International Journal of Multidisciplinary Research and Development

IJMRD 2015; 2(4): 108-110
www.allsubjectjournal.com
Received: 17-03-2015
Accepted: 03-04-2015
e-ISSN: 2349-4182
p-ISSN: 2349-5979
Impact Factor: 3.762

Seyfali Gahramanov
Scientific researcher at the Department "Systematics of Plants" of the Institute of Bio-resources of Nakhchivan Department of the National Academy of Sciences of Azerbaijan

Correspondence:
Seyfali Gahramanov
Scientific researcher at the Department "Systematics of Plants" of the Institute of Bio-resources of Nakhchivan Department of the National Academy of Sciences of Azerbaijan

Seasonal spreading dynamics of blue-green and green algae in the water bodies of the Nakhchivan Autonomous Republic, Azerbaijan

Seyfali Gahramanov

Abstract
The article contains materials derived from the results of the multi-year (2009-2012) studies of algae that spread in different type water bodies of the Nakhchivan AR, in different seasons of year. Due to rising water temperature, development of blue-green and green algae starts in early spring and continues until early fall. Amount of the algae increases, but their vegetation ceases due to the flooding. The intensive development along the river begins after the enlightenment of water. In the water bodies, the least spreading period of blue -green and green algae taxa is in winter period (December-March).

Keywords: river, water, temperature, blue-green and green algae, seasonal dynamics, family, type

1. Introduction
In the Nakhchivan AR, the flora and taxonomic structure of the algae, especially freshwater algae have not been studied sufficiently in comparing with the higher terrestrial plants. Analysis of species of algae diversity can give a general idea of the aquatic ecosystem development direction. In assessing the ecological status of water bodies, it is important to take into account the peculiarities of algae of different ecological groups. One of the important stages of the research is to study the floristic and taxonomic composition of algae in the ponds and streams both in general and in specific hydro-biological areas: K. Anagonstidis and J. Komarek(1988), S.G. Rzaeva(1999), M.A. Nureyeva(1006), B. Rancovic, S. Simic, D. Bogdanovic (2006), Chinnasamy Muthukumar, Gangatharan Muralitharan, Ramasamy (2007), S.K. Rai, R.K. Rai and N. Paudel (2008), I.M. Saadom, E. Bataineh, A. Alhandal (2008), Hamed A.F. (2008), Marija Stamenkovic, Mirko Cvijan (2009), Sh. Dzh., Mukhtarova, S.K., Dzhafarova (2011).

Material and Method
The materials for the research were the samples taken in 2009-2012 from the reservoirs: Araz, Heydar Aliyev, Arpachay, Uzunoba, river Nakhchivanchay, Gilanchay, Alinjachay, the lakes Shah Abbas, Batabat, Nehram, Bananiyar located in different ecological and geographical zones in the territory of the Nakhchivan AR, Azerbaijan. The samples were taken from the surface of water every month. There have been studied the composition of the blue-green and green algae species in the reservoirs, lakes and rivers. The points where the samples were taken are located in the 678-2400 m. above sea level. Sample collecting was conducted according to the generally accepted hydro-biological methods. The species compositions of taxa have been determined by microscopic examination. The taxonomic spectrum of the species has been determined according to the latest classification accepted in the algology science, also taking into account the discovery history of some taxa and their historical changes. [4, 7, 10, 15, 16]

Experimental Part
Massive development of blue-green and green algae species start in spring and last till October. Increasing of water temperature from July till early October influences positively to increase the species composition, especially in the coastal zones. Early in spring the amount of algae species increase greatly. But their vegetation ceases due to the flooding (The stream rate and turbidity of water increase). Intensive development of blue-green and green algae begin after the enlightenment of water along the entire length of the river. There have been

determined that, in the studied reservoirs, changes within the species composition of blue-green and green algae depends on the season and zone. The highest species diversity of algae observed in summer and in the middle of fall. Blue-green and green algae dominated in all the studied reservoirs. The largest diversity of green algae is observed, coinciding with the period of maximum warming of water (up to 21-27° C in August). The amount of planktons was very few in spring and fall. In comparing the rivers Nakhchivanchay and Gilanchay with the rivers Araz and Arpachay most changes were observed in the green algae species composition. Much more diversities of taxonomic composition of the phytoplanktons were observed in the Alinjachay and Arpachay tributaries, in July.

