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Technique for Fattening Mand Crab (*Scylla serrata*) Using the Apartement System at CV. Istana Kepiting, District Bone

Teknik Penggemukan Kepiting Bakau (*Scylla Serrata*) Menggunakan Sistem Apartemen di CV. Istana Kepiting, Kab. Bone

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ABSTRACT

Efforts to fatten Mangrove Crabs, still need to be developed because Mangrove Crabs from fishermen's catches, their bodies are less contained, weight becomes less attractive to consumers, so the economic value decreases. Therefore, the author chose the title Mangrove Crab Fattening Technique (*Scylla Serrata*) Using Apartment System at Cv. Istana Crab, Kab.Bone, South Sulawesi. With the aim of evaluating the technical aspects of fattening Mangrove Crab (*S. serrata*) by using the Apartment system. Evaluating the fattening cultivation performance of Mangrove Crabs (*S. serrata*) by using the Apartment system by showing good live growth rate results with Avirage Daily Growt (ADG) of 2-3 g / day. Identifying problems and compiling proposals for mangrove crab fattening interventions (S.serrata) by using the Apartment system with the Fishbone analysis method there are several factors that are the problem of not achieving SR targe in the company including human factors (Man) that lack discipline, methods (Methods) that are not good in handling and controlling water quality, tools (Machines) that still have some tools less than capacity, and materials (Materials) that need to be selected for good and healthy seeds based on company goals.

ABSTRAK

Upaya penggemukkan Kepiting Bakau, masih perlu dikembangkan karena Kepiting Bakau dari hasil tangkapan nelayan, tubuhnya kurang berisi, berat menjadi turun kurang diminati konsumen, sehingga nilai ekonomis menurun. Oleh karena itu penulis memilih judul Teknik Penggemukan Kepiting Bakau (*Scylla Serrata*) Dengan Menggunakan System Apartemen Di CV. Istana Kepiting, Kab. Bone, Sulawesi Selatan. Dengan tujuan untuk mengevaluasi aspek teknis penggemukan Kepiting Bakau (*S. serrata*) dengan mengguanakan sistem Apartemen. Mengevaluasi kinerja budidaya penggemukan Kepiting Bakau (*S. serrata*) dengan mengguanakan sistem Apartemen dengan menunjukkan hasil laju pertumbuhan hidup yang

baik dengan Avirage Daily Growt (ADG) sebesar 2 – 3 g/hari. Mengidentifikasi masalah dan menyusun usulan intervensi penggemukan Kepiting Bakau (*S. serrata*) dengan mengguanakan sistem Apartemen dengan metode analisa Fishbone terdapat beberapa faktor yang menjadi permasalahan tidak tercapainya targe SR pada perusahaan tersebut diantaranya faktor manusia (Man) yang kurang disiplin, metode (Method) yang kurang baik dalam penanganan dan pengontrolan kualitas air, alat (Machines) yang masih ada beberapa alat kurang dari kapasilitas, serta bahan (Material) yang perlu dilakukan pemilihan benih yang baik dan sehat berdasarkan tujuan perusahaan.

Kata Kunci	*Kepiting bakau, penggemukan, sistem apartemen*
Keywords	*Mangrove crab, fattening, apartment system*
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INTRODUCTION

Mangrove crabs in Indonesia are obtained mainly from natural catches in coastal waters, especially mangrove areas or mangrove forests and only a small portion comes from cultivation, this is confirmed by (Kurniawan et al., 2020). Bone Regency is one of the coastal areas which is located on the west coast of Bone Bay with a coastline stretching from north to south tracing Bone Bay to be precise 174 east of Makassar City, therefore Bone Regency is a producer of mangrove crabs, in general it is located in the coastal sub-district, namely , Cenrana, Awangpone, Barebbo, Cina, Tonra and Kajuara sub-districts, the type of crab that is the mainstay of the area is the mangrove crab (*Schylla serrata*) (Nurwahyunitasari, 2021).

