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FINAL REPORT ON LASCA BREEDING PROGRESS

LIFE for LASCA Project
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Fisheries Research Institute of Slovenia

Parco Ticino

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Picture on the cover: Adult Lasca specimen (*Protochondrostoma genei*). Author: Jurij Mikuletič.

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Preface

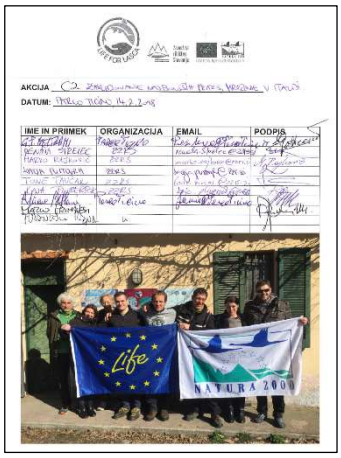
This report is the Final report of LIFE for LASCA project on Lasca breeding. It presents objectives, methodology, activities and results achieved under the project action C2: “Establishment of Lasca Breeding in Slovenia”. Further activities regarding Lasca breeding are predicted in After Life plan and Action plan delivered by the project.

Objectives and achievements of project action C2: "Establishment of Lasca Breeding in Slovenia"

The main goal of C2 action was the establishment of Lasca captive breeding in Slovenia based on past Parco Ticino experiences gained during LIFE CO.FLU.PO. project. The main goal was reached; in Slovenia, we performed 4 successful Lasca spawning seasons producing 41.000 offspring.

During the action implementation, we achieved following objectives:

- *C2.1 Tracking best practices from different groups involved in Lasca (or sister species) breeding*.
  In February 2018, Life for Lasca project team met in Magenta in Italy (Picture with attendance list). Together we visited three fish farms in Lombardia region, where Slovenian team was introduced with techniques of Lasca breeding. Afterwards, we were hosted at the Department of Biology at the University of Parma. We met experts working on similar projects, but with other fish species; Barb (*Barbus plebejus*) and Barbecues (*Barbus meridionalis*). At the University, we also met with genetic experts to prepare for further possible cooperation in the field of genetic analysis of Lasca and sister species.



- *C2.2 Professional fish farmer initiation*.
  In 2017, Parco Ticino prepared short document on Lasca breeding requirements to support FRIS in fish farm modification plan preparation. FRIS fish farmer started working in the Slovenian fish farm on 2.10. 2017. He received regular training in fish farming where he already showed great potential. In the end of May 2018 (from 28.5.2018 to 8.6.2018), the Fish farmer visited Parco Ticino fish farm (Picture). His visit was conditioned upon Lasca spawning period. This period is crucial in fish farming, since Lasca offspring is needed for species reintroduction in the wild. At Parco Ticino he was practically trained in Lasca breeding activities (equipment used, procedures and management) and preparation of fish ponds for growing of fry. He was also acquainted with other ongoing LIFE projects in the area. At the end of the visit, he successfully transported first Lasca broodstock to Slovenia (Table 1).

- *C2.3 Italian Lasca stock importation*.
  During the project, we performed 6 Lasca specimens transportations (Table 1) from Italy to Slovenia. Wild breeders with an exception of 52 specimens were intended for Slovenian Lasca broodstock establishment/reinforcement, while majority of other specimens were released in the wild.

Table 1: Lasca specimens transportations during the project implementation.

