

Nirwana Tilapia (*Oreochromis Niloticus*) Hatchery Technique at the Cibiru Fish Seed Center Bandung City

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ABSTRACT

One of the freshwater fish commodities that are widely cultivated in West Java-Indonesia is Nirwana tilapia. The purpose of this article is an observational study of Nirwana tilapia hatchery techniques at Cibiru Fish Seed Center. Based on observational studies through fieldwork practices that have been carried out at UPT Cibiru Fish Seed Center, Bandung, it can be concluded that the spawning techniques for Nirwana Tilapia at UPT Cibiru Fish Seed Center include broodstock rearing, pond preparation, brood selection, and parent spawning. Nirwana Tilapia spawning technique carried out at UPT Cibiru Fish Seed Center is using a natural method, namely the process of entering sperm cells into egg cells naturally without human assistance and without hormonal assistance implanted into the fish's body.

Keyword: Parent Selection, Spawning, Pond, Temperature, Gonad Maturity.

1. INTRODUCTION

According to the Indonesian National Standard (2014), fish hatchery is the process of producing fish seeds by spawning, hatching eggs and rearing larvae/seeds in a controlled environment. Spawning as one of the hatchery activities has two goals, namely to produce a new generation of brood fish and to produce fish seeds to be raised to meet human needs (Slembrouck et al. 2005).

One of the types of tilapia that is cultivated by the people of West Java is Nila Nirwana tilapia (*Oreochromis niloticus*). This type of tilapia has fast growth and is relatively resistant to disease compared to other types of tilapia. Tilapia has white and thick flesh so it is very preferred to be consumed either directly or processed into processed fishery products. According to Rukmana (1997), tilapia in Indonesia has an important role in improving the community's economy.

Cultivation activities for Nirwana Tilapia (*Oreochromis niloticus*) must continue to be developed. The sustainability of tilapia cultivation must be supported by the provision of seeds both in terms of quantity and quality. Efforts to produce seeds of sufficient quality and quantity are highly dependent on the seeding technique used.

Tilapia farmers around West Java Province, namely Bandung Regency, Sumedang Regency, Subang Regency and Bandung Municipality obtain their tilapia seeds from the Cibiru Fish Seed Center. This hall is located in the District of Cibiru Kodaya Bandung. Based on information from tilapia farmers, that the tilapia seeds obtained from Cibiru Fish Seed Center were of good quality as expected.

The production of good quality fish seeds obtained from Cibiru Fish Seed Center is due to the management of the hatcheries carried out in good ways. Fish hatchery facilities and infrastructure owned by Cibiru Fish Seed Center are also very supportive to produce good seeds. Thus, it is very appropriate for this Cibiru Fish Seed Center to be used as a place for field work practices. The purpose of this article is an observational study of Nirwana tilapia hatchery techniques at Cibiru Fish Seed Center.

2. RESEARCH METHODS

The practice of Nirwana Tilapia hatchery field work was carried out at the Cibiru Fish Seed Center. The address for the Cibiru Fish Seed Center is on Jalan Jatikaler RT. 2 / RW. 8, Blue Sand Village District. Cibiru, Bandung City,

West Java-Indonesia. Access via googlemaps with coordinates -6.926207,107.723204. The implementation time of the field work practice starts from June 13, 2022 to August 27, 2022.



Chart -1: Cibiru Fish Seed Center

The tools used in the natural spawning technique of Nile tilapia (*Oreochromis niloticus*) are as shown in Table 1.

Table -1: Tools used in Nirvana Tilapia Spawning

No.	Tool's Name	Function
1.	Waring	To temporarily accommodate fish (parents and larvae)
2.	Bamboo	For net support
3.	Drain	To catch male and female tilapia broodstock
4.	Camera	To document activities

Materials used in the spawning technique of nirvana tilapia (*Oreochromis niloticus*) naturally are listed in Table 2:

Table -2: Ingredients used in Nirvana Tilapia Spawning

No.	Material Name	Function
1.	Nirvana Tilapia Male and Female	As the observed fish
2.	Commercial Feed	As broodstock feed during spawning

The field work practice method used is participatory by participating in all activities carried out at the Cibiru Fish Seed Center. According to Rosidi (2008) the participatory method is direct involvement in a field activity. Active participatory activities can be used to obtain data and information on natural spawning techniques for Nirvana tilapia (*Oreochromis niloticus*).

