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

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

Execution phase

Stage I (single) 2007

REPORT SINTHESYS

GRANT MANAGER

Prof.univ. dr. Benone PASARIN

I A S I 2007

REPORT ON THE RUN ACTIVITY AND THE ACHIEVED RESULTS, COMPARED WITH THE PROJECT GOALS

TOPIC :

‘‘MONITORIZAREA TRANSFORMARILOR PRIVIND AREALUL SI EFECTIVELE UNOR SPECII ENDEMICE DE PESTI 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

STAGE I (SINGLE) 2007

GOAL SPECIFIC TO PHASE I

●1.1. Observation and analysis of the hidrobiologic conditions from the retreat habitats of the rare and almost extinct species

SCIENTIFIC AND MANAGERIAL ACTVITIES

1.1.1. Assessment of water quality (identification of pollution sources, self purging capacity, assessment of physic-chemical features)

1.1.2. Determination of sediment attributes in species habitation areas (biological and physicochemical attributes)

1.1.3. Evaluation of fish associations integrity in the studied area

1.1.4. Monitoring the development of activities in the final stage of the project

1.1.5. Following of the progress recorded during the final project stage

INTRODUCTION

Conservation of mountain water quality, including natural lakes and large hydro lakes of our country is a requirement of the Water Framework Directive 60 / 2000. EEC Directive 78/659, transposed by GD 202/2002, are set water quality standards to support fish life. Directive 91/216 EEC, implemented in our legislation through joint Ord 296/216/2005 MEWM MAFRD are set rules to protect water against pollution caused by nitrates from agricultural sources.

Fig. 1. Bistrița river

Directive 76/160 EEC, implemented in our legislation GD 88/2004, provided the requirements used for bathing water quality. All waters of the mountain, totaling thousands of miles, acres that body of water and a billion cubic meters volume, supporting sustainable development in neighboring communities, through their entertainment value, sport fishing and reacreative, hydrotherapy, bio or edibility water potential. Synchronous multiple uses and ensure these can only maintain water quality by European standards. One such use is bio fish of mountain lakes, produced in intensive farming of salmonids buoyant. Currently, three such farms already operate on Lake Bicaz, with a capacity of 230 t trout consumption per year and a farm on Lake Bradisor Valcea, with about 100 t trout per year. Overall potential of our mountain lakes is estimated (Miron, 1883) trout at about 10,000 tons / year, with a production value of about 100 million EUR freight.

Summing mountain waters about 16. 600 km, are located in 28 counties, and about 162 alpine lakes in the surface of 9600 ha.

In 2004 was implemented and remapping - evaluation funds in waters of the mountain, which clarified the requirements of juveniles for restocking.

For restocking these waters at their biogenic capacity, overheads trout in 2005 produced three million seedlings native trout, which were populated mountain waters.

In 2005, for sustainable management of living aquatic resources in the mountain waters managed directly by the director, have spent 286,434 lei (folk, repair of existing arrangements and making arrangements in November: spurs, Toplice, waterfalls), achieving revenue of 244 294 lei - made from the practice of sport fishing and fishing lease leased AGVPS funds, resulting in a loss of 42,140 lei.

National Forest manages the 26-way forest Romsilva a total of 49 trout, which occurred in 2005, 934.6 tons of trout for human consumption, with a value of 10,277,699 lei.

In 2005 there were organized training courses for the profession pisciculturist - trout for a total of 52 people, so the trout, currently works only qualified personnel with uniform remuneration, responsibility for work, care- thus preparing the personnel requirements of European standards.

Many salmonid farms but are a factor in water pollution vented increase the flow of nutrients, if Self-purification capacity of water exceeds the natural food chain, plus various productive activities practiced in the vicinity of natural emissaries: timber, maintenance of machinery, etc. (Fig. 1).

