

THE EFFECT OF DIFFERENT FEED TYPES ON THE ABSOLUTE WEIGHT GROWTH OF FRESHWATER LOBSTER SEEDS (*Cherax quadricarinatus*) 1 MONTH AGE

Pengaruh Jenis Pakan yang Berbeda Terhadap Pertumbuhan Berat Mutlak Benih Lobster Air Tawar (*Cherax quadricarinatus*) Umur 1 Bulan

Hanafi Maulidditya Mukti*, Sri Oetami Madyowati, Achmad Kusyairi, Nurul Hayati

Aquaculture Study Program, Faculty of Agriculture, Dr. Soetomo University

Jl. Semolowaru No. 84, Menur Pumpungan, Sukolilo District, Surabaya, East Java 60118

*Corresponding author: hanafiadit1234@gmail.com

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ABSTRACT

Fisheries cultivation in Indonesia includes ornamental fish cultivation and consumption fish cultivation. One of the problems in consumption fish cultivation is usually due to inappropriate feed factors, which makes the cultivation process tend to be long and inefficient. This research aims to determine the right type of feed to support the absolute weight growth of 1 month old freshwater lobster (*Cherax quadricarinatus*) seeds. The method used was an experimental method using a completely randomized design (CRD) with 5 treatments and 5 replications. The test animals used were 1 month old lobster seeds with an initial average weight of 1.60, the seeds were obtained from the spawning of the Krian lobster cultivation breeders. Lobsters were reared and given food according to treatment in the form of P1 (pellets), P2 (maggot), P3 (silk worms), P4 (potatoes), P5 (*Daphnia magna*) for 30 days. The results of the research showed that P3 silk worm food gave the highest absolute weight growth, namely 1.29gr, then maggot P2 which is 0.79gr, potato P4 0.64gr, then pellet P1 0.55g and finally daphnia magna with a figure of 0.17gr Absolute weight growth is the main parameter observed as well as supporting parameters including water quality including temperature, pH, and dissolved oxygen.

Keywords: Absolute Weight Growth, Freshwater Lobster Seeds, Type of Feed

ABSTRAK

Budidaya perikanan di Indonesia meliputi budidaya ikan hias dan budidaya ikan konsumsi, salah satu permasalahan dalam budidaya ikan konsumsi biasanya karena faktor pakan yang kurang tepat sehingga membuat proses budidaya cenderung lama dan tidak efisien. Penelitian ini bertujuan untuk mengetahui jenis pakan yang tepat untuk menunjang pertumbuhan berat mutlak benih lobster air tawar (*Cherax quadricarinatus*) umur 1 bulan. Metode yang digunakan adalah metode eksperimentall menggunakan rancangan acak lengkap (RAL) dengan 5 perlakuan dan 5 ulangan. Hewan uji yang digunakan adalah benih lobster berusia 1 bulan dengan berat rata-rata awal 1,60, benih diperoleh dari hasil pemijahan indukan budidaya lobster krian. Lobster dipelihara serta diberikan pakan sesuai perlakuan yang berupa P1 (pelet), P2

(maggot), P3 (cacing sutra), P4 (kentang), P5 (*Daphnia magna*) selama 30 hari. Hasil penelitian menunjukkan pada pakan cacing sutra P3 memberikan pertumbuhan berat mutlak tertinggi yaitu 1,29 gr, kemudian maggot P2 yaitu 0,79 gr, kentang P4 0,64 gr, kemudian pelet P1 0,55 gr dan yang terakhir daphnia magna dengan angka 0,17 gr. Pertumbuhan berat mutlak merupakan parameter utama yang diamati serta parameter pendukung termasuk kualitas air meliputi suhu, pH, dan oksigen terlarut.

Kata Kunci: Benih Lobster Air Tawar, Jenis Pakan, Perumbuhan Berat Mutlak

INTRODUCTION

Many sectors utilize and optimize natural resources in Indonesia, starting from the tourism, agriculture and fisheries sectors. The fisheries sector is an important sector in the development of resources in Indonesia because Indonesia has great water potential and also many types of activities that can be carried out, starting from capture fisheries or aquaculture. Fisheries cultivation in Indonesia usually includes ornamental fish cultivation and consumption fish cultivation, cultivation is carried out so that the resources managed remain controlled. Freshwater lobster (*Cherax quadricarinatus*) is one of the leading commodities in Indonesia because freshwater lobster is very suitable for cultivation in Indonesia's tropical environment and has a relatively easy maintenance, the price of freshwater lobster is also relatively affordable so that it can be enjoyed by the public. Freshwater lobster commodities began to enter Indonesia in 2000 and were cultivated to meet the needs of the ornamental shrimp market in 2003 to meet the ornamental shrimp market, the trend began to shift to one type of consumption shrimp (Khoirul Achmad Zaky, 2020).

