Rock oyster Australian tour

Oyster farming is one of the most ancient forms of aquaculture. Yet, despite recent technological advances, notably in genetics (triploidy and selective breeding), it remains relatively low-tech and low-cost. Oysters were first cultured some 2,000 years ago in China, and first efforts to farm oysters using spat collectors began in Japan in the 17th century and in France in the 19th century. Edible oysters have since become some of the most widespread and largest commodities produced, by volume, in marine farming the world over. The farming of edible oysters is, however, virtually absent from the Pacific Islands region, except for two farmers, Patrick Morlet in New Caledonia, and Kuva Vatunilagi from Mago Island, Fiji. Patrick and Kuva rely on wild spatfall for their farms, and while they are now using recent basket designs to grow their produce to market size, they still apply the age-long principles of wild spat collection and grow-out. What sets Patrick and Kuva apart from other oyster farmers is the species they grow: the black lip rock oyster (Saccrostrea echinata). This species is found throughout the western Pacific, and in Australia and Southeast Asia. Interest in black lip rock oyster (BLRO) farming has been growing in recent years, with projects taking place in Australia's Northern Territory (Tropical Rock Oyster Aboriginal Economic Development Program), Western Australia (Pilbara Rock Oyster Research and Development), and in New Caledonia and Fiji where the Pacific Community (SPC) collaborates with national development authorities.

In July this year, SPC's Aquaculture Section brought Patrick Morlet and Kuva Vatunilagi, along with Moape Yabakiva (Fiji Ministry of Fisheries) and Flavien Dekoninck (ADECAL, New Caledonia's development agency) to Australia to see the current state of rock oyster farming, and apply any relevant techniques and technologies to Pacific Island oyster farming. This study tour was funded by the Pacific Fund[1] and the New Zealand Aid Programme.

The tour started with a visit to the New South Wales Department of Primary Industry (NSW DPI) in Port Stephens where we were welcomed by Dr Wayne O'Connor and his team who showed us the hatchery facilities, farm operations in the bay, commercial nursery operations, and gave an overview of the oyster sector in NSW. The Sydney rock oyster (SRO) industry is unique to Australia and the current outlook is very positive, with new investments being made and the modernisation of the sector. This is due to the convergence of a number of factors: 1) continued farm-gate price increases resulting from a shortage of oysters supplied to the Australian market; 2) the modernisation of farming techniques with access to cheaper farm building and operation material and equipment; and 3) the availability of hatchery-bred, disease-resistant and faster growing and

Top quality! A black lip rock oyster (BLRO) produced by Bowen Fresh Oysters. Image: Michel Bermudes, SPC

[1] The Pacific Fund of the French Ministry of Foreign Affairs was created in 1985 to promote social, economic, scientific and cultural development and integration in the Pacific.

higher quality oysters. The SRO industry has, until recently, relied essentially on wild spatfall for sourcing juveniles to farm on wooden rack structures along the NSW coast. SRO production peaked in the 1970s when it was as big then as the whole of the Australian oyster industry is now, all species combined (i.e. SRO, Pacific oysters, native flat oysters). Port Stephens was the largest production area by volume (peak of 2,700 tonnes per annum) and supplied 200 million spat annually to farmers across the state. Production has subsequently declined gradually due to disease, the introduction of Pacific oysters, the degradation of water quality, and market competition from oysters grown in other Australian states. The key take-home message for Pacific Island farmers is that the process of farming oysters is flexible and can be moulded to the local context and the goal of the operations (i.e. small or large scale). In a country like Australia, where the oyster sector has changed and modernised significantly, oysters are being grown in a number of different ways – from very basic and traditional stick culture (collecting and growing wild oysters on sticks) to the modern approach of sourcing hatchery-bred, single seed spat grown in manufactured, off-the-shelf plastic baskets, with all possible combinations in between.

Nice spat! From left, Flavien Dekoninck, Patrick Morlet and Kuva Vatunilagi admire the quality of the selectively bred oysters produced by the team of the New South Wales Department of Primary Industries.
Image: Michel Bermudes, SPC

From a governance and sector regulation perspective, the Australian experience is also highly valuable to the Pacific Islands region, and the NSW Oyster Industry Sustainable Aquaculture Strategy[1] presented to our participants highlighted some important considerations for countries investing in the development of shellfish aquaculture, particularly in terms of biosecurity, water quality and food safety.

