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Effect of different types of feed (squid, sea worms, and trash fish) to gonad maternity and fundamental levels of Galah shrimp *(Macrobrachium Rosenbergii)*

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ABSTRACT

Giant prawns (*Macrobrachium rosenbergii*) need enough nutrients for the reproductive process. One way to give feed which contains high enough protein. Complete nutritional content, especially protein, can be found in natural food. The type of natural feed used for main feeds including squid, sea worms, trash fish. Complete nutrient content can affect the rate of gonadal development and fecundity. (Squid, sea worms, trash fish) on the level of gonadal maturity and density of broodstock parents (*Macrobrachium rosenbergii*). This research was conducted by a completely randomized design (CRD) trial design. This study used 4 replications of different types of feeding. The types of feed given are squid, sea worms, trash fish, and pellets at a dose of 5% from biomass/day. The parameters of observation include observation of the level of gonad resistance, fundamentality of broodstock parent, and measurement of water quality (temperature, pH, and dissolved oxygen). The results showed that the administration of different types of feed (sea worms, trash fish) had a very significant effect on the level of maturity and had a significant effect on the probability of prawns (*M. rosenbergii*). After analysis of variance, the results of F Calculations are greater than F Table 0.05 and F Table 0.01. The smallest significant difference test (LSD) was obtained in P1 (Squid feed) with the Gonad maturity rate ± 5- 6 days as much as 83 % parent and fecundity average results of 28,846 ± 4,925.3 thousand / 45 g.

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1. Introduction

Giant prawn is a potential freshwater fishery commodity because it has a high selling value, large body size and lobster-like taste (Irianti et al., 2016) The demand for quality prawns is increasing along with the increasing number of farmers who do giant prawn cultivation. To meet the demand for quality seed supply and continuity, the quality of prawn broodstock is needed.

Some of the factors that must be considered in hatchery business include quality mother, water and environmental conditions, availability of feed both in quantity and quality and other factors related to hatchery business. One of the factors that influence is the availability of feed for broodstock broodstock. Giant shrimp requires protein that is high enough for its growth and reproduction. Protein requirements for giant prawns reached 37-45% (Weidenbach, 1989 *in* Yuwono, 2005).

Complete nutritional content of feed, especially protein, can be found in natural food. The types of natural feed used for feed the main shrimp are squid, sea worms and trash fish. The protein content in squid is 62.21–67%, while for sea worms 52.29% and trash fish reaches 53%. In broodstock parent feed with enough nutrient content, especially protein, will affect the quality of reproduction. According to (Primaverra, 1985 *in* Pamungkas *et all*, 2007) feed with complete nutrient content can affect the rate of gonadal development and fecundity.

2. Material and methods

This study was conducted at the Brackish Aquaculture (IBAP) Installation in Probolinggo, East Java on July 9 - August 13, 2018. The tools used in this study were: 40 x 25 x 20 baskets, hose and aeration, oximeter, thermometer, pH meter, analytical scale, petri dish, measuring cup, refrigerator, spoon, waring and hand counter. The materials used in this study are: male and female giant prawns, shrimp pellets, squid, trash fish, sea worms, filter paper and aquades.

This research was carried out by an experimental method with a Completely Randomized Design (CRD) method. This study was carried out by giving different types of feed to the level of gonadal maturity and fecundity of broodstock parent (*Macrobrachium rosenbergii*). The test parameters in this study are 2, namely the main parameters and supporting parameters. The main parameters consist of testing the rate of gonadal maturity and fecundity, and supporting parameters consisting of water quality (pH, DO, temperature).

3. Results and Discussion

3.1. Gonad Marurity Level

Observation of gonad maturity in female parents was carried out by sampling the mother to see the development of the gonads located on the back of the *cephalothorax.* Female prawns undergo rapid gonadal maturation. The first ripening of shrimp ranges from 15-35 gr in 4 to 6 months (Krettiawan, et al., 2015). Observation of the development of the maturity level of the female parent gonads is carried out every day at 15.00 WIB. Observation of the level of gonad maturity is done by reducing the water in the maintenance tank by as much as 20 % from the height of the water to facilitate the observation process and clean up the remaining feed and dirt.

