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# NATURAL NUTRIENT CONTENT OF KUMSULTAN LAKE

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**Annotation.**This article provides information on what makes up the nutrient content of Kumsultan Lake and determining the biomass of aquatic plants,zooplankton and phytoplankton.

**Keywords.** Phytoplankton, zooplankton,zoobenthos,fish larvae and fry,planktophagous,bacterio-plankton.

**Annatatsiya.**Ushbu maqolada Qumsulton ko'lining ozuqa tarkibini nimalar tashkil qilishi va yuksak suv o'simliklari,zooplankton ,fitoplanktonlarning biomassani aniqlash to'g'risiga ma'lumot keltirilgan.

**Kalit so'zlar.** fitoplankton, zooplankton, zoobentos , baliq lichinka va chavoqlar, planktofag, bakterio-planktonlar.

**Аннотация.** В данной статье представлена информация о том, из чего состоит питательный состав озера Кумсултан и определяется биомасса водных растений, зоопланктона и фитопланктона.

**Ключевые слова.** фитопланктон, зоопланктон, зообентос, личинки и личинки рыб, планктофаги, бактериопланктоны.

**Enter.**Nowadays,the need for food products is increasing day by day.The fact that the average demand for fish products per person in our republic is very small means that it is necessary to study the natural nutrient content of natural lakes and use it to the maximum extent for growing fish fry.

Although artificial feed,such as kunjara feed mixtures,has a positive effect on growth and deve lopment of fish,it cannot completely replace natural feed.Firstly,they are the unchanging monotony of their composition,and secondly,the nutritional ratio is not completely balanced[2].

In order to increase the productivity of natural water bodies,it is notes in the regulations on the standards and technology of fish breeding in them that,taking into account the biological characteristics of natural water bodies in the Republic of Uzbekistan,the required amount of herbivorous cypress and white do increasing the productivity of the water basin is achieved by transplanting the species of fish and multiplying them effectively [3].

There are many natural water bodies located in Bukhara region,one of them is Kumsultan lake.It is formed from the water of the agricultural fields flowing from the Qarovulbazar district and the seepage water from the southern tributaries of the Khadicha and Dengiz lakes.This reservoir is located on the borders of Bukhara,Jondor and Olot districts of Bukhara region has been the total area is 7200 hectares,and 3800 hectares are water.Based on the Law of the Republic of Uzbekistan of May 7,1993 ,Decision No.384 "On Granting the Status of a State Reserve to Kumsultan Lake", on October 25, 2010 ,the Jondor district administration issued a decree "Protected natural areas " [1].

Since Kumsultan Lake was formed due to agricultural water in the widow of the water source,a large amount of biogenic substances is natural.Because the mineral fertilizers given to the irrigated plant are not fully absorbed and flow into the lake through the ditch waters.South-

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Western Kyzylkum water bodies (Devkhana ,Khadicha,Zikri) are similar to the water content of Kumsultan Lake[4-7].

In the spring of the year, biogenic substances amount in collector water was 3.7-4.2 mg/l.Phosphorus compounds in the lake are very high,1.4-1.7 mg/l,and this indicator was observed in the amount of 2.3 g/l in ditchs,and 2.8 mg/l in summer[1].The amount of biogens in this lake affects the dynamics of the number and biomass of phytoplankton[8].

