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The Dynamic of Changes in the Algae Flora of the Northern Fergana Canal Under the Influence of Various Environmental Factor

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ASTRACT

Factors influencing the development of algae in the ecological environment are studied in close connection with abiotic and biotic factors that do not participate in the activity of living organisms. Abiotic factors are limiting, which is determined by the resistance of algae to the effects of these factors.

Algae are photautotrophs. Their development and distribution are influenced by lighting, temperature, carbon source, types of mineral and organic compounds, concentration, pH, transparency and flow, which are limiting factors in the aquatic environment.

KEYWORDS: limiting factor, algae flora, homohydride, epiphyte, mesophilic, cryophilic.

INTRODUCTION

The cytoplasm of algae consists of 85-90% water. Chloroplasts and mitochondria also contain at least 50% water. For most algae, water is a permanent habitat. Some of the blue-green algae remain viable even when dehydrated. *Nostoc commune Elenk* collection developed after 107 years, when it moistened and restored cellular metabolism [I.N.Ugorova, 2014]. Eats belonging to the genus *Homohydride*, *Ulothrichales*, which usually grow in areas, with constant humidity.

OBJECT AND METHOD OF INVESTIGATION

Not much research has been done on the canal's algophore. Nevertheless, research in Central Asia and Uzbekistan is the basis and focus of attention of scientists in the region. Information on the algoflora of rivers, taxonomy, the influence of environmental factors on its formation and the role of algae in the assessment of the ecological and sanitary state of the hydrosphere by foreign scientists S.I.Kogan (1985), B.Zarei Darki (2004), N.Abdel Rauf, AA Al-Homaidan, I.B.M. Ibrahim (2012)J.Komarek, J.Kostovsky, J.Mares, J.Johansen (2014), N.L. Bolotova (2017), O.S. Gorbulin (2017), E.Patov's work (2017) and others.

The object of the research is artificial water canals of Central Asia. Algologically pure and axenic algae crops [A.D.Temralieva, 2014], refine methods are mainly used in studies. In addition, methods were mentioned by several scientists. The plankton sample concentrated in this way, which is located in a cup of the plankton network, is discharged via an output tube into a pre-prepared container [Vasser, etc. ,1989].

RESULTS AND ANALYSIS

Salinity and mineralization of water is one of the important factors influencing the spread of algal flora. Data on the mineralization of nitrogen, sulphur and phosphorus in the waters of the Fergana Canal Nord and the Naryn River, a watercourse, are given in the table below (table 1).

Table 1. Some chemical indicators of the waters of the Naryn and North Fergana canals (in mg/l). (Information from the Namangan Regional Committee for Nature Protection.)

Reservoirs		Years	pH	N-NO_2	N-NO_3	N-NO_4	SO_4	PO_4	mineralization	solid
Naryn		2020	7,2	0,004	2,55	0,039	66,5	0,20	602	6,5
NFC	Beginning		7,2	0,004	2,39	0,031	66,5	0,20	600	6,5

	Ending		7,3	0,007	2,78	0,033	76,4	0,20	710	7,05
Naryn		2021	7,1	0,004	2,9	0,152	71,2	0,23	653	6,7
NFC	Beginning		7,1	0,004	3,4	0,158	71,2	0,23	653	6,7
	Ending		7,3	0,006	3,9	0,201	76,9	0,24	729	7,07
Naryn		2022	7,1	0,005	3,3	0,160	69,2	0,24	721	6,9
NFC	Beginning		7,1	0,005	3,5	0,162	69,2	0,25	680	7,1
	Ending		7,2	0,008	4,1	0,204	76,4	0,25	733	7,16

The table shows that the level of mineralization in the upper and lower reaches of the river increased in 2019 compared to previous years. This is due to the influence of water pollution and anthropogenic factors over the years [1; 27-30], [2; 214-218].

Near the middle flow of the channel as a result of changes in the mineralization and hardness of the water. Compared to the Naryn River Algophlore, the taxa and the Northern Fergana Canal that receive water from it are 81 species (38.21%) [5; 125].

