HISTORICAL DEVELOPMENT OF STURGEON FARMING IN TURKEY

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Sturgeon is represented by two families and 27 species in northern hemisphere water of European, Asian and American continents. Despite the fact that they have cartilaginous skeleton, due to the bony plates on their body and armor-like head, sturgeon is grouped into the bony fish class (Osteichthyes) and is different from the other bony fish in evolutionary, morphological and physiological aspects (Ustaoğlu, 2005). In the Turkish waters of the Black Sea, there are 6 (7) species belonging to two families (Ustaoğlu and Okumuş, 2005).

During the period between 1920 and 1989, 10-28 thousand tons was registered in the countries bordering the Caspian Sea. Although this figure changes from year to year, it constitutes 80% of world's production. The highest amount of production ever known in the literature is 39,4 thousand tons which was obtained at the beginning of the century (Mazhnik *et al.*, 2005). Because of the decreased stocks, sturgeon culture started to increase after 1950s; and during the period until 1970s, 14 enterprises came into operation in the coasts of the Caspian Sea. After 1954, the individuals that Russia obtained from the culture medium were started to release, and then the other countries (Iran, Azerbaijan, Bulgaria) conducted the similar fish releasing activities in the Black Sea and the Caspian Sea (Mikhaylova, 2006).

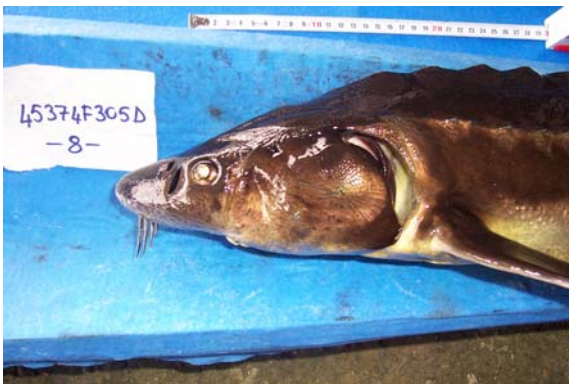
According the FAO's 2006 report, the most rapidly increasing species (101.9%) in culture production occurred in sturgeon and the production was realized as 15.551 tons in 2004.

The natural reproduction grounds of sturgeon in Turkey are mainly Kızılırmak, Sakarya, and Çoruh Rivers (Çelikkale *et al.*, 2004). There are Altınkaya and Derbent dams on Kızılırmak River where the sturgeons enter to spawn their eggs, and Hasan Uğurlu and Suat Uğurlu dams were constructed on Yeşilırmak River.

In our country, we lack scientific data to allow us to asses the caviar extraction and the present situation of sturgeon. Moreover, as it is displayed in Figure 1, production continued to increase until 1974. And as result of the legal arrangements made on sturgeon fishing, the production showed an explicit drop and then with the protection of sturgeon, the production did not take place at all or was not registered.

Despite the fact that sturgeon fishing continued in the same period of time, it decreased after the dam constructions on 1150 km long Kızılırmak River, where sturgeons enter and reproduce just like in the rivers in Russia; but after the dam was constructed, fish could attain only to 55 km. Transition to the reproduction grounds was hindered after the dam construction. This means that the ecological balance in the region has totally altered to the disadvantage of fish.

Sturgeon fishing in Turkey gained importance mainly after the Russian Revolution. When the communist rule started after the Revolution, fishing for *Huso huso* and consequentially caviar trade could not have been done. The caviar which was considered as bourgeois food by the new Russian Government was suspended for trade a while. While on one hand the production decreased, the demands flooded in from Europe and directed towards Turkey as they were not met from Russia (Demircioğlu, 2007).



At that time during the First World War, the fishermen (Uzunoğlu, Malkoçoğlu, and Demircioğlu families) of Cevra Region who migrated from Sürmene due to the Russian

invasion settled in Samsun region. A few technicians from Germany came to our country to make analyses on fishing for *Huso huso* and caviar and explained how to extract sturgeon caviar to the fishermen in the neighborhood. They brought necessary equipments such as gas refrigerator. Thus, trade in sturgeon started and continued until 1935-1940 (Demircioğlu, 2007).

