Horizon | Journal of Humanity and Artificial Intelligence

SEASONAL CHANGES OF "WATER DRAINING" CLEANING CONSTRUCTION OF HIGH WATER-PLANTS

IBRAGIMOVA Z. Yu

PhD of Biological Sciences, Karakalpakstan Institute of Agriculture and Agrotechnologies

YULDASHEVA Sh.B

2nd year student, Karakalpakstan Institute of Agriculture and Agrotechnologies

TURDALIEVA Kh.S

PhD of Biological Sciences, Uzbekistan National University

Abstract

Flora of water-plants in wastewater of the cleaning construction "Water draining" was also studied according to the seasons. The growth and development of algae in wastewater should also be emphasized by the presence of toxic substances in them. During the seasons, not only the species composition, but also the composition of their dominant species were observed in the wastewater of the "Water draining" cleaning construction, and as a result, the amount and biomass of the dominant species in them also changed.

Keywords: algae, diatom algae, fecal elements, euglena algae.

Introduction

In natural conditions, the ecosystem tends to clean itself, that is, it changes the organic substances that are not needed in nature. Human activity strongly affects the environment: soil and water are polluted with industrial (production) waste and vital products of organisms. As a result of contamination of soil and water with organic substances, the relationship between certain groups of natural biota microorganisms is disturbed, and as a result, the direction of metabolism changes, natural purification processes are disturbed. In a polluted ecosystem, beneficial microflora decreases, and harmful and pathogenic microorganisms increase. Polluted water bodies are cleaned with nitrogen and phosphorus compounds. Man-made and anthropogenic disturbance of the ecological balance seriously changes the sanitary condition of the environment, the living conditions of people deteriorate. In today's era, when the conditions are aggravated due to the dense population and the rapid development of industry, the introduction of biological water treatment technologies makes it possible to improve the ecological situation and human habitat [1].

One of the priority areas of nature protection is the protection of water bodies. The important areas of water resources protection are the introduction of economical new technologies, the creation of ecologically safe, economical and effective methods of cleaning various wastewaters [2].

Algal flora in the wastewater of the "Water draining" cleaning construction was also studied

according to the seasons.

A total of 69 species (species, types and forms) of algae were identified in the spring. Among them, 18 blue-green algae, 2 golden algae, 24 diatom algae, 2 euglena algae and 23 green algae, species, types and forms were identified. The most diatoms (24) and green algae (23) were recorded this season.

In early spring, when water temperature is 10-14ºC, clarity is 0.3-1.0 m, pH 7.8-8.7, mineralization is 250 mg/l, diatom algae, growing mainly in cold water, *Melosira distans, M.granulata, Cyclotella comta (Ehr),* Kuetz, *Diatoma vulgare Bory var.,vuegare, D.vulgare* Bory *var. breve* Grun. and *Chlamydomonas globosa, Pandorina morum, Ankistrodesmus angustus, Scenedesmus acuminatus, var. acuminatus, S. obliquus, var. obliquus, Stigeoclonium pusillum* and others were met. During this period, the rise in temperature (15-18ºC) and the presence of other environmental factors lead to the development of heat-loving algae. Such algae include *Dactylococcopsi var faciformis, Merismopedia elegans, M.glauca, Microcystis aeruginosa, Gloeocapsa alpina, G.turgida, Oscillatoria brevis, O.curviceps, O. irrigua, O. lemmermanii, O. limosa, O. princeps, O. woronichinii, Phormidium foveolarum* and others from blue-green algae.

Table 1

Seasonal change of algoflora of "Water draining" cleaning construction

Algae parts	Total types	Seasons			
		Spring	Summer	Autumn	Winter
Cyanophyta	35	20	26	31	8
Bacillariophyta	56	24	40	35	18
Euglenophyta	17	2	16	11	-
Chlorophyta	80	22	53	32	22
Chrysophyta	2	2	-	-	-
Total: 5	**190**	**69**	**134**	**108**	**48**

Chromulina ovalis and *Ochramonas fragilis* from golden algae; from diatom algae *Melosira distans, M. granulata, Navicula cryptocephala, Cyclotella comta, Diatoma vulgare, Synedra ulna, Fragilairia crotones,* etc.; *Euglena hemichromata and E. eax* from euglena algae; from green algae *Chlamydomonas globosa, Nautococcus grandis, Hydrodictyon reticulatum, Palmellocystis planctonica, Tetraeodron minimum, Chlorococum dissectum, Ankistrodesmus acicularis, Scenedesmus, S.bijugatus var. alternans* and others were met (Table 1).

