

BASIC DATA ON THE FISH COMMUNITIES FROM THE HYDROGRAPHIC BASIN OF THE PREAJBA VALLEY

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Abstract. *The paper presents the preliminary results of an ecological study developed between July 2008 and September 2009, which aims at rendering as accurately as possible the situation of the fish communities from a special category of ecosystems (small basins located along the Preajba Valley). There have been studied the 11 basins built along the Preajba Valley and two basins from the Bătrâna Strem, which is a tributary of the Preajba River; we have identified 10 fish species so far. The lacustrine complex called the Preajba Valley is included on the list of protected areas from Dolj County because of its ecological features and geographical location.*

Keywords: *the Preajba Valley lacustrine complex, eutrophic, ichthyofauna.*

Rezumat. Date preliminare referitoare la comunitățile piscicole din bazinul hidrografic Valea Preajba. *Lucrarea prezintă rezultatele preliminare ale unui studiu ecologic început în perioada iulie 2008-sept.2009, încercând să redeva cât mai exact situația comunităților piscicole dintr-o categorie specială de ecosisteme (lacurile mici de baraj Valea Preajba). S-au luat în studiu cele 11 lacuri formate pe cursul râului Valea Preajba și 2 lacuri formate pe cursul pârâului Valea Bătrâna afluent al râului Valea Preajba, fiind identificate un număr de 10 specii de pești. Complexul lacustru Valea Preajba este inclus în lista ariilor protejate din județul Dolj, datorită particularităților sale ecologice și a poziției geografice.*

Cuvinte cheie: *Complex lacustru Valea Preajba, eutrof, ihtiofauna.*

INTRODUCTION

The Preajba Valley lacustrine complex makes part of the category of aquatic eutrophic ecosystems; it is characterized by a great production of the aquatic and paludous macrophytes, of the planktonic and benthonic populations, which led to the colmatage of the first basin of this lacustrine complex and then of the last two basins, where water surface has almost entirely disappeared. The analysis of the physical-chemical indicators allowed us to establish a correlation between the obtained results and the fish populations present within the basins.

MATERIAL AND METHOD

The obtained data are the direct result of the field research; we used different tools for fishing, such as fishing rod, semi-automatic shooting rod, landing net, as well as repeated surveys among fishermen with regard to the fish communities, as the area in question is well known for sport and entertaining fishing. We took water samples from the most representative basin (basin IV) and from the streams' area in order to establish the correlations between the fish populations and the water chemistry as an indicator of the basins' quality; the samples were analysed in the laboratory of Dolj EPA, the data allowing us to draw preliminary conclusions with regard to the fish communities and their relation with the water quality of the basins.

RESULTS AND DISCUSSIONS

The Preajba Valley lacustrine complex is located 6 km south of Craiova, between the settlements of Cârcea and Făcăi; it is characterized as a geographical unit belonging to the Oltenia Plain (Fig. 1).

The ecological feature is that, within a limited geographical space, no larger than 30 sq km, there appears a great diversity of aquatic ecosystems (springs, streams, rivers, basins, and marshes), each of these imposing their own features to the biocoenoses and to the plant and animal populations. Through the damming of the Preajba Valley river, a tributary of the Jiu River in its lower sector, and of the Bătrâna Valley Stream, there appeared 13 small basins (Fig. 2) the surfaces of which varies between 0.4 and 4.2 hectares.

Hydrobiological research occurred in the area ten years ago (CIOBOIU, 1999) and the analysis of the main physical-chemical indicators emphasized that the water was characteristic to eutrophic ecosystems. The values of the pH oscillate between 7.29 and 8.64, in concordance with the content of bicarbonates of 414-695 mg/l. The amount nitrogen is relatively high, 18.5 mg/l, due to the nutrients resulted from the utilization of mineral and organic fertilizers in the neighbouring agricultural fields. The presence of the nitrites is the consequence of the oxidation activity of the abundant organic matter from water and soil. The same explanation is valid also for the presence of the phosphate ions (PO_4^{3-}) the concentration of which reaches even 7.9 mg/l. From the surface water quality point of view, the small basins from the Preajba Valley belong to the 2nd category and they can be used for pisciculture, as well as for tourist and entertainment purposes (CIOBOIU & BREZEANU 2002). Taking into account that the main supply source of the basins is represented by the 50 terrace springs, we took water samples from both the basin (VI), the most representative one, and

the streams located in the spring area for the analysis of the main physical-chemical indicators and the correlation of the results with the fish populations present in the basins.



Figure 1. Location of the Lacustrine Complex within the area (according to CIOBOIU, 2002).
 Figura 1. Localizarea Complexului lacustru în zonă (după CIOBOIU, 2002).



