Study on Survival and Growth Rate of Some Variety of Fish Fry Indigo (Oreochromis sp.) The Different Size of 3-5 Centimeters

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Abstract

Tilapia has several varieties produced from cross-breeding. The results of cross-breeding produce new varieties in tilapia with their respective advantages in terms of survival and growth. But until now there has been no research on survival studies and the growth rate of some of the best Tilapia fish varieties. This study used a completely randomized design, 4 treatments 3 replications. The treatments given were (A) Gift Tilapia, (B) Red Tilapia Fish, (C) Jatimbulan Tilapia Fish and (D) Solid Tilapia Fish. Tilapia seeds maintained in treatment B (red tilapia) gave the highest survival value of 88.87% and the lowest value in treatment A (gift tilapia) and D (stocky tilapia) were 83.33%. In treatment A (Gift Tilapia) gave the highest length growth value of 1.6-1.7 cm and the highest daily weight growth rate of 0.085 gr / day, while in treatment B (Red Tilapia) gave the lowest length growth value of 1.3-1.45 cm and the lowest daily individual weight growth rate of 0.062 gr / day. Water quality parameters such as pH, DO and temperature measured during the maintenance period are in the normal range, so they do not have a significant effect on the growth of tilapia fish. The highest FCR was obtained in treatment B (Red Tilapia) with an average of 0.90 and the lowest FCR was obtained in treatment A (Tilapia Gift) with an average of 0.69.

Keyword : Survival rate, Growth rate, Tilapia

Introduction

Tilapia (Oreochromis sp.) Is one of the freshwater fish commodities that has received great attention for the fisheries business, especially in efforts to improve the nutrition of the people in Indonesia. This is because Tilapia has beneficial properties, which are easy to breed, grow fast, the meat is thick and compact, tolerant of the environment that is not good, can live and breed in brackish water and has a broad response to food (Yuliati et al. , 2003).

Tilapia has a promising business prospect. One thing that has contributed to the rapid development of the Tilapia fish farming business is the low cost of production, so it is not surprising that the benefits are also quite large. This causes many small capital fish farmers to dare to start a Tilapia fish farming business (Amri and Khairuman, 2008).

Tilapia that is cultivated in Pasuruan has several varieties of cross-marriages that have their respective advantages in terms of survival and growth, including Tilapia Gift, Red Tilapia, Tilapia Jatimbulan and Tilapia Kekar. Some of these varieties are produced from different parent breeds, with different quality of each parent so as to produce different quality seeds, both in terms of growth and survival. Therefore, research on survival and growth rate of various varieties of Tilapia fish needs to be done so as to make it easier for farmers to choose varieties that are fast growing and low mortality rates.

Material and Metods

The materials used in this study include: test fish in the form of Tilapia fish seeds with different varieties (Tilapia Gift, Red Tilapia, Tilapia Jatimbulan and Solid Tilapia) size 3-5 cm, because at that age is an age of growth

that is easily observed its changes. A total of 360 fish were used from IBAT Pandaan, UPT PBAT Umbulan and Nila Kekar Hatchery, Gondang Wetan District, Pasuruan. The work method used in this study is the experimental method which is a set of actions and observations made to check or blame hypotheses or recognize causal relationships between symptoms. This research was conducted with 4 treatments and 3 replications. The treatments given include: (a) using Gift Tilapia, (b) using Red Tilapia, (c) using Jatimbulan Tilapia, (d) using Solid Tilapia. Observations made are the measurement of SR, absolute length growth, GR, FCR as well as physical and chemical parameters.

Result and Discussion

Survival Rate

The highest survival of Tilapia seeds obtained in treatment B (Red Tilapia) was 88.87% and the lowest was obtained in treatment A (Gift Tilapia) and D (Solid Tilapia Fish) by 83.33%, as presented in Table 1 .

Table 1. Survival rate (%) of Tilapia (Oreochromis sp.) Seeds during the study.

