

Pearls

IN THE PACIFIC

Pearl culture has the potential to be a significant source of income for the Pacific Islands. Roger Beckmann reports on a project which has overcome some of the hurdles the islands face

From dark grey and purple through to coppery pink and silver, black-lip pearl oysters, which grow naturally in many parts of the tropical Pacific, produce beautiful and highly priced pearls. But growing them is no easy matter. Large numbers of the right kind of oysters are needed, along with knowledge, skill and – above all – patience.

However, pearls could provide many Pacific Islands with a good income. They are light and non-perishable, and can be easily transported from remote places to world centres where they can fetch high prices and bring back valued foreign exchange.

French Polynesia has long been involved in pearl culture and its multi-million dollar industry has shown the potential for the region. Other Pacific states could also benefit and this is the reason behind an ACIAR project on pearl oyster resource development concentrating on Kiribati and Fiji.

Pearls are made inside mature oysters that are at least two years old. A skilled technician must carefully insert a nucleus into the oyster tissue, which is then covered in nacre or mother-of-pearl by the oyster. The nucleus is inserted into the host oyster along with a small piece of tissue from another oyster. The donor tissue grows and forms a ‘pearl-sac’ around the nucleus and secretes nacre onto the nucleus within the recipient oyster.

A pearl of 10 millimetres in diameter usually consists of an 8mm bead (the nucleus) covered by about 1mm of nacre all around. To grow such a spherical pearl takes about two years.

Inserted nuclei can be used to form half-pearls, known as mabé. This process happens without any donor tissue. The nucleus is glued onto the flat surface of the inside of the oyster’s shell and the animal’s own tissue covers it, forming a hemispherical pearl. This process takes about six months.

Choosing appropriate donor tissue for round pearl production allows the experts to influence the properties of the final pearl. The donor tissue is chosen from oysters with attractive colours in the nacre lining their shells, which gives an indication as to the colour of the resulting pearl. Recipient oysters are generally larger and older than donor oysters.

The fully formed pearl is taken out of the oyster, leaving a sac into which a new, larger nucleus may be inserted so that the next pearl will be bigger. The pearl-growing cycle can be repeated three or four times as oysters live for 10 years or more.

Although black-lip pearl oysters (*Pinctada margaritifera*) occur naturally in much of the Pacific, Kiribati faces a problem. Its atolls are large and open and the rough sea washes them out, taking oyster larvae with it.

In much of French Polynesia, on the other hand, the atolls are more sheltered and the oyster larvae, which settle as minute oysters known as spat, remain within them.

One of the first jobs of the ACIAR project was to survey the atolls in Kiribati to determine the numbers of oysters present. The results were disheartening. There were few oysters in the atolls and the adult oysters that were present were highly sought after because part of their shell is traditionally used as a fishing lure.

The project leader, Professor Paul Southgate of James Cook University in Queensland, realised that collecting suitable adult oysters from the wild was clearly out of the question.

“We knew that if the industry was to develop in Kiribati it would need to rely on hatchery production of oysters. In other words, we’d need to grow the oysters from the larval stage,” he says.

This is not easy.

“First you have to collect your adult oyster to be used as brood-stock and induce them to part with their eggs and sperm. Following fertilisation, the larvae are nurtured for around three weeks before they become spat. The young oysters must be grown for another two years before they are large enough for pearl production. The Kiribati hatchery now regularly produces large numbers of new spat.”

At the time, little was known about the biology of this non-wild species of oyster. As Prof. Southgate put it: “We were ignorant about the requirements of the larvae. Kiribati would be pioneering a relatively new concept for black-lip oysters.”

“The hatchery is now performing well and is one of the most productive in the world,” he says. “They achieve a 50 per cent survival rate of their larvae, whereas 10 per cent is the norm in many places



PARTNER COUNTRIES: Kiribati, Tonga, Fiji
PROJECT: Pearl oyster resource development in the Pacific Islands
DESCRIPTION: Recent developments in eastern Polynesia showing the potential for cultured black pearl and cultured mother-of-pearl shell industries with major export earnings have aroused considerable interest in these Pacific nations
CONTACT: Beero Tioti, blackpearl@tskl.net.ki; Paul Southgate, paul.southgate@jcu.edu.au

The local community in Savu Savu, Fiji, collects young pearl oysters (spat) and sells them to J. Hunter Pearls, a local commercial pearl operation (below left).

PAUL SOUTHGATE



JACQUI WRIGHT



PAUL SOUTHGATE

Kiribati Project Manager Beero Tioti (right) inspects the first harvest of cultured pearls produced in Kiribati with the President of Kiribati, His Excellency Anote Tong.

and 20 per cent is considered exceptional. It seems to be not only the excellent local staff and their dedicated work, but also something to do with the water there. It's a definite advantage for Kiribati."

Another advantage is that some of the oysters can produce an unusual and attractive salmon-pink to bronze nacre which is unknown elsewhere in the world, giving scope for niche marketing.

Kiribati now has plenty of young black-lip oysters and is moving on to the process of developing routine production of full-size spherical pearls. The country should soon be able to compete with other islands where large numbers of adult oysters occur naturally. However, growing spherical pearls requires very experienced and specialised pearl technicians to graft the nucleus and donor tissue. Currently, these specialists must be hired from overseas.

Although the hatchery is an added expense for Kiribati, it has brought some advantages. One is that it gives scientists the opportunity to carry out selective breeding. Experts can select oysters that grow quickly or that may produce a particularly desirable pearl colour.

The second advantage is that the hatchery allows scientists to produce triploid larvae. Usually every animal or plant contains two copies of each gene in its cells, known as diploid. However, it is pos-

sible in some species to create individuals with three copies, referred to as triploid. Triploids can be created in the hatchery and are faster growing and hardier than normal diploid oysters of the same type. As adults they are sterile, but can still be used for pearl production. They can also be sold to other farmers for 'one-off' use without losing the sole ownership of the special Kiribati colour.

Things are looking promising for the black-lip pearl industry. The increase in production may lower the global price a little, but there is still room for expansion. As the industry takes time to produce returns on investment, the mabé half-pearls come in handy. Produced from an adult oyster in just six months, they do not need the services of an experienced oyster technician. Although they sell for much less than spherical pearls, they can be readily stuck to a surface and so are widely used in jewellery.

In addition to the hatchery, the project has resulted in the establishment of a demonstration pearl farm used for showing the community what can be achieved and for training. Four smaller farms have been started elsewhere in Kiribati. With good-quality spherical pearls worth more than \$100 each – and some worth much more – it is easy to see that small Pacific Islands are likely to find pearl-growing an attractive and sustainable industry. ◀