

# Effect Of Different Commercial Feed On The Growth Of *Epinephelus SP*

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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 *Epinephelus* sp. The research was conducted in 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 100 % brand X = 100%; Feed B: Feeding with 100 % brand Y; Feed C: Feeding with 50 % brand X and Y. The parameters observed in this study were fish survival, absolute length growth, absolute weight, relative growth rate, daily growth rate, feed conversion ratio, and water quality. 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 study it can be concluded that the commercial feeding of different trade marks had an effect ( $P < 0.05$ ) on the growth in absolute length, absolute weight and relative growth of *Epinephelus* sp. of all the parameters observed, the highest average results were obtained on feed B with brand Y.

**Keywords** – *Epinephelus* Sp; Feed; Growth.

## I. INTRODUCTION

*Epinephelus* sp is a prospective commodity in the aquaculture sector. Most of the production of *Epinephelus* sp seeds is carried out in North Bali, Situbondo, Lampung, and Batam. These grouper seeds are then marketed to Java, Padang, Aceh, and the Riau Islands. In addition, *Epinephelus* sp fish are also exported to Singapore, Hong Kong, Vietnam, Thailand, Hong Kong, and China. *Epinephelus* sp fish have weaknesses in terms of maintenance, slow growth ranging from 9-12 months. Several other factors that affect the growth of *Epinephelus* sp fish are the amount of feed, time of feeding, type of feed, and the nutritional content contained in the feed<sup>1</sup>. The feed used for *Epinephelus* sp cultivation consists of two types, natural feed and artificial feed. Natural food is food that is available in nature such as plankton, phytoplankton, and zooplankton types of crustaceans in the form of crustaceans and other small fish. Artificial feed is feed made by human intervention for pet fish that comes from various kinds of raw materials, has a good nutritional content in accordance with the needs of fish, and in its manufacture pays close attention to the nature and size of the fish<sup>2</sup>.

Fish growth is one of the problems faced by fish farmers, in which this problem often requires a large amount of money to feed *Epinephelus* sp fish. The growth of *Epinephelus* sp fish is influenced by several factors such as food, environmental conditions, type of food, time of feeding, and so on. *Epinephelus* sp are carnivorous fish that eat all types of small fish they usually prey on. *Epinephelus* sp is a type of carnivore and its way of eating is devouring one by one the food that is given before the food reaches

the bottom. The most preferred feed is crustaceans such as rebon, dogol and krosok, in addition to small fish such as tembang, anchovies and mullet<sup>3</sup>.

The problem of feeding trash usually creates its own problems, especially when *Epinephelus* sp rearing is done intensively. Rucah fish is a type of fish that is not the main target of fishermen. Until now the main feed given in *Epinephelus* sp cultivation still relies on trash fish, while the trash fish is still used by the community as a source of protein, therefore an alternative feed has been tried for *Epinephelus* sp maintenance, commercial artificial feed in the form of pellets<sup>1,2</sup>. Commercial feed is feed that is mass-produced by the feed industry with nutritional content that meets the needs of fish. The need for several nutrients in grouper fish feed is known, such as the need for protein 54.2%, fat ranging from 9-12% , and essential fatty acids (n-3 HUFA) 1.4%. 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 *Epinephelus* sp.

### II. LITERATURE SURVEY

*Epinephelus* sp is a type of carnivore and its way of eating is devouring one by one the food that is given before the food reaches the bottom. The most preferred feed of the type of Crustaceae (shrimp). Feed is the main component needed by fish to maintain its survival and growth. In order for fish growth to take place optimally, the substances / nutrients contained in the feed are very influential. Nutritional needs include protein, fat, carbohydrates, vitamins and minerals. *Epinephelus* sp protein needs reach 48.0% protein and 13% fat. based on the active period of searching for food, the types of fish included in the Serranidae family are nocturnal fish. Nocturnal fish activity looking for food when it gets dark. These fish are also classified as solitary fish, where the feeding activity is carried out individually<sup>1-3</sup>.

### III. METHODOLOGY

The research was conducted in 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 100 % brand X = 100%; Feed B: Feeding with 100 % brand Y; Feed C: Feeding with 50 % brand X and Y.

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 *Epinephelus* sp fish and commercial feed with brands A and B. 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, relative growth rate, daily growth rate, feed conversion ratio, and water quality. 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 survival, absolute length, relative growth rate, and daily growth rate of *Epinephelus* sp ( $P < 0.05$ ). However, the treatment in this study had no significant effect on absolute weight gain, daily growth rate, and feed conversion ratio of *Epinephelus* sp ( $P > 0.05$ ). All research data for each parameter of *Epinephelus* sp are presented in table 1.

