Biofloc System Using a Bucket for Climbing Perch (Anabas Testudineus)

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ABSTRACT

Climbing perch (Anabas testudineus) is a peat swamp fish with high economic value so has the potential to be developed. Bio floc technology can increase the growth of Climbing perch providing additional protein feed which can increase growth and feed conversion ratio. Bio floc technology can maximize limited land, is environmentally friendly, saves water and feed use, has no smell and waste water can be used as plant fertilizer. The aim of the research is to find out how the bio floc system using buckets affects the growth and survival of climbing perch. This research used a RAL with 3 treatments and 3 replications, treatment A (without bio floc technology stocking density of 30 climbing perch), treatment B (stocking density of 30 climbing perch), treatment C (stocking density of 45 climbing perch). The rearing of climbing perch was carried out for 2 months in buckets. The results of the research showed that bio floc technology using buckets had an effect on the growth in length and absolute weight of climbing perch (Anabas testudineus) in treatment C (absolute length 2.48 cm and absolute weight 3.73 g). The survival rate of climbing perch in each treatment was not significantly different with the highest survival rate in treatment C (84%), treatment A (79%) and the lowest survival rate in treatment B (76%). The results of water quality measurements temperature, pH and DO, are still within the normal range for the life of climbing perch.

Keywords: Bio floc, buckets, climbing perch, growth and survival

INTRODUCTION

The biofloc system can increase the production of swamp fish, which is currently an attraction for fish cultivation. One type of peat bog which has a high economic value is climbing perch (Anabas testudineus). The existence of climbing perch (Anabas testudineus) has a chance to develop. This fish is highly resistant to life in poor water environmental conditions due to pollution and extreme water conditions. This is what makes the opportunity for the development of climbing perch (Anabas testudineus) with the biofloc system (Akbar ,2008). The common obstacle faced in the development of climbing perch (Anabas testudineus) cultivation is a slow growth of fish, where to reach a length of 8-10 cm and weighing 15-16 g takes about 6-7 months (Helmizuryani and Niam, 2013).

According to Cholik et al., (2005), climbing perch (Anabas testudineus) has the ability to obtain oxygen directly from the air to the maze organ located at the top of the gill opening. This additional breathing device is very useful when the fish is in muddy waters. This is in accordance with the opinion of Helmizuryani and Muslimin (2019), which stated that the climbing perch (Anabas testudineus) is known as fish that has a immune system to inappropriate environmental conditions. This is possible because this type of fish has additional respiratory tools in the form of labyrinth which makes it possible for fish to be able to live in conditions of oxygen- deficits and is not possible for other fish to live in that area.

Biofloc technology can provide additional protein feed for cultivated fish so that it can increase the growth and ratio of conversion (Imron et al., 2014). According to Prasetia et al., (2014) Biofloc technology is a

technology that changes fish metabolites containing nitrogen into proteins. Compared to conventional cultivation, biofloc has an advantage that it can maximize limited land area, environmentally friendly, efficient in using water and feed, odorless and utilize waste water as a plant fertilizer by using prebiotics and probiotics that contain microorganisms such as bacteria.

The problem in this study is that biofloc technology affects the growth and survival of climbing perch (Anabas testudineus). The purpose of this study was to determine how the bioflok system affects the growth and survival of climbing perch (Anabas testudineus). The benefit of this study is to provide information on the cultivation of climbing perch (Anabas testudineus) technology with the bioflok system using a bucket to see growth and survival.

RESEARCH METHOD

Time and Place

This research was conducted from May to July 2023 at the University of Christian Palangka Raya, Central Kalimantan.

Materials and methods

The tools used for this research activity are stationery, cameras, fish measuring boards, buckets, measuring cups, aerator, DO meters, the pH meter, thermometer, and digital scales. Meanwhile, the materials used are climbing perch (Anabas testudineus) seeds, EM4, kaportet, molasses, salt, dolomit chalk, tissue, pineapple fruit and commercial feed.

