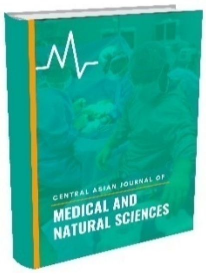

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PHYTOPLANKTON OF LAKEAYAKAGIMTA

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ABSTRACT: *This article presents the composition of phytoplankton species of the Ayakagitma lake, the development, quantity and biomass variation of phytoplankton in the lake, phytoplankton of the Ayakagitma lake has been widely used as a nutrient and provides information on the increase in fish productivity.*

Keywords: Phytoplankton, hydrobiont, heterotroph, autotroph, biomass, formalin, plankton, hygrophyte, hydrophyte, hydrophyte, planktophagus.

I. Introduction

Phytoplankton growth depends on the availability of carbon dioxide, sunlight, and nutrients. Phytoplankton, like land plants, require nutrients such as nitrate, phosphate, silicate, and calcium at various levels depending on the species. Some phytoplankton can fix nitrogen and can grow in areas where nitrate concentrations are low. They also require trace amounts of iron which limits phytoplankton growth in large areas of the ocean because iron concentrations are very low. Other factors influence phytoplankton growth rates, including water temperature and salinity, water depth, wind, and what kinds of predators are grazing on them.Lake Ayakagitma is located on the border of the northwestern Gijduvan and Shafirkan districts of Bukhara region. This lake was formed from the account of collector waters in 1985-86 years. The area of the lake is 14 thousand hectares, the maximum depth is 45 m, the average is 15-20 m, the minimum is 5-8 meters. Lake water enters the with chloride-sulphate and calcium. Water clarity is up to 10 meters in the northern part of the lake. In the Shafirkan collie, which flows into the lake, it vibrates up to 0,5-0,8 m. The lake is located in the steppe zone of the meadow. The leguminous Lake has an average nutrient base, like the lower Zarafshan lakes, that is, it is a mesotrophic Lake [1].

Biological productivity of the lake is spent on the formation of new organisms. In this regard, the importance of hydrobions is determined by its hunting importance. Depending on the practical importance of hydrobiotics in the water basin, their biological productivity is divided into primary and secondary productivity.

Primary productivity is the result of biosynthesis of organic substances from inorganic substances, that is, the result of the activity of autotrophic hydrobions. Secondary productivity is carried out in the process of transformation of existing organic substances - through heterotrophic hydrobions.

The objects that we use as hunting constitute biological resources. More precisely, biotic resources or bioresources. All this belongs to the SUVs. Bioresources are different - a sociological concept, a person's attitude to a particular plant and animal is used as a raw material. Man seeks to acquire as many biological products as possible from them by mastering natural waterfalls. As biological resources, the yield of Fish and fish is considered.

The study of tubular algae of the foot lake began in 1989 year. Seasonal (spring, summer, autumn) research work was carried out to invetigate the existing nutritional base of the lake.

I. Materials and methods.

Phytoplankton samples were collected through a special №76 digital plankton net. Samples were taken from the marked points of the lake in different seasons. The collected samples were fixed with 4% formalin, stored in a dark place for 14-15 days and detected in laboratory conditions.

Collect phytoplankton and work. It was carried out by the method proposed by Kiselev (1969). In addition to A.Andrievskaya (1982), A.Ergashev (1960, 1986), R.Sh. The methods recommended by Shoyokubov (2006) were also used.

In addition, it should be noted that the professor of Bukhara State University S.B.Buriev closely assisted in identifying phytoplankton species.

Main part

AE Ergashev (1960) studied the microscopic algae of the waters of Bukhara region, and I.A.Kiselyov (1926, 1931) studied the species he identified. THE Results of the study show that only in Bukhara basins cyanophyta-30, euglenophyta - 97, pyrophyta -11, chlorophyta - 128, bacillariophyta-198 species are listed.Also, AE Ergashev in his research lists only 365 species of phytoplankton from the ditches themselves, of which charophyta - 2, pyrrophyta - 4, euglenophyta - 12, cyanophyta - 78, chlorophyta - 112, bacillariophyta 157 species.

