



OYSTER FARMERS ARE CHANGING COURSE

Oysters on tables

To outwit a destructive predator snail and a virus, oyster farmers in the Oosterschelde estuary are raising their game. The oysters are being lifted off the seabed to be farmed on tables. ‘Without intervention, the whole oyster industry will go under.’

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High tide in the Oosterschelde, and the oyster ship *C'est la vie* is setting course for Yerseke harbour. Captain and oyster farmer Danny Nelis (50) delivers his guests – on a works outing – safely ashore. ‘My father was a fisherman. I started farming oysters in 1992,’ says Nelis. He farms some of the oysters in the traditional fashion, on beds on the sea floor. But since 2015, Nelis has also been trying out a new method. He farms the oysters in large bags



Oyster farmer Danny Nelis checks his sacks of oysters at low tide in the Oosterschelde.

on about 800 specially constructed tables which become dry at low tide. This system protects the oysters better against predators that live on the sea floor, such as crabs, starfish and the infamous oyster drill. This predatory snail, which originated from Asia, has rapidly spread around the world, first appearing in the Oosterschelde in 2007. It drills a pinprick-like hole in the oyster's shell and sucks it empty. 'One oyster drill eats two or three oysters a week. That

doesn't leave many oysters and without intervention the whole oyster industry would go under,' says shellfish expert Pauline Kamermans of Wageningen Marine Research. In recent years, Kamermans has studied the effectiveness and the environmental impact of alternative farming methods, using bags on tables or plastic baskets floating in the water on longlines. Nelis's experiences with longlines were not good, as they were impossible to

disentangle after a storm. But farming oysters on tables is working well for him, and the method is effective in stopping the oyster drill. Switching methods is quite a job, however. Nelis has had a new ship built, a flat-bottomed oyster boat in the French style. At high tide, he sails to the oyster tables. At low tide, the boat runs aground and the men wade to the tables, cleaning things up, sorting and shaking the young oysters and transferring the largest to new >



Breeding algae and oyster larvae in the hatchery at Roem van Yerseke, a fish and shellfish wholesaler.

‘If the oysters spend some time out of the water, they are not attacked so much by the herpes virus’

bags in which they have more space. When the tide comes in, the tables disappear underwater again and the boat sails back to Yerseke with the ripe oysters. This method has been in use in France for some time. Nelis harvested the first of his ‘off-bottom oysters’ in the summer of 2018. ‘These summer oysters are very good quality. They are milder in taste and meatier. But the new approach is labour-intensive. We work longer hours and those full bags are heavy, weighing 20 to 30 kilos. We try and get most of the work done between September and June. In the summer months we run sightseeing trips to our oyster farm with our tour company The Oyster Baron.’

ZEELAND CREUSES

Zeeland oysters have been popular for hundreds of years. At first indigenous flat oysters were farmed here, but they were wiped out in the harsh winter of 1963. Then

Japanese oysters were imported, and that is now the main species of oyster farmed in the Netherlands. In 2017, Zeeland harvested 28 million oysters, 73 per cent of which were Japanese oysters, also known as Zeeland creuses. The other 27 per cent were flat oysters and the overall turnover was about five million euros. Most of the oysters are destined for export. One hundred people work in the sector. Besides the Oosterschelde (1500 hectares), oyster farming also takes place in Lake Grevelingen, a closed-off part of the Rhine-Maas estuary (500 hectares). Kamermans and HZ University of Applied Sciences studied the effectiveness of new oyster farming methods. ‘Oysters live off algae, which they filter out of the water with their gills. Traditionally, they live on the seabed and can feed around the clock. With the new techniques, they are out of the water for 20 to 30 per cent of the time. They

cannot eat during that time but on the other hand, they are not attacked so much by the oyster herpes virus that is in the waters of the Oosterschelde. We also looked at how well the oysters grow. We thought they would grow more slowly in the middle of the oyster farming area, because their neighbours would already have filtered the water. But they actually grow faster, probably because the water in the middle of the area is calmer.’

MALE BECOMES FEMALE

Oysters are bivalve, hermaphroditic molluscs. They start out as males and turn into females after a couple of years. Spawning entails the male oysters depositing their sperm in the seawater, after which females capture them. The fertilized egg cells then develop into oyster larvae.

At first the larvae swim freely in the water, looking for a place to settle. Larvae develop a foot at 10 days old. At that point, the oyster farmer in the Oosterschelde scatters mussel shells on the bed for the larvae to attach themselves to. Later, these mussel shells with the little oysters growing on them are fished up and brought to the farming locations.