Research Design

The design of the research used is the Completely Random Design (RAL) consisting of 3 treatment and 3 test so that there are 9 trial units, where:

A = treatment without biofloc technology in a solid amount of 30 climbing perch

B = treatment with biofloc technology in a solid amount of 30 climbing perch

C = treatment with biofloc technology in a solid field of 45 climbing perch

Research Procedures

The implementation of the research consists of:

1. Container preparations, using a bucket with a diameter of 45 cm and a height of 55 cm (80 L) filled with water as much as 60 L and aeration using aeration.
2. Preparation of maintenance media, A's treatment is not add kaporit, salt, dolomit, molasses and pineapple, while for treatment of B and C is added to the dose of 30 grams/m^3 as a descending and left until the smell of kaporit gone (± 7 days), in the morning, salt adds : 1-3 kg/m^3 is called aeration for 1 day, molasses: 100 ml/m3, 10 ml/m^3 and the addition of blended pineapple fruit was 1 kg and at night there are added 100 g/m^3 dolomit. Then the water media is left for 7 days so that the bacteria can develop optimally.
3. The distribution of climbing perch (Anabas testudineus) seeds is carried out after the water media is pressed for 7 days, climbing perch (Anabas testudineus) seeds size 3-5 cm according to treatment in the research. Fish seeds are stocked first into absolute long measurements, initial weights and measure the quality of water which include: temperature, pH, and DO.

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4. Maintenance and providing climbing perch (Anabas testudineus) seeds were carried out for 2 months. During the maintenance process, molasses molasses is added daily at 2,1 ml/m^3 carried out simultaneously in the morning before the fish is fed. For providers of feed is given according to fish needs in the morning and afternoon at 08.00 WIB and 16.00 WIB.

Observation Parameter

The parameter in this study is an absolute long measurement, the addition of absolute weight, survival (survival rate) and as support data is also carried out water quality measurement at escort and in research end.

1. Absolute Long Growth Measurement, uses the following formula:

L : Lt – Lo

Explanation :

L = Absolute long growth (cm)

Lt = Average lenght of the fish, test on the end of maintenance (cm)

Lo = Average lenght of the fish, test on the beginning of maintenance (cm)

2. Absolute weight growth uses the following formula :

W = Wt – Wo

Explanation :

W = Absolute weight growth (g)

Wt = Average weight of the fish, test on the end of maintenance (g)

Wo = Average weight of the fish, test on the beginning of maintenance (g)

3. Survival Rate

The level of survival can be obtained with the following formula :

SR % =Nt/N_o x 100

Explanation :

SR = The survival rate of larvae (%)

Nt = Number of larvae living at the end of maintenance (tail)

No = Number of larvae living at the begining of maintenance (tail)

Data Analysis

Data analysis using ANOVA 5% level, if treatment shows a real difference, then it will be continued with Duncan Level 5% Test SPSS 26. The data analyzed statistically consists of absolute long growth, absolute

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weight growth and survival. Meanwhile, data on the measurement of water quality in the form of pH, the temperature and DO are discussed descriptively.

RESULT AND DISCUSSION

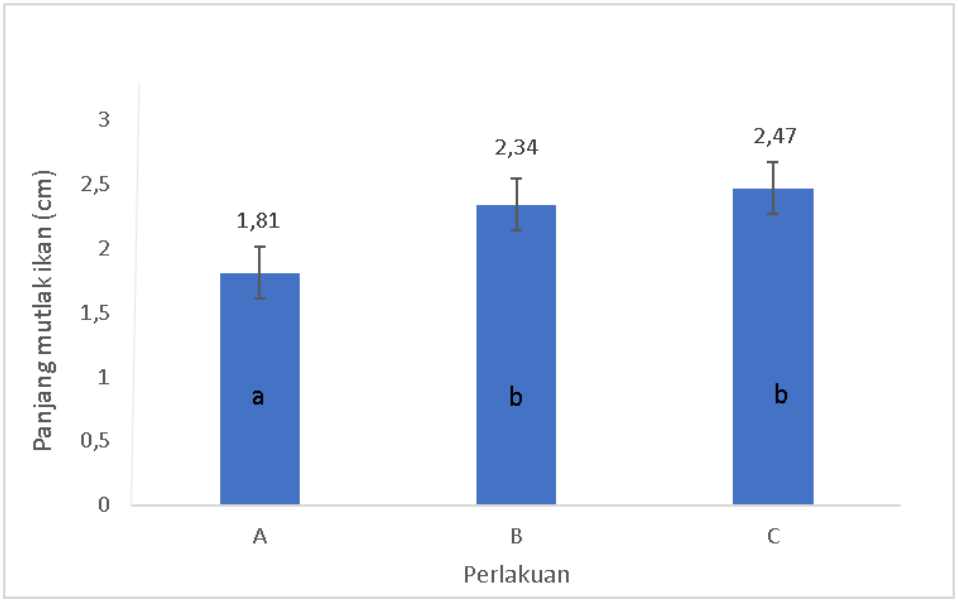

Fig 1. Absolute length of long growth of climbing perch (Anabas testudineus)