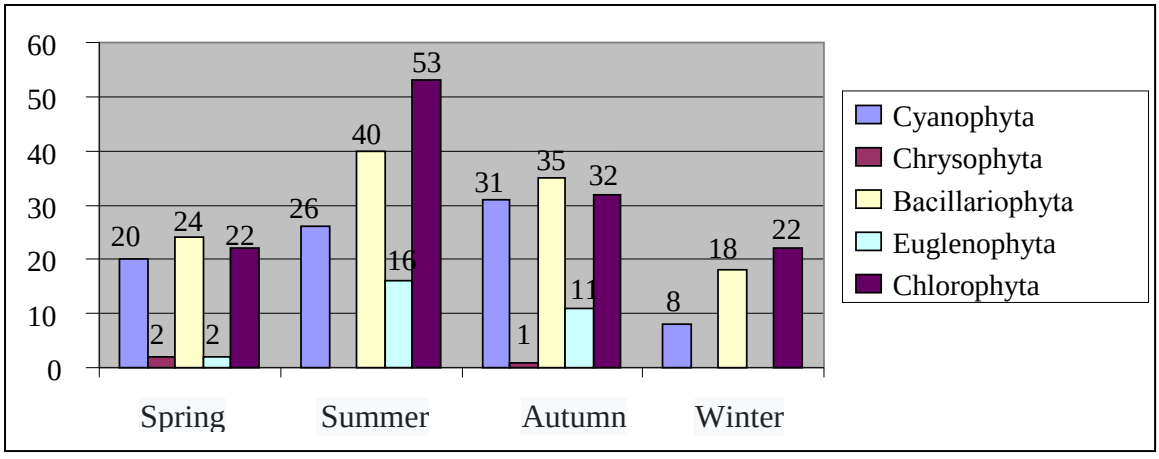

Figure 1. Seasonal change of algoflora of "Water draining" cleaning construction

According to the information of Karimova B.K. [2] and the opinions of other researchers [3], there is a mass increase of algae in the summer season, even cases of "turning blue". This situation also happened

in the devices of the Water draining cleaning construction that we studied. During this period, although there were few species of algae in the plankton, massive development of some species (from the *Euglena* family) was observed. Summer species have appeared instead of species that are common in spring.

By autumn, the species of algae, which were massively developed in the summer, were replaced by species specific to this season. Due to the influence of specific abiotic factors in the winter season, blue-green algae such as Navicula *Navicula, Diatoma, Nitzschia, Hantzschia,* diatoms, *Oscillatoria* and *Spirulina* are also found in wastewater.

The growth and development of algae in wastewater should also be emphasized by the presence of toxic substances in them.

When S.V.Plekhanov and others studied the effect of zinc, cadmium, and cobalt on the physiological properties of chlorococcal algae, they found that the salts of these elements were 10^{-4}, 10^{-6}. Concentration reduced algal growth by 30%. These elements accelerated the transport of electrons and slowed down the process of photosynthesis.

Wardas Wtadystaw et al. found that hexane, cyclohexane and benzene had a toxic effect on the development of *Chlorella vulgaris*.

It should be noted that the industrialized wastewaters that we studied also contain toxic zinc, nickel, cadmium, copper, cobalt, aluminum, margumush and other heavy metals, petroleum products, and compounds of fecal elements to a certain extent. Therefore, although there is some systematic diversity (62 species) in the algae types identified in the wastewaters we studied, this situation was not observed in their development. *Hapalosiphon, Nostoc, Lyngbya, Stephanodiscus, Tabellarta, Frustulia, Calonets Ulothrix, Mougeotia*, which are common in open water, were not found in our samples, which is explained by the contamination of wastewater with toxic substances in combination with a number of abiotic factors.

In the scientific literature, there is only a little information about the adaptation of algae to adverse factors [4-5]. Algae such as *Phormidium foveolarum, Melosira granulata, Diatoma vulgare, Synedra ulna, Cryptocephala, Gyrosigma acuminatum, Spiyrogyra crassa* found in our samples were also recorded in small quantities.

During the seasons, the first place in terms of the number of algae species is summer, then autumn (closer to summer), followed by spring and winter. The same distribution of algae by seasons was also noted by Kh.A.Alimjanova [6].

Thus, environmental factors: light, water clarity, its chemical composition, pollution and flow conditions have a great influence on the seasonal variation of algae growing in wastewater.

From biotechnological researches, which were conducted only in our republic, dedicated to study sanitary conditions of water used for communal services, works of A.A.Abdukadirov, S.B.Boriev, G.I.Jumanyozova, N.Kim, M.Mustafoeva, K.T.Raimbekov, Sh.Tajiev, H.N.Haydarova, A.Khasanov, R.Sh.Shoyakubov, A.E. Ergashev are known.

