STATUS OF STERLET (*ACIPENSER RUTHENUS* L.) IN SERBIA AND HUNGARY

MIRJANA LENHARDT[1], KAROLY GYORE[2], ANDRAS RONYAI[2], MARIJA SMEDEREVAC-LALIĆ[1], ZORAN GAČIĆ[1]
[1]*Institute for Multidisciplinary Research*, 11000 Belgrade, Kneza Viseslava 1, Serbia
[2]*Research Institute for Fisheries, Aquaculture and Irrigation (HAKI)*, 5540 Szarvas, Anna-liget 8, Hungary

STANJE KEČIGE (*ACIPENSER RUTHENUS* L.) U SRBIJI I MAĐARSKOJ

Abstrakt
Izlov kečige je tradicionalna i značajna privredna aktivnost i u Srbiji i u Mađarskoj. Osnovni problem vezan za izlov kečige u Srbiji odnosi se na nedostatak validnih podataka o izlovu kečige u poslednjim godinama što je imalo negativan efekat na upravljanje korišćenja ove vrste. Poribljavanje kečigom nije nikada u potpunosti razvijeno u Srbiji dok se u Mađarskoj počelo sa poribljavanjem mlađi kečige od 1980. godine i to sa 10.000-100.000 jedinki/godini. Uzgoj kečige je započet u Mađarskoj od 1990. godine, mada je proizvodnja malog obima. U cilju uspostavljanja boljih planova za upravljanje ovom značajnom vrstom potrebno je uskladiti i koordinisati aktivnosti svih zainteresovanih strana u obe zemlje.

Ključne reči: *prirodne populacije, Dunav, Tisa, poribljavanje, akvakultura*

INTRODUCTION

The sterlet (*Acipenser ruthenus* L.) is a resident species in the Danube Basin and in these days it plays a remarkable role in fisheries of the Danube and Tisza (G u t i, 2006). Sterlet fishery is traditional and important commercial activity in Serbia and Hungary. After a decline of sterlet stocks in Upper and Middle Danube River in previous centuries, the species' range has again been increasing since the 1980s. It has been almost extirpated from the Upper Danube while in the Middle Danube, in Slovakia and Hungary, stocks seem to be recuperating.

Increasing abundance in the Slovakian and Hungarian sections of the Danube River is not only the result of improved water quality, but also due to the efforts of artificial

propagation and release of this species in Hungary. According to R e i n a r t z (2002) in Middle Danube, stocks are recovered due to stocking, legal protection and improvement of water quality.

With ratifying of Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) in Hungary and Serbia, where sterlet as species and its products belong, there was expressed need to protect these species and enable their survival with the development and implementation of national management plans. Protection and sustainable use of sterlet become vital also by ratification of Bern Convention, Bonn Convention, Carpatian convention and Convention on Biological Diversity.

Distribution of sterlet in Serbia and Hungary

Distribution of sterlet in Serbia and Hungary is represented on Figure 1. There is one dam on Danube in Hungary (Gapčikovo – 1822 rkm), two dams in Serbia on Danube (Đerdap I - 943 rkm, constructed 1970, Đerdap II – 863 rkm, constructed 1984), one dam in Serbia on Tisza (Novi Bečej – rkm 63) and two dams on Tisza in Hungary (Tisaleka – rkm 518, finished 1957, Kiškerea – rkm 404, finished 1973**).** There are no fish passes on these dams, so only accidental pass of sterlet is possible across dams. In that way isolated populations of sterlet were formed on different side of dams with small possibility for their mixing.

Figure 1. Distribution of sterlet (*Acipenser ruthenus* L.) in Serbia and Hungary

Catch of sterlet in Serbia and Hungary

In the Serbian part of the Danube River the most abundant catch of sterlet occurs near Belgrade and in the upstream sections in Vojvodina as well as in the lower parts of the Sava and Tisza River. The total catch of sterlet in Serbia during the period from 1960-2001 is presented on Figure 2.