Calculation of the percentage of gonad maturity rate in female mothers who reached TKG III

that the calculation of the percentage of gonad III maturity rate in treatment P1 (squid feed) was 83%, treatment P2 (sea worm feed) as much as 67%, treatment 3 (fish feed trash) as much as 41% and treatment K (pellet feed) as much as 25% of the mothers who reach TKG III from the population. Based on observations, the female parent treated with squid feed showed a faster rate of gonadal development, which was 5 days, the mother who reached TKG III was 10 (83%) of the total population treated. The results of the calculation of the percentage of parent gonad maturity can be seen in Figure 1.

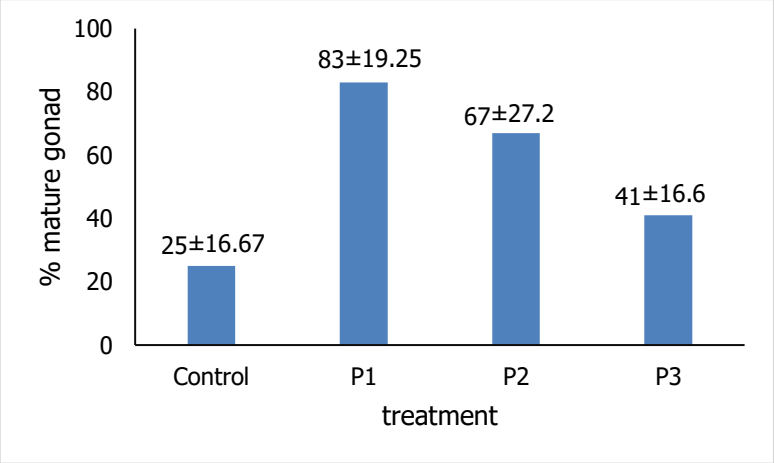

Figure 1. Percentage of Mature Parents Gonads

Furthermore, anconducted *analysis of variance* (ANOVA) wasto determine whether there was an effect of different feeding on the maturity level of giant prawn served. in table 1.

Table 1. Test Results Significant difference (LSD)

		Different					
Treatment	Average	K	P3	P2	P1	SED	Notation
		25	41	67	83		
Control	25	0	-	-	-	25,43	A
P3	41	16**	0	-	-	41,43	B
P2	67	42**	26**	0	-	67.43	C
P1	83	58**	42**	16**	0	83.43	D

Based on the results of observations made during the study, there was a difference in the treatment of different types of feed given to the level of maturity of giant prawn gonads. The average gonad maturity level at treatment P1 was 83, P2 treatment was 67, P3 treatment was 41 and Control treatment (K) was 25. Based on the data from the calculation of the smallest real difference test the gonadal maturity level of giant prawn parent was known to have the highest mean value 83 feeding squid, while the lowest average value was obtained 25 in the treatment of giving pellets.

The smallest real difference test results above show that, it is assumed that the nutritional content of squid feed plays an important role in the process of gonadal development of broodstock parent is better than other feed treatments. Squid has a fairly high protein content of 67 %. Inside the squid there is also a content of vitamin E which plays a role in increasing the process of maturing eggs. According to Machlin (1990) *in* Aryani (2002), that the function of vitamin E as an antioxidant that prevents oxidation of fatty acids, especially in unsaturated fatty acids so that vitamin E plays a role in increasing the process of gonadal maturation. Squid is a feed that is often used for mother

shrimp that can help the process of reproductive development. This is consistent with the opinion of Moss and Crocos (2001), that squid is the most commonly used material as feed in the development of penaeid shrimp. This is reinforced by the opinion of Woeters *et al* (2001), that squid play an important role in the process of bioreproduction of mother shrimp and fish, because squid have high unsaturated fatty acids or *Highly Unsaturated Fatty Acids* (HUFA) which can stimulate the process maturation of gonads of *crustaceans* and marine fish. Whereas according to Huang *et al*. (2008), it was suggested that the high PUFA content in parent feed was related to spawning quality, such as fecundity, fertilization and hatchability. From the above statement that the nutrient content of feed given during the study in table 13 that squid has a high protein content, amino acids and fatty acids (HUFA) and vitamins that can stimulate the development of gonads of giant shrimp parent.

