

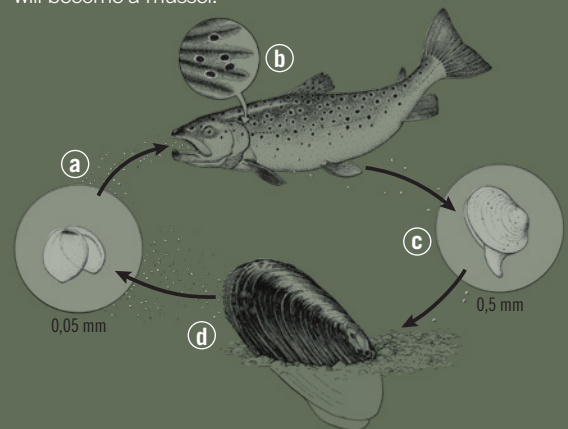


A secret treasure in our rivers

The biological life cycle of the pearl mussel is made up of various stages. The famous French saying, "to live happily, live discreetly", might well be its leitmotiv.



The freshwater pearl mussel is an invertebrate with a strong longevity ranging from 30 to 150 years. It is able to breed around 7-15 years old when its size exceeds about 7 cm. In June-July, the females take the spermatozoons released by the males and the ova are then fecundated. A few weeks later, the larvae (0,06 - 0,08 mm), which are also called glochidia (a), are released and settle on the gills of a Salmonida (brown trout or Atlantic salmon) (b). Shortly after that, a cyst forms around each larva. Having reached a sufficient development stage in May or June of the following year, these larvae break free and bury themselves in a clean substrate made up of sand or gravel where they will develop. At this point, they measure about 0,4 mm (c). Their benthic life (in sediment) lasts from 4 to 10 years, after which the pearl mussels appear at the surface of the substrate (d). Until they reach sexual maturity, their mortality rate is high : for 1 million of glochidia, less than 10 of them will become a mussel.



Precious pearls



For a long time, people have gathered pearl mussels to make sets of jewels (with pearls and nacre). Countless jewels have been made like the tunic coat of Francois I^{er}, king of France (16th century), the set of jewels of Queen Marie Leszczynska (18th century), daughter of King Stanislaw I of Poland, a necklace for Queen Marie-Antoinette (18th century) and another one for the Empress Josephine de Beauharnais (18th century), a tiara of the English Crown... The dress Marie de Medici wore at her son's, Louis XIII, baptism was adorned with 32 000 pearls coming from all over Europe. A real frenzy took over the continent in the 19th century where people literally dug riverbeds with a spade, pulling out thousands of mussels, to get, at best, a few dozens of pearls.

In Pont-Aven (Finistère), the river was paved with mussels named Kregen doue. Fridour, a pearl gatherer working in the Aven river who was very famous among the tourists, declared he had found 16 pearls in 1897 and 10 in 1898 in the 800 mussels he had gathered. The last pearl gatherer worked on the Odet river at the beginning of the 1950's. The species is now fully protected under law and an attack on its populations is punishable by one year in prison and a 15 000 € fine (art. L 415-3 of the Environmental Code).



Who does what in Brittany and Lower Normandy ?

Bretagne Vivante coordinates the overall conservation programme. It is also in charge of field operations in Brittany : inventories, environment quality monitoring, population reinforcement, awareness-raising and communication. In Lower Normandy, the CPIE of the Normandy Hills carries out the field operations in cooperation with the Inter-communal Syndicate for the Development and Management of the Sienne River and the Normandie-Maine Regional Nature Reserve. The Finistère Fishing Federation is in charge of running the breeding station.



Our essential allies for the good implementation of the programme :



Partake in the restoration of environment quality :

Fédérations de pêche des Côtes d'Armor, du Morbihan, de la Manche et de l'Orne, Services départementaux de l'ONEMA, SAGE de l'Aulne, SAGE Blavet, CATER Basse-Normandie, Syndicat intercommunal d'alimentation en eau potable du Houlmé, Syndicat intercommunal de restauration des rivières de la Haute Rouvre, Syndicat mixte de Kerné Uhel.

Water quality is a major stake for the EU

The European Commission entrusted Bretagne Vivante with the conservation of the species, in partnership with the Finistère Fishing Federation and the CPIE of the Normandy Hills for a total amount of 2,5 millions euros. It subsidize 50% of the action through a LIFE+ programme which is "the financial tool for the environment". This programme is part of a community policy and its goal is to reach a good status of biodiversity ("Habitats-Fauna-Flora" directive) and of continental and maritime waters by 2015 (Water Framework Directive).

