JMAI Jurnal Media Akuakultur INDONESIA
https://journal.unram.ac.id/index.php/jmai/index. E-ISSN : 2798-0553
Volume 4, Number 3, Agustus 2024

# PERTUMBUHAN IKAN BAWAL TAWAR *(Collosoma macropumum)* PADA SISTEM RESIRKULASI DENGAN FILTER HORIZONTAL

***Growth Of Freshwater Pomfret Fish (Collosoma macropumum) In A Recirculation System With A Horizontal Filter***

Siti Rafi'ah*[1], Muhammad Junaidi[2], Nanda Diniarti[3]

Program Studi Budidaya Perairan, Jurusan Perikanan dan Ilmu Kelautan, Universitas Mataram

*Jl. Majapahit No.62, Selaparang, Mataram, Nusa Tenggara Barat 83115 Indonesia*

Alamat Korespondensi: sitirafiah0707@gmail.com

## ABSTRAK

Budidaya ikan merupakan salah satu aktivitas memenuhi kebutuhan pangan dari sektor perikanan salah satunya budidaya ikan air tawar yang mendapatkan nilai ekonomis yang sangat tinggi sehingga ikan bawal air tawar dari tahun ke tahun meningkat. walaupun ikan ini jarang dikonsumsi, namun ikan bawal air tawar merupakan produk yang cukup diminati. Sistem resirkulasi menjadi pilihan mengaplikasikan untuk mengendalikan kualitas air yang melewati sebuah filter. Penelitian ini bertujuan untuk menganalisa pertumbuhan ikan bawal tawar *(Collosoma macropomum)* pada sistem resirkulasi dengan filter horizontal. Penelitian ini dilaksanakan selama 50 hari, di Laboratorium Produksi dan Reproduksi Ikan Universitas Mataram menggunakan metode eksperimental menggunakan Rancangan Lengkap (RAL) yang terdiri dari 4 perlakuan dan 3 kali ulangan yang dimana terdapat 12 unit percobaan. Parameter uji meliputi laju pertumbuhan ( panjang mutlak, panjang spesifik, berat mutlak dan berat spesifik ), Rasio konversi pakan ( FCR ), sintasan ( SR ) dan Kualitas air. Data dianalisa menggunakan *Analysis of Variance* (ANOVA) dan dilanjutkan dengan uji Duncan. Hasil penelitian menunjukkan bahwa parameter uji meliputi laju pertumbuhan ( panjang mutlak, panjang spesifik, berat mutlak dan berat spesifik ), Rasio konversi pakan (FCR), sintasan (SR) dan kualitas air terbaik terdapat pada P3 dengan laju pertumbuhan ( panjang mutlak sebesar 7 cm , panjang spesifik sebesar 0,033 %/hari, berat mutlak sebesar 24,5 gram dan berat spesifik sebesar 0,053%/hari ), Rasio konversi pakan (FCR) sebesar 1.1 , sintasan (SR) sebesar 90 % dan Kualitas air ( suhu sebesar 29-30 °C, Oksigen Terlarut (DO) sebesar 3-6 mg/L dan pH sebesar 7-8).

## ABSTRACT

Fish farming is one of the activities to meet the food needs of the fisheries sector, one of which is freshwater fish cultivation which gets very high economic value so that freshwater pomfret fish from year to year increases. Although this fish is rarely consumed, freshwater pomfret fish is a product that is quite in demand. The recirculation system is an application option to control the quality of water that passes through a filter. This study aims to analyze the growth of freshwater pomfret fish (Collosoma macropomum) in a recirculation system with a horizontal filter. This research was carried out for 50 days, at the Fish Production and Reproduction Laboratory, University of Mataram using an experimental method using a Complete Design (RAL) consisting of 4 treatments and 3 replicates where there were 12 experimental units. The test parameters include growth rate (absolute length, specific length, absolute weight and specific weight), feed conversion ratio (FCR), survival (SR) and water quality. The data was analyzed using Analysis of Variance (ANOVA) and continued with the Duncan test. The results showed that the test parameters included growth rate (absolute length, specific length, absolute weight and specific weight), feed conversion ratio (FCR), survival (SR) and the best water quality were found in P3 with a growth rate (absolute length of 7 cm, specific length of 0.033 %/day, absolute weight of 24.5 grams and specific weight of 0.053%/day), feed conversion ratio (FCR) of 1.1, survival (SR) of 90% and water quality (temperature of 29-30 °C, Dissolved Oxygen (DO) of 3-6 mg/L and pH of 7-8).

| | |
|---|---|
| **Kata Kunci** | *Ikan bawal air tawar, sistem resirkulasi, filter* |
| **Keywords** | *freshwater pomfret pom, recirculation system, filtration* |
| **Tracebility** | Submission: 31/1/2024. Published : 4/7/2024 |
| **Panduan Kutipan (APPA 7th)** | Rafi'ah, S., Junaidi, M., & Diniarti, N. (2024). Growth Of Freshwater Pomfret Fish (Collosoma macropumum) In A Recirculation System With A Horizontal Filter. *Indonesian Journal of Aquacuture Medium*, 4(3), 128-142. http://doi.org/10.29303/mediaakuakultur.v4i3.5050 |

## INTRODUCTION

Fisheries production from the aquaculture sector has increased. One of them is the activity of cultivating freshwater pomfret (Collosoma macropomum) which has recently been introduced to the Indonesian fishing industry, although this fish is rarely consumed, freshwater pomfret is an important product (Anggeni et al., 2013). Freshwater fish cultivation is also one of the fisheries that has very high economic value so that freshwater pomfret increases from year to year. According to the KKP (2011), freshwater pomfret is a type of freshwater fish that is being developed by the Directorate General of Aquaculture. Demand for freshwater pomfret (Collosoma macropomum) has increased from year to year, so production must be increased. In 2008, the production of freshwater pomfret fish was 40,351,000 fish and in 2010 it increased to 82,014,340 fish.