The data obtained from this street vendor activity are primary data and secondary data. Primary data is data obtained from the results of activities carried out by observation and direct interviews in the field. Observations were made on various activities related to Nirwana tilapia hatchery at the Cibiru Fish Seed Center Bandung City. Secondary data is data obtained through literature studies that are relevant to the activities of natural tilapia hatchery techniques. The analytical method used in the field work practice is descriptive method.

3. RESULTS AND DISCUSSION

The hatchery technique for Nirvana tilapia (*Oreochromis niloticus*) carried out at the Cibiru Fish Seed Center includes several processes, namely broodstock rearing, pond preparation, brood selection, and brood spawning. This activity is important to pay attention to so that the resulting harvest is optimal.

3.1 Parent Fish Maintenance

Activities carried out at the Cibiru Fish Seed Center at the time of rearing Tilapia broodstock, namely the separation between male and female brooders, as well as feeding the broodstock. The main rearing tank is equipped with water inlet and outlet channels, as well as good filtration. According to Eni et al. (2015), broodstock maintenance is carried out to conduct selection and to ripen the gonads so that the fish are ready to be spawned and are expected to produce the desired offspring.

Feeding given to the mother tilapia with the frequency of feeding 2 times, morning and afternoon. This shows that the feeding of tilapia broodstock is appropriate. were fed 2 times a day, in the morning and evening. The feed provided at the Cibiru Fish Seed Center is floating feed with a minimum protein content of 27%

Feeding must also be considered, the protein content in the feed affects the growth of the gonads. For the maintenance of broodstock, feed is needed in the amount of 1-3% of fish body weight per day. The amount of this feeding range is so that the female parent's gonad growth can be maximized. The feed given must contain high protein. According to (DKPP 2018) tilapia requires feed as much as 3% of its body weight every day. Feeding can be done in the morning and evening. Once every two weeks, samples of tilapia were taken at random and then weighed. Then adjust the amount of feed that must be given. Maintenance of brood tilapia takes 1.5 – 2 years because it is a productive period of broodstock.

In the spawning process the minimum amount of protein needed is 31%. In accordance with Sumarni's statement (2018), the feed given during the spawning process must contain enough protein as much as 28-30%.

3.2 Preparation of Spawning Media

The spawning medium used is a 30x30m pond with a height of 70-80 cm from the bottom of the pond. The pond is drained first to remove pests, diseases, and predators. Draining the pond is done by reducing the water contained in the pond, then plowing it using a manual hand tractor made of wood. This plowing is carried out in order to even out the texture of the pond so that the impermeable subgrade can hold water. After that the pond is left for 2-3 days so that the soil and mud contained in the pond become dry. Furthermore, the pool is filled with water from the inlet which is blocked by a hapa/waring measuring 1x1m to prevent predators or other organisms from entering the pond from entering. The pool is filled with water as much as 70-80 cm from the bottom of the pool.

This treatment is in accordance with Prihatini 2014 which states that pond preparation begins with drying for 2 to 3 days aimed at oxidizing organic matter contained in the soil into minerals or nutrients.

According to Ambarwati, N., & Mujtahidah, T. (2021) Tilapia can grow and develop well in aquatic environments with low or neutral alkalinity, water quality obtained from measurements of temperature, pH, and DO (Dissolved Oxygen) with average values the average temperature range is 24.64 oC, pH 8.06 and DO 6.98 ppm. The temperature experienced a stable increase, temperature sampling had a value of 24.6 ± 27.9 oC, pH value of 7.35 ± 9.23

There are 8 nets installed in the pool measuring 2x4m with a mesh size of 0.5 cm. Installation of nets is carried out in the middle of the pond to facilitate the movement of larvae which tend to always lead to the edge of the pond. Waring is paired with each corner tied to bamboo as a ballast. Each net is filled with 25 males and 75 females, each measuring 300gr. The density of fish must also be considered so that there is no seizure of territory when spawning.

3.3 Selection of Tilapia Parent

Prospective broodstock used must be of good quality, both genotypic and phenotypic, in order to produce good offspring, so before carrying out the spawning process it is necessary to have parent selection. The male and female parents used must come from different breeds (not related). The selected broodstock is the parent that has matured gonads, is healthy (agile and not deformed).

In the field work practice at the Cibiru Fish Seed Center, the ratio used is 1 male: 3 female. According to Iskandar at al (2021), the ratio of broodstock 1: 3 in tilapia spawning is ideal. The results of the field work practice obtained an average egg fecundity of 1,589 eggs per brood, with an average FR of 95% and an average HR of 76.7%. The percentage of larval survival rate obtained on average is 80%. Male and female tilapia brooders are on average 250-300 g/head.



