

Reimers said the company is taking a long-term view to developing the business and anticipates doing it over the next 10 years.

"It's definitely not a get-rich-quick scheme," Seitz said. He pointed out that the Marshall Islands doesn't have a large population of black-lip oysters, in contrast to some atolls in French Polynesia and the Cook Islands.

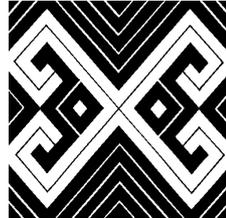
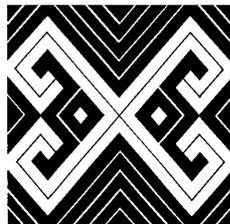
"In fact, naturally occurring black pearls are virtually nonexistent in the Marshalls", he said.

There has been some discussion of establishing an oyster hatchery, but "100 per cent of the successful oyster farms in the world depend on collecting "spat" (newly spawned oysters) from the waters where the mature oysters naturally exist," said Seitz.

"There is no successful commercial saltwater pearl farm I know of that can supply its present or future needs from a hatchery. Natural spat collection is necessary to supply the needs of any oyster farm."

Now that the company has demonstrated it can produce pearls, "our first priority is to devote our efforts to our Arno farm to firmly establish a properly managed, commercially-viable enterprise," Seitz said. "From there, we will be in a position to assist others to develop this natural resource in a responsible and ecologically-sound way."

Source: *Pacific Magazine*, Nov. – Dec. 1995.



## Marshall Islands farm on-line: exploring Hawaiian farming options

By: Neil A. Sims and Dr Dale J. Sarver  
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Black Pearls, Inc. (BPI) continues work to expand commercial pearl farming in the Marshall Islands, as well as conducting trials for pearl culture and stock re-establishment of the Hawaiian black-lip pearl oyster, and projects in Kiribati and the Philippines.

### Commercial farm in the Marshall Islands

Expanding on the early successes in the remote-hatchery production and grow-out trials in the Marshall Islands (RMI), Black Pearls, Inc. has established a commercial pearl farm in the Majuro lagoon.

A private company, Black Pearls of Micronesia, Inc. (BPOM), has been set up in the Marshall Islands in

conjunction with local land-owners, and with collaborative assistance from the Marshall Islands Marine Resources Authority (MIMRA) to help develop the farm. Initial round pearl seedlings of the first hatchery-produced oysters are scheduled for late 1996. Field trials presently continue, through a NMFS Saltonstall-Kennedy Grant, to find ways to mitigate the impacts of predatory gastropods, and to identify site-specific variability in growth and survivorship inside Majuro lagoon.

### Spat-collector trials

Trials in Namdrik Atoll, supported through an earlier NMFS Saltonstall-Kennedy Grant, had demonstrated that spat-collector returns were not sufficient to support commercial farm operations in

Namdrik, and probably not in other Marshalls lagoons. It was hypothesised that this was due to the extensive tidal flushing of these open lagoons, with spring tidal ranges of over three metres.

### **Survey of stocks in Namdrik**

A survey of stocks in Namdrik lagoon estimated the total population at around 20,000 oysters.

Most of these are larger, older oysters, with very little recruitment occurring. The existing stock obviously is unable to support any heavy commercial exploitation.

These older wild oysters are also less suitable for pearl culture, with poorer nacre quality and lower pearl-retention rates.

Namdrik lagoon reportedly has the greatest number of wild oysters of any of the Marshalls lagoons, and so collection of wild-collected oysters for commercial farming was also not considered feasible.

### **Remote-hatchery production**

Hatchery-produced stock therefore offers the only realistic option for large-scale development of pearl farming in the Marshall Islands. With an increase in hatchery capacity in early 1995, BPI was able to ship over 150,000 recently-settled spat from a single larval run.

An additional 100,000 spat were shipped early this year. Further hatchery expansions currently under way should see a substantial increase in production capacity.

Growth of the oysters has been encouraging. Some mabe pearls seeded in wild-collected oysters in the Marshall Islands have also generated considerable interest among jewellers in Honolulu and Kona, indicating excellent pearl-quality potential for the Marshalls.

### **Hawaiian pearl-farming trials**

The Hawaiian trials have focussed on the feasibility of a stock re-establishment programme and commercial pearl farming.

These two goals could well be met by the same means: results have shown that the most effective stock re-establishment plan would place large numbers of older, densely-aggregated oysters in protected bays or lagoons, and rely on natural spawning to produce a continuous rain of recruits onto the surrounding reefs.

Over a dozen grow-out sites were tested around Hawaii Island, Molokai, Oahu and Midway Atoll. Oysters at five of these sites showed excellent growth under long-line culture conditions, with minimal mortalities among adults. At most sites, spat and juvenile oysters suffered *Cymatium* snail predation, at a level similar to that encountered in the Marshall Islands.