The absolute length of long growth of climbing perch (Anabas testudineus) can be seen in a figure 1 which indicates that the highest growth in C (2.47 cm) treatment and followed by treatment B (2.34 cm) and the lowest in A (1.81 cm). Based on ANOVA and the Duncan Tests (P> 0.05) were obtained that C and B treatments were no different whereas A's treatment shows a significant different from absolute growth of fish. From the results of the Wibowo et al., (2015) suggest that the higher the tebar was that the better the growth of betox fish seeds (Anabas testudinius), therefore the more influential on the formation of the floc. With the higher the tebar, the floc that forms will be more, so that natural feed (floc) can be used to optimally for growth.

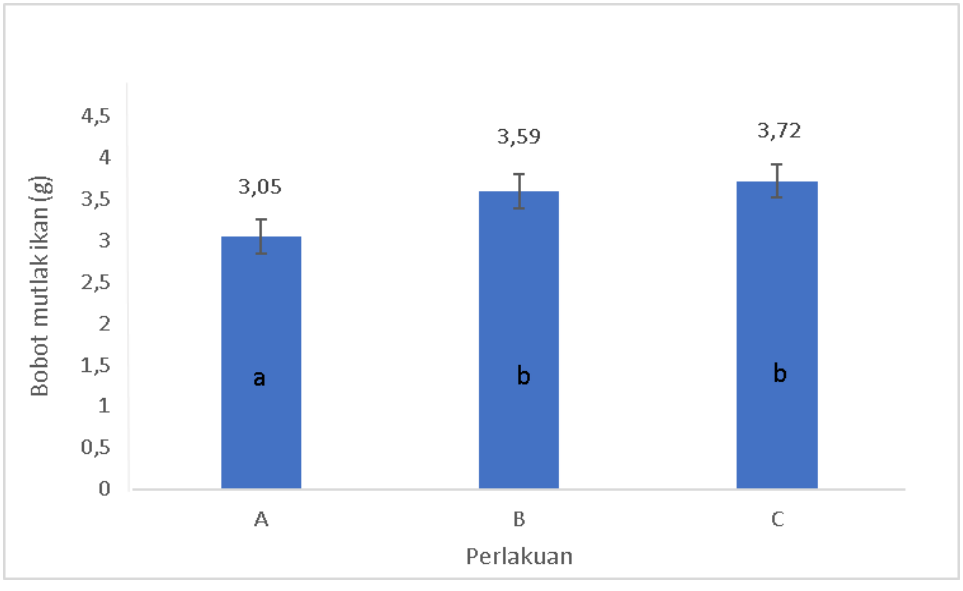

Fig 2. Absolute weight growth of climbing perch (Anabas testudinius)

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The absolute weight growth of climbing perch (Anabas testudineus) in figure 2, indicates that the highest weight growth in treatment of C, (3.72 g) and followed by treatment B, (3.59 g) and the lowest in treatment of A (3.05 g). Based on ANOVA and Duncan Tests (P> 0.05), it shows that C and B treatment is no different whereas A's treatment is significant in the absolute growth of the fish. Based on the results of the Fitrani (2015) study, it shows that the biofloc system can increase the growth of better betox fish compared to without bioflok technology. This is caused as the higher the search for the betox fish, then floc that will form higher, so that it can increase the growth of climbing perch (Anabas testudineus) and increase natural feed in buckets. The higher the resulting floc protein content, the better the quality. These are resources for fish, supporting fish growth and survival, and increasing the conversion value. (Salamah, 2014). Based on the results of the Yunarty et al., (2020) study, stated that biofloc contains a protein range of 28.4% – 38% that can be used as a source of nutrition for cultured fish. Based on the Nuari C.R., et al., (2016) research states that biofloc powder contains polyhydroxybutyrate compounds that provide energy in the fish's body. Polyhydroxybutyrate compounds are used to replace energy during tissue synthesis and regenerate somatic cells, thus the fish protein absorption process can be used for optimal growth.

