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FEEDING EFFICIENCY USING AUTO FEEDER IN VANNAMEI SHRIMP (*LITOPENAEUS VANNAMEI*) CULTIVATION AT PT. BUMI HARAPAN JAYA, TANO PHOTO, WEST SUMBAWA

Efisiensi Pemberian Pakan Menggunakan Auto Feeder Pada Budidaya Udang Vannamei (*litopenaeus vannamei*) di PT. Bumi Harapan Jaya, Poto Tano, Sumbawa Barat

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ABSTRAK

Pakan merupakan faktor yang sangat penting karena memakan 60-70% dari total biaya operasional, sehingga pakan yang diberikan sesuai kebutuhan akan memacu pertumbuhan dan perkembangan produksi udang secara optimal. Penggunaan mesin auto feeder dapat membantu dalam penyediaan pakan udang secara lebih efektif serta menjaga kualitas air agar tetap stabil dan layak untuk budidaya udang vannamei. Tujuan dari penelitian ini adalah untuk mengetahui efisiensi pemberian pakan pada budidaya udang vannamei (Litopenaeus vannamei). Metode yang digunakan dalam penelitian ini adalah metode deskriptif, data yang dianalisis dalam penelitian ini adalah data pertumbuhan udang yang diperoleh dari hasil sampling dan data kualitas air baik di lapangan maupun di laboratorium. Hasil dari penelitian ini adalah pertambahan berat harian (PBH) udang vannamei berada pada kisaran 0,22-0,38 gram, data ini sudah optimal dan untuk rata-rata bobot (MBW) yang diperoleh 4,56 gram kemudian meningkat seiring waktu hingga mencapai DOC 108 dengan bobot 24,97 gram. Berdasarkan hasil rata-rata pertumbuhan berat yang diperoleh diketahui bahwa pertumbuhan sudah optimal dan diketahui nilai kualitas air masih dalam kondisi optimal pada budidaya udang vannamei baik parameter fisika maupun kimia. Dari penelitian ini diketahui bahwa pemberian pakan menggunakan auto feeder berpengaruh baik terhadap pertumbuhan udang ADG dan MBW dan juga pakan yang diberikan menggunakan auto feeder dapat meminimalisir pakan jatuh ke dasar sehingga kualitas air tetap terjaga dan tetap dalam kondisi optimal untuk budidaya udang vannamei.

ABSTRACT

Feed is a very important factor because it takes up 60-70% of the total operational costs, so that feed provided according to needs will stimulate optimal growth and development of shrimp production. The use of auto feeder machines can help in providing shrimp feed more effectively and maintaining water quality to remain stable and suitable

for vannamei shrimp cultivation. The purpose of this study was to determine the efficiency of feeding in vannamei shrimp (*Litopenaeus vannamei*) cultivation . The method used in this study is the method descriptive, the data analyzed in this study is shrimp growth data obtained from sampling results and water quality data both in the field and laboratory. The results of this study are that the daily growth (ADG) of vannamei shrimp is in the range of 0.22-0.38 grams, this data is already optimal and for the average weight (MBW) obtained 4.56 grams then increased over time to reach DOC 108 with a weight of 24.97 grams. Based on the results of the average weight growth obtained, it is known that the growth is optimal and it is known that the water quality value is still in optimal condition in vannamei shrimp cultivation, both physical and chemical parameters. From this study it is known that feeding using an auto feeder has a good effect on the growth of ADG and MBW shrimp and also the feed given using an auto feeder can minimize feed falling to the bottom so that water quality is maintained and remains in optimal condition for vannamei shrimp cultivation.

Kata Kunci	*Budidaya, Pakan, Udang Vannamei, Auto Feeder, Pertumbuhan*
Keywords	*Cultivation, Feed, Vannamei Shrimp, Auto Feeder, Growth*
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INTRODUCTION

Cultivation is one of the alternative research in increasing fisheries production, starting from the production process, handling of results to marketing (Mulyono & Ritonga, 2019). According to Arsad *et al.,* (2017) the requirements for the implementation of cultivation research are the existence of cultivated organisms, living media for organisms, and containers/places for cultivation. It is estimated that around 6,000,000 ha of coastal land in Indonesia can be used for aquaculture purposes. V a n namei shrimp is one type of shrimp that is often cultivated in ponds , This is because the shrimp have promising prospects and profits (Yunarty *et al.,* 2022).