Freshwater pomfret cultivation activities will bring optimal profits if comprehensive management of each component of cultivation is carried out. The main component of freshwater pomfret cultivation is water quality. Water quality is a very important factor in the success of fish farming activities, because it will determine the results obtained. One effort that can be made to overcome the above problems is to apply a recirculation aquaculture system (Recirculation Aquaculture System).

The recirculating aquaculture system is a cultivation system that can save water because it can reuse water that has been used through a filter. The water quality management process in a recirculation system can take the form of physical filters, chemical filters and biological filters. The use of this filter can minimize the organic material content in the water, the filtration stage is the stage that determines the survival of the fish being kept (Silaban et al., 2012). The advantages of the recirculation system in controlling, maintaining and maintaining water quality indicate that the recirculation system has a close relationship with the process of improving water quality in wastewater treatment, especially from the biological aspect (Setyono et al., 2019). The RAS system cultivation method focuses on the use of filters. According to Putra et al., (2016) stated that a water filter is a tool used to filter water with the aim of improving the quality of the water so that it can be reused. The filter has a mechanical function to purify water and a biological function to neutralize toxic ammonia compounds into less toxic nitrate compounds in a process called nitrification and one of its functions is to minimize or eliminate aquaculture waste that is under pressure in the water (Putra et al., 2016 ). Water containing impurities is filtered using a filter to produce clean water that can be reused. One filter material that can be used is bioball. Bioball is a breeding ground for bacteria needed to process toxins in water (Alfia et al., 2013).

Cultivation filters are generally arranged vertically so that the speed of filtering water is very high. Chemical and biological filters require time to work optimally. Residence time in the processing system greatly influences the reduction in pollutant loads or pollutants contained in liquid waste (Salau, 2019). So the filter is arranged horizontally which is intended to provide optimal time to fill the filter in reducing contamination. Therefore, it is important to conduct research on the growth of freshwater pomfret (Collosoma macropomum) in a horizontal recirculation system.

## METHODS

### Place and Time

The research was carried out for 60 days, at the Fish Production and Reproduction Laboratory, Aquaculture Study Program, Faculty of Agriculture, Mataram University.

### Research Design

This research was carried out using an experimental method using a Completely Randomized Design (CRD) consisting of 4 treatments and 3 replications, resulting in a total of 12 experimental units. Each treatment uses a different filter and uses a recirculation system with different filter contents, namely zeolite, bioball, sand, dacron and gravel. The arrangement of treatments in this study is as follows:

K: No Filters
P1: Zeolite, pasir, biball
P2: zeolite, dacron, bioball
P3: kerikil, zeolite, bible

### Procedure

### Research Preparation

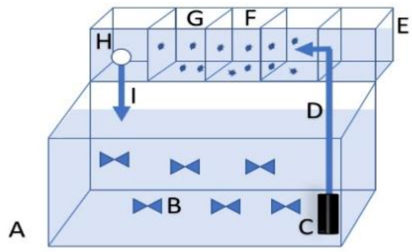
### Media Preparation

The media used is 12 containers with a volume of 45l as maintenance media. Containers are cleaned using liquid soap and dried before use. Next, the containers are arranged on a shelf which has been provided. 12 containers for maintenance containers are placed on the shelf, then filter sections are installed on each container which is a water storage container. Each container contains a different filter consisting of zeolite, bioball, sand, dacron and gravel. Then each container was filled with 45 L of water. The water used in this research was fresh water obtained from water sources in the Aquaculture Study Program. The first container holds water without a filter, the second container has a zeolite, sand and bioball filter, the third container has a zeolite, Dacron and bioball filter, the fourth container has a gravel, zeolite and bioball filter. Finally, a pump is given to each water storage container which will pump the water up from the storage container to each maintenance container. Next, when the water has reached a volume of 20 L, the water from the maintenance container will rise to the top through the pipe that has been made. Then the previous water will be filtered first by the filter on top of the container.

**Seed Preparation**

The fish seeds used in this research were freshwater pomfret with a size of 4-7cm. not attacked by disease, complete body parts, and agile fish movements. These pomfret fish seeds were obtained from fish farmers in Lingsar, West Lombok, NTB.

**Design**




Research design

Information :
A : 45L container
B : Research Biota
C: Water Pump
D: Pipe 1 Ich
E: Gutter (Filter Holder)
F: Baffle on Filter
G: Filters
H: Outlet Hole
I: Outlet Pipe

**Research Implementation**
**Fish Acclimatization**

Acclimatization aims to adapt new environmental conditions to the previous environment. Acclimatization is carried out by placing a plastic bag containing fish seeds in a container and leaving it for a few minutes until the water temperature in the plastic bag is the same as the water temperature in the container.

**Fish Measurements (length and weight)**

The length and weight of the fish were measured five times during the preservation period where these measurements were made on the 0th day, the 10th day, the 20th day, the 30th day, the 40th day and the 50th day.

**Seed Distribution**

Fish seeds are stocked with the same stocking density, namely 10 fish/liter with a size of 4-7 cm, which is 1 fish/liter, the stocking time for fish seeds is in the morning at 09.00.

**Feeding**

During the rearing period, fish fry are fed with a frequency of three times a day, namely at 08.00, 12.00 and in the afternoon at 16.00 WIB at satiation with a feeding dose of 5% of the fish biomass. Giving a dose of 5% can increase absolute weight growth and absolute length.

**Water Quality Measurement**

Water quality measured during the research included temperature, dissolved oxygen (DO), and acidity degree (pH). Water quality measurements were carried out three times, namely on day 0, day 25 and day 50 where measurements were carried out in the morning or around 09.00, in the afternoon at 12.00 and in the afternoon 16.00 WITA.

**Research Parameters**

The parameters tested in this study include absolute weight (Mulqan et al., 2017), specific weight (Sitio et al., 2017), absolute length (Mulqan et al., 2017), specific length (Sitio et al., 2017) , survival (Endraswari et al., 2021), feed conversion ratio (Suryanto et al., 2021) water quality parameters (temperature, pH, and D.O).

