Best Rearing Technique for Nilem Fish Larvae (*Osteochilus hasselti*)

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ABSTRACT

The increase in the cultivation of nilem fish (Osteochilus hasselti) causes the risk of an increase in the need for larvae. However, there are problems faced, namely larval mortality which is still high. High larval mortality usually occurs in the developmental phase, which is a critical phase when the yolk sac begins to run out and also a transition period when the larvae begin to utilize external food. The adaptation period of fish larvae from endogenous to exogenous food sources needs to be well understood by fish farmers, so that their hatchery business can run smoothly. Nilem fish is one of the fish that eats moss, algae, periphyton, aquatic plants, and plankton.
This study aims to determine the technique of rearing nilem fish larvae. This study used 10 days old nilem fish larvae. The implementation method used is the participatory method and the data collection method uses primary data and secondary data. The results obtained were nilem fish larvae had an absolute weight growth rate of 0.008 grams and an absolute length growth rate of 0.07 cm with a survival rate of 68.6%.

Keywords : *Nilem fish, larvae, maintenance, growth rate, natural food.*

1. Intoduction

Fish farming in Indonesia is one of the most important activities in the fisheries sector. This is because cultivation functions as a support for national food availability, creates income and employment. In addition, fish farming can be regarded as an important sector to support economic development in rural areas. One of the fish farming that is currently being developed is the cultivation of nilem fish [1].

Nilem fish (Osteochilus hasselti) is one type of herbivorous fish and also a natural predator of periphyton algae [2]. Nilem fish is an endemic (native) Indonesian fish that lives in fresh waters, such as rivers and swamps. Nilem fish have characteristics that are not much different from goldfish, namely at the corners of their mouths there are two pairs of tentacles that function as a sense of touch, and are pointed with a folded rostral snout [3].

Nilem fish farming has advantages both from the economic sector and environmental sustainability. Nilem fish farming is profitable from an economic point of view, environmental sustainability, and aquaculture production [3]. This fish includes fish that has economic value because in terms of price, nilem fish is very affordable for the community and very popular, especially in the West Java area [4].

This fish is quite popular because it has a delicious, chewy and savory taste and the spines are not too much when compared to Tawes fish. The economic value of nilem fish will increase after being processed into processed products such as fried baby fish, beef jerky, pindang, smoked and canned [3]. This fish can be enjoyed starting from the size of eggs, larvae (babyfish) to the size of consumption [5]. However, there is a risk of increased cultivation efforts leading to an increase in the need for large numbers of larvae and broodstock. The problem faced is that larval mortality is still high [6].

High larval mortality usually occurs in the larval development phase [7]. This phase is a critical phase, namely when the yolk sac begins to run out and also a transition period when the larvae begin to utilize external food [8]. Yolk sac (endogenous feed) is an innate feed in the form of egg yolks and oil grains which will decrease in volume as the larvae age. Meanwhile, food from outside (exogenous food) is food that comes from outside the body of the larvae and is usually in the form of natural food [9].

The adaptation period of fish larvae from endogenous to exogenous food sources needs to be well understood by fish farmers, so that their hatchery business can run smoothly. There are several types of natural food that can be consumed by fish larvae, but usually each species has a different feed preference [9]. Nilem fish is one of the fish that eats moss, algae, periphyton, aquatic plants, and plankton. At the larval or seed stage, nilem fish like phytoplankton and zooplankton [10].

1.1 Egg Hatching Container Preparation

Before the eggs hatch, the fiber tub where the nilem fish eggs are reared is cleaned first in order to optimize the hatching of eggs. The fiber tub consists of two sizes, namely a rectangular shape with a size of 2 x 1 x 0.4 m and a square shape with a size of 1 x 1 x 0.4 m. The fiber tub is cleaned by brushing the dirt that sticks to its surface and rinsing it with water. Then, the water is drained or discharged to be refilled with clean water. The water filled is as much as 1/2 of the total size of the fiber tub. After being filled with water, the fiber tub is equipped with aeration so that the eggs do not stick together and maximize the oxygen content in the water. In addition to aeration, eggs can also be stirred slowly with bamboo every few hours.
The hatchery container must be cleaned and filled with water with a height of 30 cm, as well as installing an aerator and its accessories to manipulate the flow of water [11]. According to [12], nilem fish eggs contain a lot of yolk that collects at a pole. The color of nilem fish eggs is transparent and is demersal or immersed in the bottom of the water. This is in line with the statement of [13], that fertilized eggs will be clear and transparent in color, while unfertilized eggs will be cloudy and milky white.