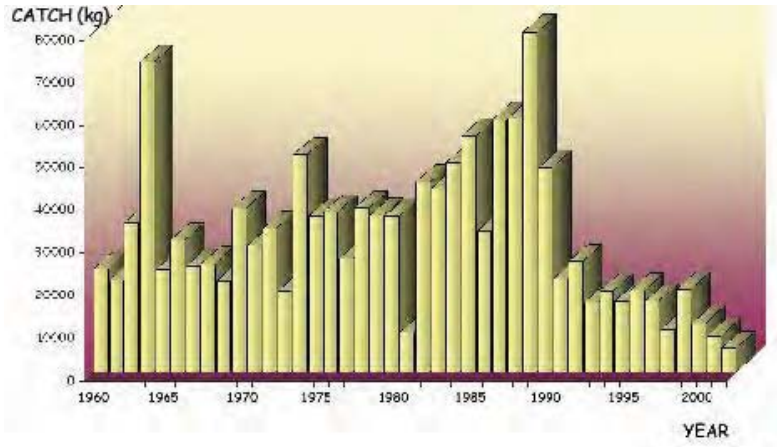

Figure 2. The catch of sterlet (kg) in Serbia by commercial fisherman during the period 1960-2001.

The main problem relating to sterlet fisheries in Serbia is that no valid catch statistic exists in last years which had negative effect on management of this species. Socio-economis situation during the last 15 years in Serbia had negative impact on status of sterlet stock due to over-fishing and common capture of sterlet under limited size by fisherman (L e n h a r d t et al., 2004). The sterlet in Hungary is a vulnerable and exploited species and catches indicate a population decrease in the 1950' and 1960' (J a c z o, 1974). First increases in catches began in 1971 presumably due to emigration of individuals from the impoundment of Djerdap I dam, improving of water quality and development of stocking program (T o t h, 1979; H e n s e l & H o l č i k, 1997; G u t i, 2006) and at the start of XXI century sterlet catch has become decreasing again (Figure 3). In contrast with catch of sterlet in Serbia where mainly commercial fishery exists, in Hungary it is caught for commercial and recreational purposes. Sterlet catches by commercial and recreational fishermen in Hungary between 1955 and 2004 are presented on Figure 3.

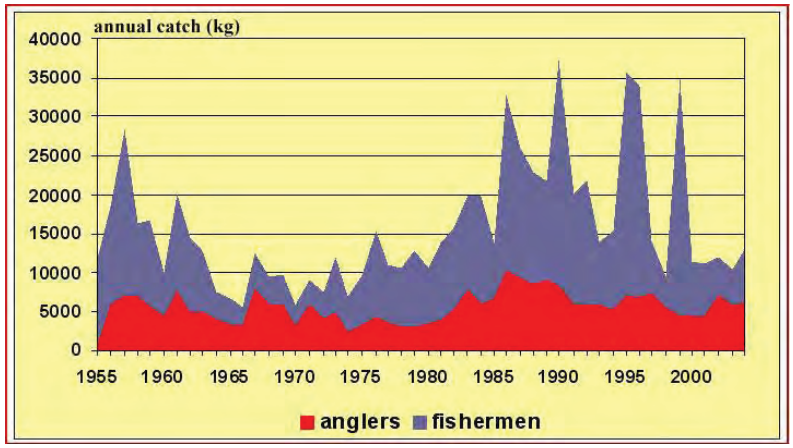

Figure 3. The catch of sterlet (kg) in Hungary by commercial and recreational fisherman during the period 1955-2004 (provided by Gabor Guti).

Habitat loss and degradation due to construction of dams and regulation of river flow

Disturbance of continuum of river flow and significant endangerment of fish population by construction of hydropower plants, present a global phenomenon today. The dams have been built on majority of rivers populated by sturgeon species, with 50 percent of all dams built in the region of Eurasian during the period from 1960 to 1980. Complex of technical and ecological factors cause changes in fish distribution as well as in commercial fishing. After construction of the Djerdap I dam mass migrations of sterlet adults have been observed toward upstream regions with faster river water flow rates where sedimentation processes are much lesser extensive than in the reservoir itself.