Figure 2. Sketch of the Preajba Valley lacustrine complex from the Oltenia Plain (according to CIOBOIU, 2002).
 Figura 2. Schița complexului lacustru Valea Preajba din Câmpia Olteniei (după CIOBOIU, 2002).

Table 1. Physical-chemical indicators analysed in the sample taken from basin VI.
 Tabel 1. Indicatori fizico-chimici analizați în proba apei lacului VI.

Crt. no.	Analysed indicators – sample basin VI	Measured value	Admitted limits According to O 161/2006 2 nd quality class	Analysis method	Used equipments
1.	pH	7.5	6.5	SR.ISO 10523 - 97	ORION 420A, series 049576
2.	CCOCr mgO ₂	9.5	25	SR ISO 6060- 96	-
3.	Fixed residue mg/L	375	750	STAS 9187 - 84	Electronic scales PRECISA 205A, series 69674
4.	Conductivity μS/cm	750	-	STAS 7722 -84	-
5.	Nitrites mg/L	0.023	0.1	STAS 3048 -90	Spectrophotometer DR 2000, nr. Series 930700025411
6.	Nitrates mg/L	10.5	13	Method 355	Spectrophotometer DR 2000, nr. Series 930700025411
7.	Ammonium ion mg/L	0.35	1.0	STAS 3049- 86	Spectrophotometer DR 2000, nr. Series 930700025411
8.	Hardness German degrees	21.78	-	STAS 3026-76	-
9.	Calcium mg/L	83	100	STAS 3662- 62	-
10.	Magnesium mg/L	45	50	STAS 66-74	-

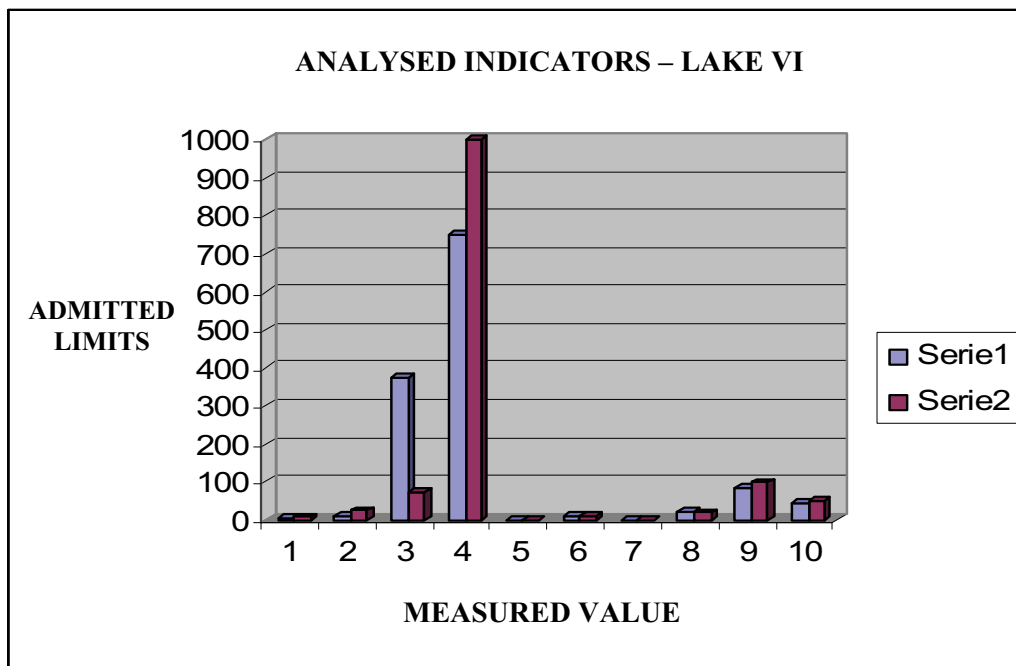


Figure 3. Graphic representation of indicators analysed in the sample taken from basin VI.
 Figura 3. Reprezentarea grafică a indicatorilor analizați în proba apei lacului VI.

