Studii şi Cercetări	Mai 2015	Biologie	24/2	78-82	Universitatea"Vasile Alecsandri" din Bacău

NEW RESEARCHES REGARDING ICHTHYOFAUNA AND ANTHROPOGENIC IMPACT ON FISH COMMUNITIES FROM LAKE SNAGOV

Nicolae Crăciun, Constantin Turmac

Key words: *ichthyofauna, aquatic habitats, hidrobionts, Snagov*

INTRODUCTION

Ichthyofauna study was realized in 2011-2013 period, with previous researches that were made in 1999-2001 period.

The most complete work covering fish in Romania and containing also data for Snagov lake is the Romanian Ichthyological Fauna, written by Peter Bănărescu (1964). Here he indicated 20 species of fishes for Snagov lake: *Esox lucius, Rutilus rutilus, Leuciscus cephalus, Tinca tinca, Scardinius erythrophthalmus, Aspius aspius, Leucaspius delineatus Alburnus alburnus, Blicca bjoerkna, Abramis brama, Rhodeus amarus, Cyprinus carpio, Carassius carassius , Carassius auratus gibelio, Misgurnus fossilis, Perca fluviatilis, Acerina cernua, Stizostedion lucioperca, Gobio gymnotrachelus, Proterorhinus marmoratus*.

MATERIALS AND METHODS

Fishing was realized with trawlers, gills, rheophile bags and electrofishing in 6 stations, from the middle of the lake and near the shores. Scientific fishing were also made at the lake's tail and on the evacuation channel toward Ialomita river.

Reophilic bag fishing method was used in shallow areas, namely in the area of reed banks and in the spillway, the outflow channel from the lake to the river Ialomita. Collected fish material was determined and ordered by species, where there was uncertainty about determining, samples were collected for subsequent determination in the laboratory. The identified species were noted in the inventory records and the fish material was later released.Cochin fishing net method was used to identify fish species in the lake. As for fishing with reophilic bag material was determined, and samples were collected for laboratory, animals beeing subsequently released. Data on individuals collected were noted in the inventory records.

Electrofishing method is using of high power electroshock devices (> 10 kW) and a long range. The device emits a weak electrical current that stuns the fish for a short period of time (maximum 10 minutes), long enough to be captured. After capturing the fish material is determined, select laboratory samples and the remaining animals are released into the environment. Etnozoological survey method consists in moving fishermen along the lake shore and identify fish species caught by fishermen. The advantage of this method is that it is possible to identify small species that couldn`t be identified by conventional methods.

RESULTS AND DISCUSSIONS

Quantitative and qualitative analysis of Snagov ichthyofauna was made. Comparing the present situation with the one from 1999-2001 period we observed a drastically reduction of fish populations and even the dissapering of some fish species, especially the ones that were used for industrial purposes (carp – *Cyprinus carpio*, grass carp – *Ctenopharyngodon idella*, silver carp – *Hypophthalmichthys molitrix*).

During the fieldwork for the study of fish fauna, preliminary results indicate the presence of 19 species of fish in Snagov natural protected area: *Abramis brama, Abramis sapa, Alburnus alburnus, Carassius Carassius, Carassius auratus gibelio, Cotibis danubialis, Cyprinus carpio, Esox lucius, Gymnocephalus cernuus, Lepomis gibbosus, Misgurnus fossilis, Neogobius gymnotrachelus, Perca fluviatilis, Proterorhinus marmoratus, Rhodeus amarus, Rutilus rutilus, Scardinius erythrophthalmus, Silurus glanis* and *Tinca tinca*.

In the ichthyofauna volume edited by Peter Bănărescu (1964) are cited 20 species of fish for the Snagov Lake, while during field trips were observed only 19. Moreover, while the presence of some species wasn`t confirmed, were observed new species. The distribution of species in the assessment stations is relatively homogenous, the average number determined at each of these stations is about 14-15 species (Fig. 2). The largest number of species have been identified in P5 and P6, respectively 18 and 16 fish species while in the P1 and P3 have been observed 12, respectively 15 species. This homogeneity indicates similar environmental conditions between the stations analyzed. The species with the highest frequency in the catches (highest number of individuals captured) were *Alburnus alburnus, Carassius auratus gibelio, Lepomis gibbosus* and *Perca fluviatilis*. Both *Lepomis gibbosus* and *Carassius auratus gibelio* are invasive species, introduced in Romania, with a broad distribution in the Carpathian range, with a high ecological plasticity.