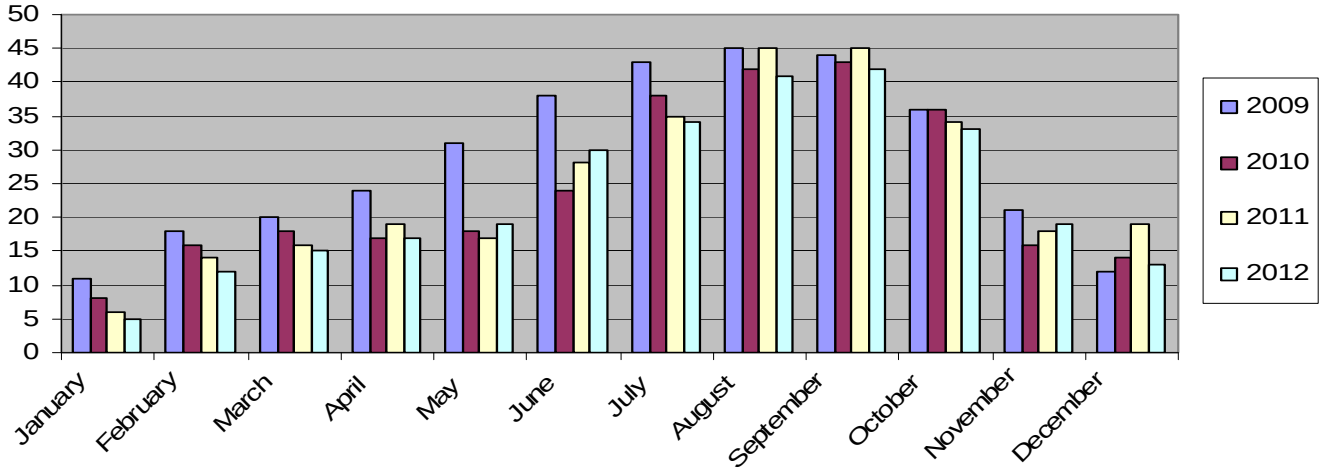

Fig 1: Spreading of green algae by months and year

Due to the increase of water temperature, development of blue-green algae in the planktons start in late spring and gradually increase till the middle of fall and reach to the maximum amount. Such conformity of natural laws was observed in summer-fall seasons of 2008-2012 research years. Green and blue-green algae dominated in all the studied reservoirs. The species as *Synechococcus elongatus* Nägeli, *Oscillatoria planktonica* Wołoszyńska, *Microcystis flos-aquae* (Wittrock) Kirchner, *Chlamydomonos polychloris* (Korschikoviella Silva), *Cosmarium subguadrans* West &+G.S.West dominated in the Arpachay, Nakhchivanchay and Nehrem reservoirs. In the phytoplanktons of the reservoirs the number of species increases and usually reaches maximum rate at a water temperature of 27° C.

