

*Feed Efficiency and Growth of Vannamei Shrimp (*Litopenaeus Vaname*) with Commercial Feeding*

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Abstract – The purpose of this study was to analyze the effect of different commercial feeds on the growth and survival of Vannamei shrimp. The research was conducted in March to June 2022 at the Marine and Brackish Water Cultivation Fisheries Center, IV Jurai District, Pesisir Selatan District, West Sumatra Province. The research method used was an experimental method using a Completely Randomized Design (CRD) with 3 treatments and 3 replications. The treatments to be carried out in this study were: Feed A: Feeding with brand X = 100%; Feed B: Feeding with brand Y; Feed C: Feeding with brand Z. The parameters observed in this study were fish survival, absolute length growth, absolute weight and specific growth rates. The data obtained will be analyzed using analysis of variance to see the effect of treatment on test parameters. Based on the results of the analysis of variance showed that feeding with different commercial feeds had a significant effect on absolute weight and specific growth rate of vanname shrimp ($P < 0.05$). However, different commercial feeds had a significant effect on absolute length ($P > 0.05$).

Keywords – Vannamei Shrimp; Feed; Growth.

I. INTRODUCTION

Shrimp is one of the main fisheries commodities in Indonesia besides crabs, squid and fish. Vannamei shrimp is one of the biggest contributors to the export value of fishery products. Vaname shrimp is one of the leading fishery products in the fisheries sector. the opportunity for Vanamei shrimp farming is very large, but the use of feed in Vanamei shrimp cultivation is very high, almost 60-70% of the total operational costs are used for feed¹. The feed given must be in accordance with the needs so that it can spur growth and development and increase vannamei shrimp productivity optimally. Feeding must be considered carefully and precisely, that the shrimp do not experience underfeeding which results in slow and non-uniform growth or overfeeding which can contaminate the waters and result in poor water quality so that the shrimp are easily stressed and stunted shrimp growth².

Feed management is a technical aspect that needs to be a major concern for technicians in ponds, because feed is the most dominant production factor in calculating production costs, reaching nearly 70% of the total cost of shrimp production. In addition, feed also affects growth, survival and production cost efficiency³. Therefore, if feed management is not carried out properly, it will be able to increase production costs, which in turn will reduce the profit potential of the cultivator. Shrimp feed management starts from the process of choosing feed, storing feed, setting the frequency of feeding and feed dosage, to calculating and analyzing the efficiency level of the feed used. Selection of the type of shrimp feed must be adjusted to the needs of shrimp so that the success of the cultivation process can be achieved. Availability of the right feed, both in quality and quantity is an absolute requirement to support shrimp growth, which in turn can increase production. Feeding in excessive amounts can increase production costs and waste and cause excess feed residue which will result in a decrease in water quality thereby affecting the growth and survival of shrimp⁴.

Poor feed management can lead to feed residues and slowly increase levels of contamination and reduce water quality. High feed inputs can lead to high waste produced, both suspended and settled at the bottom of the pond. The protein content of artificial shrimp feed (pellets) is quite high, which is around 40% so that the decomposition process will produce ammonia which is a toxic compound for shrimp⁵. Feed management is an effort made to increase the efficiency of feed used and minimize feed waste in ponds. Therefore, feed management is very important in shrimp farming. Based on this, research was conducted on the growth of grouper fish with several commercial feed brands. The purpose of this study was to analyze the effect of different commercial feeds on the growth and survival of Vannamei shrimp.

II. LITERATURE SURVEY

The quality of feed is determined by the nutritional content in the feed and its storage process. Shrimp feed must contain essential nutrients which include protein, lipids, carbohydrates, minerals, and vitamins. Protein is the largest component in feed, generally 30% -55% of the total nutrition in feed. The nutritional content of shrimp feed will affect the growth of shrimp, especially protein, different nutrient content will have a different effect on growth. Farmers should be able to selectively choose the type of feed that can improve the performance of shrimp growth and provide a good level of feed efficiency. Feed efficiency is one way to reduce production costs so that the profit margins can be increased. The good growth of vanname shrimp is indicated by the performance conditions of weight gain, proportional shrimp size and in accordance with the development of shrimp rearing age^{1,2}.