Vannamei shrimp (*Litopenaeus vannamei*) is one of the marine fishery commodities that has high economic value both in the domestic and global markets, where 77% of it is produced by Asian countries including Indonesia. One of the advantages of van n amei shrimp is its high selling price, easy to cultivate and resistant to disease (Dahlan *et al., 2017). Efforts to increase van* n amei shrimp production can be done through intensive cultivation efforts with the implementation of a complete and comprehensive aquaculture business. One of them is the provision of effective and efficient feeding (Tahe & Suwoyo, 2011).

Vannamei shrimp cultivation research , feed is a very important factor because it takes up 60-70% of the total operational costs so that the feed given according to the needs will stimulate the growth and development of shrimp production optimally. Nuhman, (2009) stated that vannamei shrimp forage during the day and night (diurnal and nocturnal) continuously so that shrimp need a long time to eat in large portions. This is important for vannamei shrimp farmers to know in determining the amount of feed and frequency of feeding so that the feed given can be optimal. Excessive feeding can damage the water quality in the vannamei shrimp cultivation container, because the

remaining uneaten feed and metabolic waste accumulate and settle at the bottom of the waters into toxic ammonia and nitrite, which triggers a decrease in oxygen in the pond and can cause poisoning in shrimp (Arsad *et al.,* 2017). Therefore, the application of creative, innovative and efficient technology is needed to support the sustainability of cultivation, one of the technologies used to respond to the problem of feeding is the use of auto feeders.

The use of automatic feeder machines or often referred to as auto feeders can help in providing shrimp feed more effectively and maintaining water quality so that it remains stable and suitable for vannamei shrimp cultivation. Autofeeder machines can be adjusted according to the needs of shrimp feeding time continuously, so that the feed spread using autofeeders can be directly eaten by shrimp in intact condition and reduce the risk of uneaten feed piling up at the bottom of the pond. Control of feeding through automatic feeders can directly reduce waste of shrimp feed residue into the waters (Arsad *et al.,* 2017). The need for this research to be carried out because in shrimp ponds with an intensive system that has a high stocking density, feeding must be optimal. Feeding that is not optimal and effective will have a negative impact on the organisms being raised. The existence of creative and innovative technology today can help make feeding more efficient.

METHODS

Tools and materials

The tools needed in this study are Anco, autofeeder, burette, ladle, mobile phone, net/mesh, mixer, sack, pH meter, raft, refractometer, spectro, test kit and digital scales while the materials used are sea water, feed, probiotics/culture, vannamei shrimp DOC 42 and vitamins C and B.

Method

The method used in this research is the method descriptive, namely describing all research conducted clearly and in detail, supported by literature studies, so that it can provide clear and complete information. The data analyzed in this study are shrimp growth data obtained from sampling results carried out once a week, water quality data from both the field and the laboratory obtained once a week.

Data Collection Techniques

Data collection in this study consists of two, namely primary data and secondary data. Primary data is data obtained or collected directly from the data source. Primary data is obtained directly through observational research, interviews, and active participation. Data collection is carried out from the sampling process using nets by taking several shrimp samples. The shrimp obtained are weighed then counted and recorded to determine the growth rate of the shrimp. While secondary data is data obtained from various existing sources (the researcher's position is as a second hand). Secondary data can be obtained from various sources, such as books, reports, journals, and others.

RESULTS

The results of growth observations carried out during the research including MBW, ADG and FCR obtained the following data:

Table 1. Growth and FCR Data

DOC	Biomass (kg)	MBW sampling (g)	ADG sampling (g)	Weight (tails/kg)
42	1,718	4.56	0.24	219.3
49	2,560	6.58	0.29	152.1
56	3,387	8.87	0.33	112.8
63	3,808	10.96	0.30	91.2
75	5,157	14.78	0.32	67.6
84	4,674	17.49	0.30	57.2
91	5.159	19.81	0.33	50.5
98	5.474	21.39	0.22	46.8
103	6,004	23.28	0.38	43.0
108	6,544	24.97	0.34	40.1

