

**AQUACULTURAL PRODUCTION OF MANGROVE OYSTER, *Crassostrea gasar*, IN TIDAL WATERS OF NIGER DELTA, NIGERIA**

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**ABSTRACT**

Aquaculture or fish farming is a developing industry in Nigeria with potentials to make significant contribution to food security, livelihood, socioeconomic status, and the nation's economy. The aquaculture industry has grown substantially the last decades, both as a result of the over-fishing of wild fish populations, and because of the increasing consumer demand for fish meat. Oyster production around the world is becoming a growing industry since natural production is decreasing. The main species used for culture belong to *Crassostrea* genus and are in use for aquaculture. The native mangrove oysters are an important group of shellfish, exploited along the coasts and estuaries where they are naturally found. Mangrove oysters are found naturally in abundance in the brackish water creeks of Bayelsa, Delta and Rivers states, attached to the aerial roots of red mangrove vegetation, *Rhizophora racemosa*.

**Key words:** off-bottom culture, spats, recruitment, maintenance, market-size, growth.

**INTRODUCTION**

Aquaculture is defined as the farming of aquatic organisms in inland and coastal areas, involving intervention in the rearing process to enhance production and the individual or corporate ownership of the stock being cultivated (FAO, 2004). Aquaculture or fish farming is a developing industry in Nigeria with potentials to make significant contribution to food security, livelihood, socioeconomic status, and the nation's economy. The aquaculture industry has grown substantially the last decades, both as a result of the over-fishing of wild fish populations, and because of the increasing consumer demand for fish meat. Brackish water fish farming is an important component of Nigeria's artisanal fisheries (FAO, 2004). Oyster production around the world is becoming a growing industry since natural production is decreasing. The main species used for culture belong to *Crassostrea* genus and are in use for aquaculture. Oysters have proved highly amenable to aquaculture, and today exploitation of wild populations contributes little to worldwide oyster productions (FAO, 2002). In Nigeria, *Crassostrea gasar*, occur in large quantities on the numerous mangrove trees that line the creeks and estuaries, which comprise the Niger Delta especially in Rivers and Bayelsa States (Deekar, *et al.*, 1994), fig. 1.

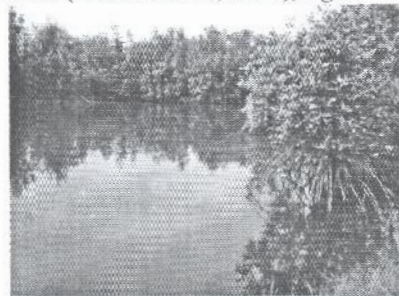


Fig.1 Stands of mangrove vegetation along Buguma Creek

Oysters are tolerant organisms able to withstand wide variations in temperature and salinity (Afinowi, 1975; Ajana 1980; Ansa and Bashir, 2003), and concentrations of suspended sediments and dissolved oxygen. The native mangrove oysters are an important group of shellfish, exploited along the coasts and estuaries where they are naturally found, due to their good flavour, nutritional values and relative accessibility, fig 2.



Fig. 2 Pond cultured mangrove oysters

The Niger Delta, a 30,000 km<sup>2</sup> wetland of global ecological significance is located at the southernmost part of Nigeria; with the delta dissected by a dense network of rivers and creeks of saline, estuarine and freshwater surface bodies (Abam, 2001). The total brackish water area for the Niger Delta is about 7,415 km<sup>2</sup> (Scott, 1996); with mangrove swamp stands stretching 30-40 km in the case of Nigeria (FAO, 2005).

**Culture method suitable for mangrove oyster**

The off-bottom methods in which mangrove oysters are held off the bottom of the culture medium, fig. 3, is most suitable, and has the advantages of increased growth rate and reduced mortality from smothering by mud.



Fig. 3 Rack and cage off-bottom culture

**Methods of collecting spats (seeds)**

Collection from the wild by cutting aerial roots of mangrove with oysters attached fig. 5.

The use of suitable collectors generally termed cultch (Afinowi, 1971). Cultch is the material upon which the oyster larvae attach or "set" (Angell, 1986). Hard timber, oyster shells and asbestos are good examples.

