

Past and present status of sturgeons in Hungary

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Introduction

Sturgeons had played an important role in the history of Hungarian fisheries, but due to over-exploitation, followed by extensive river regulations and deterioration of water quality decrease in their populations has led most of them to the verge of extinction in the middle Danube and its tributaries (LELEK 1987, PINTÉR 1991, HENSEL & HOLČIK 1997, REINARTZ 2002). Stellate sturgeon (*Acipenser stellatus*) and great sturgeon (*Huso huso*) are practically vanished from the Hungarian waters and Russian sturgeon (*A. gueldenstaedti*) and ship sturgeon (*A. nudiiventris*) has sporadic occurrences. Sterlet (*A. ruthenus*) is only common species, it is caught for commercial and recreational purposes.

The Danubian sturgeon species are threatened, with some critically endangered. Rehabilitation and conservation of sturgeons in the Danube Basin is vital and urgent (BLOESCH et al. 2005). This paper summarizes the changes and present status of sturgeons' populations in Hungary. The existing legal measures in protection are evaluated and some requirements for effective conservation are also described.

Changes of sturgeon populations

Many historical records prove importance of sturgeon fisheries along the middle Danube from the Palaeolithic age. Remains of large sturgeons were recovered from archaeological sites along various sections of the Iron Gate Gorge and in the Little Hungarian Plain at Győr and Ács (BARTOSIEWICZ 1997). These records indicate the role of the sturgeons in prehistoric nutrition 7000-9000 years ago and in the Roman Ages (1st-4th century). In the Middle Ages, between the 11th and 15th centuries sturgeon fishery flourished along the middle Danube and its major tributaries. A lot of traditional fishing settlements were established in the vicinity of spawning sites of anadromous sturgeons (PINTÉR 1991). The famous catching sites were in large and deep side-arms or big meanders (SOLYMOS 1987). However, rough exploitation of the populations caused a decreasing trend in catches in the 16th century. The overfishing continued in the following centuries and the large migratory sturgeons became an occasional catch in the Hungarian section of the Danube in the 19th century (KRIESCH 1876, KÁROLI 1877, HERMAN 1887, KHIN 1957).

Huso huso

The great sturgeon migrated in large shoals from the Black Sea to the upper part of the Hungarian section of the Danube and seldom also ascended up to the Austrian stretch (PIROGOVSKIĀ et al. 1989, HENSEL & HOLČIK 1997). It was one of the most essential subjects of the fishery in Hungary during the Middle Ages, and a lot of historical archives prove its economic importance, for instance: 77 specimens were caught in one day in November of 1553 in the Little-Danube at fishing site of Aszód (UNGER 1931), the annual catch was 27 tons in 1746 on the 55 km long Danube section between Paks and Szeremle (SOLYMOS 1987), etc. In the 20th century it was very rare, occurrences of 43 specimens were recorded at 19

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locations in Hungary (KHIN 1957, TÓTH 1987, KÁCSOR 1990). The extensive river regulations have resulted in some habitat alterations since the second half of the 19th century and construction of two dams at Iron Gate restricts its migration to the middle Danube. Only two catches (Ercsi – 1972, Paks – 1987) have been reported in Hungary since the operation of the Iron Gate Dam I (1971).

Acipenser gueldenstaedtii

The Russian sturgeon was widely distributed in the Danube Basin and it migrated from the Black Sea up to Bratislava and to the major tributaries of the middle Danube (VLASENKO et al. 1989, HENSEL & HOLČIK 1997). It occurred as both resident form and anadromous migratory form (HECKEL & KNER 1858, HOLČIK et al. 1981, HENSEL & HOLČIK 1997). From the beginning of the 20th century its sporadic catches were registered in Hungary. The last specimens were recorded in the Tisza at Tiszafüred in 1980 (HARKA 1980) and in the Danube at Paks in 1970 (PÉNZES 1970), at Dunakiliti in 1997 and 1999, at Ercsi and Fajszi in 1998 and at Gönyű in 1999 (GUTI 1997, 2000). None of these individuals were adult and it indicates the existence of the non-anadromous population in the middle Danube. Further unverified records of occurrences are also mentioned by fishermen and anglers: 6 specimens at Dunaszekcső and Mohács in 1992 and one at Budapest in 1989 (PINTÉR 2002).

Acipenser nudiiventris

The ship sturgeon has only resident form in the Danube (BĂNĂRESCU 1964). It was recorded in the lower Danube and in the middle Danube up to Bratislava (SOKOLOV & VASIL'EV 1989, HENSEL & HOLČIK 1997). On the basis of historical records it seems impossible to evaluate the occurrence of ship sturgeon, particularly because fishermen did not always distinguish it from Russian sturgeon or sterlet (PINTÉR 1991). In the first half of the 20th century 10 specimens were recorded in the upper part of the Tisza (VÁSÁRHELYI 1957). It became very rare in the second half of the century: it was observed in the Tisza at Kisköre in 1975 and in the Drava at Heresznye in 1989 (PINTÉR 1991), in the Bagoméri side-arm of the Danube in 1992 and in the Mura river at Murakesztúr in 2005. An other large (56 kg) specimen was caught close to the Hungarian border at Apatin in 2003.

Acipenser stellatus

The stellate sturgeon ascended from the Black Sea up to Bratislava in the Danube and up to Tokaj in the Tisza (SHUBINA et al. 1989, HENSEL & HOLČIK 1997), however it was always rare and played a minor role in the fisheries during the historical times. The last specimens were caught in the Danube at Mohács in 1965 (PINTÉR 2002) and in the Tisza at Hódmezővásárhely in 1965 (HARKA & SALLAI 2004). The dams at Iron Gate restricts its migration to the middle Danube and this anadromous species is probably extinct in Hungary.

