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The Dynamics of Water Quality in Tilapia (*Oreochromis niloticus*) Ponds at The Local Fish Seed Center (BBIL) West Koya District Muara Tami Jayapura City

Dinamika Kualitas Air Harian Pada Kolam Ikan Nila (*Oreochromis niloticus*) di Balai Benih Ikan Lokal (BBIL) Koya Barat Distrik Muara Tami Kota Jayapura

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ABSTRAK

This research aims to determine the daily dynamics of water quality in tilapia cultivation ponds at the West Koya Local Fish Seed Center (BBIL), Muara Tami District, Jayapura City. This research used two earthen ponds with a size of 25 x 50 m, and a water depth of 30-50 cm, a water volume of 100 L in one pond. Tilapia fish (*Oreochromis niloticus*) with an average length of 20 cm and weight of 243 grams were used in this study. Feed at a rate of 3% of fish biomass is given three times a day. The water quality parameters observed in this study were water temperature measured using a digital thermometer, dissolved oxygen using a DO meter DO 30N, water acidity using a pH meter, pH-240L, SERA aqua-test kit used to measure ammonia and nitrate. This research shows that the water quality parameters observed are normal according to the needs of tilapia fish. So it can be concluded that the water quality in the tilapia rearing pond at the West Koya Local Fish Seed Center (BBIL), Muara Tami District, Jayapura City is controlled and suitable for the growth and survival of the tilapia (*Oreochromis niloticus*) being cultivated.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui dinamika harian kualitas air kolam budidaya ikan nila pada Balai Benih Ikan Lokal (BBIL) Koya Barat Distrik Muara Tami Kota Jayapura. Penelitian ini menggunakan dua kolam tanah dengan ukuran 25 x 50 m, dan kedalaman air setinggi 30-50 cm, volume air 100 L pada satu kolam. Ikan Nila (*Oreochromis niloticus*) dengan rata-rata panjang 20 cm dan berat 243 gr digunakan pada penelitian ini. Pakan dengan takaran 3 % dari biomassa ikan diberikan tiga kali sehari. Parameter kualitas air yang diamati pada penelitian ini adalah suhu air diukur dengan menggunakan termometer digital, dissolved oxygen menggunakan DO meter DO 30N, keasaman air menggunakan pH meter, pH-240L, SERA aqua-test kit digunakan untuk megukur amonia dan

nitrat. Penelitian ini menunjukan bahwa parameter kualitas air yang di amati normal sesuai dengan kebutuhan ikan nila. Sehingga dapat disimpulkan bahwa kualitas air pada kolam pemeliharaan ikan nila di Balai Benih Ikan Lokal (BBIL) Koya Barat Distrik Muara Tami Kota Jayapura terkontrol dan layak bagi pertumbuhan dan kelangsungan hidup ikan nila (*Oreochromis niloticus*) yang dibudidayakan.

Kata Kunci	*Amonia, DO, Ikan nila, Nitrat, pH, Suhu*
Keywords	*Ammonia, DO, Tilapia, Nitrate, pH, Temperature*
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INTRODUCTION

Nationally, the Ministry of Maritime Affairs and Fisheries (KKP) is targeting an increase in tilapia cultivation production to reach around 2 million tons in 2023. To achieve this target, the Ministry of Maritime Affairs and Fisheries is developing tilapia cultivation in Papua as an effort to increase national aquaculture production. Moreover, tilapia fish consumption in Papua is high. Very high market demand causes tilapia farmers to increase the stocking density of tilapia fish, which in turn will affect the amount of feed provided. This increase in stocking density and feed will reduce the quality of pond water, which will cause a decrease in fish survival rates.

Water quality management for aquaculture development is very important, because water is a living medium for aquaculture organisms (Mulyanto, 1992 in Aquarista et al., 2012). Good water quality will support the success rate of tilapia fish cultivation, so to obtain good water quality it is necessary to carry out water quality management, water quality management is an effort to maintain water conditions in good condition for fish cultivation, so that water is suitable for growth. and survival. Rouse (1979) concluded that water quality management is an effort to maintain water quality so that the water remains of good quality and can be utilized as optimally as possible and continuously for the organisms being maintained.

Several physical factors that are water quality parameters in freshwater fish cultivation include temperature, pH (power of Hydrogen), DO (Dissolve Oxygen), ammonia, nitrate (Marlina and Rakhmawati, 2016). Intensive fish farming can reduce water quality which affects physiological processes, including the growth and survival of farmed fish as a result of the accumulation of feed waste and metabolic products (Scabra & Setyowati, 2019).

Based on this background, this research aims to determine the daily dynamics of water quality in tilapia cultivation ponds at the West Koya Local Fish Seed Center (BBIL), Muara Tami District, Jayapura City.

