Acipenser schrencki Brandt, 1869 — **Amur Sturgeon**

Order: ACIPENSERIFORMES — **Family: ACIPENSERIDAE**

SUMMARY

The Amur Sturgeon *Acipenser schrencki* is one of two species of Acipenseriformes endemic to the Amur River basin. The population of *A. schrencki* has been declining for more than a century. The two species, *Huso dauricus* Kaluga and *A. schrencki,* are rarely distinguished in harvest statistics making it difficult to assess the impact of harvest on individual species. Females of the most common morph (grey) of *A. schrencki* reach sexual maturity between 10-14 years, at which time their size ranges from 105-125 cm and 6-18.5 kg. The Amur River has not yet been affected by the construction of hydroelectric dams, however plans have been made in the past and their achievement would render numerous spawning grounds inaccessible. The water quality of the river has been increasingly degraded by pollution from oil products, mineral fertilisers from agricultural development, and by-products of gold mining operations. Although the effects of pollution on sturgeon have not been studied. The main threat appears to be over-exploitation.

Official catch statistics of *A. schrencki* in the Russian Federation and the former USSR dropped from 607 t in 1881 to 8 t in 1996. International trade in 1998 totalled 3,897 kg of caviar, with 2,366 kg being exported from China and 1,385 kg exported from the Russian Federation. The annual catch quota set for *A. schrencki* by the Russian Federation for 1999 and 2000 was 15 t. Export quotas of 1,500 kg (1999) and 2,000 kg (2000) were set for caviar, with a meat quota of 4,000 kg (2000). According to current available data it appears that the Russian Federation exceeded the 1999 caviar export quota by 1,476 kg. In China, the 1998 catch quota was 1,888 individuals with a caviar production reaching 3,235 kg. Export quotas of 2,783 kg (1998) and 2,510 (1999 and 2000) were set. The domestic consumption of caviar in China is estimated at 20% of the national production.

DISTRIBUTION AND POPULATION

The CITES database lists the current distribution of *Acipenser schrencki* as: China, Russian Federation, and former USSR (Anon., 2000a).

A. schrencki is classified as Endangered by IUCN (1996):
EN A2d China, Russia [Amur River].

A. schrencki is endemic to the Amur River system which is 4,092 km long if its longest tributary, the Shilka River, is included (Krykhtin and Svirskii, 1997a). The middle reach of the Amur River is bordered by both the Russian Federation and China. It is 975 km long and extends from the city of Blagoveshchensk (Heihe in China) to the mouth of the Ussuri (Wusuli) River between Khabarovsk (Russian Federation) and Fuyan (China), 966 km from the estuary (Krykhtin and Svirskii, 1997a). All populations have declined considerably since the turn of the century (Krykhtin and Svirskii, 1997b). The middle Amur population has been most affected being subject to catch from both the Russian and Chinese sides (Krykhtin and Svirskii, 1997b; Wei *et al.*, 1997).

China: The species occurs in the lower to upper reaches of Amur river basin, but is most common in the middle Amur and the lower reaches of the Songhuajiang and Wusulijiang river basins. The species is included in the China Red Data Book (Yue and Chen, 1998). Although the biomass of the wild populations is unknown, it is clear that stocks of sturgeon in the Amur River are declining dramatically due to over-fishing (Wei *et al*., 1997).

Russian Federation: *A. schrencki* occurs from the Amur River delta to the upper reaches, including the Argun and Shilka tributaries. There are two morphs, the grey being more abundant than the brown (Krykhtin and Svirskii, 1997a) which occurs in the middle and lower parts of the Amur and has restricted movements to 100 km up or down stream. The grey morph is found in the middle to upper reaches of the Amur River. It occurs in four fragmented populations: the estuary population which does not migrate to the sea (3,000 individuals); the middle Amur (190, 000 individuals); the lower Amur (95,000 individuals); and the Zeya-

Bureya lowlands population, which is thought to be on the verge of extinction (Khykhtin and Svirskii, 1997a; 1997b).