This is because natural catches often do not meet consumer expectations in terms of quantity and quality. Cultivation as a solution must be developed immediately because until now dependence on nature is still very high. Apart from that, the opportunities and prospects for mangrove crab cultivation are still promising to provide profits. This has triggered the development of mangrove crab cultivation in the grow-out segment. Ponds appeared that were used to raise mud crabs (Herlina et al., 2017).

The people of Bone district are quality crab breeders. Apart from breeding, some residents also choose to catch crabs directly from the river. Then cultivate mud crabs by making ponds that are free from any pollution and the environment is safe and free from predators. Implementing cultivation in ponds requires large amounts of capital and financing because it requires establishing ponds and their operations.

Suitable locations for crab ponds are also limited by the need for brackish water as a maintenance medium. This obstacle can be resolved with applied technology which can enable its cultivation to be carried out on a household scale. IPB University has discovered a technique for cultivating crabs with high efficiency, namely in an apartment system. This vertical aquaculture technology is the third evolution in mangrove crab cultivation after cultivation in nature and horizontal system cultivation which is generally carried out using ponds (Antaranews, 2020).

The Crab Apartment is an innovation developed in cultivating mud crabs under controlled conditions and reducing the problem of mud crab cannibalism, which places mud

crabs in boxes or rearing boxes in controlled rearing which is expected to increase the number of survival rates without cannibalism. The cannibalistic nature of crabs begins to appear at the megalopa stage because at that time they already have claws and is highest at the krablet stage (Pasande & Syakaria, 2016).

Crab fattening is one of the most promising production stages of the crab cultivation cycle. In general, people still depend on natural catches. Meanwhile, natural catch itself is still not sufficient in terms of the weight required by the market. This is confirmed by (Adila et al., 2020) that this method is very good for the process of fattening mud crabs, where on average many of the catches still have porous or less full bodies. With the apartment method, it is hoped that food intake will be sufficient because there is no food competition that occurs in each maintenance box.

According to (Pasande & Syakaria, 2016) the biggest obstacle for mud crab cultivators is the process of growing or fattening crabs which still does not meet market demand because at this stage the nature of crab cannibalism is still high, so the survival rate is low and body weight is still low. under size (undersize). The cultivation method using an apartment system or rearing box will have a positive impact in suppressing crab cannibalism (Suswanto, 2018). Apart from reducing cannibalism, the apartment system also increases the survival and growth of crabs.

Efforts to fatten Mangrove Crabs still need to be developed because Mangrove Crabs from fishermen's catches have less full body, their weight decreases and they are less attractive to consumers, so their economic value decreases. One way that can be taken to reduce the occurrence of underweight/porous crabs and predation (cannibalism) through providing shelter is selecting and fulfilling adequate and appropriate food requirements. Therefore, the author chose the title Technique for Fattening Mangrove Crabs (Scylla Serrata) Using an Apartment System in CV. Crab Palace, Kab. Bone, South Sulawesi.

RESEARCH METHODS

Time and Place and data collection methods

Practical implementation will be carried out on the 8th of September 2022 to the 30th of October 2022 at CV. CRAB PALACE, Jalan Sungai Musi, Waetuo Village, East Taneteriattang District, Bone Regency, South Sulawesi Province. The data collection methods that will be applied in the implementation of field practice II are observation methods, literature studies and participation in all mud crab (*S. serrata*) fattening production activities.