Chart -2: Nirwana Tilapia

Data from observations of field work practices on male and female tilapia sires that have matured gonads are as shown in Table 3.

Table -3: Characteristics of gonadally mature Tilapia brooders in Cibiru Fish Seed Center

Characteristic	Male	Female
Body shape	Taller and rounder	Lower and elongated
Body color	Brighter	Darker
Number of genital holes	One hole to remove sperm and urine	Two holes for removing eggs and for excreting urine
gender shape	The bulge is slightly tapered	Not protruding and round

According to Suyanto (2003), to ripen the gonads of the tilapia broodstock, a brood separation process is carried out for 1-2 weeks. The parent separation is also to avoid wild spawning and the gonad maturation process is not optimal. In addition, the purpose of separating the male and female broodstock is so that the quality of the eggs produced is higher. The broodstock that will be spawned must be selected first, this aims to increase seed production (Sudrajat, 2003).

3.4 Parent Release

The male and female tilapia which are ready to spawn are then put into the spawning pond which is ready at 09.00. According to Ismail and Khumaidi (2006) a good parental release time is in the morning and evening because at that time the water temperature tends to be low.

The release of the parent is carried out simultaneously, namely the male and female parent are released simultaneously into the pond with a ratio of male and female 1:3. The transfer of brood fish from the broodstock pond to the spawning pond is carried out by lifting it openly using a fishing net. In an open system, the water media in the container can be in direct contact with the open air outside the container. Lifting is done openly because the distance between the main pond and the spawning pond is not too far away.

3.4 Parent Spawning

The spawning process is carried out naturally, namely the process of entering sperm cells into egg cells naturally without human assistance and without hormonal assistance being implanted into the fish's body. The spawning process is also carried out en masse in one pond, namely in one pond not only one parent pair of tilapia (single) is spawning, but many pairs (mass).

Spawning is the mating of male and female parents so that eggs are fertilized. Natural spawning is spawning naturally without human intervention (Amri and Khairuman, 2002). Cibiru Fish Seed Center uses natural methods

because the costs incurred are cheaper, in practice it is easier and more efficient. Tilapia is also a fish that is easy to breed and does not require a lot of engineering so that even in the natural method the seeds produced are quite good. Under normal circumstances and environmental factors support, natural spawning can take place at night (first night) or no later than 3 days after the parent is released into the spawning pond. Fish spawning is characterized by a boisterous sound and gurgling of water due to spawning pairs, chasing each other and jumping when releasing eggs and sperm.

Male fish that already have a spawning territory will look for a female parent who is ready to spawn. The female fish that are ready to spawn will lay eggs in the territorial area that has been prepared by the male tilapia and the eggs will be fertilized by the male fish.

Natural spawning occurs due to the influence of the surrounding environment such as changes in temperature, DO, pH, or salinity. The temperature required for tilapia spawning is between 22-27°C, the pH of the water between 5-11 can be tolerated by tilapia, the optimal pH for breeding and growth of this fish is 7-8 (Rukmana, 1997). According to Sutisna and Sutasmanto (1999), broodstock reared in an oxygen concentration of 5 mg/l produced a high number of eggs and spawning frequency.

Secondary reproductive hormones are endocrine substances with metabolic activities that maintain the body's physiological functions and allow reproductive processes to take place. Environmental signals received by fish will affect endocrine control to produce hormones that result in attraction between male and female fish resulting in spawning. naturally (Widyastuti and Gustiano 2008). Environmental signals play an important role because in natural spawning, fish that have matured gonads and are ready to spawn can produce mature eggs in a short time if the environmental conditions are good.

4. CONCLUSIONS

Based on the results of field work practices that have been carried out at UPT Cibiru Fish Seed Center, Bandung City, it can be concluded that the spawning techniques for Nirwana Tilapia at UPT Cibiru Fish Seed Center include broodstock rearing, pond preparation, brood selection, and spawning. parent. Nirwana Tilapia spawning technique carried out at UPT Cibiru Fish Seed Center is using a natural method, namely the process of entering sperm cells into egg cells naturally without human assistance and without hormonal assistance which is implanted into the fish's body. The factors that influence the success of natural Tilapia spawning are gonad maturity, the type of water as a living medium for fish, rearing containers, nutrition or fish feed, and the influence of temperature, oxygen solubility and pH of the water body.

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