Buletinul Grădinii Botanice Iaşi
Tomul 5, 1995

THE ALGAE OF THE PERIPHYTONIC COMMUNITIES FROM THE KUCIURGAN TANK

V.M. ŞALARU*, P. OBUCH**, I. NEDBALIUC**, TINCA MIOARA NAVROTESCU***

Key words: epiphyte algae, periphytonic communities, biomass.

Abstract: In the paper, are presented the reults of the investigations upon the peryphytonic algae communities on varied substrata from Kuciurgan barage (the inferior course of Nistru) from 1991-1993. In the structure of the communities it has been diferentiated a multitude of epiphytes. There were emphasized epiphytes of degree 1, especialy *Cladophora glomerata*, which can be met on the aquatic cormophytes, stones and other substrata the gross weight 1-3 kg/m².

The epiphytes of superior order have been representated by the green algae, diatoms, cyanophytas etc. There were emphasized 109 species of epyphytes from which Bacillariophyta - 70, Cyanophyta 17, Chlorophyta 14, Xanthophyta 6, Chrysophyta 1, Euglenophyta 1.

The algae of the periphytonic communities from the ecosystem of the Kuciurgan tank have a complicated behaviour in comparesion with the substratum. The algae as a cover for the epiphyt algae were not until now the object of special studies. But they have an important role in the biological bioproductivity of this tank [14].

After two years of microscopic studies (1991-1993), there have been emphasized a lot of epiphytism ways, like those of the 1. 2, 3, order (Table I). The epiphytes of the first order usualy are green macrophyte algae, which vegetates on the aquatic cormophy-tes, stones and other aquatic solid objects. As a rule, the epiphytes from the first order determine the aspect of the periphytonic communities, being represented by *Cladophora glomerata* (L.) Kütz., *Oedogonium cardiacum* (Hass) Wittr., *Rhizoclonium hiero- glyphycum* (Ag.) Kütz., *Enteromorpha prolifera* (Müll.) Kütz.

The corps of this algae forms a vegetal compact cover with a thickness of 0,5-2,0 cm and a gross biomass of 1-3 kg/m². Through the enumerated macrophytes there are a lot of the epiphyte corps form. The first order lives epiphytes from the second order like *Oedogonium* sp., *Uroneme confervicola* Lagerh., Aphanochaete repens A. Br., *Pseudocharacium acuminatum* Korsch., Ankyra ancora (G. Smith) Fott, cyanophytes – *Phormidium faveolarum* (Mont) Gom., *Lyngbia kuezingii* (Kütz.) Schmidt f. *acrainica* (Schirsch.) Elenk., *L. perelegans* Lemm., *Plectonema terebrans* Born. et Flach., diatoms *Cocconeis pediculus* Ehr., *C. placentula* Ehr., *Rhoicosphaenia curvata* (Kütz.) Grun., *Gomphonema constrictum* var. *capitatum* (Ehr.) Cl., *Gomphonema olivaceum* (Lyngb) Kütz., *Cymbella ventricosa* Kütz., *C. cistula* (Hemp.) Grun., *C. turgida* (Greg.) Cl.,

*The State University Chişinău (Moldavia Republic)
**The Pedagogic University Tiraspol
***The Institute of Hygiene, the section of the Environment Hygiene Iaşi (Romania)

Synedra tabulata (Ag.) Kütz., *Synedra ulna* (Nitzsch) Ehr., *Amphora ovalis* Kütz., *Epithemia sorex* Kütz., *E. turgida* Kütz., *Achnanthes lanceolata* (Breb.) Grun., *Nitzschia dissipata* (Kütz.) Grun., *N. obtusa* var. *scalpeliformis* Grun., *Navicula cryptocephala* Kütz.

On some epiphytes from the second order (Oedogoniales, Ulotrichales) can live epiphytes from the third order *Uronema intermedium* Bourrelly, *Coleochate scutata*, *Characium sieboldii* var. *simplex* (Korsch.) Tsar., *Ch. pluricoccum* Korsch., *Gomphonema parvulum* (Kütz.) Grun., *Amphora perpusilla* Grun., *Achnanthes hungarica*, *Nitzschia dissipata*, *Navicula menisculus* Schum, *Synedra vaucheriae* Kütz., *Lyngbia kossinskajae* Elenk., *Calothrix elenkinii* Kossinsk., *Chamaesiphon gracilis* Rabenh., *Dermocarpa versicolor* (Borzi) Geitl.