Working Method

The work method is the activity steps that will be carried out during the final practice directly and compared with literature studies.

a. Preparation of containers
b. Media preparation
c. Seed selection
d. Seed acclimatization and stocking
e. Feed management
f. Water quality management
g. Pest and disease control
h. Growth monitoring

i. Harvest and Post-Harvest

Data Processing Methods

a. Survival Rate (SR)
Survival rates were calculated during maintenance using the Effendi (1997) formula. The parameters observed are as follows:

$$\boldsymbol{SR}\ (\%)\ = \frac{\boldsymbol{Nt}}{\boldsymbol{N_0}}\ \boldsymbol{x}\ \mathbf{100}$$

Information:
- SR = Survival (%)
- Nt = Number of fish at the end of rearing (tails)
- No = Number of fish at the start of stocking (tails)

b. Average Body Weigt (ABW)
Calculation of the average weight or Average Body Weight (ABW) at each growth monitoring sampling time using the Effendi (1997) formula

$$\mathbf{ABW}\ = \frac{\textbf{Total weight of sample (g)}}{\textbf{Number of sample (heads)}}$$

c. Food Conversion Ratio (FCR)
The FCR calculation refers to the Tacon (1987) formula as follows:

$$\boldsymbol{FCR}\ = \frac{\boldsymbol{SF}}{\boldsymbol{Wt - Wo}}$$

Information :
- FCR = Food Conversation Ratio/ Feed Conversion Ratio
- SF = Amount of feed consumed (g)
- Wt = Weight of test animal at the end of rearing (g)
- Wo = Weight of test animal at the start of rearing (g)

Data Analysis Methods

Descriptive analysis

Data analysis was carried out after the overall data had been obtained. The analysis method used in this final practice is the descriptive analysis method. According to Iskandar (2020), the descriptive method is a research method that attempts to describe and interpret objects according to what they are. This is done by clearly describing the crab (*S. serrata*) fattening business at the practice location and comparing it with literature, sources, or other observations. Then, after obtaining the data, it will be studied and discussed systematically by comparing it with literature and supported by the results of interviews with parties who are competent in their fields. Then the results of the analysis will be presented in the form of tables, graphs or images.

Cultivation Performance Analysis

Cultivation performance data includes average weight, Average Body Weigt (ABW), growth weight, Average Daily Growth (ADG), survival rate, Survival Rate (SR) and Food Conversion Ratio (FCR). This data is obtained from the results of observations, measurements and calculations, which are then tabulated with the help of data processing software and then presented in the form of tables or graphs.

RESULT AND DISCUSSION

Technical Aspects

Container Preparation

a. Preparation of Maintenance containers

Based on the results of practice at the location for the preparation of containers carried out in the fattening process in the form of boxes made of plastic with certain specifications which are arranged and assembled in such a way as to form a system known as a crab apartment. All containers/boxes are washed with fresh water, this aims to eliminate the smell of oil attached to the containers/boxes. Prepare a water intake pipe (input) at the top of the maintenance box and position the outlet pipe (output) at the back so that it can prioritize long-wasted water, creating a recirculation system. The recirculation system is controlled periodically during maintenance so that it can run well. The layout of the container or maintenance box can be seen in Figure 1.

Figure 1. Maintenance container/box

After the process of assembling the maintenance boxes in a row like an apartment (vertical), the process of cleaning the maintenance boxes is continued by rubbing the inside and outside of the maintenance boxes using a rough textured cloth. This is done to remove dirt and dust that sticks to the maintenance box during the maintenance box assembly process. Next, rinsing is carried out using flowing fresh water, ensuring that all water used for washing or rinsing fresh water is wasted through the output channel and channeled to the water drain pipe, this aims to ensure that the water that has been used in the rinsing process is not mixed into the maintenance water tank.

During the container preparation stage, the activity of installing a door on the rearing box is also carried out, this aims to prevent the mangrove crabs being kept from escaping or leaving the rearing box. The maintenance door uses material in the form of plastic fiber which has been shaped and designed according to the size of the maintenance box door. Installation of the maintenance door can be seen in figure 2.

Figure 2. Maintenance door installation

b. Preparation of filtration and storage containers

In the preparation stage of the filtration container which is carried out at the practical location, the permanent tank/container in the form of an excavation lined with walls and barriers made of concrete is used so that it is able to support and accommodate water filter media with a large capacity. The filter container/tub used is approximately 7 meters x 2.5 meters with a height of 1.5 meters. This filtration tank with an area of 20m3 is divided into 9 filtration tanks including chemical filter tanks, mechanical filter tanks, biological filter tanks, and storage tanks. Each section is filled with filter material in the form of coral rock, bioball and quartz sand. The container and filter material are washed clean, then put into the filtration container parts. The filtration system is equipped with a protein skimmer and an ultraviolet lamp.