The results of water quality observations (physical and chemical parameters) carried out during the research are as follows:

Table 2. Chemical Parameters

Water Quality Parameters	Measurement results	Optimal Value
Nitrate	2-37.5 mg/l	100 mg/l (Rudy *et al.,* 2021)
Nitrite	0.035-3.124 mg/l	0.1-1 mg/l (Pasongli & Dirawan , 2016)
Phosphate	0.75-6 mg/l	0.1 ppm (Schaduw, 2019).
Ammonium	0.25-3 mg/l	0-1.4 mg/l (Yuniarti *et al.,* 2022)
Ammonia	0.009-0.09 ppm	0.1 ppm (Pasongli & Dirawan , 201 6)
Alkalinity	140-185 ppm	120-200 ppm (Arsad *et al.,* 2017)
pH	7.5-8.2	6.5-9 (Supriatna *et al.,* 2020)
Salinity	34-36 ppt	0.5-45 ppt (Sahrijana & Sahabuddin, 2014)

Table 3. Physical Parameters

Water Quality Parameters	Measurement results	Optimal Value
Temperature	26-30°C	20-30°C (Suhendar *et al.,* 2020)
Brightness	30-45 cm	35-45cm (Supriatna *et al.,* 2020)

DISCUSSION

Auto Feeder

Auto feeder is a tool for feeding fish or shrimp automatically. Feeding using an auto feeder is currently one of the new breakthroughs used by shrimp farmers in terms of feeding. Feeding using this auto feeder can be more efficient, especially in terms of time and energy and allows the feed given to be completely consumed by the shrimp because by using an auto feeder the feed given will come out little by little in a predetermined or determined time. This is in line with the statement of Samawi *et al.,* (2021) which states that feeding using an automatic feeder is better because feeding is done little by little but with more frequent frequency so that the feed given can minimize the loss of important nutrients in the feed because it is too long dissolved in water and can be used by shrimp as energy and also for growth.

Figure 1. Auto Feeder and TDR

a) Auto Feeder Components

Auto feeders are currently widely used in vannamei shrimp farming ponds including vannamei shrimp ponds at CV. BSS, PT. Bumi Harapan Jaya. Auto feeders can be used well if there are main components to support them. The following are the components found in the Autofeeder owned by CV . BSS, PT. Bumi Harapan Jaya, namely:

1. Electric motor
   The electric motor is used as a stirrer drive in the tube and also moves the autofeeder ejector pipe component. The electric motor used has 3 phase power. This is chosen because it is more efficient and more powerful. The use of a 3 phase electric motor can produce greater power and the current used is 2 amperes.
2. Ejection pipe
   The ejector pipe functions as an outlet for feed that will be thrown or given to shrimp. The ejector pipe used has 4 parts. The ejector pipe is made of stainless steel. The ejector pipe connected to an electric motor, functions as a feed mixer so that the feed can go down the ejection pipe and the feed does not clump.
3. Storage drum
   The storage drum functions as a container to hold feed that will be given to shrimp. At CV. BSS, PT. Bumi Harapan Jaya, the storage drum is located at the top of the autofeeder machine and has a capacity of ±75 kg. Made of high density polyethylene (HDPE). In addition, maintenance is also easier and does not require a lot of costs.
4. Framework
   The frame is used as a support for the autofeeder. The frame is made of stainless steel, this material is chosen so that the support does not rust easily when exposed to salt water. In addition to the stainless steel frame, the autofeeder is also given a wooden support to make it easier to use.
5. Time Delay Relay (TDR)
   TDR functions as a timer for the autofeeder. This TDR is intended to set the on or off time and how long the autofeeder is on and the duration of the rotation.

b) Auto Feeder Layout

The layout of the auto feeder must be considered carefully because this machine is directly related to shrimp growth. The autofeeder is placed at the corner of the plot. This location was chosen because the furthest throwing range does not reach the central drain where the feed that approaches the central drain will be mixed with mud and leftover feed. In addition, the strength of the current produced is not too strong so that it

makes it easier for shrimp to eat the feed given. The following is a schematic of the installation of the auto feeder and the waterwheel can be seen in Figure 2.