The programme is in line with the launching of the "trames vertes et bleues" in France [zoning requirements concerning ecological connectivities], flagship measure of the Grenelle de l'environnement [a conference bringing together the government, local authorities, trade unions, business and voluntary sectors to draw up a plan of action regarding the environmental issue]. It aims to stop biodiversity decline by preserving and restoring ecological continuities. The programme is also consistent with the French National Action Plan for Naiads⁽¹⁾.

The populations of pearl mussels used to thrive in the watercourses of the Armorican Massif but they are now on the brink of extinction. The extinction of this indicator species would undoubtedly result as a failure for the regional and territorial policies in favour of the conservation of the watercourses and of their natural habitats. For Bretagne Vivante and its partners, the emergency is to preserve the species by saving living rivers which, tomorrow, will set an example and will provide a breeding ground for a wider re-conquest of the territory by the species.

Naiads : Freshwater mussels belonging to the Unionidae and Margaritiferidae families.

They subsidize the LIFE+ Conservation programme for the freshwater pearl mussel of the Armorican Massif :



Bretagne Vivante - SEPNB - 186 rue Anatole France - BP 63121 - 29231 BREST Cedex 3
Tél. +33(0)2 98 49 07 18 - Fax : +33(0)2 98 49 95 80 - E-mail : contact@bretagne-vivante.org

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A protected but endangered species

The pearl mussel is a species protected under French law since the Order of the 7th of October 1992 and the Decree n°99-615 of the 7th of July 1999. It is listed in the annexes II and V of the "Habitats-Fauna-Flora" Directive and in the annexe III of the Bern Convention. In 2010, it has been classified as endangered in the International Union for Conservation of Nature red list. It is considered as critically endangered and could become extinct in the wild in the near future.

LIFE+ Programme

CONSERVATION OF THE FRESHWATER PEARL MUSSEL IN THE ARMORICAN MASSIF

Newsletter n° 1 - February 2011

Living rivers of Brittany and Normandy : mobilization for the freshwater pearl mussel

A European programme (2010-2016) is underway to preserve the freshwater pearl mussel in Brittany and Lower Normandy. Its aims are to culture the species which is endangered in the Armorican Massif and to maintain, not to say develop, some genuine "living rivers", which is a prerequisite for the survival of the species in our regions.

AN ACTION COORDINATED BY



In France, the pearl mussel is an endangered species. Saving this species will without doubt be the greatest conservation challenge we will face in the coming years. Indeed, its complex biology and, most of all, its water quality requirements are hardly compatible with our limited ambitions to recover a good ecological status of watercourses. Good quality is what we aim for. The pearl mussel requires excellence!

Among the four French massifs which are or have housed the pearl mussel, namely the Vosges, the Pyrénées, the Central Massif and the Armorican Massif, it is probably in the latter that the loss has been the greatest after disappearing from the Vosges Massif. It is well-known that the rivers of Brittany have greatly suffered from human impact.

The fact that this once ill-treated territory sees the advent of a conservation programme for the pearl mussel shows that all is not lost. We thus give our full support to Bretagne Vivante who dared take up that great challenge.

Gilbert Cochet
National Museum of Natural History,
independent expert for Council of Europe



Pearl mussels, trouts and salmon... interacting species in quick current waters

The freshwater pearl mussel, whose scientific name is *Margaritifera margaritifera*, is a species which lives in the riverbeds of old massifs of Western Europe, among which the Armorican Massif. Its complex biological life cycle, its ecological requirements and its great longevity makes it an umbrella species. This means that by protecting it, we actually protect a whole ecosystem. Within the huge network that biodiversity represent, the health of the pearl mussel then takes on a special importance.



Sandbanks, meanders and Salmonidae

Besides one exception in Ireland, all the rivers hosting pearl mussels flow on siliceous rocks (our granite). It settles in a large variety of habitats, as long as a small quantity of soft sediment is able

to retain it : rivers with sandy bottoms, wooded gorges, boulders, etc. As a matter of fact, it lives half buried in riverbeds and filters up to 50 liters of water a day ! There must be sufficient current⁽¹⁾ and the depth of the watercourse must range from 0,5 to 2 meters. The presence of Atlantic salmon and brown trouts is essential to make sure the biological life cycle of the pearl mussel goes smoothly, the gills of the host fish being a compulsory stage for the larva.

