

Oyster innovation

Janet H Brown reports on a novel development from New Zealand – TOPS Oysters

If you order a rump steak in a top end restaurant you pretty much know what to expect; likewise with a salmon steak. But if you order an oyster in the UK you could receive oysters in a variety of shapes or sizes, even condition. This is less the case in France where they classify their oysters fairly strictly or USA where the products are often sold by the name of the producer. But what if the grower could actually produce the oysters in perfect condition at a uniform shape and size complete with inbuilt labelling system that guarantees the provenance, and do this in a mechanized system? This is in effect what Achim Janke can do with his Traceable Oysters Production System (TOPS).

I should perhaps declare an interest here in that I have known Achim since 1988 when he was a student doing the MSc course in Aquaculture and Fisheries Management at the University of Stirling. He came with interesting prior experience in that he had an agriculture training and had worked as an agronomist in various parts of the World. A background in agriculture seems to be quite a linking thread amongst commercially successful aquaculturists. Achim chose to do his MSc project with Ian Laing at MAFF, Conwy which was his first experience in working with bivalve larvae and may have been crucial for his career path. I next met up with Achim in 2011 where he was Manager of the Glenhaven Aquaculture Centre (GACL) in Nelson, part of the Cawthron Institute, leading the Institute's oyster shellfish R&D programme in New Zealand having by then been settled in New Zealand for 17 years. Since 2013 Achim has been working independently as a consultant in shellfish hatchery biotechnologies and in parallel



Pictured above; Achim Janke, inventor of the TOPS system. He can be contacted at achim.janke@xtra.co.nz



developing his TOPS patented system which produced its first large commercial size crop in NZ in 2015.

Back in 2011 he was already talking about “single seed” culture as the way forward which I faithfully reported at the time (The Grower April 2011) but single seed culture was not a term familiar to me and it seems to be a uniquely antipodean term for describing hatchery produced spat.

A lot of NZ culture then was based on wild caught spat (nowadays more than 60% of spat is single-seed hatchery) but the GACL had been working for some 13-

14 years at that time on family-based selection of oysters, and also using triploid oysters to allow for year-round marketing of quality oysters.

In recent years there has been considerable development in systems for cultivating oysters. But there is a pattern in that this follows the standard historic development pattern we see in agriculture. Thus oysters initially came from wild fisheries, they were then laid as collected seed in special areas hence the term oyster beds (ranching). Once hatchery production was normal then safeguarding the seed the farmer had purchased became important and systems developed for security, for avoidance of pests and predators (being raised off the sea bed) and then ever more and more sophisticated to try to reduce the amount of husbandry time required by using suspended containers such as SEAPA baskets, Ortaks, Rotoshell trays etc.

As Achim spells it out though, all these modern single-seed oyster growing systems require management interventions in terms of regular size grading and adjusting of stocking density which means increasing numbers of containers. This grading (and adjustment of numbers) is essential because with growth and increase of biomass in the containers crowding sets in, leading to reduced and uneven water exchange and consequently variable food and oxygen supply to individual oysters. These resulting disparities in growth only increase with the increasing biomass so they have to be regularly graded and thinned. Oyster growers aiming at top quality product commonly accept spending a lot of time and effort to stay on top of oyster growth and providing equitable growing conditions. (Trying to avoid this by stocking at lower densities does not work with a non-motile oyster. They will tend to be quickly moved by wave action to form piles at one end of the container so presenting the same problem but without the economies of scale.)

Once the oysters are past the 25-35mm size they need increasing numbers of growing containers for taking them up to market size and this can represent as

Oyster innovation cont.

much as 90-95% of an oyster farm's grow-out system – and they still all need grading to ensure the product is grown evenly, with a good shape and plenty of meat inside.

There is considerable investment in all these holding containers and while some systems present advantages in terms of reducing handling to some extent, with less problems with fouling and providing conditions for more even growth when compared to the traditional pillow and rack system, they all need grading and this is time consuming and costly.