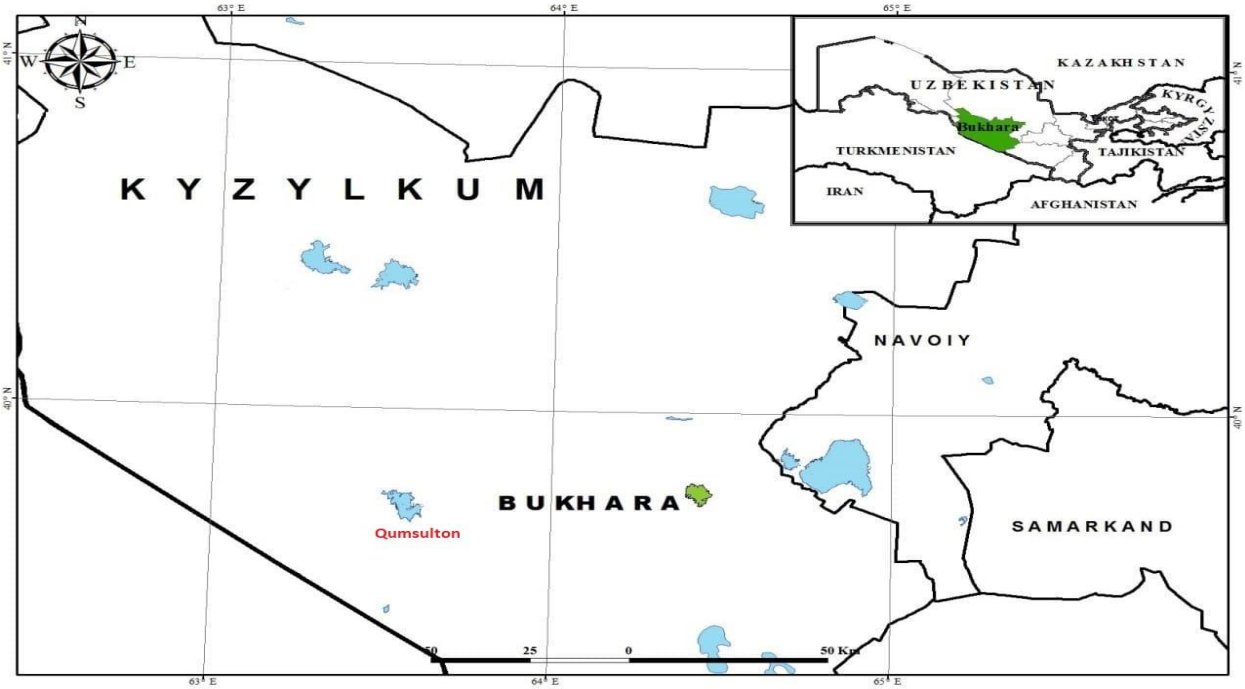


Figure 1.Map of Kumsultan Lake[1].

A small number of scientific works have been carried out within the study of the natural feed biomass of Kumsultan Lake.By studying the composition of species of organisms that make up the biomass and the process of their reproduction,we can achieve high productivity of fishing in the lake [10].

Zooplankton,phytoplankton and zoobenthos produce high biomass in early spring in Kumsultan Lake.

**Material and methods.**During 2023,ichthyological and hygrobiological observations were carried out in the lake.In the study of high-water plants of the lake,the flora of the littoral body was visually used,plant samples were harvested from 10-15 biotopes with a sickle to determine the phytomass,vegetation was counted by the standard geobotanical method.Several samples were taken to perform qualitative and quantitative analysis of phytoplankton.Phytoplankton samples from 3-4 stations of the lake,zooplankton and zoobenthos samples were collected at the same time and analyzed in biotechnology and ecology laboratories.The primary productivity of phytoplankton of Kumsultan lake was determined[9].It takes into account the daily change of oxygen.

Zooplankton sample were also collected from the places where the phytoplankton sample were collected.Zooplankton samples consist of 1)quantitative samples and 2)qualitative samples.A bogorova plankton net is mainly used to collect quantitative samples.If the reservoir is shallow,then a 1-liter mug or a 10-liter bucket can be used.But in large lakes Djeddi type is often used.The entrance of the Djeddi type is 18 sm,its surface is 25 sm.Djeddi type is mainly made

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Djeddi type is handled as follows. For example, the water depth is 3.2 m; 25 cm2x 3.2 meters=0.08lx10=0.8l. If the specified depth is taken as 100, then 100: 0.8 l=12.5 is the coefficient for determining the number of zooplankton.

The obtained result is the number of any hydrobiont in 1 m3: cyclopssicinus 1500 x12.5 (coeff)=18750 hundred/m3 in the same way the number of zooplankton was determined. When counting zooplankton, a stamp-pipette-0.05 cm3, a Bogorov camera. Here, too, it is close to counting phytoplankton. In this case, the collected sample is filtered and its collected zooplankton is collected in a glass. It is collected in a special container. A sample of 0.05 $cm^3$ is taken from this container. It is necessary to know how much it will be; 1 ml:0.05 $cm^3$=20 ml is poured into the Bogorov chamber and counted. There is now an accurate source for determining zooplankton biomass[11].

Tools such as dredge, Peterson dnocherpateli, Ekman dnocherpateli are used to collect zoobenthos samples. The mud-receiving surface of Peterson dnocherpatel D/Ch is placed in a tub of 1/40 $m^2$ or 45x35 cm and washed and filtered through a cloth. The amount left in the bag is taken and put in a vial. The label is immediately attached and fixed with 4% formalin.

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Together with dnocherpatel, zoobenthos organisms are counted in the Bogoryoov chamber. The resulting number is determined by the number of organisms in 0.025 $m^2$. If the sample is taken 3 times with dnocherpatel, then the number of animals per 0.075 $m^2$ is derived. For example, 28 animals were detected in 0.025 $m^2$. This number should be multiplied by 1 $m^2$: 28 units x 40 = 1120 units/$m^2$.

