

# Host-parasite interactions between a threatened mussel and two host fish species: implications for conservation

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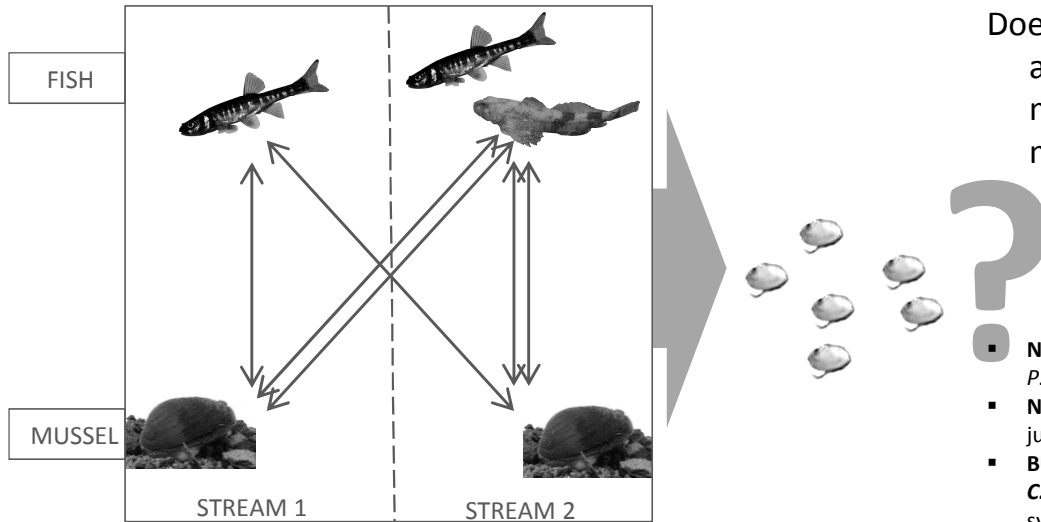


Fig.1 Experimental design of a common garden experiment between fish and mussels from two streams. Here, the two host fish species *P.phoxinus* and *C.gobio* were cross infested with their sympatric and allopatric parasitic *Unio crassus* mussel larvae in 2013.

Does the **origin** of the mussel and host matter for the metamorphosis of juvenile mussels and their survival?

- **NO** effect on mussel metamorphosis on *P.phoxinus*.
- **NO** effects of sympatry or allopatry on juvenile mussel production on *P.phoxinus*.
- **BUT** higher juvenile metamorphosis on *C.gobio* infested with allopatric than sympatric mussel larvae.
- Juvenile survival was independent of organism origin.

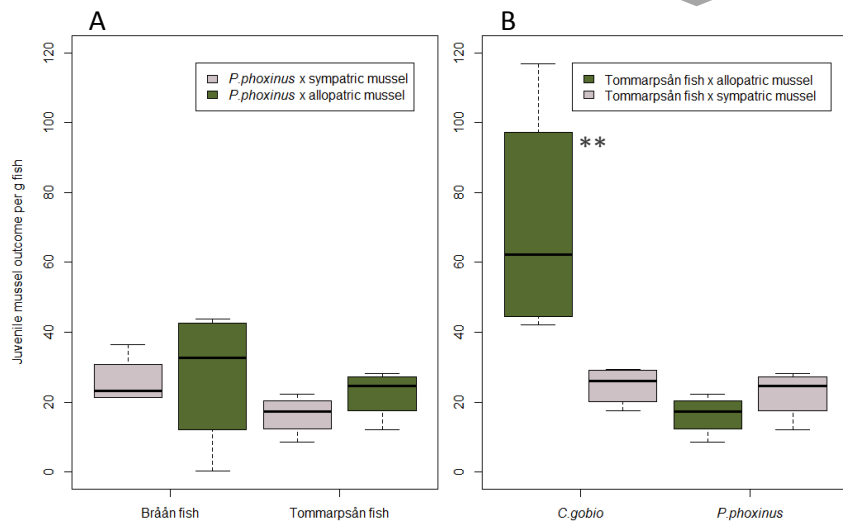


Fig.2 Juvenile outcome per gram fish for (A) *P.phoxinus* from Bråån and Tommarpsån (n= 113); (B) *C.gobio* and *P.phoxinus* from Tommarpsån (n= 120); both crossed with their sympatric and allopatric mussels.  $p < 0,01$ : \*\*.

## Conservation strategy

**Juvenile production** over artificial host fish infestation under laboratory conditions & **re-introduction** of *U.crassus*:

- It seems that any *P.phoxinus* and mussel combination can be used for this purpose (Fig.2 A).
  - For *C.gobio*, an allopatric mussel strain seems to produce the highest numbers of mussels (Fig.2 B).
- No acquired immune reaction in *C.gobio* at the first infestation with allopatric parasites (?).
- The quality as hosts of other fish species for their sympatric and allopatric mussels in other *Unio crassus* rivers needs to be investigated.

## Background

- The thick-shelled river mussel *Unio crassus* is categorized as the most threatened freshwater mussel species in Europe.
- The mussel has an obligatory one month parasitic stage on host fish (Fig.3).
- To be able to re-introduce *Unio crassus* in rivers where it has been extinct or where mussel density is low, the host-parasite interactions need to be clarified.
- The European minnow *P.phoxinus* and the bullhead *C.gobio* have been identified as suitable hosts for *Unio crassus* in Skåne, Sweden, in the year 2012.

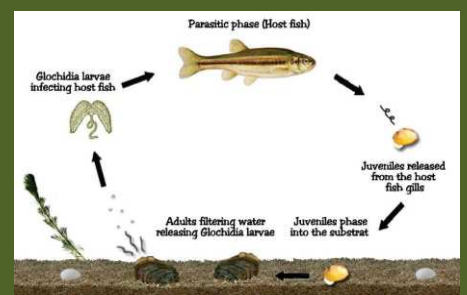


Fig.3 Life cycle of the thick-shelled river mussel (*Unio crassus*)