The preparation process is carried out using a brush and cleaned on the walls and bottom of the container then rinsed using fresh water, this is done to remove dirt that sticks to the walls and bottom of the container. The filtration container can be seen in Figure 3.

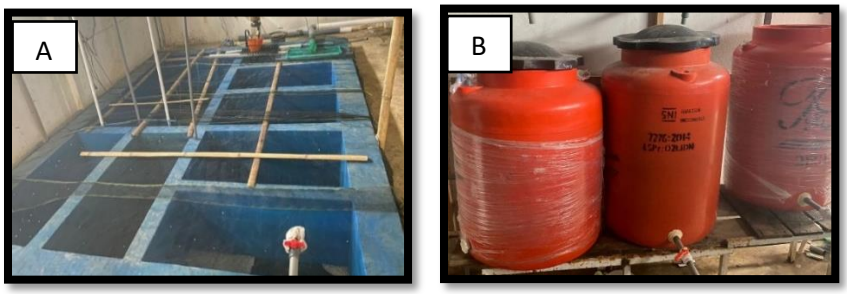

Figure 3. (a) Filtration Container and (b) Storage

In the picture above, the preparation stage for the filtration and storage containers was still not effective, this is because the preparation period for the filtration and storage containers was not long enough. In this case, the aim is to make good preparations in terms of growing decomposing bacteria which will function as a biological filter and also ensuring that the condition of the filtration tank is ready for use. According to Agus, (2010) the growth of decomposing bacteria is very useful during the maintenance period so that good decomposition of waste and food waste can occur.

Media Preparation

Fresh Water Preparation

The fresh water used at the Bone Crab Palace comes from PDAM water, a 1.5 inch pipe installation that is assembled so that it reaches the maintenance area and makes it easier to process activities sourced from fresh water. At the end of the fresh water distribution pipe, there is a water tap that can regulate and control the flow of water that comes out.

Based on the picture above, it can be explained that fresh water conditions are very necessary in the production process, both during pre-production and post-production. By installing a water pipe that is distributed to the location where fresh water is needed, it will really help with the need for fresh water. In the pre-production process, fresh water is needed in cleaning maintenance boxes and equipment used to avoid corrosion or rotting odors from the use of sea water. Fresh water is really needed for maintenance of tools that are used, both water quality measuring tools and production support tools.b. Persiapan Air Laut

The sea water used comes from the sea which is transported and deposited in a holding tank in the form of a fiber tank before use. The tub used for holding it has been cleaned and rinsed using fresh water with the aim of cleaning out remaining dirt stuck to the holding container. The purpose of this deposition process is to separate the dirt that is brought in during the sea water extraction process. Apart from that, the placement of the sea water reservoir is placed in a higher area to make it easier to fill the sea water without the help of a pump but with the help of gravity which makes the water easily channeled. to the shelter.

Based on preparatory activities, there are shortcomings in terms of sea water preparation. Water that is obtained from the sea by pumping and stored in storage tanks is still not good in terms of filters and water treatment, and with the water storage tank capacity being still minimal, it makes it difficult to change the water which requires repeated water withdrawals. This also results in additional costs and energy in the process of extracting sea water.

Seeds Selection

The selection of seeds is carried out in various weight sizes ranging from 200-300 grams/fish, these sizes are chosen to meet consumer and market demand in accordance with providing several variations in the size and weight of mud crabs being marketed. The crab seeds are then sorted based on size to make it easier to distribute and group them in rearing containers. In the sorting process, a seed selection process is also carried out by looking at the morphological condition of the crab.