Fig. 2. Destruction of trout eggs nests (Golden Bistrița river, Suceava)

In such situations should be to develop the conformity assessment and certification of mountain water quality in the context of European standards. Faculty of Fisheries Science, the Laboratory of Aquaculture has a priority and an opportunity to promote mountain water quality research through expert teachers and students, known through the publication of many papers in journals, by providing conditions for specialization in doctoral by promoting biotechnology research and restocking with various salmonids.

The project, through its objectives fall within the thematic area of sustainable management of water resources, promoting the development of new procedures and methods based on the use bioindicators species, but also adapt existing methods for determining fish quality mountain water as required and European directives associated with national implementing legislation.

MATERIAL, METHOD, PRELIMINARY RESULTS

Uniform geographical distribution of fish species in waters is restricted by barriers mountain climate, orographic, hydrographic, environmental conditions in general. Weighing and biodiversity biological invasion, we decided to do an analysis of changes occurring in recent years in various parts of the river Bistrita and evaluate the

consequences of possible invasion by less valuable species and their relationship to endemic species and species existing scarce in the area.

Fig. 3. Ist research area – Golden Bistrița river (Ciocanesti, Suceava zone)

Mountain fish species that fall into the category of fish belonging to the variety of endemic species are rainbow trout Bărnărel, hunchen and mottled bullhead.

Two tributaries of the river and creek Barnar Bărnărel lives a variety of trout with a particular color, yellow on sides and belly, with red spots and shadows rare oval, *Salmo trutta* var.Moldavia (Fig. 4). Since many of the copies of the color varieties are sterile (Pasarin, B. et al. 1997), there is the assumption that those individuals have formed the basis of interspecific crosses (native trout and brook trout, Why, P. 1978)

Fig. 4. Bărnărel trout

Hunchen is the largest fish in the mountain waters of our country being declared a natural monument, as in the past has been fished almost to extinction. Currently inhabit Hunchen Bistrita river between May and Brosteni Iacobeni and Viseu River from its confluence with the river to its confluence with the Vaser and Tisza.

Hunchen is a salmonid with the dorsal body color gray-green-yellow, and flanks and belly are silvery gray, sprinkled with gray dots that extend from the bottom of the body to the right eye. Fins are reddish, greenish, except fat, which is reddish brown (Fig. 5). With aging, Hunchen lostriței change color, becoming rusty with iridescent metallic.

Hunchen body is almost cylindrical ciclod scaled small, slightly out of date and protected with mucus. The head is flattened dorso-ventrally, with large mouth equipped with teeth that extend and strong language.

Fig. 5 Hunchen

The upper Moldavian Bistrita comprise is a very rare species – alpine bullhead, single country (be found only in Scandinavia), called mottled bullhead (*Cottus poecilopus*). This may differ from the basic species by color, shape and body lateral line appearance (Fig. 6). It also has smaller size (8-13 cm), reproduction takes place earlier in the period from February to April.

Fig. 6 Alpine bullhead

In the mountain waters, as Bistrita affluent, the invasion is a process that is found most often, it is classified as an amount of events and processes on the occurrence and impact on local ecosystems and communities of foreign communities. Invasive alien

species are species that spread with or without human or semi-natural habitat in November, causing significant changes in the composition, structure, ecosystem functions or human activities causing severe economic losses.

In the entry of foreign species of fish in Romania, naturally or with human aid, we consider three major periods: the first dates from ancient times and lasts until 1956, when he was brought first batch of embryonated eggs of whitefish in acclimatization for the second period begins in 1956 and lasting until 1989, and the third period begins in 1989 and is until today.

The first period of intrusion of foreign species of fish in Romania (till 1956)

In this first period, the freshwater ichthyofauna of our country have entered, naturally or by man, seven freshwater fish species, from Asia and North America, the mountain is being mentioned species:

Rainbow trout (*Onchorinchus mykiss*) is a species of salmon family, originally from western North America and was introduced in Europe between 1880 and 1882 in several shipments of embryonated eggs and in our country was introduced by anonymously around 1885 in Hungary (Why, 1972). Systematic position is not yet clear (Nalbant, 2003).