**Results.** The upper water plants of the lake are distributed as follows. 1. hygrophytes-27.2%, hydrophytes-9.0% and hydratophytes-63.6%.

**Kumsultan lake is a type index of higher aquatic plants**

2-jadval

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| /p | Family | Species | Ecological groups | Life is continuity | Propagation property |
|---|---|---|---|---|---|
| | Characeae | Chara fragile desis<br>Ch.vulgaris S | Gidatofit<br>Gidatofit | Perennial | Rarely in running water |
| | Typhaceae | Typha latifolid S<br>T.laxmani speech<br>T.angustifolid S<br>T.minima Fune | Hygrophyte<br>Hygrophyte<br>Hygrophyte<br>Hygrophyte | Perennial<br>Perennial<br>Perennial<br>Perennial | Often forms a thicket rarely |
| | Potamogeto aceae | Potamogeton pentinatus<br>P.crispus S<br>P.jucens S | Hygrophyte<br>Hygrophyte<br>Hygrophyte | Perennial<br>Perennial<br>Perennial | It grows like grass |
| | Butomuceae | Butomus umbellatus S | Hygrophyte | Perennial | Rarely<br>One by one |
| | Phragmitetae | Phragmites communis | Hygrophyte | Perennial | It is found in large areas |
| | Scyrpusidae | Scurpus sp | Hygrophyte | Perennial | Rare |

Reed (Phragroites communis) gives 10-12 kg of biomass per 1/ $m^2$, its gross productivity is 100-120 t/ha, while lux (Typha angustifolia) produces 8-10 $m^2$ or 80-100 t/ha of green mass. . Among aquatic plants, rdest (Potamogeton crispus) produces 6-8 kg/$m^2$ or 60-80 t/ha, and sedge 5-6 kg/$m^2$ or 50-60 t/ha. The favorable conditions of Kumsultan lake for such development of aquatic plants are mainly due to the fact that the water is extremely rich in substances.

Identification and counting of zooplankton organisms is carried out by a specialist. The number of dominant zooplankton is determined and its mass is determined. The number is indicated by 1 $m^3$ units/$m^2$ and biomass (g, $m^3$). The calculation is made using the following formula.

$$x = \frac{AxVx100x1000}{N \times p}$$

where x is the number of zooplankton, A is the number of zooplankton organisms in 1/ml of water. V is the volume of the sample, N is the amount of millimeters, p is the amount of filtered water, 1000 is the calculation coefficient.

For example, 120 brachionus colovrats were counted in 1 ml of water. The volume of filtered water is 100 l. So, after 100 l of water has been passed through the sieve, we will find out how many brachionus are in 1 $m^3$ of water using the formula.

$$x = \frac{120 \text{ pcs/m3} \times 100 \text{ l} \times 1000}{} = \frac{12\,000\,000}{} = 120\,000 \text{ pcs/m}^3$$

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1 x 100 100

According to the literature, the mass of brachionus is 0.0005 mg, which means 120,000 units/m3 x 0.0005 mg = 60 mg/ m3.

A sample of zooplankton was collected by filtering 100 liters of water with a plankton sieve (Djedi type) or with a cloth from several places (up to 3-5) of ponds where zooplankton and phytoplankton are fed, or fish (segoletka) are fed and commercial fish are fed. Zooplankton types are shown in Table 1. Calculation is done in 1 m, then the gross biomass is determined in relation to the volume of pond water. 3.5g/m3 biomass was determined in each/m3 water of the zooplankton sampling site. The sampled area of the lake is 10 ha (100 thousand/ m3), the average depth is 1.6 m.

100 000 m2 x1,6 m = 160 000 m3

160 000 m3 x 3,5 g/ m3 = 560 000 g or 560 kg

So, zooplankton biomass in 10 hectares of the lake is 560 kg. Composition of natural nutrients in the diet of Kumsultan lake fish larvae and fry.

