

THE EFFECT OF DIFFERENT TEMPERATURE TOWARD THE SURVIVAL RATE AND SPECIFIC GROWTH RATE OF THE SILVER ARWANA FISH (*Osteoglossum bicirrhosum*)

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Abstract

The business of arwana hatchery is now grew up. One of the main factors which can increase the successfulness of arwana hatchery is water quality parameter, such temperature. This research was held on February to April 2014 in BBI Punten, Batu. The silver arwana hatchery was from "MINA KARYA KOI CENTER" Sleman with its height 5,3 cm and weight 0,5 gr. It was treated in the aquarium 100x40x50 cm³ with its density 10 fry/aquarium. The treatment which given such (A) the temperature is 26°C, (B) the temperature is 28°C, and (C) the temperature is 30°C in 5 time repeated. The silver arwana hatchery which treated in the temperature 26°C has the survival rate as 78% and the lowest score for temperature 30°C treatment is 20%. In 26°C temperature, the average of height growth is -2,7 cm and the average of weight growth in a day is 2,05%.

Keywords: *Silver arwana, temperature, survival rate, growth rate*

Introduction

Arowana fish is a type of primitive fish, this fish is one of the most expensive ornamental fish in the world, with attractive colors. The high selling price of arowana fish caused many arowana fish to be caught and traded for commercial purposes. Increasing the capture and trade of these fish excessively results in a decline in the population in nature. At present Arowana fish is almost non-existent in nature due to overfishing (Manoharan ., *et al*, 2011).

The difficulty of finding arowana fish in nature, has resulted in the transfer of fishing activities into cultivation. However, arowana fish seed production is still not optimal. To support these activities there are still obstacles faced in maintaining arowana fish seeds, one of which is the temperature that will affect growth, survival, and the emergence of various diseases. Fish are cold-blooded animals so that the body's metabolism depends on the temperature of the environment, including fish immunity. High temperatures cause fish

to move actively, do not want to stop eating and metabolism rapidly increases so that the dirt becomes more numerous. This causes oxygen demand to rise, so that the availability of oxygen in the water will decrease. Reduced oxygen in water can affect oxygen levels in fish blood. Decreased oxygen in the blood can cause fish to become stressed and susceptible to disease. Lesmana (2002) states that the environmental factors that most influence the growth rate are water temperature.

Arowana fish hatchery business has begun to develop. One factor that can increase the success of arowana fish hatchery is water quality parameters, such as temperature. Temperature is very influential on metabolic processes and metabolic processes affect the growth of fish, besides that significant temperature changes can cause fish to become stressed and easily die. According to Yanwirsal (2013), silver arowana fish (*Osteoglossum bicirrhosum*) live in nature at a temperature range of 26°-31°C.

This study aims to determine the optimal temperature for survival and growth of silver arowana (*Osteoglossum bicirrhosum*).

Materials dan Methods

In this study, a research container in the form of aquariums with a size of 100x40x50cm³ as many as 15 pieces, while the materials used include: test fish in the form of silver arowana fish seeds (*Osteoglossum bicirrhosum*) of 5.3 cm in size as many as 150 heads of cultivators “MINA KARYA KOI CENTER” Sleman, Yogyakarta. The feed used *tubifex*.

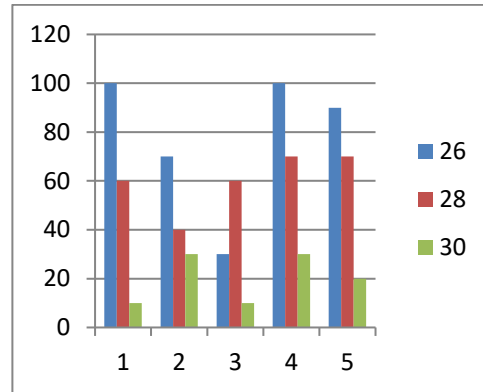
The work method used in this research is the experimental method which is a set of actions and observations, which is done to check or blame the hypothesis or recognize a causal relationship between symptoms. This research was carried out with 3 treatments and 5 repetitions. The treatments given include (A) treatment temperature of 26°C, (B) temperature treatment of 28°C, (C) temperature treatment of 30°C, referring to the temperature range in the habitat of silver arowana fish. According to Yanwirsal (2013), silver arowana fish (*Osteoglossum bicirrhosum*) live in nature at a temperature range of 26°-31°C. Observations made were measurements of SR, GR, efficiency of absorbed feed and physical and chemical parameters.

Result and Discussion

Survival Rate

The highest survival of silver arowana fish seeds was obtained at a treatment temperature of 26°C at 78% and the lowest was obtained at 30°C temperature treatment by 20%, as presented in Figure 1.

Figure 1. Survival rate (%) silver arowana fry (*Osteoglossum bicirrhosum*).

