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AQUACULTURE DEVELOPMENTS IN THE PHILIPPINES WITH EMPHASIS ON TILAPIAS AND SEAWEEDS

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ABSTRACT

Significant developments in the culture of tilapias and seaweeds in the Philippines for 1988-1991 are reviewed. The country was the top producer of the Nile tilapia *(Oreochromis niloticus)* and red seaweed, *Eucheuma* sp., in the world during the period. Intensification of cage and pond culture of tilapia in freshwater with artificial feeding was prevalent. The National Tilapia Production Program was launched in 1990 and is being implemented in 26 sites of 12 regions in the country. Culture of sex-inversed tilapias (*O. niloticus* and *O. niloticus* x *O. mossambicus* hybrids) in freshwater cages, brackishwater ponds, and sea cages was pilot-tested for the first time. For seaweeds, studies were made on the culture of other economically-important species such as *Gracilaria* sp. and *Porphyra* sp. A trial on the integrated searanching of abalones *(Haliotis* sp.) and giant clams *(Tridacna* sp.) with *Euchema* was also conducted.

INTRODUCTION

In 1990, the Philippines was the world's largest producer of Nile tilapia *(Oreochromis niloticus)* and the red seaweed, *Euchema* sp., with 78,619 tons and 291,176 tons of production. Tilapias contributed about 4% to the total fish production while dried seaweeds valued at US$49.9 million were exported for the same year. There are about 32,606 hectares of ponds, cages, and pens presently used for the culture of tilapias in addition to around 7,330 hectares of coastal waters for the farming of seaweeds in the country (BFAR 1991).

Culture of tilapia in the Philippines is mainly done in freshwater ponds and cages in lakes and reservoirs with the Nile tilapia as the major species. The Mozambique tilapia (*O. mossambicus)* is only a minor species grown in brackishwater ponds (Guerrero 1990). Two species of *Eucheuma* (*E. denticulatum* and *E. alvarezii)* are farmed in the open sea using monolines (Liana 1991).

This paper is a review of the significant developments on the culture of tilapias and seaweeds in the Philippines for the period 1988-1991.

DEVELOPMENTS IN TILAPIA CULTURE

Farming of the Nile tilapia further expanded with the intensification of pond, cage, and pen culture in freshwater. The use of artificial feeds for grow-out became prevalent. Yields of 13-20 tons per hectare in 3-4 months of rearing have been reported (Guerrero 1989, Radan 1990, Matienzo 1991). Hatchery production of sex-inversed tilapia was accelerated with the launching of the National Tilapia Production Program by the Philippine Council for Aquatic and Marine Research and Development of the Department of Science and Technology (PCAMRD-DOST).

The culture of tilapia hybrids in sea cages as an alternative livelihood for subsistence fishermen in overfished coastal waters and in "red tide"-affected areas is also being considered. In a cage culture trial conducted in northern Samar, central Philippines, the results show the feasibility of growing sex-inversed hybrids in the marine environment (Salvador, personal communication).

To produce better breeds of tilapia by selection for high growth rate, a project on the Genetic Improvement of Tilapia Species in Asia was initiated by the International Center for Living Aquatic Resources Management in 1988. A facility for the maintenance and evaluation of new African germplasm and available cultured stocks in the Philippines has been established at the National Freshwater Fisheries Training and Research Center of the Bureau of Fisheries and Aquatic Resources (BFAR) in Muñoz, Nueva Ecija Province in Luzon. Founder stocks of *O. niloticus* have been collected from Egypt, Ghana, Senegal, and Kenya (Maclean and Dizon 1989). Preliminary results show the superior growth of the Egyptian and Kenyan stocks over the Philippine stocks from Israel, Taiwan, Singapore, and Taiwan in field tests (Pullin et al. 1991). Selective breeding studies on the Nile and red tilapias are also ongoing at the Central Luzon State University's Freshwater Aquaculture Center and Aquaculture Department, Southeast Asian Fisheries Development Center (SEAFDEC/AQD) Binangonan Freshwater Substation with support from the International Development Research Centre of Canada (SEAFDEC/AQD 1991).

DEVELOPMENTS IN SEAWEED CULTURE

Studies on the culture of other economically-important species of seaweeds (other than *Euchema* sp.) such as *Gracilaria* sp. and *Porphyra* sp. were conducted by researchers of the BFAR, University of San Carlos, and SEAFDEC/AQD during the review period.

Field trials on *G. verrucosa* using natural spores and artificial substrates (adobe and hollow cement blocks) showed that production was more than double compared with that of the natural substrate (sandy-muddy bottom). Experiments on the culture of *Pophyra* sp. spores with bamboo branches as substrates were also done by the BFAR (Liana 1991).

Culture of *G. verrucosa* and *G. salicornia* in an intertidal area was tested by researchers of the University of San Carlos in 1989 (unpublished data). Their findings indicated that vegetative thalli of the two species incubated in the open area had higher growth than those of the ones incubated in the pond. Plants in the suspended or floating condition had better growth than those that were bottom-fixed.

A study on the growth of *Gracilaria* sp. sporelings and thalli in the field conducted by the SEAFDEC/ AQD show that the yield was highest in April with spacing intervals of 10 and 15 centimeters, and in February at 20 centimeters, but lowest in December at 20 centimeters. An experiment on the polyculture of *Gracilaria* sp. with sea bass *(Lates calcarifer)* in floating net cages indicates that growth rate of the seaweed decreases with increasing depth in October and November (SEAFDEC/AQD 1990). A study on the characterization of agar extracted from different species of *Gracilaria* shows that the highest agar yield and highest gel strength are obtained from *G. verrucosa* and *G. blodgettii,* respectively (SEAFDEC/AQD 1991).

An integrated searanching-seafarming trial to demonstrate the feasibility of growing *Eucheuma* sp., abalones *(Haliotis* sp.), and giant clams *(Tridacna* sp.) was conducted in a 60-square meter area in the Danajon Bank of Bohol by a private company with support from the PCAMRD-DOST in 1989. Rock mounds, each measuring one meter in diameter and spaced two meters apart, were constructed to serve as abalone shelters. Five juvenile abalones were stocked per mound. *Eucheuma* seedlings in monolines were grown in-between the rows of the abalone shelters with the giant clams. After six months, the initial results showed that the abalones doubled in size and that the seaweeds was not affected by their presence. Low survival of the giant clams in the sandy-bottom area was obtained after a strong typhoon (Ricohermoso, personal communication).

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