From Port Stephens, the group travelled to Bowen (Queensland) to meet with John Collison who, in 2014, founded Bowen Fresh Oysters and started farming BLRO with his son Nathan. Before moving to Queensland, John had farmed SRO on the Shoalhaven River for 30 years. Seeing what an experienced oyster farmer can do with a new species such as BLRO was an eye opener for all. John operates a 10-ha lease in Bowen where he is able to collect spat, which is on-grown in floating baskets. From having sold only 1,000 dozen oysters last year, John is seriously ramping up production with millions of spat collected this year. There are some challenges to farming BLRO, one being access to seed. While John has expanded his spat collection capacity, only about 20% of the oysters collected are BLRO, the rest being the milky oyster (*Saccrostrea cucullata*), a smaller and slower growing oyster that ends up being graded out[2] during the production cycle but requires considerable handling that is time consuming and costly. The milky oyster can be sold but is a smaller product than the BLRO and does not withstand the overcatch treatment process[3] used on BLRO. There is always a strong market demand in Australia for locally produced oysters, especially if you are the only producer. Being a unique product, different to other oysters produced in Australia, the market outlook is very positive, hence the steps taken by John to expand his farming operations. For Patrick and Kuva, it was a great experience for them to see the farm in full expansion as we helped John and his sons Nathan and Leon to retrieve spat collectors and deploy oyster baskets on the farm. It was inspiring to see the piles of oyster seed being stripped off collectors, and the quality of the finished product serving as testimony of the efforts and ingenuity being applied in the process. Our island farmers had plenty to contribute to the exchange with John being particularly interested in Kuva's technique for spat collection to obtain a higher percentage of BLRO. We discovered that despite working in contrasting environments, all three farmers found much common ground and were reassured that in the end, working in their own little patch of the Pacific, they are all heading toward very similar farming techniques. We hope that the knowledge they are so willing to share will now speed up their progression because shellfish farming, and oysters in particular, is one of the most sustainable ways of producing food and part of the answer to food security in the region. Oyster farming is a low-cost entry to aquaculture, requiring low initial capital investment and the option to use locally available material such as hardwood. There

[1] See https://www.dpi.nsw.gov.au/fishing/aquaculture/publications/oysters/industry-strategy

[2] Oysters are graded every few weeks or few months throughout the production cycle to keep the small and large oysters separated as bigger oysters tend to out compete smaller ones. Because milky oysters grow more slowly than BLROs, they are separated from BLROs by grading.

[3] The overcatch is all the sea creatures that attach to oysters during the farming process. It can be other shellfish, smaller oysters, sponges, etc. Oyster farmers need to minimise overcatch through farming techniques or treatments. Treatment may include leaving the oysters out of the water for 2–3 weeks; the overcatch dies, but the farmed oysters survive.

are relatively few inputs compared with other commodities (i.e. no need for feed and farmers can catch their own seed in suitable areas). Plastic mesh to make baskets is relatively cheap and durable. One of the key attributes of oysters is the level of resilience they provide, with farmers able to take their stock out of water at the approach of a cyclone. In this way, farmers can save their stock and generate critical cash flow immediately after the cyclone has past, hence they are able to recover faster from a natural disaster and supply seafood from coastal areas that are often severely impacted and impoverished.

From this tour of rock oyster farming in Australia, SPC's work to promote small-scale, entry-level marine aquaculture continues, with oyster farming trials to expand in Fiji by the end of 2018 and hatchery and spat collection trials to continue in New Caledonia for the next two years under funding from the New Zealand Aid Programme.

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Oyster baskets loaded with recently collected spat are deployed on the farm at Bowen Fresh Oysters.
Image: Michel Bermudes, SPC

Moape Yabakiva (Fiji Ministry of Fisheries) working with John Collison to retrieve spat collectors in Bowen, Queensland, Australia.
Image: Michel Bermudes, SPC