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# Mussel farming

Aquaculture Department, Southeast Asian Fisheries Development Center

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# Mussel Farming

Mussel farming depends entirely on one natural phenomenon: spatfall. This is the period when mussel larvae are developed enough to cease their floating existence, settle, and attach themselves to solid surfaces. Successful collection of these spats is essential for mussel farming. While the technology to artificially produce the spats in controlled conditions is available, it is not yet economically viable and is probably not necessary considering the abundance of natural spats. The mussels need not be grown in the same area where the spats are collected, and in some cases it is actually more desirable to have a separate growing area. Here in the Philippines, however, all successful mussel farming ventures have been conducted in the spatfall areas. Thus, at the moment, the presence of natural mussel spatfall should be considered a primary criterion in determining the viability of a potential mussel farming project.

## Site selection

The following parameters must be considered in site selection:

1. Sufficient breeding stock and spatfall.
2. Protection from strong winds and waves. Area must be sufficiently enclosed to retain larvae.
3. Enough tidal range to change water completely and frequently; strong tidal current ( $>2$  cm/s); and depth of at least 2 m at low tide.
4. Sufficient food in the water. (Generally, clear waters do not contain enough food to sustain optimum growth. Greenish water is one indication of food availability.)
5. Distance from river mouth as abrupt salinity changes is possible.
6. Proximity to market.
7. Absence of sources of pollutants.

## Selection of suitable collector materials

Mussel farming depends largely on placing the right type of collector in the right place at the right time or season to collect young mussels or spats. The material which was proven most effective is coconut husk because of its hairy, fibrous nature that is very attractive for mussel larvae to settle on. Furthermore, coconut husks are readily available in the Philippines and are easy to prepare. The husk is stripped from the coconut shell and shredded. The only difficulty with coconut husk, however, is that it does not last long in the water, so that usually the mussels will have to be "re-laid" or transplanted.

Other suitable materials as collectors are cabo negro, old frayed ropes, etc.

## Farm construction and operation

### *Basic considerations*

1. Cultures should always be under water even at low tide. Mussels that attach and survive above the lowest tide level are generally stunted or deformed.
2. Cultures should always be in an off-bottom position to prevent potential predators such as starfish, crabs, snails, and other organisms from crawling up the culture ropes.
3. Materials used should be durable enough to last at least until the mussels are harvestable.
4. Clusters of mussels on a rope should be adequately spaced to avoid contact with each other through wave action.
5. Structures must always be positioned so as not to obstruct navigation.
6. Cultures should be laid perpendicular to wave action and lined up in the direction of current flow.
7. The environment of a mussel farm degrades with continued use. It is advisable to

have an area 2-3 times larger than actual culture site to allow the farm to be moved from one section to another.

**Materials and design.** Raft or suspension culture of mussels consists of growing mussels on ropes hung from rafts or other similar floating structures. A basic raft design is sketched in Figure 1 and an attached culture rope in Figure 2. The method of mooring a single raft or a series of rafts is presented in Figure 3.

Spat collectors (coconut husk) are inserted in the lay of ropes to collect mussel spats. These spats are allowed to grow for 4-5 months and are harvested when they reach 37-60 mm in length.

Spatfall period can be predicted with a fair degree of accuracy after a few years of observation. Thus in Bacoar Bay, farmers generally lay their stakes before April and in November. In Sapiar Bay, the periods of highest spatfall intensity are from February to

March and again from September to October. In Himamaylan River, the spatfall occurs in March with a lower-intensity spatting in October. Generally, for greater chances of spat settlement, the collectors or ropes should be installed not earlier than February and not later than March to catch the first spatfall which is usually the heavier one. For the secondary spatfall, ropes should be laid not earlier than September and not later than November.

### General farm management

A raft-farm is easy to maintain due to its independence from the tide. The most important thing to watch for is timely laying of collectors. Once the mussel spats have settled on the collectors, maintenance of the farm consists of the following procedures:

1. Thinning out collector ropes and transplanting the young mussels to grow-out ropes.

(page 8 please)