**Absolute Length Growth Rate**

Absolute length increase is the difference between the length of the fish from the head to the tail end of the body at the end of the study and the body length at the beginning of the study (Mulqan et al., 2017). The formula for calculating it is as follows:

$$Pm = Lt - Lo$$

Information:
Pm = Absolute length increase (cm)
Lt = Final average length (cm)
Lo = Initial average length (cm)

**Absolute Weight Growth Rate**

Absolute weight growth is a process where the weight of fish increases from the start of the study to the end of the study (Mulqan et al., 2017). The formula used is:

$$Wm = Wt - Wo$$

Information:
Wm = Weight gain (g)
Wt = Final weight of fish fry (g)
Wo = Initial weight of fish seeds (g)

**Specific Length Growth Rate**

Based on Sitio et al., (2017) Specific length growth is calculated using the following formula:

$$LPPS = \frac{lnLt - lnLo}{t} \times 100\ \%$$

Information:
LPPS = Specific length growth rate (%)
lnLt = Average length of fish at the end of the study (gr)
lnLo = Average length of fish at the start of the study (gr)
t = Maintenance period (days)

**Specific Weight Growth Rate**

Sitio et al., (2017) stated that calculating specific weight growth can be done using the following formula:

$$LPBS = \frac{(lnWt - lnWo)}{t} x\ 100\%$$

Information:

LPBS = Specific weight growth rate (%)

lnWt = Average weight at the end of the study (cm)

lnWo = Average weight at the start of the study (cm)

t = Maintenance period (days)

**Survival Rate (SR)**

Survival Rate (SR) is the comparison level of the number of fish that survived from the beginning to the end of the study (Endraswari et al., 2021). The formula used is:

$$SR = \frac{Nt}{No} x\ 100\%$$

Information:

SR = Survival Rate (%)

Nt = Number of fish at the end of rearing (tail)

No = Number of fish at the start of rearing (tail)

**Feed Conversion Ratio (FCR)**

Feed Conversion Ratio (FCR) is a comparison between the amount of feed given and the total weight of fish produced. Feed conversion is calculated using the formula (Suryanto et al., 2021) as follows:

$$FCR = \frac{F}{(Wt + D) - Wo}$$

Information:

FCR = Feed Convertion Ratio

Wo = Weight of test animals at the start of maintenance

Wt = Test animal weight at the end of maintenance

D = Number of dead fish

F = Amount of feed consumed

**Data Analysis**

In this research, several parameters were measured, including: growth parameters (absolute weight growth, absolute length, specific weight, specific length), survival rate (SR), feed conversion ratio (FCR), water quality parameters (temperature, pH, and dissolved oxygen) using

Analysis of Variance (ANOVA) at a confidence level of 95%. The results of statistical analysis that were significantly different were carried out by Duncan's further test.

## RESULT AND DISCUSSION

**Absolute Length Growth**

The average growth in the absolute length of fresh pomfret fish for 60 days during the rearing period using a recirculation system with different types of filters ranges from 5.1 - 7cm.

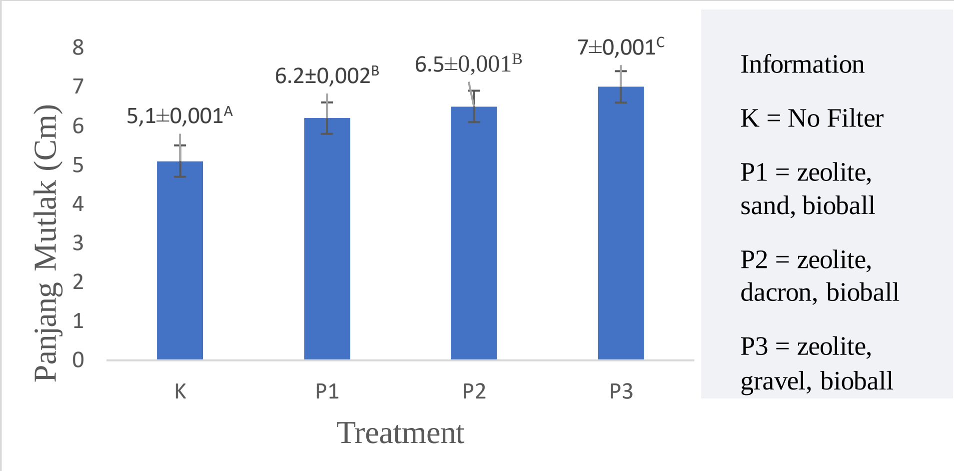



Figure 2. The absolute length of fresh pomace fish

Absolute length growth is a parameter that describes the length growth of fish from tail to head at the start of the study until the end of the study (Mulqan et al., 2017). Based on the research results, it was found that the absolute length growth rate ranged between 5.1-7 cm, where the highest average value was in P4 with an average value of 7 cm and the lowest value was in P1, namely 5.1 cm. allegedly because in P3, namely filters in the form of gravel, zeolite and bioball where the combination of the gravel filter functions to absorb large particles (Nurjanah, 2017), for the zeolite filter it functions as a binding ion in the total absorber. ammonia (Silaban et al., 2012) and bioballs function as a breeding ground for bacterial life, so that they can support the growth of fish and can purify the water to ensure good water quality (Nelvia et al., (2015). The recirculation system can create The carrying capacity of a cultivation container will increase and can increase the growth of cultivated fish and can provide good environmental support for freshwater pomfret cultivation activities because the materials used are able to filter out waste and leftover organic materials. feed so that its presence in the waters is reduced and does not disturb the life of the fish being kept and the fish's appetite is not disturbed (Diansari et al., 2013).