What Rashidov (1998) identified microscopic algae: *cyanophyta - 16, chlorophyta - 24, euglenophyta – 10, bacillariophyta - 10.*

The composition of the species phytoplankton of the foot lake is diverse.

The species composition of phytoplankton of the foot lake: *cyanophyta-37, bacillariophyta-23, pyrophyta-5, euglenophyta-8, chlorophyta-50* species.

Cyanophyta 37 Species-*Gloeocapha. tenax (Kirchn.) Hollerb, G. turgida (Kutz.) Hollerb, Gomphosphaeria aponina Kutz, G. lacustris Chod, G. f. compacta (Lemm.) Elenk, Anabaena bergii Ostenf, A. bergii f. minor (Kissel.) Kossin, A. variabilis Kutz, A. variabilis f. crassa Woronich, Nodularia spumigena Mert, Oscillatoria tenuis Ag, O. amoena (Kutz.) Gom, O. amphibia Ag, O. amphibia f. tenuis (Anissim.) Elenk, O. annae van Goor, O. angustaKoppe, O. boryana (Ag.) Bory, O. brevis (Kutz.) Gom, O. chalybea (Mert.) Gom, O. geminata (Menegh.) Gom, O. granulata Gardner, O. formosaBory, O. irrigua (Kutz.) Goin, O. limneticaLemm, O. limosa Ag, O. major Vauch,O.neglectaLemm, O. princepsVauch, O. rupicolaHansg, Spirulina. major Kutz, S. meneghinianaZanard, S. tenuissimaKutz, PhormidiumambigumGom, Ph. purpurascens (Kutz.) Gom, LyngbyalimneticaLemm, Lyngbyaaestuarii (Mert.) Leibm, L. kossinskajaeElenk.*

Bacillariophyta23 species -*Diatoma vulgare Bory, Diatoma elongatum (Lyngb), D. elongatum var. tenue (Ag.) V.H, Synedra acus kutz, S. ulna (Nitszch.) Ehr, S. berolinensis Lemm, S. capitata Ehr, S. rumpens Kutz, Navicula cryptocephala kutz, N. cari Ehr, N. cincta (Ehr.) Kutz, Amphiprora paludoza W. Sm, Amphiprora alata Kutz, Amphiprora alata var. japonica C.I, Amphora ovalis kutz, Nitzschia closterium (Ehr), Nitzschia longissima Ralfs, N. apiculata (Greg.) Grun, N. fonticole Grun, N. frustulum (Kutz.) Grun, N. microcephala Grun, N. obtusa W.Sm, Melosira ambigua (Grun.).*

Pyrrophyta 5 species-*Peridinium inconspicum Lemm, Peridinium latum Pauls, P. lomnickii Wolosz, P. pusillum (Penard), Ceratium cornutum (Ehr.).*

Euglenophyta 8 species-*Euglena acus Ehr, Euglena bucharica Kissel, Euglena oxyuris Schmarda, E, deses Ehr, E. hemichromata Skuja, E. proxima Dang, E. variabilis Klebs, E. spathirhyncha Skuja.*

