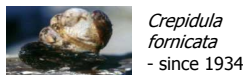


MOLLUSCS IN A COASTAL ECOSYSTEM: INVADERS INFECTED BY NATIVE PARASITES

Background

The lack of parasites observed in introduced species in their recipient environment has been discussed as a potential reason for invasion success. Following this 'Enemy Release Hypothesis', it was assumed that no metazoan parasites are to be found in introduced species of coastal ecosystems in the North Sea region, although surveys were rarely addressed to their parasite burden.



Crassostrea gigas - since 1991



Ensis americanus
- since 1979



Fig. 1: Introduced molluscs of the Wadden Sea area with year of first record.

Study objects & Location

We investigated three introduced mollusc species (*Crepidula fornicata*, *Crassostrea gigas* and *Ensis americanus*, Fig. 1) as potential hosts for metazoan parasites. Samples were taken in tidal basins in the north and south of the island of Sylt (Fig. 2).

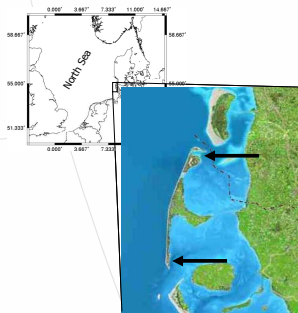


Fig. 2: Location of the island of Sylt. Samples were taken in the North and South in the tidal basins.

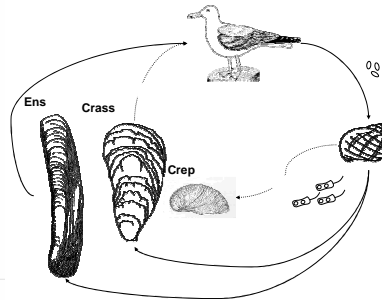


Fig. 3: Interruption and new possible cycle closure provided by the new species (Ens: *Ensis americanus*, Crass: *Crassostrea gigas*, Crep: *Crepidula fornicata*), e.g. for the trematode species *Renicola roscovita*.

Occurrence of parasites in non-native species

Non-native parasites possibly imported with the introduced molluscs were not found. However, the introduced bivalves were infected by native parasite species. Trematodes like the common species *Renicola roscovita* use bivalves predominantly as second intermediate host (Fig. 3) and hence occur as metacercariae.

Prevalence and intensity of trematodes were low in the bivalves compared to data from native species of the same habitat ^{1]}. Other taxa, such as turbellaria, occurred occasionally. In *Crepidula fornicata*, no natural parasite infestation could be detected.

Summary

Non-native parasites were not introduced with invaders

Native parasites do infest introduced bivalves

Prevalence and intensity in introduced species is still lower than in native molluscs

Potential implications for the ecosystem remain to be studied

Experimental infection of slipper limpets possible

Infection experiments conducted in small mesocosm units showed no parasite load for *Crepidula fornicata* exposed to low density of *Renicola roscovita*.

Surprisingly, an infestation in *C. fornicata* was possible to find after exposure to hundreds of cercariae of *R. roscovita*. But, only a few of them succeeded to penetrate the tissue for encystation (Fig. 4).

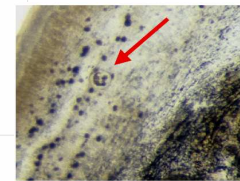


Fig. 4: Mantle edge of *Crepidula fornicata* with encysted *Renicola roscovita* metacercariae.

Implications for the parasitic life cycle

It could be shown that non-native molluscs play a role in newly inhabited coastal ecosystems not only by competing for food or space. They have also impact on parasites and their life cycle since...

⇒ trematodes are able to involve new host species in their life cycle at the metacercarial stage

⇒ the fate of infectious stages (cercariae) is strongly influenced by susceptibility of introduced molluscs and/or defence mechanisms

⇒ parasite populations are probably effected by ending in dead end hosts, not being consumed by any potential final hosts.

⇒ Concerning the potential split of the trematode stages, this may lead to a change in the parasite load for native molluscs ^{1]}.

1] Krakau M, Thielges DW and Reise K (2006) Native parasites adopt introduced bivalves of the North Sea. *Biological Invasions* 8 (4): 919-925