‘This is a roundabout method. You have to sow tons of mussel shells and often you

catch just one little oyster on each shell, and sometimes not even that,' says aquatic technologist Nienke Bakker of Roem van Yerseke, a fish and seafood wholesaler. The company sells millions of oysters per year and since 2005, has had its own shellfish hatchery: a large hall with several nurseries for young shellfish. Wageningen was engaged in 2005 to help start up this hatchery, which is unique in the Netherlands. There are several such hatcheries in France.

FOOTBATH

We step through a disinfecting footbath and reach the parent oysters: adult Japanese oysters from the Oosterschelde, which are now in large white tanks. 'With good nutrition and warming water, we get them spawning. In other words, releasing seed and egg cells,' explains Bakker. The microscopically small larvae are caught on very fine sieves and raised to become young oysters. Every few days they are sorted by size using sieves, and the largest are transferred to new tanks each time. Everything in the nursery chambers fizzes and bubbles. In the algae breeding space there are tall glass columns full of all kinds of brown, green and yellow algae from the Oosterschelde, which are tested here for their nutritional value. The smallest larvae eat the smallest algae, and so on. After 10 days to three weeks, the larvae are ready to settle on hard substrate as oyster spat. They must then be filtered out of the water quickly, otherwise they have to be scraped off the walls, getting damaged in the process. After about three months, the oysters are taken off to the outdoor farms and after three years, they reach adulthood, Bakker explains.

Just like Nelis's oyster fishery, Roem van Yerseke farms oysters in sacks on tables, but this company also makes use of plastic baskets hanging in the water on poles. The oyster drill cannot reach them there. 'In those baskets you have more control over the process and the work is not as heavy as

it is when you use those sacks, which you have to turn over regularly,' says Bakker. Together with the Worldwide Fund for Nature (WWF), Stichting Ark and Wageningen Marine research, the company is also breeding young flat oysters to release at new wind farms on the North Sea. The oyster drill is not the only threat to the oyster industry. They oyster herpes virus has done a lot of damage in recent years too. This virus from Japan came to the Oosterschelde in cargo in 2010. It penetrates to the blood of young oysters and in some years can kill 80 to 95 per cent of them. Working with Roem van Yerseke, Wageningen has set up a programme to breed herpes-resistant oysters. Oysters that looked healthy were removed from the Oosterschelde and brought to the hatchery. There, the offspring of each individual oyster were raised separately. The hatchery has space to breed 40 separate oyster families, each of which gets its own basket in the Oosterschelde. Of those 40 families, there were just two that were totally resistant to the virus. They were cross-bred and new families were bred from those offspring. The hope is to end up with resistant oysters. The oysters are also being selected for fast growth, homogeneity and shape. Nienke Bakker: 'Survival rates are steadily improving. It takes time but I think we will succeed.'

EXPANDING

The 16 oyster farmers in the Oosterschelde want to expand from seven to 50 hectares of off-bottom oyster farming, but the licensing process is slow, partly because the Oosterschelde is part of the protected Natura 2000 network. Pauline Kamermaans is monitoring the impact of oyster farming on nature in the Oosterschelde. 'We compare the new methods with the traditional ones. We have installed four cameras to analyse the behaviour of foraging birds. With the off-bottom farming, the farmers are busier doing things at low water, which is also when the

birds look for food. We are still at the data analysis stage, but in Ireland it has been found that the disturbance to foraging birds is very limited. The birds get used to the new situation. We look at the formation of new silt too. A lot of silt is not only dangerous for the oysters, which need clear water, but also for all the worms and other animals that live in the sandy Oosterschelde seabed. No accumulation of silt has been noted so far.' ■

www.wur.eu/shellfish-farming

WHAT DOES YERSEKE REGIONAL CENTRE DO?

Yerseke Regional Centre is part of Wageningen University & Research and carries out research assignments for third parties, focused on the sustainable use and management of the Zeeland delta. Other participants include the province of Zeeland, Reimerswaal municipality, the Mussel Producers Organization, the Dutch Oyster Association and the nature conservation organization Staatsbosbeheer. They buy a stake in the centre and can then submit research requests.

About a quarter of the research carried out by Wageningen Marine Research in Yerseke is work for the Regional Centre. Pauline Kamermaans monitors the effects of oyster farming on nature in the context of licensing. Other research topics include annual quantities of mussel spat, the reintroduction of oysters in wind farms on the North Sea, the creation of artificial oyster banks, and the cultivation of seaweed as a source of protein. The Regional Centre also has a help desk for the shellfish farmers.