

Oyster-mussel farming in SEA, Japan, Cuba, and Scotland

By E Aldon and R Buendia

Tropical countries like the Philippines are suitable for oyster and mussel culture because seed supply is available year-round and the temperature is ideal for mollusc farming. For oysters, two crops per year is possible.

The Philippines is still generally using traditional methods for both oyster and mussel culture, using bamboo stake, bamboo lattice, and hanging methods. Farmers can grow oysters to about 6-9 cm in 4-8 months.

Four of the 11 local species of oyster of commercial value are: the slipper-shaped oyster *Crassostrea iredalei* (talabang tsinelas); the sub-trigonal oblong oyster *Saccostrea malabonensis* (kukong kabayo); the palm-rooted oyster *S. palmipes* (pulid-pulid) and curly or wild oyster *S. cucullata* (kulot). The slipper-shaped and sub-trigonal oblong oyster are cultured because of their excellent flavor and appearance which are ideal for processing and export.

Mussel farming is more recent than oyster farming with *Perna viridis* or the green mussel as the common culture species in the country.

The profile of production in the country by region is shown in the table.

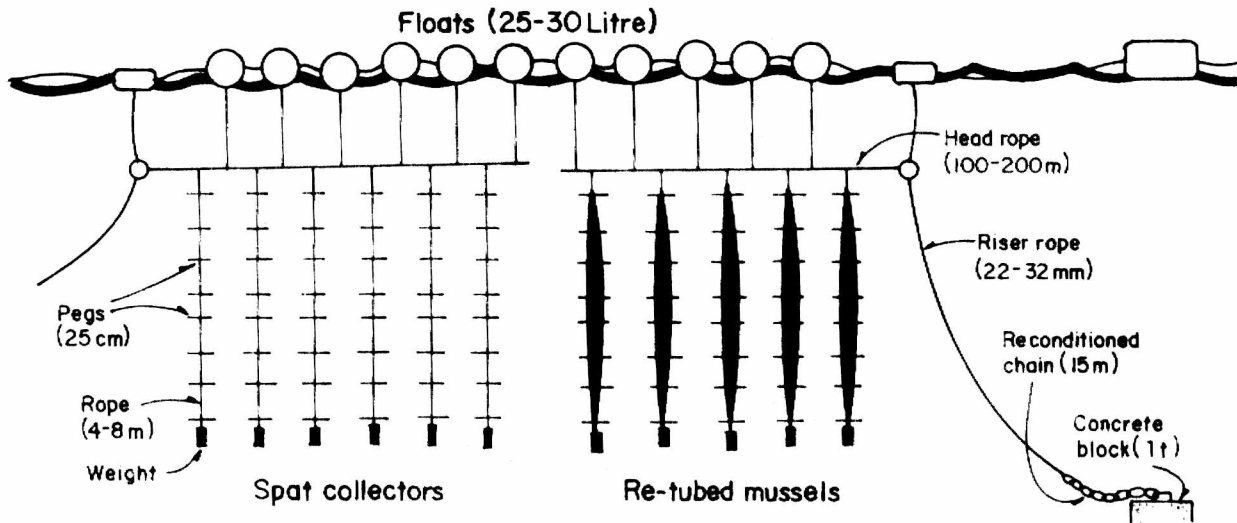
Malaysia

Oyster farming has just started in Malaysia and generally employs the traditional broadcast method. In some areas like Pulau Langkawi and Kedah, Johor, Sabah, Melaka, Terengganu and Perah, raft culture method is being done. With the progress in the culture of *Crassostrea belcheri* and *Saccostrea cucullata* according to Delmendo (1989), Malaysia is starting to go into commercial production of oysters using the more modern rack and raft methods. Spats are obtained from natural sources and from a hatchery. According to Nawawi