One can find very seldom epiphytes from the third and fourth order of the species ***Xanthophyta*** (*Chytridiochloris acus* Ettl, *Ch. scherffellii* (Pasch.) Ettl, *Characiopsis subulata* (A. Br.) Borzi, *Ophyocitium arbuscula* (A. Br.) Rabenh), ***Chrysophyta*** (*Chrysopyxis bipes* Stein) and ***Euglenophyta*** (*Colacium vesiculosus*, Ehr.). It is necessary to say that there are also epiphytes from a superior order, too. For example, on *Synedra tabulata* (Ag.) Kütz. (epiphyte from the second and third order) very seldom are fixed epiphytes from the third and fourth order (*Charapciopsis subulata*, *Characium sieboldii*).

Some epiphyte species, like *Oedogonium* sp. *Uronema confervicolum*, *Rhoicosphenia curvata* are in some communities epiphytes of one order and others of more than one order.

It must be mentioned that until now the taxonomic clasification of the phytoperyphytonic communities is not completely solved and it has not a permanent character.

The quantitative phytopheryphytonic development on different substrata is made in a different manner. The most rich, both in number of species and biomass is the peryphytonic community on the old corps of the *Cladophora glomerata*, which was found in other tanks [2, 3, 4, 5, 6, 7]. On these covers have been emphasized 109 species of algae (Table I).

All along the year predominated the *Cladophora glomerata*, *Amphora ovalis* var. *pediculus* Kütz., *Cocconeis pediculus*, *Gomphonema constrictum* var. *capitatum*, *Nitzschia amphybia* Grun., *N. fonticola* Grun , *Synedra tabulata*. The quantity of algae constitutes about $20\text{-}30 \cdot 10^3$ cells/mm^2.

In the same time with the cover age, the number of epyphytes grows, forming finally a continue cover, under which it is hardly to emphasize the cells of the algae-cover. But the *Cladophora glomerata* cells keep their viability, which show the presence of the cromatophors and pyrenoizes. The final branches grow very much, they have a dark green colour and they are not colonized epiphytes.

Some species of epiphytes algae from the second order, for example Aphanochaete, Coleochate stand upon the cover with the inferiour part. Others are fixed with the help of a little and simple foot (*Rhoicosphaenia curvata*, *Cymbella cystula*, *C. ventricosa*) or branched (*Gomphonema olivaceum*, *G. constrictum* var. *capitatum*). At some diatoms (*Cymbella turgida*, *Nitzschia peregrina* var. *asiatica* Skv.) the cells are inserted into little

cilindrical tubes which are fixed by the help of a termination. *Colacium vesiculosum* (Euglenophyta) has an apendicula leg which helps it to fix upon a cover.

The quantity of phytoperyphytonic on *Cladophora glomerata* cell (80 – 200x20 – 40 mcm) has 50-150 *Cocconeis pediculus* cells 10-30 of *Rhoicosphaenia curvata*, 10-20 of *Synedra tabulata*. The peryphyton density, made of Chlorophyta, Cyanophyta have not more than 1-10 cells on a cell of *Cladophora glomerata*.

On *Oedogonium cardicum* and *Oedogonium* sp. have been registred 33 species, especially diatoms. Very often the alga cover is without reproduction organs, and this makes difficult its systematic identification. Sometimes there is not polar "lid". On Oedogonium have been found *Uronema confervicolum, Rhoicosphenia curvata, Cocconeis pediculus, Synedra tabulata.*

In the Kuciurgan tank have been found on the *Rhyzoclonium* hyeroglyphycum 14 species of algae like the diatoms *Amphora ovalis, A. perpusilla, Gomphonema parvulum*. There have been emphasized a small number of diatoms on *Enteromorpha prolifera*. There have been found 4 species of algae epiphytes on *Spyrogyra* sp.

There are very few cases where the epiphytes can be found on the Zygnematales, because of the rapid growth of the algae corps (Ettl, 1956, Obuch, 1963).