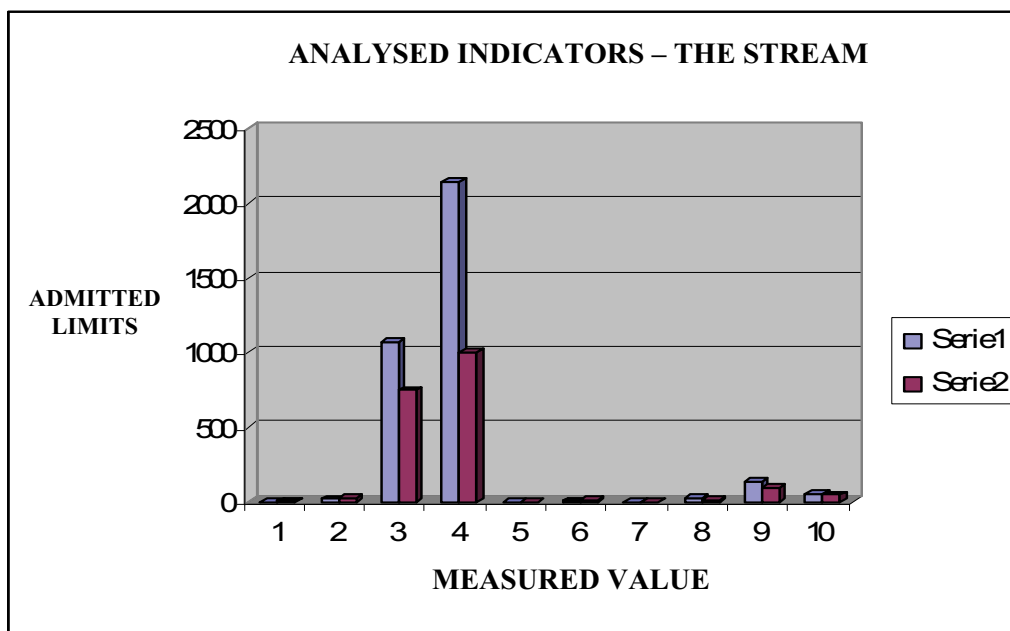


Figure 4. Graphic representation of indicators analysed in the sample taken from the stream.
 Figura 4. Reprezentarea grafică a indicatorilor analizați în proba apei de pârâu.

Table 2. Physical-chemical indicators analysed in the sample taken from the stream.
Tabel 2. Indicatori fizico-chimici analizați în proba apei de pârâu.

Crt. no.	Analysed indicators – sample basin VI	Measured value	Admitted limits According to O 161/2006 2 nd quality class	Analysis method	Used equipments
1.	pH	7.5	6.5	SR.ISO 10523 - 97	ORION 420A, seria 049576
2.	CCOCr mgO ₂	21.6	25	SR ISO 6060- 96	-
3.	Fixed residue mg/L	1070	750	STAS 9187 - 84	Electronic scales PRECISA 205A, seria 69674
4.	Conductivity μ S/cm	2140	-	STAS 7722 -84	-
5.	Nitrites mg/L	0.023	0.03	STAS 3048 -90	Spectrophotometer DR 2000, nr. Series 930700025411
6.	Nitrates mg/L	10	13	Method 355	Spectrophotometer DR 2000, nr. Series 930700025411
7.	Ammonium ion mg/L	1.99	1.0	STAS 3049- 86	Spectrophotometer DR 2000, nr. Series 930700025411
8.	Hardness German degrees	33.44	-	STAS 3026-76	-
9.	Calcium mg/L	142	100	STAS 3662- 62	-
10.	Magnesium mg/L	61	50	STAS 66-74	-

There were analysed the most representative physical-chemical indicators rendering the quality of the water from the lacustrine complex. Thus, in the group “oxygen regime”, we measured the chemical consumption of oxygen; in the group “general ions, salinity”-electric conductivity, dry fixed residue, calcium, magnesium; for the acidification state-pH and for nutrients-nitrates + nitrites and ammonium (Table 1, 2; Fig. 3, 4).

The water reaction is alkaline, pH<8.5, which emphasizes a satisfactory dissolving of the oxygen that is favourable from the piscicultural point of view.

Oxygen consumption is much higher in the stream area as compared to the one in the basin, which means there is no risk of fish asphyxiation.

With regard to the fixed residue, there are high values that exceed the maximum admissible ones in the area of the stream, which means an increased content of mineral salts induced by the climatic factors; thus, the water of the basin belong to the 2nd category of quality, while that of the stream to the 3rd category (MĂLĂCEA, 1969).

As for the values of the ammonium ion, the stream sample indicated a concentration higher than the maximum admissible one, which proved the decomposition of the organic matter.

Nitrates represent the final oxidation stage of the organic nitrogen and the low registered values do not represent a danger for the flora and fauna of the area.

The value of the electric conductivity exceeds the maximum admissible value as it is a result of the stream water mineralization degree.

Total hardness is higher than normal in both cases due to the presence of the metallic cations. With regard to the presence of calcium ions, the sample from the stream indicates higher values than the maximum limit of < 100 mg/l, which means the water belongs to the 2nd category of quality corresponding to the β -mezosaprobe zone (appropriate impurification) (MĂLĂCEA, 1969).