Freshwater lobsters are aquatic animals whose natural environment must be submerged in water and are usually overgrown with aquatic plants, freshwater lobsters inhabit various habitats such as lakes, swamps and rivers, many species of freshwater lobsters are spread throughout Indonesia but on average farmers use imported freshwater lobsters of the red claw type (*Cherax quadricarinatus*). This type has not been widely cultivated in Indonesia because the cultivation technique was only pioneered in the 90s and initially lobsters were imported from Australia and China (Fitriana Santi, 2021).

One important aspect in cultivation is feeding fish, feed is the main source for the survival of fish, good feed will affect the growth and quality of production of the fish itself, if the feed given is of good quality and the environmental conditions are supportive, it is certain that the growth rate will be fast as expected (Khairuman & Amri, 2013). The type of feed usually uses between natural feed and artificial feed, by providing appropriate feed, the growth of freshwater lobsters can be optimally increased. Natural feed for lobsters is usually in the form of silkworms and also plants available in the cultivation environment, generally all foods can be used as feed because lobsters are omnivorous. Artificial feed is some ingredients that are mixed so that they change their shape from the original. Pellets are one of the artificial feeds that can be given as the main feed for lobsters but must still pay attention to the composition of the nutritional content, texture and size. This is in accordance with the opinion of (Rihi, 2019) which states that there are two types of fish feed, namely natural and artificial feed, natural feed is food that is available in nature and has advantages including having high nutritional content, easy to digest and feed movement attracts fish.

One way to reduce the amount of feed productivity is to choose one feed that has optimal advantages, the use of natural feed such as silkworms and others is often chosen by cultivators. Therefore, based on the presentation of the data and description above, it is necessary to provide different feeds to find out what type of feed is most suitable for accelerating the growth of freshwater lobsters so that further research is carried out on the effect of different types of feed on the growth of the absolute weight of freshwater lobster seeds (*Cherax*

quadricarinatus) aged 1 month.

METHODS

In this study, researchers used an experimental research method which is one of the quantitative studies where researchers manipulate one or more independent variables, control other relevant variables, and observe the effects of manipulation on the dependent variable. The study was designed using a Completely Randomized Design (CRD) with 5 treatments and 5 replications, thus obtaining 25 experiments, with the calculation formula $(t-1)(n-1) \geq 15$.

The implementation of this study is planned for 30 days, because at the time of lobster larvae/seeds in the early stages of life they have very rapid growth and also depending on the feed given, the average initial weight is 1.60 grams with a weight per tail of 0.32 grams, with a capacity of 5 tails/tub. The tools used during the study were (a) 5-liter plastic tub, (b) plastic basin, (c) aeration equipment, (d) sieve, (e) water hose, shipon hose, (f) stationery, (g) 1000ml measuring cup, (h) analytical scales, (i) DO meter, (j) pH meter, (k) thermometer. With materials (a) Fresh water, (b) Freshwater lobster 0.32-1gr, (c) pellets, (d) maggots, (e) silkworms, (f) potatoes, (g) *Daphnia magna*. Feed was given twice a day as much as 3% of the total biomass with a dose of 25% at 08.00 WIB and 75% at 17.00 WIB. The calculation of absolute growth was calculated using the formula $W = W_t - W_o$ (Effendie, 2004).

RESULT

Data on the average initial and final values of absolute weight growth of freshwater lobster seeds in each treatment and the standard deviation values of the Effect of Giving Different Types of Feed on the Growth of Absolute Weight of Freshwater Lobster Seeds Aged 1 Month are presented in Table 1 below:

Table 1. Range of Average Values and Standard Deviations of The Effect of Different Types of Feed on The Growth of Absolute Weight of Freshwater Lobster Seeds (*Cherax quadricarinatus*) Aged 1 Month

Treatment	Absolute Weight Growth Range of Freshwater Lobsters (g)	Average (g)	Standard Deviation
P1 Pellet	0.51-0.66	0.55	0.20263
P2 Maggot	0.52-1.05	0.79	0.04760
P3 Silk worm	1.14-1.34	1.29	0.01789
P4 Potatoes	0.35- 1	0.64	0.05598
P5 <i>Daphnia magna</i>	0.10-0.20	0.17	0.13471

The P1 pellet treatment obtained an average absolute weight growth value of 0.55 grams with a standard deviation (SD) value of 0.20263, the P2 treatment obtained an average absolute weight value of 0.79 grams with a standard deviation (SD) value of 0.4760, the P3 treatment obtained an average absolute weight value of 1.29 with a standard deviation (SD) value of 0.01789, the P4 treatment obtained an average absolute weight value of 0.64 with a standard deviation (SD) value of 0.05598, the P5 treatment obtained an average absolute weight value of 0.17 with a standard deviation (SD) value of 0.15471.