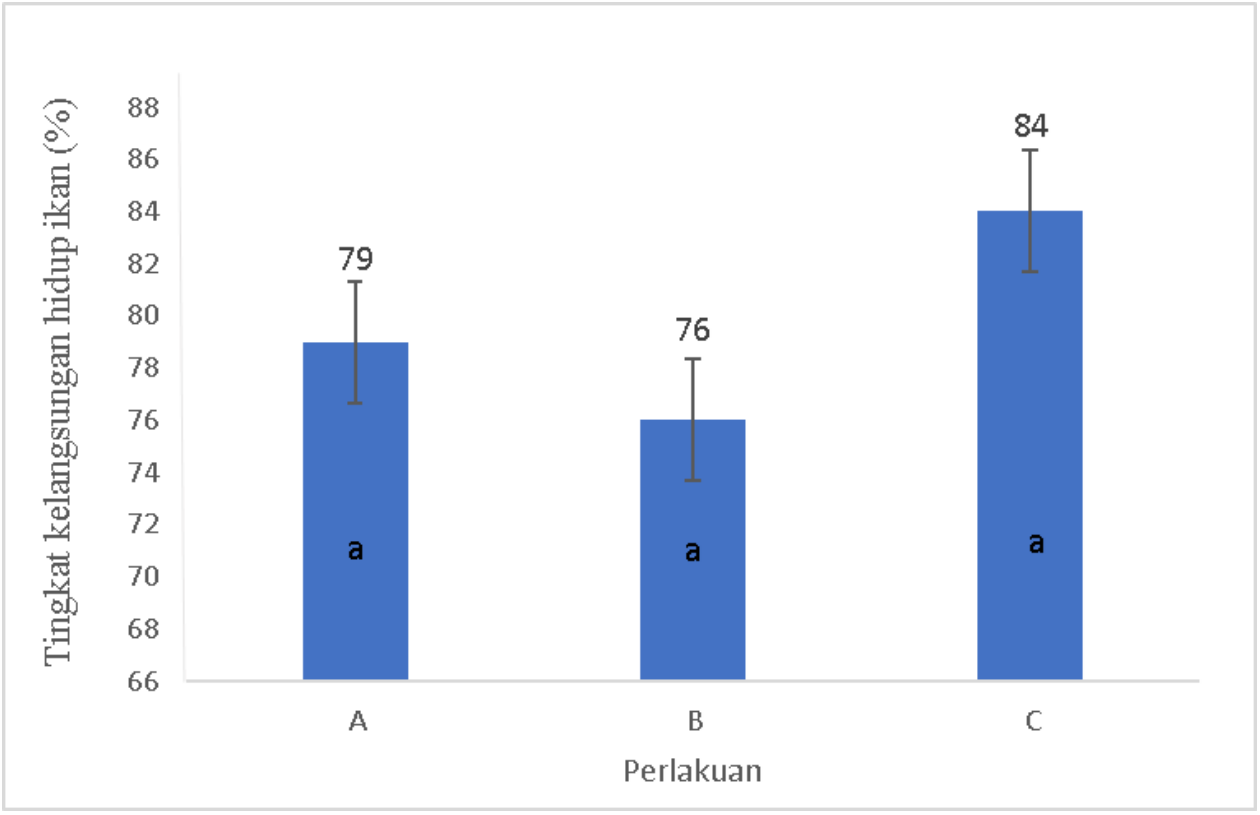

Fig 3. Survival rate of climbing perch (Anabas testudineus)

The survival rate of climbing perch (Anabas testudineus) figure 3 shows that the highest survival rate on C 84% treatment, A 79% treatment and the lowest survival rate of fish is found in B 76% treatment. Results (P> 0.05) showed that the survival rate of the betox fish's treatment at A, B, C is no different. Throughout the research period, the survival rate of betox fish is still relatively good in every treatment. The rate of fish survival is divided into three levels: namely ≥ 50% good, 30-50% moderate and 30% not good (Nursani, 2012).

Water quality measurements are carried out at initial and the end of the study including temperature, pH, and DO. Based on the results of water quality observations can be seen in figure 4, 5 and 6.

