



Fisheries  
Research Institute  
of Slovenia



LIFE16 NAT/SI/000644

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**LIFE SAVING LASCA Urgent measure to conserve nearly extinct species *Protochondrostoma genei***

## **ACTION A.2**

### **PREPARATORY PLAN FOR THE FISH FARM MODIFICATION**

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## 1. ASSUMPTION

Lasca is a species with a low fishery interest and low commercial value. For this reason, before the LIFE11NAT/IT/188 CON.FLU.PO project there were no valid protocols for its reproduction in captivity and for the farming for release in the wild.

From the experience gained during CON.FLU.PO, it is noted that achieving effective results for conservation purposes is not so much linked to the number of subjects released, as it is linked to: a) making the subjects suitable to be released in the natural environment, by growing them in semi-natural conditions; b) maintaining the release constant in long term.

Based on these premises, on 20/04/2017 the first version of the protocol for the reproduction and farming of lasca has been released by Parco. It is available to organizations and associations in order to increase the number of structures able to reproduce this species and, consequently, to increase both the releases and the range occupied by lasca.

Indications for the modification to the Kobarid fish farm under Action C.1 are set out in this document, starting from the protocol developed, in order to make the structures suitable for lasca reproduction.

## 2. INTRODUCTION

The source of water used for the farming of lasca can be:

1) water from an external water body.

This solution doesn't allow to predict the time of spawning since the temperature of the water is subject to natural variations.

2) well water.

Well water maintains constant its temperature. In this case it's necessary to use a heater to change the water temperature in the tank during the reproduction period.

This solution allows to predict the moment of spawning with some accuracy (when the water temperature reaches 17 °C fishes lay within 2-3 days).

Features of the tanks used for lasca farming and reproduction:

- circular tanks are usually used (tank diameter 2 meters - water level 45cm);
- specimens density: 270 fish/m<sup>3</sup>;
- the same tank can be used for farming and reproduction;
- if different tanks are used for the different steps, it is suggested to avoid a temperature differential between the tanks (to avoid thermal shock).

### 3. WILD BREEDING SPECIMENS RESCUE AND RECOVERY

The recovery of breeders specimens in nature must take place:

- from well structured populations, not from populations in decline or with problems;
- away from breeding season, preferably in autumn/winter;
- by electrofishing.

The recovered specimens must be transferred to fish farm inside an oxygenated tank for fish transport and placed into the quarantine tanks. They are left in the quarantine tanks for a month before being moved into the breeding tanks. The size of the transport tank has to be suitable to the number of breeding animals.

Features of quarantine tanks:

- circular or rectangular shape;
- fiberglass material;
- specimens density: 270 fish/m<sup>3</sup>.



*Figure 1. Quarantine tanks, Parco Ticino fish farm.*



*Figure 2. Adult specimens in quarantine tanks.*

#### 4. BREEDING SPECIMENS FARMING

When the quarantine period is finished, the healthy specimens are transferred in farming tanks.

Features of farming tanks:

- circular or rectangular shape;
- in fiberglass material;
- specimens density: about 270 fish/m<sup>3</sup>.



*Figure 3. Example of farming tank, FIPSAS fish farm.*



The specimens are farmed following the natural photoperiod and are fed with feed of appropriate granulometry.

Features of feed for adult specimens:

- NUTRA MPM brand SKRETTING (food for trout);
- administration every 18 hours with automatic manger.

A daily cleaning of the tanks should be carried out in order to remove food residues and droppings since they the growth of molds and fungi that can compromise the health of the fish.