Table 1. Average *Epinephelus* sp fish growth performance

Parameters	Treatments		
	A	B	C
Survival rate (%)	90.89±1.01 <sup>a</sup>	96.89±1.01 <sup>b</sup>	93.78±1.01 <sup>c</sup>
Absolute length (cm)	6.12±0.13 <sup>a</sup>	6.58±0.06 <sup>b</sup>	6.43±0.10 <sup>b</sup>
Absolute weight (g)	5.69±0.33 <sup>a</sup>	6.60±0.15 <sup>b</sup>	5.76±0.12 <sup>c</sup>

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Relative growth rate (%)	1.86±3.25 <sup>a</sup>	2.16±1.50 <sup>ab</sup>	1.98±15.71 <sup>a</sup>
Daily growth rate (%)	36.52±0.57 <sup>a</sup>	45.63±0.24 <sup>b</sup>	37.27±0.15 <sup>c</sup>
Feed Conversion Ratio (g)	1.28±0.03 <sup>a</sup>	1.28±0.02 <sup>a</sup>	1.34±0.03 <sup>b</sup>

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

The provision of different commercial feeds significantly influences the survival rate of the *Epinephelus* sp. From the Table 1, it can be seen that the highest survival rate (SR) was feed B 96.89±1.01 % followed by feed C 93.78±1.01 % and feed A 90.89±1.01 %. The results of the variance test showed that the highest absolute length growth was in feed B 6.58±0.06 cm followed by feed C 6.43±0.10 cm and the lowest absolute length growth was feed A 6.12±0.13 cm. From the data on Table 1, the results showed that the average absolute weight, relative and daily growth rate of *Epinephelus* sp during the study showed that the highest average absolute and relative weight growth of *Epinephelus* sp was obtained in feed B followed by feed C and the lowest absolute and relative weight growth was feed A. The feed conversion ratio showed that best results was feed B 1.28±0.02 g followed by feed A 1.28±0.03 g and feed C 1.34±0.03 g.

Feed B was a commercial feed that has good nutritional content compared to several other feed brands. Apart from using high quality ingredients, these feed are processed at low temperatures to maintain the nutritional stability of the feed. So this feed has the advantage of not sinking quickly to the bottom of the water and does not break easily when in the water and is a good feed for grouper growth. Fish quality of survival rate (SR) is also determined by the amount of feed to maintain fish survival rate, so that feed is needed to meet nutritional needs. The highest absolute growth in length was feed B with brand Y because feed B had a very high protein content was 51% compared to other feeds, so it could feed fish protein, feed A only had a protein content 46% so the growth rate was slightly slow down a bit<sup>4,5</sup>. The success of an aquaculture activity depends on the nutrition of the feed, the size, attractiveness and taste of the feed. Growth is influenced by several factors, internal and external factors. Internal factors include heredity, disease resistance and the ability to utilize food, while external factors include the physical, chemical and biological properties of waters. *Epinephelus* sp has a growth rate that is not comparable is allometric, the growth in length is not proportional to the growth in weight and its growth is influenced by external factors, one of which is the availability of feed. Feed efficiency is needed to support life and success in aquaculture activities<sup>6</sup>.

The high protein in feed B is thought to be due to differences in the amount of raw material composition during feed manufacture<sup>7</sup>. One of them is the difference in fat content in feed brands X and Y, it can be seen that feed A has a lower fat content than feed B. Fat is one of the main nutrients needed for fish growth, because fat has an energy source that can be used as fish activity. such as swimming, foraging, growth and body resistance. The function of fat is to dissolve A, D, E, and K which are used to meet the body's needs<sup>8</sup>. Growth occurs when excess levels of nutrients contained in the feed so that it can support growth for the better. If the nutrient content in the feed content is low, the fish will require more feed. Growth is the increase in length or weight in a unit of time. Feed A (commercial feed brand X) got the lowest results from the other treatments. In addition, the content in a feed is rich in protein, fat, and also contains vitamins, minerals so that it can guarantee the growth of fish in aquaculture activities<sup>9</sup>.

The daily growth rate of this beautiful grouper occurs due to the supply of energy contained in the feed it consumes. The quantity of energy in the feed exceeds the energy requirement for body maintenance and other body activities, so the excess energy can be used for growth. Before growth occurs, energy needs for body maintenance must be met first. Fish that are cultivated in a container cause their space to move is limited, so their growth depends on the type of feed given. The feed used in this study has different nutritional content for each brand of feed, this is thought to be the cause of the daily growth rate data being different from each other, due to differences in the nutritional value contained in the feed. It can be seen that the feed has advantages for fish growth. Good fish feed is feed that is able to increase fish growth efficiently and not waste much<sup>10</sup>.

Environmental conditions, quality and quantity of feed and condition of fish affect fish growth and are related to the high and low conversion of the feed produced. Management of feeding in fish rearing requires effective and efficient planning and feeding so as to provide optimal growth with appropriate feed costs. Feeding raised fish must be done in the right amount, size, nature of feed, technique, and time of feeding. The correct amount of feed given can also reduce the influence on the rearing water media in conditions that are suitable for fish to live and grow<sup>5</sup>. The lower or smaller the feed conversion ratio, the greater or increased the efficiency of feed utilization. Having the lowest FCR value on feed B has better feed quality, this is presumably because the

amino acids of the test feed are almost the same or similar to the amino acid pattern of the tested fish so that they are able to provide nutrients according to the needs of grouper. Good feed is feed that fits your needs, is nutritious, is on time, and is the right dose to produce optimal growth. The feed conversion ratio shows how much of the feed consumed turns into fish body biomass. Food conversion in fish ranged from 1.5-8, meaning that the feed conversion value in all treatments could be said to be good, because in general it was still within the range. Thus feed B has good quality, because the feed given can actually be utilized by fish for maximum weight growth<sup>7</sup>.

