



Global Re-introduction Perspectives: 2011

More case studies from around the globe
Edited by Pritpal S. Soorae



IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of the Itasenpara bitterling to the Yodo River in Osaka Prefecture, Japan

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Introduction

The Itasenpara bitterling (*Acheilognathus longipinnis*) is a threatened cyprinid species distributed in central Japan. This species lays its eggs in the gill chambers of freshwater mussels. Its natural habitat is lentic water in flood plains affected by flood disturbance. At present, the Yodo River system is highly regulated and rarely inundates the riparian zone. Therefore, the main habitat of the bitterling is



Itasenpara bitterling



Main habitat of the Itasenpara bitterling in the Yodo River until 2005

restricted to pools and embayments along the riverside between embankments. Large-scale improvements to the Yodo River system began in the 1970s, leading to the destruction of many of the river's pools and embayments.

Furthermore, widening and deepening of the channel and operation of the Yodo River Weir reduced the annual variation in water levels in the mid-1980s.

Additionally, alien plants and fishes have drastically increased since around

2000, especially in backwater areas of the Yodo River Weir. As a result, habitats of the bitterling and freshwater mussels have been further degraded. Consequently, wild populations of these species have not been found in the Yodo River system since 2006. This species was designated as a natural monument of Japan in 1974 and was listed as an endangered species under the Law for the Conservation of Endangered Species of Wild Fauna and Flora of Japan in 1995. The bitterling is listed as 'vulnerable' in the IUCN Red List. The Yodogawa River Office, Ministry of Land, Infrastructure, Transport and Tourism began a restoration project for the environment of this species in the Yodo River in 1997. The Aquatic Life Conservation Research Center of Osaka Prefecture has succeeded in the artificial breeding of bitterlings caught in the Yodo River.

Goals

- Goal 1: To enable the breeding of released adults and the growth of juveniles in the wild.
- Goal 2: To enable breeding in succeeding generations.
- Goal 3: To increase the wild population size.
- Goal 4: To restore habitats in the broader area of the Yodo River.

Success Indicators

- Indicator 1: Breeding of released individuals (adults) in the wild and the appearance of juveniles the following spring.
- Indicator 2: Annual appearance of juveniles born in the wild.
- Indicator 3: Breeding every year and increase in the number of individuals in the wild population.
- Indicator 4: Occurrence of ample and appropriate habitats in the broader area of the Yodo River.

Project Summary

Feasibility: The Itasenpara bitterling has not been found in the Yodo River system since 2006. Because most fish die within a year after breeding in the wild, this population is considered to be declining to a critical level, and the possibility of unaided recovery is extremely low. On the other hand, the Yodogawa River Office has reconstructed several embayments within the original habitat, which have been recolonized by mussels and other



Juveniles of the Itasenpara bitterling appeared in the spring of 2010

bitterling species without a remarkable increase of alien plants and fishes. Therefore, reconstructed embayments are considered suitable habitat for the Itasenpara bitterling. Since 1972, the Aquatic Life Conservation Research Center has been breeding the bitterling using specimens originally obtained from the Yodo River. The captive population is large in size, and reproduction has been quite successful. Additionally, the genetic diversity of the captive population has been maintained at a relatively high level. Given these circumstances, the Yodo River Itasenpara Study Committee (consisting of researchers, river managers, and others) began to consider and plan for the re-introduction of this species in March 2009. Re-introduction procedures were planned in conformity with the 'Guidelines for Re-introduction of Fishes for Conservation' (The Ichthyological Society of Japan, 2005). We aimed to implement the re-introduction of the Itasenpara bitterling in the autumn of 2009 as an experimental trial.

Implementation: Mature adults were released in autumn 2009 during the spawning season of the Itasenpara bitterling, as a primary objective of the project was to observe whether the fish could breed in reconstructed embayments. Five hundred individuals (1:1 sex ratio) were selected from the captive population at the Aquatic Life Conservation Research Center and were then released into several embayments in September and October 2009. The bitterlings had grown well after swimming out from the mussels in the spring of 2009, and all fish had matured by the time of release. Predatory alien fish had not notably increased in the embayments, and those present were removed using a seine net prior to the bitterling release. After the first release in September, a large-scale flood caused by a typhoon violently disturbed the embayment environment, possibly flooding the Itasenpara bitterling and mussels out of the embayments.

Post-release monitoring: Hatched larvae of the Itasenpara bitterling spend about half a year in the mussels until the following spring. Subsequently, after swimming out from the mussels, juveniles swim close to the surface of the water. The best method for assessing the status of the population is to count the number of juveniles appearing in the spring, as these numbers reflect breeding during the past autumn. In May 2010, a total of 133 juveniles were observed in the embayments where the bitterlings had been released, indicating that the released adults had successfully bred. Thus, one goal of the re-introduction project was achieved. However, the number of juveniles was rather low, and no juveniles were found in the spring of 2011. None of the 133 individuals were likely able to survive, perhaps because of the frequent flooding.

Major difficulties faced

- Frequency and magnitude of flood disturbances in the bitterling habitat: Suitable habitats for the Itasenpara bitterling are maintained by the adequate frequency and magnitude of flood disturbance. To restore such a habitat is very difficult; however, this issue is one of the main problems that must be resolved to ensure the successful re-establishment of this species.
- Decrease of mussels: Excessive or weak flood disturbance can reduce the population of mussels used for Itasenpara bitterling spawning. Thus, the restoration of the habitats mentioned above is essential.
- Increase of alien plants and fishes: Reduced flooding can lead to increases in populations of alien plants and fishes.
- Illegal poaching: Poaching of the Itasenpara bitterling by aquarists and traders continues in other habitats. After the release of this species in the Yodo River, surveillance by cameras, river managers, the police, and others has been conducted to restrain poaching.
- Anonymity of the habitat: Because this habitat has not been disclosed for conservation purposes, it has attracted limited media interest, thus slowing the rate of public awareness.

Major lessons learned

- Difficulty of restoring the floodplain environment: Although embayments were reconstructed in the area affected by flood disturbance, as required by the Itasenpara bitterling, the species could not survive under conditions of excessive flood disturbance.
- The significance of the accumulation of ecological and hydrologic data: The re-establishment of the Itasenpara bitterling in the Yodo River did not succeed during this trial. However, a great deal of useful ecological and hydrologic knowledge was obtained. To successfully restore the floodplain environment, the collection of such data is crucial.
- The significance of artificial breeding: Because artificial breeding has been successful, and the genetic diversity of the captive population has been maintained, this re-introduction project can still be implemented. Furthermore, in the future, maintaining the condition of the captive population is critical for subsequent re-introduction trials.

Success of project

Highly Successful	Successful	Partially Successful	Failure
		√	

Reason(s) for success/failure:

- Habitat of mussels: Because the mussel habitats were restored in the embayments, the Itasenpara bitterling was able to breed. However, excessive flood disturbance reduced the quality of the mussel habitat.
- Excessive flood disturbance: The Itasenpara bitterling could not survive, probably because of these excessive flood disturbances.

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