RESEARCH METHODS

This research was carried out in August-September 2023, using two earthen ponds with a size of 25 x 50 m, and a water depth of 30-50 cm, a water volume of 100 L in one pond.

Fish cultivation

Tilapia fish with an average length of 20 cm and weight of 243 grams were used in this study. Feed at a rate of 3% of fish biomass is given three times a day.

Water Quality Parameters

The water quality observed in this study was water temperature measured using a digital thermometer, dissolved oxygen using a DO meter DO 30N, water acidity using a pH meter, pH-240L, SERA aqua-test kit used to measure ammonia and nitrate.

Research methods

The method used is a quantitative descriptive method that compares daily water quality parameters at the West Koya Local Fish Seed Center (BBIL), Muara Tami District, Jayapura City.

RESULT AND DISCUSSION

The results of measuring quality parameters in the form of temperature, DO, pH, ammonia and nitrate are presented in the form of a graph of the average fluctuation of each parameter during the observation period.

Temperature

The results show almost the same range every day during the observation period. This can happen because the temperature distribution is the same at the pool location. The optimal temperature range for cultivating freshwater fish is 28-32°C (Mas'ud, 2014), while according to Gupta and Acosta (2004), a good temperature range for cultivating tilapia is 25-30°C. The results obtained in this research can be said to be optimal for the growth of tilapia cultivated in ponds at BBIL.

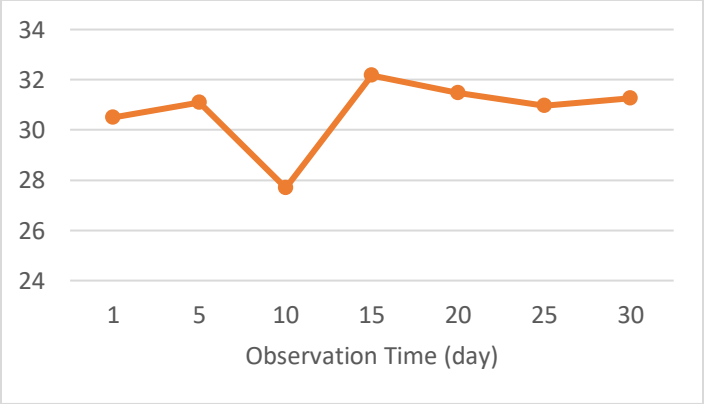

Figure 1. Daily temperature fluctuations during observations

Dissolved Oxygen (DO)

The results show relatively stable DO conditions in the pond. However, it decreased on day 25 which affected the survival of cultivated fish. This occurs due to the influence of dissolved particles in the water (Mas'ud, 2014), where the pool has a higher solubility of dissolved particles on the 25th day which can be seen in Figure 2. From the results obtained

it can be said that the pool can maintain its condition. dissolved oxygen as a result of the solubility of small particles in water.

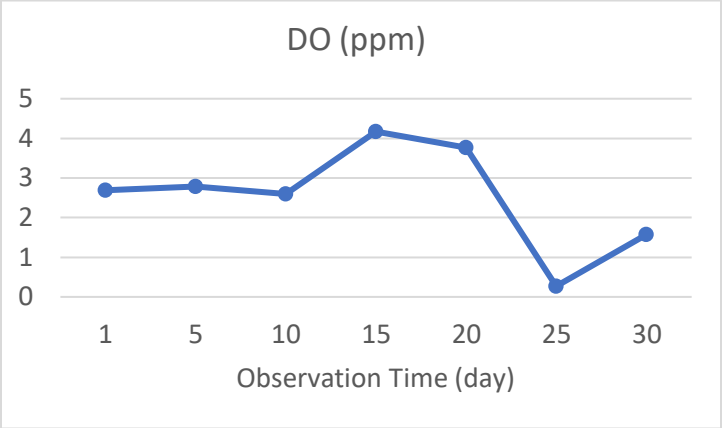

Figure 2. Daily DO fluctuations during observation

pH (power of Hydrogen)

The results of pH observations during observations in ponds show the same range between these two systems which is in the range of 7-8 which can be said to be stable and supports the survival of freshwater fish (Mas'ud, 2014). Associated with dissolved oxygen, the pH of waters is influenced by dissolved oxygen, where the smaller the dissolved oxygen, the more likely the pH will be alkaline and the opposite condition if dissolved oxygen is present in large quantities (Dauhan et al., 2014).