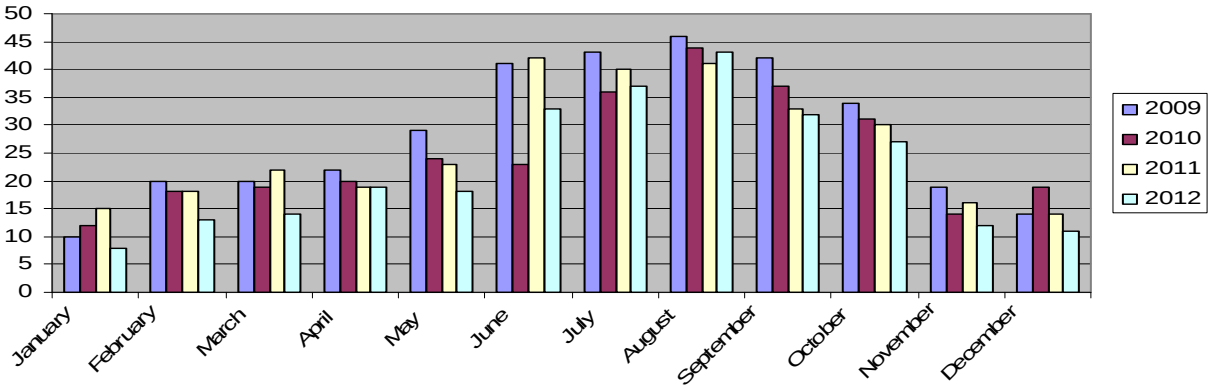

Fig 2: Spreading of blue-green algae by months and year

Winter (November-March) is the least scarcity period of the number of blue-green algae taxa in all the reservoirs. Spreading of algae species along the zones was different. We observed that the blue-green and green algae species composition is richer in the lowlands and mid-highlands in comparing with the highland and alpine zones. In the reservoirs of mid-highland zones often met green and blue-green algae. In the summer planktons one can meet blue-green species as *Synechocystis aquatilis* C. Sauvageau, *Sy. salina* Wislouch, *Synechococcus elongatus* Nägeli, *Mycrocystis flos-aquae* (Wittrock) Kirchner, *Anabaena constricta* (Szafer) Geitler, *Tolypothrix tenuis* F.T. Kützing ex Bornet & Flahault, *T. distorta* F.T. Kützing ex Bornet & Flahault, *Oscillatoria brevis* (F.T. Kützing) ex Gomont, *O. tenuis* J.Agardh *O. planctonica* Wołoszyńska, *Phormidium molle* (Kützing) Gomont. We also discovered green algae species as *Ulothrix moniliformis* Kützing, *U.subtilissima* Rabenhorst, *Chlamydomonas polychloris* (Korschikoviella Silva) *Pediastrum duplex* Meyen. *Scenedesmus hystrix* (von Lagerheim) Hegew., *Spyrogira sp*., *Cosmoastrum turgescens* (De Not.) Palamar-Mordvintzeva, *Actinotaenium clevei* (P. Lundell) Teiling, *Cosmarium subguadrans* West & G.S.West. *Desmidium schwartzii* (C.A. Agardh) C.A. Agardh ex Ralfs, *Staurastrum tetracerum* Ralfs. The greatest number of species constitute *Merismopediaceae* Elenkin family-9 species of 2 genus, *Microcystaceae* Elenkin-1 genuses, 6 species and 7 intraspecific taxa, Nostocaceae Eichler-3 genuses, 12 species, *Oscillatoriaceae* (Kirchner)

Elenkin-3 genera, 12 species, *Phormidiaceae* Anagnostidis & Komárek -2 genus, 6 species, *Rivulariaceae* Frank-one genus, 3 species.

In the Nakhchivan AR reservoirs the floral composition of the green algae includes 66 species and 67 intraspecific taxa. The *Desmidiaceae* Ralfs family includes 8 genuses, 35 species. *Ulotrichaceae* Kütz includes 1 genus, 7 species. *Chlamydomonadaceae* F. Stein includes 1 genus, 5 species. *Hydrodictuaceae* includes 2 genuses, 6 species. *Scenedesmaceae* Oltmanns includes 1 genus, 5 species. *Zygnemataeceae* includes 1 genus, 5 species. However recent studies conducted year-round or for a number of years show that these algae are found both in large rivers and in the reservoirs of the Nakhchivan AR. Depending on the altitude zones of the reservoirs, the species compositions of algae taxa were different. The green and blue-green algae species have spread unevenly in the Nakhchivanchay, Alinjachay and Gilanchay rivers. During the investigations the highest amount of taxa-23 species were found in the lowest current of the Nakhchivanchay (900 m. above sea level), 16 species were found in the middle current (1100 m. above sea level) and the fewest number-7 species were found in the highest current (2100 m. above sea level). In the outfalls of the rivers the amount of green and blue-green algae increases to maximum number in the planktons. The large number indicator in the phytoplankton has developed thanks to the small-cell blue-green and green algae. Increase of water temperature, mainly in the coastal zones, influence positively to the development of the species composition of algae. The winter period (November-March) is on average the poorest period of blue-green and green algae, when water temperature in the reservoirs falls from 27º C to 7-8º C. In the reservoirs of the Nakhchivan AR there have been revealed 66 species and 67 intraspecific taxa of green algae, belonging to 3 classes, 6 orders, 8 families and 16 genera, 60 species and 65 intraspecific taxa of blue-green algae belonging to 2 classes, 4 orders, 10 families and 18 genera. For the first time there have been observed 66 species, 67 intraspecific taxa of green, 41 species and 46 intraspecific taxa of blue-green algae, in the algae flora of the Nakhchivan AR. For the first time there have been studied 42 species of green, 16 species of blue-green algae in the Azerbaijan Republic algal flora.

