Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

DYNAMIC CHANGES IN THE BIODIVERSITY OF ALGAE IN BIOPONDS OF THE TREATMENT FACILITIES OF BUKHARA

Мустафаева Мамлакат Исмаловна
доцент Бухарского медицинского института, Узбекистан
mamlakatm@mail.ru, mamlakatmustafayeva@bsmi.uz

Abstract
To understand the dynamics of phytoplankton, it is necessary to have a clear understanding of the seasonal periodicity and distribution of populations of mass algal species. Mass dominants include dominants that give a large amount and abundance of phytoplankton in a particular period. The composition of the dominant algae species in water bodies of different types located in different regions is not constant, it changes with changes in environmental factors such as temperature, sunlight, nutrients, water salinity, transparency, hydrogen ions (pH), gas content and others.

Introduction

Analysis of the seasonal dynamics of algae makes it possible to identify how stable the nature of the predominant algae species is. Consequently, the nature of the distribution of the dominant species of algae in the water body largely depends on the composition and intensity of phytoplankton development.

In the works of a number of authors (Muzafarov, Muzaffarov, Musaev, Mambetalieva, Ergashev, Kogan, Saxe, Khalilov, Abdukadyrov, Khabibullaev, Tazhiev, Temirov and others) an analysis of the prevailing algae and the studied water bodies was carried out. Let's consider the data of Uzbek and Central Asian researchers who studied rivers, streams, ponds, lakes, reservoirs and others, a scientific analysis of the development and distribution of algae was carried out. These authors indicate that the main role for the development and distribution of algae belongs to temperature, light, nutrients and minerals, water transparency, and others.

The composition of the dominant algae of the biological ponds of the treatment facilities varies seasonally as follows. In spring, 14 taxa are dominant, as in

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

spring, the dominant algae are blue-green algae. In summer, 18 species and varieties turned out to be predominant algae of biological poods of treatment facilities. These predominant algae include blue-green-8, diatoms-2, euglenaceae-2, green-6.

Большинство эти преобладающие водоросли являются доминантам весной, так например, Microcystis aeruginosa, M.pulverea, Aphanothece clathrata, Oscillatoria irrigua, O.brevis, O.lemmermanii, O.woronichinii, Nodularia spunigena из синезеленных водорослей; Nautococcis grandis, Palmellocystis planctonica, Oocystis marssonii, O.lacustris, Scenedesmus quadricauda, Ankistrodesmus acicularis из зеленных; Cyclotella kuetzingiana, Nitzschia hungarica из диатомовых; Euglena acus, E.oxyuris из эвгленовых водорослей. Along with them, Aphanothece clathrata f. brevis, Nodularia harveana f. sphaerocarpa of blue-green plants are often found in the summer; Chaetopeltis orbicularis, Chlamydmonas globosa, Ch.simplex, Coelastrum microporum, Scenedesmus obliquus, S, obliquus var. alternans of green; Melosira varians, Synedra ulna, Cocconeis placentula, Nitschia linearis of diatomaceae; the species Nitzschia linearis was dominant in the spring, but in the summer this species is often noted.

Euglena caudata, E. caudata var. minor bucharica, E. acus, E. oxyuris and others. In summer, the leading role belonged to bluesel and green algae. Along with them, representatives of euglenic, diatom and dinophyte algae have become common.

In autumn, the dominants include -12 taxa, of which the largest number are representatives of diatoms, such as Synedra ulna, Nitzshia hungarica, N. linearis, Navicula cryptocephala. After that, blue-green algae, Microcystis aeruginosa, Oscillatoria irrigua, O.brevis, Phoromidium fovetlar, from green algae in this period were dominated by Palmellocystis planctonica, Coelastrum microporum, Scenedesmus guadricauda.

Here, the leading position is occupied by diatoms and blue-green algae. Blue-green and green algae dominated in early autumn, after the second half of October, diatoms occupied a dominant position. Representatives of euglenic and dinophyte algae are rarely observed in the autumn period, it was not predominant. The winter period was not dominant; some representatives of diatoms and green algae were quite rare.

It should be noted that most of these predominant algae of biological ponds of the treatment facilities of Bukhara city somewhat coincide with the dominant algae

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

of the Kalgan Chirchik fish ponds of the Tashkent region (Saxen, 1965), the ponds of the collective farm named after Sabir Rakhimov of the Denau district of the Surkhandara region, the ponds of the Yakkabag district of the Kashkadarya region, the ponds of the fish farm of the Akkurgan district of the Tashkent region (Ergashev, 1974), the algoflora of the bioponds of the city of Shymkent of the Republic of Kazakhstan (Tazhiev) algae, biological ponds, industrial effluents of the Chirchik Production Association "Electrokhimprom" (Abdukadyrov, 1989), etc.

