

Importation and Handling of Tilapia SUPER YY

GUIDELINES FOR IMPORTATION AND HANDLING OF TILAPIA SUPER YY BROODSTOCK BY FISH HATCHERY OPERATORS IN KENYA

Introduction

Tilapia species is the most cultured fish species in Kenya. However, a major constraint in the culture of this fish is its early maturation, prolific breeding, over population, increased competition for food and space. Ordinarily, females have a slower growth rate than the males because they spend most of their energy in reproduction and brooding. Tilapia males grow faster thus are preferred by most farmers operating grow-out aquaculture units.

Various techniques have been applied in achieving all male tilapia population in grow-out ponds by undertaking the following;

1. Hand sexing
2. Use of MTH in initial feed for fry
3. Hybridization
4. Temperature manipulation of fertilized eggs
5. Super YY tilapia maleThe stages of YY male technology involves a series of stages of feminization and progeny testing. The model for the breeding program in the production of YY males by genetic manipulation of sex in *O. niloticus* is achieved through a combination of feminization and progeny testing to identify the novel YY genotype that sires only XY male progeny. The steps leading to YY male that sire XY male progeny include;
6. The first four methods are costly, tedious, time consuming and have limited effectiveness. The super YY all male tilapia approach has proved to be the most effective method of producing all male sex fingerlings for commercial-scale farming.
 - This technique produces YY chromosome males.
 - The first generation fry are treated with estrogen so that all XY females are produced. These are then mated with males that are known to be XY. This generation are then mated with XX females.
 - From this, it can then be determined which breeder fish are YY 'supermales' as they will only produce XY male offspring.
 - These fish can then be kept as YY breeding males.

Justification for use of super YY male

Inadequate supply of seed, poor growth, early maturation and breeding of tropical finfish in various production systems are the major concerns of aquaculture sector in many developing countries. Culture of monosex progeny, preferably males, which, in tilapia species, grow faster and to a larger size than females, has long been recognised as the most effective solution to the widespread problem of early sexual maturation and uncontrolled reproduction in

tilapia culture. Unlike the other approaches mentioned above, the super YY male technology has 100% all male tilapia fingerling success. However, it should be noted that the XY progeny from the YY male are viable off-spring. The progeny of the 'YY' males ("GMT" distinguishes them from sex reversed male tilapia), have been comprehensively evaluated in on-station and on-farm trials. Results from onstation trials indicate that GMT have very considerable benefits under culture, significantly increasing yields by up to 58%, compared to mixed sex tilapia of the same strain (Mair et al., 1995). Yields of GMT are also consistently greater than those for sex reversed male tilapia. In addition to the negligible recruitment in GMT populations, they have the further advantages of more uniform harvest size distribution, higher survival, and better food conversion ratios.

The technique can be considered environmentally friendly as no hormones are applied to fish that are consumed and overall, hormone application to broodstock is very low. Species\strain purity is maintained and the fish produced for culture are normal genetic males. Although the development process is time consuming and labour intensive, once developed the production of monosex males can be maintained through occasional feminisation of YY genotypes. Discounting the initial development costs, additional costs for application of this technology at the hatchery level would be minimal, while the potential economic advantages to growers have been demonstrated to be very considerable

Environmental Concerns

As stated above, YY male tilapia progeny are normal fertile genetic males and can be used as broodstock. However, use of the progeny as male broodstock, crossed with normal females, will produce normal mixed sex progeny so there is little advantage to this. Generally, there are no environmental challenges anticipated during the introduction of the YY male technology. However, caution should be exercised by hatchery managers on the management of YY super males since if they escape to wild traditionally occupied by normal tilapia females (XX), they will breed and produce XY (all male) progeny. Even though with further breeding with the XY progeny, a mixed sex progeny will immediately arise to manage the sex imbalance. Therefore, there is no major environmental concern associated with the YY male technology.

Sources And Suppliers Of Super YY Male

Super YY male tilapia is widely used in the aquaculture field with improved production statistics very prominent in the Asian continent. Broodstock will be sourced from an established hatchery with a worldwide reputable track record. In order to guard against its abuse in the importation and culture management, there is need to regulate its source and supply into the market in Kenya. It is therefore important that:

1. Suppliers of super YY tilapia brooders to be used in Aquaculture shall be vetted and registered with the State Department of Fisheries in collaboration with other relevant competent authorities. The list of certified suppliers and their physical locations shall be gazetted. (See Annex).

2. The State Department of Fisheries shall regulate and monitor procurement and sale of super YY tilapia brooders to hatcheries.
3. All hatcheries shall be authenticated and licensed by the State Department of Fisheries.
4. The State Department of Fisheries shall carry out regular inspections in the hatcheries to ensure adherence to all laid down standard operating procedures with regard to the handling and culturing of YY tilapia brooders.
5. The State Department of Fisheries shall monitor the super YY male tilapia broodstock progeny production, supply and performance with the country.

Handling Of YY Super Male Tilapia Brooders

1. Utmost care will be exercised to avoid escape of brooders to the natural water bodies through flooding, predators and accidental release by hatchery operators
2. Any hatchery handling super YY should seek approval from the State Department of Fisheries
3. The hatcheries shall engage trained personnel with relevant knowledge on hatcheries operations and super YY tilapia breeding.
4. A hatchery intending to produce super YY tilapia should have a quarantine facility.

STEPS TO CERTIFICATION AND ACCREDITATION

1. A hatchery wishing to deal with super YY male tilapia brooders will be required to make written application to the State Department of fisheries.
2. Upon receipt of application, a certification and accreditation process will start
3. Certification and accreditation team visits the hatchery facility and make a report (First visit is to verify existence of the mandatory facilities and make recommendations. Second visit is to verify if the recommendations have been met based on the guidelines below).
4. The team then recommends for approval or rejection for certification and accreditation of the hatchery to deal with super YY tilapia brooders.

Guidelines for Certification and Accreditation of Hatcheries to Deal with Super YY Tilapia Brooders

- Authentication

The hatchery shall provide proof of certification/authentication by the MoALF

- Best Management Practices

The hatchery shall show evidence of adherence to BMPs i.e

- fish handling
- Good labor relations
- Effluent management plans

- Hatchery chemicals storage, use and disposal standards
- Predator control measures
- Hatchery facility be completely isolated from natural water bodies
- Quarantine facility

The hatchery shall show evidence of well secured quarantine units i.e tanks and ponds

- Evidence of qualified hatchery personnel

The hatchery shall provide list of employees and their qualifications. The hatchery manager shall be a diploma holder and attended training in hatchery management.

- Evidence of record keeping

The hatchery shall provide quantity and source of broodstock and fingerling distribution records.

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