



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 and re-enforcement of oily bitterling in conjunction with local communities in Northern Mie, Japan

Junya Kitazima¹ & Seiichi Mori²

¹ - Graduate School of Environmental Studies, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan kazetoge@gmail.com

² - Biological Laboratory, Gifu-keizai University, 5-50 Kitagata, Ogaki, Gifu 503-8550, Japan smori@gifu-keizai.ac.jp

Introduction

The oily bitterling (*Tanakia limbata*) is the one of the cyprinid species which is distributed to the west of the Nobi Plain in Japan. It is designated as Near Threatened by the Ministry of the Environment in Japan and Vulnerable in the Mie Prefecture's Red List. Many bitterlings such as the oily bitterling have inhabited satoyama areas such as waterways and farm ponds, which have been developed through agricultural use and can assist biodiversity if properly maintained by human activities. Northern Mie where the project was conducted is a satoyama area where agriculture is the main occupation and it is also dotted with automobile factories and electrical related industries, and is also developing as a bedroom suburb of Nagoya. There is a group of ponds which have ichthyophagous alien fish such as the largemouth bass (*Micropterus salmoides*) which influence the native ecosystem.

The changes in agriculture in this area such as the large-scale farming, the decrease in farmer population and the urbanization of local societies results in poor management of the water resources in the area and results in mud being deposited in the ponds and eutrophication. In order to conserve the oily bitterling, it is necessary to reconstruct satoyama management which had been performed by local farmers, to bring a new framework for conservation. We therefore started a project of oily bitterling restoration through the self-sustaining construction of the water environment management system by local residents. We also began the integration project of



Male oily bitterling (*Tanakia limbata*)

Humanities and Science to encourage local residents to participate in biodiversity conservation activities through the Environmental Psychological Action Research.

Goals

- Goal 1: Continuation of the oily bitterling population in Northern Mie Prefecture.
- Goal 2: Restoration of satoyama ecosystem represented by the oily bitterling.
- Goal 3: Construction of voluntary and scientific water environment management systems by local residents.
- Goal 4: Progress on biodiversity conservation in relation to agriculture and conducting the Community Development based on the progression.
- Goal 5: Progress of satoyama conservation and generalization of experience as the role model.

Success Indicators

- Indicator 1: Breeding multiple generations of oily bitterling in multiple ponds.
- Indicator 2: Breeding multiple generations of mussels and common freshwater goby in multiple ponds.
- Indicator 3: Restoration of traditional pond management "ikehoshi" which is the draining and subsequent drying of a pond by the local residents.
- Indicator 4: Extermination of the invasive alien fish, largemouth bass and bluegill, in the project area.
- Indicator 5: Public awareness (including the Place Attachment of their own region) activities for local residents including children.

Project Summary

Feasibility: Japanese bitterlings spawn in the gills of certain species of live freshwater mussels and a decrease in mussel populations have an adverse effect on bitterling populations and on the other hand, mussels are parasitic to other fish during the larval stage. The bitterling habitation is an index of affluence of the familiar satoyama. Oily bitterling habitats have rarely been found in recent years in the Northern Mie Prefecture. They have also thought to have become extinct around Komono town (Shimizu, 1991). However, we found the following mussels *Anodonta sp.* and *Inversidens japonensis* which are listed as Near Threatened in the 2004 Ministry of the Environment and Mie Prefecture Red List, and they are as spawning hosts of the oily bitterling. We started the investigation to restore oily bitterling in the ponds in this area and two individual oily bitterlings were found at Kusune-tame pond in Tabika, Komono town in July, 2005. It was revealed that a number of largemouth bass were found in the Kusune-tame pond and a few oily bitterling remained downstream where no mussels live.

Therefore we started the re-introduction project which is aimed at breeding the population as the re-introduction source for the neighboring ponds and conducting the recovery in Kusune-tame pond. The investigation of the farm pond planned for re-introduction such as Kanshiro-tame pond and Kusune-tame pond revealed that following problems; Habitation of invasive alien fish such as largemouth bass (*Micropterus salmoides*) makes it difficult for oily bitterling to survive. Individual

mussels (spawning hosts) are hardly seen and which may be absent due to a large amount of mud deposition. As the result of those problems, our team planned the re-introduction by restoring the ponds through traditional pond management, removal of invasive alien fish, reducing mud deposition and enhancing new recruitment of mussels.



