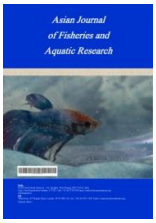

Asian Journal of Fisheries and Aquatic Research

10(3): 34-39, 2020; Article no.AJFAR.63894
ISSN: 2582-3760

Tilapia Hatchery Techniques (*Oreochromis niloticus*) at the Local Fish Seed Center, Singgamanik, Karo Regency, North Sumatra Province

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Author s' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJFAR/2020/v10i330185
Editor(s):
(1) Dr. Pınar Oguzhan Yildiz, Ataturk University, Turkey.
Reviewers:
(1) Belem-Costa, Andrea, Federal University of Amazonas, Brazil.
(2) Mônica Cassel, Mato Grosso Federal Institute of Education, Brazil.
Complete Peer review History: http://www.sdiarticle4.com/review-history/63894

Original Research Article

Received 01 December 2020
Accepted 20 December 2020
Published 28 December 2020

ABSTRACT

The research was conducted for two weeks starting from 26 October 2020 to 9 November 2020 at Singgamanik local fish seed center, Karo regency, North Sumatra province. The Singgamanik Local Fish Seed Center is located in a wet area with a tropical climate. Therefore, this study aims to determine the technicalities of tilapia hatchery at the Singgamanik Local Fish Seed Center (LFSC). The Singgamanik Local Fish Seed Center (LFSC) has water sources that come from river water, rainwater, and ground water. The area of the Singgamanik Fish Seed Center is 1.5 hectares, consisting of 48 pond plots and one Singgamanik Fish Seed Center office building, 1 hall building, and 1 mesh building. Primary data collection techniques were carried out by observation, interviews and active participation, while secondary data were obtained from the literature. The Singgamanik Local Fish Seed Center (BBI) was established in 1980 in Singgamanik Village, Munte District, Karo Regency, North Sumatra. Tilapia in Indonesia is an economically important fish in the world because of its easy cultivation method, good taste, relatively affordable prices, and a wide tolerance to the environment.

Keywords: Local fish seed center; tilapia fish.

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1. INTRODUCTION

Tilapia fish is an economically important fish in Indonesia because of its easy cultivation method, good taste, relatively affordable prices, and a wide tolerance to the environment [1]. Now that public interest is increasing, tilapia has become an attractive commodity, both in large and small scale cultivation.

Efforts to increase tilapia production continue to be carried out in various ways, such as bringing in several new superior strains from outside, improving seed and cultivation technology, and genetic improvement [2]. Germination and cultivation improvements are carried out using advanced technology, such as the use of hatchery funnels for seeding and recirculation in closed-system cultivation, engineering. as well as engineering of increasingly advanced cultivation containers. Efforts for genetic improvement include producing monosex tilapia species, genetic engineering, and conventional selection to produce tilapia strains with specific look [3].

Therefore, this study aims to determine the technicalities of tilapia hatchery at the Singgamanik Local Fish Seed Center (BBI). Starting from the natural spawning stage, harvesting fish larvae, rearing larvae into seeds, and transportation.

2. MATERIALS AND METHODS

The research was conducted for two weeks starting from 26 October 2020 to 9 November 2020 at Singgamanik local fish seed center, Karo regency, North Sumatra province. The method used is descriptive method. The types of data used are primary and secondary data. Primary data collection techniques were carried out by observation, interviews and active participation, while secondary data were obtained from the literature.

2.1 Research Sites

The Singgamanik Local Fish Seed Center (BBI) was established in 1980 in Singgamanik Village, Munte District, Karo Regency, North Sumatra. The area of the Singgamanik Fish Seed Center is 1.5 hectares, consisting of 48 pond plots and one Singgamanik Fish Seed Center office building, 1 hall building, and 1 mesh building. The Singgamanik Local Fish Seed Center is located in a wet area with a tropical climate. The rainy season starts from November to May and the dry season from July to September. The altitude is approximately 800 above the water surface, the average annual rainfall is 1,500-2,400 mm, with an average temperature of 23 degrees Celsius and the water temperature generally ranges from 23-28 degrees Celsius. The Singgamanik Local Fish Seed Center (BBI) has water sources that come from river water, rainwater, and ground water. The source of water for ponding comes from the irrigation of the Lau Bengap river.

3. RESULTS AND DISCUSSION

3.1 Tilapia Spawning Pond

At BBI Singgamanik itself, the tilapia spawning pond used is pond P.12. This pool is a natural spawning place for tilapia. The bottom of the pond is also made of drainage to make it easier when harvesting. The bottom channel of the pool (slope) is made from the inlet to the outlet channel. The pond for spawning tilapia at BBI Singgamanik is a rectangle with an area of 180 m². The pool is included in the semi-intensive pond type where the pool embankment is made of concrete. To prevent the entry of waste and harmful organisms into the inlet and outlet saliva, a net is installed. Near the outlet channel of the pool, there is also a rectangular tubing tub measuring 3 mx 2 m with a depth of 40 cm made of concrete. This Kobakan has a function as a gathering place for tilapia larvae and broodstock.

