

Settlement success of flat oysters on different types of substrates

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Figure 1. Left: oyster spat on shell. Right: suspended baskets with substrate used for spat settlement.

Background

Native European flat oysters (*Ostrea edulis*), have nearly disappeared from the Dutch North Sea. Availability of hard substrate is critical for initial settlement and the reintroduction of flat oyster populations. Such substrate is offered in offshore wind farms (OWF), and as further anthropogenic disturbances of the seabed are restricted, they make promising sites for restoration efforts. To optimize settlement and outplacement of flat oysters on scour protection in OWFs it is critical to use the most suitable substrate for settlement.

Objective

Providing insight in which substrate is most likely to be successful in collecting spat. As part of the objective to test outplacements methods a windfarm in the SW Netherlands (Borssele V), settlement success rates of oysters on 10 different types of substrates were compared.

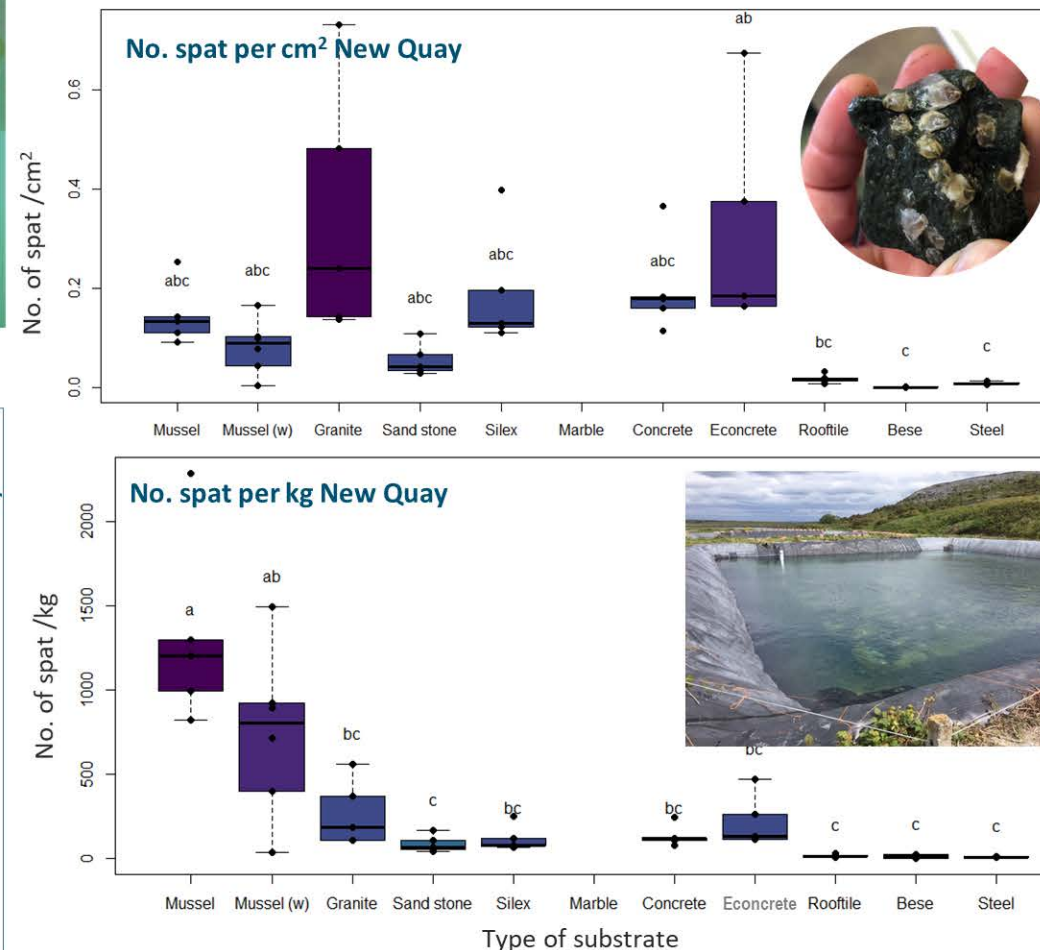


Figure 2. Above: spat on shell per cm² substrate in settlement pond New Quay, inset spat on granite. Below: spat on shell per kg substrate in New Quay. Inset: settlement pond New Quay, Ireland.

*ECONcrete: enriched concrete that is textured to increase settlement of organisms (econcretetech.com)
 **BESE-elements: biodegradable modular 3D structures partly made of starch from potato waste that are intended to be used for restoration of ecosystems (www.BESE-products.com)

Materials & methods

- Baskets with substrates were deployed at three locations: the saltwater lake Grevelingen (Netherlands), an oyster spatting pond in New Quay (Ireland) and a Bonamia-free natural bay in Tralee (Ireland).
- Substrate types were fresh mussel shells, weathered mussel shells, granite, sandstone, silex (a.k.a. flint), concrete, ECONcrete*, fragments of roof tile, BESE-elements**, steel and marble (Grevelingen only).
- Oyster spat was counted as: 1) spat per surface area (cm²) and 2) spat per kg substrate.
- The fraction live spat of the total spat present on the substrates was calculated.

Results

Settlement of *O. edulis* per surface area was highest on **granite**. Per kg substrate settlement success was highest on **mussel shells**. On average 86% of the flat oyster spat found on the substrates was alive.

Conclusion

Besides settlement success the final choice of substrate for application in wind farms also depends on cost-effectiveness and suitability for the offshore environment. In a follow-up study, spat on substrate is outplaced at Borssele V and monitored over time. The knowledge gained with these experiments is expected to contribute to the induced return of oyster beds in the North Sea. Restoring self-sustaining populations of wild oysters to a significant level benefits the continuous supply of wild oyster larvae.