexuses of threads, etc., were placed in glass jars (made of dark glass) with a 4% formaldehyde solution poured into them in advance. This excluded the possibility of introducing into the test material organisms suspended in water, undesirable during the treatment of fouling. Diatoms are usually considered one of the most difficult groups to study, and many of the algologists in their floristic works give lists of all algae with the exception of diatoms. This greatly reduces the scientific value of such works, often leading even to incorrect conclusions, because it is diatoms that are the most subtle indicators of the ecological conditions of the aquatic among them, their ecology has been studied much more fully than in other algae.

The species diversity, ecological and systematic characteristics of **Bacillariophyta - Diatoms in the reservoirs of Chirchik have been studied. The city is located in the** north of Uzbekistan in the valley of the most abundantly flowing river of the Tashkent region, the city of Chirchik (translated as "noisy", "noisy"), from which it got its name. The area is 34 sq. km. The height above sea level is 582 meters. The type of climate is moderately continental.

In fact, the determination of diatoms is not particularly difficult, provided that the material is carefully prepared technically, which requires some time. The species features of diatoms are so clear that the possibility of errors in their determination is very small. The study of diatoms is carried out in preparations with solid media, and this has a great advantage in that it makes it possible to check the desired appearance in the preparation at any time. Therefore, collections of preparations of diatoms have the same great scientific value as herbariums for the study of macroscopic algae and higher plants.

The forms are predominantly small, less often large, free-floating or attached, of different colors. Small forms are usually invisible to the naked eye or distinguishable only in mass growths in the form of clusters of thin threads, balls, pillows, plates, scales, grains, etc. Large forms - in the form of thick, sometimes branched threads, bushes and cords that do not show a whorled structure (only some forms with whorled twigs, but then they are mucous to the touch, not impregnated with lime and painted in olive-green color).

Cells with a silica bivalve shell - a shell that usually persists after calcination on fire. The sashes are bilaterally symmetrical or radial, with a complex structure (hatched in appearance, dotted, etc.). The forms are unicellular or colonial; Their mass clusters are yellowish-brownish.

Phylum Bacillariophyta - Diatoms are a rather ancient group of algae. Single fossil forms are known

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from the Jurassic sediments (leyas), and in the Cretaceous sediments they are already found in a large number of species. Cretaceous diatoms are very perfect in their structure. This suggests that they have already passed a long evolutionary path before the Cretaceous period.

Diatoms are an independent, highly organized type of algae that does not have direct kinship with other algae in the present geological period. Despite the absence of external similarities, the signs of the internal organization of diatom cells bring them closer to Chrysophyta and Xanthophyta (Heterocontae) (commonality of pigments, assimilation products, the presence of silica in the shell and other smaller features).

Silica shell (theca) consists of silicon oxide hydrate (Si02 + H20), close to opal, and appears to be devoid of organic matter. It is transparent, thin, with a specific gravity of 2.07, usually fragile and only in some species with a very thin shell, slightly elastic. The shell, or theca, is similar in structure to a box; It consists of two independent halves, which are pushed into one another with edges, like the doors of a box. The outer half of the armor, corresponding to the lid of the box,

In modern diatomology, there are a number of problems that are widely discussed in the scientific literature. First of all, this is the problem of identifying species and determining species boundaries.

The Department of Diatoms (Bacillariophyta) has more than 20 thousand (**Uzbekistan more than 1265**) species. These are photoautotrophic tubulocrystats of microscopic size, with an exclusively cocoid thallus, having integuments in the form of a silica shell. The carapace is tightly adjacent to the plasmolemme and consists of two parts: epitheca and hypotheca.

The collection of diatoms does not require the use of any special technique and is carried out by the usual methods used to collect other algae - plankton and benthos. For the purposes of taxonomy, when collecting diatoms, the material is fixed. The quality of the fixator does not really matter here, because only the armor is examined in diatoms. Any fixatives are suitable: formalin, alcohol, copper sulfate, etc., of which alcohol is the best, as it compacts the mucus and thus protects the colonies from decay. Diatoms benthos - epiphytes, fouling of stones and various objects, bottom films, etc. - in the absence of dishes and a fixative, can be dried by the usual herbarium method, as macroscopic algae are dried.

For cytological studies, the following fixatives are used: a one-percent solution of osmic acid, a one-percent solution of chromic acid, chromoacetic acid according to Fleming (composition: 70 cm3 of 1% chromic acid, 5 cm3 of glacial acetic acid, 90 cm3 of distilled water) and Buen's fixative (composition: 15 cm3 of saturated solution of picric acid, 5 cm3 of formalin and 1 cm3 of glacial acetic acid).

Morphological and partly cytological studies were carried out on a living cell.

