

Monosex tilapia fry production using 17 α -methyltestosterone immersion with exposure to higher temperature

A.R.S.B. Athauda¹ and A.R. Mudalige²

¹*Department of Animal Science, University of Peradeniya, Peradeniya.*

²*Aquaculture Development Center, National Aquaculture Development Authority, Dambulla.*

Early sexual maturation and frequent spawning are management challenges when controlling over populated, stunted tilapia populations in Sri Lankan aquatic environments. Maintenance of only male tilapia populations is one of the most appropriate mechanisms for controlling them in environments, where they are used as a food fish, while controlling reproduction and achieving faster growth. Of the various techniques that have been developed to produce male tilapia, hormonal sex reversal is the most commonly used procedure. This study aims using an immersion technique with 17 α -methyltestosterone (17 α -MT) hormone at high temperature (34°C) in order to produce an all male tilapia population at the NAQDA breeding stations.

In this experiment, tilapia fry at the 11th and 13th day of post fertilization (dpf) were immersed for 3 hours each day. Immersion in a 1.5 mg/LMT hormone solution at 34°C was used as Treatment 1, and immersion in a 1.5 mg/LMT hormone solution as Treatment 2, while the control used neither hormone nor high temperature. The 34°C high temperature exposure for Treatment 1 fry was provided only from 10th to 18th dpf. The stocking density of fry was maintained at 33 fry/L during immersion for all treatments including the control. Treated fry were placed in two locations (NAQDA, Dambulla and CIC, Pelwehera) for growing, in 09 hapas (03 replicates/treatment) at a stocking density of 100 fry/hapa and fed with a diet containing 30% crude protein, according to body weight. After 12 weeks, the sex of the experimental fish was identified by observing its external genital characteristics while leaving histological analysis to be done at 20 weeks of age. The results showed that there is a significant difference ($p < 0.05$) in the proportion of male tilapia in Treatment 1 where hormone immersion treatment was done at high temperature (100% male) compared to the proportion observed in Treatment 2 (89% male) and the control (50% male). According to these results, 100% male populations can be achieved by immersion of fry at 11th and 13th dpf, in 1.5 mg/L MT hormone concentration at high temperature (34 °C) only during its labile period of 10th to 18th dpf. Application of this technique in fish breeding stations is a reliable, environmentally safe and low cost method to produce all male tilapia which can be introduced to water bodies to control over population of this invasive species.

Key words: Nile tilapia, 17 α -MT, sex reversal, immersion treatment, all male tilapia.