Once the trade in sturgeon started, dexterity for fishing in sturgeon and producing and processing caviar improved. From 1940s to 1960s, they produced 6 tons to 8-10 tons of caviar in the workshop they established, and they exported their product to Germany. Later then, people started to catch fish at the mouth of Sakarya River. *Huso huso* stocks decreased after 1960s. Fishing activities and caviar production also dropped. Nonetheless, trade in caviar continued with 3-4 tons of yearly production until 1973 (Demircioğlu, 2007).

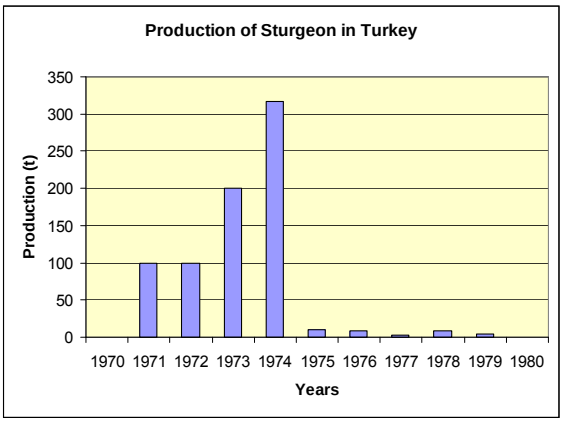
Because the NATO staff that came to the Black Sea in the 1960s showed interest to caviar, fishermen in the region considered sturgeon as the most valuable means of livelihood. At that time, sturgeon fishing was done only for caviar extraction. The sturgeon, which was caught to strip eggs, could found no sale for its flesh and distributed to the needy as a free of charge food. In the same period, the Istanbul Chamber of Commerce considered sturgeon as a commercially important fish; and Beykoz Leather and Shoe Enterprise was suggested to export and commerce the caviar for domestic consumption and additionally to commerce the flesh, skin, swim bladder, fat, vesica and nerves (Ustaoğlu, 2005).

Fishing sturgeon in the mouth of Kızılırmak, Yeşilırmak and Sakarya Rivers in spring time until 1997 with "karmak" (hook) which is a fishing gear attached to hundreds of hooks, floater and fish line, has come to the forefront. Gillnets have also been utilized in sturgeon fishing in river mouth and deep water.

Protection Activities

It was indicated that the reduction in the worldwide populations of sturgeon has reached to a level necessitating the protection of these fish within the scope of "Washington Agreement". On December 1996, Turkey became a signatory to CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) which was signed by 169 countries. As of April 1, 1998, sturgeon species were included into the scope of CITES and the worldwide commerce of products obtained from the fish and the eggs (caviar, flesh, live fish and fish egg) was started to be controlled. *A. sturio* and *A. brevirostrum* have the highest protection level and the other species have the second degree protection (Attachment II) (CITES, 2004; Ustaoğlu and Okumuş, 2005).

In 1971, the Ministry of Agriculture and Rural Affairs took legal decisions to regulate sturgeon fishing for the purpose of preventing overfishing, fishing during reproduction season and fishing the small fish. These regulations completely banned sturgeon fishing in Kızılırmak, Yeşilırmak and Sakarya Rivers and fish size bans were introduced for the other rivers. In 1979, fishing *Huso huso* longer than 140 cm was banned. In 1997, fishing all the beluga was legally stopped.



Production of sturgeon species in Turkey

Scientific Studies in our Country

Primarily Kızılırmak and Yeşilırmak; and Sakarya River, Melet Creek, and Çoruh River

which flow into the Black Sea are accepted as the natural reproduction grounds. However, the reproduction situation of these rivers and even the situation of smaller rivers are not clear. In Turkey, there are various activities on sturgeon carried out by Istanbul University (Faculty of Fisheries), Ankara University (Faculty of Agriculture), Black Sea Technical University (Sürmene Faculty of Marine Sciences, Rize Faculty of Fisheries), and the Ministry of Agriculture and Rural Affairs, Trabzon Central Fisheries Research Institute, Turkish Marine Research Foundation (TÜDAV), and Association for Protection and Sustenance of Sturgeon (MERKODER).