Water pollution

Release of industrial, agricultural and communal waste water into environment caused contamination of aquatic ecosystems. Fish are often exposed to highly contaminated water, which can lead to different changes, from biochemical alterations and single cells to changes in the whole population. As bental feeding species, sterlet is highly exposed to pollutants found in sediment. Researchs done by L e n h a r d t et al. (2004a) and P o l e k s i ć et al. (in press) showed presence of sublethal histopathological changes in sterlet from Danube and Tisza River which is probably response to presence of heavy metal and other pollutants in water and sediment. Research on sterlet in Danube has shown the rise of activity of superoxide dismutase and glutathione peroxides in liver as the reaction to presence of certain contaminants in the ecosystem, originated from oil refinery (S t a n i ć et al., 2006).

Influence of political, social and economic changes Serbia and Hungary

For Hungary and esspecialy Serbia the last decade of 20th century has been very turbulent politically as well as economically. Ongoing transition has affected all segments of the society. Among other things strict fishing control seized to exist what resulted on increase of pressure on many economically important species of fish in Danube.

Sterlet restocking

Sterlet stocking was never fully developed in Serbia while artificial propagation of sterlet in Hungary was developed in the 1970' and 1980'. Stocking of juveniles in the 1980' was regular with 10.000-100.000 individuals/year. Stocking in 1990' became occasional with 10.000-20.000 individuals/year, while stocking from 2000 start again to be regular with 50.000-150.000 individuals/year. Stocking programmes do not have significant effects on recruitment of sterlet.

Sterlet aquaculture

Sterlet is a promising candidate for freshwater aquaculture production and it has several indisputable advantages comparing with other sturgeon species. It has relatively small size, but fast reaches commercial weight and sexual maturity. The commercial relevance of sterlet is related to international trade in its meat and in juveniles for ornamental purposes. Although the biology and life of this fish is known relatively well, there are several details which require further studies, in order to develop sterlet production technologies to the same level as those of other fish species (e.g. Salmonids and Cyprinids, or channel catfish).

The sterlet has been produced in Hungary on a commercial scale in Research Institute for Fisheries, Aquaculture and Irrigation (HAKI) and some other farms since 1990, although the volume of production is low. Tremendous knowledge on the biology, breeding and rearing technology of sterlet are available in HAKI (V a r a d i & R o n y a i, 1999). There is also produce of sterlet in Hungary for ornamental purposes.

Sterlet aquaculture is not developed in Serbia and only attempts were made in artificial spawning of sterlet and juveniles rearing.

Existing conservation measures and Activity plan for sterlet

The sterlet was under protection in period from 1974 till 1982 in Hungary (G u t i, 2006) but since 1982 it has been only protected by closed season (1 March – 31 May) and size limit (45 cm – total length). Similarly, sterlet in Serbia nowdays is only protected by closed season (1 March – 31 May) and size limit (40 cm – standard length).

In frame of the project "Sustainable use of sterlet and development of sterlet aquaculture in Serbia and Hungary" which was realized by the Institute for Multidisciplinary Research (Belgrade, Serbia) and HAKI (Szarvas, Hungary) and financed as cross-border Cooperation Programme by the EU-EAR "Activity plan for the conservation and sustainable use of sterlet (*Acipenser ruthenus* L.)" was prepared. Activity plan comprehends measurements which have to be done for the protection of sterlet from future devastation (decrease) of population, and recommendations for increase of population on historical level, which has to reflect on taking off these species from the list of vulnerable.

In that manner it is necessary to work on more detailed investigation of these species, and conduct better coordination of work between scientists involved in the sterlet projects as all of the other stakeholders who are dealing with management of these species.

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