

MODIFICATIONS OF PHYTOPLANKTON STRUCTURE IN THE CIRIC LAKE DETERMINED BY ALGAL BLOOM

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INTRODUCTION

Algal bloom takes place in the eutrophized waters and represents the expression of industrial development and ecological perturbation in the context of a negligence concerning the environment protection. The waters bloom is followed by the degradation of the water quality and the impossibility of using it for drinking, agriculture and amusement. Some species of blue-green algae produce toxins (Collins 1978, Codd 2000) and require strict control of the phenomenon of algal bloom.

In order to have control on the phenomenon of algal bloom, it is necessary to understand the mechanism that leads to this phenomenon. An explanation is that among the species of the phytoplankton there is competition for light and nutrients realized by biochemical, physiological and morphological mechanisms (Legrand Catherine 2003). It was noticed that *Microcystis* produces blooming more often in stagnant waters than in running waters (Pearl 1988). Thus, blooming is naturally controlled by water conditions and phytoplankton composition, and this implies classifying the existent species in phytoplankton before and after algal bloom (the objective of this study).

MATERIAL AND METHOD

The tests were taken from the water mass in recipients of 500 ml from different depths in June, July, August, September, and October. On tests it was written the date, place and depth. The tests were taken in two samples: a test fixed with formalin 4% and in laboratory with solution Utermöhl – to colour and sediment the algae; another test, non-fixed, was used to determine the Flagellates.

The density of species that produce blooming and the accompanying species were expressed by the no. of cells/l.

RESULTS

In the phytoplankton of Ciric Lake were identified a number of 188 taxons classified on divisions as follows: Cyanophyta 49 taxons (25%),

Bacillariophyta 50 taxons (27%), Chlorophyta 56 taxons (30%), Euglenophyta 26 taxons (14%), Xanthophyta, Chrysophyta, Cryptophyta, 2 taxons and Dinophyta 1 taxon (together 3.7%).

In the period of algal bloom produced by *Microcystis aeruginosa*, the taxons are classified as follows: Cyanophyta 18 taxons (38.29%) - increase by 13.29%, Bacillariophyta 10 taxons (21.27%) – decrease by 6.73%, Euglenophyta 11 taxons (23.40%) – increase by 9.60%, Chlorophyta 6 taxons (12.76%) – decrease by 17.24%, Dinophyta and Cryptophyta 1 taxon (4.25%) – increase by 0.55%.

In the period July-October were recorded the following species with rapid evolution: *Microcystis aeruginosa* (4750000 cells/l-August), *Gloeocapsa punctata* (2300000 cells/l-August), *G. turgida*, *Euglena oxyuris*, *E. deses*, *E. polymorpha*, *Trachelomonas caudata*, *Tr. hispida*, *Tr. planctonica*, *Phacus caudatus*, *Ph. ovalis*, *Ph. pleuronectes*, *Peridinium cinctum*.

In the period of algal bloom were visibly damages the genus: *Nitzschia*, *Navicula*, *Cyclotella*, *Oocystis*, *Coelastrum*, *Chlamydomonas*, *Scenedesmus*, *Pediastrum*, *Monoraphidium*. At the end of this period appear again the genus: *Oocystis*, *Scenedesmus*, *Coelastrum*, *Pediastrum*, *Cryptomonas*. The genus *Cryptomonas* seems to mark the end of bloom.

On the vertical *Microcystis aeruginosa* is dominant, located in the superior layer of the water, and in depth there are no layers due to the presence of the superior aquatic macrophytes, frog movements, intensity and direction of movement of air masses.

DISCUSSIONS

Many studies concerning cyano-bacteria were reported as dominated by *Microcystis*, the bloom being favoured by phosphor, nitrogen and silicium increase (Holm, Armstrong 1981, Navrotescu et al 1995). In the relations between the species in the phytoplankton special attention should be paid to the paralyzing effect of the substances eliminated by some cyano-bacteria. For instance, *Anabaena flosaque* produces a neurotoxin (anatoxin) that care blocks the functioning of neurotransmitters acetylcholine in muscular cells, provoking their paralysis. In studies realized in laboratory, it was noticed that neurotoxin paralyzes the cells of *Chlamydomonas* (Legrand Catherine, 2003) and we conclude that in our case *Chlamydomonas*

disappears during the algal bloom also due to species *Anabaena flosaque* that is present in all the tests taken in Ciric Lake. Under these circumstances, it should be studied whether the environment favours some particular combinations among cyano-bacteria that represent another condition that leads to provoking the bloom phenomenon.

REZUMAT

Structura fitoplanctonului din Lacul Ciric este reprezentată de specii care aparțin următoarelor Diviziuni: Cyanophyta 25%, Bacillariophyta 27%, Euglenophyta 14%, Chlorophyta 30%, Xanthophyta, Crysiophyta, Dinophyta.

În perioada august-septembrie 2004 a fost identificată o înflorire algală produsă de *Microcystis aeruginosa*. Cu această ocazie s-a realizat o inventariere a fitoplanctonului și s-a constatat o descreștere a unor genuri și lipsa altora, care în mod normal intrau în componența fitoplanctonului. S-a confirmat observația că dezvoltarea masivă a cianofitelor determină

scăderea masivă a clorofitelor și că revenirea la echilibru se realizează treptat prin creșterea numerică a speciilor din genurile: *Oocystis*, *Scenedesmus*, *Coelastrum*, *Cryptomonas*. Înflorirea a produs modificări în structura fitoplanctonului exprimate prin schimbări ale raportului dintre diviziuni.

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