Table 1

| Zooplankton | Ratatoriya-kolovratkas | Cladocera-Horned mustaches | Copepoda- copepods |
|---|---|---|---|
| Brachionus ruadridentatus | | + | |
| Brachionus usseus (linne) | | + | |
| Brachionus calcyciflorus Ahlson | | + | |
| Brachionus nilsoni Ahlsron1-jadval | | + | |
| Oeratella quadrata O.F.M | | + | |
| O.Vulda (Mull) | | + | |
| Notholca acuminate Ehrenberg | | + | |
| Testudinella patina Hermann | | + | |
| Asplanohna priodonta Gosse | + | | |
| Stcane nana Merrai | + | | |
| Lecan luna Muller | + | | |
| Lecane bulla Gosse | + | | |
| Lepadella patella Muller | + | | |
| Brachionus angularis Pallas | + | | |
| Keratella qudrata (Muller) | + | | |
| Keratella cochleares (Gosse) | + | | |
| Notholca acuminate Ehren | + | | |

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| | | | |
|---|---|---|---|
| Filina longiseta (Ehren) | | | + |
| Trichocerca longiseta (Sehran) | | | + |
| Diaphanosoma brach sieving | | | + |
| Daphnia Longispina O.F.M. | | | + |
| Daphnia pulex De Geer | + | | + |
| Simocephalus vetulus O.F.Mull | | | + |
| **Zoobenthos** | **Chironomyl larvae** | **Insect larvae** | **Nektobenthos** |
| Chironomus plumosus | + | | |
| Ch.thumi | + | | |
| Ch.reductus | + | | |
| Cryptochironomus Conjgens | + | | |
| Limnochironomus neriso sus | + | | |
| Tanytarsus mancus | + | | |
| Odonata (Dragonflies) | | + | |
| Plecoptera | | + | |
| Hemiptera water channels | | + | |
| Trichoptera Buloqchilar | | + | |
| Colioptera water beetles | | + | |
| Ostrocoda | | | + |
| Mysidacea mizids | | | + |
| Gammaridae Gammaridlar krivetkas | | | + |

To determine the biomass of zoobenthos organisms, 8 animal larvae are measured on a torsion scale. The resulting number is divided by 28 and the weight of each larva is determined. For example, 28 larvae equals 10.5 mg.

28 pieces: 10.5 mg = 0.8 mg

1120 x 0.8 mg = 896 mg/m2.

10,000 $mm^2$ x 1 g/m $m^2$ =10 kg/ha.

Seasonal biomass of dominant zooplankton species in Kumsultan Lake is mg/m3.

Table -7

| **T/r** | **Zooplankton species** | **Seasons** | | | |
|---|---|---|---|---|---|
| | | **Spring** | **Summer** | **Autumn** | **Total** |

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| | | | | | |
|---|---|---|---|---|---|
| 1 | Daphnia longispina | 15,3 | 10,1 | 5,3 | 30,7 |
| 2 | Daphnia pulex | 28,5 | 20,1 | 8,2 | 56,8 |
| 3 | Ceriodaphnia reticulata. | 10,8 | 29,1 | 13,4 | 53,3 |
| 4 | Diaphanosoma brachunrum | 5,8 | 14,7 | 10,3 | 30,8 |
| 5 | Moina vseberi | 17,4 | 39,2 | 14,8 | 71,4 |
| 6 | Mesocuclops ceucharti | 40,0 | 50,5 | 24,2 | 114,8 |
| 7 | Arctodiaptomus salinus | 150,9 | 250,6 | 40,5 | 442,0 |
| 8 | Mesocuclops crassus | 23,0 | 39,3 | 28,7 | 91,0 |
| 9 | Nauplii | 25,7 | 41,4 | 33,4 | 100,5 |
| 10 | Brachionus quadridentatus | 10,5 | 13,7 | 8,7 | 32.6 |
| | The main dominant zooplankton total biomass | 327,9 | 508,7 | 187,2 | 1023,8 |

The above table shows that the biomass of zooplankton is high in the spring months. Arctodiaptomus salinus is dominant among species. Among phytoplankton organisms, diatoms and blue-green algae are dominant. In the open areas of the lake, the number of cells is 100-300 thousand/hoj/l. Biomass is 200-350 mg/m3, when the number of plankton is 50-100 thousand huj/l, biomass is 65-90 mg/m3. During the summer, the average number of cells is as follows: blue-green algae -1.03-1.4 million xuj/l bimass- 0.5-0.8 r/m3 diatom algae -1 ,3-1.5 mln.huj/l-biomass-1.3-1.5 g/m3, green algae - 1.03-1.9 mln.huj/l, biomass 0.2-0 ,3 g/m3. The maximum number of cells belongs to diatoms and blue-green algae.

**Discussion**. The lake's water remains for a long time, it is formed at the expense of waste water used in agriculture, and its chemical composition is the main reason for its richness in minerals. At the same time, it is necessary to take into account the hydrobiological characteristics and seasonal changes of water temperature when fishing the reservoir with fish fry.

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