Water acidity (pH) is an important environmental factor in the distribution of algoflora taxa. Resistance of algae belonging to different taxa to changes in water acidity (pH) is similar to resistance to changes in mineralization and salinity. Depending on the acidity of the aquatic environment, which is in alkaline conditions, are called alkalophiles, which are in acidic conditions, are called acidophiles. The algae flora in the Northern Fergana Canal is low in alkalophiles and acidophiles, as the acidity of the water has changed slightly with the pH concentration of the canal ends. Only members of the family *Desmidiaceae* have been found.

Nutrients. Nutrients are widely digested by algae. Nitrogen and phosphorus compounds play an important role here. In the mucus that surrounds the association of calcium, magnesium accumulates in large amounts in chlorophyll. The microelements themselves appear to be particularly affected by iron, manganese, zinc, copper, boron, silicon, cobalt, molybdenum, chlorine, vanadium [6; 248-278], [5; 125].

The movement of water is also important in algae life, development and distribution. There are no completely immobile ponds in our environment, so almost all algae are algae in a moving pond. Other algae, primarily blue-green, do not develop under severe turbulence. So we've identified most of the algae species in this section of the canal. *Aphanizomenon flos-aquae* (Ralfs ex Bornet & Flahault 1886), *Cyclotella kuetzingiana* (Thwaites 1848). 5; 125], [6; 248-278].

The indirect effect of dynamic factors accelerates photosynthesis and other processes in algae by lifting nutrients by mixing water vertically.

The lack of algoflor in phytoplankton canals of Central Asia is explained by turbidity of water according to A.M.Muzaffarov (1965), Ergashev (1974). It has also been argued in the literature that the speed of turbulent flow in canals that extract water from Mountain Rivers also prevents algae from developing. A similar situation exists in the Northern Fergana Canal [3; 4].

Temperature is an important factor in the geographical distribution of algoflu during seasons and in many cases has an indirect rather than a direct influence. Since the temperature optimum of different taxa is not the same, their composition varies depending on the season. Algoflora vegetation in our conditions begins in the first half of March. The highest temperature at which algae grow is at "hot" springs, varying from +90o to + 93ºC. The minimum temperature does not freeze even at -7 -80°C. To the eurhythmic species, which can grow in a wide temperature rangedependent conditions include algae from the Chlorophyta section of the Northern Fergana Canal, as well as stenothermes of mesophilic groups..

Algoflora-containing Euriterms identified from the Great Namangan Canal include *Aphanothece clathrata* (West & G.S.West 1906), *Gomphosphaeria aponina* (Kutziing 1836), *Anabaena cylindrica* (Lemmerman 1896), *Aphanizomenon flos-aquae* (Ralfs ex Bornet & Flahault 1886), сечение- Cyanophyta, *Melosira italica* ((Ehrenberg) Kutziing 1844), *Cyclotella kuetzingiana* (Thwaites 1848), *Synedra ulna* (Kutziing 1844), *Cladophora glomerata* ((Linneus) Kutziing 1843), *Pediastrum duplex* (Meyen 1829)-Chlorophyta. This group of algae is widely distributed along the canal during periods other than winter species is the Cladophora glomerata (Linnaeus) Kützing, Ulnaria ulna ((Nitzsch) Compère 2001), Cymatopleura solea ((Brébisson) W.Smith 1851) distribution of algae [1;5;6]. Northern Fergana Canal 212 species (1-diagram).

