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Letter from the Director

Aloha!

We are amidst preparations for our annual joint Industry Advisory Council/Technical Committee meeting, which will take place this week at the Oceanic Institute. This meeting is a key event during our development process. It provides an opportunity for members to discuss the FY11 full proposals, and ensure that each project's objectives and deliverables will serve the needs of the industry. For more information on our development process, visit our recently updated website www.ctsa.org.

In this month's issue of e-notes, you will find an article highlighting the Year 1 activities of CTSA's "Half-Pearl" project in Pohnpei, Micronesia. There is also an announcement about the NFI list of the top-ten most consumed sea foods, and a link to a new seafood health facts website. In our South Pacific Spotlight, we feature an article about recently published US shrimp production data. *Congratulations CNMI shrimp farmers on ranking 4th in the country!*

As always, if you have any comments, questions, or suggestions, please do not hesitate to let us know.

Mahalo,

Cheng-Sheng Lee
Executive Director, CTSA

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Micronesian Half-Pearls: Year 1 Project Summary

Developing value-added product "half-pearls" from the blacklip pearl oyster *Pinctada margaritifera* in Pohnpei (the Federated States of Micronesia) Years 1 and 2.

by Masahiro Ito, *College of Micronesia*

edited by Meredith Brooks



Figure 1: Micronesian half-pearls, from shell to jewelry. Most pendants are mechanically drilled and set in jewelry fittings, except on Pakin Atoll where technicians use manual threading techniques.

Half-pearls (Mabe) have been used in jewelry for more than 4000 years, dating back to ancient China. However, they are not currently considered a major profitable product of pearl farming. There have been a few publications about half-pearl production and half-pearl farming using the blacklip pearl oyster (*P. margaritifera*) as a tool for income generation in Tanzania (Southgate et al., 2006) and Kiribati (Antoine, 2007). However, no commercial success has been sustained from those projects, from neither small domestic sales nor the international jewelry market. Historically, these types of internationally funded income-generating projects have tended to demonstrate farming methods and handicraft-making techniques without advanced training for local citizens in sales and marketing development. A project has never before reached a stage of creating highly skilled half-pearl grafting technicians from local communities, who have pearl farming and pearl grading skills and are capable of training other local people. Year 1 of the half-pearl project shows one example of how to do just that; transfer technology which can be readily acquired and generate income from the skill training program itself.

Half-pearl production was recently incorporated into the College of Micronesia's (COM) pearl grafting skill training program and its industry development efforts. Thanks to support from this CTSA project, technicians have learned new technology that utilizes nuclei materials, such as organic nuclei, to produce a new type of larger 15 - 20 mm size baroque pearl that only requires one year of cultivation. Because the nuclei culture cycle is similar to that of the half-pearl, the nuclei also attach to virgin pearl oysters, so farms can harvest two kinds of pearl products during one harvest operation. The effects of this could be quadrupled: high-value, large baroque and half-pearls from virgin oysters, less financial burden as a result of a shorter cultivation period, and onsite skill training in round (organic and normal nuclei) and half-pearl grafting. There are a few other places where researchers work with organic nuclei: Japan, French Polynesia, Indonesia and Philippines. However, no other location uses young and best-quality virgin oysters for half-pearl nucleus implantation. The results of doing so have led to high quality and colored half-pearls, as described in this report.

While producing high-quality half-pearls is an objective of this project in and of itself, the primary objective is to demonstrate that Micronesian technicians are able to produce high quality half-pearls and transfer the skills they have learned to other Micronesians. It is the goal of the project to train at least two young people from each participating island community to act as core technicians of their community farm. These core technicians will be able to demonstrate their abilities to their fellow citizens and engage in half-pearl grafting training with local youth. Creating a solid workforce of Micronesian pearl technicians is key to the successful development of a sustainable pearl industry, particularly in the outer islands. In order to achieve the primary objective, COM has continued to train core pearl technicians under the tutelage of a master grafting technician and a pearl grading expert, who is certified for pearl grading by the internationally recognized GIA (Gemological Institute of America).

