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Nursery ponds in prawn farming

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NURSERY PONDS IN PRAWN FARMING

There are at least three important advantages in the use of nursery ponds on a prawn farm:

1) They permit the farmer to maintain intensive control over the young prawn seed during their early, and most vulnerable, weeks of life.

2) Nursery ponds make more effective use of pond area by always keeping prawns at high densities.

3) They shorten the time that prawns are in the fattening ponds which permits the ponds to be used for multiple harvests each year.

Advantages

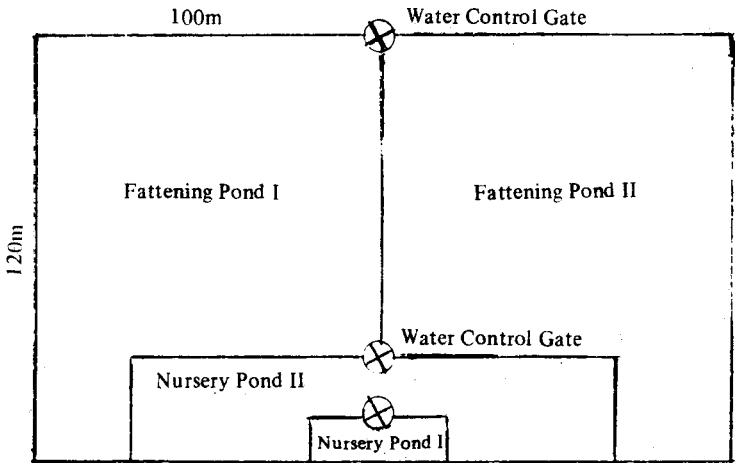
The first advantage, intensive care, can result in higher overall survival rates. Most of the non-crisis prawn mortality in aquaculture is thought to occur during the first six weeks after stocking. It is hard to tell since even 200,000 juvenile prawns, each only 20 mm long, could be needles in the haystack of a one-hectare pond. In a small nursery pond of only a few hundred meters, predation and competition can be minimized while feed availability and water quality are maximized.

After about six or eight weeks, especially in new ponds or those managed by inexperienced prawn farmers, one often encounters an environmental crisis. This might be caused by overfeeding or overfertilization and is often characterized by low oxygen "event" where some prawns are lost, or by an algae bloom that gets out of hand. The growth rate of the prawns slows down, perhaps due to a spoiled pond bottom or chronic oxygen depletion or high acidity and the consequent loss of natural feed. If at this point the farmer could transfer his prawns into a new pond, growth rate would increase like magic.

This is the magic of a nursery pond. After six or eight weeks of intensive care the prawns are drained out of the nursery into a new fresh (or newly freshened) pasture. Whether it is the new source of natural feed, or the larger area of foraging, or the clean pond bottom with more oxygen, the transfer does indeed perform magic for prawn growth rates. You could transfer the prawns every four to six months and increase sizes per harvest and harvests per annum.

The problem might be costs: the expense of building small ponds and water control structures, and maintaining them, managing water in many small ponds, and the cost of labor to manage and feed many small ponds. On the other hand, the advantages of improved growth and survival rates, more efficient use of pond areas, and the multiple harvests could make it all worthwhile. Each farmer will have to work it out for his own needs.

An example of a nursery pond scheme is shown below. With a bit of engineering, a single water control gate could be designed to deliver prawns from the nursery to either of the two associated fattening ponds, and from the fattening ponds into a harvest pit. The first nursery pond is built higher than the second, and the second higher than the fattening pond so that the prawn could drain down by gravity at each stage and the nursery could be fully dried and treated as necessary.



Suggested layout for two nursery pond system.

The pond is divided into four parts, in the ratio of 0.03 to 0.30 to 1.0 to 1.0. In the first stage the prawns are raised to one gram; in the second, to ten grams; and in the third and fourth, to harvest size. Using this or similar proportions, the pond could be any size so long as each section had an independent water control system and prawns could be easily drained from the smaller into the larger ponds. In this example, the prawn farmer could operate two fattening ponds from the single set of nursery ponds. The schedule might be something like the one shown below:

Nursery pond stocking and harvest schedule

Pond type	*Size ratio of ponds*	*Stocking size*	*Weeks in the pond*	*Size at harvest*
Nursery I	0.03	PL 20	6	1 - 2 g
Nursery II	0.30	1 - 2 g	6	8 - 10 g
Fattening	1.00	8 - 10 g	13	25 - 30 g

The harvest sizes and growth rates are approximate and will vary enormously with the species, water temperature, feeding, stocking density, and management. At the end of about six months of cultivation there is as much likelihood of harvesting a 15 gram prawn as a 50 g prawn.

Multiple harvest

Perhaps the most economically important advantage of the nursery pond use is the increased number of potential harvests per pond for the same fixed costs of time, labor, water, facilities, and overheads. In the above example there can be a harvest of 25-week-old prawns every 14 weeks from each of the two fattening ponds, that is, four harvests every 56 weeks. Without nursery ponds the same fattening ponds could produce only two harvests each year, provided the temperatures are adequate and seed is available.

Since the residence time in each nursery is half as long as in the fattening pond, one set of nursery ponds can support two fattening ponds. The above stocking schedule should be sufficiently flexible to provide a week or ten days between stockings to dry out, lime, clean, or maintain the ponds between crops. It should also permit a crop to be speeded up or held back by a week or two in the event of cold weather, an environmental crisis, or favorable market conditions.

Source: Robert Cordover, "Nursery Ponds," **AustAsia Aquaculture Magazine**, Vol. 3. No. 6. January 1989.

SUBMERGED TIERED CAGES FOR GROWING SHRIMP

The West German firm *Fischtechnik* has developed a new cage method which can be applied to the farming of shrimp (*Penaeus monodon*). The shrimp is a bottom-dweller and so any structure in which it is grown has to provide a suitable floor. This would waste most of the depth of a cage and so *Fischtechnik's* answer is a series of decks or tiers.

The cage is suspended in the sea in mid-water and is anchored to the bottom in suitable areas.

In the prototype version, cages of 40 decks are designed to lie five meters below the surface in water some 20 meters deep. This will protect the cages from damage by wind, rough surface waters, and obstructions such as driftwood.

A center feeding tray tube reaches each deck and allows a flow of dry feed to the growing shrimp. A multi-purpose service boat provides the feed through a connecting pipe and special pump.

In this system any number of cages can be anchored at distances of about 10 meters. As the area of sea covered is relatively small, it ensures effective and economical growing.

For checking the cages and the shrimps, an expert diver is preferred instead of an underwater camera.

The cage is hauled up only for stocking and harvesting. A boat would be equipped to carry out these operations.

One net cage of 40 decks is 4 meters deep and has a diameter of 1.9 meters. Each deck has an area of 2.8 square meters.