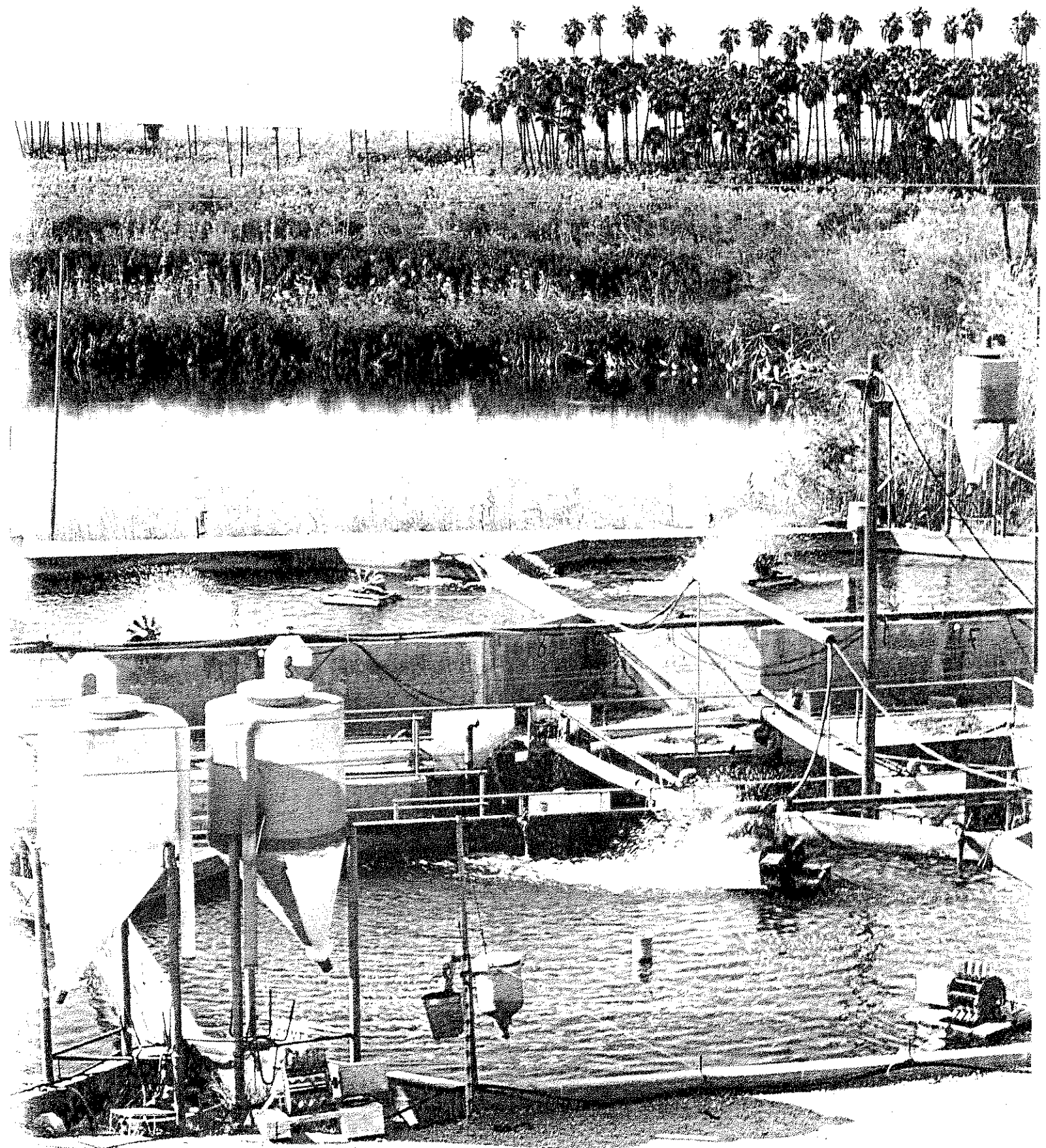


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# Pearls: An Update

## Shrimp, abalone and backyard farming

By C. Richard Fassler

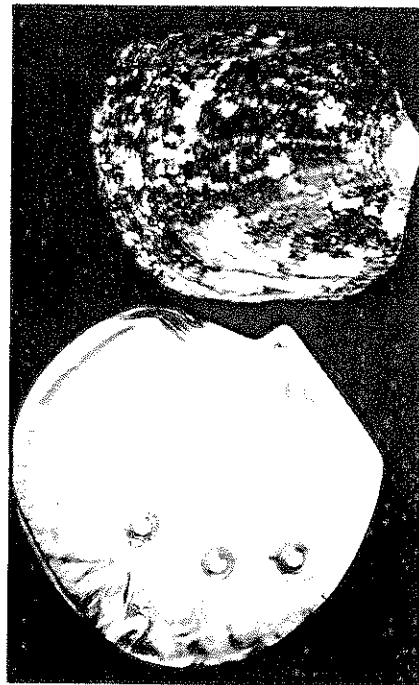
Two articles on pearl farming that recently appeared in *AQUACULTURE MAGAZINE* have succeeded in bringing this industry, hitherto largely unknown outside of Japan and the South Pacific, to the attention of the world's aquaculture community, "Farming Jewels: The Aquaculture of Pearls" (Sept./Oct.) and "The Return of the American Pearl" (Nov./Dec.), by this author, discussed both opportunities and obstacles. Since the publication of the articles, the State of Hawaii's Aquaculture Development Program (ADP) has received telephone calls, letters and FAXes from persons all over the world, many of whom are now seriously considering plunging into this highly rewarding, but highly challenging business. The purpose of this article is to provide an update on some of the latest developments in pearl farming.

### China and Japan

The Japanese have long held a monopoly on pearl farming, but recent information we have acquired indicates that the Chinese are coming up fast. In the years ahead, China is likely to be the nation where expansion will be the greatest. What the Chinese have done to become the world's number one shrimp producer could enable them to become number one in pearls, too. They have an abundance of land, cheap labor, and strong technology, which they have mostly developed themselves. There are more than a thousand freshwater pearl farms in central and eastern China, and several dozen saltwater farms on the island of Hainan.

The Japanese are fearful that the Chinese will start mass-producing large (13 mm-plus) South Seas pearls from the saltwater oysters, *Pinctada margaritifera* and *Pinctada maxima*, and will set up a hatchery with foreign investors. They fear not only the quantity, but the quality of pearls that may come out of China. Recent improvements in quality

