Sea ranching – the scientific support for the development of an environmental-friendly industry

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Photos: Top: E. Farestveit; bottom: E. Hellan

Great scallop (*Pecten maximus*) and the European lobster (*Homarus gammarus*) are the first candidate species for sea ranching. These two species are very different in terms of habitat and biology, a fact that is also reflected in operational aspects of sea ranching.

What would sea ranching of scallops and lobsters mean for our coastal environment? The new Sea Ranching Act offers the prospect of developing a future industry free of undesirable impacts on the environment. The Institute of Marine Research has defined potential impacts, and has started work on acquiring the knowledge that will be needed to provide the best possible advice to the authorities.

Sea ranching has been a field of research at the Institute of Marine Research for the past fifteen years, and has involved studies of the species included in the previous sea-ranching programme PUSH (Programme for the Development and Stimulation of Sea Ranching: 1990–1997), as well as the development of great scallop as a sea-ranching species. Central problems studied have included fry production, interactions with wild stocks, health status and interaction with predators and other benthic fauna in the release area. These activities have been important for the Sea Ranching Act, not least in its

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accompanying regulations. The Act encompasses the "release and recapture of crustaceans, molluscs and echinoderms", and its objective is to contribute to the development of a new coastal industry within the framework of balanced and sustainable development. The Act was passed in December 2000, and the first licences were issued at the end of 2004.

RESEARCH STRATEGY

To fulfil the requirements set by the Act on Sea Ranching we will need more information of the environmental effects of the sea-ranching activities. Our knowledge will have to be improved in several fields if we are to be able to answer questions and satisfy the demands for advice that will come from the authorities. It will also be a prerequisite for the ability to fulfil the objective of the Act: "... to contribute to the balanced, sustainable development of sea ranching and enable it to become a profitable industry for our coastal communities". The Ministry of Fisheries and Coastal Affairs has commissioned the Institute of Marine Research to suggest fields of needed research and a plan for following up the commencing sea-ranching activities. The suggested research strategy also reflects questions and problems authorities have forwarded. In order to be capable of developing a responsible sea-ranching industry, we have made the following recommendations:

- Study the composition and diversity of species in sea ranching as a consequence of release density and exposure time.
- Study carrying capacity: what are the densities that affect survival and growth in the species released?
- Describe the health status of potential sea-ranching species and establish a model for preventive health-care, control of disease and combatting disease in fry production and released sea-ranching species.
- Study which biological and physical characteristics (genetics, behaviour, predation and morphology) of ranched species in the release phase influence survival and growth.
- Map the genetic profiles of local strains in release areas.

- Map the genetic profiles of broodstock of individuals used for sea ranching.
- Study genetic interactions between sea-ranching strains and local stocks.

LONG-TERM RESEARCH

In 2005, the Institute of Marine Research commenced a programme of research aimed at identifying the potential long-term effects of sea ranching lobsters on the make-up of species in release areas, and on the genetic structure of lobster populations. For great scallop genetic markers will be developed to be able to study the genetic structure of scallop populations along the coast. Ongoing research on disease transmission between fish and bivalves is highly relevant for the development of models of disease control in sea ranching. Other studies have begun to look at how fenced sea ranching of scallops might affect other benthic community.

The proposed plan comprises collection of data, monitoring environmental conditions and research carried out by or in collaboration with a number of other organisations. These activities will ensure that we possess necessary information forming a basis for future evaluations of the environmental and ecological effects of sea ranching. If the proposals regarding follow-up of sea-ranching activities are adopted, we believe that the prospects of developing an environmental-friendly industry are good.

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