Effect of Different Density to Growth and Survival of Gurame Seedling

[1.2]Elisnawati Harun, [2]Yuniarti Koniyo, [2]Juliana

[1]harunelisnawati@yahoo.com
[2]Department of Aquaculture, Faculty of Fisheries and Marine Sciences,State Universityof Gorontalo

Abstract

This study aims to determine the effect of different stocking density on the growth and survival of fish fry carp (Osphronemus gouramy). This study used an experimental method. The design used was completely randomized design (CRD) with three treatments and three replications. The results showed that the absolute growth in length and the highest weight shown on treatment A (3 heads / l) respectively of 1.09 and 0.9 g cm, followed by treatment B (5 animals / l) respectively of 0.9 cm and 0.84 g, and the lowest in treatment C (7 animals / l), respectively for 0.86 cm and 0.8 g. Gurame fish seed viability during the study showed treatment A by 82.86% whereas 72.67% of treatment B and C treatment amounting to 83.33%. The results of this study continue with the LSD (Least Significant Difference) with a confidence level of 99%.

Keywords: Gurame seedling; Osphronemus gouramy; survival; density; growth

Introduction

This study aims to determine the effect of different stocking density on the growth and survival of fish fry carp (Osphronemus gouramy). This study used an experimental method. The design used was completely randomized design (CRD) with three treatments and three replications. Test animals used were fish seed Gurame (Osphronemus gouramy) 450 tail with an average length of initial seed ± 3 cm and weight of early ± 1.3 grams. The volume of water used 10 liters / container. Maintenance lasts for 42 days. The treatments used different stocking densities, namely (A) 3 heads / l, (B) 5 tails / l and (C) 7 mice / l. The container used in the form of 9 pieces of plastic containers synthesis with a capacity of 16 liters equipped with aeration. The results showed that the absolute growth in length and the highest weight shown on treatment A (3 heads / l) respectively of 1.09 and 0.9 g cm, followed by treatment B (5 animals / l) respectively of 0.9 cm and 0.84 g, and the lowest in treatment C (7 animals / l), respectively for 0.86 cm and 0.8 g. Gurame fish seed viability during the study showed treatment A by 82.86% whereas 72.67% of treatment B and C treatment amounting to 83.33%. The results of this study continue with the LSD (Least Significant Difference) with a confidence level of 99%.

Research Methodology

This study was conducted in August and September 2015. The location penelitia Development Center Aquaculture Freshwater Fish (BPBIAT) Gorontalo Province.

Tools and materials used in this study are: plastic containers, analytical balance, a ruler, a pH meter, DO meter, blower, hoses and AIRSTONE, hose Sipon, faucet aeration, seser, bailer, Loyang, camera, writing equipment. The ingredients used are fresh water, seed and feed carp pellet F-888.

Seed carp kept in a container maintenance in the form of cylindrical plastic container with a capacity of 16 liters of water. A stocking density (3 heads / l), B (5 animals / l), C (7 animals / l). The amount of container used is 9 units are equipped with aeration. Aeration is provided to increase the oxygen content in the water, so that can meet the need of oxygen for the growth of the seed. Seed carp reared for 42 days, the feed given in the form of feed pellets (F-888). Feed given in the morning and afternoon, feeding on seeds given adlibitum carp (fish and were satisfied). Water quality measurements carried out once a week. The water quality is measured dissolved oxygen (DO), temperature and acidity (pH). Water quality measurements along with penyiponan process and the replacement process water.

The study design used randomized block design complete. Test variables are giving different stocking densities. The treatments used are stocking densities 3, 5 and 7 animals / liter. Seeds to be used with a length of 2-3 cm seed ± / ± tail and seed weight of 1.5-2 g / fish. Each treatment was performed three replications, conducted in a container maintenance.

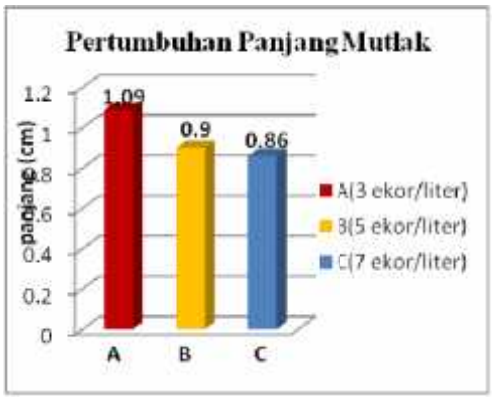
The variables measured in this study is the length, weight and seed viability of carp. The calculation of the length growth the absolute growth of heavy absolute, the calculation of weight gain average daily or Average Daily Growth (ADG), the calculation of the length average daily or Daily Growth Rate (DGR) and calculation of continuity using a formula that is used Cholik et al., (2005).

