

Southeast Asian Fisheries Development Center

Aquaculture Department

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Producing 100% male tilapia

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Producing 100% male tilapia

The major drawback in tilapia culture is their ability to quickly overpopulate aquatic systems. The most widely used technique to prevent uncontrolled reproduction is to produce monosex populations. All-male tilapia populations are often preferred, as they grow faster than the female.

In many juvenile fish, it is possible to fix or reverse the sex by administering androgenic or estrogenic steroids through the diet or the water. The theoretical minimum dosage and treatment duration for endocrine sex reversal varies from species to species and in some cases, strain to strain. Researchers determine the earliest time when the fish are labile to endocrine sex reversal because the residues of administered steroids can be carcinogenic and may interfere with the consumers' sexual functions. In tilapias, the labile periods vary widely: 11-69 days for *Oreochromis mossambicus*, 18-32 days for *O. aureus*, and 25-59 days for *O. niloticus*. For *O.*

mossambicus, the critical minimum period is 10-21 days from hatching. In other tilapias, the labile periods are short and end at a very early age when the fish are not more than 50 g. The short labile period that ends before the fish attain harvest size confers two advantages: first, the cost of hormone treatment is considerably reduced, and second, the residual steroid is so little that it is harmless to consumers.

The recommended doses of methyltestosterone (MT) to ensure all-male populations vary widely: 5-1000 mg MT/kg diet for *O. mossambicus*, 30-60 mg MT/kg diet for *O. aureus* and 5-60 mg MT/kg diet for *O. niloticus*. Apart from such wide variation in doses, success rates also vary from 47 to 98% males even at high doses (20-50 mg MT/kg diet). However, 100% male populations may be produced with the lowest dose of 5 mg MT/kg diet during the critical labile period of 10-21 days after hatching.

The fry of *O. mossambicus* may also be

immersed in water containing 5 mg of 17 α -ethynyltestosterone per liter. Dimethylsulphoxide (2.5 ppt) can be added to promote the solubility of the steroid.

Another technique is the manipulation of the chromosome set (see figure). A combination of endocrine sex reversal and gynogenetic techniques (where parental chromosomes are inactivated) can produce what are called supermales (YY).

The supermale *O. mossambicus* is viable and produces fertile sperm that can produce consistently 100% males.

Source: TJ Pandian and K Varadaray. *Techniques to produce 100% male tilapia*. Naga, the ICLARM Quarterly. July 1990.

