

The project mussel farms in Baltic Blue Growth

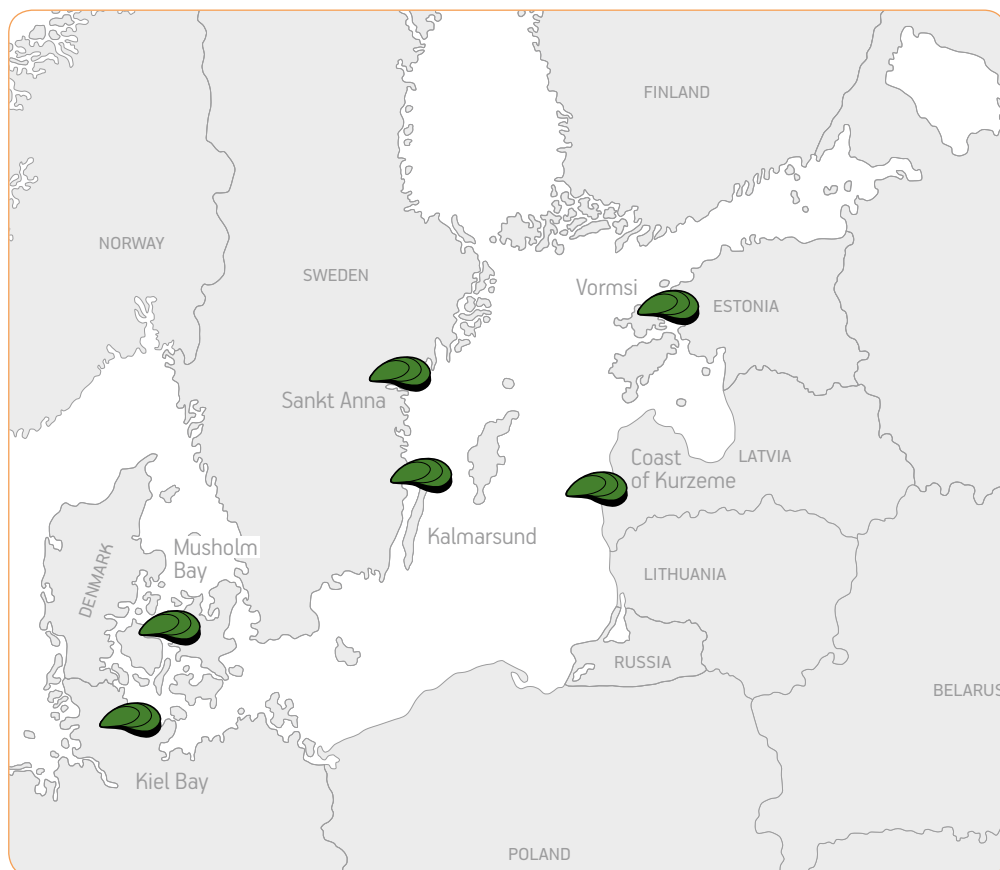


Figure 1: Map of the demonstration mussel farms studies in the Baltic Blue Growth project

Initiating full scale mussel farming in the Baltic Sea

In large parts of the Baltic Sea, mussels do not grow to a marketable size for human consumption because the water's salinity is lower than in other seas. However, meal made of Baltic Sea mussels could be used by the feed industry in agri- and aquaculture, replacing e.g. imported fish and soybean meal. What is more, cultivating and harvesting blue mussels in the right place can substantially improve the water quality and transparency as mussels filter water and take up nutrients through their food intake. Mussel farming can thus complement source-related measures and make important local contributions to counteracting eutrophication, the Baltic Sea's primary environmental challenge.

Except some sites in the Western Baltic Sea, mussel farming has so far not gone beyond experimental scale in the Baltic Sea Region. The Baltic Blue Growth project is thus demonstrating that full scale mussel farming in the Baltic Sea is possible and should be further developed.

Site-specific solutions

The preconditions for successfully operating a commercial mussel farm vary substantially between the different shores of the Baltic Sea. Depending on the location, cultivation sites can be more or less exposed to ice cover and ice drift and the salinity can range from 6 ‰ to more than 20 ‰. Also differences in labour costs are huge – between € 6 and € 40 per hour according to initial data. To represent this variability, Baltic Blue Growth partners are studying six different mussel farms in the project. These farms are not only located at locations with different environmental conditions, they are also using different cultivation techniques. Based on data and experiences gained at these project farms, site-specific production manuals and business plans will be developed.

Table 1: Basic facts about the six Baltic Blue Growth mussel farms

| Location | Size of the farm | Substrate type (label in brackets) | Growth depth | Status in autumn 2016 |
|-----------------------|--|--|--------------|--|
| Sankt Anna, Sweden | 24,000 m long line / surface area 0.5 ha | Long line (Quality Equipment Ltd.) | 2–12 m | Launched in summer 2016, first harvest expected autumn 2017 |
| Kalmarsund, Sweden | 40,000 m rope / surface area 1 ha | Rope net (Shelltech) | 3–6 m | Launched in summer 2016, first harvest expected 2018 |
| Musholm, Denmark | 49,000 m rope / surface area 1 ha | Rope net 10 units Trawl net 4 units 5 different mesh sizes | 0–4.5 m | Launched in 2012, extended by new test tubes in 2016; first test harvest in Oct 2016 |
| Kiel Bay, Germany | at least 1,650 m rope, surface area at least 0.32 ha | Long line | 6–12 m | Farm to be settled in spring 2017, to be operated by company “Kieler Meeresfarm” |
| Kurzeme Coast, Latvia | 625 m rope, surface area 1 ha | Long line | 5–7 m | Farm operator identified, farm to be settled in spring 2017 |
| Vormsi, Estonia | 126 m / surface area 40 m ² | Net strings from trawl net | 0–3.5 m | Launched in 2015, first test harvest expected in 2017 |

Sankt Anna archipelago, Sweden

The Sankt Anna mussel farm is the first full-scale mussel farm with a long-line system on the Swedish East Coast. It is located in the sheltered archipelago of Östergötland just east of the island Inre Kärrö (58° 21,22 N 16° 56,14' E).