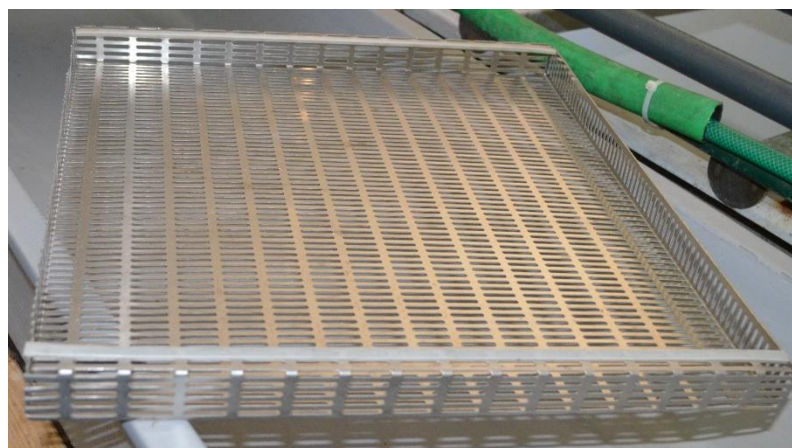
## 5. BREEDING PREPARATION

The specimens chosen for reproduction must stay in captivity for some months and have to be healthy. If they don't spend some months in captivity conditions, their gonads don't reach the maturity.

At the beginning of the breeding season (month of May) the natural conditions of the environment in which lasca usually reproduces are recreated in the tanks.

Features of the tanks used for reproduction:

- circular or rectangular shape;
- in fiberglass;
- specimens density: about 270 fish/m<sup>3</sup>;
- presence of turbulence (created by water jets from leaky pipes); to create turbulence the water inlet tube is used; tubes material = PVC, tube diameter = approximately 3 cm, holes diameter = approximately 8 mm;
- inside the tanks grids with a layer of gravel are placed (stones of diameter between 2 and 4 cm); under the grids a thin net is installed to avoid the loss of eggs; the surface of the containers must be quite large, otherwise in case of deposition of a large number of eggs they risk to be lost; usually the containers used for gravel are the internal incubation tanks of the troughs used for the next phase (hatching, figure 9); the internal incubation tanks of troughs are made of stainless steel and have holes 3x20 mm.



*Figure 4. Internal incubation tank where gravel layer is placed.*



*Figure 5. Turbulence is created by leaky pipes.*



*Figure 6. Tank set up for lasca reproduction in Parco Ticino fish farm.*

In this phase water temperature must be suitable for reproduction:

- if the tanks are powered by external water body, water reaches the “right” temperature by itself;
- if the tanks are powered by well water, the temperature must be gradually (in 7-10 day) increased to 16-18 °C by the heater.

In this phase it is suggested to:

- interrupt feeding because food residue and droppings promote the growth of molds and fungi that compromise the health of fishes;
- interrupt cleaning of the tanks because fish must not be stressed out;
- monitor the grids daily to find out the spawning of the eggs;
- monitor the water temperature daily.

## 6. SPAWNING OF THE EGGS

Once the spawning has occurred, it is necessary to:

- transfer quickly the grids containing the eggs from the tank where the spawning occurred to the troughs set up for hatching;
- replace the grids removed from the breeding tank with other grids with gravel until depositions are observed for at least 15-20 days.

*Parco experience and critical issues*

- the deposition took place at the end of May;
- if in a tank there are several breeding specimens it is possible that different deposition waves occur within a period of 15-20 days. This happens because the reproductive period lasts for about a month and not all the fishes lay exactly in the same days;
- for laying lasca prefers the grids placed in the zone with the greatest turbulence. It is not been noticed lay in the containers far away from turbulence zone;
- a small number of breeding specimens dies at the end of the reproduction.

## 7. INCUBATION AND HATCHING OF THE EGGS

For incubation and hatching, trough tanks can be used. In these tanks the incubation grids containing the gravel, used as artificial substrate for deposition, are transferred.

It is necessary to avoid the thermal shock during the transfer phase. For this reason, water of tanks used for deposition and water used for hatching tanks must have the same temperature.