Acipenser ruthenus

The sterlet is a resident species in the Danube Basin. It was very abundant in the middle Danube and in these days it plays a remarkable role in the fisheries of the Danube and Tisza. Sterlet catches in Hungary indicated a population decrease in the 1950s and 1960s (JACZÓ 1974), but an improvement was observed from the beginning of the 1970s till the second half of the 1990s. (Fig. 1). Population increases were presumably due to emigration of individuals from the impoundment of the Iron Gate Dam, as well as the improving water quality and stocking of juveniles (TÓTH 1979, PINTÉR 1991, HENSEL & HOLČIK 1997). Since the second half of the 1990s sterlet catch has become unstable and decreasing.

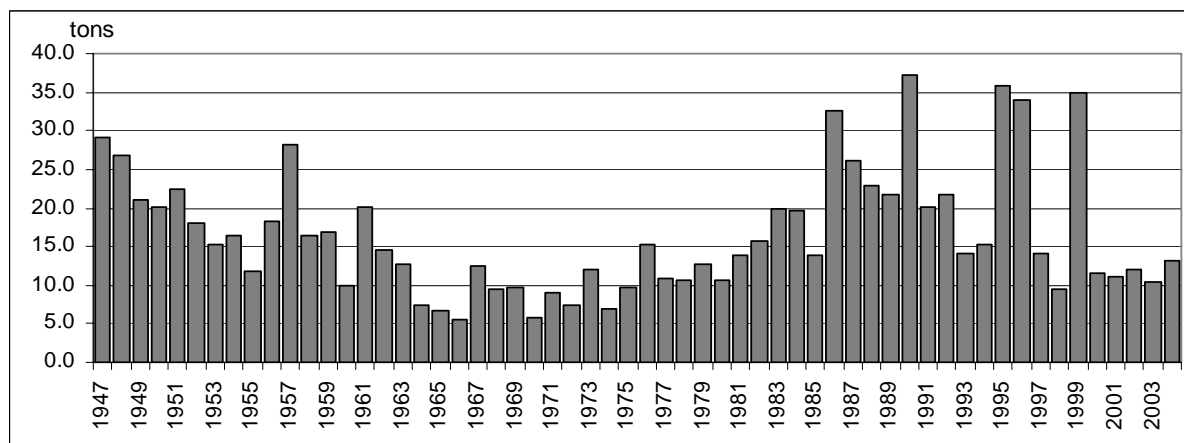


Figure 1: Sterlet catches in Hungary between 1947 and 2004. Data on fishing effort are not available, but it should be taken into consideration that number of commercial fishermen decreased by more than 50% and number of licensed anglers raised 10-fold in the second half of the 20th century.

Existing conservation measures

Legal measures in protection of sturgeons have different approaches according to the present status of the species in Hungary. The great sturgeon, the stellate sturgeon, the Russian sturgeon and the ship sturgeon have been under protection since 1988 (stellate sturgeon since 1993). Their catches are forbidden, but theoretical value of their individuals is only 10.000 HUF (equivalent to 35 € in 2006) therefore catches are punishable with a very low fine, less than the real value of the fish.

The sterlet was under protection between 1974 and 1982; however its catch increased from 7 tons to 15.8 tons in this period (Fig. 1). Since 1982 it has been only protected by closed season (1 Mar – 31 May) and size limit (45 cm). Its artificial propagation was developed in the 1970s and 1980s and young sterlet fry were released in the Danube and Tisza. Restocking activity was not systematic and its documentation is incomplete. Estimated quantity of restocked juveniles varied between 10-100 thousands specimens annually in the 1980s, but it decreased in the 1990s and releasing of sterlet fry has become occasional recently.

Discussion

Effectiveness of the existing legal measures in protection of the threatened sturgeon populations is rather doubtful in Hungary (PINTÉR 1991). Fishery closures have not effected increases in abundance of sturgeons as is often case for other species of fish that mature at earlier ages. Loss of spawning and nursery habitat, coupled with blockage of migratory spawning routes, may be the greatest factors that keep most sturgeon populations repressed (AUER 1996). Implementation of restoration programmes is an urgent need on the middle Danubian sturgeon populations, and the life histories (ROCHARD et al. 1990) and the present status of the species (BLOESCH et al. 2005) must be considered in development of conservation strategy:

The sterlet is a vulnerable and exploited species. Its stock was partially recovered in the 1970s and 1980s but it has become unstable recently. Our knowledge on its populations in rivers of Hungary is inadequate for lack of particular researches. A research program should be started on population dynamics, migration behaviour, habitat use and spawning success of sterlet, with evaluations of restocking activity and investigation of predation of cormorant. These comprehensive studies could contribute to improvements of the population enhancements and working-out of management plans for rehabilitation of river habitat structure for sterlet.

Finally, a long-term monitoring program has to be developed and implemented in order to support a sound management of utilization and conservation.

The ship sturgeon and resident form of the Russian sturgeon are critically endangered. Their restoration is very difficult because of lack of living specimens of the resident populations for artificial breeding as well as our knowledge on their ecology is not satisfactory. A long-term program should be initiated for their artificial propagation and restocking including establishment of a live collection of Danubian specimens and a gene-pool bank of deep-frozen sperm. A further project should be implemented to discover and localize the habitats of the remaining populations.

The great sturgeon and the stellate sturgeon are practically extinct in the middle Danube. Rehabilitation of their migratory way and the longitudinal connectivity at both dams of Iron Gate is a crucial requirement for their restocking and conservation in the Hungarian part of the Danube.

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