

PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

PROPOSAL: Inclusion of the following species of *Psephurus gladius* in **Appendix II** of the Convention on the Conservation of Migratory Species of Wild Animals (CMS):

B. PROPONENT: Federal Republic of Germany

C. SUPPORTING STATEMENT

1. Taxon

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| 1.1 | Classis: | Actinopterygii |
| 1.2 | Ordo: | Acipenseriformes |
| 1.3 | Familia: | Polyodontidae |
| 1.4 | Species: | <i>Psephurus gladius</i> (Martens, 1862) |
| 1.5 | Common names | Chinese: Yin yui, Wei, Chin yui English: Chinese paddlefish, Chinese swordfish, White sturgeon Finnish: Miekkasampi French: German: Polish: Wioslonos chinski Spanish: |

2. Biological data

2.1 Distribution

Psephurus gladius is endemic to the Yangtze River (Chang Jiang) and its attached tributaries, including the rivers of Tuojiang, Mingjiang, Jialimjiang, Qiantangjiang and Yongjiang, and the lakes of Dongting and Poayang (Liu and Zeng, 1988; Liu et al., 1995).

In the past, the species was most commonly found in the trunk of the Yangtze River and only rarely encountered in the tributaries (Wei et al, 1997).

Mature adults of *Psephurus gladius* are reported to migrate to sea and are historically documented in the East China Sea, The Yellow Sea and The Yellow River (Liu and Zeng, 1988). Furthermore, individuals are sometimes accidentally brought in from the sea by high spring tides, so that they are rarely discovered in the lower reaches of the Qiantang and Yangjiang rivers of Zhejiang Province (Liu and Zeng, 1988).

2.2 Population

According to Liu (1995) the entire population of *Psephurus gladius* is decreasing, mainly since 1976 due to overfishing and pollution. In a study conducted along the mainstream of the Yangtze River in Sichuan Province from 1974 to 1975, Liu and Zeng (1988) were able to capture only ten individuals older than one year. The authors state that during

1976 to 1986 the population decreased immensely due to heavy fishing and that since 1987 individuals with a body weight greater than 100 kg are seldom encountered (individuals may reach a body weight of approximately 300 kg and reach sexual maturity with a body weight of approximately 25 kg). Liu et al. (1995) report that they have failed to collect large living specimens older than two years since 1989.

In general, the population of *Psephurus gladius* is believed to be in a depressed status (Liu et al., 1995). American scientists who visited China in the beginning 1990s never saw a live individual of *Psephurus gladius* and were only told that singular specimens have been captured recently (Georgi, 1994; Mims, 1994 and 1995). Yuan et al. (1992) report that the fish is very rare now and that it is even difficult to catch a living specimen. Wei et al. (1997) state that after 1988 only three to ten adults were annually found in the section below Gezhouba Dam. Since 1994, no individual has been found in the middle and lower reaches of the Yangtze River and only some specimens have been incidentally caught in the upper reaches (Wie et al., 1997). The number of the still existing individuals remains uncertain.

The IUCN (1996) classifies the status of the populations of *Psephurus gladius* as Critically Endangered.

The building of the Gezhouba Dam in 1981 just at a point between the upper and middle Yangtze River led to a division of the population in two subpopulations. The population in the upper reaches of the Yangtze is supposed to survive because the spawning grounds are located in this section and the environmental conditions have not changed after the dam construction (Liu et al., 1995). On the opposite, the population living below the dam in the middle and lower reaches of the river is deprived of adequate spawning grounds and faced with environmental changes due to the dam construction. During their investigations from 1989 to 1991, Liu et al. (1995) were able to collect young fishes aged from one to three years in the upper reaches, whereas no juvenile has been found in the section below the dam since 1986. Hence, it is believed that the population living above the dam is still reproducing while within the population downstream the dam there is no natural reproduction anymore. The age structure of a collection of 17 specimens incidentally caught below Gezhouba Dam from 1981 to 1986, ranged from 8 to 12 years and included only a single female aged 10 years (Wei et al., 1997).