An aqueous solution of methylene blue was used to stain living cells; In a solution of 0.001 g per liter of water, cells live throughout the day, stronger solutions serve to stain mucus and volutin. Volutin is painted with blue in a reddish-purple color (without coloring, it is almost indistinguishable from oil). Various dyes were used to stain fixed cells, but they were used only for fine cytological studies. Drops of oil are stained with one percent osmic acid in a dark brown color. Mucus is stained with all aniline paints in the appropriate colors: safranin, methylblau, methyl violet, gentian violet, bismarckbrown, and so on.

The technique of processing material for the determination of diatoms is quite laborious and consists of two stages: removal of the protoplast by chemical treatment of the sample and preparation of the drug in a solid or liquid medium with a high refractive index. Removal of the protoplast requires the following processes:

1) washing the sample from the fixative, 2) removing carbonic salts insoluble in water by the action of HCL and 3) burning the protoplast by boiling in strong acids.

In practice, this is done as follows:

1) A part of the sample is taken, large foreign particles (sand, pebbles, shells) are removed by soaking, the sample is precipitated by centrifugation, the fixative is carefully sucked out with a pipette with a cylinder and a rubber bulb. Washing is repeated 2-3 times, depending on the amount of material and capacity of the centrifuge tube. Simultaneously with the removal of the fixative, salts dissolved in water are removed, therefore, a particularly thorough washing of the material taken from brackish and salty reservoirs is required, since the remaining salts during further processing can crystallize and interfere with the study of the fine structure of the shell.

2) To remove water-insoluble carbon dioxide salts, the precipitate washed from the fixative and soluble salts is treated with 10% HC1 (in a centrifuge tube) with slow heating to a boil. The material is then washed in distilled water by repeated centrifugation until traces of acid are completely removed (litmus test). The need to remove carbon dioxide is caused by the fact that these salts, with further boiling of the

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material in acids, will precipitate, clog the material and spoil the preparations.

3) Removal of organic matter is done by boiling in strong acids. In the sediment, washed from HC1 and, if possible, dehydrated, carefully pour clean, strong (smoking) H2S04. The mixture is poured into the Erlenmeyer cone and boiled in a sand bath in a fume hood for 10-20 minutes, and with a large amount of material for 30-50 minutes.

Thus, the quality of the medium is of great importance for identifying the finest structure of the shell.

The drug medium must meet the following requirements:

1) have a high refractive index,

2) be completely transparent, do not become cloudy, crystallize, dry or crack over time,

3) be light, since otherwise the possibility of obtaining satisfactory micrographs of objects is excluded.

Division - Basillariophyta					
class-	***That is ok-***	***Suborder***	***family-***	***genus***	***view***
Centrophyceae	***Discoidales***		***Coscinodiscaceae Kuetz.***	***Melosira Ag.***	**4**
				Cyclotella Kuetz.	**9**
				Stephanodiscus Ehr.	**2**
	Solenioidales		***Soleniaceae debris.***	**Rhizosolenia Ehr**	**1**
Pennatophyceae	***Araphinafes Sch.***		***Tabellariaceae Pant.***	**Tetracyclus Ralfs**	**1**
			Fragilariaceae (Kuetz) D.T	**Meridion Ag.**	**1**
				Diatoma D.C.	**3**
				Ceratoneis Ehr	**1**
				Synedra Ehr.	**5**
	Raphinales	***Rabhidioineae***	***Eunotiaceae Kuetz.***	**Eunotia Ehr.**	**6**
				Peronia Breb. and Arn.	**1**
		Monoraphineae	***Achnanthaceae (Kuetz) Grun.***	**Cocconeis Ehr.**	**5**
				Achnanthes Bory	**11**
				Rhoicosphenia Grun.	**2**
		Diraphineae	***Navictdaceae West***	**Diatomella Count.**	**1**
				Mastogloia Thw.	**2**
				Stauroneis Ehr.	**2**
				Navicida Bory.	**41**
				Pinmdaria Ehr	**3**
				Caloneis Cl.	**4**
				Gyrosigma Hate	**5**
				Pleurosigma W. Sm	**1**
				Amphora Ehr	**9**
				Cymbella Ag.	**31**
				Didymosphenia M. Schmidt	**1**

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				Gomphonema Ag.	**8**
		Aulonoraphineae	***Epithemiaceae cough***	**Denticula Kuetz**	**2**
				Rhopalodia 0 . Muell.	**1**
			Nitzschiaceae hatred.	**Bacillaria Gmelin**	**1**
				Nitzschia Hass.	**28**
			Surirellaceae (Kuetz.) Grun.	**Cymatopleyra W.Sm.**	**1**
				Surirella Turp.	**7**
2	**4**	**4**	**10**	**33**	**200**

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