HABITAT AND ECOLOGY

A. schrencki feeds on benthic freshwater molluscs and the larvae of the Arctic Lamprey *Lampetra japonica* (Svirskii, 1971, cited in Krykhtin and Svirskii, 1997a). Spawning occurs from the end of May to early-July (Krykhtin and Svirskii, 1997a). At 12 years of age, mature *A. schrencki* females of the brown morph are 96-117 cm long and weigh 3.5-5.6 kg (Krykhtin and Svirskii, 1997a), while females of the grey morph are 125-142 cm long and weigh 8.3-16.4 kg. Most grey morphs mature at the age of 10-14 years, with a length of 105-125 cm and weighing 6-18.5 kg (Krykhtin and Svirskii, 1997a). The maximum known size of the grey morph is approximately 3 m in length and more than 190 kg at an age exceeding 60 years (Krykhtin and Svirskii, 1997a). According to Wei *et al*. (1997), surveys carried out on the Chinese side of the Amur River suggest that the youngest spawning age for *A. schrencki* males is 7-8 years, at about 103 cm in length and 4 kg in weight. The corresponding age and size for females are 9-10 years, 105 cm and 6 kg. Fecundity ranges from 114,000-1,292,000 with a mean of 385,000 eggs. The average number of eggs per gram of body weight is 44.6 (Wei *et al*., 1997). However, the survival rates of juveniles is low (CITES Management Authority of China, *in litt*. to TRAFFIC Europe, August 2000).

THREATS TO SURVIVAL AND DOMESTIC USE

Unlike many of the large rivers in the region, the Amur has not been affected by construction of hydroelectric dams. However, it is feared that hydroelectric dams would restrict access to many spawning sites (Birstein, 1993). The river has been polluted by oil products, mineral fertilisers and by-products of gold mining operations. Agricultural pollution downstream from towns is increasing from both the Russian and Chinese sides (Krykhtin and Svirskii, 1997a; Matthieson, 1993). The effects of pollution on sturgeon have not been studied. The main threat appears to be overexploitation, particularly in the middle Amur (Heilong) River, where both Chinese and Russian fisherman are operating.

Current information suggests that amendments of previous regulations and/or adoption of new legislation are in effect in both range States. However, enforcement measures appear to be lacking and numerous experts as well as government officials have reported increasing pressure from illegal fishing practices and criminal activities such as sturgeon poaching and black markets which occur in a large part of the range (Medetsky, 2000; Winchester, 2000).

At the turn of the century the highest volumes of *A. schrencki* were caught in the middle Amur River where both brown and grey morphs of the species occur. Official catch records of *A. schrencki* in the former USSR and the Russian Federation decreased from 607 t in 1881 to 4.2 t in 1948 (Krykhtin and Svirskii, 1997a). In 1996, the catch was 8 t (Anon., 2000b). Official records from China indicate that sturgeon (both Kaluga and Amur Sturgeon) catches on the Chinese side of the Amur River peaked in 1987 (452 t), dropped to 136 t in 1997 and then increased to 149 t in 1998 and 141 t in 1999 (TRAFFIC East Asia *in litt*. to TRAFFIC Europe, September 2000).

Russian catch data for 1996 suggest that the current composition of *A. schrencki* versus *Huso dauricus* in the Amur River is 9% and 91% respectively (Anon., 2000b). However, late 19th century records suggested an equal composition (Krykhtin and Svirskii, 1997a).

In China, all caviar of wild sources is from *A. schrencki* and *Huso dauricus*. Heilongjiang Province is the only province in China where caviar is processed from wild specimens (TRAFFIC East Asia , *in litt*. to TRAFFIC Europe, September 2000). Most caviar originating from the Amur River in China is destined for export, with domestic consumption representing less than 20% of the total caviar production in the country (CITES Management Authority of China, *in litt.* to TRAFFIC Europe, 28 August 2000).

Domestic consumption of *A. schrencki* caviar in China (kilogrammes)

	1993	**1994**	**1995**	**1996**	**1997**	**Average**
A. schrencki	386.0	407.0	403.0	480.0	582.0	*451.6*

Source: CITES Management Authority of China, *in litt.* to TRAFFIC Europe, 28 August 2000

Aquaculture products (captive breeding sources) of a variety of sturgeon species are sold on the domestic market (including in Hong Kong Special Administrative Region) and the rest is exported (TRAFFIC East Asia *in litt*. to TRAFFIC Europe, September 2000).

INTERNATIONAL TRADE

The listing of *A. schrencki* in CITES Appendix II entered into effect on 1 April 1998. Available complete trade data is therefore limited to nine months of trade (April-December 1998).

Gross exports and the comparative tabulation of trade in *A. schrencki* are given in the Appendix. According to Annual Report data for 1998, the China and the Russian Federation reported respective exports of 2,366 kg and 1,385 kg of *A. schrencki* caviar. The importing countries were Japan (2,589 kg), Germany (900 kg), USA (247 kg) and South Africa (15 kg). In 1999, Russian exports of *A. schrencki* caviar totalled 2,976 kg. These shipments were imported into Japan and the USA (CITES Management Authority of the Russian Federation, *in litt*. to TRAFFIC Europe, 18 September 2000).