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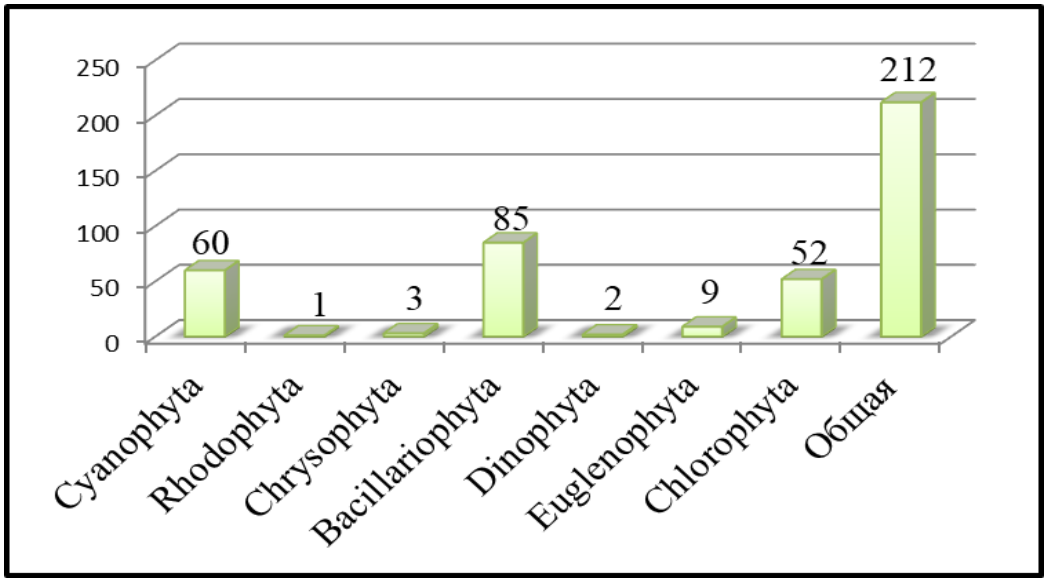

Figure -1 Algoflora of the Northern Fergana Canal

Of the 212 algae taxa found in the Northern Fergana Canal, 37 (0.17%) are cryophilic groups. These algae develop in the canal in late autumn, winter and spring. They were also found in our samples at water temperatures ranging from 12-16ºC to +2º-4ºC. *Oscillatoria irrigua* (Kutziing ex Gomont 1892), *Oscillatoria terebriformis* (Agard ex Gomont), *Phormidium foveolarum* (Gomont 1892), *Hydrurus foetidus* ((Villars) Trevisan 1848), *Melosira distans* ((Ehrenberg) Kutziing 1844), *Diatoma hiemalis* ((Roth) Heiberg 1863), *Cymbela affinis* (Kutziing 1844), *Navicula radiosa* (Kutziing 1844), *Euglena proxima* (P.A.Dangaerd 1902), *Ulothrix zonata* (Kutziing 1833), *Cladophora glomerata* ((Linneus) Kutziing 1843).

The temperature factor has a significant influence on the distribution of taxa in the algae flora of the Northern Fergana Canal. Due to the fact that the temperature is the main factor influencing the formation of seasons of his description in table 2 [2;3].

Table 2. Distribution of thermophilic, mesophilic, cryophilic groups in the algae flora of the Northern Fergana Canal

Algophore department	Number of common species	Percent	Thermophiles		Mesophiles		Cryofillar	
			Number of species	Percent	Number of common species	Percent	Number of common species	Percent
Cyanophyta	60	0,283	16	0,27	30	0,50	14	0,23
Rhodophyta	1	0,004	1	100	-	-	-	-
Chrysophyta	3	0,014	1	0,33	2	0,67	-	-
Bacillariophyta	85	0,401	23	0,27	47	0,55	15	0,18
Dinophyta	2	0,009	-	-	2	100	-	-
Euglenophyta	9	0,042	2	0,22	6	0,67	1	0,11
Chlorophyta	52	0,245	10	0,19	35	0,68	7	0,13
Total	212	100	53	0,25	122	0,58	37	0,17

Trophic factors affect the systemic composition of algoflora in water bodies. In the aquatic ecosystem, algae are the creators of organic matter. Therefore, consumers of algae in a growing ecosystem also affect their distribution and quantity. There is not enough data in the literature on the species of invertebrates and vertebrates that feed on algae of the Great Namangan Canal, their numerical distribution, and nutrition [3; 45-48], [5125].

