

## ***Margaritifera auricularia* (Unionoidea, Margaritiferidae), the giant freshwater pearl mussel rediscovered in Spain**

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*Margaritifera auricularia* was described by Spengler in 1793. Since then specimens have been found in several localities in Western Europe and North Africa, often as fossils. However no living specimens have been scientifically recorded since 1917 (Haas, 1917). This author was the only one to study live specimens, collected in the Ebro River in Spain, publishing a short paper about its anatomy (Haas, 1924). As no more specimens were ever found, no data exist about its reproductive habits, spawning season nor is there a description of its larval stages.

In a recent survey of Spanish Rivers to inventory the Habitats Directive (Directive 92/43/CEE) non-insect invertebrate species (Ramos, 1998), we found living populations of this giant pearl mussel in a very ancient channel (Imperial Canal) of the Ebro River (Araujo & Ramos, 1996) and in the Ebro (Álvarez Halcón, 1998), both in Aragón. More recently, there has been news about other *M. auricularia* populations living in the lower course of the Ebro river and in one of its irrigation channels (Altaba, 1997), both in Catalonia.

An interesting theory exists about the specificity between *M. auricularia* and the Western European sturgeon *Accipenser sturio* (Linnaeus, 1758), a relict fish in European rivers and extinct in Spain. Both species occur together in Pleistocene deposits (Preece, 1988) and both have been declining since the first half of this century. With this theory in mind, we introduced several sturgeons into an aquarium with mussels, realizing that all mussels began to spawn. In the aquarium the mussels released all their larval stages, from unfertilized eggs to mature glochidia, passing through all intermediate stages.

The glochidium of *M. auricularia* is very small (about 140 microns) and presents very small teeth. It is of the hookless type, as in other known species of the genus (Araujo & Ramos, 1998). This kind of glochidium specifically attaches itself to the gill filaments of the fish, whereas the hooked ones, typical of other genera, also attach themselves to the fins.

Immediately after the glochidia were released, we observed how they attached to the fish gills. We excised the gill filaments of the sturgeons 1, 2, 3, 4, 5 hours and 2, 3, 5, 13, 34 and 60 days after the beginning of glochidia release. Now we are studying histological and scanning samples of these gill filaments in order to investigate the encystment process and to discover the period the glochidia need to complete their metamorphosis.

Timing and length of the glochidial release period in the wild has been determined by collecting drift samples. With these data, fish were collected by electrofishing in order to investigate their susceptibility to the glochidia.

The large size of all the specimens from the Imperial Canal population and the longevity achieved by species of this genus (around 100 years) suggest that this population may not have reproduced for many years. This leads us to ask whether the species has lost its reproductive capability, if it is unable to complete larval maturation or do the juveniles simply have a different habitat that we have not been able to find up to now?

*In situ* observations suggest that the species should be more common, as occurs with other related genera (i. e. *Unio*, *Psilunio*, *Anodonta*) in the study area, if any kind of fish were compatible with

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its larval requirements. Evaluation of the possibility that other fish species may be parasitized by glochidia of *M. auricularia*, and of the success of this unusual cycle in captivity and in the wild is yet to come. In addition, the results of a molecular study currently in progress, can provide information on the genetic variability of this population and possible reproductive strategies. This kind of results are of interest for subsequent application of species recovery plans and reintroduction policies.

Fortunately, after our rediscovery of *Margaritifera auricularia* and the corresponding report to the Dirección General de Conservación de la Naturaleza, the Comisión Nacional de Protección de la Naturaleza has included the species in the National Endangered Species List (Royal Decree 439/90) in the category of “threatened with extinction”, then being protected by the Law 4/1989. *Margaritifera auricularia* was the first invertebrate species on this List.

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