1.2 Hatching Eggs and Harvesting Larva

Hatching of eggs occurs when the embryo becomes longer than the yolk circle and has formed a pelvic fin. Hatching occurs by destroying the chorion by enzymes secreted by the ectoderm glands. In addition, hatching is caused by larval movements due to increased temperature, light intensity, and reduced oxygen [14].

After hatching, the embryo enters the larval stage. Larvae are embryos that are still in primitive form or are in the transition process to become a definitive form by means of metamorphosis. The end of the larval stage can be determined when the yolk sac is full. It was the end of the primitive form, and then the adult individual. The larval phase is divided into two, namely pre-larvae and post-larvae. The pre-larvae phase is characterized by the presence of egg yolk in the pouch, while post-larvae is characterized by the exhaustion of the yolk sac, the appearance of fin folds and pigment spots [14].

The eggs hatch after three days in the fiber tub. This is close to [15] statement, that nilem fish eggs will hatch at 31-32 hours after fertilization at a temperature of 24.7°C and the yolk is completely absorbed after 96 hours. For 2 days, nilem fish larvae were left in the fiber tub until the egg yolks were used up and actively moved or rotated to the middle area of the fiber tub, because in the first 2 days, nilem fish larvae tended to gather in every corner of the fiber tub. Then, nilem fish larvae were harvested on the 3rd day, according to the statement of [16], where after the eggs hatched, the 3-4 day old larvae were then harvested and reared in nursery ponds.

Nilem fish larvae are harvested when they are actively moving to the middle area of the fiber tub because nilem fish larvae do not yet have a strong and weak physique, so harvesting with active conditions is carried out so that they are ready to face the conditions of the rearing pond if there are bacteria and other parasites, because nilem fish larvae very small size similar to the larvae of Tawes fish.

Figure 1. One Spoon Larvae Sample

At the time of harvesting, nilem fish larvae were harvested using hapa. Then, nilem fish larvae were counted by sampling method once. Sampling is done by taking the larvae with a spoon, then the number of larvae in one spoon is counted. The result of one spoon is multiplied by the total number of spoons in 12 tubs of fiber which is 18 spoons. The results obtained in one spoon are 5,293 fish, so the total number of nilem fish larvae is 95,274 fish.

1.3 Preparation of Larvae Cultivation

Before carrying out larval rearing, the HDPE (High Density Poly Ethylene) pond is cleaned first in order to optimize the rearing of nilem fish larvae. The HDPE pool started from a concrete pool that had a leak, so action was taken by coating it with HDPE plastic. HDPE pool is rectangular with a size of 28.4 x 9.75 x 0.7 m. HDPE ponds are cleaned by dredging the dirt that sticks to the surface and rinsed with water. Then the water is reduced or discarded.

After drying, chicken manure husks are sprinkled on the bottom of the pond with the aim of growing natural food in the rearing pond so that it can be eaten by nilem fish larvae. Then, the pool is filled with water as much as 1/2 of the total size of the HDPE pool. After being filled with water, the harvested nilem fish larvae can be transferred to the HDPE pond. HDPE ponds used for rearing nilem fish larvae are 2 ponds.

1.4 Larvae Maintenance

Nilem fish larvae grow well in cold water conditions and have a flowing current. Because according to [17], in their natural habitat, these fish are found living wild in public waters, especially in rivers with medium currents and clear water. In addition, it can also be found living in swamps. According to [18] nilem fish live in freshwater environments with a sufficient range of dissolved oxygen content of 5-8 mg/L. Meanwhile, according to [19], in the tropics generally nilem fish are kept well in areas with an altitude of 150-1000 m above sea level, but the optimum altitude is 800 m above sea level with optimum free carbon dioxide for fish survival, which is <1 ppm.

Based on the maintenance of nilem fish larvae for 10 days, the survival rate, absolute weight growth rate, and absolute length growth rate can be calculated. After 3 days of hatching, the calculation was carried out by sampling once on the nilem fish larvae. The results obtained in one spoon are 5,293 larvae. The result of one spoon multiplied by 18 spoons so that the total number of nilem fish larvae is 95,274 tails. From the results of interviews, it is estimated that the survival rate of nilem fish larvae for 1 month is 70%, so that the total nilem fish larvae for 1 month is estimated to reach ±66,691 tails. The statement above is close to the data on the total stock of nilem fish in SPKPD-CDKPWU as of July 15, 2022, namely the size of 1-2 cm of nilem fish with a total of 65,375 tails.

According to[20], the tested nilem larvae had an average initial weight of 0.001 gram/head and an average fish length of 0.4 cm. While the results of weight measurement using the sampling technique of 65 nilem fish larvae aged 10 days was 5 grams, then the weight of 1 nilem fish larvae was 0.08 grams. Then, in measuring the length using a sampling technique on 6 nilem fish larvae, the average length was 1.1 cm.