In summer, water temperature was 20-28ºC, pH 5.8-8.5, clarity 0.9-1.5, mineralization was 430 mg/l. During this period, a total of 134 types of algae were detected in the devices of the cleaning construction. Among them, 26 blue-green algae, no golden algae, 41 diatom algae, 16 euglena algae, and 55 green algae were found. In this, from blue-green algae, mainly *Dactylococcopsis rhaphidioides var faciformisz, Merismopedia elegans., M.glauca, M.punctata, Microcystis aeruginosa., Gloeocapsa .alpina,. f .lignicola, G.turgida, f.turgida, Tolypothrix limbata, T. limbata, Calothrix brevissima, Oscillatoria amphibia, O.boemaisoni, O.geitleri, O. irrigua, O. lemmermani., O. nigra, O. princeps, Spirulina laxa., Phormidium foveolarum, Aphanothece clatrata etc.* were found.

From diatom algae *Melosera granulata, M. islandica, M. varians, Cyclotella. kuetzingiana, C.meneghiniana, var vulgare, D. vulgare var. breve, D. vulgare var. lineare, Synedra capitata, Mastogloia baltica, Navicula cincta, N. cryptocephala, N. dicephala, N. pygmaea, N. radiosa, N. rhynchocephala,*

Anomoeoneis sphaerophora, Caloneis amphisbaena, Gomphonema acuminatum, G. olivaceum, Nitzschia acicularis, Surirella ovata; from euglena algae *Euglena aculeata, E.caudata var. caudata, E. clara, E. gracilis, E. hemichromata, E. fenestrata, Phacus acuminatus, Ph. Alatus, Ph. caudatus, Lepocinclis steinii ва яшил сувўтларидан Chlamydomonas gelatinosa, Ch. minima, Ch. reinhardtii, Pandorina charkoviensis, P. morum, Eudorina elegans, Pediastrum boryanum, P. duplex, P. Integrum, P. simplex, P. tetras, Coelastrum cambricum, C. micriporum, C. sphaericum, Micractinium quadrisetum, Hydrodictyon reticulatum* and others were met.

A total of 14 species of blue-green and diatom algae dominated during the summer months. Their total amount was 12,890,000 x/l, and their biomass was 2640 mg/l.

In autumn, the average water temperature was 21-22ºC (September), clarity was 1.1-1.5 m (clear to the bottom in bioponds), pH 7.9-9.1, mineralization was 290 mg/l. In this season, a total of 108 types, species (variations) and forms of algae were identified in the devices of the Angren "Water draining" cleaning construction. Among them, there were 30 blue-green algae, 1 golden algae (*Chromulina ovalis* Klebs), 11 euglena algae, 20 diatom algae and 31 green algae.

The similarity between the types of algae in summer and autumn is explained by the proximity of environmental factors in the cleaning construction devices.

In the last days of October and the first days of November, due to the decrease in air and water temperature, representatives of all heat-loving blue-green and euglena algae were almost absent or very rare. At this time, representatives of diatoms and green algae are still abundant.

In the last days of October, the types of algae found in the summer and in the first (September, beginning of October) and last months of autumn began to decrease sharply. By this time, cold-loving green algae and diatoms began to increase in the composition of algae species. These include *Merismopedia elegans, M.glauca, M.punctata, Microcystis aeruginosa, M.pulverea, Gloeocapsa alpina, G. crepidinium, G.turgida, Tolypothrix limbata, Calothrix brevissima, Oscillatoria .bonnemaisoni, O. bornetii, O.brevis, O.curviceps, O.dzeman-sor, O.geitleri, Spirulina laxa and Phormidium foveolarum;, Chromulina ovalis* from golden algae; from diatom algae *Melosira distans, M. granulata, M. islandica, M. varians, Diatoma vulgare, D.vulgare, D. vulgare var. Vulgare, Fragilairia crotonesis, Synedra capitata, S. pulchella, S. ulna, Cocconeis* pediculus, etc.; *E. gracilis, E. hemichromata, E. fenestrata, Phacus acuminatus, Ph. alatus, Ph. caudatus* from euglena algae, and from green algae *Chlamydomonas gelatinosa, Ch. globosa, P. morum, Eudorina elegans, Pediastrum boryanum, P. simplex, P. tetras, Trochiscia aciculifera, T. granulata, C. micriporum, Hydrodictyon reticulatum, Chlorella vulgaris, O. pelagisa, Palmellocystis planctonica, Chlorococcum disscetum, Pyrobotrys gracilis, A. arcuatus, A. braunii, S. arcuatus, Scenedesmus obliquus, Cosmarium granatum* and others. Out of 105 species and varieties encountered in autumn, 15 species dominated, their total amount was 10,500,000 x/l, and their biomass was 1502 mg/l (Table 2).