Fig. 6 Brook trout (female)

In our natural waters rainbow trout is rare and came here by popular escape from the farm or furnished, but are basic species of Romanian salmoniculture. A surprising finding is maintaining micropopulation Teplice rainbow trout in the stream - a stream flow and consistently high terrace Tisa, only 2.5 km long, located near Sighetu Marmatiei - where the species was colonized in 1930, when no have already been popular with

specimens of this species, which leads us to assume that rainbow trout were reproducing naturally here (Ardelean and Beres, 2000).

Brook trout (*Salvelinus fontinalis*) is a salmonid is originating from the Atlantic coast of North America, the eastern tributaries of the Mississippi River, the Hudson Bay and Labrador. In European waters was introduced in 1884 (Vasiliu, 1959) and in Romania was made in 1900 in Moldova, Putna River and its tributaries (Nemes and Bănărescu, 1954). After Nemes and Bănărescu (1954), brook is known in our country in some streams in Moldova, one in Banat and one in Transylvania, but many times the species was introduced in other mountain waters, but by private individuals, the alerts that have not appeared in the literature.

Fig. 6 Brook trout (male)

Many experts argue that brook trout give sterile hybrids with native (*Salmo trutta fario*) or that could destroy his brood, but Nemes and Bănărescu (1954) have found this field. *Salvelinus fontinalis* inhabiting the upstream side of streams where native trout do not live, which is an advantage. As to color, brook can be considered as the most beautiful fish in our waters mountain.

The second period of intrusion of foreign species of fish in Romania (1956-1989)

During this period there has been the most action to introduce new species of freshwater fish. Thus, they introduced a total of 15 species of fish for aquaculture development in our country, and among them are naturalized currently six species in our waters

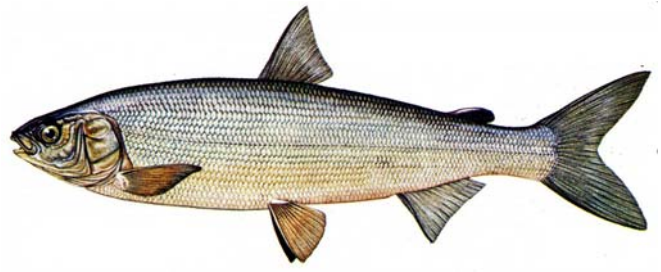

Fig. 7 Big lake chud whitefish

In our country works acclimation of whitefish (Coregonidae family) began in 1956 to populate lakes, ponds future accumulation and growth as additional species in lakes and ponds. In that action since 1956 have been imported from the former Soviet Union embryonated eggs of the species *Coregonus lavaretus* and *Coregonus Albula maraenoides ladogensis*, which were divided into fish ponds Nucet and Tarcau stations and several lakes in the country (Buşniţă et al., 1957). And current research data are conflicting regarding the present situation of our country whitefish.

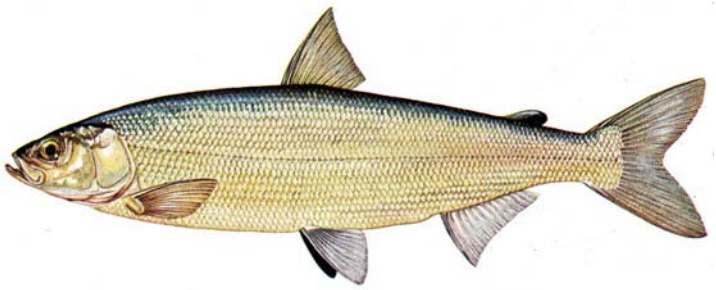

Fig. 8 Small lake chud whitefish

A third species of whitefish, Coregonus Peled was introduced in 1980 by Matthew D. in Fisheries Research and Production Station Podu Iloaiei as cell embryo stage eggs imported from the former Soviet Union. Body color is silver, darker back and white belly. Body height is larger than the species Coregonus lavaretus and Coregonus Albula maraenoides ladogensis.Growth is also high. Favorite food is the benthic fauna and zooplankton. Peled Coregonus was raised so far only in ponds in the SCPP Podu Iloaiei (Matthew and Manea, 1990). We have additional data on this species.