In the maintenance of vanname shrimp in ponds, generally farmers use commercial feed products from companies that are their partners in developing the shrimp pond business. In addition to supplying feed, the company also provides technical services related to monitoring water quality, controlling pests and diseases and monitoring services for vanname shrimp growth. which is done regularly. However, shrimp pond cultivators should also have a reference in choosing and deciding the type of feed they will use. In addition to considerations of feed quality and quality, the price factor is also important to take into account because it has a direct effect on production costs and the profits they will get later. Expensive or cheap feed prices are not necessarily able to provide maximum profit, because it correlates with the growth rate and the efficiency level of feed use^{3,6}.

III. METHODOLOGY

The research was conducted in March to June 2022 at the Marine and Brackish Water Cultivation Fisheries Center, IV Jurai District, Pesisir Selatan District, West Sumatra Province. The research method used was an experimental method using a Completely Randomized Design (CRD) with 3 treatments and 3 replications. The treatments to be carried out in this study were: Feed A: Feeding with brand X = 100%; Feed B: Feeding with brand Y; Feed C: Feeding with brand Z.

The tools used are rulers, digital scales, inlet and outlet pipes, baskets, drains, Viber tubs, blowers, and hoses. The materials used in the study were vanname shrimp and commercial feed with brands A, B and C. This study observed the number of fish and measured the length and weight of the fish. Feeding is done 3 times a day, siphoning is done 2 times a day, and observations are made by taking length and weight sampling once every 10 days. Water quality parameters measured were temperature, DO salinity, and pH at the beginning and end of the study.

The parameters observed in this study were fish survival, absolute length growth, absolute weight and specific growth rates. The data obtained will be analyzed using analysis of variance to see the effect of treatment on test parameters.

IV. RESULT AND DISCUSSION

Based on the results of the analysis of variance showed that feeding with different commercial feeds had a significant effect on absolute weight and specific growth rate of vanname shrimp ($P < 0.05$). However, different commercial feeds had a significant effect on absolute length ($P > 0.05$). All research data for each parameter of vanname shrimp are presented in table 1.

Table 1. Average vanname shrimp fish growth performance

Parameters	Treatments		
	A	B	C
Absolute length (cm)	10,67±8.19 ^a	6,04±0,15 ^a	6,00±0,06 ^a
Absolute weight (g)	44,65±0,37 ^a	20,07±0,09 ^b	19,81±0,11 ^b
Spesific growth rate (%/day)	2,63±0,44 ^a	1,88±0,01 ^b	1,87±0,02 ^b

Note: Different superscript on the same line show significant differences (P<0.05)

Table 2 also shows that the provision of different types of commercial feed was not significantly different on the absolute length growth of Vanname shrimp. The average survival rates for each treatment were A (10.67 ± 8.19 cm), B (6.04 ± 0.15 cm) and C (6.00 ± 0.06 cm). Based on the results of Duncan's further test in table 2 and appendix 1, the provision of different types of commercial feed on the absolute weight growth of Vanname shrimp showed that treatment A was significantly different from treatments B and C (P<0.05). The highest absolute weight growth of Vanname shrimp was treatment A (44.65 ± 0.37 g), followed by treatment B (20.07 ± 0.09 gr) and treatment C (19.81 ± 0.11 gr). Duncan's further test in Table 2 and Appendix 1 also showed that the use of different types of commercial feed on the specific growth rate of Vanname Shrimp treatment A was significantly different from treatments B and C (P<0.05). The highest specific growth rate of Vanname shrimp was treatment A (2.63 ± 0.44 %/day) followed by treatment B (1.88 ± 0.01 %/day) and treatment C (1.87 ± 0.02 %/day).