Chlorophyta 50 species-*Chlorella vulgaris Beyer, Chlorelia ellipsoidea Gerneck, Chlamydomonas sphagnicola Fritsch. et Так, Oocystis submarina Lagerh, Oocystes gigas Archer, Oocystes lakustris Chod, Oocystes parva Limm, Oocystes pusilla Hansd, Oocystes salitaria Usittr, Scenedesmus acuminatus (Lagerh.) Chod, S. obliquus var. alternans Christ, S. obliquus (Turp.) Kutz, S. quadricauda (Turp.) Breb, S. quadricauda var. setosus Kirchn, S. acuminatus var. biseriatus Reinh, S. acutiformis Schroed, S. apiculatus (W. et W.) Chod, S. bijugatus (Turp.) Kutz, S. denticulatus var. austalis Playfair, Ankistrodesmus angustus Bern, A. arcuatus Korschik, A. pseudomirabilis var. spiralis Korschik, Enteromorpha intestinalis (L.) Grev, Ulothrix limnetica Lemm, U. tenerrima Kutz, Hormidium rivulare Kutz, Microspora sp, M. willeana Lagerh, M. stagnorum (Kutz.) Lagerh, Oedoganium sp, Oedogonium inconspicum kutz, Cladophara glomerata (Kutz), Closterium aciculare Fuffen, Closterium sp, Closterium dianae Ehr, C. dianae var. arcuatum (Breb.) Rabenh, Vaucheria sp, Cosmarium angulosum Breb, C. granatum Breb, C. laeve Rabenh, C. laeve var. septentrionale Wille, C. sexnotatum var. tristriatum (Lutk.) Schmid, C. vexatum West, Cosmarium sp, Mougeotia sp, Spirogyra borystheniea Kasanow et Smir, S. crassa (Kutz). Czurda, S. longata (Vauch) Czurda, Bulbochaete sp, Bulbochaete repanda Kessel.*

The number of dominant species is 39.

Cyanophyta 7 specy - *Microcystis sp., Anabeana oscillarioides, A.laxa, Oscillatoria limosa, O.plankomica, O.tenuis, Lindbia limnetica.*

Bacillariophyta10 specy - *Diatoma vulgare, D.elangatum, Synedra acus, S.ulna, Navicula cryptocephala, Amphiprora paludoza, Amphora ovflis, Cymbella parva, Nitschia closterium, N.longissima.*

Pyrrophyta2 specy - *Peridinium inconspicuum, P.latum.*

Euglenophyta3 specy - *Euglena acus, E.bucharica, E.oxyuris.*

Chlorophyta17 specy - *Chlorella vulgaris, Oocystes gigas, O.lakustris, O.parva, O.pusilla, O.solitaria, Scenodesmus acuminatus, S.abliguus, S.guadricauda, Cladophara glomerata, Closterium aciculare, Acutum sp., Spirulina major, S.punctata, S.calaspora, Oedogonium inconspicum, Bulbochaeta repanda* иборат.

It should be noted that the main part of the species or true plankton forms are located in the pelagic part of the lake. These are oocystes lakustris, synedra acus, scenodesmus abliguus, anabaena sp, diatoma vulgare.

In lake phytoplankton, chlorophyta, cyanophyta and bacillariophyta belong to the larvae in terms of species diversity.

Ayagagitma lake is qualitatively similar to the Southwestern Kyzylkum watershed in terms of phytoplankton, a similarity being the diversity of bacillariophyta and chlorophyta.The main reason for this similarity is the hydrological proximity of the waters and the similarity of their physicochemical properties. Because in all the waters of the lower Zarafshan, including Lake Ayagogitma, it is formed from the waters of ditches, rich in biogenes and strongly mineralized.

Phytoplankton is the primary and primary food chain of Ayakagitma Lake.It should be noted that taking into account the number of aquatic cells and the total amount of biomass is of great importance to determine the productivity of each contour of the lake. This is because phytoplankton, firstly, enriches the amount of dissolved oxygen in the water, and secondly, it is a source of nutrients for zooplankton, which is a filtrate, and especially for whiteflies.The productivity of phytoplankton depends on the amount of single-celled algae.Productivity, on the other hand, fluctuates throughout the year. The level of development of phytoplankton depends on many factors. So, first of all, the biogenic elements in the water, the environment (pH), the amount of phytoplankton, the turbidity of the water, the flow velocity are negatively affected by large waves.The calmer and clearer the water, the greener it will be when the temperature is 38-420C and the water temperature is 26-280C.It should be noted that in Ayakagitma Lake, like other lakes, chlorophyta and cyanophyta predominate in terms of numbers, while bacillariophyta predominates in terms of biomass.