have led some Japanese companies (in the spirit of "If you can't beat them, join them!") to market Chinese pearls in Japan. Despite the existence of Japanese laws which forbid techniques for cultivating pearls to pass to other countries, the unthinkable is now being proposed: joint-venture operations in China, producing low-cost pearls with Japanese technology, marketed in Japan with strict quality and price controls.



*Pinctada margaritifera* is the oyster of choice for pearl farming the South Pacific islands. The oyster produces a blackish-grey pearl.

### Indonesia

Indonesia promises to be another major center of pearl farming. As every shrimp aquaculturist knows, the nation has resources that are similar to China's: vast amounts of land (and water) and very inexpensive labor. Up to March, 1991, the Indonesian government had granted 30 licenses to

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companies to operate pearl farms. The Japanese aren't as worried about Indonesia because they are setting up joint ventures with local firms, uniting their technology with remote island sites to produce *maxima*. In addition to their ability to breed and grow oysters, they offer their astounding implant abilities.

### Hatching

There have been significant developments in the hatching of pearl oysters in the past six months. Not only have the Indians succeeded in spawning *margaritifera*, but French Polynesian and Chinese officials report considerable success.

### Implanting

In order for an oyster to produce a pearl, a technician must implant a bead, usually made from the shell of an American freshwater mussel, into the gonads of a pearl oyster. In all the world of aquaculture, there is no more closely guarded secret than this. Indeed, as mentioned above, it is against the law in Japan for a Japanese to share this with a non-Japanese. So successful have the Japanese been at holding this secret that persons in the pearl industry can usually name every non-Japanese implantor. Our research over the past few months has turned up less than a dozen names.