The lowest growth value occurred in treatment K with an average value of 5.1 cm. In treatment K, there is no use of a filter which causes dirty water conditions, the fish's appetite decreases so that the growth of the fish is also low. This is in accordance with the opinion of Prasetyo (2018), that the use of the right filter will produce clean water quality so that the fish that are kept can live with good growth rates.

## Specific Length Growth

The average specific length growth of freshwater pomfret fish in 60 days during the rearing period using a recirculation system with various types of different filters is around o.o27-0.033%/day.

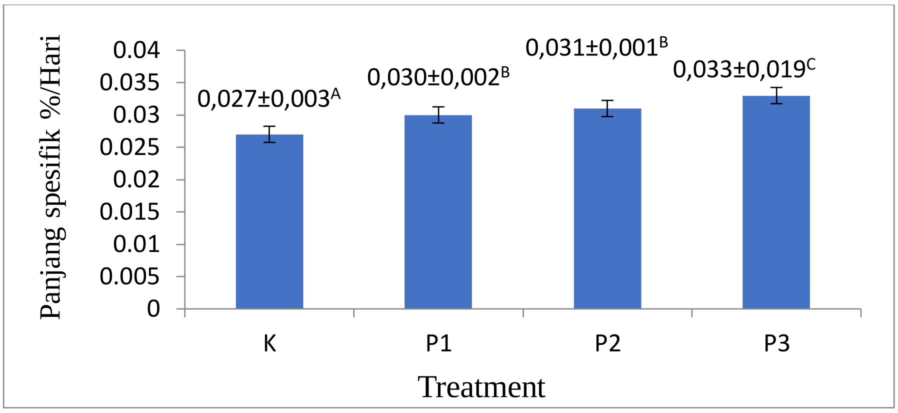



Figure 3. Specific length

Specific length growth is a parameter that describes the daily percentage of the absolute length of the fish divided by the length of rearing (Mulqan et al., 2017). Based on research that has been carried out, it was found that the specific length growth was in the range of 0.027-0.033%/day, where the highest specific length growth rate was found in P4, namely 0.033%/day. The high specific length value was thought to be due to the P3 filter combination, namely gravel. functions to absorb large particles (Nurjanah, 2013), zeolite functions as an ion binder, especially in total ammonia absorbers (Silaban et al., 2012), and bioball functions as a breeding ground for bacterial life, so that it can purify water which has good supporting capacity for the growth of freshwater pomfret fish and is able to provide good environmental carrying capacity (Alfa, 2013). One of them is that the Bioball filter can also reduce ammonia levels in the fish rearing media, thereby causing the fish's appetite to increase, and growth in the specific body length of the fish during rearing which is thought to be a good growth environment resulting in better rearing (Putra, 2015).

The lowest value of specific length growth is found in K with an average value of 0.027%. This low value is due to the absence of filters so that the water quality decreases and the fish's appetite causes fish growth to be delayed. The absence of filter use also causes high ammonia levels resulting in low growth rates, which is supported by the statement by Gichana et al., (2019), that the higher the ammonia concentration, the lower the growth rate..

## Absolute Weight Growth

The average absolute weight growth of fresh pomfret fish during the 60 day rearing period using a recirculation system with various types of different filters ranges from 8.7 – 24.5 gr.

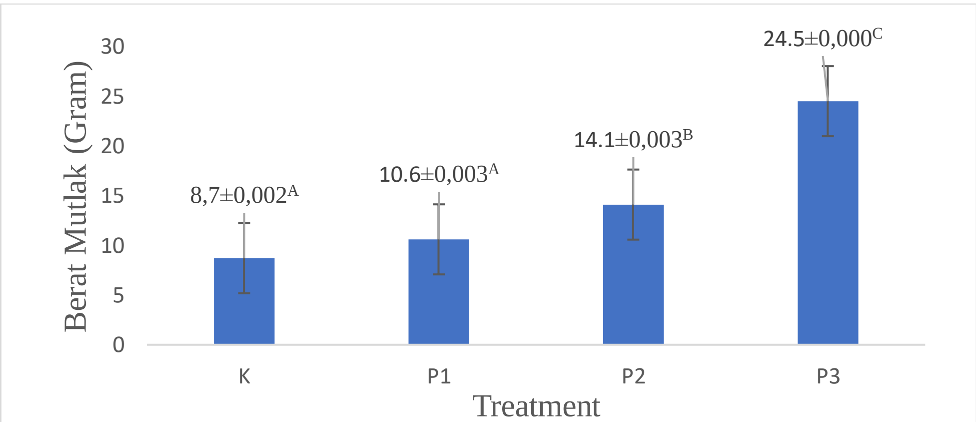



Figure 4. Absolute Weight (Gram)

Absolute weight growth is the weight growth of fish measured at the end of rearing and expressed in grams. This is the opinion of Suparlan et al. (2020) who stated that absolute weight is the total growth rate of fish during rearing. Based on the results of observations during the 60 day research, it can be concluded that the highest average value was obtained at P3 at 24.5 grams because it is thought that the rearing environment is good so that it can provide good growth for fish (Putra, 2015), the filter used is functional gravel as absorbing large sized particles (Nurjanah, 2017), zeolite functions as a binding ion in the total ammonia absorber (Silaban et al., 2012), and bioball functions as a place breed live bacteria, providing increased growth during maintenance (Alfa, 2013). Using the right filter will produce good water quality so that the fish that are kept can live with good growth rates. As well as providing an absolute weight increase for freshwater pomfret fish (Prasetyo, 2018).

The lowest growth value was found in K with an average value of 8.7 grams. The low absolute weight value for K is thought to be due to not using a filter, which can reduce the carrying capacity of water quality and decrease the appetite of rearing fish, considering that the size of the fish at the time of stocking does not vary in size, resulting in competition between fish. Nugroho et al. (2012) stated that the use of food which is supposed to provide growth for fish is used as defense to protect themselves from other fish. Food that enters the fish's body will first be used for survival and then used for growth.