CONCLUSIONS

The mountain waters, the species can be found in the following situations:

• native species, native or indigenous - refers to a taxon (species, subspecies, race or variety) that is found naturally in a geographical area, where widespread human factor completely independent;

• non-native species, allochthonous, foreign or exotic - refers to a species, subspecies, race or variety (including gametes or any other body part that might survive and subsequently reproduce) are not found naturally in a geographical area and get there via human deliberately or inadvertently, directly or indirectly.

In the case of species that reach a new area, foreign to them, they may subsequently manifest in several ways:

1. by extinction in a while - often foreign taxon not survive in the new area, even with human help, disappeared more slowly or faster;
2. adapting to new conditions - foreign taxon are kept only semiartificiale conditions improved, and toplițele small outdoor artificial ponds, farm;
3. by acclimation - foreign taxon may carry some or almost full life cycle in nature, in their new environment, but not only with human reproduction.
4. Integration - foreign taxon after their entry into a new area, are able to form a self-sustainable population, from their self - reproduction. This is the first phase of the naturalization process.
5. by colonization - after establishment of a population, it increases the number of individuals, some of them subsequently migrated to a new habitat, where they form a new population that will fix that or not.
6. naturalization - the process whereby one taxon, after setting is maintained long enough in the new environment, where it fits without any help from man. For a taxon to come to naturalize, has to overcome three barriers: geographical, environmental resistance to penetration of new foreign and reproducing taxon, rules, the new environment. We must mention here: we can not say that those are naturalized species (subspecies, races or varieties) that have established populations only in some parts of the new complex.

The mountain waters, the invasion is a process that is found most often, it is classified as an amount of events and processes on the occurrence and impact on local ecosystems and communities of foreign taxon. Invasive alien species are species that spread with or without human or semi-natural habitat in November, causing significant changes in the composition, structure, ecosystem functions or human activities causing severe economic losses.

Fig. 4 IInd research area – Bistrița river (Barnar zone)

Making effective analysis and territory to hunchen, grayling and speckled bullhead, but we believe that an alien may have an impact on new areas, under certain conditions, even in an earlier stage invasion, starting with colonization.

From the historical point of view, introduction and translocation of fish in Europe began to be made since the first century AD, when some species of fish, most marine and freshwater but were kept in pools by the Romans. With the spread of Christianity, construction of ponds has become a necessity and almost all major monasteries and parishes preserved fish in natural waters surrounding transfer. Later the nobility also learned habit and farms during the Renaissance was a widespread fashion in Europe. The idea of transfer of fish from other continents seems to have occurred also in the Renaissance. However, widespread introductions of fish species in areas in November is a relatively recent phenomenon, most translocation of fish dating from the second half of the nineteenth century (Holcik, 1991).

Many species have entered the West, were brought from the East. It appears that the species common carp (*Cyprinus carpio*) was first transferred from freshwater species its natural habitat, the first time in Rome and later in other European countries. Eastern species are well known to Chinese cyprinids, *Odontobutis glennii* and in North America, *Gymnocephalus cernuus* (ruff) and several species of gobiide.

Conversely, the western region, were made a number of fish species, especially the middle and late nineteenth century in Europe, North America and Australasia.

SPECIES WHICH INCIDENTALLY ENTERED IN MOUNTAIN WATERS

Carp bream (*Abramis brama*) is a cyprinid that recently entered into Spring Lake and other mountain-Bicaz higher accumulation, although in water basins and less hilly plains.

