Artificial substrates as a tool for the conservation of the Italian Spring Goby (*Orsinigobius punctatissimus*)

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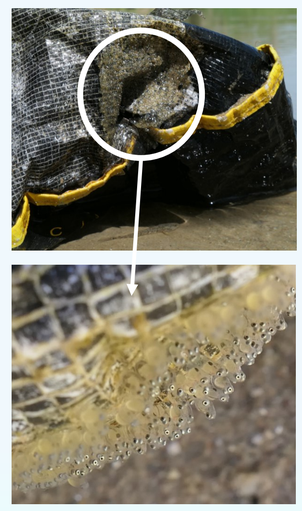
INTRODUCTION

The Italian Spring Goby (*Orsinigobius punctatissimus*) is an **endemic** species of the Padanian spring waters, classified as critically endangered. Reproduction generally occurs in spring and summer, with the species using suitable substrates such as stones, branches, and leaves for egg laying. Male parental care extends from egg fertilization to hatching. Over recent decades, a 70% decline in the species' distribution in the Lombardy region occurred because of habitat reduction, fragmentation, and decrease of suitable reproductive substrates, leading to a population decline.

The aim of this project is to study the effectiveness of the introduction of artificial substrates (hollow bricks) to support the reproduction of the Italian Spring Goby.

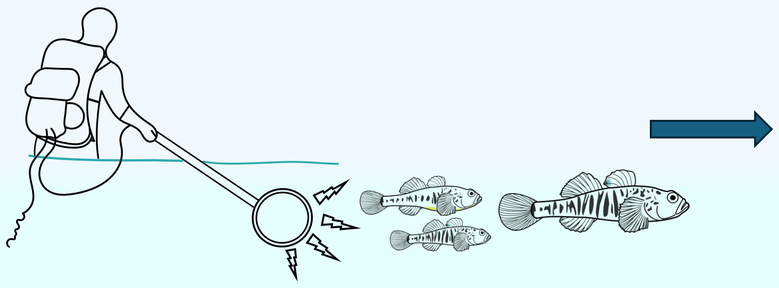


MATERIAL AND METHODS

The experiment was conducted in 10 sites (i.e., springs) where the species was detected. In each site, 20 m^2 cells were established, and bricks were placed at three densities (0, 1, or 3 bricks per cell), with a maximum density of 20 brick per 400 m^2 per site. Cells with bricks were selected randomly. From April, every two weeks, sites were visited and the following information collected for each brick:

- **usage** (species, presence, abundance, location, and egg development)
- **environmental variables** (substrate, vegetation, distance from the water source, current, depth, and temperature)