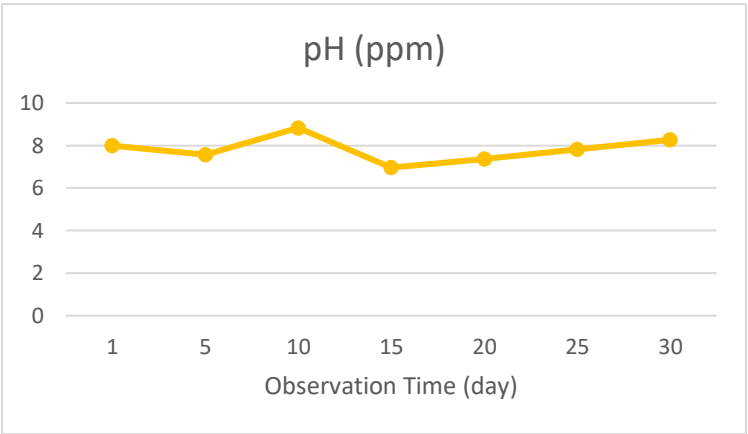

Figure 3. Daily pH fluctuations during observation

Ammonia (NH3)

From the results obtained from the ammonia concentration during the treatment period, it can be seen that on the 15th day of observation the ammonia concentration was higher compared to the ammonia concentration on days 20-30 which was low and tended to be the same (Figure 4). This is related to the rate of conversion of ammonia to nitrate which can be seen in Figure 5. Based on research conducted by Putra et al., (2011) Dauhan et al.,

(2014); Effendi et al., (2015), stated that the conversion of ammonia to nitrate is also influenced by the solubility of oxygen which can be seen in Figure 2. where the conversion of ammonia to nitrate takes place optimally under stable dissolved oxygen conditions (Mas'ud, 2014).

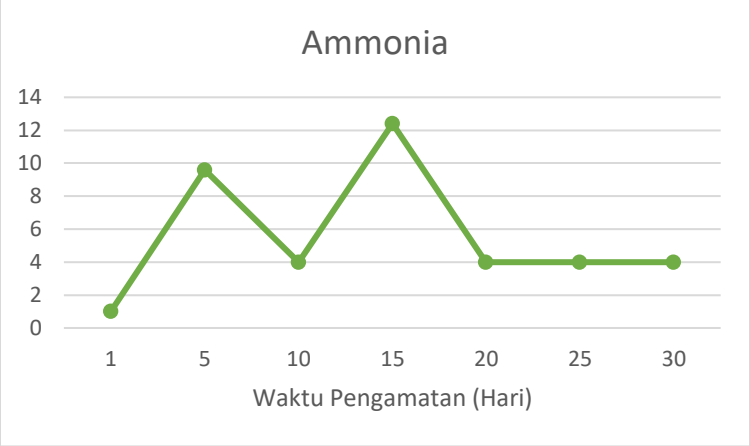

Figure 4. Daily ammonia fluctuations during observations

Nitrat (NO3)

From the results obtained, it can be seen that in the pond there was an increase in nitrate concentration on day 15. The increase in nitrate concentration on day 15 indicates the conversion of ammonia to nitrate through the nitrification process (Figure 5). From the results obtained, it can also be seen that the nitrate concentration decreased on day 25 and began to increase again on day 30, which was the end of the observation period. This can be Dauhan et al. (2014) which states that the higher the plant growth rate, the greater the assimilation of nitrate into biomass which will have an effect on the nitrate concentration in the media.

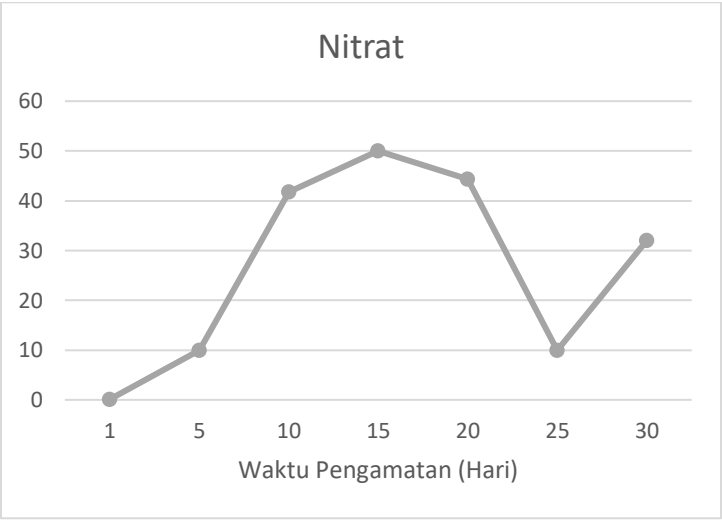

Figure 5. Daily Nitrate (NO3) fluctuations during observation

CONCLUSION

Based on the results of the research carried out, it can be concluded that the water quality in the tilapia rearing pond at the West Koya Local Fish Seed Center (BBIL), Muara Tami District, Jayapura City is controlled and suitable for the growth and survival of the tilapia (Oreochromis niloticus) being farmed.

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