3.2 Tilapia

Nursery pond called P.07 have the same construction as tilapia breeding and spawning ponds. P.07 pond for nursery has a rectangular shape with embankments and the bottom of the pool is made of soil with a size of 140 m2. However, there are also fish nursery ponds on embankments that are covered with tarpaulin which aims to prevent porosity / absorption of water.

3.3 Roads and Transportation

The road conditions in BBI Singgamanik are well maintained and are good, only a few of the roads are still rocky. The road to the hall is paved. In addition, the location of this hall is not far from the main road, making it easier for the distribution of fish to ship to other regions. This road can be passed by two-wheeled or four-wheeled vehicles. Transportation activities at BBI Singgamanik provide several types of

transportation, including motorbikes and cars used by BBI Singgamanik employees and employees for official purposes. In addition to the official needs, the availability of transportation means is also used to transport heavy goods such as transporting large amounts of garbage, fertilizer and feed.

3.4 Facilities

At BBI Singgamanik have six facilities. In general, some of the facilities provided include the Hatchery Building, Guard Room, Workspace, Feed Warehouse, Spawning Pool, Hatchery Pond. Complementary facilities are also provided such as water pumps, blowers, hapa and other hatchery cultivation equipment.

3.5 Parent Selection Tilapia

Selected parentare those that have the ability to reproduce with special characteristics. In this case it can be said that the male tilapia parent is able to produce sperm and the female tilapia parent is able to produce eggs. Mains selection is done by catching brood tilapia using scoop net. Broodstock that has been caught are then selected visually by looking at the body shape, sex and health of the fish in terms of disease or not. Selection of broodstock for spawning is an important stage in hatchery. This selection aims to select good broodstock to be spawned so that good broodstock is expected to produce good quality and quantity of eggs as well.

3.6 Maintenance of Tilapia Broodstock

Maintaining the broodstock is a stage before spawning. In the maintenance of the mains always pay attention to the feeding and water quality levels. Tilapia broodstock maintenance in hatchery activities at BBI Singgamanik was carried out for 8 months in pond P.03 (holding pond). Male and female tilapia broodstock are kept separately at different hapa. The aim is to obtain eggs of good quality, facilitate the selection of broodstock that have and have not spawned and prevent wild spawning. Indigo broodstock that has ripe gonads are characterized by a reddish color.

3.7 Maintenance and Harvesting of Tilapia Seed

Larvae Harvesting when the tilapia larvae are visible on the pond surface. Larvae to be harvested are carried out in the morning. The steps taken when harvesting larvae, namely, the water in the pond to be harvested is sorted, after the water reaches the limit of the “kamalir”. The larvae are taken using a scoopnet, then the larvae are placed in a bucket filled with water. After which the larvae are sorted according to size and transferred to a holding pool or transferred to Happa.

3.8 Nursery 1

After harvesting larvae, the next step is nursery 1, nursery 1, namely the distribution of tilapia larvae produced from spawning, the larvae are 21 days old. In this BBI nursery pool 1 used is P.24 with an area of 140 m². For stocking density larvae in nursery 1 are usually 30 individuals / m² for 21 days of rearing. In nursery 1, the results of larvae that have become tilapia seeds are 3-5 cm in size.

3.9 Pests and Diseases of Tilapia

Tilapia is generally a fish that is resistant to disease, a disease can arise due to three factors, namely the condition of the fish's body, environment and pathogens [4]
To prevent disease, the fish's body condition must be considered carefully. The pests that interfere with the maintenance of tilapia seeds are the snails and snail eggs. Snails and snail eggs are very annoying when harvesting tilapia, besides that the presence of parasites can also reduce the growth rate of tilapia seeds, one example of a disease that often attacks is *Aeromonas* sp [5]. Tilapia that is attacked by disease will have characteristics such as lack of appetite, passive movement, darker body color in fish. One of the factors of disease is water quality that is not good, so the quality of the water in the pond must be considered. Treatment carried out when the fish is attacked by a disease is by changing the water, giving feed containing protein and antibiotics.

3.10 Harvesting the Seeds

Before harvesting, it takes some preparation between the fishing gear, the storage container and also the container for transporting the harvest. The tools used when harvesting seeds include hapa size 4.5 mx 2 mx 1 m, slash, lambit, bucket, anco, wooden and rubber beam, and scoopnet. Harvesting of seeds is carried out the same as when harvesting larvae, namely when the water temperature in the pond is relatively

Table 1. Characteristics of male and female parent

Males	Females
More attractive colors	Less attractive color
The scales under the chin and stomach are dark	Scales under the chin and belly are white or light
The part of the genitals protruding and tapering	The genitals are oval and visible
Slender and elongated body shape	Flat and elongated round body shape

cool, harvesting is usually done at 09.00. To speed up the receding water, the water intake channel is also closed. Seed harvesting is done by herding the seeds to the pond area where the seeds will collect and make it easier to catch the seeds. The seeds can be caught using lambit or anco. When catching the seeds, it must be done carefully so that the seeds are not injured and stressed. The seeds that are harvested are collected in a temporary storage net (hapa) with a size of 4.5 mx 2 mx 1 m. The process of transferring the seeds is carried using a bucket. The container is filled with water for the live media for the seeds and also given salt to prevent injury to the fish seeds.

