The larasati tilapia (*Oreochromis niloticus*) fingerling rearing activity in PBIAT Janti, Klaten, Central Java: its performance through survival rate

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Abstract. Tilapia (*Oreochromis niloticus*) is one of the fisheries commodities that are popular with many people. In aquaculture, fingerling is the main component that support the business. This study aimed to provide information on the performance of the rearing techniques of tilapia fingerling so that the information could be used in tilapia hatchery activities. This study was conducted at Loka PBIAT Janti, Klaten, Central Java on December 2018-January 2019. The work method used in this research was descriptive method with supported by primer and secondary data, especially survival rate data. With high quality rearing techniques, the survival rate of larasati tilapia fingerling in PBIAT Janti showed high level of 88.81%.

1. Introduction

Tilapia (*Oreochromis niloticus*) is one of the fisheries commodities that are much favored by the community. This is because of its rich omega 3 and high protein content. Previous studies have shown that the amount of omega 3 from tilapia reaches 16.2%, higher than 2.5% chicken [1, 2]. Omega-3 content in tilapia plays an important role in improving the health of the human body, fostering brain cell development, and supporting human diet through fat regulation [3, 4]. Tilapia meat also has a protein content of 15.63% where the protein functions for growth, bone and muscle formation and maintain human health [5, 6, 7, 8]. Tilapia also has several advantages, including being easily cultured, relatively fast growth and resistant to changing environmental conditions [9, 10]. Therefore, aquaculture activities continue to be developed until now, including fish hatchery.

One aspect of fish hatchery is the rearing of fingerling after the hatchery process. The purpose of fingerling rearing is to support fish enlargement activities by keeping the fingerling so they do not experience death and can be raised to the size of consumption [11]. The availability of fingerling for aquaculture activities is very important so that the fish aquaculture cycle continues [12].

PBIAT Janti is a Center for Freshwater Fish Breeding and Culture in Central Java-Indonesia, which experienced in tilapia production. The Office of Maritime Affairs and Fisheries of Central Java Province has determined that PBIAT Janti is the place that can do tilapia larasati hatchery production well [13]. PBIAT Janti can also do tilapia aquaculture activities. PBIAT Janti is an expert place of the maintenance of tilapia larasati fingerlings [14]. This study aimed to determine the performance of
rearing techniques of tilapia fingerling at PBIAT Janti through survival rate parameters. From this article it is hoped that it can provide information on the performance of the rearing techniques of tilapia fingerling so that the information can be used in tilapia hatchery activities.

2. Material and methods

2.1. Research design
The sample was 76,000 fingerlings of tilapia larasati which were rearing in PBIAT Janti, Central Java. The fingerlings were 2-7 cm in size. The fingerlings came from the broodstock of pandu tilapia and kunti tilapia in a ratio of 1: 3 for 15-18 days.

2.2. Sampling and survival rate estimation
The work method used in this research was descriptive method, a method that described the situation or event in a particular area to examine a group of people, an object, a system of thought, or an event in the present [15]. Descriptive methods were supported by primary data collection (interviews, observation and active participation) and secondary (obtained indirectly) [16]. The performance of rearing techniques of tilapia description was determined by survival rate value. Survival rate in this study was calculated using the formula according to previous study [17]. The survival formula could be seen as follows:

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SR = \frac{N_0 - N_t}{N_0} \times 100\%
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Description:
SR = Survival rate (%)
N_0 = Total fish died during experiment
N_0 = Total fish at the start of experiment

3. Result and discussion
Fingerlings were sampled and grouped into four sections according to size, which were 2-3 cm, 3-5 cm, 4-6 cm and 5-7 cm. Fingerlings sampling data at Janti PBIAT could be seen in Figure 1. The total fingerlings sampling results obtained as many as 67,500 fishes with an initial stocking density of 76,000 fishes. The survival rate of fingerlings rearing activities in PBIAT Janti showed in Figure 2. The survival rate was reached 89%, even higher than the previous study which was 75-88.3% [18]. This was because the pond preparation process and anticipation of the disease had been carried out by adding dolomite lime. Lime functioned as a disinfectant to prevent dangerous diseases that caused fish dead [19]. Previous study [20] said that the use of dolomite lime could increase pH soil and streamlining nutrients so that it could be utilized by tilapia fingerlings to maintain their metabolism. Liming also served to neutralize acidity in ponds and increased carbon availability for photosynthesis of plankton that was used as natural feed [21].
Figure 1. Fingerlings sampling result of larasati tilapia in PBIAT Janti