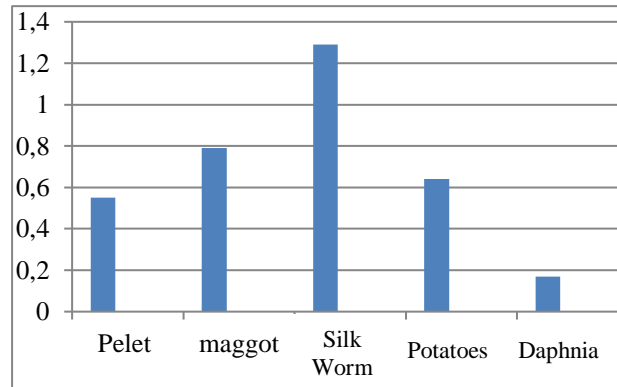


Figure 1. Absolute Weight Growth Graph of Freshwater Lobster Seeds

Based on the data above, it can be explained that the P1 treatment with pellet feed gave an average absolute weight growth value of 0.55 gr, while in the P2 treatment with Maggot feed there was an increase from the P1, P4 and P5 treatments by giving an average absolute weight growth value of 0.79 gr, in the P3 treatment the silk worm feed increased from all treatments so that it gave the highest absolute weight growth with an average value of 1.29 gr, while in the P4 treatment the potato feed decreased from the P2 and P3 treatments with an average absolute weight growth value of 0.64 gr, and in P5 the *Daphnia magna* feed had the lowest average absolute weight growth value compared to other treatments with an average value of 0.17 gr.

Table 2. One Sample Kolmogorov-Smirnov Test The effect of Different Types of Feed on The Absolute Weight Growth of 1-Month-Old Freshwater Lobster (*Cherax quadricarinatus*) Seeds

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N		25
Normal Parameters ^{a,b}	Mean	.4261
	Std. Deviation	.13471
Most Extreme Differences	Absolute	.181
	Positive	.127
	Negative	-.181
Test Statistic		.181
Asymp. Sig. (2-tailed)		.033 ^c

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.

The data obtained P value (Sig.(2-tailed)) = 0.033 > 0.05, it can be concluded that the data on the absolute weight growth of freshwater lobster seeds is also normally distributed.

Table 3. Test of Homogeneity of Variances The Effect of Different Types of Feed on The Absolute Weight Growth of Freshwater Lobster Seeds (*Cherax quadricarinatus*) Aged 1 Month

		Level statistic	df1	df2	Sig.
Absolute weight	Based on Mean	38.270	4	20	.000
	Based on Median	2.239	4	20	.101
	Based on Median and with adjusted df	2.239	4	4.473	.213
	Based on trimmed mean	33.946	4	20	.000

Test results $P = 000 < = 0.05$ which means that the data on the absolute weight growth of freshwater lobster seeds can be said to be heterogeneous, there are differences in observations on the provision of different types of feed on the absolute weight growth of freshwater lobster seeds.

Table 4. Anova Test The Effect of Different Types of Feed on The Absolute Weight Growth of Freshwater Lobster Seeds (*Cherax quadricarinatus*) Aged 1 Month

ANOVA					
	Sum of Squares	Df	Mean Squae	F	Sig.
Between Goups	.250	4	.062	6.727	.001
Within Groups	.186	20	.009		

Based on table 4.4 above, the sig value is obtained = $0.001 < \alpha = 0.05$, which means that the effect of different types of feed has a significant effect on the growth of the absolute weight of freshwater lobster seeds (*Cherax quadricarinatus*) aged 1 month.

Table 5. BNT Test The effect of Different Types of Feed on The Growth of The Absolute Weight of Freshwater Lobster Seeds (*Cherax quadricarinatus*) Aged 1 Month

Tukey HSD*	Types of feed	N	1	2	3
	Pellet	5	.2826		
	Daphnia	5	.3540	.3540	
	Potatoes	5	.4460	.4460	.4460
	Maggot	5		.4760	.4760
	Silk Worm	5			.5720
	Sig.		.093	.301	.272

The table above shows that in subset 1 there is an average absolute weight growth of freshwater lobster seeds in treatments P1 (Pellet), P5 (*Daphnia magna*), P4 (Potato). This means that the average absolute weight growth of treatments P1 (Pellet), P5 (*Daphnia magna*), P4 (Potato) does not have a significant difference. In other words, the average absolute weight growth of P1 (Pellet), P5 (*Daphnia magna*), P4 (Potato) is the same.

