

STATUS OF BIVALVE EXPLOITATION AND FARMING IN THE COASTAL WATERS OF SOUTH VIETNAM

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ABSTRACT

Edible bivalves play an important role in Vietnamese fishery, especially in recent years with increasing export demand. The most commercial resources are *Anadara antiquata*, *Anadara granosa*, *Meretrix lyrata*, and *Chlamys nobilis*. The annual harvest is about 90-120 thousand tonnes. There are two main catching grounds: South Central Vietnam for sublittoral species, and the Mekong delta for littoral species. It has been difficult to manage sustainable utilisation of fisheries for molluscs, but bivalve culture has developed since 1987 and contributes now to improved living standard of coastal communities in southern Vietnam. Plans for management and farming of *M. lyrata* and *A. granosa* are presented.

INTRODUCTION

In recent years, the bivalve resources have played an important role in the fisheries of Vietnam. They are locally exploited for food and ornamental use, but also exported to China, Taiwan, and Japan. (Nguyen 1980; Vo 1995; Nguyen & Vo 1996). Species belonging to the pearl oyster group are exploited for ornamental use, especially in the lacquerware handicraft business.

This paper reviews some general information on bivalve resources in South Vietnam since almost no results of research in Vietnam have been printed in foreign journals, not even in FAO statistics on fishery.

RESULTS

Fishery activity

Tab. 1 shows the species of commercially exploited bivalves in Vietnam. The list is based on literature studies and surveys of the Institute of Oceanography, Nha Trang carried out since 1989.

Three of these species occur in the littoral zone: *Anadara granosa*, *Meretrix lyrata*, and *Cyrenobatiassa subsulcata*. The blood cockle *A. granosa* is widely distributed in the estuary of the Mekong river to some lagoons and estuaries in central regions (Fig. 1). *M. lyrata* is mainly distributed in the south-east regions, and *C. subsulcata* has a narrow dis-

tribution in Tamgiang lagoon (Thua Thien, Hue province). The fishing gear used to catch these resources is steel rakes and hand catching at low tide. The annual harvest of *A. granosa* and *M. lyrata* is very high.

The remaining species are mainly caught in coastal waters of central regions, especially in the southern central provinces (Fig. 1). Landings of the species *Anadara antiquata*, *Chlamys nobilis*, and *Modiolus philippinarum* are high (Tab. 1). They are mainly exploited by diving. *Amusium pleuronectes* is caught by trawling.

Farming operation

Cockle farming of *A. granosa* started in Minh Hai, Kiengiang provinces, in 1989 and achieved a production of 16,000-17,000 tonnes yr⁻¹ in 1991-1992. Seed beds are locally available on tidal flats. The spat (700-1000 spat · kg⁻¹) are transported to the farms and cultured at a density of 200-300 ind. m⁻². Farmers start to harvest after 8-9 months when blood cockle cultures have reached a size of 70 ind. kg⁻¹. The production is 10-40 tonnes ha⁻¹. In comparison with cockle farming in Thailand (Tookwinas 1985), it takes shorter time to achieve market size in southern Vietnam.

Farming of the clam *M. lyrata* started in

1987 in Tiengiang province and then expanded to Travinh and Bentre. Seed beds are found on sandy tidal flats, but location of the beds varies considerably among years. Natural spat is collected and cultivated at different sizes (10,000, 5,000, or 1,000 ind. kg^{-1}). The size depends on farming conditions: Stocking density, price, and quality. Starting with a size of 1000 ind. kg^{-1} the clams grow to a size of 40 ind. kg^{-1} after 18 months of culture. The farms are surrounded by 1-3 nets with small mesh size. Usually, nursery culture is carried out on higher tidal flats near the shore and cultivation on banks in shallow water.

In recent years, pearl oyster culture has increased, mainly in the form of joint-venture companies involving Vietnamese and foreigners, usually Australian and Japanese companies. Adequate amounts of spat are produced in hatcheries for grow-out cultivation. Pearl oyster farming is mainly located in the coastal waters of Khanhhoa province (South Central Vietnam). Results of pearl oyster culture have not been published earlier. A survey aiming at stock enhancement of *Pinctada maxima* in the Cu Lao Cau Marine Protected Area (Binhthuan province) has been carried out by the Institute of Oceanography, Nhatrang, since October 1996. After 8 months, the pearl oysters reached a size of 5-7 cm.