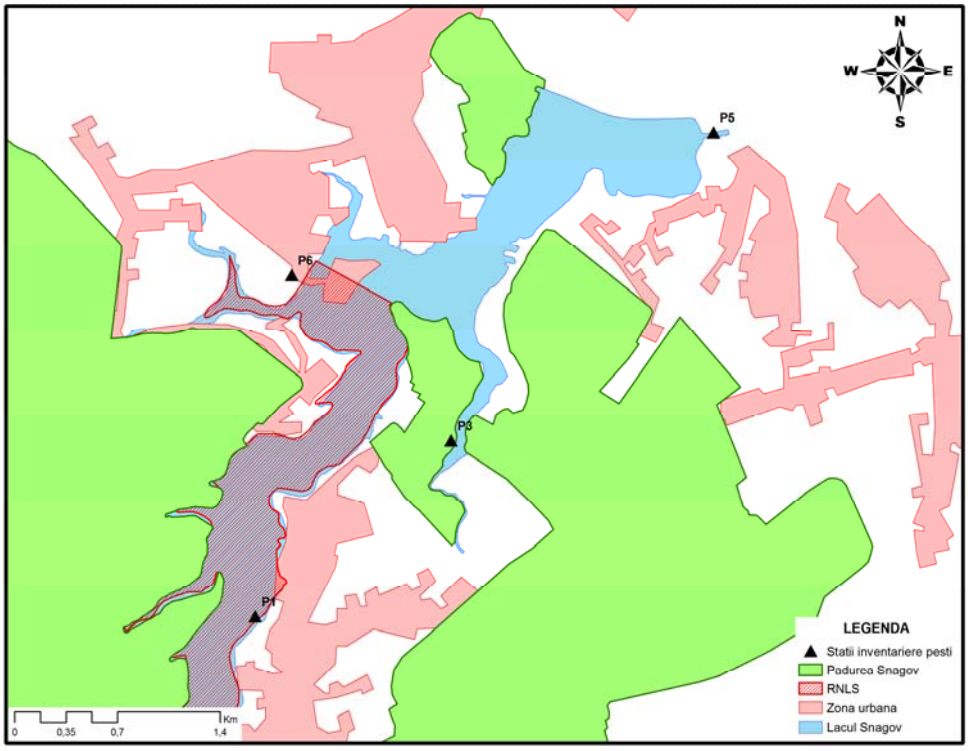

Figure 1. Spatial distribution of assessment of the ichthyofauna of Lake Snagov

Tabel 1. Comparison of the data from the literature and results from field trips in the Snagov natural protected area

No.	Species	Bănărescu 1964	Current assessment
1	*Abramis brama*	X	X
2	*Abramis sapa*	-	X
3	*Acerina cernua*	X	-
4	*Alburnus alburnus*	X	X
5	*Aspius aspius*	X	-
6	*Blicca bjoerkna*	X	-
7	*Carassius carassius*	X	X
8	*Carassius auratus gibelio*	X	X
9	*Cobitis danubialis*	-	X
10	*Cyprinus carpio*	X	X
11	*Esox lucius*	X	X
12	*Gymnocephalus cernuus*	-	X
13	*Lepomis gibbosus*	-	X
14	*Leuciscus cephalus*	X	-
15	*Leuciscus delineatus*	X	-
16	*Misgurnus fossilis*	X	X
17	*Neogobius gymnotrachelus*	X	X
18	*Perca fluviatilis*	X	X
19	*Proterorhinus marmoratus*	X	X
20	*Rhodeus amarus*	X	X
21	*Rutilus rutilus*	X	X
22	*Scardinus erythrophthalmus*	X	X
23	*Silurus glanis*	-	X
24	*Stizostedion lucioperca*	X	-
25	*Tinca tinca*	X	X