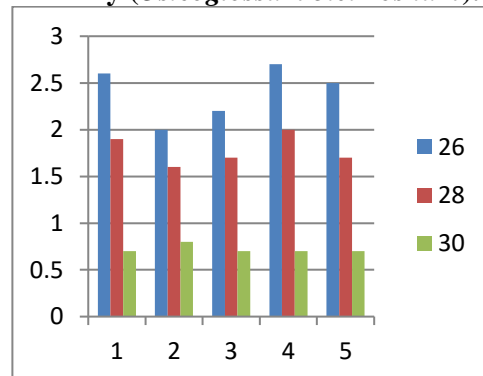


The survival of silver arowana seeds showed the highest yield at a treatment temperature of 26°C at 78% and the lowest at a treatment temperature of 30°C by 20%. This is probably caused by temperature differences, because temperature is one of the most important water quality factors in the survival of fish, because it is cold-blooded animals, so that the body temperature is influenced by the temperature of the habitat. live Arowana silver fish seeds, in accordance with the opinion of Effendi (2004), Decreasing water quality can cause stress on fish, even if the decline in water quality has exceeded the tolerance limit, it will result in death.

Growth

In this study, the results show that temperature has a very real effect on growth. The highest growth was obtained at the treatment temperature of 26°C and the lowest was obtained at a treatment temperature of 30°C. The absolute growth of silver arowana fish seeds can be seen in Figure 2.

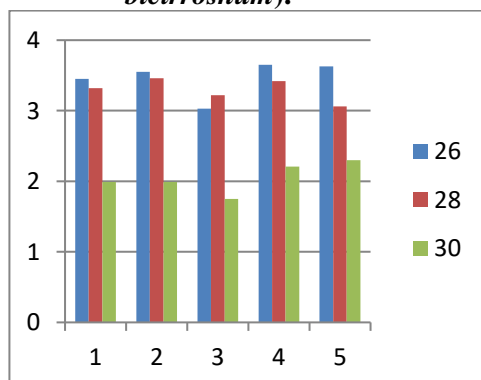
Figure 2. length (cm) silver arowana fry (*Osteoglossum bicirrhosum*).



The highest average length growth was found at 26°C temperature treatment where during maintenance experienced a rapid growth increase of 2-2.7 cm. This is because silver arowana fish seeds can grow optimally at these temperatures and are supported by water quality such as pH and DO in the range of tolerance, in accordance with the opinion of Stickney (2000), that each fish species has an optimum temperature, namely the temperature range where growth can reach optimum, the temperature outside the range continuously will cause stress and even death. The lowest average length growth was found at 30°C where during maintenance experienced a slow growth of 0.7-0.8 cm. The slow growth at 30°C can be caused because the temperature causes the metabolic workload to become large, so that the energy used for the metabolic process is greater and growth is not optimal. In accordance with Stickney's (1979) opinion that in most fish species, the above optimum temperature can result in increased metabolic rate and energy starting to be diverted from growth for a high metabolic rate so that the rate of growth decreases.

The highest daily growth rate of silver arowana fish was obtained at a temperature of 26°C at 3.46% and the lowest was obtained at 30°C at 2.048%, as shown in Figure 3.

Figure 3. Daily growth rate (%) silver arowana fry (*Osteoglossum bicirroshum*).



The highest daily individual growth rate was obtained at the treatment temperature of 26°C which was 3.462%. This shows a condition in which silver arowana fish seed has the best level of adaptation in using existing energy for metabolic processes in the body, in the opinion of Cholik et al (1986) that the increase in water temperature is followed by the degree of metabolism. But the higher temperature increase will reduce growth, because the appetite for fish has an optimal temperature. At a temperature of 30°C, the lowest daily individual growth rate was 2.048%. This happens because high temperatures cause metabolism to increase and the rate of food consumption is faster, this should result in faster growth. But this did not occur in the 30°C temperature treatment because of the possibility of silver arowana fish seeds using all their energy to survive and the rate of metabolism so that energy for growth is reduced.

Water quality and food efficiency

During the study pH in the treatment ranged from 7-7.9. This value is still at the normal limit of water quality for freshwater fish. According to Boyd (1990) optimal water pH to support fish growth is between 6.5-9, while in the pH range 5-6 can affect the growth of fish to be slow.

The range of oxygen during the study is still in the range between 5.3-7 mg / L with the administration of aeration so that dissolved oxygen remains stable, in accordance with Boyd's (1990) statement, the growth and survival of fish at DO > 3.5 mg / L, while Total ammonia values ranged from 0.0501-0.0892 mg / L. The DO and Ammonia values are still in the normal range. According to Asmawi (1983), stated that a good dissolved ammonia for fish survival is less than 1 ppm.

In this study, an increase in temperature affects feed efficiency. The highest feed efficiency in the treatment temperature of 26°C was 23.1% and the

lowest was at 30oC at 16.9%. This is consistent with the opinion of Effendi (2004), feed efficiency depends on species (eating habits, size / stadia), water quality (especially oxygen, temperature, pH and ammonia), feed (quality and quantity).

Conclusion

Based on the research carried out, the following conclusions can be drawn :

- Temperature affects the survival of silver arowana fish (*Osteoglossum bicirrhosum*). The highest survival was achieved at a temperature of 26°C at 78%.
- Temperature affects the growth of silver arowana fish seeds (*Osteoglossum bicirrhosum*). The longest growth of the best silver arowana fish was achieved at a treatment temperature of 26°C at 2-2.7 cm and the best daily individual weight growth was achieved at a temperature of 26°C at 3.46%.

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