Table 2

Changes in the amount and biomass of the dominant species of algoflora in the "Water draining" cleaning construction by seasons

Type/species	**Seasons of the year**			
	Spring	**Summer**	**Autumn**	**Winter**
1	2	3	4	5
Cyanophyta				
Merismopedia elegans A. Br.	520000 / 61	450000 / 72	520000 / 87	—
M. glauca (Ehr.) Naeg.	—	420000 / 52	500000 / 58	—

Gleoecapsa turgida (Kuetz.) Hollerb. Em.	350000 / 82	—	—	175000 / 41
Gleoecapsa turgida f. turgida (Kuetz.) Hollerb	—	—	400000 / 98	—
Microcystis aeruginosa Kuetz. em.Hollerb.	—	260000 / 38	—	—
Oscillatoria brevis (Kuetz.) Gom.	—	310000 / 47	290000 / 37	—
O. princeps Vauch.	—	450000 / 111	500000 / 31	—
O. limosa Ag.	—	—	480000 / 53	—
O. lemmermannii Wolasz.	310000 / 31	320000 / 31	500000 / 43	—
O. woronichinii Anissim.	230000 / 12	280000 / 29	—	—
Bacillariophyta				
Cyclotella kuetzingiana Thw.	685000 / 165	1800000 / 217	950000 / 147	—
C. meneghiniana Kuetz.	—	190000 / 191	—	—
Diatoma vulgare var. vulgare Bory	300000 / 62	1880000 / 280	800000 / 156	150000 / 31
Fragilaria crotonensis Kitt.	450000 / 89	1500000 / 280	500000 / 91	—
Nitzschia sigmoidea (Ehr.) W. Sm.	—	1600000 / 380	—	—
Synedra ulna var. ulna (Nitzsch.) Ehr.	900000 / 326	1800000 / 380	—	450000 / 163
Melozira varians Ag.	—	1600000 / 102	—	—
Melozira granulate (Ehr.) Ralfs.	850000 / 68	—	—	—
Navicula cryptocephala var. cryptocephala Kuetz.	—	—	350000 / 103	175000 / 53
Cocconeis pediculus Ehr.	—	—	360000 / 152	—
Chlorophyta				
Chlomydomonas globosa Snow.	—	—	200000 / 59	—
Pandorina morum (Muell.) Bory	—	—	850000 / 109	—

Palmellocystis planctonica	550000 / 140	—	350000 / 11	—
Pediastrum boryanum (Turp.) Menegh.	—	—	100000 / 138	—
*P. tetras (*Ehr.) Ralfs.	—	—	800000 / 68	—
Stigeoelonium tenue (Ag.) Kuetz.	365000 / 123	—	—	—

In winter, the air temperature is 10-12 ^{o}C, clarity is 1.4-1.5 m, pH is 7.4-8.1, mineralization is 680 mg/l, and a sharp decrease in solar energy causes some changes in the composition of algae, that is, a sharp decrease in their species. At this time, a total of 48 taxa of algae were identified. Among them, 8 blue-green algae, 17 diatom algae, golden and euglena algae were not found at all, 20 types and forms of green algae were found. At this time, the species of dominant algae also decreased sharply and made 4 species. Their total amount was 950 x/l, and their biomass was only 288 mg/l.

Conclusion. Thus, not only the composition of species, but also the composition of their dominant species were observed in the effluents of the "Water draining" cleaning construction during the seasons, and as a result, the amount and biomass of the dominant species in them also changed. During the year, a total of 43 species out of 190 species, varieties and forms dominated. Their total amount was 7844000 x/l, and their biomass was equal to 4012 mg/l. In the spring, the amount is 10150000 x/l, the biomass is 1155 mg/l. It was found that the quantity in summer was 5510000 x/l, biomass was 2640 mg/l, in autumn it was 10150000 x/l, biomass was 1502 mg/l, in winter it was 950000 x/l, biomass was 288 mg/l.

Literature

1. Taubaev T., Buriev S. Biological cleaning of wastewater. Science, 1980. 151 p.
2. Karimova B.K. Algoflora of reservoirs of the southern Yuga Kyrgyzstan. Bishkek. Technology, 2002. 214 p.
3. Raimbekov K.T., Shoyakubov R.Sh. Some peculiarities of biological flowering and vegetative multiplication of Eichornia crassipes Solms. In the condition of introduction. // DAN RUz. 1978. No. 3. 76-76p.
4. Alekin O.A., Semenova A.D., Skopintseva B.A. Manual on chemical analysis of water. L. Hydrometeoizdat, 1973, 270 p.
5. Sladecek V. System of water quality from the biological point of view // Arch. Hydrobiol. Ergoeb. 1973. Bd. 7. P. 210-218.
6. Alimjanova K.A. Norms of spreading algae in the river Chirchik and their importance in determining ecological-sanitary condition of reservoirs. Publisher "Fan" AN RUz. 2007, p. 264.