The characteristics of healthy crabs according to (Hermanto et al., 2022)

a. Has complete body organs (claws, walking legs and swimming legs).
b. Has a bright body color (dark color/not pale).
c. The eyes respond to touch or movement.
d. Quick response if the swimming leg is pulled.
e. A healthy condition is also characterized by the absence of foam at the mouth.

Seed Acclimatization and Stocking of Mangrove Crabs

The acclimatization process is carried out after the crab sorting process based on size. The acclimatization process is carried out to minimize the death of crabs due to stress when entering new conditions by pouring brackish water with the same salinity as the salinity in the rearing container. This adaptation process is carried out for approximately 10-15 minutes, this can give the crab time to get used to the new environment. In this acclimatization process, spacing is carried out so that mud crabs that have just arrived during the acclimatization period do not experience stress due to excessive accumulation. When the crab gives signs of being active or responding quickly, the crab is not experiencing stress or is in healthy condition. For more details, the acclimatization process can be seen in Figure 4.

Figure 4. Seed acclimatization

The seed acclimatization process carried out was not optimal. This is in accordance with the opinion of (Harisud et al., 2019) which states that mangrove crabs that have been obtained from collectors undergo a good acclimatization process to reduce stress on the crabs, therefore it is necessary to carry out a good acclimatization process. Apart from minimizing stress conditions, a good acclimatization process over a long period of time and good treatment will minimize the occurrence of pest and disease contamination. After the adaptation or acclimatization process for the seeds is carried out, the next process is to spread the mud crab seeds into rearing containers/boxes with each crab box containing 1 crab. Stocking is carried out according to the weight of the mangrove crabs which have been sorted. In 1 plan or block the maintenance container is filled with relatively the same size making it easier to control and maintain, more details can be seen in Figure 5.

Figure 5. Seed distribution

In the seed stocking process which is carried out at the Practice Location through a grading process first, it is an effective way of rearing, making it easier to control and monitor the development of crab growth with rearing box codes which have been divided according to the average size. Apart from that, the stocking process is one of the causes of stressful conditions, this is affected by the nature of mud crabs which respond to movement which according to them threatens to protect themselves, making it difficult to carry out the stocking process one by one.

Maintenance of Mud Crabs

a. Feeding

During maintenance in boxes, crabs are fed twice a day, namely in the morning at 07.00 - 08.00 WITA and in the afternoon at 15.00-16.00 WITA. The food given is trash fish that have had their heads and stomach contents removed. Removal of the head is carried out to minimize the remaining uneaten feed and removal of the stomach contents to reduce dirt due to uneaten stomach contents which cause rot in the rearing water.

The feeding rate is around 5%-10% of the crab's weight, this is based on research results (Hanif & Herlina, 2021) which say that the growth rate is good for mud crabs with this dose. Then, in the feeding process, you also need to be careful and still use tools and gloves to prevent unwanted things from happening, such as pinched hands. Apart from that, the feeding process also needs to be carried out properly and according to the SOP that has been set, so that the mangrove crabs see the food given and reduce the remaining uneaten food. The feeding process can be seen in Figure 6.

Figure 6. Feeding

In the process of feeding, this is done by looking at the adequacy of the amount needed per individual. This is done to streamline the adequacy of feed for the growth and development of crabs. This can be done by looking at the remaining food left in the crab box/house. If there is leftover food, further feeding can be reduced. The thing that needs to be considered when giving food is that the food given must be fresh. According to (Adila et al., 2020) said that fresh fish food can encourage the growth of mangrove crabs in a short time.

b. Type of Feed

At the beginning of rearing, the type of food given to mud crabs is small kurisi type trash fish (*Nemipterus nematophorus*) whose body parts or flesh have been separated from their bones and the scales have been removed. The form of trash fish food can be seen in Figure 7.