Not only liming, pool drying carried out at PBIAT Janti also supported the high survival rate of fingerlings. Drying the pond at PBIAT Janti took 3-4 days using the sunlight. This was longer than previous study [22] that draining ponds took 2-3 days to kill pests and diseases in the pond. The purpose of drying ponds was to oxidize organic matter contained in the soil to become minerals or nutrients and to evaporate poisons that came from the remnants of feed and feces [23].

Figure 2. Survival rate of fingerlings tilapia larasati in PBIAT Janti

Before the fingerlings were stocked in ponds, fertilizer was first applied. The fertilizer used was organic fertilizer from quail feces. quail feces were chosen because they have high nutrient content, were easily broken down and absorbed to stimulate the growth of plankton in ponds [24]. The application of fertilizer functioned to grow plankton organisms as natural food for fish [25, 26].

Hatchery activities also supported fingerling rearing at PBIAT Janti through high quality selection of fingerling. Larasati tilapia fingerlings were obtained from spawning activity between pandu tilapia and kunti tilapia. Spawning pandu tilapia and kunti tilapia were done in a ratio of 1: 3 for 15-18 days. This was in accordance with the previous study [27] that the use factor of the female parent was more than male during spawning aims to obtain optimal reproductive results. The broodstocks used were also high quality broodstock (not disabled, good offspring history, fast growing) [28].

Feeding also influenced the survival rate. The feed used in the fingerlings rearing was natural and artificial feed. Natural feed consumed by tilapia larasati fingerling was in the form of plankton that grew after fertilizing during pond preparation as described previously. Natural feeds that grew in ponds were Artemia. This was in accordance with the previous study [29] that the natural feed given to the seeds of tilapia larasati was Artemia.
Artificial feed given for tilapia larasati fingerling was pellet type of hi-pro-vite 782. Pellets were given twice a day at 07.00 and 16.00. This was in accordance with the previous study [30] that feeding was done twice a day in the morning and evening to accelerate the process of seed growth. The dose of feed given was 2-3% by weight of biomass. This was according to previous study [30] that the type of feed given to tilapia fingerling was floating pellets at a dose of 3% of the weight of the fish. The pellets were grinded to turn it into powder. Pellets that had become powder could facilitate the larvae to consume them because they were in accordance with the mouth opening. The pellets that had become powder were then mixed with shrimp feed. Comparison of shrimp feed with pellets was 1: 2. The addition of shrimp feed was intended because shrimp feed contains a lot of protein [31]. In addition, shrimp feed is also rich in natural carotenoid sources so that it can increase the color intensity of the fish's body [32]. The intensity of the color on the body of the fish is used to attract the attention of the opposite sex at the time of spawning and as a value of selling fish to consumers [33].

Good water quality control also increased the survival rate of tilapia fishes so that they were not easily stressed and attacked by diseases [34]. According to the previous study [13], the optimal temperature range for tilapia aquaculture was 25-30°C. This statement was in accordance with the conditions in the field which showed the temperature of 25-32°C. In addition to temperature, pH and DO also affected water quality. The pH measurement resulted in tilapia larasati fingerlings rearing ponds was 7. This pH measurement was in accordance with the previous study [35] which stated that the pH value for water media freshwater fish was 6.8-8.0. DO result obtained from the maintenance of tilapia larasati ponds was 5.5-7.2 ppm. This was consistent with previous study [36] that the DO value was at least 4 ppm.

4. Conclusion

From this study it could be concluded that the survival rate of tilapia larasati fish fingerlings rearing activities in PBIAT Janti was 88.8%. The high value was due to pond preparation activities, feeding, pond preparation, hatchery and good water quality control.

5. References
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