**Specific Weight Growth**

The average growth in specific weight of fresh pomfret fish during the 60 day rearing period using a recirculation system with various different filters ranges between 0.036 – 0.053%/day.

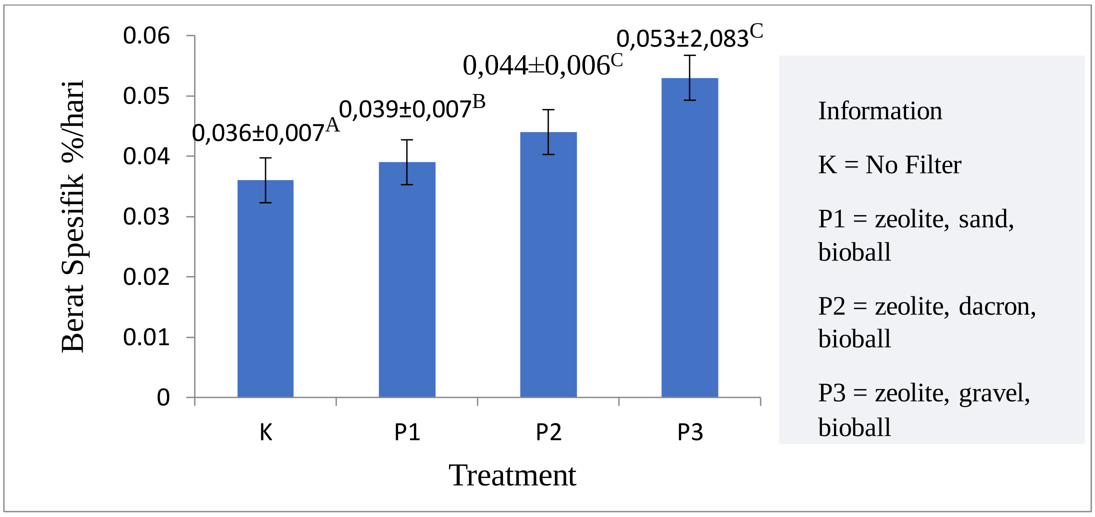



Figure 5. Specific weight

Specific weight growth is the daily weight gain of test fish during maintenance. The weight gain of test fish is usually expressed in (%). This is in accordance with the statement of Muhammad et al. (2017) who said that the specific growth rate is the percentage of the difference between final weight and initial weight divided by the length of maintenance time. Based on the results of research over 60 days, the specific weight growth rate in pomfret fish was in the range of 0.036 – 0.053%/day, where the highest specific weight growth rate was found in P3 with a value of 0.053%/day. The high value is thought to be due to the maintenance environment which is able to provide good supporting capacity for growth (Putra, 2015), apart from that the combination of filters, namely gravel, functions to absorb large particles (Nurjanah, 2015), zeolite functions to bind ions, especially in total ammonia absorbers. (Silaban et al., 2012), and bioballs function as a breeding ground for bacterial life (Alfa et al., 2013). Apart from the combination of filters, food factors can influence fish growth as well as a recirculation system to maintain good water quality. Reusing water that has been used by rotating the water continuously over and over again through a filter (Fauzia et al. 2020).

The lowest value of specific weight growth was found in K with an average value of 0.036% day. The low specific weight value for K is thought to be due to the presence of residual phases contained in the rearing media as well as large amounts of food remaining which are not completely consumed by the fish, which can cause the fish's health to be disturbed so that the fish's appetite decreases. This is in accordance with the statement of Soemardjati et al. (2013), that high levels of bacteria will attack the cultivated biota so that they become weak and their appetite decreases, often causing death in the cultivated biota..

**Survival Rate**

The average survival value (SR) of fresh pomfret fish during the 60 day rearing period using a recirculation system with various different types ranges from 63 – 90%.

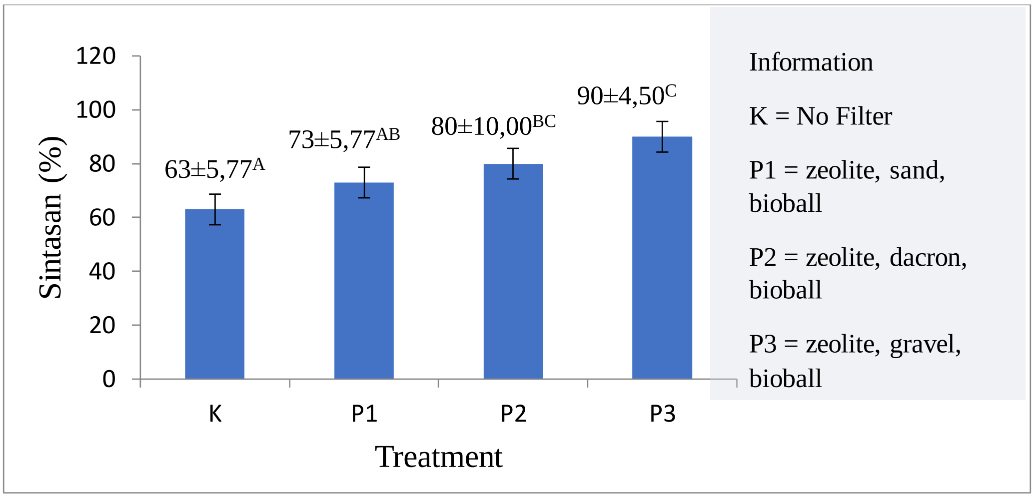



Figure 6. Survival rate (%)

Survival is the number of living organisms at the end of cultivation expressed as a percentage (%). Based on the results of research during 60 days of rearing, the survival rate for freshwater pomfret fish ranges from 63 – 90%. This is in accordance with the opinion of Dewi et al. (2022), namely a survival rate of ≥50% is classified as good, survival rate of 30-50% is classified as moderate and less than 30% is classified as poor. The results show that the highest survival rate is found in P3 at 90%, allegedly because a good rearing environment can have an influence on fish growth (Putra, 2015), the filter process can optimize and be able to filter leftover feed and waste waste in fish so that it can maintain quality. good water during maintenance. This is in accordance with the statement by Maldino et al. (2022) which states that the recirculation system can improve water quality in the rearing media which greatly influences fish life. Apart from water quality, a factor that influences fish survival is feeding.