Like many rural areas, it is difficult to establish permanent jobs, and in the archipelago region, it is even more difficult given stringent environmental policy in the area. The primary goal of the project is to demonstrate the potential for an industry with a positive impact on the environment and the creation of jobs in the region.

This location was chosen based on several physical, chemical and social conditions. It is part of a protected natural area and is therefore not affected by conflicts over land/water-ownership. The site has sufficient depth (~20 m), salinity and acceptable current and wind conditions. In addition, the area is not normally affected by ice movements during freezing or spring break-up.

Based on a prior study, the expected harvest of this pilot farm in 2017 will be approximately 21 tonnes. A harvest of that size will remove 231 kg of nitrogen (N) and 23 kg of phosphorous (P).

The farm is owned and run by East Sweden Aquaculture Centre (ERAC), a non-profit organisation aiming to facilitate the transfer of information between research and industry, and to educate and advise interested parties on aquaculture in East Sweden.

Kalmarsund, Sweden

Placed in an exposed area at the northern inlet of the Kalmarsund between the Swedish East Coast and the Öland island, this farm uses a submerged net-farm production system which has been designed to withstand ice and offshore conditions. The area was chosen because of its good biological potential for mussel growth, few conflicting uses and interests and the proximity to two larger harbours, making the farm easily accessible.



Figure 2: The farm in the sheltered Swedish Sankt Anna archipelago is the first full scale long line farm at the Swedish East coast



Figure 3: The Kalmarsund farm is located in an exposed area of the Kalmarsound

The estimated harvest in 2018 is 50 tonnes, corresponding to a nutrient uptake potential of 500 kg nitrogen (N) and 50 kg phosphorous (P). The farm is owned and run by the company Bohus Havsbruk according to a contract with Kalmar municipality.

Musholm Bay, Denmark

The farm in the Musholm Bay is a mussel-farm run by a fish aquaculture company, thus representing the "Danish model" of fish farms that compensate nutrient outlet from their fish farm by growing and harvesting mussels. The conditions for farming at the site are exposed, with general strong currents, shifting salinity and rough weather. The special interest for the Musholm farm at this stage is to maximise nutrient uptake by testing different mesh-sizes of net substrate and different times of the year to harvest in order to increase the mussel production. Since it is more efficient to harvest the mussels at a smaller size if the aim is to gain a high biomass in a short time, the business potential to use small and thin-shelled mussels in animal feed is also of great interest to the Musholm farm.

Kiel Bay, Germany

The Ministry of Energy, Agriculture, Environment and Rural Areas Schleswig-Holstein (MELUR) is about to establish a cultivation site in the Kiel Bay in Northern Germany with the aim of achieving a maximum biomass production of small mussels. The planned farm area is at least 80 x 40 m and it is intended to deploy at least three production units consisting of 100 m rope each with 150 elements with hairy rope (so-called "Christmas tree ropes"). As a result of a public procurement, the private company "Kieler Meeresfarm" (www.kieler-meeresfarm.de) has been selected as the operator of the farm by MELUR. The company is already running a small scale commercial mussel cultivation in the Kiel Fjord and selling its mussels to both private and business customers for human consumption. The Baltic Blue Growth project farm will be an extension of the company's existing cultivation site.

Coast of Kurzeme, Latvia

Off the port town Pāvilosta on the Latvian coast, the Latvian Institute of Aquatic Ecology is about to establish a test cultivation farm using long lines as a substrate. Located some 5 km off the shore in the open sea, there is rapid water circulation in the area. To protect the cultivation units, the cultivation will thus be submerged in a depth of at least 5 m. The site has a depth of approx. 20 m with a stony bottom with patches of sand.

Figure 4: The existing mussel farm in the Musholm bay has been extended with different mesh-size substrates to test maximum nutrient uptake





Figure 5: The small-scale test farm outside the Estonian island of Vormsi

A special focus with this open water test farm will be on comparing its costs and benefits to those of already existing farms in sheltered sites. It is expected that the costs of deployment will be comparable to other farms, whereas the maintenance costs will most probably be higher, in particular due to the need to deploy navigation signs to warn ships that pass the farm area.

Vormsi island, Estonia

Placed in the waters outside the island of Vormsi, this small-scale test farm is owned and run by the private company Vormsi Agar, which is cooperating with the University of Tartu. The company's interest is in

blue-green business and rural development, and they have been experimenting with different products such as mussel-based consommé. The farm is very interesting from a business development perspective but also biologically, as it is the most eastern farm of the focus sites represented in BBG. This small-scale test farm is operating cultivations of the red algae (*Furcellaria lumbricalis*) and blue mussels (*Mytilus trossulus*) in the same area. The test farm has a plan to add 2–3 more lines (net strings from trawl net) in 2017.

THE PROJECT

This factsheet has been elaborated by the Baltic Blue Growth project. The aim of Baltic Blue Growth is to advance mussel farming in the Baltic Sea from experimental to full scale to improve the water quality and to create blue growth in the feed industry. 18 partners from 7 countries are participating, with representatives from regional and national authorities, research institutions, private companies. The project is coordinated by Region Östergötland (Sweden) and has a total budget of € 4.7 million. It is a flagship project under the Policy Area "Nutri" of the European Union Strategy for the Baltic Sea Region (EUSBSR).



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