

Exotic mussel species invasions in Belgian freshwater systems (Mollusca Bivalvia)

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Introduction

Exotic species invasions are unplanned ecological experiments that can help us understand natural ecosystems. These species can be very conspicuous, since their spread is far to often correlated with human activity. Accidental introductions of aquatic mollusks have become more common since the increase in traffic and speed of trans-oceanic crossings.

Zebra mussel and Asiatic clam

Before the nineteenth century the Zebra mussel (*Dreissena polymorpha*) was restricted to the region of Black and Caspian seas. In 1824 it was introduced (probably more than once) in British docks attached to imported timber. By 1850 it had spread by canals and rivers over central England and was successfully spreading in Western Europe.

The Asiatic clam (*Corbicula fluminea*), an estuarine bivalve, was introduced as a food item to North America during the early parts of the 20th century by Orientals. By 1977 the conquest of the United States was complete. In the last two decades *Corbicula* species were also introduced in South America and Europe. The first Belgian record dates from 1992. The present distribution of *Corbicula* species in Belgium is shown in fig. 1. We assume that Europe is currently invaded by this bivalve in quite the similar way as what happened in North America.

Environmental impact: economic and biological aspects

Once established in canals, which seems to be an ideal habitat, population explosion is most certain within few years, limited only by the competition for physical space. The major economic impact of the zebra mussel is the fouling of underwater structures and devices used by man such as clogging of smaller pipes in electrical power plants, resulting in a decrease of cooling efficiency.

Biological impact is varied: filtration capacity of settled mussels is large. Mussel populations act as large nutrient pumps, removing nutrients from the limnic waters and transferring them to the benthic sediments. The impact of exotic mussels on contaminant cycling is

believed to be potentially important. Exotic mussels are suitable test organisms for toxicological food chain experiments.

Control techniques

Draining, drying and physical removing (often after chlorination) is used in Belgian power plants.

Unionacean bivalves

Dispersion of Unionacean bivalves (freshwater mussels), presumably as glochidia on exotic fishes, are also the result of the activities of man. The Chinese mussel *Anodonta woodiana* (fig. 2), a native of S.E. Russia, China and Cambodja, proved to be a very successful colonizer. It is a very large species, up to 26 cm, which grows quickly and can tolerate various habitats. Able to parasitize a wide range of host fishes, gives the mussel the potential to settle outside its native range if given the opportunity. Chinese carps, commercially exported fish, are suspected as hosts. By now it is becoming a pest-species in Hungary and Romania and a regular nuisance in irrigation channels in Southern France and Italy

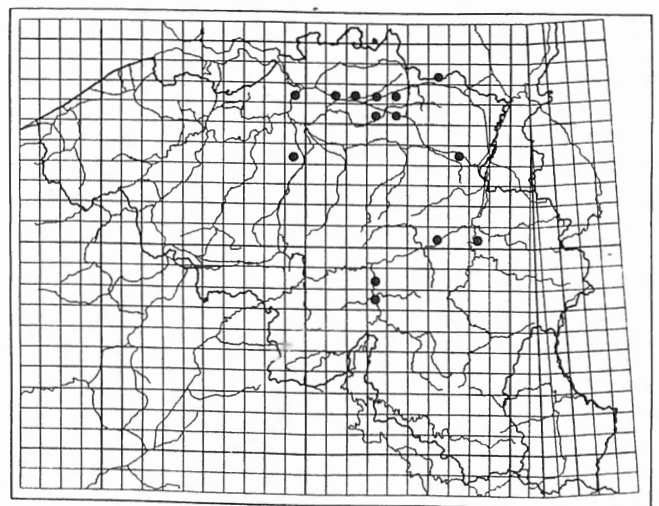


Fig. 1 — Presently known distribution of *Corbicula* species in Belgium.

