

SPATnz PGP Programme



QUARTERLY REPORT FOR Q1, YEAR 2, JUL- SEP 2013

The SPATnz PGP Programme will develop methods for hatchery production of juvenile mussels (spat) in commercial quantities. It will also develop improved strains of mussel using conventional selective breeding strengthened by the application of modern genetic techniques.

While year round spat production is not essential to deliver selective breeding gains, it would provide a range of benefits including a more efficient hatchery operation and more efficient use of marine farm space. Winter is often the most challenging time to rear shellfish in hatcheries, because it is outside of the natural breeding season. Mussels, like most shellfish, have a larval stage where the mussels swim in the water column for a few weeks. In the last few months we have made good progress in understanding factors that make winter larval rearing so challenging, and in starting to develop ways to overcome those challenges.



Swimming mussel larva, 0.2 mm. Photo: Adam Rusk

Another of the challenges in producing mussel spat is in providing them with sufficient food of suitable quality. Mussels feed on plankton that they filter from the water. For the most sensitive larval stage we grow selected species of microscopic algae to meet the nutritional needs of the larvae. Growing these top quality “gourmet algae” in a controlled environment is an expensive part of a hatchery operation, especially for one of the key algae that we use, *Chaetoceros calcitrans*. Cawthron Institute staff have developed more efficient ways of growing this alga, and in recent months we have been testing how well the algae from the new method performs as larval food. Results have been very encouraging to date.



Microalgae growing as feed for mussel larvae. Photo: Cawthron Institute

After swimming for about 3 weeks, the mussel larvae attach to a substrate and metamorphose (transform) into a juvenile, which soon grows to look like a miniature form of the adult mussel. As these spat grow, their food requirements increase exponentially so it becomes unaffordable to feed them gourmet algae. Fortunately after metamorphosis, the spat are less sensitive than the larvae so we can wean them on to algae reared in earthen ponds. Essentially we fill an earthen pond with seawater and let a natural population of microalgae develop. This is a less controlled diet but it lets us produce the volume of food required. At commercial scale we may be trying to feed up to half a billion hungry mouths at a time. So we have to get them out the door at an early age to keep them fed. We are currently learning how much water and food they need to optimise survival after transfer to the sea.



Mussel spat a few mm long. Photo: Cawthron Institute



Seawater pond for mussel food production