Let us briefly characterize the dominant algae found in the biological ponds of the treatment facilities of Bukhara.

1.Microcystis aeruginosa Kuetz

Emend. Elenk blue-green algae is a widespread species dominant in mid-spring, summer and early autumn in plankton in all ponds. Vegetation of this species begins at a water temperature of 21-31 ºC, thermophilic in spring the number is 860 thousand cl/l, in summer 1860 thousand cl/l. In early spring, late autumn and winter, this species will not be registered at a water temperature of 0 ºC -12-14 ºC.

2.Microcystis pulverea (Wood) Fortti

Emend Elenk. blue-green algae, vegetation in all ponds begins in spring, summer and early autumn. The thermophilic species of the population reaches mass development at a water temperature of 23-30 ºC, in spring it is 810 thousand cells/l, in summer 1100 thousand cells/l, in autumn 620 thousand cells/l.

3. Aphanothece clathrata Wet G.S. West

Blue-green algae. Recorded very often in late spring, summer and autumn at a water temperature of 23-31ºC. Thermophilic species, the number of abundance in spring in all ponds is 980 thousand cells/l, in summer 1250 thousand cells/l, in autumn 970 thousand cells/l. In early spring and late autumn at a water temperature of 12-16ºC, it is very rare. In winter, it stopped happening.

4.Nodularia spumigena Nert

Blue-green algae develop abundantly in summer at a water temperature of 26-30 ºC. Heat-loving species. The number in all ponds reaches 910-980 thousand cells/l. This species was not found in other seasons of the year.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

5. Oscillatoria brevis Kuetz

Blue-green algae are found in all seasons of the year. They are abundant in spring, summer and autumn at a water temperature of 18-28 ºC. The number in spring turned out to be 716 thousand cells/l, in summer 820 thousand cells/l, in autumn 780 thousand cells/l. In late autumn and winter, this species is very rare at a water temperature of 8-2 ºC.

6. Irrigation oscillation (Kuetz) Gom

Blue-green algae appear in plankton in early spring at 10-16 ºC and give an outbreak of mass development in mid-spring, summer and early autumn at a water temperature of 18-26 ºC. The number in spring in all ponds is 620 thousand cells/l, in summer 810 thousand cells/l, in autumn 715 thousand cells/l.

7. Oscillatoria lemmermannii Wolosz

Blue-green algae are widespread. It occurs in all seasons of the year, but it is very common in spring and summer at a water temperature of 18-27 ºC. The number in spring was 810 thousand cells/l, in summer 1.080 thousand cells/l.

8. Oscillatoria woronichinii Anissim

Blue-green algae are widespread. The species was found during the year at a water temperature of 4-26 ºC. It develops abundantly in spring, summer and autumn at a water temperature of 18-26 ºC. In spring, the number in all ponds is 580-720 thousand cells/l.

9. Nautococeus grandis Korsch

Heat-loving green algae are found in late spring, summer and early autumn at a water temperature of 20-27ºC. In spring, the number is 580 thousand cells/l, in summer 815 thousand cells/l.

10. Palmellocystis planctonica Korsch

Green algae are a widespread species. It vegetates at a water temperature of 12-30 ºC. Maximum development is observed in spring, summer and autumn at a water temperature of 18-30 ºC. In spring, the number is 720 thousand cells/l, in summer 980 thousand cells/l, in early autumn 680 cells/l.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

11. Oocystis marssonii Lemm

Green algae are widespread. The heat-loving species occurs at a water temperature of 16-31 ºC. Mass development occurs in the middle of summer at a water temperature of 25-31 ºC. In summer, the number in all ponds is 990 thousand cells/l. In early spring, late autumn and winter at a water temperature of 2-10ºC, development stops.

12. Oocystis lacustris Chod

Green algae are a heat-loving species. The maximum development is also confined to the period of the greatest warming of the water in summer at a water temperature of 24-30 ºC. The number in summer in all ponds is 960 thousand cells/l.

13. Coelastrum microporum Naeg

Green algae are a heat-loving species. It occurs in spring, summer and autumn, the maximum development is observed in early autumn at a water temperature of 20-24ºC. The population is 480 thousand cells/l. In spring and summer, it is found quite often. In early spring, late autumn and winter, the species has completely ceased to be found.