**Hatchery production of oyster spats.**

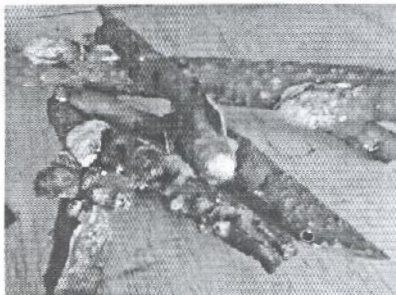


Fig. 4 Cut mangrove aerial roots with oysters attached

Steps in farming mangrove oysters include Site selection and preparation of rack stands.

Spats collection and preparation of protective cages.

Stocking of spats and arrangement in the culture medium.

Routine management of stocks and equipment during culture (daily and monthly).

Harvesting and post harvest

**Basic requirements for farming mangrove oyster**

According to Nikolic, *et al.* (1976), these include water depth, salinity, pH, dissolved oxygen, velocity of water currents, protection against wave action, and freedom from pollution. Others include sufficient tidal flow to change water completely and frequently, suitable temperature, and adequate nourishment for plankton production. Factors affecting oyster culture include predation, fouling, extreme climatic condition, pollution, and disease while the factors affecting growth of oyster include temperature, time of submergence in water, pests and stocking density.

**Fouling organisms and predators of mangrove oysters**

Common fouling organisms are barnacles mussels, tunicates, tube-dwelling polychaetes and hydroids (Quayle, 1980), which compete for space and food while common predators are crabs and drills, both of which have means to remove oyster meat. These are controlled by mechanical, chemical and biological means.

**Advantages of mangrove oyster culture**

Simple technology using locally available materials.

No need for feed supplements as oyster filter natural food materials from water.

Low capital investments.

Small-scale operations and labour.

Minimum impact on the environment.

**Research needs:-** Hatchery production of oyster spats.  
Pollution monitoring programme.  
Disease study.  
Sanitation measures and depuration of cultured oysters.  
Development of suitable and inexpensive cultch using locally available materials.

#### **CONCLUSION**

Mangrove oysters are found naturally in abundance in the brackish water creeks of Bayelsa, Delta and Rivers States, attached to the aerial roots of red mangrove vegetation, *Rhizophora racemosa*. Aquacultural production of mangrove oyster is one way of producing protein rich food and providing artisanal occupation to coastal communities. Widespread oyster farming can help ease fishing pressure in over-fished waters through diversification of income sources of fishermen. This can be achieved by active dissemination of information of culture techniques and processes.

#### **REFERENCES**

- Abam, T.K.S. (2001). Regional Hydrological Research Perspective in the Niger Delta. *Hydrological Sciences Journal-des Sciences Hydrologiques* 46(1). Feb. 2001. p13.
- Afinowi, M. A. (1971). Oyster culture. Fed. Dept. Fish. An. Rep. 1971, pp. 50-53.
- Afinowi, M. A. (1975). Investigation on the Geography of settlement of the Mangrove Oyster, *Crassostrea gasar*, in the Niger Delta. NIOMR An. Rep. 1975, pp. 11.
- Ajana, A. M. (1980). Fishery of the Mangrove Oyster, *Crassostrea gasar*, Adanson, in the Lagos Area, Nigeria. *Aquaculture* 21: 129-137.
- Ansa, E. J. and Bashir, R. M. (2003). Fisheries and Culture Potentials of the Mangrove Oyster (*Crassostrea gasar*) in Nigeria. *African Journal of Interdisciplinary Studies*, Vol. 4, No. 1: pp 32-39.
- Angell, C. L. (1986). The Biology and Culture of Tropical Oysters. *ICLARM Studies and Reviews* 13, 42 pp.
- Deekar, S. N., Ayinla, O. A. and Marioghae, I. E. (1994). Possibilities of the Culture of Mangrove Molluscs with Special Reference to the Niger Delta. NIOMR Tech. Paper No. 96, 20 pp.
- Nikolic, M., Bosch, A. and Alfonso, S. (1976). A System for Farming the Mangrove Oyster (*Crassostrea rhizophorae* Guilding, 1828). *Aquaculture*, Volume 9, 1976, pages 1 – 18.
- FAO (2004). Status of Marine Fisheries. <File://A:\FAO %20document%20Repository\files\y484e0c.htm>, pp 1 - 5.
- FAO (2007). The World's Mangroves 1980-2005. *A thematic study prepared in the framework of the Global Forest Resources Assessment 2005*. FAO Forestry Paper 153. FAO, Rome 2007.
- Quayle, D. B. (1980). Tropical oysters: culture and methods. Ottawa, Ont., IDRC, 1980. 80 p.: ill.