3.2. Fecundity

Calculation of fecundity is carried out oneggs *broodchamber broiled*. The value of fecundity is determined after the female parent incubates the egg for 20 days. Calculation of eggs begins with taking the mother who has laid eggs in the maintenance tank, then the eggs are taken on the underside of the shrimp or *broodchamber*. Then the eggs were weighed and a sample was taken to determine the fecundity.

The calculation of egg fecundity is done by the gravimetric method, namely by taking egg samples placed on the petri dish then weighing the sample weight and then counting the number of eggs sampled. After the number of sample eggs is known then the calculation is done by the formula, total egg weight (grams) divided by the sample egg weight (gram) multiplied by the number of sample eggs (items). According to Wilson (2011) states that, fecundity is measured based on the gravimetric method, measured when *broodchamber* femaleproduces yellow eggs. The results of the of the egg calculation can be seen in Figure 2. Below.

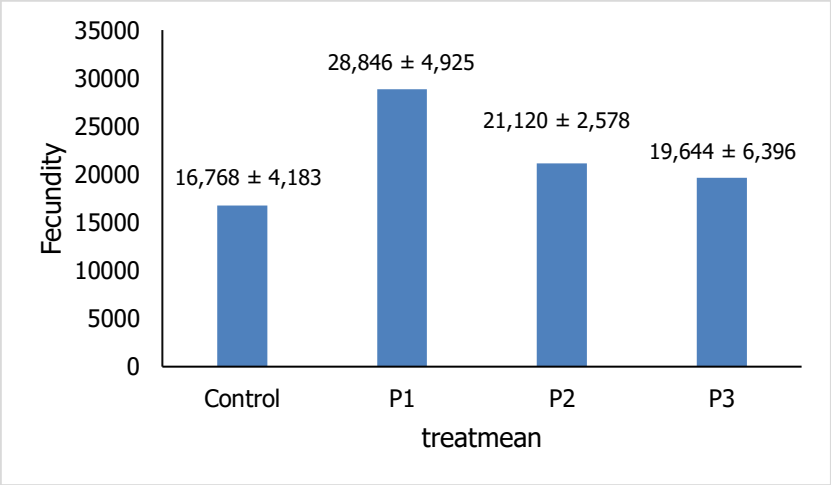

Figure 2. Giant Shrimp Fecundity Histogram

Based on the data in Figure 14. It can be seen that the average value of fecundity produced by giant prawns using different feeds is in the treatment of squid feed as much as 28,846 ± 4,925.3 eggs / 45 g, feed treatment sea worms as much as 21,120 ± 2,578.9 grains / 45 g, 19,644 ± 6,396.4 eggs / 45 g in the treatment of trash fish feed and in the control treatment with pellet feed as much as 16,768 ± 4,183 eggs / 45 g. According to Hartati et al. (2013) it is stated that, broodstock broods measuring 50 g can produce eggs between 15,000-25,000 eggs and according to Murni, (2004) which have a length of 14-20 cm capable of producing 14,000–69,000 eggs.

Table 1. Test Results Significant difference (LSD) of Fecundity

		Different					
Treatment	Average	K	P3	P2	P1	SED	Notation
		16768	19644	21120	28846		
K	16768	0	-	-	-	20.109.490	A
P3	19644	2876^{tn}	0	-	-	19644	A
P2	21120	4352^{tn}	1476^{tn}	0	-	37887.5	A
P1	28846	12078*	9202^{tn}	7726 ^{tn}	0	33.029.344	B

In this study, the number of eggs produced by the parent by feeding squid, sea worms, trash fish and pellets is still at the limit of the number of eggs produced during the parent spawning which is above 15,000 eggs. From this study, the control treatment (pellet feed) produced the lowest fecundity of 16768 ± 4183.3 highest and thesquid feed treatment obtained the highest average value of 28846 ± 4925.3.

