RESEARCH NOTES

Identification of the river blenny, *Salaria fluviatilis*, as a host to the glochidia of *Margaritifera auricularia*

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Laboratory experiments to control glochidial infestations of fishes are particularly interesting when considering the conservation of endangered freshwater mussels. The few species of the family Margaritiferidae for which hosts have been identified have specific fish gill filament glochidia. *Margaritifera margaritifera* (L.), *M. laevis* (Haas) and *M. falcata* (Gould) glochidia seem to be specific to salmonids,[1,2] and recent results suggest specificity between the ictalurid *Noturus phaeus* (Taylor) and the North American *Margaritifera hembeli* (Conrad).[3] In the critically endangered *M. auricularia* (Spengler), controlled experiments in aquaria have demonstrated the suitability of the Siberian sturgeon *Acipenser baeri* Brandt for successful metamorphosis of the glochidium[4], suggesting a possible historical relationship between *M. auricularia* and the endangered native Atlantic sturgeon *A. sturio* L. Recent studies in the Ebro River using both drift nets and electrofishing have demonstrated that none of the fish species currently living with *M. auricularia* can host their glochidia for complete metamorphosis[5]. The absence of juveniles in the habitat of the known population also supports this fact.

To discover more about possible suitable fish hosts of *M. auricularia*, we attempted to infest several native fishes that historically cohabited with *M. auricularia*. Experiments were carried out in aquaria at the Museo Nacional de Ciencias Naturales in February, March and April (*M. auricularia* glochidia release period[5]) 1999 and 2000. Numbers and species tested were: 2 *Salaria fluviatilis* (Asso) the river blenny, 12 *Barbus* spp. (including *B. haasi* Mertens and *B. graellsii* Steindachner), 1 *Rutilus arcasii* (Steindachner) and 3 *Anguilla anguilla* (L.). The river blenny, an endangered species, was directly collected at the Canal de Lodosa (La Rioja, Spain). Eels, a historically common species in the Ebro River, were purchased from a fish hatchery. The other species were collected by electrofishing in River Ebro tributaries.

Eleven and ten gravid specimens of *M. auricularia* were collected at the Canal Imperial de Aragón (Zaragoza, Spain) in February 1999 and 2000, respectively, and maintained in aquaria until mature glochidia emerged. Mussels and fishes were kept in aerated tanks with average room and water temperatures of 19°C and 17.5°C, respectively.

Prior to infestation, fishes were fed with red mosquito larvae. For induced infestation, glochidia were obtained with a pipette from the exhalant apertures of the mussels and rinsed with aerated water into glass jars each containing a fish. After infestation, each fish was isolated in an aerated aquarium without substratum and with a 5 mm-mesh plastic net on the bottom and regularly inspected for glochidium

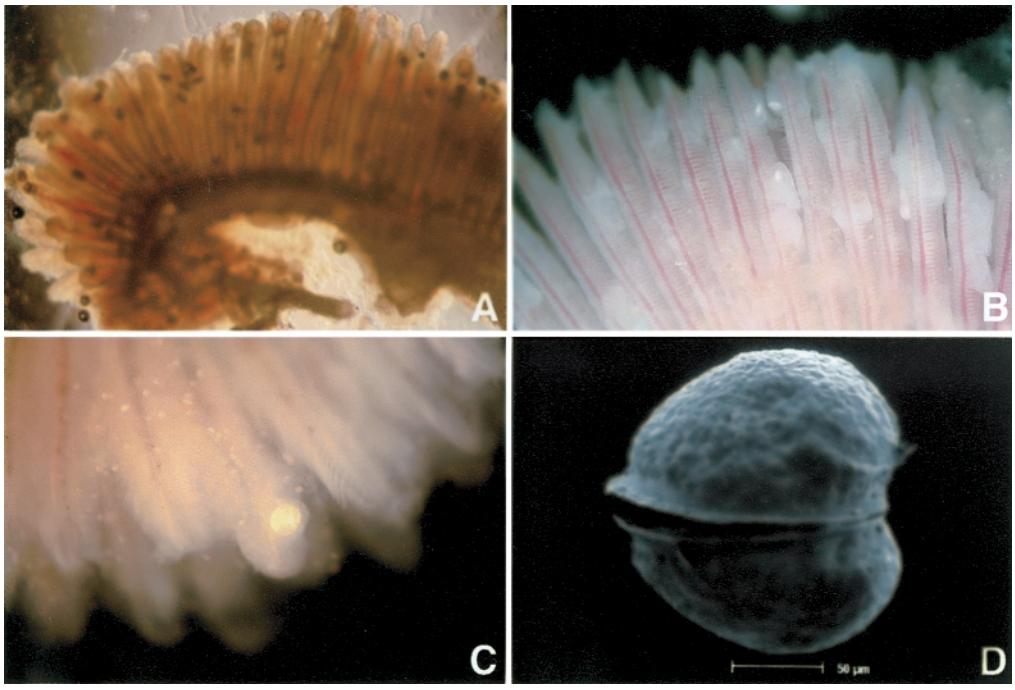

Figure 1. **A**. Barbel gill filaments 6 days after infestation with *M. auricularia* glochidia. **B**. Eel gill filaments 4 days after infestation. **C.** Encysted glochidia in the gill of a river blenny. **D**. Juvenile *M. auricularia*.

encystment. Water was periodically siphoned from the aquarium bottom through a 60 μm-mesh nylon sieve to check for possible release of glochidia or juveniles.

Some fishes were then anaesthetised with MS222 and gill filaments excised and photographed.

Glochidia of *M. auricularia* successfully attached themselves to the gill filaments of all five species tested.

Five infested barbels maintained the glochidia for six days on their gill filaments (Fig. 1A), but a gradual sloughing of glochidia was subsequently observed. None of the specimens checked at 8, 12, 13 and 14 days after infestation carried glochidia.

The only specimen of *Rutilus arcasii* studied maintained several glochidia for the first three days after infestation. On Day 6 only one glochidium was observed, and none on Day 8. Sloughed glochidia appeared on the aquarium bottom.

The experiments with eels were unsuccessful. As they could not be checked alive because of the lack of operculum, they were anaesthesized and killed before inspection. Of the 3 specimens tested, the first harboured approximately 20 glochidia (Fig. 1B) in the gill filaments 4 days after infestation. Neither of the other two, which were examined 14 and 24 days after infestation, carried glochidia.

Of the 2 river blenny specimens, the one infested with a few glochidia died in the aquarium 23 days after infestation, harbouring 6 encysted and grown glochidia. The other specimen maintained glochidia throughout the experiment, with successful encystment (Fig. 1C) and metamorphosis. Six juveniles appeared at the bottom of the aquarium 42 days after infestation, and 204 juveniles 3 days later (Fig. 1D), thus indicating that the river blenny is a suitable host for the glochidia of *M. auricularia*.

The successful results obtained with the river blenny allow for greater optimism regarding the future recovery of *M. auricularia* populations. Given the inadvisability of repopulating the River Ebro and Canal Imperial de Aragón (the only European rivers harbouring fertile *M. auricularia*) with the exotic *Acipenser baeri* and the difficulty of introducing specimens of the endangered *Acipenser sturio*, using *S. fluviatilis* would be an interesting solution. Artificially infested fishes can be released in selected areas of the Canal Imperial and the River Ebro to obtain juveniles which will be maintained in other selected and monitored areas in the historical distribution area of *M. auricularia*. Indeed, the release of fish populations in areas with dense beds of *M. auricularia* could help the latter to recover naturally.

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