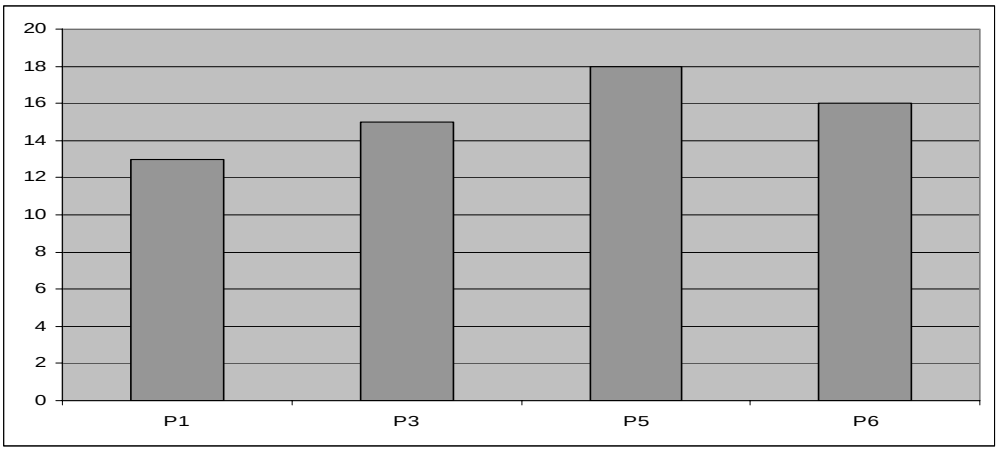

Figure 2. Specific fish diversity in the assessment stations

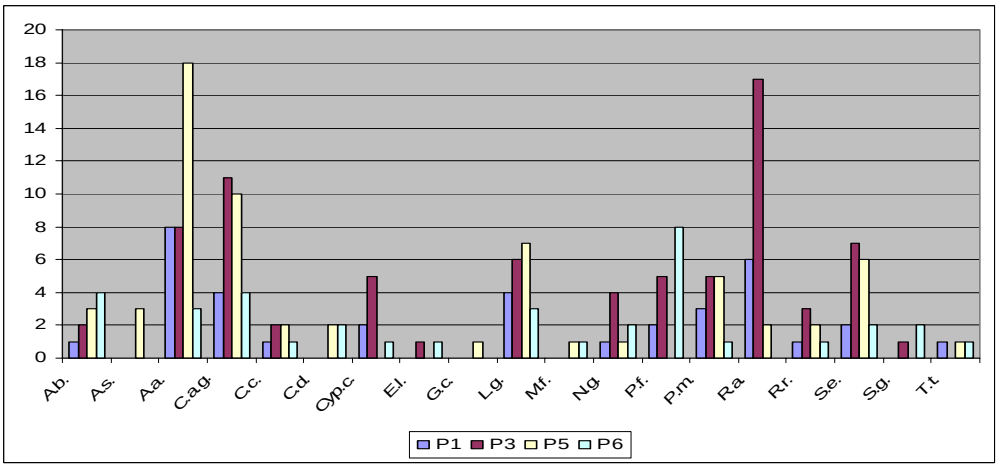

Figure 3. The individual capture of 19 species identified in the area of Snagov natural protected area

Species with high conservation importance had a low frequency catches and have a small share of lake ichthyofaunistical composition, habitat preferences being strict. Thus *Rhodeus amarus*, species listed in Annex 3 of UGO 57/2007, prefer areas with rich submerged vegetation, sandy substrate or a thin layer of mud and shallow water areas, which explains why it was found only in wharf and spillway area. *Carassius carassius*, species also included in Annex 3 of UGO 57/2007, although it didn`t need high environmental requirements, compete for food with *Carassius auratus gibelio*, so that populations are small and frequecy of captures was low. *Misgurnus fossilis* is nocturnal fish and spend the day hidden in the mud, he was captured only by accident and the number of individuals caught not reflect actual size of the population. However, this species require slurry bottom areas, so that it eas found only in P5 and P6 stations. The area immediately before the spillway provides ideal conditions for this species because the lake narrows in this sector, there are rich submerged vegetation and the bottom is muddy. The inventory of potential punctual pollution sources and of those accidental or other anthropogenic influences was made. For Lake Snagov fish fauna was established a conservation status, depending on the frequency of individuals in catches, data synthesis, human impact and the degree to which it affects each individual species (Table 2).Species such as *Cobitis taenia, Carassius carassius, Gymnocephalus cernuus* are rare, and sensitive to habitat destruction (*Cobitis taenia, Gymnocephalus cernuus*) or competition of invasive species (*Carassius carassius*). The share of individuals of these species in the sample units was low during the field research, which shows small population and a small number of individuals. *Misgurnus fossilis* is a common species in the side arms and bottom shallow muddy habitats and rich aquatic vegetation. However, these habitat types are first targeted to different anthropogenic activities (draining, vegetation removal, accidental or intentional pollution) so that local species is vulnerable and its future depends on the future evolution of aquatic ecosystems.

Tabel 2. Conservation status (national, world and local) of fish species in the perimeter of Snagov natural protected area

Scientific name	OUG 57/2007	Red List IUCN*	Local conservation statuts **
Abramis brama	-	LC	C
Abramis sapa	-	-	C
Alburnus alburnus	-	LC	C
Carassius auratus gibelio	-	-	C
Carassius carassius	Anexa 4B	LC	A
Cobitis taenia	Anexa 3	LC	A
Cyprinus carpio	-	VU	C
Esox lucius	-	LC	C
Gymnocephalus cernuus	-	-	A
Lepomis gibbosus	-	-	C
Misgurnus fossilis	Anexa 3	LC	VU
Neogobius gymnotrachelus	-	LC	C
Perca fluviatilis	-	LC	C
Proterorhinus marmoratus	Anexa 4B	LC	C
Rhodeus amarus	Anexa 3	LC	C
Rutilus rutilus	-	LC	C
Scardinius erythrophthalmus	-	LC	C
Silurus glanis	-	LC	C
Tinca tinca	-	LC	C