The seeds in hapa are then sorted to equalize and separate the seeds according to size. To be able to determine the Survival Rate (SR), it can be calculated with the formula:

SR = $\frac{Nt}{Na}\ x\ 100\ \%$

SR = $\frac{\Sigma\ Benih\ (panen)}{\Sigma\ Larva}\ x\ 100\ \%$

Information:

Nt : Total amount of seed harvested
Na : The initial total number of seeds you put in the pool

SR P.24

SR = $\frac{300}{500} X\ 100\ \%$
SR = 60 %

3.11 Tilapia Spawning

Prior to spawning, the parent selection is first carried out, which aims to obtain broodstock that has high productivity with desired morphological characteristics and can be inherited. This high productivity is mainly characterized by high growth and survival rates in certain aquaculture environments, such as traditional ponds, jetted ponds, floating nets, and particularly different water quality [6]. The type of spawning in BBI Singgamanik is natural spawning, namely male and female parents who are ready to do spawning are put into the pond, then left to spawn themselves. The ratio of the number of stocking broodstock is 1: 3. According to Younis et al. [7], the stocking density of the broodstock for spawning is 1: 3 to 1: 5. The weight of the broodstock used is about 250 g with an age of 6-8 months. This was also stated by Khairul (2003), that female tilapia can start to be spawned when it is mature (5-6 months) with a weight of 250-300 g. The ripening of the gonads is influenced by several factors, including environmental manipulation, namely drying the ponds, selecting a good parent, handling the gonads, and feeding them both quantity and quality. Fish food in the form of pellets can be sprinkled in a fixed place, this place is usually near the discharge of water [8]. It is intended that if there are leftovers that do not run out, the leftovers will be easily wasted with water through excretion so as to minimize pool contamination. Tilapia is a fish that is a mouth breeder, which is incubating its eggs in the mother's mouth for about 6-10 days.

3.12 Harvesting Tilapia Larvae

Harvest should be done at low temperatures, namely in the morning [9], the goal is to do in the morning to avoid stress on the larvae. However, the reality is that harvesting activities are not on time due to inadequate preparation. This can result in a high mortality rate for the larvae. The newly harvested larvae cannot be reared**.** In the nursery pond, the larvae are first reared in a holding pond until they reach a size of 3-5 cm. To reach this size, larvae are reared for 21 days in a holding pond.

3.13 Nursery for Tilapia Seeds

One Nursery is for 30 days 21 with seeds 3-5 cm in size and ± 0.2-1 g in weight. The stocking density for tilapia seed is 290 fish/m2. The feed is given in the form of fine pellets or bran as much as 15-20% of the fish weight with a protein content of 28% (Suyanto 1994). At the nursery

stage, the important thing to pay attention to is feeding in sufficient quantities and placing fish of the same size in one place, so that fish growth will be evenly distributed and avoid preying on one another. Tilapia is cannibalistic, especially when it is hungry or lacking food (Djarijah 1995). In such circumstances, the larger tilapia seeds often eat smaller seeds. So that the cannibalism process does not occur, it should be sorted first.

3.14 Transportation

BBI Singgamanik has an operational vehicle that can be used for the process of transporting tilapia seeds to places that are relatively not too far away. For long distances, buyers or orderers use a private vehicle in the form of a pickup truck to carry the seeds. Packing technique (packing) must also be considered, young seeds are still vulnerable so that the wrong treatment can cause the death of the seeds. The goal is that in the process of sending shocks to the car, the quality of the seeds will decrease. It is also necessary to pay attention to the distance traveled, type, size of the plastic bag, density of water volume, method of packaging, and arrangement in the transport vehicle.

4. CONCLUSION

Conclusions that can be drawn from the Field Work Practice on Tilapia *(Hatchery Oreochromis niloticus)* at the Singgamanik Fish Seed Center. Tilapia *(hatchery activities Oreochromis niloticus)* begin with parent procurement, broodstock maintenance, parent selection, spawning, larval harvesting, larval handling, nursery and feeding and seed harvesting. Spawning is carried out naturally in spawning ponds with a mass system, namely the ratio of male and female parents is 1: 3 where the population is 100 male and 300 female parent. Diseases that attack tilapia are Aeromonas hydrophila, Trichodina and Arguolosis and prevention by administering drugs with the trademark “Premium C” and “Strepto Vac” vaccines, which are sprinkled into pond waters. The pests found in tilapia hatcheries are golden snails. Feeding Tilapia hatcheries have different pellet sizes, for larvae up to 2-3 cm in size are fed in the form of flour, 3-5 cm and 5-7 cm in size are given nano-type feed and in the maintenance of the parent they are given pellets measuring 0.3 mm- 0.4 mm.

CONSENT

As per international standard or university standard, respondents’ written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/63894