The most common species of Bacillariophyta is the synedraacus.Plankton occurs mainly throughout April and throughout the year.Their maximum volume is 1.7-2.0 million/l in May-June, the water temperature is 18-200S. *Naisiculacryptocephala* - dominates in the summer 600-800 thousand/l, mainly common in the pelagic part of the lake.

In summer, oocysteslakustris from chlorophyta is especially abundant in June-July, which is 2.0-2.5 million / l. forms. *Anabeana from cyanophyta, lindbia occurs in larger quantities up to 150-200 thousand / l.*

The amount and biomass of Ayakagitma lake phytoplankton are seasonal and not evenly distributed throughout all parts of the lake. As a result of the study, material was collected along 3 contours (1-North-East, 2-South-West, 3-South-East) to study the phytoplankton biomass of the lake and its amount (Figure 1).

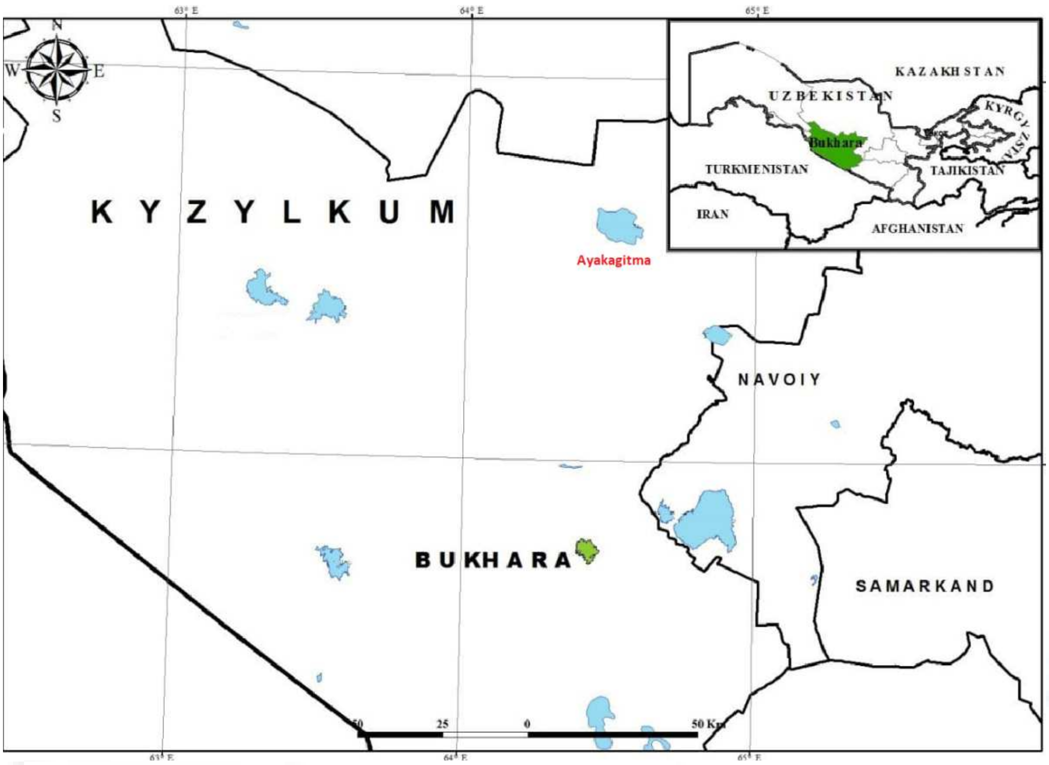

Figure-1. Ayagagitma Lake

Contour 1 The North-Eastern part of Lake Ayagagitma is characterized by the absence of hygrophytes - coastal plants and hydrophytes.30-40% of this contour is covered with gidatophytes.