The lowest survival rate was in the K treatment at 63%, which without using a filter was thought to be due to a buildup of food waste and fish faeces which then settled in the rearing media so that it could affect water quality, causing the fish to become stressed and have a poor response to feed so they could not adapt well. According to

Mulyadi et al. (2014) high or low survival rates of fish can affect their age and abilities which can help them adapt to their environment.

## Feed Convertion Ratio

The average value of the feed conversion ratio for fresh pomfret fish during the 60 day rearing period using a recirculation system with various types of different filters ranges from 1.1 – 1.5%.

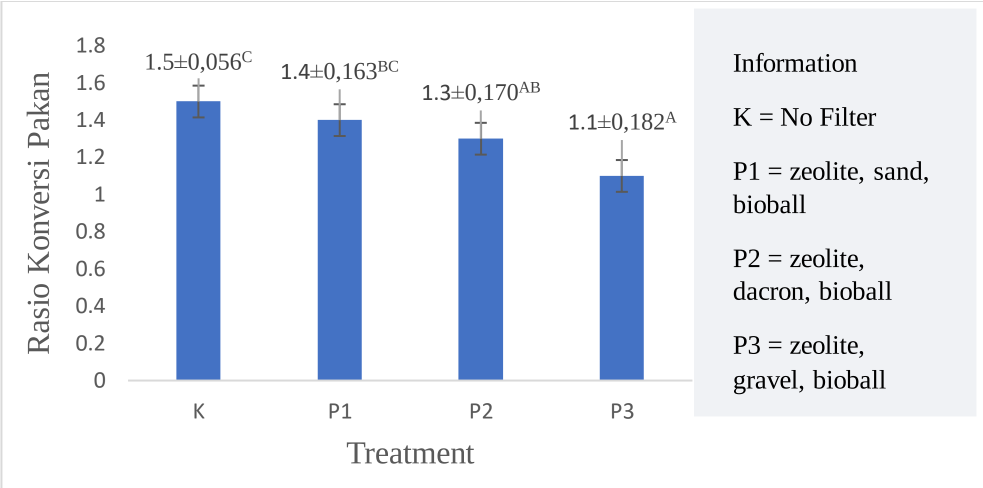



Figure 7. Feed Convertion Ratio

Feed conversion ratio (FCR) is the ratio of the amount of feed given to the weight of the fish produced. The smaller the FCR value, the better the fish farming activities. According to Rapida et al. (2022), feed conversion depends on the fish species in terms of eating habits and body size. Based on the research results obtained during 60 days of maintenance, the FCR value ranged from 1.1 – 1.5%. The feed convention value obtained during maintenance is still in the good category because Sukardi et al. (2018), which states that the FCR value is still considered efficient if it is less than 3%. The highest value is found in K with a value of 1.5% and the lowest value is in P3 with a value of 1.1%, presumably because the feed conversion value is inversely proportional to fish weight growth, so the lower the value, the better the quality of the feed and the use of the feed consumed for growth. The value of the feed convention ratio in this study has a very significant effect, presumably because the quality of the feed given to freshwater pomfret is relatively good and is influenced by the amount of feed which can increase weight gain. This is like the opinion of Rapida et al. (2022) said that the quality of feed is greatly influenced by the fish's digestibility or absorption capacity of the feed consumed and to obtain optimal growth, the fish feed must contain sufficient nutrition as a source of energy to maintain its immune system. The remainder is used for growth.

## Water Quality

Water quality measurement data during maintenance is presented in table 1. The data displayed is the lowest to highest data for all treatments during the 60 day maintenance period.

Table 1. Water quality parameters

| Parameters | Treatment | | | | References |
|---|---|---|---|---|---|
| | K | P1 | P2 | P3 | |
| Temperature (℃) | 29,4℃-29,7℃ | 29,9℃-30℃ | 29,7℃-30℃ | 29,2℃-29,9℃ | Sulistyansyah (2018) |
| DO (mg/l) | 5,9 – 6,0 (mg/l) | 5,9- 6,0 (mg/l) | 5,9 (mg/l) | 5,9 – 6,0 (mg/l) | Arianto (2019) |
| pH | 6,6 - 7,9 | 7,2 - 7,3 | 6,8 – 7,3 | 6,8 – 7,3 ppm | Rapida *et al.,* (2022) |

### Temperature

The water temperature obtained during the period of rearing fresh pomfret fish ranges from 29.2-30oC. The temperature range obtained is still within the optimal water temperature limits for the life and growth of freshwater pomfret fish. According to Sulistyansyah (2013), the temperature value for rearing freshwater pomfret fish is 29 – 32 ℃. The growth of freshwater pomfret fish will be greatly reduced if the water temperature drops below 25 ℃. Wahardi et al., (2014) said that water temperature greatly influences growth rate, fish metabolism and fish appetite as well as the solubility of oxygen in water.

### Degree of acidity (pH)

During the period of rearing freshwater pomfret, the degree of acidity (pH) obtained ranges from 6.6-7.9 ppm. Based on the PH value obtained, it shows that the use of a recirculation system provides a good pH value for the growth and survival of freshwater pomfret fish. The pH value is considered good for the life of freshwater pomfret fish. This is in accordance with Kordi's statement, (2011) that a good Ph value for cultivating freshwater pomfret fish is around 7 – 8.