Date	Number	Notes
08.06.2018	380	300 wild breeders; 80 1+
14.03.2019	11.000	YOY (spawing 2018)
04.10.2019	25.072	72 wild breeders; 25.000 YOY (spawning 2019)
23.09.2020	20.000	YOY (spawing 2020)
16.09.2021	20.100	100 wild breeders; 20.000 YOY (spawning 2021)
07.10.2022	20.100	100 wild breeders; 20.000 YOY (spawning 2022)
SUM	**96.652**	**572 WILD BREEDERS and 96.080 YOY**

- *C2.3 Lasca breeding*.
  Lasca breeding was performed in Slovenia as well as in Italy. Offspring from Italy was transported to Slovenia each year. The dates of transportations and numbers of specimens transported are presented in Table 1 (1+ and YOY).
  In Slovenia, Lasca breeding was established in 2018 by transportation of 380 specimens from Italy (Table 1). Due to delay of the Slovenian fish farm modification under actions A2 and C1, mitigation strategies for rearing and spawning were implemented:
  i. For newly arrived Lasca, we used quarantine owned by Angling club Tolmin,
  ii. The Municipality of Kobarid allowed us to use their nearby outside ponds,
  iii. We borrowed the equipment form other Fish farms (Obrh and Tolmin) to ensure Lasca spawning and rearing conditions,
  iv. The external plumber assembled temporary Lasca breeding system.

  Despite all mentioned challenges, we succeeded to perform the first successful Lasca breeding already in 2019. Until the end of the project, 4 successful Lasca spawning seasons in Slovenia produced 41.000 offspring (Table 2).

Table 2: Annual number of Lasca offspring in Slovenia.

Year	Number of spec.	Notes
2019	10.000	182 specimens of Lasca broodstock died in June 2019, just before spawning (water supply disruptions)
2020	10.000	
2021	20.000	
2022	1.000	Spawning 2022 was very succesful. We estimated that no. of eggs/elviens was at least comparable to previous year. **However,** **DROUGHT***: Gradual mortalities started to occur in late June/July due to unknown concentrated chemicals/substances in water; probably as consequences of low water in the source streams in the Hatchery. The mortality increased for all species in the fish farm. Other fish farms in Slovenia also report simillar problems and many of them decreased/stopped fish production. The drought stepted into an affect at the time of Lasca hatching, when the juveniles are very vounrable.
SUM	**41.000**	

*water tests showed increased values of organic matter. The source was damage to the sewage system of a nearby nursing home. The wastewater seeped into the spring water (source water for the Hatchery), which became evident during droughts. The damage was repaired after discovery.

Lasca breeding methodology

Based on Fish farmer training (C2.2) and Parco Ticino (LIFE CON.FLU.PO.) guidelines issued in two documents under action A2: “Preparatory plan for fish farm modification”, Lasca breeding techniques were successfully transferred into Slovenia.

Crucial points in Lasca breeding:

- Breeders for broodstock establishment are used from viable wild populations. Technique used: electrofishing. Period: not during the spawning season, preferably in autumn to winter.
- When moving fish between water sources the temperature differential should not exceed 4°C.
- Handle fish with utmost care and attention.
- Specimen density 270 fish/m^3
- Natural photoperiod
- Feeding every 18 hours with food for trout
- During reproduction period (starting in late May):
  i. well adopted specimens to captivity (few months).
  ii. circular ponds are used (diameter 2 m, water level 45 cm).
  iii. turbulence created by water jets from inlet tubes (PVC, Ø=3cm).
  iv. on the bottom of ponds stainless steel incubation trays (net = 3 x 20 mm) filled with gravel (2 - 4 cm in diameter) layer are placed. Under the gravel, thin net is placed to avoid egg loss.
  v. water temperature has to be gradually raised to 16-18ºC (within 7-10 days). When the target temperature is reached, fish lay eggs within 2 - 3 days.
  vi. feeding and cleaning are interrupted.
  vii. water temperature and baskets are monitored on daily bases.

viii. trays full of eggs are transferred to troughs set up for hatching.
ix. Period of laying eggs is 15 to 20 days.

- Hatching:
  i. eggs hatch in 5 - 6 days.
  ii. trays full of eggs are slightly lifted to enable hatched larvae to pass outside.
  iii. small (mortar grinded) sized food suspended in water is used.
  iv. Fish are moved to outdoor ponds after yolk sac is absorbed. In case, fish are moved to inside ponds, they need to be additionally fed with live food (etc. Artemia).

Figure 1: Lasca in tank during spawning period.