In subset 2, there is an average absolute weight growth of freshwater lobster seeds in treatments P5 (*Daphnia magna*), P4 (potato), P2 (Maggot). This means that the average absolute weight growth of treatments P5 (*Daphnia magna*), P4 (potato), P2 (Maggot) does not have a significant difference. In other words, the average absolute weight growth of P5 (*Daphnia magna*), P4 (potato), P2 (Maggot) is the same.

In subset 3, there is an average absolute weight growth of freshwater lobster seeds in treatments P4 (potato), P2 (Maggot), P3 (silk worm). This means that the average absolute weight growth of treatments P4 (potato), P2 (Maggot), P3 (silk worm). This does not have a significant difference. In other words, the average absolute weight growth of P4 (potato), P2 (Maggot), P3 (silk worm) is the same.

Table 6. Range of Average Water Temperature Values in The Study

Treatment	Range	Average	Standard Deviation
P1 Pellet	27 – 29 °C	28	0.70711
P2 Maggot	27 – 29 °C	28.2	0.83666
P3 Silk Worm	27 – 28 °C	27.6	0.54772
P4 Potatoes	27 – 29 °C	33.4	1.00000
P5 <i>Daphnia Magna</i>	28 – 29 °C	28.2	0.44721

Feed treatment A using pellets showed a water temperature range of 27-29°C, an average of 28, then treatment B using Maggot feed also showed a water temperature range of 27-29°C, an average of 28.2, Treatment C using silk worm feed had a range of 27-28°C an average of 27.6, treatment D using potato feed had a range of 27-29°C an average of 33.4, and the last treatment E *Daphnia magna* feed showed a range of 28-29°C an average result of 28.2.

Table 7. Range of Average pH Values in The Study

Treatment	Range	Average	Standard Deviation
P1 Pellet	7.2-7.8	7.48	2.68326
P2 Maggot	7.4-7.6	7.44	0.89443
P3 Silk Worm	7.2-7.4	7.36	0.89443
P4 Potatoes	7.2-7.5	7.38	1.09545
P5 <i>Daphnia Magna</i>	7.2-7.5	7.40	1.22474

Based on the table above, it shows that the P1 pellet treatment has a pH range of 7.2-7.48 with an average of 7.48, in P2 maggot feed shows a range of 7.4-7.6 with an average of 7.44, then P3 feed using silk worms ranges from 7.2-7.4 with an average of 7.36, then P4 potato feed shows a range of 7.2-7.5 with an average of 7.38 and the last P5 feed using daphnia pH numbers range from 7.2-7.5 with an average of 7.40.

Table 8. Range of Average DO Values in The Study

Treatment	Range	Average	Standard Deviation
P1 Pellet	5.2-5.5	5.4	2.68328
P2 Maggot	5.2-5.4	5.28	0.89443
P3 Silk Worm	5.3-5.5	5.42	0.89443
P4 Potatoes	5.3-5.4	5.36	1.09545
P5 <i>Daphnia Magna</i>	5.1-5.4	5.26	0.29052

Based on the table above, it shows that the P1 pellet treatment DO range is 5.2-5.5 with an average of 5.4. In P2 maggot feed shows a range of 5.2-5.4 with an average of 5.28, then P3 feed using silk worms ranges from 5.3-5.5 with an average of 5.42, then P4 potato feed shows a range of 5.3-5.4 with an average of 5.36 and finally P5 feed using daphnia DO figures range from 5.1-5.4 with an average of 5.26.

DISCUSSION

Growth is usually divided into 2, namely daily growth and absolute weight growth, both of these parameters are very often used to measure the physical development of fish over time and also indicate the success or failure of the maintenance method or type of feed used in the research process. Feed is an external factor in the form of materials given to meet nutritional sources to support the growth and health of freshwater lobster seeds, the type of feed given affects the growth rate and development of freshwater lobster seeds because different types of feed have different protein content values and this difference can affect the growth rate of freshwater lobster seeds. Protein is the main component needed in feed, protein is very important for the growth of freshwater lobsters because it plays a role in the formation of body tissue, development and in terms of regeneration and repair of tissue systems. The use of feed with good protein content is one of the factors needed by lobsters for growth (Suriadi et al., 2016).