Many local residents participated in pond airding

Implementation: Our team started to capture fish which would be used for breeding and release in a concrete pool from July 2005 and a total of 23 out of 27 collected were used for breeding purposes. Spring water at a low temperature was used for the pool and prolonged the breeding period and about 300 fish were bred. We conducted the draining and drying of a pond in Kusune-tame pond in October, 2005 which included experts in plants and insects. About 80 participants including researchers, students, local residents and civil servants gathered for draining and drying pond. After setting a net at a drain gate for the prevention of the alien fish spreading, the dirty water was removed. A total of four individual oily bitterling, 48 individual *Anodonta sp.* and seven individual *Inversidens japonensis* (Near Threatened in the Ministry of the Environment and Mie Prefecture in Red List) and other native species were captured. In this process a total of 262 largemouth bass were exterminated.

Draining and drying pond was conducted in neighboring farm pond (Kanshiro-tame pond) in January 2008. About 200 local residents participated and exterminated 1,100 individual largemouth bass. Only 71 individual fish (4 kinds of species), 917 individual *Anodonta sp.* and 4 individual *Inversidens japonensis* were captured. In April, 2008, we dried the bottom of the pond for a month then repaired a sluice and filled it with clear water. After that local children released 100 individual oily bitterling (50 male and 50 female), 100 Amur gobby (orange type) which were captured downstream of the pond, and indigenous fish species which were captured during draining and drying of the pond in April 2008. Furthermore, another draining and drying pond and releasing were also conducted with the local children and residents in neighboring pond in February 2009.

Also lectures on biodiversity were given at local elementary schools before releasing the fish and local volunteers prepared meals at every pond draining and drying and participants increased each time. Preparing the ponds also provided participants experience on satoyama management.



Junya Kitazima explaining mussels to children

This project has been as a part of the Action Plan for improvement of farmland, water and environmental preservation since 2008 and the Japan Fund for Global Environment from the Ministry of the Environment since 2009. Also the Local Contribution Special Support Project of Nagoya University since 2010 and the Subsidy for the promoting communion of food and region from the Ministry of Agriculture,

Forestry and Fisheries of Japan since 2011.

Post-release monitoring: The breeding of oily bitterling and the new recruitment of mussels were identified by visual counting and periodic research during the breeding period of oily bitterling. Based on the findings, we continuously conduct habitat management such as the draining and drying of a pond and releasing stock. It was confirmed that some largemouth bass were alive in Kusune-tame pond in June 2006 and Kanshiro-tame pond in June 2008. From the residents reported sighting these were thought to be illegally releases. We then conducted pond airing in Kusune-tame pond in January 2010 and Kanshiro-tame pond in October 2010 and exterminated the largemouth bass and released oily bitterling and other native fish. The number of people such as local residents, children and others from outside the prefecture participates in these management activities and it is counted as a public education opportunity in experiencing satoyama activity.

Furthermore, the promotion of satoyama conservation results in environmental education lessons at elementary schools of Komono town and an exhibition of oily bitterling at the town office. Also, the Social Psychology Investigation is conducted to estimate its effect. About 300 persons participated in the Draining and drying of a pond in January 2010 and 500 persons from 50 nations participated in October at the CBD event of COP 10. These activities were evaluated and the Kusune-tame pond was elected as the one of the 100 selected ponds of the Ministry of Agriculture, Forestry and Fisheries and the local agricultural organization. It was awarded "the Secretary of State for the Environment commendation" and "environmentally-conscious-agriculture contest".

Major difficulties faced

- It may be necessary to evaluate genetic diversity because of the low numbers of founders.

- As the activities of this project spread some anonymous anglers sent e-mails which objected to this project to one project member. Largemouth bass were illegally released. The extermination system against illegal release was conducted not just as one event but for continuous management with local residents.
- Some local residents released other rare freshwater fish and varicolored carps with their kindness outside the project researchers knowledge which influenced the habitat of the mussels which are spawning hosts for oily bitterling. It is necessary to ensure that scientific biodiversity conservation and aspirations of the local residents are considered together.

Major lessons learned

- It is important to know the fundamental ecology of Japanese bitterlings for the project.
- To have a well developed management system for the project to accomplish objectives and not something only for a one-off event.
- The children participating in this activity made the local residents realize that this project is important for the future of the region and ensure the oily bitterling lives into the future.
- The local residents who have the higher Place Attachment were more cooperative for the activity.
- A social survey indicated that people who participated in our activity increases their Place Attachment - what we call "researching ability for local treasure".

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Breeding in multiple ponds is conducted for each species of fish, such as oily bitterling, mussels and freshwater common goby.
- Largemouth bass have not been fully exterminated out of this area because of illegal release by anglers.
- The statement that, "no bass in Tabika" will be declared by the end of this fiscal year.
- This is just the beginning of biodiversity conservation and sustainable agriculture such as agrochemical-free soybean cultivation.
- The road ahead will be long.

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