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RESEARCHES REGARDING ICHTHYOFAUNA FROM NADRAG RIVER BASIN

CERCETĂRI PRIVIND IHTIOFAUNA DIN BAZINUL RÂULUI NĂDRAG

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On this research is showing the present situation of the fish genostock in the Nadrag River, an important confluent of the Timis river, being part of the Banat hydrographical area. The fish species caught in the investigated area are part of Cyprinidae family. The dominant species is Barbus meridionalis petenyi, followed by Alburnoides bipunctatus, incorporating the investigated area in the European grayling (Thymallus thymallus) or the Mediterranean barbel (Barbus meridionalis petenyi) zone of the running waters. At present the Barbus meridionalis petentyi population from the area investigated founds itself in a regression, fact that can be connected both with the poaching and with unauthorized hydrotechnic buildings build-up in the last decade.
Key words: specie, *Barbus meridionalis petenyi*, river ichthyofauna, O_2.

Introduction

Following the antropic activities from the last 40-50 years, the native ichtiofauna from the natural streams suffered important quantitative and structural alterations due to water pollution, hydrotechnic buildings (fig. 1), agricultural intensive exploitations and because of the uncontrolled fishery.

Because of this reasons it is necessary to know the exact native fish stock and of those acclimatized in order to reform, preserve and scientific administer the existent fish genostock.

Materials and Methods

The present study sets forward the present situation of the fish genostock from the Nadrag river (table 1), part of the Banat hidrographic area.

The research area was covered between the entrance in Jdioara locality and the river outfall.

The collection of the biological material was made with the fresh water trawl (L 6 m, l 1.5 m, the eye net 0.7/0.7 cm), in seven different places, with a total of 18 collections.

Table n^{o}. 1

Hydrological regime characteristics [DAB, 2003]

River	Altitude (mdM)	Multiannual mean debit	Monthly debit with assurance (m^3/s)			Qm/QM
			80 %	90 %	96 %	
Timiş hydrographic basin						
Nădrag	742	0.734	0.140	0.112	0.090	1/1516.67

mdM –meters above sea level (Black Sea)
Qm/QM – minimum debit versus mean debit report.

The geographical coordinate of investigation points were established with the help of an GPS that indicated the next positions with an accuracy of 0,8 m:

- point I of collection: 45.62º N, 22.11º E, 204 m altitude;
- point II of collection: 45.61º N, 22.11ºE, 195 m altitude;
- point III of collection: 45.61^{o} N, 22.108^{o} E, 163 m altitude;
- point IV of collection: 45.61^{o} N, 22.1^{o} E, 161 m altitude;
- point V of collection: 45.62^{o} N, 22.09^{o} E, 149 m altitude;
- point VI of collection: 45.62^{o} N, 22.09^{o} E, 136 m altitude;
- point VII of collection: 45.612^{o} N, 22.072^{o} E, 117 m altitude.

The classification of the collected material consisted in:

- isolation of the subjects on species;
- the determination of biological integrity parameter (BIP);
- the determination of both bio-mass and supply (the surface of every collection point was of 100 m^2 water area);
- knowledge of fishy associations through determination of some ecological coefficients.

On the present research are exhibit also the chemical feature who might directly influence the dynamic of aquatic biocenosis. The chemical values established on the collecting points were the water solved oxygen, oxygen saturation, pH, water hardness, nitrites and nitrates.

Results and Discussions

As a result of these researches it was observed that on the investigated area there can be encountered eight fish species , belonging to a single family: the Cyprinidae:

- *Barbus meridionalis petenyi* (fig. 2), 38 subjects (Np);
- *Phoxinus phoxinus*, 7 subjects (Np);
- *Alburnoides bipunctatus*, 33 subjects (Np);
- *Alburnus alburnus*, 5 subjects (Np);
- *Gobio albipinnatus*, 1 subjects (Np);
- *Leuciscus leuciscus*, 11 subjects (Np);
- *Leuciscus cephalus*, 1 subjects (Np);
- *Nemacheilus barbatulus*, 1 subjects (Np).

N – nativ specie
p - present

Fig. 1. Hydrotechnic building on Nadrag river (original photo).

Fig.2. *Barbus meridionalis petenyi* (original photo).

The food structures of the populations from the investigated points are presented in the table number 2.

Table n^{o}. 2.