However, it should be noted that farming operations often suffer from inadequate supply of spat. The sources of natural seed are not stable among years, causing too high a price for spat. Of course, this decreases farming profits. Recently, the price of *M. lyrata* spat (700 ind. kg^{-1}) reached 0.8-0.9 US\$ kg^{-1} in the Tiengiang province. Farming is also fraught with many problems. In the grow-out period, cultivation of *M. lyrata* and *A. granosa* may suffer from the impact of siltation in the rainy season, inflicting heavy losses on farms. Meanwhile, the main problem for production of pearl oyster *P. maxima* is predation by gastropods and platyhelminths.



Figure 1. Map showing the coastal provinces of Vietnam (Vietnamese spelling of provincial names).

Management

Management plans for sustainable exploitation are mainly issued by the Department for Protection of Marine Resources in each province, based on the regulations published by the Ministry of Fishery in 1991.

Surveys of scientific institutions have provided the needed information for policy makers. The regulations put a ban on fishing for scallop and clam in the spawning seasons, and the minimum marketable size is fixed for each species: *C. nobilis* (>65 mm), *A. antiquata* (>35 mm), *M. philippinarum* (>90 mm), *M. lyrata* (35-40 mm), and *A. granosa* (>25 mm).

However, the effectiveness of legislations is very limited. Exploitation size and sea-

Table 1. Main bivalve resources in southern Vietnam.

Species	Main catching grounds	Productions (tonnes/year)
<i>Anadara granosa</i>	Kiengiang, Minhhai	17,000 - 18,000
<i>Meretrix lyrata</i>	Tiengiang, Travinh, Bentre	55,000 - 61,000
<i>Cyrenobatissa subsulcata</i>	Thuathien - Hue	1,000 - 1,500
<i>Anadara antiquata</i>	Binhthuan, Baria - Vungtau	10,000 - 25,000
<i>Chlamys nobilis</i>	Binhthuan	100 - 15,000
<i>Modiolus philippinarum</i>	Binhthuan	3,500 - 4,000
<i>Amusium pleuronectes</i>	Central provinces	400 - 500
<i>Arca navicularis</i>	Binhthuan	1,000 - 2,000
<i>Perna viridis</i>	Central provinces	500 - 600

son depend thoroughly on market demands. For example, the blood cockle *A. antiquata* is only caught in big size when foreign markets need the frozen meat. China imports quantities of dried clam from Vietnam, stimulating the fishermen to catch clam of all sizes and at all times.

A survey on scallop exploitation in Binhthuan province (Vo 1995) showed that landings before spawning season encompassed 30-35 % of the total catch. Most of the year scallops were smaller than the permitted size. Obviously, the catch of scallop decreased as a consequence of over-exploitation, but also on account of environmental conditions. Rainfall, temperature and wind regime are considered being the main reasons for scallop fluctuations ranging from 100-15,000 tonnes yr⁻¹ (Vo 1997). Such large-scale variations invariably cause difficulties for the planning of policy makers, deciding on how to exploit, process and export the scallop resource.

In addition, effective management is hampered by lack of baseline data, and some regulations are not in accordance with reality. Biological characteristics of Vietnamese resources should be known, but several important species have not been studied. It is not satisfactory just to copy regulations published in foreign literature.

REFERENCES

- Nguyen, C. 1980. Some molluscs with high economical significance in marine waters of Vietnam. - Collection of Marine Research Works **II**(1): 153-173 (in Vietnamese).
- Nguyen, H.P. & S.T. Vo 1996. Main marine bivalve resources in Vietnam. - Collection of Marine Research Works **III**: 9-16 (in Vietnamese).
- Tookwinas, S. 1985. Commercial cockle farming in Southern Thailand. ICLARM, Translation 7.
- Vo, S.T., 1995. Exploitation status of noble scallop *Chlamys nobilis* (Reeve) in Binhthuan province. - Journal of Fishery **4**: 11-14 (in Vietnamese).
- Vo, S.T. 1997. A contribution to study resource fluctuation of the scallop *Chlamys nobilis* (Reeve) in Binhthuan province. - Journal of Biology **19**(1): 56-64 (in Vietnamese).

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