

Qualitative and Quantitative Considerations of Phytoplankton and Zooplankton, in the First Sector of Maritime Danube, Cotu Pisicii – Gropeni

Lucica GERU¹⁾, Angela TREFIMOV²⁾, Daniel COCAN³⁾, Vioara MIREȘAN³⁾,
Viorel MICLĂUȘ³⁾, Ionel RADU⁴⁾

¹⁾Sanitary-Veterinary Directorate and for Food Safety, Brăila, Romania

²⁾Institute for Development and Aquatic Ecology, Fishery and Aquaculture, Galați, Romania

³⁾University of Agricultural Science and Veterinary Medicine, Cluj, Romania; vmiclaus@usamvcluj.ro

⁴⁾Sanitary-Veterinary Directorate and for Food Safety, Galați, Romania

Abstract. Given the importance of phytoplankton and zooplankton (Bud *et al.*, 2004), assigned to two groups of organisms, the role of an essential component of aquatic ecosystem, these being the main source of oxygen and biomass. Our aim was to evaluate in terms of quality and quantity the plankton of the Danube, in Cotu Pisicii–Gropeni sector. For this we have proposed the following objectives: plankton harvesting in two different points (station 1 Galați, respectively station 2 Brăila); quantitative assessment of collected plankton; plankton preservation using the establish techniques; qualitative analysis of plankton in the laboratory by determining the species and their share of total; dissemination of the results.

Keywords: phytoplankton, zooplankton, abundance, quality, environmental factors

Introduction. The plankton is a community of plant and animal organisms, which in the ontogenetic period or only in certain stages of its floats free, more or less passive, in the water layers (Oprea *et al.*, 2000). Given the importance of phytoplankton and zooplankton (Bud *et al.*, 2004), assigned to two groups of organisms, the role of an essential component of aquatic ecosystem, these being the main source of oxygen and biomass. Starting from the concept that fish species diversity grows with the decreasing altitude (Bănărescu, 1964), it becomes evident the important role that phyto and zooplankton is presented in the lower Danube.

Aims and Objectives. Our aim was to evaluate in terms of quality and quantity the plankton of the Danube, in Cotu Pisicii–Gropeni sector. For this we have proposed the following objectives: plankton harvesting in two different points, station 1 Galați, respectively station 2 Brăila; quantitative assessment of collected plankton; plankton preservation using the establish techniques; qualitative analysis of plankton in the laboratory by determining the species and their share of total; dissemination of the results.

Materials and Methods. Plankton samples were collected between May and September of 2010, in both stations. For plankton harvesting were used grids with openings size no. 25, which has been filtered 30 liters of water each. For the qualitative evaluation of samples, they were preserved in formaldehyde 4% and were transported to the laboratory, where we performed the planktonic species identification.

Results and Discussions. At the level of the phytoplankton structure there were found algae species, belonging to five systematic groups (*Cyanophyta*, *Bacillariophyta*, *Chlorophyta*, *Euglenophyta*, *Crysophyta*). For *Chlorophyta* class, there were identified 11 taxonomic units, of which the best representation had *Coelastrum microporum*, *Crucigenia tetrapedia* and *Tetraedron minimum*. For *Bacillariophyta* class there were identified 22