2.3 Habitat

The biology of *Psephurus gladius* has been poorly investigated although the fish had a high commercial value. Thus, there is no information about the preferred habitat of the species. Wei et al. (1997) state that the location and structure of the spawning grounds are unknown but that they are probably scattered and limited to reaches above Chongqing (the upper reaches of the river).

2.4 Migrations

Psephurus gladius is supposed to be anadromous (definition see on p. 12: 2.4) because mature adults are reported to migrate to sea (Anonymous, 1988 in Wei et al., 1997) and are historically documented in the East China Sea, The Yellow Sea and The Yellow River (Liu and Zeng, 1988). Moreover, the species has been recorded in the lower reaches of the Qiantang and Yangjiang rivers of Zhejiang Province (Liu and Zeng, 1988) where

individuals are sometimes accidentally brought in from the sea by high spring tides. The pattern of migration of the Chinese paddlefish is not completely investigated yet but it seems very likely that when migrating to the open sea, the species also enters into Korean and Japanese waters.

3. Threat data

3.1 Direct threat of the population

The sharp reduction of the population size of *Psephurus gladius* is mainly due to overfishing and overexploitation in the 1960s and 1970s until the complete ban on fishery in 1983 (Liu and Zeng, 1988). But even though the commercial fishery for *Psephurus gladius* was prohibited in China, there still might be some illegal catching and caviar production (Birstein, 1993b) which may further threaten the survival of the still-existing few individuals.

One of the major threats for the Chinese paddlefish is the loss of adequate spawning grounds as a result of building insurmountable hydroelectric dams like the Gezhouba Dam which completely cut off the population living in the middle and lower reaches of the Yangtze River from their spawning sites located in the upper reaches of the river (see 3.2). A future hydroelectric project, the Three Gorges Dam, is planned to be built in the upper reaches in the near future. This project will lead to a further reduction of available spawning grounds and thus endangers the survival of *Psephurus gladius* (Wei et al., 1997).

Moreover, Liu et al. (1992) and Wei et al. (1997) indicate that there is a high level of water pollution in the Yangtze River which represents an additional threat to the species' survival. However, no data about the specific effect of toxins and pollutants on *Psephurus gladius* are available.

3.2 Habitat destruction

In 1981, the Gezhouba Dam was built just at the point between the upper and middle Yangtze River at Yichang, Hubei Province. This dam represents an insurmountable barrier for many migratory fishes and *Psephurus gladius* is one of the most affected (Liu et al., 1995) because its spawning grounds are most probably located in the upper reaches of the river. The population has been divided in one below and one above the dam. Whereas the population above the dam in the upper portions of the Yangtze is still able to reproduce due to the availability of adequate spawning grounds and unchanged environmental conditions, the population in the middle and lower reaches below the dam is faced with environmental changes and a complete loss of breeding sites because of the massive hydroconstruction (Liu et al., 1995). Wei et al. (1997) suggest that adequate spawning grounds have disappeared in the middle and lower reaches of the Yangtze River since 1986, because since that time no juvenile has been found in the section below Gezhouba Dam downstream to the mouth of the river.

As described above the building of the Gezhouba Dam led to a division of the population in two. It is presumed that only the population above the dam is able to survive whereas the population below the dam is expected to disappear sooner or later (Liu et al., 1995). Thus, in the future the distribution of *Psephurus gladius* will be restricted only to the

upper Yangtze River, where the species still finds adequate living and spawning conditions. A migration of mature adults to Sea is not possible anymore due to the insurmountable hydroelectric barrier but the role of this migration is not clear yet.

3.3 Indirect threat

There is no information available about an indirect threat of *Psephurus gladius*. Although a high pollution rate is reported for the Yangtze River, the impact on the paddlefish and its natural reproduction have not been studied.

3.4 Threat connected especially with migrations

The threats of the species that are especially connected with migrations have not been investigated and the migration pattern of *Psephurus gladius* is unknown. However, it is reported that the building of the Gezhouba Dam blocked the migration route of the fish and divided the population in two: one population restricted to the upper reaches of the river which cannot migrate to sea anymore but which are still provided with adequate spawning grounds; and one population restricted to the lower reaches which is still able to migrate to the open sea but has no adequate spawning grounds within its section of the river. This latter subpopulation is believed to be extinct within the near future because its migration route to the spawning grounds has been blocked and there is no natural reproduction within this subpopulation.

