

## Development of Aquaculture in Sierra Leone with a Brief Reference to Oyster Culture

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### Introduction

In Sierra Leone, the need for increasing aquaculture produce such as fish and oysters is becoming a necessity. They can also be used in the rural areas where the production of other animal protein is either expensive or low.

Oysters, a luxury food item in many parts of the world are an important source of protein in Sierra Leone for the poorest people. This is true in many West African countries.

Oysters in Sierra Leone are commonly called mangrove oysters, mud oysters, or rock oysters depending on the substrate. Mangrove roots with oysters attached to them are cut by men using dug-out canoes and machetes. A small amount is also gathered by women mostly from mud banks and rocks. Oysters are usually boiled in a large drum, shucked and sold fresh. Since they are so small, collection and processing are laborious, production is limited, and distribution is localised.

The present oyster culture project, jointly funded by the International Development Research Centre (IDRC) of Canada and the Sierra Leone Government's Fisheries Division, was started in February, 1974.

The purpose of the project is to increase the yield of mangrove oysters and establish a practical and economic system for their cultivation through various culture systems, biological investigations, processing studies and sanitary and bacteriological surveys.

Since the project started, various culture systems have been tried and further work is actively being pursued in the following:

1. Continuation of rack and raft culture in the established sites while the search for new sites continues;

2. Seasonal gonad changes of mangrove oysters;
3. Seasonal settlement of principal fouling organisms;
4. Study of the major predators;
5. Plankton studies with emphasis on the seasonal settlement of young oysters; and
6. Preliminary studies on traditional harvesting, processing and marketing of oysters.

### Sierra Leone

Sierra Leone has a coastline of 210 miles with a population of about 3 1/2 million people. Freetown is the capital. The country lies on the southwest coast of West Africa between 6°55' and 10°N and between 10°16' and 13°18'W, with a total area of 27,925 sq miles (73,326 km).

The climate is hot (30°C) and humid (80-90 percent), with a very marked rainy season from June to September, and the dry season prevailing the rest of the year. Although cattle is reared in isolated areas mostly in the North, fish, oysters, etc., are the primary sources of protein.

### The study areas

The work has been concentrated in and around the Sierra Leone river near Freetown. Five stations have been established. The first station set up in 1974 is at No. 2 river which is a small tidal lagoon about 2.5 km long by 50-60 m wide and 1-3 m deep on the West Coast of Freetown Peninsula.

The second site, established in 1974, is at Jui on the east coast of Freetown Peninsula. The third station is 25 km northeast of Freetown. The fourth site, Dare, was begun in July 1975 and is about 10 km northeast of Pothko. Pepel is the fifth station where active work is going on. A new station in Shenge in the provinces has been opened.

## Materials and Methods

Using oysters still on the root, tests have been made of rack culture or stick culture by building small frames above and below low tide, as well as suspended culture using mangrove roots strung from floats made of a small log or bamboos. Tarred sticks, cement dipped veneers, mangrove roots, mangrove aerials and oyster shells as cultch have also been tried. Most of the above methods and materials failed to show any success.

The raft or suspended culture method has been found to be most promising followed by sub-tidal rack culture. A raft is made of 44 gallon oil drum floats coated with tar or pitch and connected by a bamboo frame. It measures about 5 m x 6 m and lasts for about a year, but some of the materials could be re-used. The cost of a raft is about US\$55 to 60.

### Cultch

Mangrove oyster shells and cultured oyster shells are so far the best cultch materials as they are light, abundant, easy to punch, cheap and able to catch the spat very well. Other cultch which have been tried but found unsuitable are cement dipped veneers, tarred boards, mangrove roots, cockle shells, docked oyster shells, and bamboo.

### Predation

Predation on the raft has been minimal. Considered as predators are drills, crabs and fish. Drills are not common on raft oysters. The spider crab or shore crab and porcupine fish or "puffer" which sometimes are found on the raft or among the strings are also considered to be predators but this has not been proved.

### Fouling

Most important of the fouling organisms are the hydroids and the barnacles *Chthanalus* and *Balanus* such as *Balanus amphitrite*. The hydroids form a layer over the shell surface and inhibit spat settlement. Other fouling organisms include the sea squirts, mussels, fanworms, sponges, sea anemones, brittle stars, and algae. Fouling of all types is heaviest during the dry season, especially from December to July.

### Salinity and temperature

The optimum salinity is not known, and therefore different sites have been established to test the effects of various salinities. The temperature at most of the stations is usually 26<sup>o</sup>-28<sup>o</sup>C during the rainy season and 28<sup>o</sup>-30<sup>o</sup>C during the dry season.

## Pen and cage culture

At present, the above system is only applicable to oyster culture. This system however attracts much fish in Sierra Leone and therefore floating cage culture is possible.

Among the many species suitable for the system are *Tilapia nilotica*, mullets, catfish, *Alestes macrolepidotus* and others.

The Guma dam and mining pools in Kono district and other mining areas are very suitable for pen and cage culture. Also, many up rivers like the Moa river, Sewa river, Jong river, Wanjai river, and River Bokel are suitable for the system. Cage and pen culture can go on in some areas of the country throughout the year.

## Conclusion

Sierra Leone with her numerous fresh water bodies suitable for fish culture and her long coastal marine waters has great potentials for aquaculture.

Oyster culture has so far shown great success as it is now possible in 9 months to produce oyster of an average weight of 9 grams which is four times the size of wild mangrove oysters. Also, studies on plankton tows, cultch exposures and condition factors indicate that the oysters may spawn all year round in some areas.

## Selected Literature

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