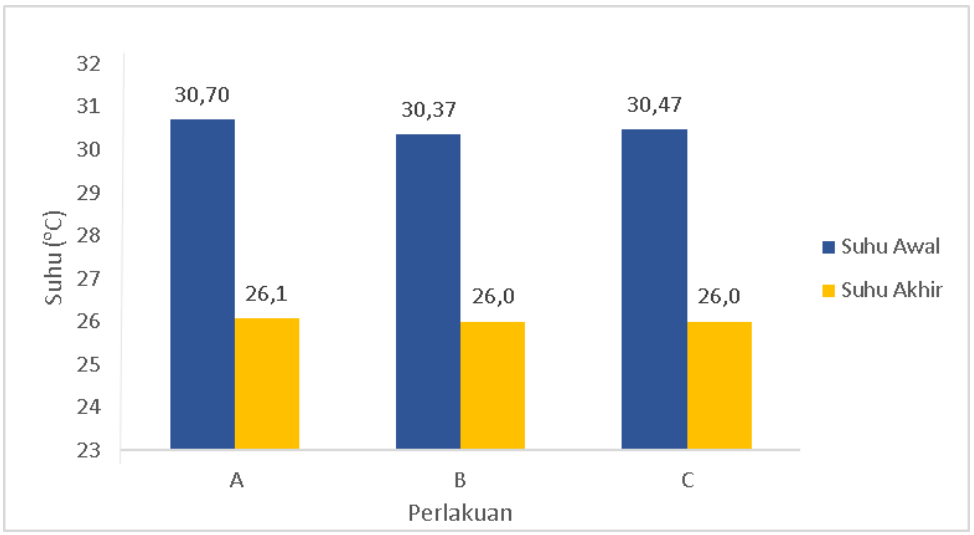

Fig 4. Temperature Measurement of Water

The water temperature range (figure 4) is good for B treatment, namely 26.0 -30,37ºC, while the C treatment is 26.0 – 30,47ºC and A treatment of 26.1 -30,47ºC. Temperature is an important physical factor in fishery cultivation. This is because fish are warm-blooded animals and their body temperature is influenced by environmental temperatures. The temperature during the study period still supports the growth and survival of the climbing perch (Anabas testudineus). Based on the research of Syulfia et al., (2015), the value range of 26 – 30ºC, this value is appropriate for fish life including climbing perch (Anabas testudineus).

