

SHRIMP HATCHERY AND GROW-OUT OPERATIONS IN THAILAND

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Shrimp farming in Thailand has been practiced since more than 50 years ago. This began with the extensive system (traditional method) where shrimp fry are allowed to enter ponds during the high tide, and then harvested after some time. Production then was low and widely fluctuated. After the Department of Fisheries (DOF) successfully spawned and nursed the shrimp (*Penaeus*), new techniques were developed and this led to more intensive culture systems. Production of shrimp from aquaculture continuously increased - from 991 t in 1972 to 130,000 t in 1991. The estimated production for 1992 is 150,000 t.

The tiger shrimp (*Penaeus monodon*) is the most desired species due to its rapid growth (commonly grows to 30 g in 4 months in ponds) and its high export value. It is also the major species cultured especially in the intensive system. The other species are banana shrimp (*P. merguensis*), white shrimp (*P. indicus*), and *Metapenaeus ensis*. These are normally grown in extensive and semi-intensive culture systems.

THE HATCHERY INDUSTRY

Status

Seed production techniques of *Penaeus* spp. in hatcheries were developed 15 years ago. Basically, there are two types of hatchery techniques: the big tank system which was originally developed in Japan and the small-tank system which originated from Texas, U.S.A. Both systems have their advantages and disadvantages depending on the environmental condition in each area.

Hatchery techniques normally used in Thailand are the same as the techniques used in other countries. Broodstock are collected from the wild or from ponds and ablated to induce them to spawn in captivity. Seawater used in hatcheries is clear and clean, though some chemicals such as chlorine or formalin are used. Some hatcheries mix the highly saline water from salt or *Artemia* ponds and freshwater to the desired salinity. Feeding techniques are also the same as in other countries. Phytoplankters such as *Chaetoceros* and *Skeletonema* are fed to the nauplius and zoea stages after which *Artemia* and artificial feeds are used. Chemicals and antibiotics are only applied when necessary.

Table 1. Number of private hatcheries and nurseries, by province

	1986	1987	1988
<u>Central region</u>			
1. Bangkok	-	1	1
2. Samut Prakan	6	-	-
3. Samut Sakhon	5	14	18
4. Samut Songkran	6	9	9
5. Phetchaburi	2	5	11
	19	29	39
<u>Eastern region</u>			
1. Chachoengsao	4	415	1,200
2. Chonburi	11	171	200
3. Rayong	4	10	19
4. Chanthaburi	6	3	14
	25	599	1,433
<u>Southern region</u>			
1. Prachuab Khirikhan	1	-	6
2. Surat Thani	1	-	15
3. Nakhon Si Thammarat	3	15	27
4. Songkhla	4	8	11
5. Krabi	-	1	1
6. Phangnga	-	3	6
7. Satun	-	2	2
8. Phuket	8	29	102
	17	58	170
Total	61	686	1,642

The hatcheries in Thailand can be divided into three main groups. The first includes hatcheries that produce only nauplii, located in two main parts of the country where natural broodstock of shrimp can be collected (Phuket in the south and Chonburi in the east). The nauplii are supplied to other hatcheries that nurse them until postlarval stage (PL5). The second group of hatcheries is the big group located throughout the country, especially in central Thailand (Chachoengsao, Chonburi, and Supanburi provinces). The third group comprises the nurseries that grow PL 5 up to PL 15-30 or to sizes that farmers order. Most of the shrimp hatcheries are developed for the giant freshwater prawn (*Macrobrachium rosenbergii*), small-scale, and operated by families.

The Department of Fisheries has surveyed the increasing number of shrimp hatcheries: 61 in 1986; 686 in 1987; 1,642 in 1988; and 2,000 in 1992 (Table 1). Seed production is estimated at 8-20 billion postlarvae per year, enough to meet the demand of shrimp farms in the country.

Problems

The most important problems are as follows:

Lack of broodstock. Most of the hatcheries that produce the nauplii of the tiger shrimp, *Penaeus monodon*, use broodstock caught from the wild. The supply can not sometimes meet the demand. In addition, some of the broodstock are exported to other countries, forcing the government to ban export of both broodstock and seed.

Manpower. Since most hatcheries are of the backyard type, they lack technicians knowledgeable in many areas such as eyestalk ablation, hatching of *Artemia* and its application, and chemical and antibiotic application. In response to this problem, the Department of Fisheries is intensively and continuously training and extending technology to farmers. The government has also legislated the registration of all the hatcheries and grow-out ponds in operation.

THE GROW-OUT INDUSTRY

Status

Shrimp production of Thailand comes from two main sources: capture and culture.

	Production (t)		
	Capture	Culture	Total
1978	121,009	6,395	127,404
1980	110,278	8,063	118,341
1985	91,631	15,841	107,472
1990	82,494	118,227	200,721
1991	80,000	130,000	210,000

The production from capture fisheries decreases every year because of the new 200-mile economic zone and overfishing. Production from aquaculture comes mainly from tiger shrimp and banana shrimp (Table 2). In 1990, culture area was about 500,000 rai (80,000 ha) in 22 provinces along the coastline. Culture system can be divided into three:

Extensive system. Culture area is 40% of the total area. Production is low (30-60 kg/yr), and widely fluctuates because it depends on natural conditions.

Semi-intensive. Culture area is 30% of total area. This system is partly controlled like for seed, feed, or water exchange. Production is 80-200 kg/yr.

Intensive system. Culture area is 30% of total area. Most conditions during culture are controlled, and production is high - 1,000-2,000 kg/yr.

The super-intensive system is also practiced in eastern Thailand. In this system, stocking rate is more than 100 postlarvae/m², culture period is 4 months, and production is 2,000 t/crop.

Table 2. Shrimp and prawn production

	No. of farms	Culture area (rai)	Production (t)				Total
			Banana shrimp	School prawn	Tiger shrimp	Other shrimps	
1980	3,572	162,727	5,859	1,502	88	614	8,063
1981	3,657	171,619	7,127	2,152	25	1,424	10,728
1982	3,943	192,453	6,346	2,454	96	1,195	10,091
1983	4,327	222,107	7,835	2,417	147	1,527	11,926
1984	4,519	229,949	8,657	2,653	170	1,527	13,007
1985	4,939	254,805	10,397	3,635	106	1,703	15,841
1986	5,534	283,548	11,031	3,672	897	2,286	17,886
1987	7,221	325,929	8,843	2,703	10,544	1,476	23,566
1988	11,838	342,364	9,226	3,557	40,775	2,561	56,119
1989		486,269					90,000
1990		500,000					

Sources : Monthly review - Bangkok Bank, Vol. 30, No.11, November 1989; Thailand in figures 1990, Tera International Co.; Monthly review - Bangkok Bank, Vol. 30, No. 9, September 1989.

Marketing

The main market is Japan, USA, the EEC countries, and Singapore. The volume exported is as follows:

	Quantity (t)	Value (million Baht)
1987	28,729	21,391
1989	74,293	16,056
1990	84,691	20,444
1991	121,203	26,675
1992	110,000	28,000