Caviar export quotas established for *A. schrencki* (kilogrammes)

		1998	pre-Convention	1999	2000
Caviar	**RU**	1,700		1,500	2,000
	CN	2,783	1,000	2,510	2,510
	Total	4,481		4,010	4,510
Meat	**RU**	0		0	4,000

Source: *CITES Notification No.s 1998/35-36-61, 1999/21-47-53-68 and 2000/053*

Only trade in caviar is detailed in 1998 CITES data. However, the Russian Federation has established an export quota of 4,000 kg of meat for 2000.

Confiscation of *A. schrencki* shipments was not reported in 1998, however smuggling of caviar on the Sino-Russian border seems to occur frequently during the migration season (Medetsky, 2000).

CONSERVATION MEASURES

The species is not fully protected in the Russian Federation or China.

China: The listing of *A. schrencki* in the State Category of Protected Wildlife is expected to be adopted in the near future (CITES Management Authority of China, *in litt.* to TRAFFIC Europe, 28 August 2000). In the early 1950s, the Heilongjiang Province authorities adopted protection and management regulations, such as gear restrictions, harvest size, closed seasons and areas, and the requirement of a fishing licence. These were renewed in 1982 through "*The Heilongjiang Ordinance on the Protection and Propagation of Fisheries Resources*". However, the regulations have not been fully implemented (Wei *et al.*, 1997).

Restriction on fishing size

The Ordinance of 1982 prescribed the minimum catch size limits for *A. schrencki* to be 100 cm or 4 kg (CITES Management Authority of China, in litt. to TRAFFIC Europe, 28 August 2000). Specimens under these size and weight specifications must be released (TRAFFIC East Asia, in litt. to TRAFFIC Europe, September 2000).

Other restrictions

According to the *"Protocol on Fisheries Resources Conservation, Regulation and Multiplication in Border Areas of Heilong (Amur) River and Wusuli (Ussuri) River of The People's Republic of China and the Russian Federation"* adopted on 27 May 1994, fishing on the Heilong River is prohibited from mid-June to mid-July. The protocol also established areas where fisheries are prohibited: the mainstream of the Heilong River from Dagangzi, Luobei County, to Saniangkou where the Heilong and Songhua rivers converge. These areas were designated as no-fishing zones by the Government of China. The fishing grounds stretch over 1,270 km, from Fuyan (downstream) to Heihe (or Aihui) (Blagoveshchensk on the Russian side)

(upstream). These measures protect *A. schrencki*'s natural breeding sites and hence the survival of juvenile sturgeon.
The catch of *A. schrencki* on the Chinese side of the Heilong (Amur) River requires prior acquisition of a fishing licence. In 1991, 2,248 sturgeon fishing licences were issued, and in 2000 the number had been reduced to 1,850 (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000).

Restocking of juveniles
From 1988 to 1998, a total of 3,780,000 larvae and fingerlings of *A. schrencki* bred artificially in hatcheries in the China were released in the Heilong (Amur) and Wusuli rivers (CITES Management Authority of China, *in litt.* to TRAFFIC Europe, 28 August 2000). Since 1998, the restocking activities of the main hatchery, Qindeli State Farm (Heilongjiang Province), have been jeopardised by financial constraints and an increase in the price of eggs (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000).
In 2000, the Heilongjiang Province Fisheries Bureau authorised seven stations to undertake research on the captive breeding of *A. schrencki* and *H. dauricus* (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000).

Determination and allocation of quotas by local government
Based on the average annual production for 1986-1988, the average size of fish landed, decreasing caviar production and the hydrological resource and migration conditions, Chinese scientists calculated Amur River sturgeon (*A. schrencki* and *H. dauricus*) annual catch quotas for the period 1989-1997. This quota was revised in 1997 and the Heilongjiang Province Fisheries Bureau adopted a new total catch quota of 105.4 t for 1998. The 1998 quota is composed of 1,888 individuals for *A. schrencki* with an expected caviar production of 3,235 kg and 309 individuals for *H. dauricus* with an expected caviar production of 4,045 kg (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000).