According to the research conducted in Turkey by the FAO experts Edwards and Doroshov (1989), Beluga (*Huso huso*), Russian sturgeon (*A. gueldenstaedtii*), Atlantic sturgeon (*A. sturio*), starry sturgeon (*A. stellatus*), and fringe barbell sturgeon (*A. nudiventris*) were sold in the fish markets in Istanbul, Samsun, and Trabzon in April. In the same report, it was argued that based on the views of the fishermen Beluga species are in the salty waters in Turkey, an that they do not enter the rivers of our country for the purpose of reproduction; however the other species would be the natural fish of the region.

In the researches conducted in the Black Sea by Geldiay and Balık (1988), Pourkazemi *et al.* (1999), and Billard and Lecointre (2001), it was reported that there are 7 species in the Black Sea and in Azov basin, i.e., beluga (*Huso huso*), Russion sturgeon (*Acipenser gueldenstaedtii*), Atlantic sturgeon (*A. sturio*), Starry sturgeon (*A. stellatus*), Fringe barbell sturgeon (*A. nudiventris*), Sterlet (*A. ruthenus*) and the Persian sturgeon (*A. persicus*).

English Name	*Latın Name*	*Local Name*
Beluga	*Huso huso*	Morina Balığı,
Atlantic sturgeon	*Acipenser sturio*	Mersin Balığı,
Russian sturgeon	*Acipenser güldenstädti*	Rus mersini,
Stellate sturgeon-Sevryuga	*Acipenser stellatus*	Sivrişka
Ship - Sip	*Acipenser nudiventris*	Şip Balığı

Çelikkale *et al.* (2004) indicated that 5 species belonging to Acipenseriformes family (*Huso huso, Acipenser sturio*, *Acipenser stellatus, Acipenser gueldenstaedtii, Acipenser nudiventris*) are naturally present in the Turkish water in the Black Sea, Kızılırmak, Yeşilırmak, Sakarya, and Çoruh Rivers, and in their mouths. Additionally, they stated that reliable data were barely present to give an opinion on sturgeon stocks in the Turkish waters in the Black Sea.

Ustaoğlu and Okumuş (2005) stated in their study, "The sturgeons: Fragile Species Need Conservation" that beluga (*Huso huso*) and Russian sturgeon (*Acipenser gueldenstadti*) were coincidentally caught by trawl and purse seine in Samsun. Again in the same study, it was indicated that from the perspective of diversity of species and of the country's economy, it is unacceptable to loose these fish, and it is necessary to protect these valuable fish, and to take and implement the necessary measures for the purpose of ensuring the continuity of the generations.

Culturing sturgeon is a new attempt in our country. However, several researches on sturgeon have been initiated in recent years. In Istanbul University, Faculty of Fisheries, Sapanca Fisheries Production Unit, the fries of more than 5000 Russian sturgeon which were propagated in hatchery were released to Sakarya River. Activities in Siberian sturgeon (A.*baeri*) culture are still going on in Ankara University, Faculty of Agriculture, and Research Unit of Fisheries Department. At Ondokuz Mayıs University, Sinop Faculty of Fisheries and the Black Sea Technical University, Sürmene Faculty of Marine Sciences and Rize Faculty of Fisheries, beluga and Russian sturgeon are reared in tanks.

In recent years, sturgeon culture has been attracting the attention of the private sector. Some entrepreneurs in Giresun and Ordu provinces are trying to rear the fish they catch from the sea with an amateur spirit. Two companies in Istanbul and Samsun are searching for an appropriate place to set up sturgeon farm. Preliminary permits are issued

for the farms to be established in Erdemli district in Mersin and Sürmene district in Trabzon. The entrepreneurs who intend to produce caviar in addition to fish flesh are about to establish farms for sturgeon culture.

According to the CITES report, our country is referred to as the transition point of illegal trade in caviar (Sellar, 2006). It is necessary to promote export and rearing with CITES permissions and significant attention should also be paid. It could be a point of departure to prevent illegal fishing, to provide support for the culture production and fish releasing activities, and external support for the stocks.

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