The project first got underway in August 2010 with the harvest of 700 half-pearls from 170 oysters that had been grafted a year earlier (top left picture in Figure 1). The 170 pairs of pearl shells were from oysters aged 6-7 years that had been rejected for use in the round-pearl operation. They were used for half-pearl grading training and accessory making sessions, and were also used to compare quality against half-pearls from 2-year-old virgin oysters. In June 2011, approximately 1,200 half-pearls from 400 virgin oysters were harvested after 10 months of cultivation for training and marketing purposes (top middle picture in Figure 1). As described above, half-pearl harvesting and nucleus implantation work commenced in the first quarter and was conducted by the project's technicians, as well as trainees at farming sites at Nett Point and Pakin Atoll. The seeding work and skill training sessions continued intermittently during the subsequent quarters. Two additional farming communities, Pingelap Atoll (150 miles east of Pohnpei) and Pweniou Island (at the southeast corner of Pohnpei), joined the half-pearl seeding operations in October, February and April.

During Year 1, total numbers of approximately 700 oysters, 1,400 oysters, 200 oysters and 500 oysters were implanted with half-pearl nuclei at Nett Point, Pakin, Pingelap and Pweniou, respectively. An average of 2 - 4 nuclei size 11 mm, 12 mm or 13 mm, either half-round or half-drop shape, were implanted in each oyster. All of the grafting operations were done by the project's Micronesian technicians and trainees who participated in training sessions at each farming location (Figure 2: top left photo). During the first quarter of Year 1, the first half-pearl demonstration and skill training sessions were conducted over two weeks at Nett Point. These sessions continued throughout Year 1, with two sessions at Nett Point, five at Pakin Atoll, one at Pingelap Atoll, and two at Pweniou Island. Among the 23 participants of the training sessions on Pakin Atoll, three teenage girls were selected by the Pakin Community Association to continue receiving specialized training, including training in round-pearl grafting skills. Three trainees from Pingelap, who were selected by their municipal government to learn farming operations, half-pearl grafting, and accessory making, also participated in the skill training program. Pweniou Island, which is owned by a single family of five to ten people, has sent one teenage girl to participate in the project's training session and learn the half-pearl grafting skills from the technicians. The total numbers of participants were 16 at Nett Point, 23 at Pakin, three at Pingelap and one at Pweniou. The duration of the demonstration and training sessions varied from three to 15 days per session, and a total of ten sessions were carried out in Year 1. The number of host oysters implanted per trainee varied from 2 to 50 oysters a day, depending on individual talent and capability.



Figure 2: Micronesian technicians conducting half-pearl work and training fellow Micronesians

Half-pearl pendant and pearl shell accessory making on-site training sessions were also conducted by the project's core technicians, along with grafting work. In Year 1, two sessions were conducted at Nett Point, six at Pakin Atoll (Appendix 5 - 2), one at Pingelap Atoll and two at Pweniou Island. The total number of participants in the jewelry making sessions were 24 at Nett Point (including 3 trainees from Pingelap), 110 (including 30 school children) at Pakin, and 20 at Pweniou. The duration of these demonstration and training sessions varied from two to 15 days per session, with a total of 11 sessions carried out in Year 1. As described above, several trainees from Pohnpei and

the outer islands participated in the hands-on training, which included preparations of tools and equipment necessary to make half-pearl pendants and pearl shell handicrafts and accessories. The pearl grading expert and the project seeding technicians worked side-by-side to grade everything from the raw materials to the finished products.

