UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE IAŞI

Research contract no.406/01.10.2007

Research topic:

MONITORIZAREA TRANSFORMARILOR PRIVIND AREALUL SI EFECTIVELE UNOR SPECII ENDEMICE DE PEŞTI DIN BAZINUL SUPERIOR AL BISTRITEI MOLDOVENESTI

MONITORING THE TRANSFORMATIONS CONCERNING THE AREAL AND THE AMMOUNT OF SOME ENDEMIC FISH SPECIES FROM THE UPPER BAZIN OF MOLDAVIAN BISTRITA RIVER

YEAR III

GRANT MANAGER,
Prof . univ. dr. PASARIN BENONE

I A Ş I 2008

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REPORT SYNTHESIS

GRANT MANAGER,
Prof . univ. dr. PASARIN BENONE

Report on the run activities and achieved results, compared with the project goals

TOPIC:

" MONITORIZAREA TRANSFORMARILOR PRIVIND AREALUL SI EFECTIVELE UNOR SPECII ENDEMICE DE PEŞTI DIN BAZINUL SUPERIOR AL BISTRITEI MOLDOVENESTI''

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IInd stage - 2009

ABSTRACT

Lately, the research concerning the delimitation, monitoring and preserving those ichthyotaxons submitted to extinction of the Romanian fauna in general and of the North-East part of Romania in particular has suffered a pronounced regress. There were few studies that focused on the refuge areas of the rare and endemic species offish of sweet water, having as habitat the mountain regions, their reproductive evolution, migrations, the impact of the invasive species, etc, the general emphasis being on thorough fundamental research regarding the species of major economic importance, the same species that represent the object ofaquaculture.

Few of these published studies can be labeled as non-disparate, systematized and of deontological probity, as many of them comprise data from the inhabitants near the banks, from sportive fishermen or different forestry employees.

We grafted the research in the Northeast region of the country because:

1. The superior area of the Moldavian Bistrita includes a series of singular biotope in Romania and Europe, assertion that is supported by the fact that this is perhaps the last zone where the huch (*Hucho hucho L*), grayling (*Thymallus thymallus L*. and eel (*Eudontomyzon danfordi)* etc. can still be found.

2. In the upper area of Bistrita there is a species of miller's thumb unique in Romania (another species of this fish was discovered only in Sweden), bearing the name of variegated miller's thumb (*Cottus poecilopus Heckel 1836*);

3. In the above mentioned area there will probably be an expansion of the vast hydro-technical devices, which will involve important geographical changes in the course of the Bistrita river, from the end of the lake Bicaz up to Vatra Dornei region.

Chaotic forestry exploitations have altered the equilibrium achieved in tens or hundreds of years, by removing sawdust from the riverbed of the emissaries, by wild rafting, by spilling used fuel and lubricants, sonic pollution, sunstroke, trepidations etc.

Keywords: endemic fish, Bistrifa River, invasive species, pollution

DETAILED ABSTRACT

The study aimed to characterize the state of ichthyofauna in an area where the river Bistrita, naturally, is included habitat of endemic species and endangered. At the same time, sought to find usable parts scientifically sustainable management of ecosystem integrity in the study.

Also, the results can be a database for further research, aimed at finding some changes to the structure and operation of fish communities in the area due to environmental factors and anthropogenic influences.

Research, both at the stage of evidence collection and processing phase and the evaluation results were achieved with modern principles, agreed nationally and internationally.

Thus, the results allow the formulation of conclusions consistent with results of other similar research bill, as follows:

• taxonomic analysis of the material collected shows the presence of 16 fish species, species belonging to seven families - Cyprinidae (6 species), Cobitidae (2 species), Cottidae (2 species), salmon (three species), Thymallidae (species) Petromyzomidae (one species) and Godidae (one species).

• With the spread of species in the study area is noted ubicvicitatea of nine species present in all three fishing stations, but most are small body size and without economic value or for fishing.