Figure 7. Trash fish is a type of small kurisi fish (*Nemipterus nematophorus*)

At the beginning of rearing with food, the kurisi type trash fish (*Nemipterus nematophorus*) had disadvantages in terms of texture and water resistance. This is based on observations during feeding and after feeding, decay occurs more quickly in the kurisi type trash fish (*Nemipterus nematophorus*). Based on observations during field practice II, it is indicated that food with soft meat condition is indeed good to be given to mud crabs as daily food, but the drawback is if the fish meat has been torn apart by the crabs and there is a buildup of excess food residue in the rearing box, this is causing the condition of water quality in the maintenance media to quickly decline. Therefore, in the next feeding, trash fish are given with petek fish (Leiognathus sp).

The feed used is about 2-3 cm long or weighs about 2-4 g/head. The feed used is fresh fish and the head and stomach contents are separated to maintain the freshness of the fish to be given as feed to the mangrove crabs that are kept. The form of fresh trash fish feed used can be seen in Figure 8.

Figure 8. Fish feed for petek fish (*Leiognathus* sp.)

Based on observations made during field practice II using different feed than before, there were differences in the amount of feed consumed and a reduction in wasted feed. This is because the trash fish food used is suitable for rearing mud crabs, according to (Harisud et al., 2019) that trash fish food is a suitable feed for fattening mud crabs because of the aroma which increases the crab's appetite and the good amount of protein. Trash fish has nutritional content with 28.26% protein, 1.49% fat, 1.76% carbohydrates, 4.82% ash, 4.10% fiber and 59.57% water content.

Water Quality Management

Water quality parameters during maintenance are always well maintained. Collection of leftover feed is always carried out every day. Physically, the water during maintenance always looks clear. The water management system is carried out by recirculation using a 1.5 inch submersible pump (200 watt power) for 600 bh crab houses. The water flow that flows throughout the crab house container is 50 L/minute (3000 L/hour). The addition of water is carried out to replace water that evaporates and seeps during feed control in the recirculation filter container and is carried out using a flowtouh system by removing the remaining dirt that has settled in the filter container and maintenance container/box at 50% per week. Placing the crab house in a closed room and preventing gusts of wind will reduce water loss due to evaporation in the recirculation system. The observed water quality parameters can be seen in Appendix 4.

Water quality is a measure of the condition of water seen from its physical, chemical and biological characteristics. Water quality also shows the size of water conditions relative to the needs of aquatic biota. Water quality is often a standard measure of the health condition of water ecosystems. Water quality management is an effort to manage water so that the desired quality is achieved according to its intended function to ensure that water quality remains in its natural condition. Continuous water quality management is one of the external factors that determines the success of cultivation businesses. Water quality includes the physical, chemical and biological properties of water. The use of a circulation system in mangrove crab cultivation is very good for maintaining water quality. The circulation system aims to maintain stable water quality and reduce media water changes because the water will continue to flow so that turbidity can be minimized.

Growth monitoring

Growth monitoring is carried out to determine the development of the growth of mangrove crabs that are kept in terms of weight, length and condition of the mangrove crabs. Monitoring also functions as a way to identify parasites or other diseases that attack by visually observing conditions, both behavior and body condition. Growth monitoring can be seen in figure 9.

Figure 9. (a) Sample collection (b) Sample weight measurement

Growth inspection/monitoring is carried out every 7 days by looking at the overall condition of the mud crabs in the rearing box and taking samples of around 10 – 20% of the total number cultivated. From the samples taken, a clinical/visual examination of the body condition is then carried out, such as the condition of body color, completeness of body organs (walking legs, swimming legs, claws). Records will be made if mangrove crabs are

found experiencing abnormal conditions. Next, each weight was measured and the ABW (Average Body Weight), ADG (Avirage Daily Growth) and SR (Survival Rate) were calculated.

One of the things that hinders the growth of mud crabs is stress on mud crabs, characterized by the release of froth or froth from the mouth or exhibiting unusual behavior, decreased appetite and slow response. This stress condition in mangrove crabs occurs due to several factors such as poor water quality conditions, or indications of contamination with types of diseases such as the parasite Octolasmis sp. Apart from that, during growth monitoring, it was found that several mud crabs had failed to molt. This makes the crab unable to release its shell and results in the death of the mangrove crab. Molting failure can be seen in figure 10.