Based on the results of the calculation of fecundity that has been treated P1 is the best, it is assumed that the average number of eggs is influenced by the nutritional content of squid such as protein, fat and vitamins. According to Haryati *et al.,* (2010) squid contain Carotenoid 0.005, *Arachidonic Acid* (AA) 5.4 %, *Ecosapentonic Acid* (EPA) 8.83% and *Docosahexaenioic* (DHA) 12.66%. According to Azwar (2007) there are two important compounds in the reproductive cycle namely HUFA and vitamin C. Mokoginta (1998) *in* Habibi *et al.,* (2013) states that feeding with nutritional content (protein, fat, carbohydrates, minerals and vitamin E) is both will affect gonadal maturation, maximal fecundity and egg quality.

3.3. Water quality level

quality is the most important supporting factor in a prawn hatchery activity, poor water quality can affect the health of the parent used in seed. production. Water quality parameters measured in this study include temperature, DO and pH. Water quality measurement data are presented in the following table:

Tabel 3. Water quality level

Parameters	Result	SNI 6486.3-2015
Temperature (ºC)	25.1-28.8	25-30
DO (mg / L)	5.01-7.55	> 3
pH	8.35-8.82	6.5-85

Temperature is a parameter of water quality that has a considerable influence, the temperature that is not in accordance with the life requirements of an aquaculture object will affect the metabolism of the fish's body. Temperature measurement in this study uses a dissolved oxygen meter YSI, the results of temperature measurements in this study were relatively stable, namely 25.1-28.8 ºC in all treatments. This is in accordance with SNI 6486.3-2015 Broodstock Master that the optimum temperature for giant prawn broods ranges from 25-30ºC. If the temperature is below 18 ºC shrimp appetite will go down and if the temperature is below 12ºC or above 4ºC can cause death for shrimp (Ditjenkan, 2006). Temperature is the main limiting factor for aquatic animals.

Dissolved oxygen *(Dissolved Oxygen),* which is often abbreviated as DO is a very important parameter because hidrobiologis including primary need for organism and one of the limiting factors for farmed shrimp (Elovaara, 2001). Ditjenkan (2006), states that dissolved oxygen is the main parameter of water quality which greatly affects the growth of shrimp. The direct effect is the effectiveness of feed use and the metabolic process of shrimp and indirectly influence the condition of water quality. The DO measurement uses a *dissolved oxygen meter* YSI by calibrating the device using distilled water and entering into the sample water. The results of DO measurements in this study are relatively stable, namely 5.01-7.55mg / L. According to Kordi and Tancung (2007), that dissolved oxygen that is good for shrimp life is 3 - 9 mg / l.

The degree of acidity or pH is said to be normal if it has a pH of 7, said base if more than 7 and acid if less than 7. The pH measurement in this study uses a pH meter device, the results obtained in pH measurements during the study are 8.35-8.82 the pH obtained is still within optimal limits for the maintenance of giant prawn broods. This is in accordance with the opinion of Elovaara (2001) stating that the optimum pH range in the maintenance of giant prawns is 6.5-9.

4. Conclusion

Conclusion of this study is the provision of different types of feed significantly affect the level of gonadal maturity and fecundity of giant shrimp parent (Macrobrachium rosenbergii). The more effective treatment The more effective treatment in giving different types of feed to the level of gonadal maturity and fecundity of broodstock parent is by feeding squid (Loligo sp.) Giving the best value at the gonad maturity level of 10 tails at the gonad mature speed. 2-6 days and the average fecundity of broodstock parent produced 28,846 ± 4925.35..

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