Phytoplankton samples were collected 4 times during the year, according to the established direction.The composition of the phytoplankton is mainly composed of cyanophyta, bacillariophyta and chlorophyta algae, as shown in Table 1.

Table 1

Phytoplankton Quantity and Biomass ($\frac{thousand/l}{mg/m^3}$) of the Northeastern part of Lake Ayagagitma (2019)

Phytoplankton	May			July			September		
	thousand/l	Biomass mg / m^3	Grossproductivityk g / ha	thousand/l	Biomass mg / m^3	Grossproductivityk g / ha	thousand/l	Biomass mg / m^3	Grossproductivityk g / ha
Cyano-phyta	450	48,5	45,5	195	19,5	19,5	210	33,5	33,5
Bacillario-phyta	950	107,5	107,5	1,3 mln	153	153	1,1 mln	160,7	160,7
Chloro-phyta	750	25,4	25,4	1,5 mln	63,7	63,7	1,3 mln	60,2	60,2
Total	**2150**	**181,4**	**181,4**	**2995**	**236,2**	**236,2**	**2610**	**225,4**	**225,4**

In the northeastern part of the lake, bacillariophyta and chlorophyta predominate in terms of phytoplankton quantity and biomass. This means that the gross productivity will be 181.4 kg / ha in May, 236.2 kg / ha in July and 225.4 kg / ha in September.

While the average annual phytoplankton is 225.4 kg / ha, the gross productivity in the Northeastern part of the lake is 1971.5 tonnes.

Contour 2 The southwestern part of Lake Ayakagitma covers an area of 3,020 hectares. The maximum depth is 16 m, with an average of 6.8 m. The bottom of this contour is completely covered with 70-90% gidatophytes. Because the wave is strong, the water is not relatively clear. The amount and biomass of phytoplankton are shown in Table 2. In May, cyanophyta 540 thousand/l biomass 53.7 mg / m3, bacillariophyta 348 thousand/l biomass 45.3 mg/m^3, and chlorophyta 721 thousand/l biomass 28.3 mg/m^3 further decreased in September.190 thousand/l - biomass - 18.4 mg/m^3. Bacillariophyta are numerous in summer and early autumn - a total number of 1.6-1.2 million / l - biomass 104.5-78.3 mg / m^3, the highest value in July belongs to chlorophyta 2.2 million / l - biomass is 72.2 mg / m^3.In the south-western part, the total productivity of phytoplankton is 1.6 million / l - biomass - 126.8 kg / ha, in July - 2.0 million / l, biomass - 205.7 kg / ha and in September - 2.8 million / l , biomass - 11.0 kg / ha. The average annual biomass is 157.8 kg / ha. The phytoplankton in the south-western part of the lake is 476.5 tons.

Table 2

Quantity and biomass ($\frac{thousand / l}{mg / m^3}$)of phytoplankton in the south-western part of Lake Ayagagitma for 2019

Phytoplankton species	May		Grossproductivity kg / ha	July		Grossproductivity kg / ha	September		Grossproductivity kg / ha
	thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3	
Cyanophyta	540	53,7	53,7	243	253	28,0	190,5	18,4	18
Bacillariophyta	38	45,3	45,3	1,6 mln	104,5	10,5	1,2 mln	98,3	98,3
Chlorophyta	721	27,8	27,8	2,2 mln	72,2	72,2	650	24,7	24,7
Total	**1609**	**126,8**	**126,8**	**4043**	**205**	**205,7**	**2840,5**	**141,4**	**141**

Contour 3 Southeastern part of Lake Ayagagitma, area 2480 hectares, starting from the place of inflow to the lake, maximum depth 12-14 meters, average 5-6 meters.The bottom of the south-eastern part is covered with gidatophytes. The amount and biomass of phytoplankton of this part are shown in Table 3.The phytoplankton of this part is less than that of parts 1 and 2.