PHILIPPINES <i>Production by region/province 1997</i>	Oyster			Mussel		
	Production (metric tons)	Value (thousand ₱)	Price (/kg)	Production (metric tons)	Value (thousand ₱)	Price (/kg)
Philippines	13,853	72,000	5.20	11,856	44,113	3.76
REGION I	3,738	22,805	0.10	-	-	-
Ilocos Norte	5	50	10.00	-	-	-
Ilocos Sur	20	240	12.00	-	-	-
La Union	232	2,109	9.09	-	-	-
Pangasinan	3,481	20,408	5.86	-	-	-
REGION II	5	57	11.40	-	-	-
Cagayan	5	57	11.40	-	-	-
REGION III	2,491	12,174	4.89	-	-	-
Bulacan	2,491	12,174	4.89	-	-	-
Zambales	b/	c/	-	-	-	-
REGION IV	4,098	21,000	5.13	2,021	17,751	8.78
Cavite	4,098	21,000	5.13	2,021	17,751	8.78
REGION V	57	301	5.28	1,072	7,002	8.53
Sorsogon	57	301	5.28	1,072	7,002	8.53
REGION VI	3,147	13,439	4.27	8,137	12,870	2.10
Aklan	98	374	3.92	787	1,573	2.00
Capiz	1,322	8,455	4.89	4,260	8,045	2.12
Iloilo	415	2,336	8.19	1	3	3.00
Negros Occ.	1,269	3,965	3.09	1,089	2,249	2.07
Guimaras	23	89	3.00	-	-	-
REGION VII	83	485	7.39	-	-	-
Bohol	83	465	7.39	-	-	-
Cebu	-	-	-	-	-	-
Negros Or.	-	-	-	-	-	-
REGION VIII	-	-	-	2,423	6,423	2.65
Western Samar	-	-	-	2,423	6,423	2.65
REGION IX	142	1,079	7.80	4	50	15.00
Zamboanga Norte	142	1,079	7.80	4	50	15.00
REGION X	12	90	7.50	-	-	-
Surigao del Norte	12	90	7.50	-	-	-
REGION XI	102	390	5.78	-	-	-
Davao del Sur	102	390	5.78	-	-	-
National Capital Region	-	-	-	1	7	7.00
Metro Manila	-	-	-	1	7	7.00

Source: Bureau of Agricultural Statistics. *Oyster / mussel 1997 production and value.*

Long-line mussel culture in Scotland



(1993), there are presently two hatcheries in Malaysia (Fisheries Research Institute in Penang and Muka Head Station of Science University of Malaysia in Penang).

Rafts, floating longlines and bottom longlines are used to suspend cultches. The choice of methods depends upon cost, durability of materials and environmental conditions. Grow-out rafts can be used for spat collection with cultches hung from the raft frame.

The rack-and-raft method produces about 18 tons per ha per yr.

Harvests are usually sold freshly shucked to restaurant and hotels. Growing of other oyster species such as *Ostrea folium* and *C. iredalei* is now being explored.

Oyster and mussel spatfalls occur all year round. For oysters, the peak seasons are in March-May and September-December. Heaviest spatfalls occur 2-3 weeks after a sudden heavy rainfall. For mussel spats, the peak seasons are in November-February and May-June.

Indonesia

Oyster is not popular in this country and mollusc production is mainly from the wild. Mussel culture is still experimental while traditional farming of oyster species like

C. iredalei and *S. cucullata* using stake method is now being used.

The government is putting high priority on seafarming development and is testing the modern culture systems such as the raft method for oyster cultivation.

Thailand

Oyster (*S. commercialis*, *C. belcherii*, and *C. lugubris*) and the green mussels (*P. viridis*) are the most important molluscs in Thailand. Spat collection peaks in February or March and September or October.

Culture method is semi-traditional. Rocks, cement poles and cement pipes are widely used as spat collectors. Spats are removed from collectors when they reach 5-8 cm in length and refixed on cement tubes, bamboo poles or net. Harvest is done when oysters reach 11-18 cm in length. Less than 11 cm oysters are refixed until they attain marketable size.