A pure and cool water

The pearl mussels are very sensitive to water and sediments quality. They thus favour cool waters whose temperature does not rise above 13-14 °C and with low nutrient concentration⁽²⁾. It is thus a very good indicator species in terms of watercourse quality. The sediments in which it lives completely buried during its youth will also have to be of good quality, at least sufficiently oxygenated in order to allow exchanges with the surface. The conservation stakes of the species thus depend on the natural quality of the rivers.



Further reading... www.life-moule-perliere.org

(1) between 0,25 et 0,75 meters per second (2) Nitrate NO₃⁻ rate inferior to 5 mg/L, phosphate PO₄³⁻ rate inferior to 0,1 mg/L

A species of exceptional scientific interest

Preserving the pearl mussel is all the more important since the populations of each river all have particular genetic characteristics. In some of them, the species is even the living witness of geological events which took place more than one million years ago. They are true living fossils which have been miraculously preserved!

Citizens, farmers, fishermen and elected representatives are already taking steps to restore the rivers to their natural state



To preserve the pearl mussel populations, we must first restore their living environment : water and substrate quality, host fishes quantity, preservation of the areas around the watercourse, etc. It is everybody's business : that of the elected representatives, the associations, the users, the citizens. The LIFE+ programme is an extension of their actions by means of which conservation actions are for instance carried out in a breeding station.

Letting rivers flow freely again

The watercourses must recover a form of free flowing which is nowadays too limited due to outdated and counterproductive land management practices. Ecological continuities must be restored : in that respect, suppressing obstacles or creating fish-passes are essential operations. We also have to restore the destroyed meanders which are favourable to biodiversity. It is essential for all the species living in a watercourse that the latter be of excellent quality and most particularly for the pearl mussel. Managing or restoring riverbank vegetation while favouring deciduous tree species as well as monitoring silvicultural practices (by avoiding clear cutting and hauling in the riverbed, etc.) allow for nice watercourse borders which will filter the overland flow.



Suppression of an obstacle in order to restore the ecological continuity

Reducing pollution sources



Farmers are already changing their practices in order to preserve wetlands : thanks to agri-environmental measures or Natura 2000 contracts. This can result in a limited use of fertilizers on some plots which are close to the river, in setting up drinking troughs and fences in order to prevent the cattle from straying in the watercourse. It is thus possible to better value the agricultural products of these responsible practices. As for the farming habits of individuals in their garden, they, too, must evolve in their use of pesticides, for instance. Other solutions exist : using repellent plants or seasonal cultures. Setting up adequate wastewater treatment plants and implementing mechanical weeding are possible solutions for urban agglomerations to lessen their environmental impact.

The LIFE+ programme : preserving and reintroducing the pearl mussel

The pearl mussel populations of the Armorican Massif are old and could become extinct within 10 years if nothing is done. The preservation of the populations in breeding stations and their reinforcement in a quality environment will be at the core of our efforts during the next six years.

In Brasparts, fishermen become breeders

Being an essential partner of the LIFE+ programme, the Finistère Fishing Federation will set up a breeding station in Brasparts (Finistère) as early as 2011. The major goal is to culture mussels of various age-classes in order to anticipate its extinction in its natural environment and to ensure its survival for a possible restocking. The goal of this ex-situ conservation operation is to have a batch of about 4 000 pearl mussels aged 4 to 5 years for each of the watercourses at the end of the programme.

One goal : reinforcing wild stocks

The reinforcement of wild stocks is carried out each year by directly reintroducing individuals in the sediment of the rivers and also using methods which make it possible to assess the outcome of the operation in-situ (thanks to incubator baskets that are placed in the substrate). However, on rule prevails for these reintroductions : the original watercourse will first have to have reached a sufficient quality.



Further improving the environment quality

Actors and managers of the watercourses, who are indispensable allies, are guided throughout their activities of restoring river and habitat quality. Further inventories are carried out. Regulations adapted to each site are implemented in order to protect the habitat, the mussels and the host fishes.

The habitat quality is assessed throughout the project in order to optimize the populations reinforcement so that, in the end, a better understanding, a better management and a better monitoring of wild stocks can be achieved.

Awareness-raising and communicating on the stakes

The LIFE+ programme also includes an educational section addressed to the general public, elected representatives and professionals. The general public can, for instance, visit the breeding station. Elected representatives and field actors of the concerned territories are also invited to come and are often informed of the stakes and progress of the programme.