### Dissolved Oxygen (DO)

The dissolved oxygen (DO) content obtained during the rearing period of fresh pomfret fish ranged from 5.9-6.0 mg/L. The dissolved oxygen (DO) value obtained was still within the normal range. According to Kordi (2011), the dissolved oxygen range in freshwater pomfret fish is approximately 4 – 6 mg/L. This opinion is supported by Arianto (2019) who said that the dissolved oxygen concentration suitable for rearing freshwater pomfret fish is therefore at least 4 mg/L. According to Manurung et al., (2018), DO is influenced by temperature, PH and organic matter. The higher the temperature, the lower DO seems to be. DO that is too low can be caused by moss, dead plankton, water viscosity and the amount of organic material that has accumulated.

## CONCLUSION AND SUGGESTIONS

### Conclusion

Efektifitas jenis filter secara horizontal pada sistem resirkulasi terhadap pertumbuhan ikan bawal air tawar yaitu dimana nilai pertumbuhan panjang mutlak pada P3 sebesar 7 cm, nilai panjang spesifik pada P3 sebesar 0,033%/hari, nilai berat mutlak P3 sebesar 24,5 gram, nilai berat spesifik 0,053%/hari, rasio konversi pakan pada K sebesar 1,5, dan nilai sintasan pada P3 sebesar 90%, serta kuliatas air dengan nilai DO 6,0 (mg/L), nilai suhu 30℃, dan nilai Ph 7,3.

**Suggestions**

In this research activity, implementing a recirculation system with horizontal filters is recommended to be continued with various types of filters and the same density.

## UCAPAN TERIMA KASIH

All praise and gratitude to the author prays to the presence of Allah SWT for all His mercy and grace, so that the thesis with the title "Growth of fresh pomfret fish (collosoma macropunun) in a recirculation system with a horizontal filter", can be completed well. On this occasion, the author would like to thank: Mr. Prof, Dr, Ir. Muhammad Junaidi M.Si, as main supervisor, Mrs. Nanda Diniarti, S.Pi., M.Si as co-supervisor, Dr. Zaenal Abidin, S.Pi., M.Si as Head of the Aquaculture Study Program at Mataram University, prof. Dr. Ir. Muhammad Junaidi, M.Si as Head of the Department of Fisheries and Maritime Affairs, University of Mataram. The author would like to express my deepest thanks to my parents, my beloved brothers and sisters, in short, the entire extended family who have provided prayers, support and materials so that I can complete the entire process of working on my thesis smoothly, as well as my colleagues who are involved and ready to help in thesis completion process.

## REFERENCES

Arianto, D., Harris, H., Yusanti, I. A., & Arumwati. (2019). Padat Penebaran Berbeda terhadap Kelangsungan Hidup, Fcr dan Pertumbuhan Ikan Bawal Air Tawar *(Colossoma macropomum)* pada Pemeliharaan di Waring. *Jurnal Ilmu-Ilmu Perikanan dan Budidaya Perairan, 14(2)*, 1693-6442

Anggeni, P., Amir, S., & Diniarti, N. 2013. Pengaruh Dosis Natrium Chlorida (NaCl) yang Berbeda sebagai Media Penetasan Telur dan Sintasan Larva Ikan Bawal Air Tawar *(Colossoma macropumum). Jurnal Perikanan Unram, 3*(2), 56-62.

Alfia, A. R., Arini, E., & Elfitasari, T. (2013). Pengaruh Kepadatan yang Berbeda terhadap Kelulushidupan dan Pertumbuhan Ikan Nila (*Oreochromis niloticus*) pada Sistem Resirkulasi dengan Filter Bioball. *Journal Of Aquculture Management and Technology. 2*(3)*,* 86-93.

Diansari, R. R. V. R., Arini, E., Elfitasari, T. (2013). Pengaruh Kepadatan yang Berbeda terhadap Kelulusan Hidup Ikan Nila (*Oreochromis niloticus*) pada Sistem Resirkulasi dengan Filter Zeolit. *Jurnal Of Aquaculture Management Technology 2*(3), 37-45.

Dewi, N, P, A, K., Arthana, I, W., & Kartika, G, R, A. (2022). Pola Kematian Ikan Nila pada Proses Pendederan dengan System Resirkulasi Tertutup di Sebatu, Bali. *Jurnal Perikanan, 12*(3), 323-332. https://doi.org/10.29303/jp.v12i3.323

Endraswari, L. P. M. D., Cokrowati, N., & Lumbessy, S. Y. (2021). Fortifikasi Pakan Ikan dengan Tepung Rumput Laut *Gracilaria* sp. pada Budidaya Ikan Nila *(Oreochromis niloticus). Jurnal Kelautan, 14*(1), 70-81. https://doi.org/10.21107/jk.v14i1.9991

Fauzia, S. R., & Suseno, S. H. (2020). Resirkulasi Air untuk Optimalisasi Kualitas Air Budidaya Ikan Nila Nirwana *(Oreochromis niloticus). Jurnal Pusat Inovasi Masyarakat, 2*(5), 887-892.

Gichana, Z., Meulenbroek, P., Ogello, E., Drexler, S., Zollitsch, W., Liti, D., Akoll, P., & Waidbacher, H. (2019). Growth and Nutrient Removal Efficiency of Sweet Wormwood (*Artemisia annua*) in a Recirculating Aquaculture System for Nile Tilapia (*Oreochromis niloticus*). *Journal MDPI Water*, *11*(923), 1-14.

Kementerian kelautan dan perikanan (2011). Perkembangan Ikan Bawal Tawar. www.djpd.kkp.go.id/berita.php=532. Diakses 3 November 2014, 1 hal.

Muhammad, M., Sayyid, A. E. R & Irma, D. (2017). Pertumbuhan dan Kelangsungan Hidup Benih Ikan Nila Gesit (*Oreochromis niloticus*) pada Sistem Akuaponik dengan Jenis Tanaman yang Berbeda. *Jurnal Ilmiah Mahasiswa Kelautan dan Perikanan Unsyiah, 2*(1), 183- 193

Maldino, M. F., Junaidin, M., & Lestari, D., P. (2023). Pengaruh Kombinasi Filter dengan Sistem Resirkulasi terhadap Pertumbuhan dan Kelangsungan Hidup Benih Ikan Nila *(Oreochromis Niloticus). Jurnal Ruaya, 11*(1), 2541 – 3155

Mulqan, M., Rahimi, S. A. E., & Dewiyanti, I. (2017). Pertumbuhan dan Kelangsungan Hidup Benih Ikan Nila Gesit *(Oreochromis niloticus)* pada System Akuaponik dengan Jenis Tanaman yang Berbeda. *Jurnal Ilmiah Mahasiswa Kelautan dan Perikanan Unsyiah*, *2*(1), 183–193.