Due to differences in the economic situations and infrastructure of Nett Point (Pohnpei) and Pakin Atoll, the techniques of making half-pearl pendants were modified. At Nett Point, ordinary electric machines and tools such as hand-held grinders, sanders, drills and sewing machines were used to make sample pendants and earrings with metal fittings and chains (Figure 2: top right photo). On Pakin, where there is no public electricity supply, non-electric tools such as manual grinders, hacksaws, files, sandstone and sandpapers were the tools used (Figure 2: bottom right photos). A miniature hand-held drill powered by a small generator was used to drill holes in the shells and the pendant-tops. Pendant fittings were made of a strong string usually used for seaweed cultivation lines, woven into a strap (Figure 1: bottom right photos). This is a similar technique to the Japanese traditional "Kumihimo" strap or string-weaving technique, which does not require any metal fittings, rings or chains to wear a half-pearl pendant. The old-fashioned Kumihimo is an alternative to the modern method of jewelry making but its final product gives a more artistic and unique impression.

Half-Pearl Grading

Unique, Micronesian-branded half-pearls are more colorful than the whitish and/or grayish existing half-pearls in the international market. They can be a great value-added product from ongoing pearl oyster production. It is necessary for this project to teach the Micronesian technicians and trainees about pearl quality grading, since the quality assessment of both half-pearls and the mother-of-pearl cannot be understood without knowledge of basic round-pearl grading. Pearl grading is also closely related to quality assessment and pricing of the half-pearl pendant and earring products before conducting trial sales.

Coloration of half-pearls reflects the nacre color of the shell in each species, e.g. white-silver and yellow-golden of *P. fucata* and *P. maxima*, brownish-blue of *P. penguin*, bluish of *P. sterna*. The blacklip pearl oyster *P. margaritifera* have the unique luster and color from silver or grey to dark green or purple. The darker colors, particularly bluish, are considered to fetch higher prices in the round-pearl market, so the project's Year 1 efforts targeted to produce darker and/or bluish color half-pearls. For this purpose, the pearl grading expert taught Micronesian core technicians and trainees how and where to look at the inner side of a pearl shell, and how to select host oysters for grafting. The pearl grading expert also demonstrated basic GIA round-pearl grading methods to four of the project's extension aides and three trainees, and conducted onsite training of half-pearl grading for the participants.



Figure 3: A GIA expert was brought in to train Micronesian technicians in pearl grading methods

A preliminary quality assessment of the half-pearls from the previous year was completed during the second quarter, in which the GIA's standard of round-pearl grading (grades A to D) on luster, flaw, color, nacre thickness and shape was modified to grades A to C so as to develop grading of half-pearls. Unlike with round-pearls, the superior shape of a half-pearl (including half-round and half-drop) is defined by sharpness or clarity of outline. In order to simplify grading the half-pearls, the project adopted three grades: A = superior, B = good, C = inferior. Grade A pieces have a darker and/or lighter color such as blue, green or mixed colors, with a high luster and no/minute blemishes on the surface as seen with the naked eye. Grade B pieces are either darker and/or lighter in color with a high luster and minor blemishes visible to the naked eye; or have a whitish color with high luster without any visible blemishes. Grade C pieces have medium luster with distinct blemishes visible to the naked eye.

Sample products of half-pearl pendants and earrings from this project are different from finely made half-pearl (Mabe) jewelry, which requires very complex processing that is impossible for the outer island people to utilize. Therefore, the project adopted simple techniques by cutting through the half-pearl with the polished shell intact. Since sample products have received favorable reactions from foreign tourists, local people, and some overseas jewelry businesses, the project's processing technique could be viable. A preliminary study by COM has shown clearly that high quality half-pearls with unique color and luster can be produced by the local labor force to develop a new export market.