Allelopatic factors. The taxons that make up the algophore develop as a result of allelopatic interactions. The difference in the composition of the algoflora formed in the channels created by human activity is due to a number of other factors, as well as allelopatic connections. The systematic composition of plankton forms is formed due to the physical, chemical factors of the reservoir. This group of algae reduces its specific mass to survive on the surface of the

water (forming oil in the Bacillariophyta fission algae) to form a variety of tumors (in the *Scenedesmaceae* of the Chlorophyta subdivision), chivcines (*Volvocaceae* family of Chlorophyta division). Most of the mass of plankton is small. The plankton of the Northern Fergana Canal is not as rich in species as in other canals. Single-celled filament and colonial forms of the departments Chlorophyta and Cyanophyta, especially the taxa Volvocales, *Protococeales, Pediastrum, Scenedesmus*,, blue-green *Microcystis, Anabaena, Aphanizomenia* and similar to *Glooth*. Phytoplankton has few taxa divisions Ceratium, Peridinium, Euglenophyta, Bacillariophyta from Dinophyta [1;5].

Another feature of the phytoplankton of the North Fergana Canal is the presence of taxa in plankton for a certain period. We believe that this is due to the turbulent flow in the Naryn Canal, which receives water from the mountain. Phytoplankton Rivers, canals are somewhat different from lakes and reservoirs. Because of the turbulent flow of water in rivers and canals, phytoplankton development is due to a lack of capacity.

Phytoplankton is home to freshwater algae. In urban areas, after which various organic and inorganic substances pollute water, the number of saprobas and their diversity are beginning to increase. Later, the number of species near the middle of the channel decreased [1; 27-30].

The algae that develop in benthos are composed of epiphytes in the solid, epiphytes in mud, sand and epiphyte in the underwater part of the plant, which are groups of periphyton involved in the rotation of water. There is no sharp difference between epiphytes and benthos. Benthos algae grow well in turbid waters under channel conditions. Digestion of nutrients (nutrients) leads to an increase in photosynthesis and respiration by 30-50%. Therefore, benthic algae were found in the watersheds of the canal. Rheophilic species contaminated with various inorganic, organic compounds, blue-green, green algae of different colours have been found in the coastal areas of the canal. When the temperature of the water and air dropped, they disappeared.

In the waters of the Northern Fergana Canal are more common coastal rocks, *Ulothrix zonata, Hydrurus foetidus, Bangia atropurpurea* and especially *Cladophora glomerata C. fracta*. Taxa belonging to the families *Ulothrix, Oedogonium, Aphanothece, Hydrurus, Characium, Gomphonema, Lyngbya, Oscillatoria, Calothrix, Microcoleus, Achnanthes, Cocconeis* cone are widely distributed in body parts covered with slime [4;6;].

CONCLUSION

In our opinion, waterfalls built on the banks of the canal have special ecological conditions. When immersed in the water forms a kind of algoflor, places covered with dark brown-green diatoms. In our collected specimens, 42 species have been identified: 28 from Cyanophyta, 6 from Bacillarophyta, 7 from Chlorophyta and 1 from Rhodophyta. These include *Phormidium molle* (Gomont 1892), *Ph.tenue* (Gomont 1892), *Ph.subfuscum* (Kutziing ex Gomont 1892), *Ph.papyraceum* (Gomont ex Gomont 1892) of the family *Phormidium*, along with *Diatoma elongatum* ((Lyngbe) C.A.Agard 1824), *Gomphonema parvilium, Plactonema terebrans, P. Notatum, Lyngbya aestuarii* the most common. The above figures show that among the species belonging to Section 4, the species belonging to the Cyanophyta division were the most common and predominant. This is due to the fact that abiotic and biotic conditions for species belonging to this category have a sufficient impact.

Species belonging to the genus Rhodophyta were not widespread. This is due to the fact that the growing environment negatively affected the group members. There are differences in the morphology of algae that have evolved. Trichom twisting, changing the shape of the cells made their identification difficult. Most of the species identified in the protein had a mucous membrane structure. Thus, the development and spread of the algofluoro in the Northern Fergana Canal, an analysis of the factors influencing it, shows that the algae formed in this reservoir are influenced by many different abiotic and biotic environmental factors.

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