Processing and export company management
Caviar processing companies are required to register with the Heilongjiang Provincial Fisheries Bureau. In 1998, six companies were registered as sturgeon product processors, all established in Heilongjiang Province. Six other companies were registered as caviar exporters: four in Heilongjiang Province, one in Beijing and one in Dalian Free Trade Zone (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000). According to the Ministry of Agriculture's (MOA) "*Regulation on Special License of Aquatic Wildlife Utilization, People's Republic of China*", caviar processing companies must acquire special qualification from the local Fisheries Bureau, including a "special (caviar) purchase license" and a "special (caviar) processing license". Caviar purchase and processing are controlled by the local Fisheries Bureau. The Fisheries Bureau will gradually decrease the number of licenses issued and also monitor those companies with special purchase and production licenses. According to the "*Law of Wildlife Protection of the People's Republic of China*", the MOA only issues caviar trade licenses to a limited number of import and export companies. The MOA also strictly manages those companies issued with this special license (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000).

Russian Federation: A total prohibition on sturgeon catch throughout the USSR was adopted in 1923 and withdrawn in 1930. A ban on the catch of *A. schrencki* and *Huso dauricus* was introduced in 1958. This prohibition is still in effect (Krykhtin and Svirskii, 1997a). However, a tolerance called "controlled catch" for incidental and scientific catches is permitted. These catches are the current source of caviar and sturgeon meat from the Amur River. "Controlled catch" is not well defined and difficult to enforce. Russian catch quotas of 15 t annually for 1999 and 2000 were adopted by the Federal Government following recommendations set by the State Fisheries Committee in consensus with an independent body of experts (Anon., 2000b).

CAPTIVE BREEDING

China: Aquaculture has been successful for 30 years (Dr Zhang Chun-Guang, *in litt*. to IUCN/SSC, Wildlife Trade Programme, September 2000). An aquaculture station was set up on the Chinese side of the Amur River and was in operation from 1988 to 1991. During this period it released 900,000 fry and 168,000 fingerlings into the Amur River. The restocking programme was not able to continue after this time due to lack of funds (Dr Zhang Chun-Guang, *in litt*. to IUCN/SSC Wildlife Trade Programme, September 2000).

Russian Federation: Sturgeon hatcheries were under construction during 1996–97 (Krykhtin and Svirskii, 1997b). A broodstock also exists in captivity in research stations (Svirskii *et al*., 1993).

According to FAO Fishstat, the world annual production of farmed sturgeon and paddlefish (mostly for the meat market) has increased rapidly, from 160 t in 1987 to 2,576 t in 1998. Species specific data are not available in the FAO database and China have not reported the results of their research on sturgeon captive breeding nor the development of commercial farms.

However, *A. schrencki* is recognised as an important species for China's sturgeon aquaculture industry (TRAFFIC East Asia, *in litt*. to TRAFFIC Europe, September 2000). In 1992, construction began of a large commercial sturgeon aquaculture farm in Dalian at the tip of the peninsula in Bo Hai Bay, west of Beijing. The expected annual production of the farm was 2,000 t, with 800 marketable fish (average weight of 2.5 kg) and 200 t of fish fillets in 1999 and 50 t of caviar in 2001. Other sturgeon products planned in the marketing strategy of the farm are skin (to be processed into leather), bones, meat, and internal organs (as raw materials for biomedical products and tonics). This large intensive aquaculture facility was developed with the assistance of Russian experts (Anon., 2000c).

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Gross exports of, and export quotas for *Acipenser schrencki* 1998

TAXON	TERM	UNIT	Exporter	1998	Export quotas 1998 (kg)
Acipenser schrencki	eggs		RU	145	
Acipenser schrencki	eggs	kg	CN	2,352	2,783 + 1,000 pre-Convention
Acipenser schrencki	eggs	kg	DE	15	
Acipenser schrencki	eggs	kg	RU	1,385	1,700

Comparative Tabulation of trade in *Acipenser schrencki* 1998

				Imports reported					Exports reported				
Year	Imp.	Exp.	Origin	Quantity	Unit	Term	P	S	Quantity	Unit	Term	P	S
1998	DE	CN		900	kg	eggs	T	O	900	kg	eggs	T	O
1998	JP	CN							1,349	kg	eggs	T	W
1998	JP	RU							1,240	kg	eggs	T	W
1998	US	CN		102	kg	eggs	T	W	102	kg	eggs	T	W
1998	US	RU		145		eggs	T	W					
1998	US	RU							145	kg	eggs	T	W
1998	ZA	DE	CN						15	kg	eggs	T	O
TOTAL				***1,147 kg***					***3,751 kg***				