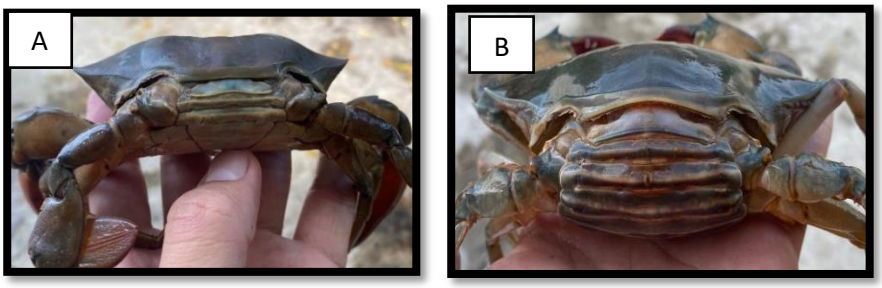

Figure 10. Forms of crabs that fail to molt (a) male (b) female

Based on the observations made, it is suspected that the cause of molting failure in mangrove crabs reared by external and internal factors. Internal factors themselves are influenced by the condition of the body experiencing stress so that appetite decreases. Decreased appetite results in a lack of energy in mangrove crabs. This energy is one of the things needed in the molting process, this is confirmed by (Samidjan & Rachmawati, 2015) who said that the energy needed in the molting process is only focused on repairing damaged cells, thereby triggering the ecdysteroid hormone for molting to occur. For external factors such as light, temperature and availability, this is a factor in molting failure, as stated by (Diana et al., 2014).

Pest and Disease Control

By implementing the crab apartment system which is carried out indoors, it has its own advantages in terms of controlling pests that interfere with growth and development during the maintenance of mangrove crabs because they are in a controlled and closed container/box, thereby minimizing interference from outside. Apart from that, mud crabs also live in rearing containers/boxes with a capacity of 1 per box, providing free space for movement and avoiding fights which could damage the crab's morphological condition or body organs. This is different from the living habits of mud crabs, which are kept or cultivated in ponds with high stocking densities, which can lead to uncontrolled cannibalism. This is also one of the causes of disease contamination that can attack the bodies of mud crabs that are injured due to damage. body organs or morphological parts of mangrove crabs.

Even though the closed crab apartment system can reduce pests that disturb the rearing container, the implementation of biosecurity is also carried out to provide better prevention for controlling maintenance. By providing a cover for the crab box, it provides more security for the rearing container from external disturbances or the habit of mud crabs

which often move or leave the rearing box. Biosecurity is also implemented in the water filter container by providing a cover in the form of a Hapa net. This is done to prevent the entry of foreign objects or dirt into the filter container which can cause damage or contamination to the maintenance water.

From the results of growth monitoring examinations, there were several deaths of mangrove crabs due to indications of being attacked by the parasite Octolasmis sp. Parasite Octolasmis sp. is a type of parasite that infects mud crabs and attaches to its gills. This parasite causes damage to body organs and disrupts growth and reduces the crab's defense system. According to (Herlinawati et al., 2017), this parasite enters through the respiratory cavity and directly attacks the gill surface. The parasite Octolasmis sp which attacks the gills of mud crabs can become a competitor in absorbing oxygen, so it can cause the bkau crab's condition to drop and ultimately can cause the death of the mangrove crab. The characteristics of mud crabs that are attacked by this parasite usually make the gills change color to dark or even black and there is something like fungus attached to the gills. The form of the parasite Octolasmis sp which attacks mangrove crabs on the gills can be seen in Figure 11.

