Reviving the Bais City Oyster Industry

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Coauthor Herculeo Rada harvests some 10-month old *C. iredalei* from tire strips.

Background

Bais City with its two bays on the southeastern coast of Negros Island is historically the main source of shellfish in Negros Oriental, Philippines. Indigenous oyster species include the large, desirable *Crassostrea iredalei* (Talaba) and *C. malabonensis* (Kuko Kabayo) and the small, less desirable *C. echinata, C. lugubrius* and *C. cucullata.* Currently the dominant oysters are the smaller less desirable species. From interviews with elder, local fishermen, *C. iredalei* and *C. malabonensis* were once numerous but are now nearing extinction due to selective overharvesting.

The available oysters, almost all smaller species, are gathered individually, shucked, salted, packed in "flats" (375-ml bottles) and sold in the market in Bais City and 45 km away in Dumaguete City, the capital of Negros Oriental. There is almost no supply of large, fresh, unshucked oysters, which are the preferred consumer product.

In 1979 the Bureau of Fisheries and Aquatic Resources (BFAR) reintroduced *C. iredalei* broodstock near Barangay Looc, a village in South Bais Bay, to demonstrate the culture of oysters and to produce oyster seedlings for dispersal. Funds and manpower were lacking and the project was soon abandoned. However, in 1981, BFAR funds were again available and a U.S. Peace Corps Volunteer (senior author) was assigned to manage the project, research environmental and economic parameters relating to the oysters, and extend the culture technology to the community.

Methodology

South Bais Bay is semi-enclosed with an area of 14.5 km^2 protected from strong winds and waves but with good tidal flow and continuous freshwater

A good yield of market-size *C. iredalei* attached to tire and nylon/shell spat collectors, observed by BFAR worker, Heine Cancio.

inflow. The 0.25 ha experimental farm area has a mud bottom and an average tidal fluctuation between 1 and 2 m. The farm consisted of four 40-m long racks formed by vertical bamboo poles protruding 1 m from the mud and supporting two horizontal and parallel bamboo beams. Spat collectors, 1.5-m long, made of thin nylon ropes strung through 10 oyster shells were hung across the framework every 30 cm. The breeding oyster population and the cultured oysters on the collectors were dominated mainly by small *C. cucullata.* No selective culling to accumulate a preferred broodstock of the larger species had been practiced and the ratio of numbers of small to large species was 80:20.

During March to May 1982 the collectors were harvested and only the *C. iredalei* and *C. malabonensis* were returned to the farm in bamboo trays for broodstock. Eight hundred spat collectors were prepared for the spawning season during the rainy months of June-September. Sliced tires were also designed for experimental collectors. This method is used extensively in Dagupan City, north of Manila, and is economically appropriate to Negros since discarded truck tires are a byproduct of hauling sugar cane, which is Negros' major agricultural product.

In June more racks were constructed to enlarge the farm area to a total of 0.75 ha and both types of spat collectors were hung from the framework.

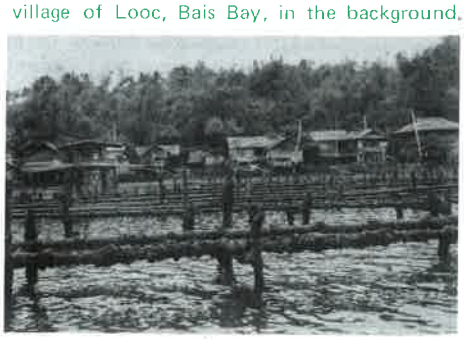
Results

Good settlement of young oyster (spat) occurred on both the shell and tire strip collectors. Each 1.5-m collector received about thirty spat making a total of 24,000 oysters. Selective culling successfully decreased the ratio of small to preferred species. The ratio now is approximately 80% large species. Juvenile *C. iredalei,* 3-4 cm mean diameter, were found to grow at 0.4-0.6 cm/month over an 8-month observation period. Most oysters reach preferred market size of 7-9 cm mean diameter in 8-9 months from spatfall.

Mean temperature, salinity and transparency were 29°C, 34 ppt and 1.3 m, respectively. Dissolved oxygen readings were 2.5 to 6.0 ppm; mean pH was 6.8.

