



## Clam invasion threatens ecosystem balance and water quality

**Invasive alien species** can have destructive effects on ecosystems. A recent study has shown that the invasive Asian clam (*Corbicula fluminea*) is reproducing at such a high rate in the River Minho Estuary, on the Portuguese/Spanish border, that it is not only threatening native species but also the quality of the river water.

The functioning of freshwater ecosystems is easily unbalanced by human activities, such as the intentional or accidental release of alien species. Some of these species become invasive, causing damage to habitats and threatening biodiversity. The Asian clam is considered to be an invasive alien species (IAS) in many parts of Europe and most likely arrived in the River Minho estuary as a result of human activity. Local fishermen use Asian clams as bait and they are also found on the water plants sold for use in fish tanks. The clams can find their way into waterways when fish tank contents are disposed of through domestic waste disposal routes, for example.

The Asian clam has an extraordinary reproductive rate: a single clam can produce up to 70,000 offspring a year. This reproductive success can be attributed to what is known as an "r-strategy" life cycle consisting of a short life span, early maturity and rapid growth.

An ecological study spanning the life cycle of the Asian clam in the River Minho Estuary was performed between January 2005 and August 2006. It demonstrated that the Asian clam is a major component of this estuary and completely dominates the riverbed. The study demonstrated that the abundance of this clam is clearly related to sediment characteristics (granule size and organic matter content) and nutrients in the river water. The estuary has very low nutrient levels and the levels of phytoplankton found there were too low to support this invasive population. Instead, the research suggests that the Asian clams were most likely surviving using additional food sources, such as organic matter available in the sediments.

Given the clam's incredible reproductive rate, it is possible that the River Minho population is sequestering a large portion of the available carbon and altering ecosystem functioning. In addition, the clams are prone to dying in huge numbers during droughts or extreme temperature changes (e.g. heatwaves). This leads to large deposits of rotting meat on the riverbed and a consequent rise in toxic ammonia in the water.

In order to protect waterways, detailed risk assessments on individual species need to be conducted and external sources of potential invasion should be identified. These processes should be underpinned by monitoring IAS introduction into new habitats, population growth and their impacts on nutrient and energy flow of invaded ecosystems.

Data from this and other studies have revealed that the Asian clam has persisted in the River Minho for more than 15 years and there are no signs of a decline. Preventing the introduction of this IAS into aquatic ecosystems could be an important conservation measure.

**Source:** Sousa, R., Nogueira, A.J.A., Gaspar, M.B. *et al.* (2008). Growth and extremely high production of the non-indigenous invasive species *Corbicula fluminea* (Müller, 1774): Possible implications for ecosystem functioning. *Estuarine, Coastal and Shelf Science*. 80(2): 289-295.

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