taxonomic units. The number of this taxonomic units identified in this class, is the greatest of all five classes. For *Cyanophyta* class there have been identified just three taxonomic units (*Anabena circinalis*, *Oscillatoria tenuis* and *Oscillatoria sp.*), presents at both sampling stations. For *Crysophyta* class were identified a number of 2 taxonomic units (*Cryptomonas marsoni* and *Peridinium sp.*). For *Euglenophyta* class there were identified a number of 2 taxonomic units at Galați station (*Dinobryon sertularia*, *Euglena viridis*, *Phacus pleuronectes* și *Strombomonas fluviatilis*) and 3 taxonomic units at Brăila station (*Euglena viridis*, *Phacus pleuronectes* and *Strombomonas fluviatilis*). Algae populations are greatly influenced by the conditions offered by the river water, such as composition and the temperature, solar lighting and turbidity. How in June 2010, the Danube river presented a relatively high turbidity due to flooding that occurred in this month, the algal species were underrepresented in terms of quality in this period, due to high turbidity, which negatively affected their development. In the overall analysis of the results, it was a slight increase of fauna content, from upstream to downstream. This is the result of the stagnophyle species input, arising from the flooding that took place in June. With the exception of June, phytoplankton analyzes revealed an algal flora with a large number of taxonomic units, that increasing from upstream to downstream, due to the widening of the ecological spectrum of Danube in the first two sectors, spectrum materialized in the intake of algae from the affluent. The general assessment of plankton biomass showed that it ranged between 43 and 185 mg/mc (43-621 mg/mc, Ciolac, 1998). The water analysis from both sampling station, showed the presence of zooplankton, this being represented by a number of 15 species, belonging to the following systematic groups: *Rotatoria*, *Cladocera* and *Copepoda*. On their share of zooplankton structure in the Danube water, during the study, have reached to the following results: rotifers had a share of 75.20% in the Galați station and 73.80% in the Brăila station; copepods were represented 10.40% in the Galați station and 13.50% in the Brăila station; *Cladocera* class was present in rate of 14.40% at Galați station, respectively 12.70% at Brăila station. In the quantitative terms, rotifers prevailed in spring and early autumn; copepods showed variations, reporting a low frequency in April, afterwards their number increased in September. Cladocers were presented in the studied period, predominantly in May, July, August and September. Like the phytoplankton, flood waters from June, brought in the Danube a significant amount of zooplankton. Before flooding, the quantity of zooplankton was 89 ex./L, and after the flood the quantity of zooplankton was 1.430 ex./L. High amount of suspension in June due to floods, has influenced negatively the zooplankton development. The low water flows recorded during the summer-autumn has negatively influenced the offspring development resulting from natural reproduction. Zooplankton biomass in the Danube in the studied sectors, ranged between 312-800 mg/mc. Although quantitatively, zooplankton of the Danube is well below the level of the lakes, although it represents an important link in the food chain of the river and a compulsory stage in ontogeny and fish feeding, knowing that during larval and juvenile stages they feed on zooplankton organisms.

Conclusion. Phytoplankton analysis showed the presence of five systematic groups: *Bacillariophyta* (50.70% to Galați and 49.20% to Brăila), *Chlorophyta* (27.80% to Galați and 31.40% to Brăila), *Euglenophyta* (10.70% to Galați and 9.90% to Brăila), *Cyanophyta* (6.30% to Galați and 5.40% to Brăila) and *Crysophyta* (4.40% to Galați and 4.10% to Brăila), the number of taxonomic units increasing from upstream to downstream by bringing the algae of the affluents. Zooplankton analysis from two sampling stations showed the presence of a number of 15 species, belonging to the following systematic groups: *Rotatoria* (75.20% to Galați and 73.80% to Brăila), *Copepoda* (10.40% to Galați and 13.50% to Brăila) and *Cladocera* (14.40% to Galați and 12.70% to Brăila), the density increasing by the upstream to downstream, by the input of the affluents.

REFERENCES

1. Oprea, L. and Georgescu Rodica (2000). Nutriția și alimentația peștilor. Ed. Tehnică, București.
2. Bud, I., Diaconescu Ș. and Mudure M. (2004). Creșterea crapului și a altor specii de pești. Ed. Ceres, București.
3. Bănărescu, P. (1964). Fauna Republicii Populare Române, *Pisces-Osteichthyes*. Ed. Academiei Republicii Populare Române, București.
4. Ciolac, A. (1998). Studiu privind fitoplanctonul din Dunărea predeltaică. Analele Științifice ale Institutului Național de Cercetare-Dezvoltare Delta Dunării, 10-13.