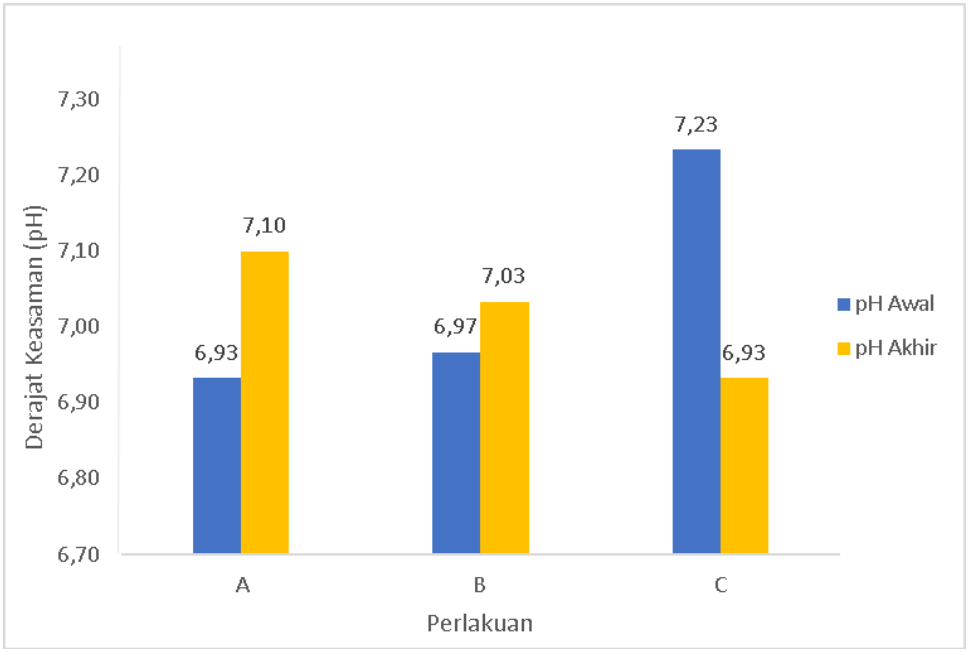

Fig 5. pH measurement of Water

A good range of water pH (figure 5) is found in the treatment of B is 6.97-7.03 while A's treatment is 6.93-7.10 and C is 6.93-7.23. The pH value on each treatment is still tolerated by the climbing perch (Anabas testudineus). The optimal range of pH for the growth and survival of the climbing perch (Anabas testudineus) is 6 to 8. Kordi (2013) stated that the optimum pH life is 6 – 8.5. According to Rahmi (2012) that many factors affect the tolerance of water pH, among others, dissolved oxygen, and adaptation of fish against its environment. pH values play the role in the formation process of the biofloc, where the pH value

is too low in the range between 4-4.5 will slow the formation of floc (Fanani et al., 2018).

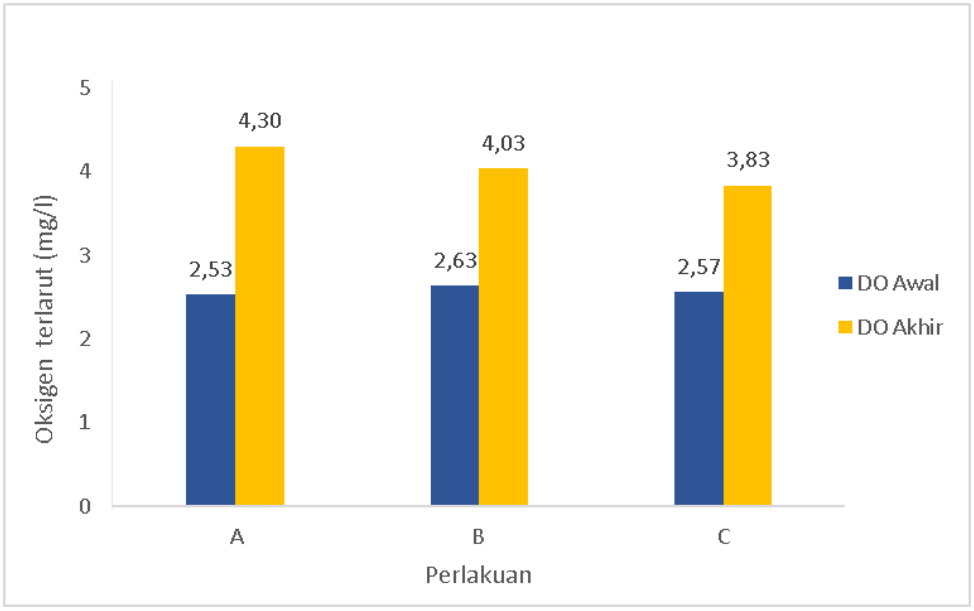

Fig 6. Dissolved oxygen measurement (DO)

The dissolved oxygen content (DO) which was obtained during research showed A treatment of 2.53-4.30 mg/l while B's treatment was 2.63-4.03 mg/l and C treatment was 2.57-3.83 mg/l. In this study, the value range of DO is still low. This is because climbing perch (Anabas testudineus) include fish resistant to low DO ranges, One of has a maze of climbing perch (Anabas testudineus), so they can survive in low DO conditions. Helmizuryani (2011) stated that the amount of oxygen dissolved in water is 2 mg/L, which is enough to support the lives of aquatic, but the water does not contain a toxic substance.

CONCLUSION

Based on the results of the study in treatment C showed an absolute length of 2.48 cm and absolute weight 3.73 g higher than treatment A with an absolute length of 1.81 cm and absolute weight 3.05 g and treatment B is 2.34 cm and absolute weight 3.59 g. The survival rate of climbing perch (Anabas testudineus) in the treatment of A, B, and C is no different, where the treatment of C (84%), A (79%) and B treatment (76%).

From the results of the measurement of temperature parameter water is around (26.0 – 30.47ºC). Water pH ranges (6.97 – 7.23). Dissolved oxygen (DO) ranges (2.53 – 4.30 mg/l) which is still in the normal range for climbing perch (Anabas testudineus) life.

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