The coprs of the *Ulothrix, Stigeoclonium, Spirogyra, Mougeotia* like Cyanophyta are colonized with very few epiphyte - algae, and with a small number of individuals.

Conclusions

The investigation from 2 years of the peryphytonic communities on the algae from the Kuciurgan tank emphasized an abundant flora of epiphyte algae. There have been identified 109 species, including 70 diatoms, 17 Cyanophytes, 14 Chlorophytes, 6 Xanthophytes, Chrysophyta 1, Euglenophyta 1.

There were established more subordonate groups of algae and from the first order, there are very few. *Cladophora glomerata* is the most rich in epiphytes. The algae from the second order live on those from the first order, and those from the third order lives on those, from the second order. Some epiphyte species can be found in the peryphytonic communities as a cover (1, 2, 3 order).

On the corps of *Ulothrix, Uronema, Stigeoclonium, Spirogyra, Mougeotia* there is no epiphyte alga because of their rapid growth.

References

Ettl, H., 1956 – Ein Beitrag zu Systematik der Heterocontae, Bot. Not., 109, p. 411-445

2. Stoica, A., 1978 – Quantitative Angaben uber das Macrofitobentos des Vordeltas der Donau, 20 Int. Tag. Arbeitsgemeinsch. Donauforsch., sept., Kiev, p. 144-146

3. Stoica, A., 1980 – Dinamica cantitativă a microfitobentosului pelagic maritim a Dunării, Hidrobiologie, 16, p. 83-89

4. Szemes, G., 1967 – Das Phytobentos der Donau, Limnologie der Donau, Stuttgart, 3, p. 225-241

5. Gaumes, G., 1967 – Systematische Verzeichnis der Pflanzenwelt der Donau, Limnologie der Donau, 3, p. 70-131
6. Vădineanu, A., Botnariuc N., Sergiu C., 1989 – Tranziții ale stării trofice ale ecosistemelor acvatice din Delta Dunării în perioada 1981-1987, Ocrotirea naturii și med. înconj., 33, p. 27-34
7. Vladimirova, K., 1978 – Phytobentos Dnepra, egovodochraniise i Dneprovsko-Bugscogo limana, Nauk. Dumka, Kiev, p. 230
8. Danilov, I.E., 1989 – Vodorosli obrastanii i gruntov Ghidigicscogo vodohranilișca, Bot. issled., Chișinău, 5, p. 116-123
9. Kosticova, L.E., 1980 – Vodorosli perifitonu na Phragmites australis u Kirvskomu vodoshovișci, Ucr. bot. jurnal, 37, 3, p. 18-24
10. Kosticova, L.E., T.I. Mitkovscaia, 1986 – Vidovoi sostav vodoroslei perifitona Dneprovskih vodohranilișci, Vopr. ecol., fiziologi ispolzovania vodoroslei, Kiev, Institut hidrobiologi., I, p. 2-43
11. Obuch, P.A., 1962 – De Chytridiochloris scherffelii in URSS inventa, Not. systemat. sec. cryptogam. Inst. Bot. V. Komarovii Acad. Sci. URSS, Leningrad XV, p. 57-62
12. Șalaru, V.M., 1962 – Materialy po fitobentosu malih vodohranilișci Moldavii, Biol. resurs. vodoem. Moldavii, Chișinău, I, p. 40-45
13. Șalaru, V.M., 1970 – Diatomoviie epifity Kuciurganscogo limana, Biol. resurs. vodoem. Moldavii, Chișinău, 6, p. 41-46

TABLE I
The composition of periphyton on different substrata

Phylums	Substratum algae						
	Cladophora glomerata	Oedogonium sp.	Rhizoclonium hieroglyphicum	Enteromorpha prolifera	Spirogyra sp.	Ulothrix subtilissima	Synedra tabulata
Cyanophyta	17	7	4	2	–	1	–
Bacillariophyta	70	20	7	3	3	1	–
Chrysophyta	1	–	–	–	–	–	–
Euglenophyta	1	–	–	–	–	–	–
Xanthophyta	6	–	–	–	–	–	1
Chlorophyta	14	6	3	3	1	–	1
Total	109	33	14	8	4	2	2