• Some habitats were found valuable species, rare or endangered (*Hucho hucho, Endomytizon danfordi, Cottus Cobiltis poecilopus and Balkan aurata*, protected by national legislation and international conventions.

• stock assessment and gravimetry expressed numerically catch per unit effort is equal to 100 m^2 catch made with 100 m gillnet, show values ranging between a minimum of 30 specimens/100 m^2 and 173 specimens/100 m^2 respectively 527 ± 0.29 per 100m^2 and 1800 ±1.28/100m^2.

• The ecological importance ihtiocenoze, assessed by corroborating structural characteristics and fractional, *Phoxinus phoxinus, Gobio gobio, and Leuciscus cephalus Alburnoides bipunctatus* are driving species without economic value, and *Salmo trutta fario, Hucho hucho, Cottus gobio and Leuciscus cephalus* are species characteristic of the area studied.

INTRODUCTION

Natural and anthropogenic changes are so current situation fish fauna of natural emissaries exteme considerable pressure to bear to find solutions to hazards warning constitutes a major demand, both in terms of management of the fisheries resources and the measures for ichthyofauna conservation and protection.

Through our study we proposed to update data on ichthyofauna fish in some mountain areas have been studied in the past (Bistrita river basin), and the premiere of some aspects of ecology of ichthyofauna consists of rare species and endangered.

Besides faunistic data, species list, we wanted to give information on aspects of ecology of fish populations and communities, addressed through analytical and synthetic indicators.

Biological evaluation of water quality study was done by IBI (Index of Biotic Integrity), according to the method adopted in the study area considered hidrogeographic (2, 7).

Information obtained on the condition of aquatic habitats and studied area ihtiocenoses allow the realization of the degree of change in the aquatic environment associated with measures of protection and conservation of fisheries and fishing funds.

MATERIAL AND METHOD

There were used for development work resulting release of exploratory fishing trips organized during the three months of 2006, using conventional fishing gear (gill nets, traps), respecting the methodology to calculate the reported catch "unity of effort equal (quantitative test).

During the study, were driven over 500 km of rivers, with a large area over 8700 km2, establishing three target study areas (upstream of Worcester, the confluence of the Bistrita Bistrita confluence with the brook and the brook Barnari Borca (Fig 1), 33 fish for the experiments performed in a number of three stations (upstream Wah), between Worcester and Brosteni between Brosteni and Bicaz lake).

In order to obtain conclusive results for a verification retultatelor and recorded data, further experiments were conducted in the field of laboratory tests, which refers to evidence of sewage effects on the behavior of species like green algae, and microcrustacee fish in contact with various concentrations of pollutants.

