EXPERIENCES FROM OYSTER TRANSPLANTATION IN THAILAND

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ABSTRACT

To remedy shortage of spat, oysters have been transplanted from the east to the west coast (and vice versa) of Thailand. But transplantation of oysters may have undesirable effects. *Crassostrea lugubris* were transplanted together with *C. belcheri* to an area where previously only the latter occurred. *C. lugubris* became abundant although this was not intended. Other transplantations have shown that the quality of oyster flesh can be improved by transplantation. Three months after transfer from the west to the east coast of Thailand, the transplanted oyster changed colour of the flesh which increased the market value. Lack of spat in some culture areas was solved by transplantation of spat collected in nature or raised in culture. A study after the transplantation did not show any differences in growth rates of spat from the two sources.

INTRODUCTION

Oyster culture is popular in many coastal areas of Thailand (Brohmanonda *et al.* 1988). The main genera for culture are *Crassostrea* spp. called big oyster (hoy takroome in Thai language), and *Saccostrea* spp., referred to as oyster (hoy pak jeab, hoy jor, & hoy tib in Thai language).

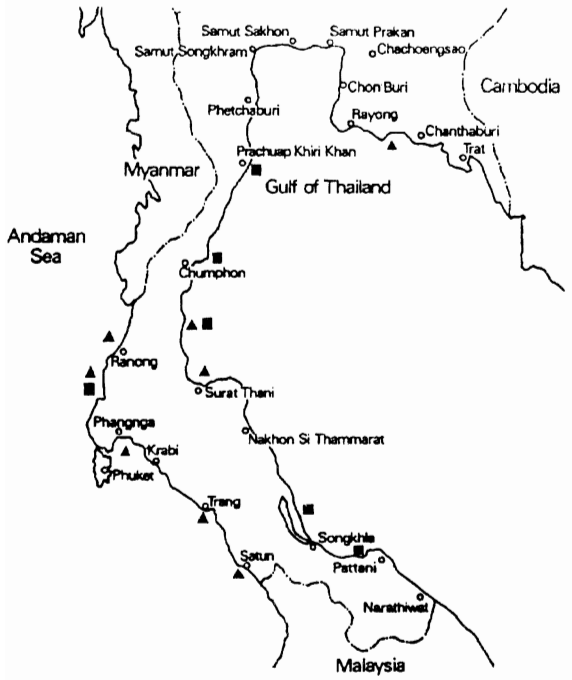

Figure 1. Distribution map of oysters in Thailand. Triangle: *Crassostrea lugubris*; Square: *Crassostrea belcheri*

Two species of oysters dominate the market in Thailand: *Crassostrea belcheri* Sowerby, 1871 (white muscle scar) and *Crassostrea lugubris* Sowerby, 1871 (black muscle scar). The local consumption and demand for oyster to support the tourist business are higher than production rates at present. *Crassostrea belcheri* grow larger than *Crassostrea lugubris*. The largest *C. belcheri* observed during the present study was about 28 cm in length. The adductor muscle scar measured 5 cm in diameter.

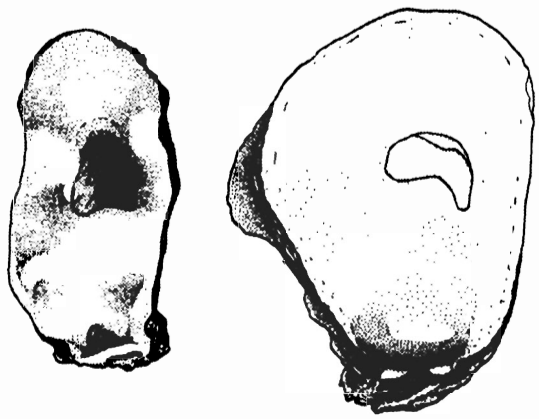

Figure 2. Left: black muscle scar oyster (*Crassostrea lugubris*), and right: white muscle scar oyster (*Crassostrea belcheri*)

Since 1960, Surat Thani has been the largest culture area in the Gulf of Thailand, and has supplied oysters to all the main markets. In concert with an increasing market demand and increasing prices per oyster, the

supply of oyster from other areas has become increasingly important. This fact created a need for transplantation from areas rich in oysters to poor areas with a view to boost oyster production. Transplantation experiments have been carried out during the last 15 years, but the outcome of transplantations have varied considerably. The purpose of this paper is to show some of the findings, which occasionally have given unwanted results.