Other observations included competition from sponges, heavy siltation and periodic pollution. The sponges encrust the spat collectors killing some and competing for space. Rapid sedimentation was observed around the embedded structures. Pollution was also noted during the milling season of sugar cane from January to April. Fish kills occurred and the seawater became a rusty red color on one occasion.

The BFAR experimental oyster farm with the village of Looc, Bais Bay, in the background.



Extension Work

Informal education of the nearby Looc community was conducted by house to house visits, informal group gatherings and by encouraging villagers to visit and observe the project. An inexpensive culture method was also demonstrated to show that even a subsistence family could utilize the basic technology.

Bais City School of Fisheries is currently developing a small project adjacent to the farm site using the nylon and shell method. This will be used as a training site for students. Meanwhile, twelve families neighboring the farm site have also commenced small projects using the sliced tire technique. In fact, oyster project recipients have recently received orders from restaurants and other consumers for fresh oysters. However, the supply is still too low to fill the demand.

Economics

All of the oyster project recipients are using the strip tire method of culture. For a 50-m rack, the cost of bamboo pieces, tires, sickle for cutting tires and labor is ₱195. Income, if all oysters are sold fresh would be ₱580, or if salted ₱239. (US$1 = ₱11.0)

Bamboo oyster racks at the Looc project site showing good growth of *C. iredalei.*

Hazards

Contrary to the apparent success of the project, some of the environmental parameters indicate poor conditions. The mean salinity of 34 ppt is higher than the optimum for growth, while optimum spawning salinity is 15 ppt. The mean transparency of 1.3 m indicates very turbid water. However, oysters are tolerant of turbidity and siltation. The competition by sponges could have been a problem also but they were occasionally removed manually with brushes.

The major ecological problem in South Bais Bay is domestic and industrial pollution. This affects the consumer of oysters even more than the oysters since adult oysters are tolerant of, and even concentrate, enteric bacteria, heavy metals and pesticides.

The effects of pollution on the oyster, and more importantly, on the people, have not been measured. What is known is that gastroenteritis is one of the major diseases in the Philippines and that a subsistence family will consume almost any mollusc they harvest, whether cultured or from the wild.

Recommendations

The Bais Bay project should become a center for community extension and training and to continue providing a broodstock. Extension education should stress the need for selective culling to preserve and upgrade the broodstock and the need to fully cook the oysters before consumption to guarantee hygienity. Also, for optimum production the spat collectors should be set during the rainy months of July–September and December–January and the racks should be moved periodically to reduce sedimentation.

Further research is needed to measure the pollution and its effects on the water and oysters. If pollution reaches unacceptable levels it may be necessary to use a depuration plant (see ICLARM Newsletter, July 1982, p. 14) or take steps to locate oyster farms distant from major population centers (see below). ●

Oyster Depuration: A Postscript

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The Philippines, as well as other countries in Southeast Asia, has recognized that oysters can be a valuable commodity for export-oriented trade. The exportation of oysters is mainly hampered by the presence of water-borne pathogenic microorganisms within the areas in which the oysters are grown. Oyster depuration has been suggested as a possible means of partially overcoming this problem (see ICLARM Newsletter, July 1982, p. 14). This approach has been championed by many agencies in the Philippines, including Bureau of Fisheries and Aquatic Resources, Philippine Council for Agriculture and Resources Research and Development, and Southeast Asian Fisheries Development Center as evidenced by releases to the popular press over the last year.

Oyster depuration, although highly effective in reducing the numbers of bacterial pathogens, is not the only criterion on which a viable export industry can be based. First, most countries which are potential customers for the sale of oysters have regulations concerning the cleanliness of the source waters of oysters and other shellfish. Most of the regulations are similar to those of the United States Public Health Service. These regulations are not without basis. Controversy still remains as to the efficacy of depuration to remove viral pathogens from shellfish. Another drawback to the sole use of depuration is that without proper blast-freezing equipment directly on the premises of the depuration plant, post-depuration increases of bacterial populations during transport are difficult to control. These are difficulties which have been encountered by the commercial Philippine depuration operation previously reported.

If oysters and other bivalve molluscs are to be pursued as a product for export marketing by Southeast Asian countries, it is recommended that source cleanliness be assured by the placement of the shellfish farms in areas which are not in the close proximity to major population centers and that periodic bacteriological monitoring be performed on a routine basis. The placement of depuration and blast-freezing facilities in the vicinity of these acceptable source areas would then assure safe, exportable shellfish.