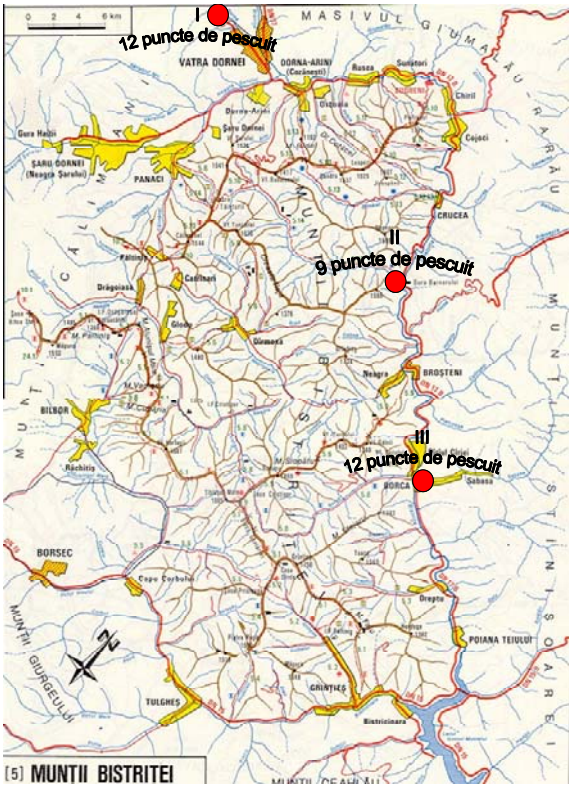

Fig. 1 Bistrița river and experimental fishing stations

RESULTS AND DISCUSSIONS

Variety of environmental conditions of water catchment of the river Bistrita biogeographical zoning allows one to fish in these waters. Thus, according to his clasificației Vermaux (1977), adapted and modified by Matthew and Manea (1990) in flowing water ecosystems in Moldova, according to the environmental performance of a particular fish biocenotip, there are nine socio-ecological groups (Fig. 2), of which the first four are found in physical-geographical and ecological conditions of the river Bistrita area studied (Fig. 2).

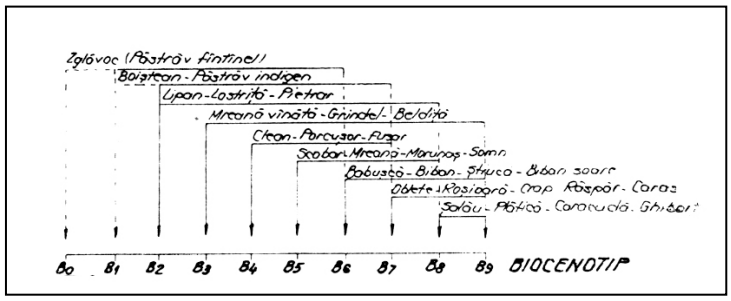

Fig. 2 Socio-ecological grouping of the main fishes from the freshwaters Moldova ecosystem (*after Verneaux, 1977 modified*)

Results obtained in fishing station no. I

a) On the taxonomic range of species

The Fishing Station No. 1 were collected from 284 individuals belonging to six species, most abundant species numerically accounted a piglet (*Phoxinus phoxinus*), with 140 individuals (46%).

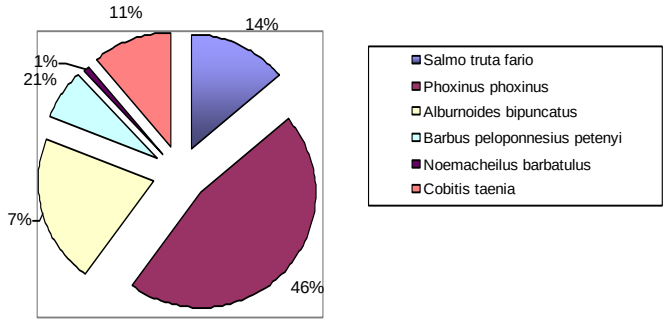

Fig. 3 Taxonomic spectrum of the ichtiocenosis in Fishing station I

b) Water Quality Index

Water chemical analysis revealed the following values: pH - 8.5; GH - 5; NH4/NH3 - 0 mg / l, NO2 <0.1 mg / l NO3 - 3 mg / l, Po4 - 0 1 mg / l.

c) The physical and geographical area

Minor bed of the river is 25-30 m wide, flat and fast flow facies. Natural banks, flat, herbaceous vegetation and shrubs (alder, willow). Land use is classified in categories of forest and grassland.

Stable substrate is composed of boulders and gravel between 25-250 mm between 2.5 and 25 mm, making the cover of the dominant elements of the bed, accompanied by sand, less than 2.5 mm and large stone blocks with ancillary. Natural sedimentary mineral. Coarse plant debris, branches, relatively abundant, following floods in previous days.

Results obtained in fishing station no. II

a) On the taxonomic range of species

The station no. Fishing II was collected a total of 127 individuals belonging to seven species, most abundant species number with increasing piglet (*Phoxinus phoxinus*), with 82 individuals (64.5%).