Treatment	Repeat			Average
	I	II	III	
A	86,67	80	83,33	83,33
B	83,33	100	83,33	88,87
C	93,33	100	63,53	85,55
D	83,33	86,67	80	83,33

From Table 1 above, the best treatment was obtained in treatment B (Red Tilapia) of 88.87%. According to Suryanti (2013), Red Tilapia has advantages such as Red Tilapia can live in high density conditions, resistant to disease and inadequate aquatic environments.

Survival rates can be affected by genetic diversity resulting from parent crossing. The higher genetic diversity, the more positive traits the seed will produce. According to Leary et al., (1985), Low genetic diversity results in the emergence of negative traits, namely decreased growth, diversity in size, stability of organ development, survival rates, and adaptation to environmental changes. In the research results, the survival rate of red tilapia is higher than other black tilapia. This is caused by the attack of the fungus Saprolegnia sp. The fungus was carried by Nila GIFT. The Red Tilapia is slightly attacked by fungi because of the location of the isolation apart from the Tilapia GIFT so that its survival is higher than other Tilapia fish. Morphological signs of fungal attack Saprolegnia sp such as the presence of cotton fibers in almost all fish bodies. This is in accordance with the opinion of Jefri (2011), that the symptoms that can be seen clinically are the presence of fine threads resembling cotton that sticks to eggs or cuts on the external part of the fish. In addition, the fins and fish body color changes to red.

Growth Rate

The absolute length growth of tilapia fish can be seen in Table 2.

Table 2. Growth in absolute length (cm) of Tilapia (Oreochromis sp.) Seeds during the study.

Treatment	Repeat			Total (cm)	Average (cm)
	I	II	III		
A	1,6	1,7	1,6	4,9	1,63
B	1,3	1,45	1,3	4,05	1,35
C	1,4	1,3	1,4	4,1	1,37
D	1,4	1,6	1,6	4,6	1,53

The results from Table 2 above show the highest average absolute length growth in treatment A (1.63 cm), followed by treatment D (1.53 cm), treatment C (1.37), and treatment B (1.35 cm)). The highest average absolute length growth was found in treatment A (Tilapia Gift) where during maintenance experienced a rapid growth increase of 1.6-1.7 cm. The lowest average absolute length growth was found in

treatment B (Red Tilapia) where during maintenance experienced slow growth of 1.3-1.45 cm. This is likely due to the different quality of the parent so as to produce seeds with different qualities, according to the opinion of Effendie (1997), growth is influenced by two factors namely internal factors including heredity, sex, age, and from external factors including the aquatic environment, food, diseases and parasites. While Osure and Ronald (2006), added that the comparison of different Tilapia seed yields can be a complex problem, because it is influenced by several factors including the size of the parent, previous spawning history, production regulation, and the type of selection pressure associated with domestication.

In addition to the quality of the parent, one of the factors that influence the growth results of Tilapia is sex. Male and female tilapia show different growth rates. Male tilapia is faster than female tilapia (Lowe-McConnel, 1982 in Siddiqui and Ahmed, 1995). Therefore, fish population with male domination will lead to better growth results. Mamun et al., (2007) have reported three commercial Tilapia groups namely Tilapia GIFT, Tilapia GMNT, Tilapia CNT used in the study showed no statistical differences in the digestive efficiency of dry feed, protein, lipids and energy. Growth rate and efficiency of tilapia fish feed also showed the same tendency.

GIFT Tilapia get the highest yield because this fish is a fish from the selection program. According to Yuliati et al., (2003), in 1995 Indonesia brought the 3rd generation Nila GIFT (Genetic Improvement of Farmed Tilapia) from ICLARM Philippines. This tilapia is the result of a family selection program from public waters and aquaculture countries of Egypt, Ghana, Sinegal, Kenya and Singapore.

GIFT tilapia has a higher genetic diversity resulting from crossing of tilapia between countries. According to De Silva (2015), the level and pattern of parent genetic variation affects the quality of the seeds produced. Decreasing genetic level causes decreased growth.

Daily growth rate of individual weight of Tilapia fish can be seen in Table 3.

Table 3. Daily individual weight growth rate (gr / day) of Tilapia (Oreochromis sp.) Seeds during the study.