Features of the trough tanks used for hatching phase:

- stainless steel or fiberglass material;
- composed of an external tank with a 1,5 mm round hole bottom and an inner tank (grid) with oblong holes on the bottom (3x20 mm);
- the internal tank is the one used for the gravel layer;
- the oblong holes allow the newborn fish to pass outside the grid. This facilitates the removal of the grid (and the layer of gravel) from the tank.





*Figure 7. Grids containing eggs are transferred to troughs tank.*



*Figure 8. Troughs tanks.*



*Figure 9. Troughs tank with incubation containers.*

In this phase it is suggested to:

- not place the incubation tank at the bottom of the trough to allow the larvae, once born, to pass outside the box and facilitate its removal from the tank;
- use several tanks placed in sequence and communicating with each other;
- place the incubation containers in the trough tank where the water entrance is located. In this way, the newborn fish will be dragged by the current in the tank downstream and then separated from the deposition substrate. This shall facilitate the next fishes transfer.

*Park experience and critical issues*

- the hatching took place 5-6 days after the deposition.

## 8. WEANING AND FIRST GROWING IN PREPARATION FOR RELEASE IN NATURE

If the water that feeds the troughs derives from an external water body, the fry will find nourishment in it, moreover some small food is added. These two types of food allow the fry that absorb the yolk sac to start feeding on their own.

At the beginning, given the small size of the fish, it is advisable to use very thin food, better ground using a small mortar. Before administering it, a small amount of water is added to form a water-feed suspension. The administration of this suspension allows to disperse the feed making easier the intake by young fish.

Features of fry feed:

- NUTRA HP1.0 feed (food for trout), SKRETTING brand;
- grind the feed with a mortar.

When all the fry have adsorbed the yolk sac they have to be weaned using artificial ponds, where they find natural food and favorable thermal conditions for growth.

If a heater is used in the tanks, in order to avoid thermal shock it is suggested to bring the temperature of the water to a temperature similar to the one of the ponds where they will be transferred.

Features of the ponds used for the growth:

- the dimension depends to the available space;
- made with concrete;
- depth about 1m;
- fertilization with manure, with a small water flow, about 10 days before their use. This favors the development of phytoplankton and zooplankton from which the fry are fed in the early stages of growth;
- it is possible to use organic or chemical fertilizer;
- exposure to the sun to encourage the development of phytoplankton and guarantee a thermal input for the growth of the fry.



Figure 10. Ponds used for the first growing, Provincial fish farm of Abbiategrasso.

The complete cleaning is performed only when all the fry are released and has to be done by removing water and drying the pond under the sun.

When the fry reach 3-4 cm in length, feed should be administered to enrich their natural nourishment. Then gradually they are nourished only with the additional feed.

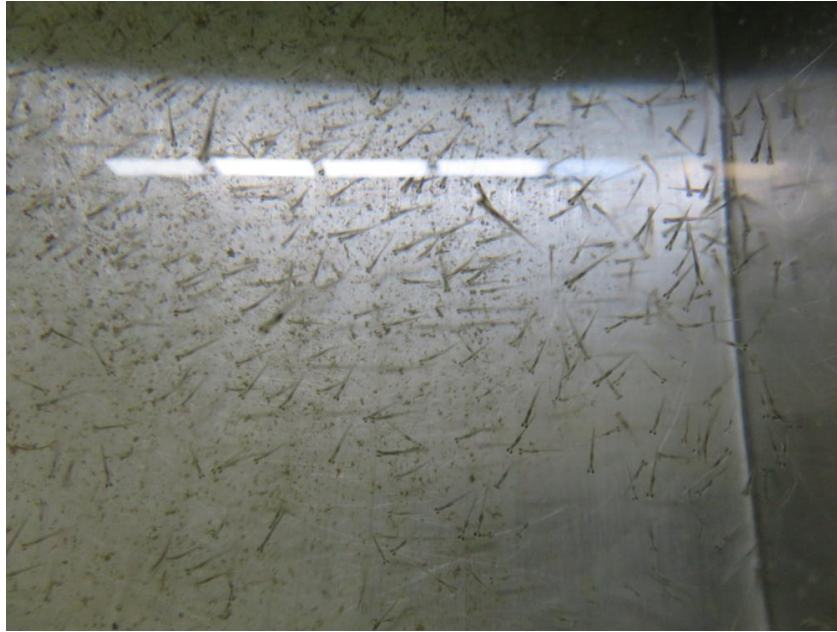
Features of feed for growing fry:

- NUTRA HP1.0 feed, SKRETTING brand (food for trout);
- administration every 18 h with automatic feeder;

The residence time of the fry in the ponds varies according to the size chosen for their release in nature. To have fry of 1.8-2 cm in length, the residence time is 1 month (temperature= 25-26°C).

*Park experience and critical issues*

- before using the ponds for fry growth, the Park used fiberglass tanks and *Artemia salina* for food. This meant a considerable management effort compared to the use of ponds and feed. Infact, to be able to administer *A. salina* it is necessary to develop its life cycle (with the availability of structures, hot water, salt water);
- the growth of fry housing in fiberglass tanks fed with well water (at temperature 12-13°C ever) did not allow the normal growth of the fishes. If compared to fry grown in the ponds, a considerable difference in the size of fishes of the same age was noted (in a month fry grown in the ponds measured 1,8-2 cm in length, those grown in well water were only 1 cm long).



*Figure 11. Young lasca (about 2 weeks of life).*

## 9. DECISIVE FACTORS FOR THE SUCCESS OF THE REPRODUCTION

On the basis of the experience of the Parco, the success of lasca reproduction is related more to the conditions in which the fishes are farmed during the breeding season, rather than the size and the type of structure of the tanks and the quantity of water in them.

In particular, the factors that were fundamental for the success of the reproduction are:

- before the breeding period:
  - recovery of the breeding specimens in autumn/winter (far from the breeding season);
  - breeding specimens must stay in captivity conditions for a few months to be used for the reproduction.
  
- during the reproductive period:
  - use of water deriving from external water bodies (or well, but warmed up);
  - natural photoperiod;
  - turbulence;
  - grids with gravel in the zones where turbulence is present;
  - use of healthy breeders.

## 10. ACTIVITY TABLE

It is suggested to fill out daily a table containing all the informations concerning breeding and reproduction of the lasca.

An example is shown below.

Date	Tank temperature (°C)	Notes (for example start of feeding, start of hatching, displacement of grids, transport of fry, special treatments, release of fry, etc.)

## 11. HANDLING OF FISH, CLEANING AND HYGIENE

Since lasca is a sensitive fish, it is not recommended to touch it, except for absolutely necessary operations. In case of need, every handling operation must be carried out:

- with gloves;
- with the utmost care and attention.

Also the fishes/eggs transfer and tank cleaning operations must be carried out using gloves.

Once the reproductive cycle is over and the adult fishes are transferred to the farming tanks, the tanks used for breeding and hatching phase must be disinfected with sodium hypochlorite (15%).

It is necessary to remove the coarse organic residues and clean the surfaces before using hypochlorite. Infact, the presence of coarse organic material makes the germicidal action of the hypochlorite much less effective.

How to carry out the disinfection operations of the tanks:

- close the entrance of water into the tanks;
- pass a brush with sodium hypochlorite on the surface of the tanks;
- wait 10 minutes;
- rinse the tanks with water.

## 12. FURTHER INFORMATION

In the Life CON.FLU.PO experience it has been observed that both young lasca and adults adapt well to artificial feeding.

Parco used trout feed, but it is possible to use feed for cyprinid.

For the phases of weaning and first growth:



if it is not possible to use artificial ponds, it is possible to use fiberglass tanks and feed with an appropriate granulometry.

It is recommend storing feed in a dry place.

Failure to comply with reported in paragraph 7 has led to negative results.