Regular inspection of spat bags and lantern baskets is necessary to prevent serial predation by snails. An innovative holding system has also shown some promise in minimising serial predation in untended oysters.

Several sites apparently have no snail problems, but we are presently unable to explain this anomaly.

### **Constraints to commercial farming**

Obtaining exclusive ocean leases in Hawaii has constrained commercialisation of Hawaiian pearl farming. Nevertheless, the results of these trials (supported to date by a US Department of Agriculture, SBIR grant and an ongoing NMFS SK Grant), have been sufficiently encouraging to warrant further efforts aimed at offshore culture, land-based farms, or some combination of the two.

### **Kiribati trials**

Attempts to replicate the Majuro remote-hatchery successes in Kiritimati Island (Christmas Island) in Kiribati have so far been thwarted by the outright refusal of the animals there to spawn. Spawning induction has presented little problem for oysters from other locations. Even the remote-hatchery work for the Marshall Islands usually results in over 90% of the animals successfully spawning.

### **Perpetually spent?**

For the Kiritimati trials, however, four spawning induction attempts have been made in both Kona and in Kiritimati, over a full year, without even a single male spawning.

We hypothesise that this oyster population is perpetually spent, with spawning occurring almost continuously.

Most of the stock in Kiritimati is found in the passage opening to this vast, shallow lagoon, and is therefore subjected to extreme tidal fluctuations in salinity and temperature. On several occasions we have observed other oyster species and other benthos spawning on the late afternoon ebb tide.

### Continued attempts

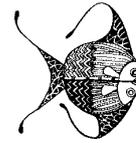
The most recent induction attempt therefore used over 20 oysters which had been held on the outer reef slope, as well as another 70 oysters collected from inside the lagoon — still to no avail.

Trials will continue, with an attempt to condition oysters in isolated pockets on the outer reef slope of the island, where they are not subject to effluent lagoon water, as well as with attempts at on-land

conditioning of Kiritimati oysters under quarantine conditions at the Kona facility.

### Philippines hatchery

Black Pearls, Inc. has also begun work under a commercial contract to design, build, operate and train the staff for a *P. maxima* hatchery, which will be used to supply an established pearl farm in the Philippines.



## Round pearl seedings in Nukuoro, FSM

The first Polynesians came to Nukuoro Atoll, now part of Pohnpei State (Federated States of Micronesia), many years ago by canoe from Samoa, some 2,000 miles away.

Nobody quite remembers exactly when the first Polynesians landed. All they know is that it was a long time ago. But the latest arrival, pearl technician John Lyons, probably will command greater attention in local history because he is a man with the long-awaited skills to help the island become the Pacific's newest producer of black pearls.

Nukuoro is geographically isolated from the rest of the FSM. It is the second southmost atoll in the country (Kapingamarangi is 185 miles farther south). Its land area is just sixteenths of a square mile, formed in a near-perfect circle around a lagoon that is four miles in diameter.

The black oyster (*Pinctada margaritifera*) has grown naturally in Nukuoro's lagoon, which locals call **Loteloda**, for as long as anyone can remember. It coexists with sponge, clams and many other kinds of marine life.

The chief magistrate (equivalent to mayor), Hosea Fred, is 52 and can remember learning about the value of the oysters early in life. The people eat the meat and use the mother-of-pearl shells for making knives, fish hooks and lures and jewelry.

Seafarers from Yap, more than 1,000 miles away, sailed their boats to Nukuoro to trade for the shells, which they took home to use as currency.

In the 1800s, German divers plundered 50 tons of oysters from Nukuoro's lagoon. Fred was told by a Danish pearl farmer a few years ago that one of the black pearls netted from that haul made its way to England and is now one of the crown jewels in the Tower of London.

Lyons and his family operate Pauveva Pearls and Services Ltd. The Pearls farm is in the lagoon of Manihiki Atoll, which bears a great similarity to Nukuoro. It, too, is just a speck on the map. But Lyons calls it home, his island.

Son George manages the farm, while daughter Carlene Hendricks runs the wholesale outlet in Rarotonga, capital of the Cooks. Lyon's Wife, Gienice, runs another wholesale outlet in Hawaii. Lyons divides his time between the farm, which he hopes will produce 2,500 pearls next year, and travelling the Pacific seeding pearls for the other farmers.

There is about a 75 to 80 per cent success rate in seeding oysters, he said. That means, in about 18 months, Nukuoro should have at least 3,000 pearls ready for market. At today's depressed prices, they should net US\$ 50 a piece.

"The way I look at it," said Fred, "the pearl project is essential for our future. It's our most important resource, aside from copra and fish. But, we also want to look at other things, such as sponge, clams, making jewellery, fishing lures and buttons from the pearl shells, and preserving bread-fruit. And, we want to increase our oyster numbers. In the long term, we want between 10,000 and 15,000 oysters."