Treatment	Repeat			Total (gr/hari)	Average (gr/hari)
	I	II	III		
A	0,089	0,085	0,081	0,255	0,085
B	0,064	0,058	0,065	0,187	0,062
C	0,061	0,064	0,064	0,189	0,063
D	0,079	0,080	0,075	0,234	0,078

The results from Table 3 above show the highest daily individual weight growth rate obtained at treatment A (Tilapia Gift) with an average of 0.085 gr / day and the lowest daily individual weight growth rate obtained at treatment B (Red Tilapia) with an average of average of 0.062 gr / day. The difference in growth rate is influenced by several factors. According to Huet (1971) in Panjaitan (2004), growth is influenced by internal and external factors. Internal factors include resistance to disease and heredity / genes, while external factors are environmental conditions both biotic and abiotic which include water temperature, dissolved oxygen content, quality and quantity of food and space for fish.

According to Fujaya (2004), genes regulate the processing of nutrients including food, water and oxygen which provide raw material for growth. And hormones speed up processing and stimulate genes. Meanwhile, according to Khans et. al. in Yanti et al. (2003), one of the important nutrients needed by fish is protein. This is because protein is a food substance that is very necessary for growth. Utilization of protein for fish growth is influenced by several factors, including fish size, fish age, feed protein quality, feed

energy content, water temperature and feeding frequency. However, in this study, some of these external factors, both biotic and abiotic, have been uniformed so that the alleged differences in growth rates lead to factors including genetic factors and parent quality that affect seed quality.

Water quality parameters in all treatments in this study were relatively normal, as presented in Table 4.

Table 4. Parameters of average water quality during the study.

Parameter	Treatment			
	A	B	C	D
DO	4,5-7,4	4,6-7,7	4,8-7,2	4,2-7,2
Suhu	25-27,7	25-27,6	25-27,7	25-27,7
pH	7,5-8,1	7,3-8,1	7,4-8,0	7,5-8,1

During the study oxygen was still in the range between 4.2-7.7 mg / L by giving aeration so that dissolved oxygen remained stable, according to Boyd's statement (1990), fish growth and survival were good at DO values> 3.5 mg / L.

The pH of the treatment during the study ranged from 7.3 to 8.1. This value is still within the normal limits of water quality for freshwater fish. According to Boyd (1990) the optimal pH of waters to support fish growth is between 6.5-9, while the pH range of 5-6 can affect fish growth to be slow. The temperature in the treatment during the study ranged from 25-27.7 ^{o}C. This value is included in the optimum range of water quality for the growth and breeding of tilapia. According to Amri and Khairuman (2008), Tilapia grows normally in the temperature range of 14-38 ^{o}C and the optimum temperature for growth and breeding of Tilapia is 25-30 ^{o}C.

In the measurement of Feed Convertion Rate (FCR) we get different results for each treatment, which are presented in Table 5.

Table 5. Feed Convertion Rate (FCR) of Tilapia (Oreochromis sp.) Seeds during the study.

Treatment	Repeat			Total	Average
	I	II	III		
A	0,64	0,70	0,73	2,07	0,69
B	0,92	0,86	0,92	2,70	0,90
C	0,87	0,78	1,02	2,67	0,89
D	0,73	0,72	0,81	2,26	0,75

In this study, differences in varieties affect the value of the FCR. The lowest FCR was obtained in treatment A (Tilapia Gift) with an average of 0.69. This means that to add weight to 1 gram of fish meat takes 0.69 grams of feed. Whereas the highest FCR was obtained in treatment B with an average of 0.90. This means that to add weight to 1 gram of fish meat takes 0.90 grams of feed. The higher the FCR value, the feed needed for maintenance is greater so that it is inefficient in the use of feed that is not proportional to the addition of fish weight. The lower the FCR value, the more efficient the feed given to fish. According to Effendi (2006), feed conversion value is the ratio of the amount of feed given to the weight of fish produced. The smaller the value of feed conversion, the better fish farming activities.

Conclusion

Variety differences do not affect the survival of tilapia (Oreochromis sp.). Variety differences affect the growth of tilapia (Oreochromis sp.). The growth of absolute length and growth of individual weights of the best individual Tilapia seeds achieved at treatment A (Tilapia Gift) of 1.63 cm and 0.085 gr / day.

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