Year 1 of this project has demonstrated the successful transition of a micro-economic development plan into larger scale business opportunities through technology transfer. Although the first display and sale in Pohnpei was small, garnering \$500+ from 24 pieces, as of August 31, there are more than one thousand pieces in process to become accessories that will be used in training sessions and local and overseas public promotions in Year 2. International enquires for purchase, which could be worth approximately \$12,000, have already been received for jewelry-cut half-pearl accessories produced by the islanders who are participating in the project's training. As previously mentioned, there are a handful of other countries producing half-pearls at this time. According to the recent economic modeling of half-pearls for rural small-scale aquaculture (SPC/QDPI workshop 2008, unpublished data), gate prices of the half-pearls from the blacklip pearl oyster were expected to fetch from \$10, \$7 down to \$2 each for the half-round and from \$12, \$7 to \$2 each for half-drop shapes for A, B and C grades, respectively. In Pohnpei, however, domestic customers tended to purchase the products in the range of \$5 to \$40 (farm gate prices established by grading expert) at trial sales, which is an encouraging forecast. The average price per-piece sold was \$20.

Technology transfer and practical skill training conducted under this project can help to generate income and immediately benefit islanders. Half-pearl pendant making and half-pearl seeding training has contributed to enhanced local communities and islander's awareness of and interests in the pearl farming activities. More public exposure in Pohnpei and active sales promotions of the Micronesian branded half-pearl jewelry and handicrafts for overseas market are planned in Year 2 of the project.

Announcements: NFI Top Ten, New Seafood Health Website

The National Fisheries Institute list of top ten seafood products (by per-capita amount consumed in 2009, as well as 2008 amount in parenthesis):

- 1) Shrimp, 4.10 pounds (4.10 pounds)
- 2) Canned tuna, 2.50 pounds (2.80 pounds)
- 3) Salmon, 2.04 pounds (1.84 pounds)
- 4) Alaska Pollock, 1.45 pounds (1.34 pounds)
- 5) Tilapia, 1.21 pounds (1.19 pounds)
- 6) Catfish, 0.85 pounds (0.92 pounds)
- 7) Crab, 0.59 pounds (0.61 pounds)
- 8) Cod, 0.42 pounds, (0.44 pounds)
- 9) Clams, 0.41 pounds (0.42 pounds)
- 10) Pangasius, 0.36 pounds

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NEWS FROM NIFA

USA - As part of an initiative from experts across the country, the Seafood Health Facts project has launched a website - www.seafoodhealthfacts.org - designed to help clear up some of the confusing messages surrounding seafood.

The group was started by researchers from Oregon State University, Cornell University, and the Universities of Delaware, Rhode Island, Florida, and California, as well as the Community Seafood initiative. With the help of a grant from the US Department of Agriculture's National Institute of Food and Agriculture, the group was able to develop an easy-to-use site for both consumers and health professionals that contains Q & A about seafood nutrition and safety along with downloadable

brochures for health professionals and consumers.

"Seafoodhealthfacts.org is a convenient place where anyone can go to learn more about the latest advice for eating seafood," said Jennifer McGuire, registered dietitian for the National Fisheries Institute. "There have been some mixed messages in the media about seafood consumption and the USDA's latest Dietary Guidelines are clear that Americans are not eating enough seafood. This initiative is a step in the right direction toward replacing misinformation with science-based guidance."

Pacific Island Spotlight: CNMI Ranks 4th in US Shrimp Production

By Clarissa David, The Saipan Tribune. September 8, 2011.

The CNMI ranked the fourth highest in shrimp farm production throughout the United States in 2010, surpassing other U.S. Pacific jurisdictions such as Guam and Hawaii. In the shrimp farm production 2010 data compiled by Granvil Treece of the Texas A&M University, the CNMI harvested a total of 42,000 lbs of shrimp last year.

The state of Texas holds the top position with 2,526,648 lbs of shrimp harvested. Coming in second is Alabama with 248,900 lbs while Florida is in third spot at 90,368 lbs. Guam ranks fifth next to the CNMI at 40,000 lbs while Hawaii is sixth with 18,000 lbs. South Carolina placed seventh with 7,000 lbs.

"As the agency responsible for aquaculture in the CNMI, we're very happy about this development," aquaculture specialist Michael Ogo of the Northern Marianas College-Cooperative Research Extension and Resource Service told Saipan Tribune.