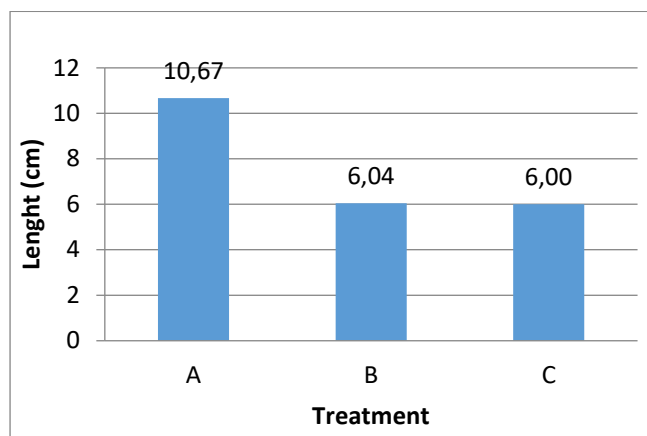


Figure 1. Bar Diagram of the Long Growth of Vaname Shrimp

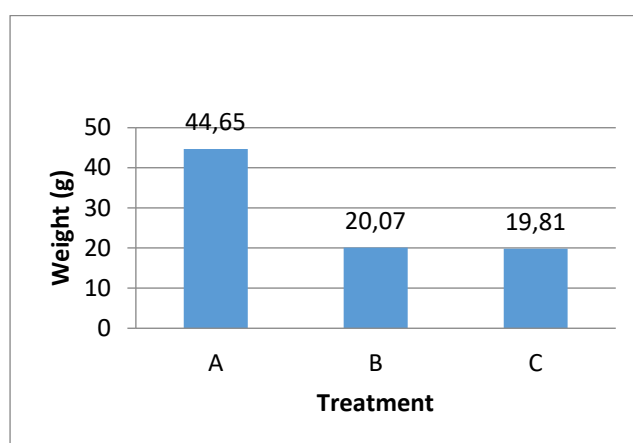


Figure 2. Bar Diagram of the weigh Growth of Vaname Shrimp

From the results of the study it was found that the best growth was in treatment A followed by treatments B and C. The decreased weight gain in shrimp was suspected because the feed given was less preferred by shrimp even though it had nutritional content that was in accordance with their needs. With nutrient content that is not balanced with the level of preference of shrimp, growth will be hampered and can cause certain symptoms called malnutrition. Treatments B and C resulted in a smaller increase in biomass growth than treatment A, which means that in addition to sufficient nutrient content, shrimp response to feed also needs to be considered so that shrimp have a high level of consumption of feed^{2,7}.

The level of feed consumption will affect the growth and biomass of shrimp at the end of rearing. A high feed efficiency value indicates that the utilization of feed in the fish's body is more efficient and the quality of the feed is getting better. The higher the value of feed efficiency proves the better use of feed. Good feeding management will increase the growth and survival of vanname shrimp^{3,8}. Feed efficiency can be achieved when growing shrimp pay attention to feeding management because the feed consumed by cultivated organisms will be used to increase growth. Lack of protein will result in stunted shrimp growth and lower shrimp biomass, while excessive protein in the feed will only partially be utilized for the formation of body protein and the rest will be converted into energy. Providing quality feed in sufficient quantities will reduce the percentage of shrimp mortality. Feed consumption greatly affects shrimp body weight gain, because feed consumption determines the entry of nutrients into the body which will then be used for growth and other purposes^{5,9}.

Growth in weight will increase if the metabolic processes in the body run smoother, so that the incoming energy will become recovered energy for the growth process. Growth occurs when there is an excess of energy after energy is used for body maintenance, basal metabolism and activity. The energy needs of a species are expected to be mostly met by non-protein nutrients such as fats and carbohydrates. If energy from non-protein nutrients is sufficiently available, then most of the protein will be used for growth, but if energy and non-protein nutrients are not fulfilled, then protein will be used as an energy source so that the function of protein as a body builder will decrease. The occurrence of growth in the test shrimp in all treatments indicated that the feed energy given had exceeded the need itself for maintenance so that the rest was for growth. Optimal protein requirements are influenced by the use of protein for energy, amino acid composition, feed digestibility, and protein energy balance^{6,10}.

V. CONCLUSION

Based on the results of this study, it can be concluded that the the results of the analysis of variance showed that feeding with different commercial feeds had a significant effect on absolute weight and specific growth rate of vanname shrimp ($P < 0.05$). However, different commercial feeds had a significant effect on absolute length ($P > 0.05$).

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