Also in May they were as follows: 567 thousand / l biomass 53.5 mg / m3 or 53.5 kg / ha, in June 708 thousand / l biomass 66.5 mg / m3 or 66.5 kg / ha, in September 628 thousand / l - biomass - 57.3 mg / m3 or 57.5 kg / ha. The average annual biomass was 59.1 kg / ha. The total productivity of phytoplankton in the south-eastern part of the lake was 146.6 tons.

Table 3

Phytoplankton content and biomass ($\frac{thousand / l}{mg / m^3}$)of the South-Eastern part of Lake Ayagagitma for the seasons of 2019:

Phytoplankton species	May		Grossproductivitykg / ha	July		Grossproductivitykg / ha	September		Grossproductivitykg / ha
	thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3	
Cyanophyta	180	12,5	12,5	138	8,5	8,5	128	8,0	8,0
Bacillariophyta	157	25,7	25,7	370	44,3	44,3	350	40,	40,0

Chlorophyta	230	15,3	15,3	200	13,7	13,7	150	9,3	9,3
Total	**567**	**53,5**	**53,5**	**708**	**66,5**	**66,5**	**628**	**57,3**	**57,3**

Information on the total amount and biomass of Ayakagitma Lake phytoplankton is presented in Table 4.

Table 4

Total amount and biomass of phytoplankton in the foot lake

($\frac{thousand\,/\,l}{mg\,/\,m^3}$)for the seasons of 2019

Contours	May		Grossproductivitykg / ha	July		Grossproductivitykg / ha	September		Grossproductivitykg / ha
	thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3		thousand/l	Biomass mg / m^3	
Northeast	2150 млн	181,0	181,0	2995	236,2	236,2	2610	225,4	225,4
Southwest	1609	126,8	126,8	4043	205,0	205,0	2840	141,4	141,
Southeast	567	53,5	53,5	708	66,5	66,5	628	57,3	57,3

From Table 4 above, it is clear that the Northeast has a high productivity of 225 kg / ha, while the South-West has a productivity of 141.4 kg / ha and the South-East has a productivity of 57.3 kg / ha.

The phytoplankton of Lake Ayakagitma consumes white larvae - hypophathalmichthusmolitrix (valenciennus) fish from larvae to the end of its life as food.The total productivity of phytoplankton on the lake is 2073.7 tons. As far as we know, 50% of phytoplankton products are consumed by fish.

2073.7 tons: 2 = 1036.8 tons.

The nutritional coefficient of Hypophathalmichthusmolitrix (valenciennus) is 40.

1036.6 tons: 40 = 25921 kg of fish products.

For the judicious use of phytoplankton organisms in the Northeastern part of the lake, it is recommended to fish with 25921 ekz hypophathalmichthusmolitrix (valenciennus) trout to bring the average hypophathalmichthusmolitrix (valenciennus) to 1 kg.

25921 copies: 9200 ga = 3.0 ekz / ha.

The biomass of phytoplankton in the south-western part of the lake is 157.8 kg / ha, the total productivity is 476.5 tons: 2 = 238.25 tons.

238.25 tons: 40 = 5956.2 kg.

5956.2: 3020 = 2 ekz / ha

Phytoplankton of the south-western part can produce 5956.2 kg of fish products.To do this, it was recommended to fish with hypophathalmichthusmolitrix (valenciennus) fish with an average fish weight of 1 kg, 6000 copies, weighing 60-70 g.

The south-eastern part of the lake has a phytoplankton biomass of 59.1 kg / ha and a gross yield of 146.6 tons.

146.6 tons: 2 = 73300kg

73300 kg: 40 = 1832.5 kg of fish product

To do this, it was recommended to fish with 1832.5 ekz of hypophathalmichthus molitrix (valenciennus) fishing.