Data obtained include the measurement results and a long growth rate growth rate carp seed weight, calculated using Analysis Of Variance (ANOVA) one way to test F of the method completely randomized design (CRD).

Result and Discussion

Absolute length growth

Measurement of the absolute length growth of seeds carp (Osphronemus gouramy) using the three treatment treatment A (3 heads / l), treatment B (5 animals / l) and treatment C (7 animals / l) contained in Figure 1 below:



Figur 1 Graphic of absolute length growth

Based on the research that the stocking density of different influence on the growth of the seed absolute length of carp. Growth in absolute length decreased with increasing stocking density (Figure 4).

Based on the analysis of variance were obtained also stocking density can affect the growth of the absolute length. Absolute length growth in solid stocking 3 tails / liter were significantly different to the stocking density 5 and 7 animals / liter. Absolute length growth of carp fish seed stocking densities are in the best treatment A tail that is 3 / liter.

Increasing the value of the long growth conclusively demonstrate that the low density has the ability to utilize the space well compared to high density, because the stocking density is different in the container which covers the same at each treatment and competition between individuals will also increase, especially competition for space so that people who lose will be stunted, and it is also possible there is competition in terms of getting the feed.

Absolute weight growth

The growth of the absolute weight of seeds of carp (Osphronemus gouramy).for 42 days, using three treatments ie treatment A (3 heads / l), treatment B (5 animals / l) and treatment C (7 animals / l). The results of measurements of the average length of the absolute seed of carp found in Figure 2 as follows:

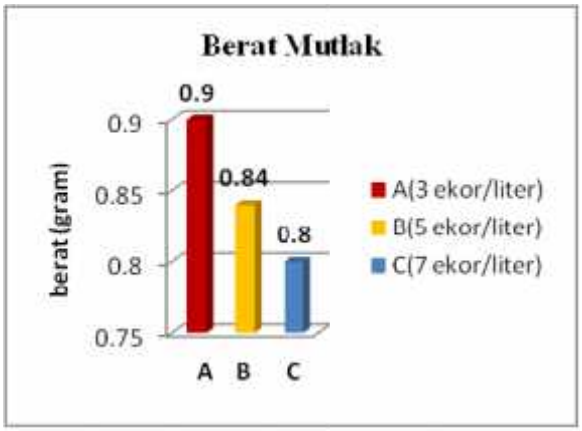


Figure 2 Graphic of absolute weight growth

The results showed the best stocking density currently on treatment A tail that is 3 / liter that each stocking density of different influences which berbada also on the growth of the seed weight of carp (Osphronemus gouramy).

Based on the analysis of variance showed that the stocking density of different significant effect on weight gain absolute on the seed carp. To know the differences of each treatment on the absolute weight

of carp then proceed with the least significant difference test (BNT).

Stocking density difference during the study to give effect to the growth of the absolute weight of the carp. Along with the increasing stocking density, the rate of growth of absolute weight decreases. This is in accordance with the opinion of Wedemeyer (1996), that the decline in the absolute weight of fish thought to be caused by a disturbance in physiological processes and behavior of fish due to the density that crosses a boundary. In addition, increased stocking density causes the space for the fish to be cramped that ultimately resulted in a decline in the heavy growth in fish.

Daily growth

Research results daily growth in length and weight of the seed carp (Osphronemus gouramy) for the maintenance of 42 days using three treatments ie, treatment A (3 heads / l), treatment B (5 animals / l) and treatment C (7 animals / l) can be in see the following table:

Table 1 Average daily growth of carp seed

Treatment	Average	
	Length (cm)	Weigth (gram)
A	0.03	0.021
B	0.01	0.020
C	0.02	0.019

Long and weight relationship that occurs in fish, there are positive allometric which shows that the growth of fish weight faster than the growth the length and showed negative allometric growth of fish length faster than the growth of its weight (Mashuri et al., 2011).

Stocking density difference during the study to give effect to seed the growth of carp. Along with the increasing stocking density, the weight and length growth decreases. This is consistent with the statement (Zaenal, 2009) in his research that the higher stocking densities in a container then the correspondingly reduced seed growth of carp. Declining growth of fish thought to be caused by a disturbance in physiological processes and behavior of fish due to the density that crosses a boundary. In addition, increased stocking density causes the space for the fish becomes narrow, which in turn causes stress.