*International conservation status (according to IUCN Red List): NE - Not evaluated; DD - Data deficiency; LC - Without Threats; NT - Near Threatened; VU - Vulnerable; EN - Endangered; CR - critically endangered; EW - Extinct in the wild; EX - Extinct

**Local conservation Status: C - common; R - rare, but no significant threats; VU - vulnerable due to anthropogenic pressures in the area; A - threatened, due to human activities in the area

CONCLUSIONS

Even if water quality is better than 1999-2001 period, even if phytoplankton and zooplanktondiversity is increased and in the process of restoring, still we can observe a decrease of individuals in all species populations, hence the biological productivity is lower, which indicates a deficiency in nutrients, this explaining the decrease of communities diversity and ichthyofaunistical associations, and also the total disappearance of some fish species and the regress of other species.

Fail to respect the prohibition periods and intensive use of gills led to drastically decrease of breeders from all fish species, that in this 15 year period from the last researches led to species disappearing through overfishing and poaching.

Realisation of wharfs and other type of buildings on the shores of the lake led to shore thicket disappearing and implicitly the loose of reproduction places for many fish species.

ABSTRACT

The study was carried out in 6 stations placed in the Lake Snagov, in 2011-2013. The aim of the study was to assess the state of ichthyofauna in this area relative to the reference data. Quantitative and qualitative analysis of Snagov ichthyofauna was made. During the fieldwork for the study of fish fauna, preliminary results indicate the presence of 19 species of fish in Snagov natural protected area. Comparing the present situation with the one from 1999-2001 period we observed a drastically reduction of fish populations and even the disappearing of some fish species, especially the ones that were used for industrial purposes.

REFERENCES

1. BĂNĂRESCU P., 1960 - Einige Fragen zur Herkunft und Verbreitung der Su sswasserfischfauna der europaisch-mediterranen Unterregion. Arch. Hydrobiol. 57: 16 – 134;
2. BĂNĂRESCU P., 1964 - Fauna of Popular Republic of Romania, Vol. XIII: Pisces – Osteichtyes. Ed. Romanian Academy;
3. CRĂCIUN NICOLAE, 2008 - Methods and techniques of juvenile fish aquaculture zooplankton nutrition. Docendi Ard Publishing, 369 pp., ISBN: 978-973-558-304-0;
4. BĂNĂRESCU P., 1969 - Cyclostomata et Chondrichthyes. Romanian Fauna Vol. XII, Romanian Academy Publishing, Bucharest;
5. BACESCU M., 1940 - Les Mysidaces des eaux roumaines: etude taxonomique, morphologique, biogeographique et biologique. Ann. scient. Univ. Jassy 26: 454 – 804;

6. BĂCESCU M., 1954 - Crustacea – Mysidacea. Fauna of Popular Republic of Romania, Vol. XIII: Pisces – Osteichtyes. Ed. Romanian Academy;
7. BĂCESCU - MEŞTER L., 1970 - The morphological comparative study of the shoulder girdle of the fishes belonging to the Cobitidae family from Romania. Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa» X: 251 – 272;
8. BANARESCU P., NALBANT, T., CHELMU, S., 1972 - Revision and geographical variation of *Sabanejewia aurata* in Romania and the origin of *S. bulgarica* and *S. romanica*. Annot. Zool. Bot. (Bratislava) 75: 1 – 49;
9. BĂNĂRESCU P., 1989 - Zoogeography and history of the freshwater fish fauna of Europe. In: Holeik J (ed) The freshwater fishes of Europe, Vol 1. AULA-Verlag, Wiesbaden, pp 88–107;
10. BANARESCU P., 1992 - Zoogeography of fresh waters: Distribution and dispersal of freshwater animals in North America and Eurasia, Vol. 2. AULA-Verlag, Wiesbaden;
11. HARTEL T., NEMES S., COGALNICEANU D., ÖLLERER K., SCHWEIGER O., DEMETER L., MOGA C.I., 2007 - The effect of fish and aquatic habitat complexity on amphibians. Hydrobiologia, 583, pp. 173-182.

AUTHOR' S ADDRESS

CRĂCIUN NICOLAE - Bucharest University, Faculty of Biology, Spl. Independentei 91-95, Bucharest, Romania,
e-mail: nicolae.craciun@yahoo.com.

TURMAC CONSTANTIN - *SNAGOV* Foundation, 78, Snagov Street, Snagov village, 077165 Snagov District, Ilfov County, Romania, e-mail: fundatia@snagov.ro.