Magnesium ions impose water hardness meaning the basin water belongs to the 4th category of quality corresponding to the polysaprobic zone (extremely high impurification). Thus, by analysing the most representative physical-chemical indicators we may conclude that the values of the stream sample exceed the maximum admissible values, which means they influence certain organoleptic indicators, as well (taste, smell, colour, turbidity, and pH), but these indicators do not hold a great importance for the aquatic biota, including fish populations, as the supply of the basin is made from many sources and the dilution and physical-chemical transformations modify the discharge of the basin.

Most of the basins are invaded by paludous and aquatic macrophytes, which is a feature of the eutrophic ecosystems (ANTONESCU, 1963); but, phytoplankton does not have proper development conditions here. 20-30 percent of the basins' surface is covered by paludous macrophytes that develop within shallow areas that surround as a thick belt the shore of the basins (especially in the upstream area of the basins). The main species of paludous and aquatic macrophytes are – *Phragmites communis* TRIN, *Typha angustifolia* L., *T. latifolia* L., *Nuphar luteum* L., *Scirpus lacustris* L., *Polygonum amphibium* L., *Heleocharis palustris* L., *Juncus effuses* L., *Potamogeton natans* L., *Mentha aquatica* L., *Carex riparia* L., *C. hirta* L., *Sagittaria sagittifolia* L., *Miriophyllum spicatum* L., *Ceratophyllum submersum* L.

The geomorphologic, hydrologic, and hydrochemical features, macrophytes areas, as well as the structure of the benthic facies emphasize the environment where fish populations develop, which represents one of the most important components of the basin biological production.

Thus, the presence or the absence of the fish populations from one or another basin represents characteristics determined by their ecological structure and the pressure exerted by the abiotic and biotic environment. By seasonal fishing, there were identified 10 fish species in the basins from the Preajba Valley (Table 3).

Table 3. Species from the basins (lakes) located in the Preajba Valley basin.
Tabel 3. Speciile întâlnite în lacurile din bazinul Valea Preajba.

Cypriniformes Order Cyprinoidei Sub-order Cyprinidae Family	<i>Cyprinus carpio</i> LINNAEUS, 1758
	<i>Carassius gibelio</i> (BLOCH, 1782)
	<i>Alburnus alburnus</i> (LINNAEUS, 1758)
	<i>Pseudorasbora parva</i> (TEMINK&SCHLEGEL, 1848)
	<i>Rutilus rutilus</i> (LINNAEUS, 1758)
	<i>Scardinius erythrophthalmus</i> (LINNAEUS, 1758)
	<i>Abramis brama</i> (LINNAEUS, 1758)
Percidae Family	<i>Perca fluviatilis</i> LINNAEUS, 1758 <i>Sander lucioperca</i> (LINNAEUS, 1758)
Centrarchidae Family	<i>Lepomis gibbosus</i> (LINNAEUS, 1758)

CONCLUSIONS

- The Preajba Valley lacustrine complex is located 6 km south of Craiova, between the settlements of Cârcea and Făcăi; it is characterized as a geographical unit belonging to the Oltenia Plain.
- The ecological feature is that, within a limited geographical space, no larger than 30 sq km, there appears a great diversity of aquatic ecosystems (springs, streams, rivers, basins, and marshes).
- Through the damming of the Preajba Valley River, a tributary of the Jiu along its lower sector, and of the Bătrâna Valley Stream, there appeared 13 small basins the surface of which varies between 0.4 and 4.2 hectares.
- We took water samples from one basin (basin IV) and from the streams' area in order to analyse the main physical-chemical indicators and to establish a correlation between the results and the fish populations present in the basins.
- From the surface water quality point of view, the small basins from the Preajba Valley belong to the 2nd category and they can be used for pisciculture, as well as for tourist and entertainment purposes.
- 20-30 percent of the water surface is covered by paludous macrophytes that develop in shallow water that surrounds like a large belt the shores of the basins (especially in the upstream areas of the basins).
- In the 13 basins from the Preajba Valley, there were made seasonal fishing which led to the identification of 10 species belonging to one order and three families.

REFERENCES

- ANTONESCU C. S. 1967. *Biologia apelor*. Ediția a II-a. Edit. Didactică și Pedagogică. București: 1-500.
- CIOBOIU OLIVIA. 2002. *Gastropodele lacurilor mici de baraj din Câmpia Olteniei*. Edit. Sitech. Craiova: 1-16.
- CIOBOIU OLIVIA, BREZEANU GH. 2002. *Hidrobiological Particularities of some small Eutrophic Reservoirs within the Hydrographical Basin of the Jiu*. Limnological Reports. **34**. Tulcea. România: 275-287.
- MĂLĂCEA I. 1969. *Biologia apelor impurificate*. Edit. Academiei R. P. R. București: 61-83.

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