14. Scenedesmus guadricauda (Turp) Breb

Green algae are a widespread species. It occurs in all seasons of the year at a water temperature of 6-26 ºC. The maximum development is given in spring, summer and autumn at a water temperature of 18-26ºC. In spring, the number in all ponds turned out to be 760 thousand cl/l, in summer 810 thousand cl/l, in autumn 860 thousand cl/l.

15. Ankistrodesmus acicularis (A. Br) Korsch

Green algae, a heat-loving species. It will be registered in spring, summer, autumn. It reached its maximum development in summer at a water temperature of 24-30 ºC. The number seemed to be 860 thousand cells/l.

16. Euglena acus Ehr

Euglenic algae are found in summer and autumn. It gives maximum development in summer at a water temperature of 24-26 ºC. The number is 580 thousand cells/l.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

17. Euglena oxyuris Schmarda

Euglenic algae are recorded in summer and autumn, reaching the maximum number in summer of 480 thousand cells/l at a water temperature of 24-26ºC. In spring and winter, it was not found.

18. Navicula cryptocephala Kuetz

Diatoms are found in spring, summer and autumn at a water temperature of 14-24ºC. The maximum vegetation index gives in autumn at a water temperature of 20-24ºC. The number is 620 thousand cells/l.

19. Nitzschia hungarica Grun

Diatoms are found year-round in all ponds at water temperatures of 0-4 ºC to 27ºC. It gives the greatest development in spring, summer and autumn at a water temperature of 18-27ºC. The number in spring turned out to be 880 thousand cells/l, in summer 950 thousand cells/l.

20. Nitzshia linearis W. Sm.

Diatoms are found throughout the year at a water temperature of 26-27ºC.
The maximum development is observed in spring, summer and autumn at a water temperature of 18-27ºC. The number in spring in all ponds is 680 thousand cl/l, in summer 790 thousand cl/l, in autumn 810 thousand cl/l.
In winter, it is rare.

21. Nitzshia lorenziana Grun

Diatoms are found in all seasons of the year at a water temperature of 4-25ºC. The maximum development gives in autumn at a water temperature of 22 º C, the number in autumn is 660 thousand cells / l.
Based on the above, the following conclusions can be drawn;
1. In the biological ponds of the treatment facilities, 21 dominant species are noted, of which most belong to blue-green 8 species, then green 7, diatoms 4, euglenic 2 species.
2. The main factors favoring the development of predominant species in the biological ponds of treatment facilities are water and air temperature, mineralization, nutrients, transparency and other environmental factors.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6964

3. In the composition of the dominant species of algae, there is not a single one that would dominate in all seasons of the year, however, most of the dominant species are recorded in spring, summer and autumn.
4. Most of the predominant species of biological ponds of treatment facilities are similar to the flora of other ponds in Uzbekistan.

REFERENCES

1. Vasser S.P., Kondratiev N.V. et al. Algae. Reference book.- Kiev: Naukova Dumka, 1989. - 608 p. [Wasser S.P., Kondratyev N.V. and others. Algae. Reference book. - Kiev: Naukova Dumka, 1989. - 608 p.]
1. Mustafaeva M.I., Gafarova S.M. Eco-floristic characteristics of algae of biological ponds of treatment facilities // Scientist of the XXI century. Scientific journal. – Moscow. – 2016.– No 5-4. – P. 15-18. [Mustafaeva M.I., Gafarova S.M. Eco-floristic characteristics of algae in biological ponds of treatment facilities // Scientist of the XXI century. Science Magazine. - Moscow. - 2016.– №. 5-4. - P. 15-18.]
2. Gorbunova N.P. Algology: Ucheb. posobie dlya vuzov po spets. "Botany". Moscow: Vyssh. Shk., 1991. - 256 p. [Gorbunova N.P. Algology: Textbook. manual for universities on specality. "Botany". M .: Higher. sch., 1991 .- 256 p.]
3. Plitman S.I. Complex assessment of the self-cleaning ability of water bodies. Gigan. and sanit. – 1991. No 3, pp. 15-16. [Plitman S.I. Comprehensive assessment of the self-cleaning capacity of water bodies. Gig. and nurses. - 1991. №. 3, P. 15-16.]
4. Fedorov V.D. O metodakh izucheniya fitoplankton i ego aktivnosti [On the methods of studying phytoplankton and its activity]. Moscow, MGU Publ., 1979. - 168 p.