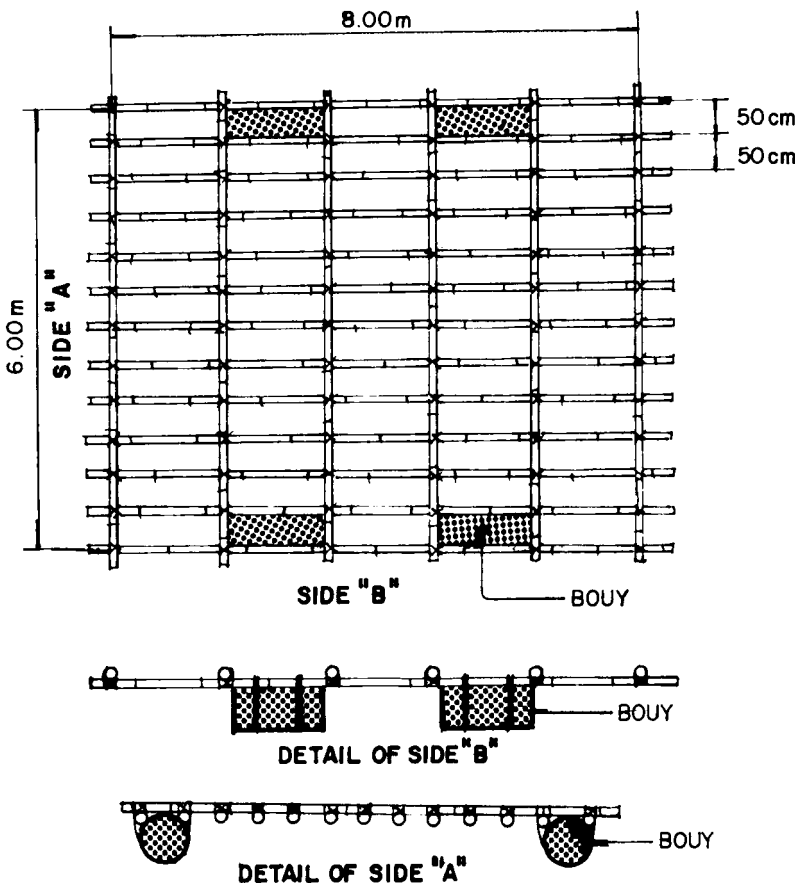
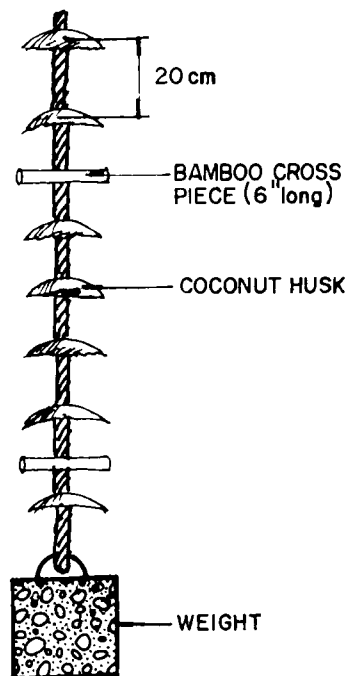
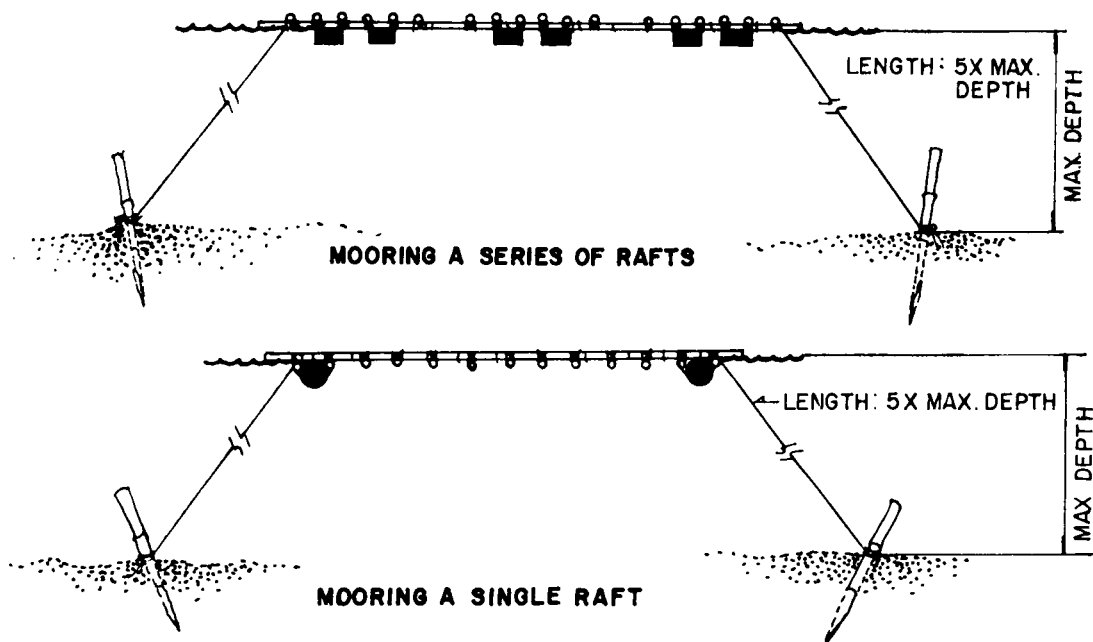


Fig. 1. Construction detail of a mussel raft using bamboo framework and floats.