C. belecherii and *C. lugubris* are usually sold in shell while *S. commercialis* are sold shucked.

The green mussels comprise over 50% of the total mollusc production. Fishers use the stake method and "fish trap." Mussels and oysters are produced in south Thailand. Delmendo reports that there are 7,046 ha of oyster farms using various culture meth-

ods such as rock culture, culture on cement, tray culture and hanging method. Studies showed the possibility to mass produce large oyster spats from hatcheries.

Singapore and Brunei

Although mussel culture was successfully tried in Singapore, the market did not prove attractive, discouraging farmers to go into large-scale production. Among the raft, long-line, pole and bouchot culture systems, the raft culture system was found economically feasible.

Brunei on the other hand is just developing aquaculture. The oyster and mussel culture is targeted at producing high quality seafood for domestic consumption.

Japan

The oyster culture industry is well-developed in Japan (SRDC 1991). It started with the broadcast method, but has since shifted to raft and long-line methods.

Farm units have 10-100 rafts each which is operated by fisher cooperative groups. Culture period is 2 years per crop.

Japanese researchers have already developed reliable techniques to forecast spatfall. Spatfall usually occurs only once

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or twice every summer. Hatchery methods have also been standardized.

Japan's major farming grounds are located in Hiroshima and Miyagi prefectures. The major species cultured is *C. gigas*, the Japanese or Pacific oyster.

Cuba

Cuba farms the mangrove oyster (*C. rhizophorea*). To collect spat, farmers use mangrove branches or aluminum wires.

Oysters are harvested when they have reached 40 mm, the minimum legal size. Usually there are two to three harvests in 6-8 months depending on settlement distribution and tide levels.

Cuban farmers also use the raft method to grow oysters. The raft is made of steel pipes with an operational area of 18 m². For buoyancy, polystyrene blocks are attached to the raft. Spat collectors are 1 meter long monofilament nylon with 10 shells spaced 7 cm apart.

Scotland

The blue mussels (*Mytilus edulis*) in Scotland have long been used as bait for line fishing. Dense beds are found in estuaries in the west coast. These mussels, however, are small and of poor quality due to overcrowding. Mussel culture started when seeds were transplanted to better growing areas.

Mussel farmers use the bottom and suspended (raft or longline) methods. Rafts are made of tube metals converted from salmon cages, timber, or galvanized steel. Polypropylene blocks serve as buoys. Rafts carry 100-200 culture ropes called droppers.

The long-line culture system is illustrated on the previous page. A 10 ton harvest from a 200 meter long-line is feasible, with a net income of \$13,040-17,930 per crop (Karayucel 1997).

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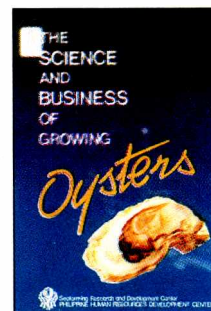
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only half of the products eaten during the year-end activities. Oysters are also exported to neighboring countries primarily in restaurants which serve French cuisine.

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FURTHER READING

EXCELLENT REFERENCE

The work of the **Seafarming Research Development Center (SRDC)** based in the Philippines on oyster culture is detailed in the book '**The science and business of growing oysters**' published in 1991.

It contains information not taken up in this issue, for example:

- oyster **purification and processing**. A recirculating depuration system designed and tested by SRDC is discussed. There is also a depuration plant layout.
- **oyster products**: how to smoke oysters; procedure for canning smoked oysters in oil and for preparing oyster sauce; preparation of oyster by-products like grits/powder. Discussion also covers finished product specifications.
- areas in the Philippines that are suitable and unsuitable for oyster culture
- recommended recipes

SEEN AND NOTED

International processing plant in Capiz

The opening of a seafood processing plant two years ago in Panit-an Capiz, west central Philippines indicates that bivalve farming is an economically important industry. Currently, the company's average production of processed mussel and oyster is 2 tons a day. Product forms include canned smoked mussel and oyster in water or brine with various kinds of oil. All the plants output are exported to Canada, South Africa, Japan or Europe.

The company is now establishing and developing its own farms because of shortage of raw materials (processing capacity is 5 tons a day) and to meet increasing demand.