Estimating initial fish density by **electrofishing**

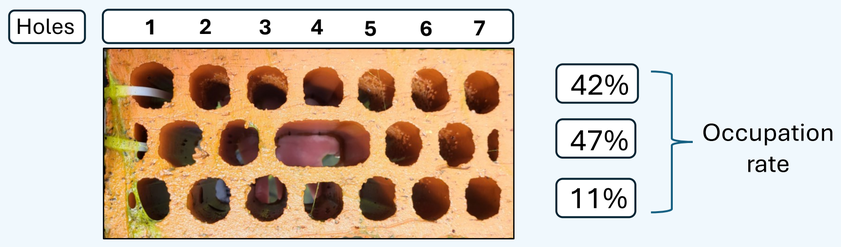


Placement of bricks

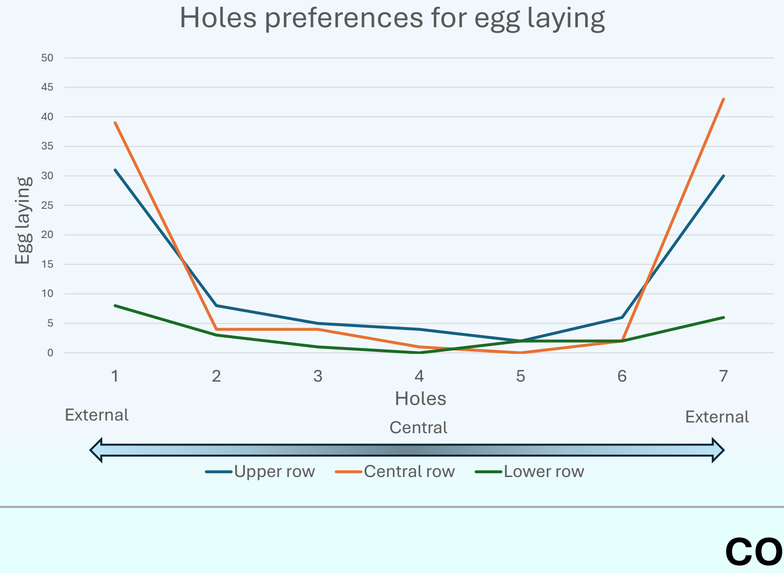
PRELIMINARY RESULTS

Overall, 202 egg laying were observed in 118 bricks, with clutch numbers ranging from 1 to 11 per brick, with an average of 1.8 egg laying per occupied brick. Egg laying were observed in 34% of the total checks, with high frequency accounting for 85% during the peak of the reproductive period.

EGG LAYING PREFERENCES

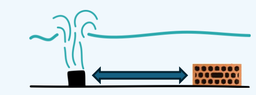


A clear preference for egg laying in the external holes was observed, with smaller holes being the most frequently used, representing 40% of total laying. High-density cells (3 bricks per cell) had 35.5% of bricks occupied, compared to 31.8% in low-density cells (1 brick per cell).

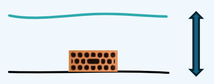


SUBSTRATES USAGE

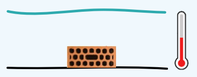
The occupied bricks were at:



Average distance from water source: **4.9 m**



Average depth: **40.4 cm**



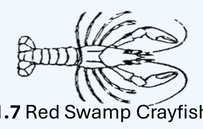
Average temperature: **16.7°C**

Hosted an average of:

1.5 Italian Spring Goby ♂ (**0 – 7** per brick)

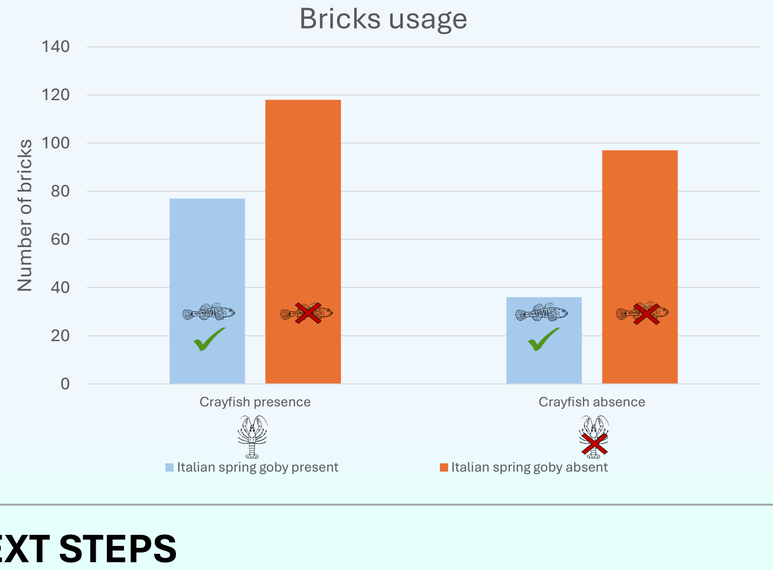
0.2 Italian Spring Goby ♀ (**0 – 3** per brick)

0.8 Padanian Goby (**0 – 4** per brick)



1.7 Red Swamp Crayfish (**0 – 7** per brick)

Egg laying were observed from January to September, thus extending the known reproductive period (spring–summer)



CONCLUSIONS AND NEXT STEPS

This preliminary study demonstrated that hollow bricks can be effective for egg laying and hatching of the Italian spring goby, potentially providing a valuable tool for *in-situ* conservation of this species. Further samplings at the study sites will be performed to assess whether changes in fish density occurred.