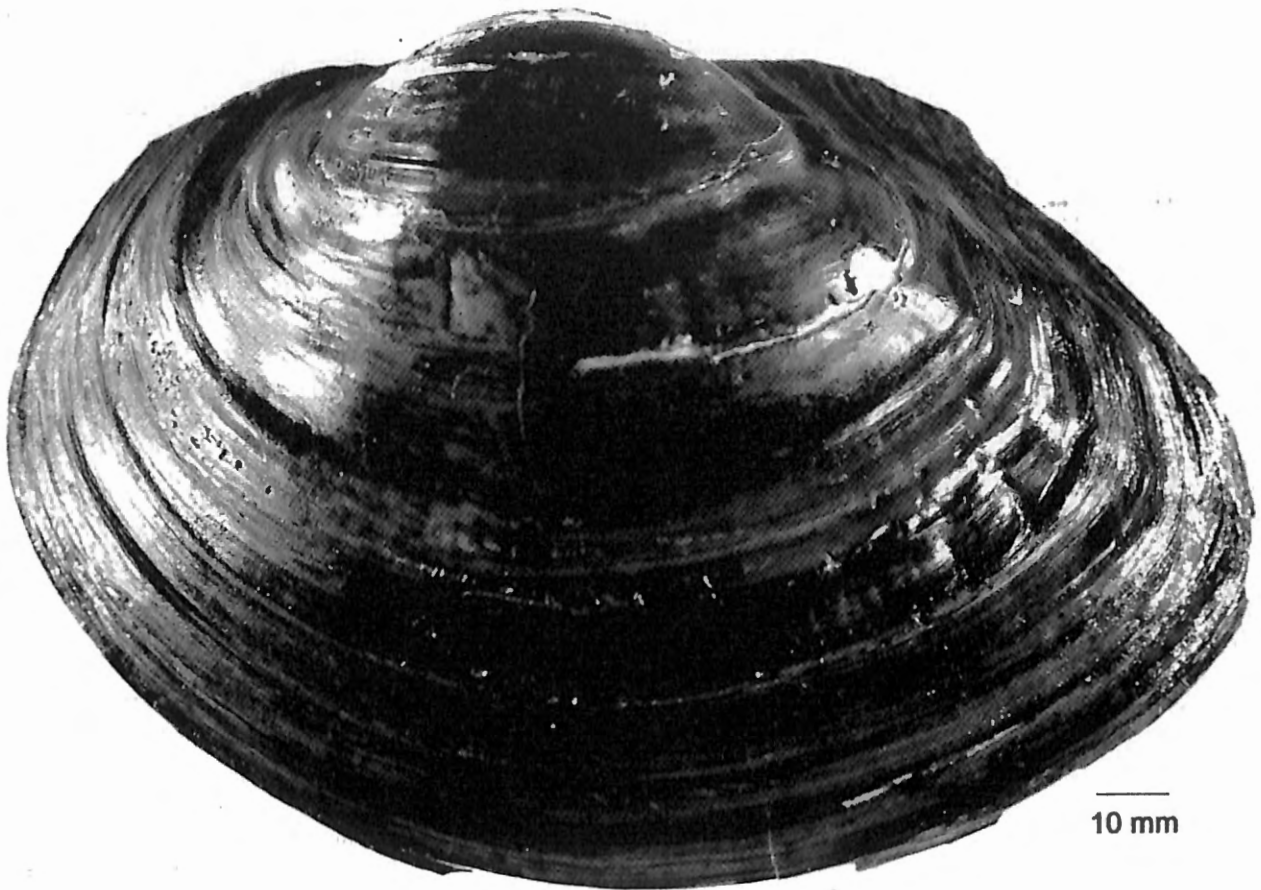


Fig. 2 — *Anodonta woodiana* LEA, 1834 from Diest.

(river Po). Both juvenile and adult specimens were found in spring 1999 in a fish pond at Diest, and in January 2001 in a fish pond between Zonhoven and Zolder. Given the history of this invasive species elsewhere, and the farming and exporting of hosts, it is likely that *A. woodiana* eventually will invade Belgian waters.

Environmental impact

Competition with native mussels: the advantage on native mussels is important because of its glochidial release from May till August, a much shorter parasitic phase (15-18 days), its ability to parasitize a wide range of host fish, high larvae densities resulting in tight host competition, strong survival capacity and physical nuisance. The impact on fish population: causing higher death rates amongst young fishes. Rats such as the muskrat can benefit from the extra supply of organic matter. Possibilities: the large amount of biomass creates an additional source of animal protein which could be used as food supply for animals or even man.

Controle techniques

In Eastern Europe, this mussel has reached a pest-status.

Physical removing and drying out of ponds is used in hatcheries. For Belgium we should be vigilant, using the experiences of European colleagues to our advantage.

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