Although *Psephurus gladius* is believed to be anadromous, there is no information about its migration to the sea and the oceanic phase of its life cycle. This lack of knowledge also represents a threat to the species and further conservation actions for *Psephurus gladius* should take this migration in the sea into account.

3.5 National and international utilization

Historically, *Psephurus gladius* represented one of the most valuable fishes in China and was famous and highly sought for its delicious caviar. However, despite this great commercial importance, the catch of *Psephurus gladius* was relatively low: prior to 1976 the total annual catch for the entire Yangtze River was estimated to be only 25,000 kg, less than 1% of the total annual Yangtze River fishery for all species (Liu and Zeng, 1988). Since 1976, the catches of *Psephurus gladius* have decreased for several reasons.

In 1983, *Psephurus gladius* was protected by law as Endangered species in China and in 1989, it was placed in category I status and fishery was completely prohibited (Liu, 1995).

4. Protection status and needs

4.1 National protection status

In China, *Psephurus gladius* is protected by law as Endangered species since 1983 and placed in category I with the highest degree of protection since 1989 (Liu, 1995). This includes a complete ban on fishery. Protected stations for *Psephurus gladius* were set up along the river flow in the provinces of Hubei and Sichuan (Wei et al., 1997).

4.2 International protection status

Psephurus gladius is listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

4.3 Additional protection needs

Since Chinese scientists believe that artificial propagation might be the most effective way to maintain the population of *Psephurus gladius*, several attempts of captive breeding has been undertaken but failed until 1994 (Wei et al., 1997). The causes for the failure included the difficulties of catching an adequate broodstock due to the low abundance of *Psephurus gladius*, and of the simultaneous availability of ripe male and female individuals.

Recently, joint efforts between China and the USA to conserve and restore *Psephurus gladius* by artificial propagation have been initiated (Mims, 1995).

Detailed recommendations for the conservation of the Eurasian sturgeon species - worked out during the 1st Meeting of Representatives of the Range States on Developing Measures for the Conservation of Sturgeon Species under CITES Provisions (Moscow, Russia, 19-23 January 1998) - are attached in the Appendix at the end of the document.

5. **Range States**

The range state of *Psephurus gladius* is **China**. Since the species is recorded to migrate into the open sea, it may also cyclically enter **Korean** and **Japanese** waters.

According to FAO-data the major fishing countries in the Northwest Pacific (reporting over 100,000 metric tons in 1996) and thus potential Range States are the countries bordering the area, e.g. China incl. the Province of Taiwan, Hong Kong, Japan, the Russian Federation, North and South Korean Republics, as well as Poland as only country not bordering the area.

6. **Comments from Range States**

The Range states of the species have been provided with a copy of a draft proposal (Inclusion of 18 species of Acipenseriformes in Appendix II of CMS) and were asked for their comments. The appreciated scientific comments and corrections are integrated in the text. The position of each Range state on the proposal are as follows:

- **China** states that it is not a Party to CMS and has therefore difficulties in making any comments on the proposal.
- **Japan** gives no comments on the proposal because it is not a Party to CMS and no sturgeons live within the Japanese territory.
- **Korea** states that it has no objections to the proposal.

7. **Additional Remarks**

Psephurus gladius is sympatric with the Yangtze sturgeon, *Acipenser dabryanus*, and the Chinese sturgeon, *Acipenser sinensis*. The location of the spawning grounds of *Psephurus gladius* and *Acipenser sinensis* are supposed to be the same (Liu et al., 1995) whereas their

spawning seasons are different (March to April for *Psephurus gladius* and September to October for *Acipenser sinensis*).

The only closely related species belonging to the same family, Polyodontidae, is the American paddlefish, *Polyodon spathula*, which lives in North America, mainly in the Mississippi River basin. *Polyodon spathula* is listed in Appendix II of CITES.

8. References

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