25921 ekz on the North-Eastern part of the lake

6,000 ekz on the southwest side of the lake

1832.5 ekz on the South-Eastern part of the lake

Conclusion

In order to take advantage of the total Ayagagitma Lake phytoplankton productivity, it was recommended to fish with 33753 ecz hypophathalmichthus molitrix (valenciennus) fishing weighing 60-70 g.

References:

1. Shamsiev N.A. Oyoqog'itma ko'li kadastri va ixtoofaunasi. "O'zbekiston mustaqilligiuningfanivatexnologiyalarinirivojlantirish kafolat" uchunchi respublika ilmiy anjumani. Tashkent.1999, 62-65 pp.
2. Shoyoqubov R.Sh. Oq amur baliqlarini hovuzlarga tig'iz o'tkazish hisobiga hovuzlar hosildorligini oshirish bo'yicha uslubiy qo'llanma. Tashkent 2006 yil. 4-14 pp.
3. Rashidov N.E. Buxoro viloyati kollektorlar suvi tarkibidagi tuban suv o'tlarning turlarini aniqlash. O'zbekiston biologiya jurnali-1998. №26, 57-59 pp.
4. Kiselev I.A. 1930. Plankton pruda (xauza) "Nau". Staroy Buxari, yego sostav i periodichnost v svyazi s izmeneniyami fiziko-ximicheskix usloviyvodnoy sredi, Tr. Uzb. In-ta trop, medisini, vip. I, № 1.
5. Kiselev I.A. 1931. Opit gidrobiologicheskoy xarakteristiki tipovix vodoemov Sredney Azii, Tr. SAGU, seriya XPa, № 9, 10, 11.
6. Kiselev I.L. Plankton morey i kontinental'nix vodoyomov. T. I. Izd-vo "Nauka". Leningrad.1969. 265-310 pp.
7. Andrievskaya S.A. Kayrakkumskoe vodoxranilisha. Izd-vo "Donish". Dushanbe-1982. 76-109 pp.
8. Ergashev A.E. O rastitel'nosti kollektornoy seti Buxarskoy oblasti,Uzb. biol. jurnal, № 3. 1960.
9. Ergashev A.E. Kulturnie i dikorastushie rasteniya Buxarskogo oazisa. Tashkent. 1986. 67-70 pp.
10. Shamsiyev N. A. et al. Morpho-Ecological Features Of Pikeperch (StizostedionLucioperca) In Lakes Of Ayakagytma In Uzbekistan //Turkish Journal of Computer and Mathematics Education (TURCOMAT). – 2021. – T. 12. – №. 11. – С. 3471-3478.
11. Amonovich S. N. et al. Phytoplankton of Ayakagimta Lake //International Engineering Journal For Research & Development. – 2020. – T. 5. – №. 4. – С. 3-3.
12. Khodjayeva Z. F., Shamsiyev N. A. Lake Devkhona is as hydrobiological object.
13. Baxshullayevich, TokhirovBaxtiyor, AlimovaLuizaKhalilovna, and Khudoiberdieva Sabina Alisherovna."Practical value of microscopic algae in the farming sector." *Вопросынаукииобразования* 10 (22) (2018).
14. Tokhirov, Bakhtiyor Bakhshilloyevich. "PRACTICAL IMPORTANCE OF PURE CHLORELLA FOR FISHERIES." Scientist of the XXI century 1-1 (2017).

15. Shamsiev NA, Tokhirov BB, Bakhshullaeva GV Breeding conditions of some commercial fish species of Lake Ayakagitma // Scientist of the XXI century. - 2016. - No. 5-1.
16. Shamsiev NA, Tokhirov BB, Bakhshullaeva GV Breeding conditions of some commercial fish species of Lake Ayakagitma // Scientist of the XXI century. - 2016. - No. 5-1.
17. Shamsiev N. A., Safarova Z. T., Saidova M. S. Inventory of Natural Lakes of the South-Western Kizilkum and POSSIBILITIES OF THEIR USE IN FISHERIES // SCIENTIST OF THE XXI CENTURY. - S. 13.