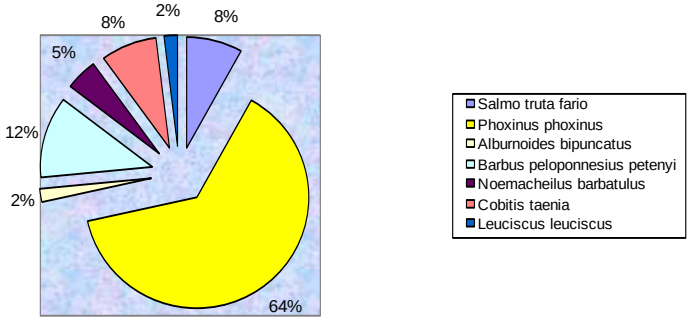

Fig. 4 Taxonomic spectrum of the ichtiocenosis in Fishing station II

b) Water Quality Index

Water chemical analysis revealed the following values: pH - 8.5; GH - 5; NH4/NH3 - 0 mg / l, NO2 <0.1 mg / l NO3 - 3 mg / l, Po4 - 0 1 mg / l.

c) The physical and geographical area

Minor bed of the river is 30-35 m wide, flat and fast flow facies. Banks are natural, flat, medium vegetation, grass and shrubs, particularly copies of alder and willow. The land is classified into categories of use pastures and rural housing. Stable substrate is composed of boulders and gravel between 25-250 mm between 2.5 and 25 mm, making the cover of the dominant elements of the bed bed, accompanied by sand, less than 2.5 mm and large stone

blocks with ancillary. Natrualã mineral sedimentation is evident. Coarse plant debris, branches, relatively abundant, following floods.

Results obtained in fishing station no. III

a) On the taxonomic range of species

The station no. III fishing has been collected a total of 148 individuals belonging to eight species, most abundant species number with increasing piglet (*Phoxinus phoxinus*), with 62 individuals (42%).

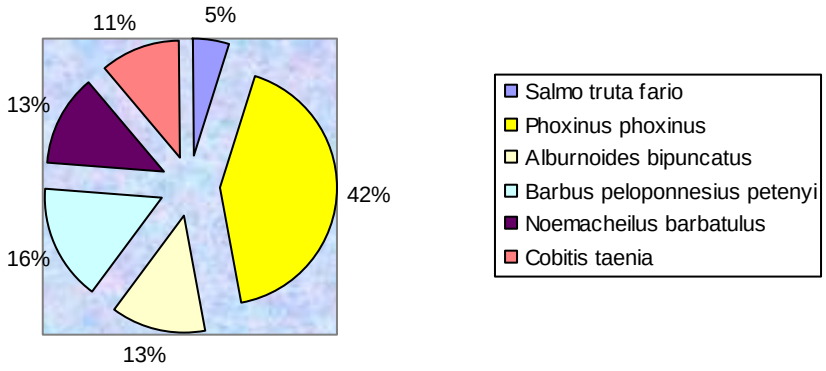

Fig. 5 Taxonomic spectrum of the ichtiocenosis in Fishing station III

Table 1

Data related to main ecologic, analytical and synthetic indices, for the fish species captured in the river Bistrița stations, with fishing tools

Nr. crt.	Species	Numeric abondance	Constancy		Dominance		Ecologic significance index	
			(%)	Class	(%)	Class	(%)	Class
1	Salmo trutta fario L. 1758	4	75	C3 constant	0,68	D1 subrecedent	0,51	W2 Accesory
2	Barbus peloponnesius petenyi H. 1847	87	75	C3 constant	15,00	D5 eudominant	11,25	W5 Characteristic
3	Alburnoides bipunctatus Bl. 1752	57	75	C3 constant	9,82	D4 Dominant	7,36	W4 Characteristic
4	Alburnus alburnus L. 1758	2	25	C1 accidentală	0,34	D1 subrecedent	0,08	W1 Incidental
5	Leuciscus cephalus L. 1758	52	75	C3 constant	8,96	D4 Dominant	0,72	W4 Characteristic
6	Cobitis taenia L. 1758	32	75	C3 constant	5,51	D4 Dominant	4,13	W3 Accesory
7	Phonixus phonixus L. 1758	315	100	C4 euconstant	54,31	D5 eudominant	54,31	W5 Characteristic
8	Gobi obtusirostris V. 1844	3	75	C3 constant	0,51	D1 subrecedent	0,38	W2 Accesory
9	Noemachelus barbatulus L. 1758	28	75	C3 constant	4,82	D3 subdominant	3,61	W3 Accesory