Fig. 2. Detail of a 2-m culture rope.





*Fig. 3. Method of mooring a series of rafts or a single raft.*

The thinning and transplanting operations should be carried out before the coconut husks start to decay. During transplanting operations, the young mussels must be protected from the heat of the sun and from the wind, while they are out of the water. For this purpose, a small hut may be constructed on the raft.

2. Adding additional buoys whenever necessary.

As the mussels grow, the ropes get heavier and additional buoys must be provided to keep the bamboo framework above water and prevent the ropes from sinking to the bottom.

3. Protecting the mussels from predators and ridding them of parasites, pests, and silt.

Grow-out ropes should be inspected regularly for crabs, sea urchins, and other predators. These may be removed by hand. Other pests growing on the shells of the mussels or on the ropes may be removed by scraping them off with a knife or by exposing the ropes for a short period during the early morning or late afternoon when the sun is not too intense.

Pests and other foulers growing on mussels or on the ropes reduce yield through crowding or smothering newly settled spats, or

by reducing movement of water and food. Furthermore, these organisms add weight and represent extra expense in terms of additional buoys or floats. Likewise, ropes may have to be shaken periodically to dislodge silt that settled on the shells.

Perhaps the greatest harm that can be done to a mussel farm is caused by human poachers. As the raft method of culture allows for easy harvest, by the same token it is also easily poached. To discourage poaching, the farm must be guarded at all times, especially when the mussels have grown to marketable size. In this regard, the raft-hut used for transplanting operations may serve as a floating guardhouse.

4. Replacement of pegs.

The grow-out ropes should be inspected regularly to see if the pegs are still doing the job of supporting the mussel clumps. Decayed pegs should be replaced. If necessary, additional pegs may be provided to support exceptionally large mussel clusters.

## Harvesting

Transplanted mussels grow faster than mussels which settled and grew on the same surface. They may be harvested 4-6 months

after spatfall. Mussels ideally measure 40-60 mm at harvest (consumers prefer medium or bite-sized mussels). The mussel should be harvested before they grow too big to be acceptable in the market.

Also, the mussels should not be harvested when they are too thin. "Thinness" or "fatness" of mussels is indicated by the degree to which the meat shrinks after cooking. A "fat" mussel is full-bodied and attractive in appearance; males have a rich, creamy appearance while females are filled with bright-orange eggs in almost every part of its body. The flesh of fat mussels shrinks only slightly after cooking.

In contrast, the flesh of thin mussels is "watery" and transparent. There is very little distinction between males and females and the flesh shrinks to less than half its original size after cooking. Mussels cultured on ropes grow very rapidly due to the abundance of food and the absence of crawling predators. These off-bottom mussels generally taste better because they do not contain mud.

When detaching mussels from the rope, care must be taken not to injure them by pulling out their byssus threads. These threads are a very important part of their bodies and they

die within a few hours if these threads are violently pulled out to include the muscular support. For this reason, the mussels should be scraped with a sharp knife or bolo and never pulled off the ropes. Alternatively, the mussels may be taken off the ropes by grasping their byssal attachment rather than the mussels themselves when pulling them off the rope. If possible, mussels should be harvested and transported to market in clusters as clustered mussels effectively conserve moisture and thereby live longer. Removing clustered mussels from the rope is relatively easy as the cluster readily slips off. During transport to market, the mussels should be kept in moistened jute sacks protected from the sun. The mussel clusters should be broken up just before they are displayed for sale, again with a sharp knife or a pair of scissors.

At least 10-15% of the mussels should remain after harvest to serve as breeding stock to produce spat for the following season.

Source: WG Yap, AL Young, CF Orano, and MT de Castro. 1979. *Manual on mussel farming*. Aquaculture Extension Manual No. 6. SEAFDEC Aquaculture Department, Tigbauan, Iloilo. 17 pp.

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*"The poor getting poorer but with the rich getting richer, it all averages out in the long run."*



Source: *SCN News* (United Nation's Newsletter), No. 7, mid-1991.