The food spectrum of the fish in the Nadrag river basin

No.	Specie	Nutrition type						
		Carnivore	Omnivorous	Zooplanktonophagus	Benthonophagus	Detritophagus	Herbivorous	Entomophagus
1.	*Barbus meridionalis petenyi*				XX	X		
2.	*Phoxinus phoxinus*				XX	X		
3.	*Alburnoides bipunctatus*				XX	X		
4.	*Alburnus alburnus*			X	(X)		X	X
5.	*Gobio albipinatus*				XX	X		
6.	*Leuciscus leuciscus*	X	XX					
7.	*Leuciscus cephslus*	X	XX					
8.	*Nemacheilus barbatulus*				XX	X		

Table n^{o}. 3.

Body measurements accomplished on the captured species on the Nadrag river

Specie	Body measurment				Fish mean age (years)
	Body total length (cm)		Corporal weight (g)		
	Average				
	♂	♀	♂	♀	♂ / ♀
Barbus meridionalis petenyi	11.61	17.11	15.35	56.18	1.5-4
Phoxinus phoxinus	4.46	6.52	0.97	4.41	-
Alburnoides bipunctatus	9.09	9.99	6.97	9.77	3-7
Alburnus alburnus	8.7	10.7	5.85	13.22	3-6
Gobio albipinatus	11.6	-	13.02	-	3
Leuciscus leuciscus	12.6	12.8	18.37	19.78	2-3
Leuciscus cephslus	17.6	-	63.49	-	2-3
Nemacheilus barbatulus	9.4	-	6.93	-	-

Tabel n^{o}. 4

The stock and the ichthyofauna bio-mass for the collected species from Nadrag river

Collection date and year	SPECIE – NUMERIC STOCK (ex/60 m^2)								Total stock / collection point	
	Barbus meridionalis petenyi	*Phoxinus phoxinus*	*Alburnoides bipunctatus*	*Alburnus alburnus*	*Gobio albipinatus*	*Leuciscus leuciscus*	*Leuciscus cephslus*	*Nemacheilus barbatulus*	Ex / 100 m^2	g / 100 m^2
2007 21.04-12.10	0.63	0.11	0.55	0.08	0.016	0.18	0.016	0.016	13.85	200.97

Table n^{o}. 5.

The determination of proposed integrity biological index (IBI) for grading the natural fish populations (from rivers, natural lakes and collection reservoirs) from the Basin of Nadrag River.

Parameters category	The parameter	Grading class		
		5	3	1
Structure and abundance in species	1.The total species number.	(>90% - abund.)	***3*** (50-90% -const.)	(< 50% - rar)
	2.Ciprinides total number	***5*** (>45%)	(1-5%)	(<1%)
	3.The native species total number	***5*** (>68%)	(35-67%)	(<34%)
Trophic structure of fish population	4.Bentonophags species population	***5*** (>45 %)	(200-45 %)	(<20%)
	5.The carnivorous species population	(> 5%)	(1-5%)	***1*** (<1%)
	6.The carnivourous and detritophagus species population	(<20%)	(20-45%)	***1*** (>45%)
	7.Herbivourous and detritophagus species population	(<25%)	(25-50%)	***1*** (>50%)
The stock and bio-mass of fish populationsi	8. Bio-mass (g/100 m^2)	(>1.000)	***3*** (100-1000)	(>100)
	9. Abundance (ex/100 m^2)	(>100)	***3*** (10-100)	(>10)

By making a sum of the values from the table 5, it can be observed the enflaming of the biological integrity degree of the studied aquatic ecosystem. The

integrity level of Nadrag river basin ichthyocenosis was moderate, being thereby distributed in the fifth class of integrity.

In the table number 6 is presented the frequency and the constancy for *Barbus meridionalis petenyi*, *Phoxinus phoxinus*, *Alburnoides bipunctatus* and *Alburnus alburnus*.

Table n^{o}. 6.

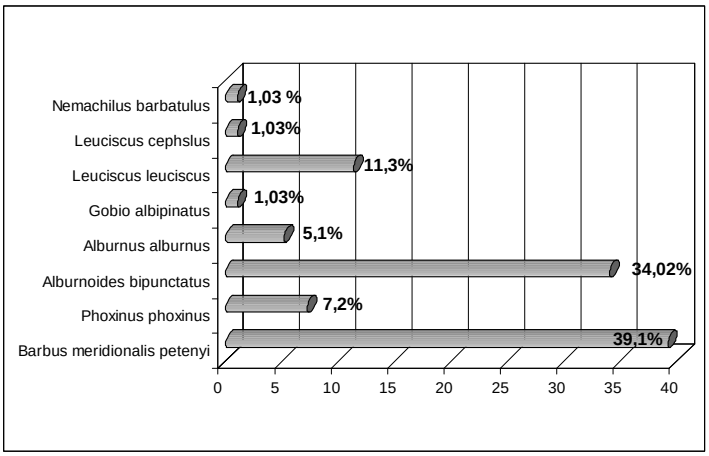
The frequency and the constancy for some captured species.