Achim is passionate about oyster quality so the whole driving force behind the TOPS system is providing the optimal growing conditions for each oyster. There is also an increasing incentive to be able to prove the provenance of a cultivated product when mere external packaging can be copied. This has already been a problem for New Zealand shellfish in some export markets and the risks associated with an inferior and potentially unsafe product being sold under a counterfeit label is severe and can cause long term damage to the reputation of a product.

Thus Achim with his mind firmly set on producing absolutely top quality oysters has developed and patented a radically different approach. The patent is world-wide patent applied in NZ, Australia, Japan, USA, Canada and Europe. The novel system Achim has developed and patented allows each individual oyster free and unrestricted access to water exchange and food. This is because each oyster is grown attached by a patented tag to a continuous culture rope with optimal spacing between oysters for good growth. Each oyster is freely suspended and spaced so that they are not touching their neighbours. Without this element of competition between individual oysters they do not push for shell growth as a means of outcompeting their neighbour and so have more energy directed to growing into a “meaty” oyster. As Achim says, “Growing meaty oysters is the art of oyster growing!” The oysters have to be glued to each tag and this is done by a mechanized process on land but at that time it cannot be known how each seed will be oriented when put out to sea. Thus the “loose” attachment of the oyster tag on the rope or tape is critical since the oyster growing away from its hinge changes its centre of gravity and that provides the self-orientation of each

oyster on the tape so all oysters finally face the same



direction. Then since the oyster is actually growing from the tag this remains integral even after harvest (*see figure above*) so provides a complete guarantee of the provenance.

Achim has not worked alone to develop this system from his original idea. Specific partners in the TOPS Oysters enterprise are leading oyster companies Pacific Marine Farms/Aotearoa Fisheries Ltd and Aaron Pannell of Marlborough Oysters Ltd who led the development of the mechanization which is such an essential part of TOPS oysters. It will be Achim and Aaron who will be leading the development of the technology overseas.

This technology has huge potential to produce top quality individually labelled oysters. The attachment and grow-out of individual oysters with TOPS Oysters benefits a lot from a supply of uniform top quality hatchery spat. Spat from genetically selected oysters can be confidently expected to grow well and uniformly. Apart from uniform genetics, another aspect that will optimize product quality is spat husbandry. Keeping spat in close size classes via regular grading is important until it reaches the 30mm size when it is ready for seeding on TOPS culture rope. Any investment into uniform genetics and good husbandry of spat will



Pictured below far left; Aaron Pannell of Marlborough Oysters with TOPS oysters on frame; centre, harvest of continuous long line grown TOPS oysters and right, hanging out seeded rope in Croisilles Harbour, NZ.

Oyster innovation cont.

certainly pay off with TOPS Oysters. But once you have these 30mm size spat they can be attached to the patented tags and line and laid out in either inter-tidal or sub-tidal conditions and left to grow undisturbed until harvest; which like the setting out is also fully mechanized.

It sounds easy but full mechanization in oyster



Above; mechanized attachment of young oysters to the growing lines.

aquaculture still means a lot of heavy work and getting wet but it will still represent a huge advance in technology. This is the first growing system in the world that produces individually labelled oysters of high quality with the benefits of product traceability (from

spat to consumer) and product branding. There are other benefits in terms of less infrastructure and less plastic materials used so consequently less fouling problems and so even greater environmental friendliness than other forms of shellfish culture.

Achim is originally from Germany but after his itinerant life is probably by now fully “globalised”. But I think it is fair to say that a system such as this is more likely to have been developed in New Zealand where their emphasis is so targeted at export and where there is a striking cross fertilisation of ideas between the different exporting businesses. They all clearly understand that for them to compete globally they must have the branding New Zealand as representing best quality; they don’t call their country “God’s Own” for no reason!

Achim and Aaron are currently working with selected partner companies overseas. Finding the best means of implementing the system in new environments does take a period of time working together to optimise but it surely won’t be long before you are hearing a lot more about TOPS Oysters.

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