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# Tilapia hatchery and nursery

Aquaculture Department, Southeast Asian Fisheries Development Center

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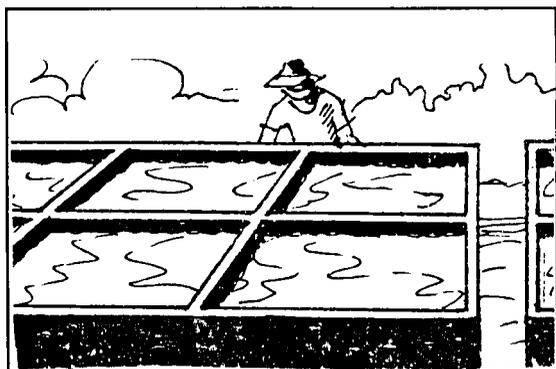
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# Tilapia hatchery and nursery



## Spawning facilities

Nile tilapia spawn in rice paddies, earthen ponds, *hapas* and concrete tanks. The use of concrete tanks for spawning and nursing tilapia is efficient but involves high capital and operational expenses. When concrete tanks are used, they should not be less than 20 tons in water capacity so that temperatures do not fluctuate too much. Tanks must be designed so that they can be easily cleaned without disturbing the females incubating eggs in the mouth. The average fry production per spawner is 80-100 per month.

In Laguna de Bay near Manila, Nile tilapia are commonly spawned and nursed in *hapas*, each 3 x 3 x 2 m, arranged in a row or two, and supported by bamboo poles. The average fry or fingerling production is 60 per spawner per month. The advantage of using *hapa* is the big savings on feeds. The breeders are given supplementary feeds only when the natural food in the lake is scarce. The disadvantage is the lack of control over water quality.

## Sex ratio and stocking density

The sex ratio commonly used for fry production in *hapas* is one male to 4-7 females. The stocking density is 5 females/m<sup>2</sup>. In concrete tanks, the sex ratio is the same but the stocking density is 4 females/m<sup>2</sup> if no aeration is provided and 6 females/m<sup>2</sup> if with aeration. In earthen ponds, the same sex ratio is used but the stocking density is 2 females/m<sup>2</sup>.

## Broodstock feeding

Poultry feed (21% crude protein) or fish pellets (27% crude protein) is used by hatchery operators in Laguna de Bay. The tilapia breeders are fed daily at 1-2% of biomass. One-half of ration is given in the morning and the other half in the afternoon.

## Water management

In earthen ponds, water is changed at least once a month to check pollution. Where water comes from underground springs, changes are done after longer periods. The pond water is 1 m deep and easily drained by gravity. In concrete tanks, the water depth ranges from 50 to 75 cm and water is changed every 10-15 days.

## Fry or fingerling harvest

One method of harvesting fry is forcibly removing them from the mouth of the female. Another method is scooping the fry as soon as they are released by the spawners. If the water is turbid, the fry are scooped when they swim on the water surface. Scissor net, *hapa* or seine are commonly used to harvest fry. A combination of these methods is used for both concrete tank and earthen pond.

In earthen ponds, the fingerlings are totally harvested after 1-2 months before they become sexually mature. In concrete tanks, harvest is done every 15 days in time with the water change. In *hapas*, the fry or fingerlings are harvested every 15 days during summer, or every 21 days during the cold months. One side of the *hapa* is raised to confine the fish to one side. The fry or fingerlings are scooped out and the breeders transferred to the other side with a net that allows the fry or fingerlings to escape.

## Nursery management

Fry are initially reared in *hapas* to protect them from predation. In nursery ponds, the pond is thoroughly cleaned and protected from the intrusion of predators. As soon as the fry in the *hapa* reach 2.5 cm in length, these can be

released into the pond. In a lake-based nursery, the fry being reared in *hapas* are sorted into two or three sizes after two weeks. Each size group is stocked in a separate net cage.

The fine-meshed *hapa* measuring 3 x 3 x 1.5 m is stocked with 300-500 fry/m<sup>2</sup> and covered. Fingerlings of 2-2.5 cm are stocked at 200-250/m<sup>2</sup>. The recommended stocking density is 40-50 fry/m<sup>2</sup> in ponds, and 1000 fry in concrete tanks.

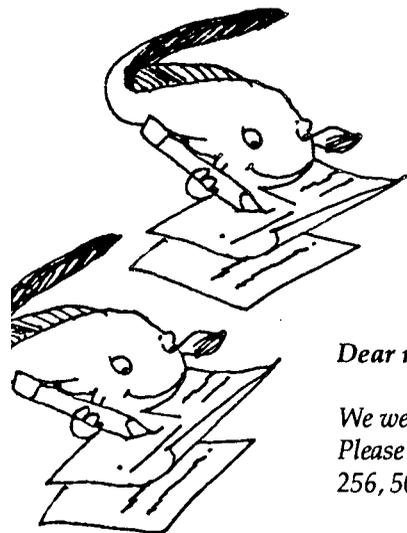
Fry reared in *hapas* are fed hard-boiled egg yolk daily for three days at a rate of one yolk per 20 000 fry per day. Then trash small shrimps are given to fry at 25 g shrimp per 10 000 fry per day. The shrimps are finely ground and mixed with water (1:2 by weight). After a week, the fry are able to feed on finely ground poultry starter mash (about 50 g per 10 000 fingerlings). Half of the feed is given in the morning and the other half in the afternoon. In lake-based nursery, no supplemental feeding is given when primary productivity and plankton density are high (as indicated by low water transparency).

Source: AMBautista. 1987. *Tilapia hatchery and nursery systems: operation and management*, p. 8-13. In: RD Guerrero III, DL Guzman, CM Lantican (eds.). **Proceedings of the 1st National Symposium on Tilapia Farming**, PCARR, BFAR and SEAFDEC/AQD. Los Baños, Laguna. PCARRD Bank Series No. 48. 68 pp.

### Summary of known nutrient requirements of Nile tilapia, *Oreochromis niloticus*

| <i>Nutrient</i>             | <i>Requirement<br/>(% of dry diet)</i>                   |
|-----------------------------|--|
| Protein                     | 35% for fry<br>25% for fingerlings<br>40% for broodstock |
| Essential amino acids       |  |
| Arginine                    | 4.2  |
| Histidine                   | 1.7  |
| Ileucine                    | 3.1  |
| Leucine                     | 3.4  |
| Lysine                      | 5.1  |
| Methionine<br>+ Cystine     | 3.2 (Cys, 0.5)   |
| Phenylalanine<br>+ Tyrosine | 5.5 (Tyr, 1.8)   |
| Threonine                   | 3.8  |
| Tryptophan                  | 1.0  |
| Valine                      | 2.8  |
| Lipid                       | 6-10%  |
| Essential fatty acids       | 18:2 (n-6), 0.5%   |
| Carbohydrate                | 25%  |
| Digestible energy           | 2,500-4,300 Kcal/kg                                      |
| Phosphorus                  | <0.9%  |

Compiled by the Feed Development Section of SEAFDEC/AQD.



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*AFN Production Staff*