b) Water Quality Index

Chemical analysis of water showed the following values: pH - 8.5; GH - 5; NH4/NH3 - 0 mg / l, NO2 <0.1 mg / l NO3 - 3 mg / l, Po4 - 0.1 mg / l.

c) The physical and geographical area

Minor bed of the river is 30-35 m wide, flat and fast flow facies. Banks are natural, flat, with a luxuriant vegetation. The land is classified into the categories of forest use.

Stable substrate is composed of boulders and gravel between 25-250 mm between 2.5 and 25 mm, making the cover of the dominant elements of the bed bed, accompanied by sand, less than 2.5 mm and large stone blocks with ancillary. Natural mineral sedimentation is evident. Coarse plant debris, branches, relatively abundant.

CONCLUSIONS

Based on the results of statistical processing of data obtained were calculated for the estimated values allow the qualitative and quantitative characterization of fish communities and comparing them among themselves. These data were combined with physical-geographical data and chemical analysis of ground water, to estimate the degree of anthropogenic modification of natural ecosystems in the area.

• Chemical analysis of water showed a constant pH of 8.5 with a hardness of GH - 5; NH4/NH3 - 0 mg / l, NO2 <0.1 mg / l NO3 - 3 mg / l, Po4 - 0 , 1 mg / l. It noted the absence of ammoniacal nitrogen in all plants studied, which indicates positive because no domestic sources of pollution faeces.

• In terms of the constancy of species, indicating the continued presence of a species showing highlights *Phonixus phonixus* species as being present in all species euconstant ihtiocenoses investigated, followed by other species: *Leuciscus cephalus* L. 1758, 1847 H. *Barbusse peloponnesius petenyi* , 1844 V. *Gobi obtusirostris, Salmo trutta fario L.* 1758, 1752 Bl *Alburnoides bipunctatus*, *Noemachelus barbatulus L.* 1758, *Cobitis taenia* L. 1758, constant species caught in 75% of the samples.

• In terms of species dominance appreciate *Phonixus phonixus L. Peloponnesius petenyi H. Barbusse* 1758 and 1847 as eudominante species, with a major role in the establishment and operation of such ihtiocenoze typical mountain water moioagei area, except Station and the trout. Chub *Leuciscus cephalus L.* 1758, omnivorous species with high ecological plasticity successfully compete with species characteristic of the area. Extension of this species is an opportunistic consequence of deforestation, changes in bed bed and appearance of the dam lake.

Regarding the index of ecological significance is noted that the characteristic species are *Phonixus phonixus L.* 1758, followed by the species *H. Barbusse peloponnesius petenyi* 1847 1752 *Alburnoides bipunctatus Bl. Noemachelus* species *Barbatulus L.* 1758, 1758 *Cobitis taenia L., Salmo trutta fario L.* 1758, 1844 V. *Gobi obtusirostris* reached accessories species and species *Alburnus Alburnus L.* 1758 due to sporadic occurrence may be considered an accidental species.

• It is important to point out the presence of the species *Salmo trutta fario L.* 1758, *Barbusse peloponnesius* , especially the absence grayling *Thymallus thymallus*.

• In conclusion, based on comparison of the results of fishing with fishing assets, combined with previous studies results, we can say that of fish fauna of the river Bistrita, the section studied is affected by phenomena of deforestation and changes in the bed bed. Some of the valuable species, abundant in the past (grayling, trout), recorded experiencing a decline, their place being taken by Valuable species, small and growing number.

* *The goals and activities for 2008 year have been fully acomplished*

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