	Specia			
	Barbus meridionalis petenyi	*Phoxinus phoxinus*	*Alburnoides bipunctatus*	***Alburnus alburnus***
Frequency	**71.42 % permanent or characteristic species**	**21.42 % Occasional species**	**42.85 % Appendant species**	**21.42 % Accidental species**

>50 % - constant or characteristically species; 25-50% - Appendant species; <25% - accidental species.

Analyzing table number 6 it is observed that the subspecies *Barbus meridionalis petenyi* is characteristic to the studied area from the Nadrag river basin.

For a better pointing up of the species from the basin of the Nadrag river, we exhibited the diagram for the representation degree of each species formulated in percentage (graphic number 1).



Graphic n^{o}. 1. Representation degree of the captured species from the basin of Nadrag river

Barbus meridionalis petenyi has the greatest presence [39.18%], followed by the *Alburnoides bipunctatus* [34.0 – 2%]; the poorest representation was that of *Leuciscus cephalus* [1.03%], *Gobio albipinatus* [1.03%] and *Nemacheilus barbatulus* [1.03%].

Dates presented in the tables 3, 4, 5, 6 are valid only for the captures that took place at a maximum body height over 0.7 cm, because the trawl had the eyes of the net of 0.7 / 0.7 cm.

The mean values of chemical indicators pursued on the investigation area are presented in the table nº 7.

Table nº. 7

The mean value of chemical indicators from the basin of Nadrag river.

No	Observed indicators	The concetration of the chemical indicators	
		At the shore	to 1,5-2 m Toward the shore
1.	NO^-_2	0.02 mg/l	0.02 mg/l
2.	NO^-_3	2.5 mg/l	2.5 mg/l
3.	The quantity of O_2 solvite	9.56 mg O_2/l	9.7 mg O_2/l
4.	Saturation grade in O_2	100.19 %	101.04 %
5.	dH^O	6 dH^O	6 dH^O
6.	pH	8	8

The values of the O_2 decrease easily up-stream (204 m altitude) and down-stream (110 m altitude) because the oxygen solubility in the water depends on: atmospheric pressure, air and water temperature, the water salinity and the speed of the flowing (current) that is determined by the angle of the slope.

Analyzing the hardness of the water from Nadrag river in the seven checking points it can be observed that the analyzed water can be placed on the smooth water category (4-8 dH).

The value of N (quality indicator) as mineral compounds (nitrites, nitrate, etc) is diminished due to the fact that in the investigated area there are no important polluting sources with nitrogenous substances.

The mean pH value from Nadrag river is ranked at level 8, inducing a alkalinous chemical reaction of the water.

To establish the ecological status of the Nadrag river there were made analogies of the gathered values with the quality water levels of the order nº161 from 16 of February 2006 for the normative regarding the classification for the surface waters quality in order to establish ecological status of water bodies.

By analyzing the table nº 6, there can be drawn the conclusion that Nadrag river found itself on the first level of water quality class.

Conclusions

- The ichtyofauna from the basin of Nadrag river includes eight species, all of them being members of the same family (Cyprinidae).
- The prevalent specie on the investigated area is *Barbus meridionalis petenyi* (Mediterranean barbel) followed by *Alburnoides bipunctatus*.
- According with the prevailing fish species, the researched area belongs to the ecological zone of the *Thymallus thymallus* (European grayling), that can be replaced with *Barbus meridionalis petenyi*.

- At the present all the fish populations are in regression, phenomenon related with poaching and unauthorized hydrotechnics equipments on the investigated area.
- There is a need of immediate measures to protect the ichthyofauna due to the fact that in the basin of the river can be found protected species from the Habitation Directive.
- The value of the nitrogen (quality index) as mineral compounds (nitrites, nitrates, etc) is lowered because of the fact that in the investigated area there are no important polluting sources to produce nitrogenous substances.
- The direction 161 from 16th of February 2006 for the approval of the Normative regarding the classification of surface water quality in order to establish the ecological status of bodies of water, classifies the Basin of Nadrag River on the first level as quality.

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