Mulyadi, M., Tang, U., & Yani, E. S. (2014). Sistem Resirkulasi dengan Menggunakan Filter yang Berbeda terhadap Pertumbuhan Benih Ikan Nila (*Oreochromis niloticus*). *Jurnal Akuakultur Rawa Indonesia, 2*(2), 117-124.
DOI: https://doi.org/10.36706/jari. v2i2.2079.

Nelvia, L., Elfrida, Y., & Basri. (2015). Penambahan Bioball pada Filter Media Pemeliharaan terhadap Kelangsungan Hidup dan Pertumbuhan Benih Ikan Mas Koki *(Carassius auratus). Prosiding Hasil Penelitian Mahasiswa FPIK, 7*(1), 1-12.

Siegers, W. H., Prayitno, Y., & Sari, A. (2019). Pengaruh Kualitas Air terhadap Pertumbuhan Ikan Nila Nirwana *(Oreochromis* sp.*)* pada Tambak Payau. *The Journal Of Fisheries Development, 3*(2), 95-104.

Supii, A, I., Aprilia, T, I., Sulianto, A, A., & Lusiana, N. (2020). Uji Pemanfaatan Air Buangan Hatchery Budidaya Ikan Laut untuk Pendederan Ikan Kerapu Hibrid Cantang. *Ecotrophic, 14*(1), 49-61. https://doi.org/10.24843/EJES.2020.v14.i01.p05

Sukardi, P., Soedibya, P. H. T., & Pramono, T. B. (2018). Produksi Budidaya Ikan Nila *(oreochromis niloticus)* System Bioflok dengan Sumber Karbohidrat Berbeda. *Ajie - Asian Journal Of Innovation And Entrepreneurship, 3*(2), 198-203.

Silaban, T. F., Santoso, L., & Suparmono. (2012). Dalam Peningkatan Kinerja Filter Air untuk Menurunkan Konsentrasi Amonia pada Pemeliharaan Ikan *Mas (Cyprinus Carpio). E-Jurnal Rekayasa Dan Teknologi Budidaya Perairan, 1*(1), 2302-3600

Setyono, B. D. H., & Scabra, A., R. (2019). Teknologi Akuaponik Apung Terintegrasi Budidaya Ikan Nila di Desa Kapu Kabupaten Lombok Utara. *Jurnal Abdi Insani Lppm Unram, 6(2).*

Suparlan., Azwar, T., Said, A., & Nurhayati. (2020). Kombinasi Filter pada Sistem Resirkulasi terhadap Pertumbuhan Benih Ikan Nila (*Oreochrimis niloticus*). *Jurnal Tilapia, 1*(1), 26-31.

Sulistyansyah, Y. (2013). Pengaruh Pemberian Kalsium Karbonat (CaCo3) pada Media Bersalinitas untuk Pertumbuhan Ikan Bawal Air Tawar *(Colossoma macropomum) Skripsi.* Institut Pertanian Bogor.

Sitio, M. H. F., Jubaedah, D., & Syaifudin, M. (2017). Kelangsungan Hidup dan Kelangsungan Benih Ikan Lele *(Clarias* sp.) pada Salinitas Media yang Berbeda. *Jurnal Akuakultur Rawa Indonesia, 5*(1): 83–96. https://doi.org/10.36706/jari.v5i1.5810

Suryanto, D., & Suprianto, B. (2021). Pengaruh Pemberian Pakan dengan Formulasi Berbeda terhadap Pertumbuhan Ikan Nila Salin *(Oreochromis niloticus). Jurnal Airaha, 10*(2), 248-254. https://doi.org/10.15578/ja.v10i02.272

Soemardjati, W., & Muqsith, A. (2013). System Filtrasi dan Sterilisasiultra Violet (UV) pada Pemeliharaan Abalone *(Holiotis Tokobushi /Squamata). Jurnal Ilmu Perikanan, 4*(1), 1-6.

Putra, S., Arianto, A., Efendi, E., Hasani, Q., & Yulianto, H. (2016). Efektifitas Kijing Air Tawar *(Pilsbryoconcha exilis)* sebagai Biofilter dalam Sistem Resirkulasi terhadap Laju Penyerapan Amoniak dan Pertumbuhan Ikan Lele Sangkuriang *(Clarias gariepinus*). *Jurnal Rekayasa can Teknologi Budidaya Perairan, 4*(2), 2302-3600

Prasetyo, H. (2018). Aplikasi Teknologi Aquaponic Pada Budidaya Ikan Air Tawar Untuk Optimalisasi Kapasitas Produksi. *Jurnal Saintek Perikanan, 8*(1), 46-50.

Rapida., Juniarti., Baso, H. S., & Siswati. (2022). Pengaruh Pemberian Udang Rebon *(Acetes* sp.*)* Kering terhadap Pertumbuhan dan Kelangsungan Hidup Ikan Bawal *(Colossoma macropomum). Eucheuma Journal Of Aquaculture,1*(1), 30-36

Wihardi, Y., Yusanti, I.A & Haris, R. B. K.( 2014). Feminisasi pada Ikan Mas *(Cyprinus carpio)* dengan Perendaman Ekstrak Daun-Tangkai Buah Terung Cepoka *(Solanum torvum)* pada lama Waktu Perendaman Berbeda. *Jurnal Ilmuilmu Perikanan dan Budidaya Perairan, 9(1)*, 23 – 28.