

MARINE PEARL FARMS AT PHUKET ISLAND

By Somchai Bussarawit

Phuket Marine Biological Center, Phuket P. O. Box 60, Phuket 83000, Thailand.

ABSTRACT

There are two major pearl farms producing spherical and half pearls by use of *Pinctada maxima* Jameson, 1901 and *Pteria penguin* Röding, 1798. Spat of *Pinctada maxima* is provided by Prachuab Khirikhan Aquaculture Center.

Pearl oyster species and distribution

Pearl oysters occur around islands in the Andaman Sea and the Gulf of Thailand. Five species of pearl oysters have been recorded: *Pinctada fucata* (Gould, 1850), *P. radiata* (Leech, 1841), *P. margaritifera* (Linnaeus, 1758), *P. maxima* (Jameson, 1901), *Pteria penguin* (Röding, 1798). Among these, *Pteria penguin* is the most common species.

In the Andaman Sea, the oyster beds are located at Ko Payam in Ranong; Ko Pratong in Phang Nga; Ko Naga, Ko Bon, Laem Pan Wa in Phuket; Ko Phi Phi, Ko Pai, Ko Hong, Ko Lanta, Ko Muk in Krabi; Kao Yai, Ko Lepae in Satun and in the Gulf of Thailand are located at: Samaesam in Chon Buri; Ko Chan in Prachuab Khirikhan; Ko Samui in Suratthani. At Phuket island, pearl oyster beds are located in the areas near the pearl farms, east Ko Naga and southeast Laem Pan Wa of Phuket island. The oysters are collected, mainly by sea Gypsies, and sold to the pearl farms.

Observations at the two major pearl farms at Phuket island were conducted in April 1994. Additional information was obtained from Amatayakul 1961; Lohakarn 1970; Alagaswani 1987; Hemsiri & Chotiyaputta 1976; Nagchinda 1989; Hylleberg, 1992; and James *et al.* 1992.

Pearl farms at Phuket

The oldest farm is located at Naga Island. It has 5,000 *Pinctada maxima* producing large spherical pearls every 18 months. The farm established co-operation with the Japanese 30 years ago. All the pearls are exported to Japan. A Japanese pearl technician has supervised Naga for 10 years. After implantation of nuclei, the oyster shells are rotated and cleaned every three months by the island's 25 trained workers. The oysters are suspended from wooden rafts. Naga Island produces the highest amount of fully-rounded pearls.

The farm also maintains 10,000 winged oysters *Pteria penguin* for half pearl (mabe) production.

The Kriangsak Pearl Farm is located south of Naga Island. Kriangsak grows both spherical and half pearls of good quality. The farm has 20,000 *Pteria penguin* and 10,000 *Pinctada maxima* pearl oysters. The farm is operated without Japanese investment.

Around Phuket Island, especially on the east coast at Ko Maphrao, there are a number of small family business which have specialized in half pearls. It takes about 14 months before such pearls can be harvested.

Pearl Oyster Hatchery

Prachuab Khirikhan Coastal Aquaculture Center has produced spat of *Pinctada maxima* since 1991. Exposure to air temperature, ammonium hydroxide, and serotonin injection, can induce spawning of the pearl oysters, although alternating exposure to air and seawater gives the best result (Nugranad *et al.* 1991). Fertilized eggs develop to straight-hinge larvae within 18 hrs. Mean hatching rate is 51.33%. Metamorphosis takes place within 3 weeks. The spat grow to 0.5-0.8 mm shell length within one month and reach 0.8-1.0 and 2.0-2.6 cm as they are 2 and 3 months old respectively. The survival rate from D-shaped larval stage to settlement is around 3-5%. The survival from metamorphosis until 3 months old is approximately 10%.

Marketing and trade

Most spherical pearls are shipped off to Japan for processing and export to the world. The value of spherical pearls ranges from a hundred to several thousand US dollars while half pearls cost between 5 and 20 dollars. The quality of cultured pearls is decided by the thickness of nacre, iridescence, lustre, colour, size, shape and flaws. A good quality pearl must be

homogeneous and smooth. Stress on the pearl sac leads to the deformation of pearls. If the nucleus is located near the adductor muscle, the contractions may result in baroque pearls. Infection by micro-organisms may cause pear-shaped or elongated pearls. Bacteria can lead to small gas bubbles enclosed in the nacre. The iridescence of the pearl is due to refraction of light from aragonite crystals. When the individual layer of organic matrix is thin, the light penetrates into the translucent crystals. Good lustre and refraction indicate that the nacre is composed of pure aragonite crystals. The colour of the nacre is mainly due to environmental factors, minerals, and trace elements. *Pinctada maxima*

generally produce pearls with a diameter of 10-12 mm, but Naga pearl farm produced one 40 mm pearl valued at US\$ 20,000.

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