The lack of non-Japanese implantors has been the major factor in restraining the growth of pearl forming. The scarcity of this service dictates a high cost: \$3 to \$4 per implant and quite possibly \$1000 per day. John Latendresse, an American pearl farmer, equates the technician's skill to that of a brain surgeon. He recently told us that he has six implantors who took three to four years to get to the point where they could perform successfully.

The expansion of pearl aquaculture will, then, largely depend on the ability to spread the implant technology. Here are some possible scenarios:

1. The Japanese will continue to monopolize the skill; more joint-ventures are likely, but the demand for implant

services may drive prices even higher.

2. The Japanese may be "bribed" into sharing their skill. Latendresse says that this is already happening. According to him, the Chinese are paying three Japanese \$1 million a year each for the technology.

3. The handful of non-Japanese implantors may be persuaded to share their skills. This group may include the Chinese (it is clear the Chinese have some implant skills; we were not able to determine how developed these are). The resulting competition with the Japanese may bring prices down,

4. New financial arrangements may make implanting more feasible for pearl farmers. For example, instead of paying his implantor by the graft, one black pearl farmer we know shares his crop with his Japanese implantor. He swears that the implantor achieves a higher oyster survival rate than being paid by the piece.

### Expanding the Industry

In the last six months, ADP has received inquiries from persons wishing to raise pearls in Ecuador, Guatemala, Tanzania, the Bahamas, South Africa, French Polynesia, Tonga, Australia, Fiji, and parts of the United States: Georgia, California and New York. In some areas, there is a considerable oyster resource already in place — Ecuador, for example. In others, the Bahamas, for example, there may not be a large supply of oysters, but grow-out possibilities exist, if the oyster can be hatched elsewhere.

One of the more interesting inquiries came from a shrimp



The black pearl necklace is selling for \$25,000 at a Honolulu jewelry store.

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### Catfish & Tilapia

Specifications for twelve catfish rations, including six floating and three sinking feeds, and NRC requirements for coldwater and warmwater fishes and shellfishes. Compiled by Dr. Ed Robinson, Mississippi State University.

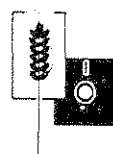
### Shrimp

Nutrient and ingredient specifications for *Penaeus vannamei* and *Penaeus monodon*. Tables give the recommended levels of vitamins and minerals for minimum necessary requirements.

### Trout & Salmon

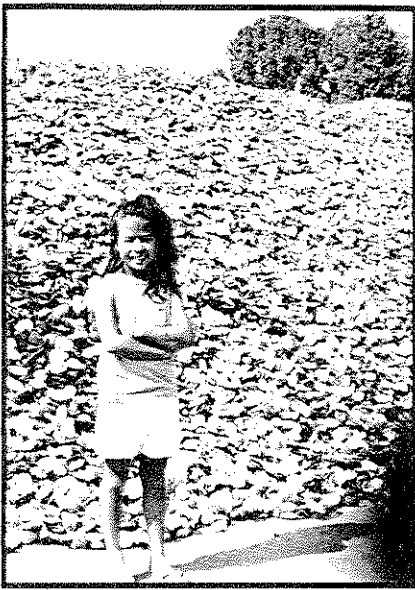
Nutrient and ingredient specifications for five trout and one salmon diet. Compiled by Dr. Gary Rumsey and Dr. Steven Hughes of the U.S. Fish and Wildlife Service, Tunison Laboratory, Cornell University.

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Author's daughter, Kimmy, in front of a mountain of American mussel shells. The shells are destined to be nuclei -- the heart of every cultured pearl.

collected in an hour." (David Kawahigashi, pers. commun., 1992). He also mentioned oysters growing wild in shrimp effluent disposal canals.