In some treatments, P3 silkworms and P2 maggots have quite high values, this feed has protein with high biological value and has a fairly fishy odor so that it is preferred by freshwater

lobsters, this is because lobsters can smell and smell more clearly than seeing them, therefore lobsters tend to be attracted to food that moves and smells fishy. This is in accordance with (Mahmudin et al., 2016) who argue that lobsters rely more on smell stimuli than sight in searching for food so that the high aroma of the food will stimulate the lobster to approach and consume the food. The lobster's sense of smell plays a greater role in detecting the presence of food compared to other senses (Elfrado et al., 2014).

In the P3 treatment, silk worms have various very significant advantages as a source of protein for feed compared to other treatments, silk worms play an important role in increasing the growth and appetite of freshwater lobster seeds, providing feed that has high-quality protein content and is easy to digest is the key to supporting the growth of the absolute weight of freshwater lobsters, it can be said that feeding silk worms to freshwater lobster seeds is a good feed so that it can support the growth of the absolute weight of freshwater lobsters seeds because of the protein content, nutrients and of course it is liked by freshwater lobsters and the size of the silk worms that match the mouth opening and eating ability of freshwater lobster seeds, lobsters can easily consume them without experiencing difficulty so that they can be quickly absorbed optimally by digestion to affect the growth of the lobster's weight itself. Silk worms are low-level animals because they do not have a backbone (invertebrates), silk worms are easily digested and absorbed by the intestinal walls of their eaters (Mulla et al., 2019).

In the P5 treatment showed a significant decrease in weight growth compared to other treatments, this shows that feeding using *Daphnia magna* for freshwater lobsters is less than optimal to support the absolute weight growth of freshwater lobster seeds because the protein content and stimulation of *Daphnia magna* are less than other treatments. *Daphnia magna* has limitations in providing all the nutrients needed by freshwater lobsters, the nutritional content is considered insufficient to support the growth of lobster seeds. This is because the very small size makes lobsters may need a larger amount to meet their food needs and also *Daphnia* is easy to move in water so it is not easy for lobsters to catch it. In addition to the protein factor in the feed given to freshwater lobsters, the attraction factor also plays an important role in the growth of freshwater lobsters where food that tends to have good attraction will stimulate the appetite of freshwater lobster seeds, this can be seen because of the difference in absolute weight growth between P1 pellets, P4 potatoes, P5, where potatoes which are carbohydrates have a higher value than P1 pellets and P5 *Daphnia* this is because in potatoes the attraction and consumption levels generated are quite good because they are still included in the type of natural feed and the dense texture makes it easier for lobsters to consume it, while in pellet feed it can be assumed because the lobsters used in the study were still 1 month old so they relied more on their natural instincts in finding food, the digestive system of freshwater lobster seeds is also in the development stage therefore providing easily digestible protein and proper absorption is very important. While the small size of *Daphnia magna* makes it difficult for lobsters to get their food because daphnia is scattered when hit by the ripples of the aerator and also dies quickly so that lobsters get less food.

The results of the water quality study consisting of temperature, pH and dissolved oxygen showed that the water quality was in normal conditions and could be tolerated for the life and growth of freshwater lobster seeds. In the study, water quality temperature data showed a figure ranging from 27-29°C, this figure is still considered normal to support and support the growth of freshwater lobster seeds. The ideal temperature for lobster cultivation is around 24 - 30 degrees Celsius (Guna, Irawan, & Ariwibisono, 2021). Based on the results of the study, the acidity level in the maintenance media obtained a value ranging from 7.1-7.8. Lobsters want water with a pH of 7-8. If the pH of the water is lower than 5 and higher than 9, it indicates that the water has been polluted so that the life of aquatic biota will be disrupted and unsuitable for use (Rifki et al., 2023). Dissolved oxygen during the study period obtained a value ranging from 5.2 - 5.5ppm, this value is still considered normal and indicates that the water is still good

for use. Dissolved oxygen is one of the limiting factors in fish farming, but some types of lobsters can still survive in waters with concentrations below or above normal (Wijaya, 2022).

CONCLUSION

The provision of different types of feed has different effects on the absolute weight growth of freshwater lobster seeds. The provision of different types of natural feed with the treatment of silk worm feeding (P3) gave the highest absolute weight growth of freshwater lobster seeds, namely 1.29 grams, followed by the provision of maggot feed (P2) 0.79 grams, the provision of potato feed (P4) 0.64 grams, then the provision of pellet feed (P1) 0.55 grams, and the last provision of daphnia feed (P5) 0.17 grams. Water during the research period showed good results and was within normal limits for the life and growth of freshwater lobster seeds, namely Temperature ranging from 27-29°C, pH ranging from 7.1-7.8, DO ranging from 5.1 - 5.5 ppm.

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