RESULTS

Mixing of species

Most of the broodstocks for spat production are white muscle scar oysters collected from nature in Surat Thani Bay, the east coast of southern Thailand. White muscle scar oysters are also found in Phang-nga Bay on the west coast of southern Thailand. In some areas white and black muscle scar oysters co-occur, *e.g.*, in Kuraburi District in the north of Phang-nga Province, and in Chumporn and Prachuab Khiri Khan Provinces. The production of big oyster from Surat Thani, the largest culture area of the country, was not enough for the market, and the oyster traders were looking for another source. Some traders transplanted big oyster from Chumporn and Prachuab Khiri Khan Provinces. After a few years of operation, the spat collected from Ban Don Bay and Pum Riang Bay, Chaiya District in Surat Thani proved to be the black muscle scar oyster introduced by mistake. This happened because individual oysters may be very difficult to separate into species just by looking at the shells.

The colour of oyster flesh

Promotion of oyster culture in some areas was quite successful such as in Phang-nga bay, Kuraburi and Ranong. But they all got a problem with marketing. The reason for this is the colour of the flesh. White muscle scar oysters from Surat Thani have a nice milky-white flesh, while the same species from the other areas have a brownish or dark brown colour. Even though taste of the meat is not very different, the market prefers the milky-white flesh that looks nicer and more appetizing, especially when served raw in half shells decorated with vegetables.

The effect of environment on flesh colour of oysters was studied by transplantation of oysters from Surat Thani to Phang-nga and vice versa. For comparison, transplants from both places were cultured at Phuket in front of Phuket Coastal Aquaculture Development Center. The experiments used the string-hanging-method from rafts. After 2-3 months the colour of the oyster flesh had changed according to the available food and other conditions of the environment. Milky-white flesh from Surat Thani became brownish in Phang-nga, and vice versa. Oysters from both areas had changed to the same colour when cultured in Phuket.

Growth of oysters from nature and hatchery

Table 1. **A**) Size, half-monthly measured, and accumulated mortality of cultured oyster spat (N = 2400) from the hatchery August-October 1987. **B**) oyster spat from the nature (N = 280) during the same period. Data from Tandavanitj and Kurdmeesuk (1987).

Time after start (days)	A. Average shell size l x w (cm)	B. Average shell size l x w (cm)	A. Mortality % of N at start	B. Mortality % of N at start
30	1.1 x 1.5	2.5 x 2.9	42	37
45	1.8 x 1.8	3.5 x 3.6	48	48
62	1.9 x 1.9	3.4 x 3.9	67	66
78	2.1 x 2.2	3.5 x 3.8	74	no data
96	2.2 x 2.3	3.6 x 3.8	77	70
104	2.2 x 2.3	3.7 x 3.9	80	no data

Table 2. **A**) Size, monthly measured, and accumulated mortality of cultured oyster spat from the hatchery (N = 2000), August 1987 - March 1988. **B**) oyster spat from the nature (N = 2321) outplanted in October 1987. Data from Tandavanitj & Promma (1988).

Time after start (months)	A. Average shell size l x w (cm)	B. Average shell size l x w (cm)	A. Mortality % of N at start	B. Mortality % of N at start
1	4.3 x 4.9		24	
2	4.8 x 5.4		30	
3	4.9 x 5.7	4.3 x 4.5	35	5
4	5.3 x 6.3	4.4 x 5.0	36	8
5	6.0 x 7.0	5.2 x 6.1	41	17
6	6.4 x 7.3	6.2 x 7.1	47	20
7	6.7 x 7.7	6.8 x 7.3	48	28
8	6.9 x 7.9	7.2 x 7.5	48	44

Oyster culture in Ranong was promoted from the beginning in 1987-88 but was short of spat. To solve this problem, spat collection was initiated in Phang-nga, and spat was transplanted to be cultured in Ranong (Fig.1) (Promma & Tandavanitj 1988). Shortage

was also remedied by taking spat to Ranong from the east coast hatchery Prachuab Khiri Khan Coastal Aquaculture Development Center. A comparative growth rate study was made on spat from nature and the hatchery. The experiment used two methods. Culture on trays by the hanging method for small oysters, 1.5-2.5 cm, and concrete pole culture for larger ones, 4.5 cm. Results from the study are shown in Tables 1 and 2. Increase of shell length as a function of time resulted in nearly parallel regression lines, indicating no difference of growth rates of *C. belcheri* used for transplantation.

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