Survivality

The survival rate of the fish will determine the production will be obtained. Carp seed viability during the study can be seen in Figure 3 below.

Figure 3 Survivality of Gurame

Based on the percentage of the graph above shows that the survival of carp highest seed is at a solid 3 tail / liter with a percentage of 83.33%.

Based on the analysis of variance seed viability of carp showed that the stocking density of different influence on seed viability of carp in which the value of Fhit (11.30) is greater than Ftabel level of 1% (10.92). Furthermore, to determine the differences in each treatment stocking density on the seed carp continue with the least significant difference test (BNT).

The low viability of seeds carp allegedly as a result of the limited space compared to the amount of seed collected will cause the accumulation of seed from each other, the result would be competition in obtaining a place. Based on the opinion (Almaniar et al., 2012), states that the density is too high will lead to competition space, so it becomes limited because the fish is getting crowded, this can lead to individual growth, feed utilization and survival of fish will decrease. In addition, the increase in density can affect the physiology and behavior of fish to space. This in turn can reduce health and physiological condition of the fish so that the use of food, growth and survival decreased (Yulianti, 2007).

During the study the seeds of death carp allegedly brought about by increased stocking density resulting in friction, pain and stress. The higher stocking densities, the space becomes narrow so that the friction between the body of the fish more often and easily injured. Then conditions carp causing injury to the fish become faster stress that can eventually lead to death. Another condition of some fish were found dead, showing the wounds on the body as a result of the attack among fellow fish. This can happen because the carp including a territorial fish are fish that protect the territory (Sendjaja, 2002). When attacked other fish causing injuries and stress that if left untreated will cause death. Stress on carp when research is marked by the appearance of a darker body color.

Water quality

Results of water quality measurements during maintenance seed carp (Osphronemus gouramy) showed that the range obtained was in the range which is good for the growth of the seed. Water quality data can be seen in Table 2.

Table 2 Water quality parameters range

Treatment	Parameters		
	pH	Temp.(^{O}C)	DO(Mg/l)
A	6.93-7.17	26.87-27.77	4.90-5.13
B	7.03-7.13	27.17-27.46	4.93-5.17
C	6.90-7.13	27.13-27.67	4.93-5.17

Based on a range of media for maintenance of water quality in treatment A, B, and C are still in a reasonable range. This is because every day do penyiponan to remove dirt (feces), causing water quality remained stable in a range of media that is appropriate for the growth of carp seed.

The temperature range during the study between 26,87oC-27,77oC. The optimal temperature for fish life between 25oC-32oC (Djarijah, 1995). This shows that the water temperature during the study in the optimal range. (Sasono, 2001), states that the temperature is the most important environmental factors regulate the growth rate, while the pH of the water is the cause of many parameters of ions contained in the water, the low pH can cause death while the pH value is too high causing unproductive waters.

PH range during the study was 6.90 to 7.17. The fish can grow well in a pH range between 6.5 to 8.5 (Djarijah, 1995). This shows that the pH range when the study was still in the range where the fish can grow and survive.

Dissolved oxygen (DO) is a water quality parameters are very important because they absolutely needed by the organism cultivation to the process of respiration. The oxygen content in this study ranged from 4.9 to 5.17 mg / l. The fish require sufficient dissolved oxygen for life. Low oxygen content causes decreased appetite, which in turn will affect the growth rate of fish. The range of optimum value of dissolved oxygen for fish growth by Azhary (2006) is 4-6 mg / liter. Oxygen is essential for the growth and survival of carp.

Conclusion and Suggestion

Different stocking densities give effect to seed the growth of carp (Osphronemus gouramy). Solid stocking different in the maintenance of seed carp (Osphronemus gouramy) provides highly significant effect (F hit> F tab) on the growth and survival of fish fry carp. Growth of the length and the highest weight on the seed carp (Osphronemus gouramy) contained in solid stocking 3 tails / litermasing amounting 1:09 cm and 0.9 g, and the lowest in stocking density 7 animals / liter respectively by 0.86 cm and 0.8 gr.

The survival of fish fry highest gurameyang during the study indicated the stocking density 3 heads / liter amounted to 83.33%, while survival was lowest for the stocking density 5 mice / liter amounted to 72.67%.

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