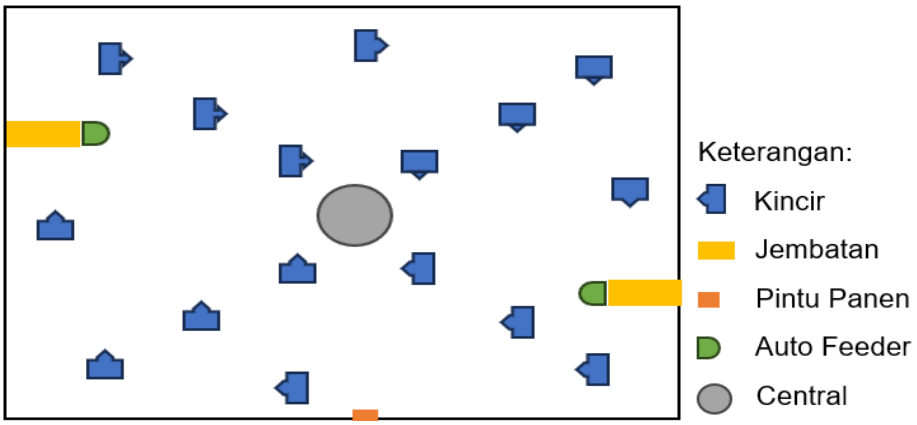

Figure 2. Auto Feeder and Waterwheel Installation Scheme

Shrimp Growth

One of the aspects observed from the efficiency of feeding using auto feeder is the growth rate of vannamei shrimp cultivated in the shrimp ponds of CV. BSS, PT. Bumi Harapan Jaya, Poto Tano, West Sumbawa. According to Riani *et al.,* (2012) growth is an increase in size, length or weight in a certain period of time. Growth occurs due to the addition of tissue from cell division through mitosis which occurs due to excess energy and protein input from feed.

Shrimp Daily Weight Growth (ADG)

Based on the data obtained, it can be seen that the daily shrimp growth rate (ADG) obtained from the sampling results carried out once a week, the daily shrimp growth rate (ADG) varies and there is an increase in weight or a decrease in weight every week as seen in Figure 3. Graph 1, this is caused by different shrimp conditions, environmental factors and the ability of shrimp to utilize the feed given. This is in line with the statement of Yunarty *et al.,* (2022) which states that the ADG obtained shows differences in each DOC, this condition is because the shrimp growth rate per time period varies according to body condition, feed input, and environmental factors that influence.

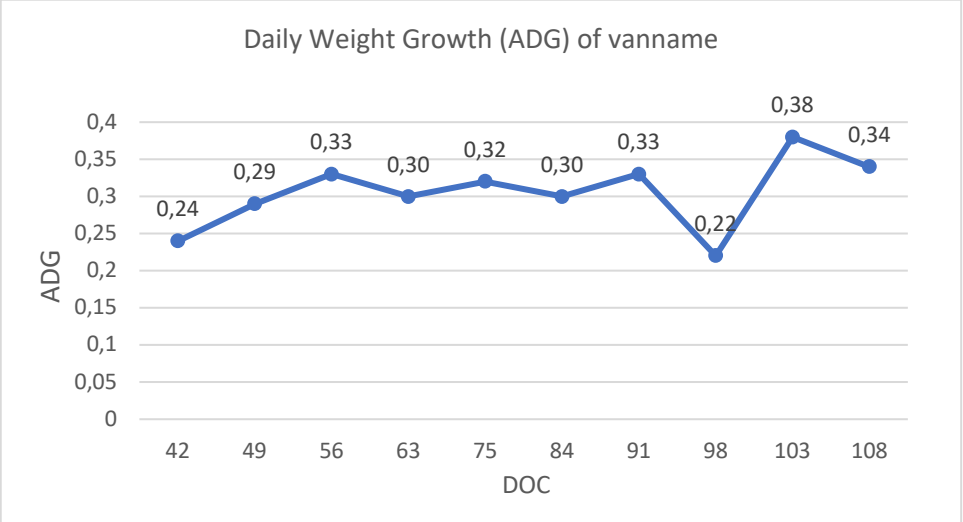

Figure 3. Graph 1. Daily growth of shrimp

From the growth data, it is known that the daily growth of vannamei shrimp is in the range of 0.22-0.38 grams, this daily growth data is known from the results of sampling carried out once a week, this data is already optimal because according to Bahri *et al.,* (2020) in vannamei shrimp cultivation activities, the daily growth (ADG) of normal shrimp is 0.14 grams/day. The higher the ADG value, the faster the shrimp will reach the desired size and the growth of the shrimp is classified as optimal.