Body strongly flattened (hence the name is drawn), small head, with obvious lateral line, bent down so much. Food rich in natural water basins, the color is darker, but in mountain and submontaneous lakes is open: gray-green back, silvery on flanks and abdomen (Fig. 9).

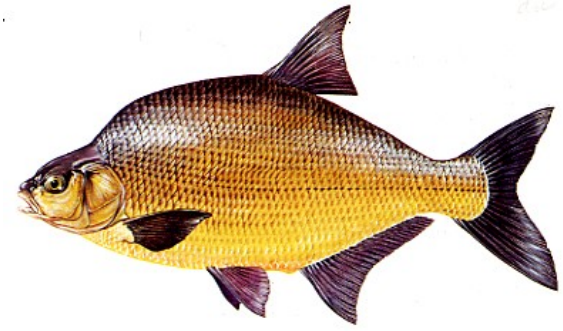

Fig. 9 Carp bream

Carp bream is reproduced in the months from April to May, the newly flooded areas and areas near shore or shallow. Males in nuptial period, the body has many buttons. Is a strong enough fish to different environmental conditions, but also very shy. In the first year to 20 g in the 2nd approx.75 g and the 3rd approx. 250 g. reproduce after the age of 4 years. It is ravishing, but can also have a vegetarian diet regimen.

River perch (*Perca fluviatilis*) is part of the family Percidae, as a guest quite recently in Spring Lake Mures-Bicaz and probably in many mountain lakes, the species being found in plain water and less hilly.

The body is flattened and covered with scales ctenoizi, dark reddish gray back, gray-green on the flanks and yellowish-white abdomen. Lanes 5-8 are characteristic darker region that goes back and lost to the ventral (Fig. 10).

Fig. 10 Perch

It has two dorsal fins, the first (D1) is high and consists only of strong radiation, bone, and the second (D2) below, consisting of soft radiation, branched.

Note that by the age of two years, perch feed on plankton, worms, crustaceans, etc.., Then predators are sometimes feared for many fish species.

Sexual maturity is reached at age 4 years and is located in the reproductive period March-April.

Weatherfish (*Cabitis taenia L.*) is a small fish that live in hilly rivers (the broad snout), but is also present in the submontane (grayling zone), and many lakes and ponds. Prefers sandy beds, where they can hide almost completely.

In general, the body is more elongated and slightly compressed laterally. Color is generally dark: along cord has a stripe composed of several small spots lined (20-30) brown or black color and the center line (sides) is 12 to 18 spots, more distinct and . All fins have rows of spots arranged as a semicircle (Fig. 11).

Fig. 11 Weatherfish

Head presents around corners of mouth, 6 whiskers and a thorn in the eye is hidden in an excavation when you get attacked or is attacked.

Weatherfish meat is tasty, but it is the economic importance due to its small size (6-10 cm) was used as bait for hunchen, trout and even grayling. It feeds on insect larvae, worms and eggs rarely with other species. Spawn in April-May.

Burbot (*Lota lota L.*) is specific in cold water from the broad snout, but can move in the grayling, under large rocks near the shore, being a large predator. For autumn becomes very active, bringing great damage by eating eggs of salmonids and is an undesirable species for restocking the waters with trout.

Burbot replicate in December-January, when over 1 million eggs deposited on vegetation or în sand, deep and quiet areas. 3-4 years of age reach sexual maturation, approx. Four years with a size of 17-35 cm. Meat is tasty and happy fishing, some specimens reaching a weight of 1 kg (Fig. 12).

Fig. 12 Burbot

Burbot is easily recognized by that body is elongated, with the second dorsal fin much enlarged and almost equal to the anal and the caudal rounded. Scales are very large and covered with a layer of mucus abundant. Lower jaw is an extension of the skin, called barbion or yarn beard.

Is a loner and a large predatory fish at night.

Body color varies by area of life, usually on the back and sides is tan spots with large, dark and confluent, and the abdomen is whitish.

* *The goals and activities for 2007 year have been fully acomplished*

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