A key question, then, is: Can pearl oysters be grown in shrimp effluent, or even in shrimp ponds? Research recently completed at the University of Hawaii indicated that *C. gigas* and *C. virginica* not only survived, but thrived, in shrimp effluent (Jaw-kai Wang, pers. commun., 1992). But these are not pearl oysters, and it is not known whether the Ecuadorian oyster can become a pearl oyster. It is likely that we will see a pearl oyster pilot project in Ecuador before the end of the year, the progress of which will be followed with great interest by shrimp farmers everywhere.

farmer in Ecuador, where shrimp companies are seeking to diversify into new species. He noted the large oyster on the cover of AQUACULTURE MAGAZINE's Sept./Oct. issue and told us that oysters of this size exist in abundance along the coastline (Bill Bright, pers. commun., 1992). His observations were confirmed by a shrimp consultant with many years' experience in Ecuador who told us that "100 pounds can be col-

## Abalone

Abalone pearl production was pioneered by the Japanese in the 1950's (INFOFISH International, 1991), and today there are abalone farms raising pearls in Japan, Korea, New Zealand, Canada, South Africa and the United States (California and Hawaii). An abalone pearl takes on the blue-green colors of the abalone shell. One specimen, taken by an abalone diver off the coast of California in 1990, baroque in shape, weighed in at 118.57 carats, for an appraised value of \$142,248 (Jewelers' Circular-Keystone, April, 1991). The cultured variety is likely to be a mabe, or half-pearl, or a 3/4-round pearl, with a value of \$25 to \$100.

In January, Paul Cross, a freshwater pearl farmer with an operation in northern California, launched an abalone pearl project at Ocean Farms of Hawaii (OFH) on the Big Island. His implantor placed two 3/4-round, 12 m nuclei into six hundred 3" to 4" farm-grown abalone to produce 3/4-round pearls—perfect for a ring mount. Cross reports a mortality rate of less than 20% and plans to nucleate 30,000 more abs. He has several implant pilot projects underway with abalone raisers in California, and is negotiating with an abalone ("paua") farm in New Zealand,

Also noteworthy: ADP has received inquiries from persons associated with abalone operations in South Africa and Australia who would like to look into the possibility of culturing pearls in large, wild-caught animals.

## American pearls and nuclei

In the last several months, American pearls (almost all mabes) have found a home in Nashville, Tennessee. Freshwater pearl farmers and business rivals, John Latendresse and Jim Peach, are making the Tennessee city the center of their marketing operations. Latendresse sold his mussel export business and is building a plant that will produce jewelry incorporating his mabes.

Peach has a 5000 square-foot retail outlet, called "Factory Jewelers" that features his pearl creations, Paul Cross continues to manufacture nuclei, but has been joined in this industry by several other American companies. Cross has



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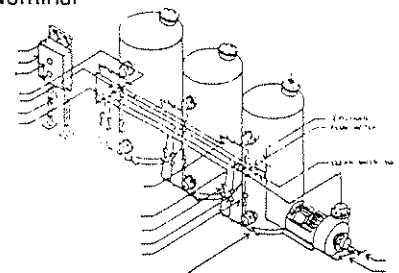
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A major question concerning nuclei is whether the supply of American freshwater mussels will be destroyed by overharvesting and/or the rapidly invading European import, the zebra mussel. The zebra has proliferated to the point where it can outcompete or "smother" our native mussels. These topics, and others, will be addressed at a symposium entitled "The Conservation and Management of Freshwater Mussels," to be held in St. Louis, October 12-14. (For further information, write to Kurt Welke, State of Wisconsin Department of Natural Resources, 111 West Dunn St., Prairie du Chien, WI 53821).

#### Backyard pearl farming?

Alan Sperling, a gentleman from Georgia who has a "water landscape" publication called Pondscapes, asked us about the possibility of raising pearls in decorative home ponds using an American freshwater mussel. This would seem to be possible if a nucleator could be found to implant a simple plastic half-sphere to make a mabe pearl. American pearl farmers have discovered that round pearl production is too difficult (Sperling, pers. commun., 1992).