Shrimp Average Weight Growth (MBW)

Mean Body Weight (MBW) is the average weight of shrimp from one population obtained from sampling results. Based on the data from the sampling results of the average weight of vannamei shrimp in Table 1, the sampling carried out on DOC 42 days, the average weight obtained was 4.56 grams, then experienced a fairly high increase in DOC 75 days, reaching a weight of 14.78 grams and increasing over time until reaching DOC 108 with a weight of 24.97 grams can be seen in Figure 4. Graph 2. Based on the results of the average weight growth obtained, it is known that the growth is optimal, according to Bahri *et al.,* (2020) stated that good shrimp growth is 1-3 grams/week besides that According to Supono, (2019) vannamei shrimp can grow well with a growth rate of 1-1.5 grams/week.

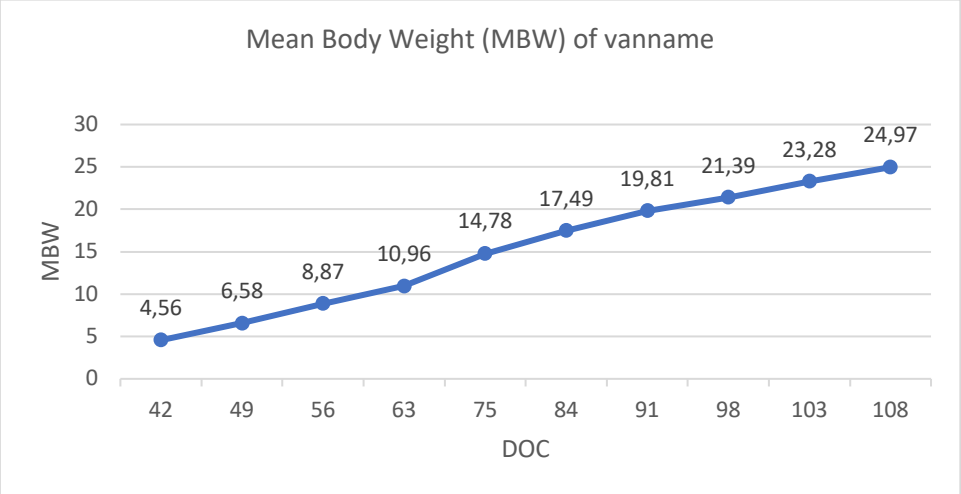

Figure 4. Graph 2. Average Weight Growth of Shrimp

Water Quality

In addition to growth, aspects that need to be considered in feeding using this auto feeder must also pay attention to the condition of the quality of the cultivation water, where as is known water is an important factor in vannamei shrimp cultivation activities. This is in line with the statement of Fauzia and Suseno, (2020) water quality is very important in fish or shrimp cultivation because water is a living medium that greatly determines the survival of the cultivated biota. The quality of the water obtained, it is known that the value of this water quality is still in optimal condition in vannamei shrimp cultivation, both physical and chemical parameters. But here for phosphate there is a fairly high increase from its optimal value, this is due to the high organic matter in the pond caused by leftover feed and metabolic waste from shrimp. This is in line with the statement of Ariadi *et al.,* (2020), which states that the high phosphate value is due to the high input of cultivation input, especially feed which continues to increase following the age of shrimp maintenance. To reduce the organic matter content in this pond, siphoning activities can be carried out. According to Renitasari & Musa, (2020), siphoning is carried

out to remove organic material at the bottom of the pond in the form of leftover feed, dead plankton, shrimp waste and mud deposits so that they do not turn into dangerous toxic gases.

CONCLUSION

The conclusion of this study is that feeding using an auto feeder is efficient in supporting the success of cultivation in vaname shrimp ponds at PT BUMI HARAPAN JAYA, feeding using an auto feeder has a good effect on ADG and MBW of shrimp and also the amount of feed given.

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