1.5 Feeding

Nilem is an organic fish which means it does not require additional feed or pellets. Nilem fish are classified as plant-eating fish (herbivores). Newly hatched larvae usually feed on zooplankton (small or micro-sized animals that live in

waters and move with the flow of water) namely rotifers. Meanwhile, the seed stage and adult fish eat aquatic plants such as chlorophyceae, characeae, ceratophyllaceae, polygonaceae [15]. Nilem fish is one of the fish that eats moss, algae, periphyton, aquatic plants, and plankton. At the larval or seed stage, nilem fish like phytoplankton and zooplankton [10].

By providing feed in the form of plankton or moss that comes from feeding chicken manure, it will save expenses because there is no need to buy pellets. If necessary, can add 100 kg of bran as additional feed for one month. This maintenance usually lasts for 2-3 months [11].

2. DISCUSSION

The range of survival rates of 30-day-old nilem fish larvae achieved in each treatment was between 89-91% (A), 89-90% (B), 90-92% (C), 91-93% (D) and 93-96% (E). Meanwhile, in other treatments that used lower doses of feeding, the larvae were likely to experience a lack of feed, resulting in death [21]. The survival rate for street vendors activities has a lower value, which is 68.6%. The availability of natural food in the form of zooplankton and phytoplankton continuously plays an important role [9]. This is in accordance with the opinion of [22] that the success of fish cultivation in a hatchery unit is not only determined by the cultivation technique, but also by the production and use of natural feed as feed for larval development.

The absolute weight growth of all treatments ranged from 0.00151 grams to 0.00424 grams [20]. The results of this study are lower than the results of the absolute weight growth rate on street vendors, which is 0.008 grams. Growth marked by increased body weight indicates that the feed provided can meet the needs for the growth of nilem fish. If the energy generated from feed reform exceeds the total body maintenance needs and daily activities, then the rest will be used for weight growth [23]. Differences in weight growth can be caused by different nutritional content of feed [20].

According to [24], the balance of amino acid and protein components in feed is a major factor in influencing the growth and health of fish. Amino acid and protein components in the feed that are not in accordance with the amino acid and protein components in the body of nilem fish can result in low growth rates. In addition, the response of fish to relatively small feed causes the absorption of protein in the body and its conversion into energy for growth is less than optimal because the feed eaten is relatively small. The protein in the feed along with the feed energy ratio also affects the growth and survival of fish fry [25].

According to [25], the absolute length growth rate of nilem fish larvae reared for 10 days by giving different types of feed was 0.07 (P0), 0.06 (P1), 0.09 (P0), 0. 08 (P0). Meanwhile, according to[20], the absolute length growth of all treatments of nilem fish larvae for 15 days ranged from 0.75 cm to 1.18 cm. The absolute length growth rate value in the above study is close to the absolute length growth rate value for street vendors, which is 0.07 cm.
[26]explained that fish will grow if the nutrients in the feed that are digested and absorbed by the fish's body are greater than the amount needed to maintain their body. This can happen if the supporting factors are in an optimal condition and it will be different if the supporting factors such as temperature are below the limit that can be tolerated by the fish, then the food eaten is used more to defend themselves to live. [27] added that not all food eaten by fish is used for growth. Most of the energy from food is used for metabolism (maintenance), the rest is used for activity, growth and reproduction.

Fish growth is influenced by genetic, hormonal and environmental factors. Broadly speaking, there are two factors, namely internal factors consisting of genetic and physiological conditions of fish, as well as external factors related to the environment. The most influential environmental factor is nutrients. Other external factors include chemical and physical quality composition of water, metabolic waste materials, availability of feed, and pests and diseases. In addition, fish growth is also influenced by factors of food, space, temperature, salinity, season, and physical activity [28].

Nursery I on nilem fish larvae was carried out after being reared for 1 month. Meanwhile, according to[11], nilem fish are harvested after 3 months of age by subtracting from the volume of water and sorting by size. However, harvesting on rearing activities is carried out after the rearing period. Harvesting is done by using a coarse shear and transferred to a bucket before being put into the waring. The means of transportation used is a pick-up car.

Harvesting of enlargement activities is carried out for 8 months or until the fish reaches a weight of 100 grams/head with a selling price of IDR 25,000 per kg.

3. CONCLUSION

Based on the results of the research, it can be concluded that rearing nilem fish larvae includes preparation of hatching eggs, hatching eggs and harvesting larvae, preparation of larval rearing containers, and larval rearing has been going well. In addition, the survival rate of rearing nilem fish larvae for one month reached 68.6%. The absolute weight growth rate and the absolute length growth rate of 10-day-old nilem fish larvae were 0.008 grams and 0.07 cm, respectively.

4. REFERENCES

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