References

1. Anagonstidis, K. and J Komárek, Modern approach to classification system of cyanophytes. 3. Oscillatoriales- Arch. Hydrobiol. Suppl., 80 Algological studies, 1988, 50/53: pp. 327-372
2. Chinnasamy Muthukumar, Gangatharan Muralitharan, Ramasamy Vijayakumar, Annamalai Panneerselvam and Nooruddin Thajuddin Cyanobacterial biodiversity from different freshwater ponds of Thanjavur, Tamilnadu (India) // Acta Botanica Malacitana Malaga 2007, 32, pp.17-25
3. Hamed A.F. Biodiversity and Distribution of blue-green algae *Cyanobacteria* and Diatoms in Some of the Egyptian Water Habitats in Relation to Conductivity // Australian Journal of Basic and Applied Sciences, Botany Department, Faculty of Science, Ain Shams University, Cairo, Egypt. 2008, 2(1), pp. 1-21
4. Hollerbach, M.M., Kosinskaya E.K., Polyansky V.I. To freshwater algae USSR. Blue-green algae. In the fourteen editions. Vol. 2, M .: "Soviet science", 1953. - 327 p.
5. Method of study biogeocenosis inland waters of the USSR Academy of Sciences, Institute of Biology of Inland Waters. Ans. Ed. FD Morduch-Boltovskoi, M., 1975. - 240 p.
6. Marija Stamenković and Mirko Cvijan Desmid flora (*Chlorophyta*, *Zygnematophyceae*) of the river Tisa in the Province of Vojvodina (Northern Serbia) Botanica Serbica, 2009, 33 (1), p. 89-99
7. Moshkova N.A., Hollerbach, M.M. Determinant to freshwater algae USSR. Green algae. Class ulotriksovye, L .: "Nauka", Vol. 10 (1). 1986, 360 p.
8. Mukhtarova Sh.Dzh., Dzhafarova S.K. Algological research ponds Azerbaijan // Proceedings of the Central Botanical Garden, Baku: Elm, 2011, Vol. VIII, pp. 128-143
9. Nureyev M.A. Species diversity *Hormonogoniophyceae (Cyanopyta)* // Scientific papers of the Institute of Botany of the National Academy of Sciences of Azerbaijan XXVI c., 2006, pp. 45-50
10. Palamar-Mordvintseva G.M. Determinant to freshwater algae USSR. Green algae. Class conjugates., L., 1982, Vol. 11 (2), 620 p.
11. Rai S.K., Rai R.K. and Paudel N. Desmids from Bees-hazaar Lake, Chitwan, Nepal / Our Nature, 2008, 6, pp. 58-66
12. Ranković B., Simic S., Bogdanovic D. Phytoplankton as indicator of water quality of lakes bubanj and šumarice during autumn // Kragujevac J. Sci., 2006, 28, pp. 107-114
13. Rzaeva S.G. Materials on the blue-green algae three mineral springs Nakhchivan Autonomous Republic. Flora of Azerbaijan. Baku Elm, 1999, pp. 15-19,
14. Saadoun I. M., Bataineh E., Alhandal A. Phytoplankton Species Composition and Seasonal Variation at Wadi Al-Arab Dam Lake, Jordan // Turk. J. Biol., 2008, v. 32, pp. 291-298
15. Seyfali Gahramanov Seasonal dynamics of the spread of blue-green algae in the water bodies of the Nakhchivan Autonomous Republic // Bulletin of Nakhchivan Department of ANAS. A series of natural and technical sciences, 2011, Vol. 7 number 2, p. 166-172
16. http://www.biolib.cz/en/taxon/id14839/#system
17. http://www.biolib.cz/en/taxonsubtaxa/id14839/