Table 2. Parameters of water quality of maintenance media

Parameters	Beginning of study	End of study
Temperature (° C)	28.5-29.7	29.5-29.7
pH	6-7	6-7
Salinity (ppt)	32-33	33
DO (ppm)	5.6-6.0	6.0-6.2

The aspect of water quality is a very important parameter in aquaculture activities. There are three factors that play a role in reducing water quality, namely external and internal factors. These two factors are very related and closely related, because when the water put into the pond is water that has been polluted or the water quality is poor, fish growth will decrease or be stunted. Water quality is also very metabolic activity of organisms because the spread of organisms both in sea and fresh water is limited by the water quality in these waters. In general, the growth rate increases and in line with the increase in water quality in the waters, it can suppress the life of cultivated animals and even cause death if the increase in water quality is considered extreme. The value of the range of water quality that this parameter is still within the feasibility limits for grouper fish. Based on the table above, it is known that the water quality at the time of raising grouper fish is quite good. The water quality requirements for grouper cultivation are in accordance with the place of origin of the fish, namely with a temperature of 20-30 °C, dissolved DO > 5 ppm, pH 6-9, and salinity 6-29 ppt.

### V. CONCLUSION

Based on the results of the study it can be concluded that the commercial feeding of different trade marks had an effect ( $P < 0.05$ ) on the growth in absolute length, absolute weight and relative growth of *Epinephelus* sp. of all the parameters observed, the highest average results were obtained on feed B with brand Y.

### REFERENCES

- [1] Suprpto, H and Sudarno. 2021. Increased survival rate of hybrid grouper *Epinephelus* sp. after feeding with microalginatate particles. *International Journal of Fisheries and Aquatic Studies* 2021; 9(4): 245-248
- [2] Choo, W. J., & Nadirah, M. (2018). Culture Techniques of Cantang grouper (*Epinephelus fuscoguttatus-lanceolatus*) at Floating Net Cages in Brackish Water Aquaculture Development Center, Situbondo East Java. *Jurnal Ilmiah Perikanan dan Kelautan*, 10(2):70-75
- [3] Firdaus, R. F., Lim, L. S., Kawamura, G., & Shapawi, R. (2016). Assessment on the acceptability of hybrid Grouper, *Epinephelus fuscoguttatus* ♀ × *Epinephelus lanceolatus* ♂ to soybean meal-based diets. *AAFL Bioflux*, 9(2): 284-290.
- [4] Cai W.C., Jiang G.Z., Li X.F., Sun C.X., Mi H.F., Liu S.Q., et al. Effects of complete fish meal replacement by rice protein concentrate with or without lysine supplement on growth performance, muscle development and flesh quality of blunt snout bream (*Megalobrama amblycephala*) *Aquacult Nutr.* 2018;24(1):481–491.
- [5] Brinkera A., Reiter R. Fish meal replacement by plant protein substitution and guar gum addition in trout feed, Part I: effects on feed utilization and fish quality. *Aquaculture.* 2011;310(3–4):350–360. doi: 10.1016/j.aquaculture.2010.09.041.

- [6] Faudzi N.M., Yong A.S.K., Shapawi R., Senoo S., Biswas A., Takii K. Soy protein concentrate as an alternative in replacement of fish meal in the feeds of hybrid grouper, brown-marbled grouper (*Epinephelus fuscoguttatus*) × giant grouper (*E. lanceolatus*) juvenile. *Aquacult Res.* 2018;49(4):1–11.
- [7] Jiang L.S., Chen W., Li B.S., Sun Y.Z., Wang J.Y., Huang B.S., et al. Effects of replacing fishmeal by protein hydrolysates on the growth performance and physiological metabolism of *Scophthalmus maximus*. *Marine Fisheries.* 2019;41(5):596–605.
- [8] Ailhaud G., Massiera F., Weill P., Legrand P., Alessandri J.M., Guesnet P. Temporal changes in dietary fats: role of n-6 polyunsaturated fatty acids in excessive adipose tissue development and relationship to obesity. *Prog Lipid Res.* 2006;45(3):203–236.
- [9] Grigorakis K., Alexis M.N. Effects of fasting on the meat quality and fat deposition of commercial-size farmed gilthead sea bream (*Sparus aurata*, L.) fed different dietary regimes. *Aquacult Nutr.* 2005;11(5):341–344.
- [10] Birolo M., Bordignon F., Trocino A., Fasolato L., Pascual A., Godoy S., et al. Effects of stocking density on the growth and flesh quality of rainbow trout (*Oncorhynchus mykiss*) reared in a low-tech aquaponic system. *Aquaculture.* 2020;529:735653.