Saipan Aquaculture Technician (photo: CTSA)

Ogo disclosed that he provided the shrimp production data to Dr. Hui Gong of the University of Guam who then provided it to Texas A&M University where she is an alumna. According to Ogo, there are currently three shrimp farms in the CNMI: two on Saipan and one on Rota. Of these three, Saipan Aquaculture Co. Inc., owned by businessman Tony Pellegrino, is the first major shrimp farm in the CNMI that produces the Marianas Sweet Shrimp.

In fact, a greater part of the CNMI data used by Texas A&M University for the 2010 ranking came from Saipan Aquaculture. "He [Pellegrino] is what we call in the industry as the catalyst of aquaculture because of the success story of his shrimp farm," said Ogo.

Ogo disclosed that many are afraid to venture into shrimp farming because of the difficulties and challenges in sustaining it. More people choose to venture into tilapia farming, which is less challenging compared to shrimp farming, he added.

"That's why people who are not sure about shrimp farming, they look at Mr. Pellegrino's story and his success has encouraged them," he said.

[Click here to read the full story.](#)

AquaClip: Captive Breeding Could Transform the Saltwater Aquarium Trade and Save Coral Reefs

Originally published on <http://esciencenews.com>, September 20, 2011.

Marine biologists at The University of Texas at Austin Marine Science Institute are developing means to efficiently breed saltwater aquarium fish, seahorses, plankton and invertebrates in captivity in order to preserve the biologically rich ecosystems of the world's coral reefs. These scientists believe their efforts, and those of colleagues around the world, could help shift much of

the \$1 billion marine ornamental industry toward entrepreneurs who are working sustainably to raise fish for the aquarium trade.

"It's the kind of thing that could transform the industry in the way that the idea of 'organic' has changed the way people grow and buy fruits and vegetables," says Joan Holt, professor and associate chair of marine science at The University of Texas at Austin. "We want enthusiasts to be able to stock their saltwater tanks with sustainably-raised, coral-safe species."

Holt is a co-author of a recent article, "Advances in Breeding and Rearing Marine Ornamentals," published in the Journal of the World Aquaculture Society in April. The paper is a complement to Holt's broad-ranging work over the past 10 years to promote captive breeding of ornamentals. She's been a pioneer in developing food sources and tank designs that enable fragile larvae to survive to adulthood. Holt has also been a vocal critic of the extraordinarily wasteful methods currently used to bring sea creatures from the oceans to the tanks.

"One popular method is to use a cyanide solution," says Holt. "It's squirted into the holes and crevices of the reef and it anesthetizes the fish. They float to the surface. Then the collectors can just scoop them up, and the ones that wake up are shipped out."

This method, says Holt, has a number of unfortunate effects. It bleaches the coral. It kills or harms other species that make the coral their home, particularly those that can't swim away from the cyanide. It can deplete or distort the native populations of the species. And it contributes to 80 percent of traded animals dying before ever reaching a tank.

Unlike the freshwater ornamental market, which relies mostly on fish raised in captivity, the saltwater ornamental market is 99.9 percent wild caught. Holt says this is largely because there's less accumulated knowledge on breeding saltwater fish in captivity. Saltwater species also tend to spawn smaller, less robust larvae, which are harder to rear to maturity, and to rely on various foods, such as plankton, that are not readily available in mass quantities for breeders. Yet all these difficulties, says Holt, are surmountable.

[Click here](#) to read the full article.

The Center for Tropical and Subtropical Aquaculture (CTSA) is one of five regional aquaculture centers in the United States established and funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture (NIFA) under grants 2006-38500-16901, 2007-38500-18471, 2008-38500-19435, and 2010-38500-20948. The regional aquaculture centers integrate individual and institutional expertise and resources in support of commercial aquaculture development. CTSA was established in 1986 and is jointly administered by the Oceanic Institute and the University of Hawaii.