#### The South Pacific Pearl Conference

Japanese, Chinese, Australians, Cook Islanders, hatching, spat collecting, implanting, nuclei availability, disease problems, quality control, what is obviously needed is something to pull the various segments of the pearl industry together in one location so that there can be discussion, examination and proper direction into the next century—in

other words, a conference. ADP is proposing the first-ever international meeting of persons in the pearl industry. The focus will be on pearl farming as an important economic development opportunity for the South Pacific, but the meeting is expected to attract people from throughout the world.

The goals of the conference are to: 1. exchange technical information; 2. promote and market product; 3. monitor the quality of product; and 4. attract investment dollars to the region. We plan to have a heavy media presence, which should greatly boost the public's awareness of the beauty of South Seas—and American—pearls.

The target audience is farmers, government officials, equipment manufacturers, and retail and wholesale jewelers. According to Dr. John Munro, South Pacific Director for ICLARM, "Virtually all Indo-Pacific fisheries departments would be interested in the meeting and would try to send representatives." (Munro, pers. commun., 1992).

The program will include: hatchery and grow-out technology; site location factors (e.g. resource surveys); disease considerations; government support (e.g. extension); quality control and marketing; research priorities; international funding support; technical assistance; environmental issues; social, economic and legal aspects of maring tenure; and training and education.

In addition, there will be a trade show that will feature the latest in equipment for pearl farming. We were most pleased to receive word from Dr. Shohei Shirai, from Japan, that he would like to present an educational display of both cultured

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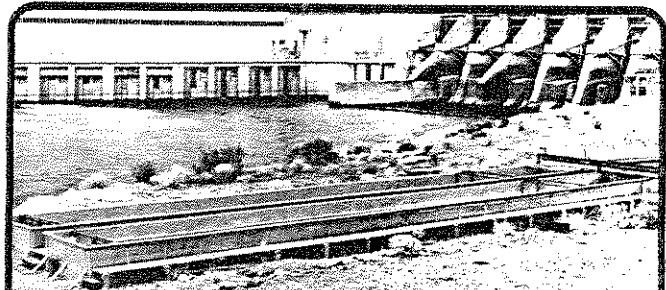
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and natural pearls (Shirai, pers. commun., 1992). Dr. Shirai is the author of a well-known volume on pearls. Also, we expect a great deal of trading to take place in black (*margaritifera*) and white (*maxima*) pearls.

The location of the conference will be Honolulu. The proposed date would be early to mid-1993. We are in the process of seeking funding from international economic development organizations operating in the South Pacific. For more information, see us at the ADP booth at the World Aquaculture Society conference in Orlando in May.

### Looking ahead

1993 promises to be a most important year for the aquaculture of pearls. The Chinese will push ahead; the Japanese will continue to see opportunities in the South Pacific; the feasibility of raising abalone pearls will most likely be determined; and, of course, there is the conference.

The non-Japanese pearl culture world will make a considerable effort to learn Japanese implant techniques. The acquisition of the implant knowledge may be a good thing, or a bad thing, for pearl farmers. Latendresse points out that the implant monopoly acts as a price and quality control mechanism for the pearl industry. If the world is let in on the Japanese secret, he says, there will be pearl farms on every island and atoll, and prices will tumble. Other people we have spoken to say that immediate price declines are bound to occur, but these will eventually be offset by long-term price stability. Demand will pick up as pearls become more affordable, and people in such areas as the European Economic Community become more affluent.

Quality control is on everyone's mind, and there is much talk among farmers about forming a cartel to control quality (and, of course, prices), similar to the situation in the diamond industry. Others say that this would be impossible, given the expected expansion of pearl farming in China.

On one point everyone seems to be in agreement: the need to give the Japanese monolith a nudge, if not a large push. They predict that the ending of the monopoly will result in increased jobs and tax revenues in areas of the world where few economic development opportunities exist. The Japanese must decide whether it is in their best interest to cooperate, or continue to hold tightly to their "national gem."

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### About the Author

C. Richard Fassler is the Economic Development Specialist with the State of Hawaii Aquaculture Development Program. He has been with the program for the past 15 years.