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The recent expansion of the Pacific oyster, *Cassostrea gigas*, in Denmark

Authors

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Abstract

The successful establishment of wild and naturally spreading populations of the invasive Pacific oyster (*Crassostrea gigas, syn. Magallana gigas*) in northern Europe in recent decades, together with its recent expansion in Danish coastal waters raises concerns in Denmark from both ecological and economical point of views. The Pacific oyster is capable of significant changes to coastal ecosystems and potentially negatively impact native bivalve species from competition for resources, food and habitat, or from co-travelling predators, pathogens and parasites. This could affect the Danish shellfish fishery for blue mussels, native flat oysters and cockles that represents 94% of the shellfish production in Denmark (51 898 t in 2017). Meanwhile, the Pacific oyster has become a new fishery resource, hence a small *C. gigas* fishery started in 2017 with 10 t, while aquaculture is not permitted.

Pacific oyster was introduced for aquaculture purposes throughout Europe on multiple occasions, particularly in the second half of the 20th century. In Denmark, it was first introduced to the Limfjorden in the 1970's and over the next two decades to other areas. Small and localized wild Pacific oyster populations first appeared in the 1990's in the Limfjorden, Wadden Sea and Isefjord, which since the middle of the 2000's have increased in population size, but also been spreading to new areas. Nowadays, the Pacific oyster is widely distributed in inner Danish coastal waters, with large Pacific oyster reefs, often mixed with blue mussels, presents in the western Limfjorden and intertidal flats of the Danish Wadden Sea.

We will present the recent expansion and spread of the Pacific oyster in the Limfjorden, where dense populations and reefs have developed in non-tidal shallow (< 1m depth) coastal areas, and new smaller populations became established in both deep and shallow areas in the past 5 to 10 years. Other noticeable expansions, such as the *C. gigas* predatory oyster drill *Ocinebrellus inornatus* or of the native flat oyster *Ostrea edulis* in the Limfjorden have been recorded at the same time.

The recent and future expansion of the Pacific oyster is discussed from a Danish perspective, on the evaluation and establishment of management decisions/policies that balance multiple stakeholders' interests. These range from protection against the potential impacts on both coastal ecosystems and economically important native bivalve fisheries as well as aquaculture activities. Furthermore, the development of a new resource exploitation of the already established wild Pacific oyster populations by commercial fishing, leisure fishing and tourism events e.g. oyster safaris are growing in Denmark.

Shellfish in new and changing environments

Keywords

Crassostrea gigas, Pacific oyster, Expansion, Denmark

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