Figure 11. Type of Octolasmis sp parasite that attacks the gills

In the picture above, it is explained that there are several Octolasmis sp parasites in the gills, it can be seen in picture (B) number 2, apart from that it can be seen in picture (A) that there is an infection in the gills of the mangrove crab due to the Octolasmis sp parasite nesting in the gills. The way to control parasites that attack mangrove crabs is by regularly changing the water and periodically controlling the cleanliness of the maintenance box. The more important thing is to be more selective in selecting good seeds. Taking good action on seeds purchased or taken from nature is one of the main factors in being contaminated by this parasite.

Cultivation Performance

Average Body Weight (ABW)

To determine the weight growth rate of mud crabs during the fattening period, sampling is carried out every week. This sampling activity was also carried out to determine the average weight of each rearing block. After 7 days of rearing, sampling was taken based on the block and samples were taken from each of 5 animals (10%) and then the weight was averaged. The sampling data for the average weight of each block can be seen in Figure 12.

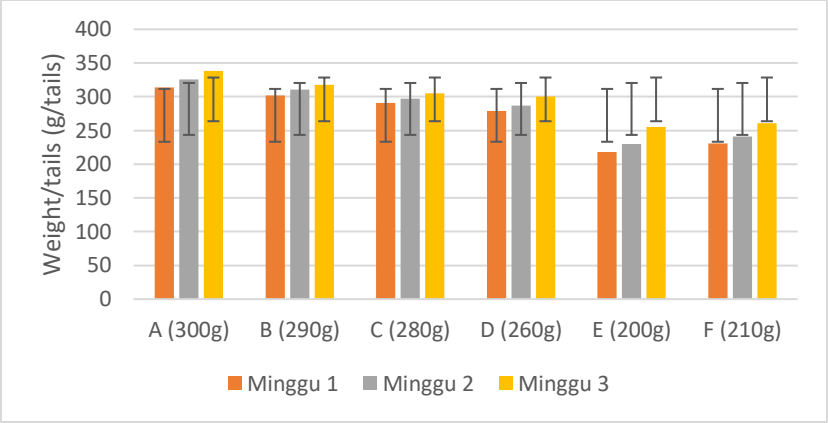

Figure 12. Average Weight (ABW)

In the table above it can be seen that the weight of each mangrove crab seedling that is kept has been grouped based on size. In Block A the average weight in the 1st week of sampling was 314g, the 2nd week of sampling was 326g and the 3rd week of sampling was 338. In Block B the average weight in the 1st week of sampling was 302g, the 2nd week of sampling was 311g and the 3rd week 318g. In Block C the average weight in the 1st week of sampling was 291g, the 2nd week of sampling was 297g, and the 3rd week of sampling was 305g. In Block D the average weight in the 1st week of sampling was 279g, the 2nd week of sampling 287g and the 3rd week sampling 300g. In Block E the average weight in the 1st week of sampling was 218g, in the 2nd week of sampling 230g and in the 3rd week of sampling 255g. In Block F the average weight in the 1st week of sampling was 231g, in the 2nd week of sampling 241g, and in the 3rd week of sampling 261g.

Based on the sampling data above, the average weight (ABW) of each maintenance box block was found. From the data obtained, this makes it easier to calculate the amount of feed consumption and other calculation needs such as the total biomass amount up to that day and calculating the daily growth rate.

Survival Rate (SR)

The Survival Rate (SR) calculation is carried out for each body monitoring activity every 7 days. This growth monitoring activity also aims to determine the survival rate of mangrove crabs. In the first week or at the time of the 1st sampling, it was still in good condition with an average SR of 96.1% or with a total of 11 deaths. However, entering the 2nd week of maintenance, conditions experienced which caused the SR to decrease to an average of 68.8% or a total of 68 deaths. The decrease in SR was caused by several conditions such as decreasing water quality, failure to molt and many crabs experiencing stress due to seeds that were indicated to be infected with parasites. And when we entered the 3rd week, the average SR remained at 68.8%, this was because the obstacles in the previous week could be overcome quickly, thereby minimizing deaths. The Survival Rate (SR) calculation graph can be seen in Figure 13.

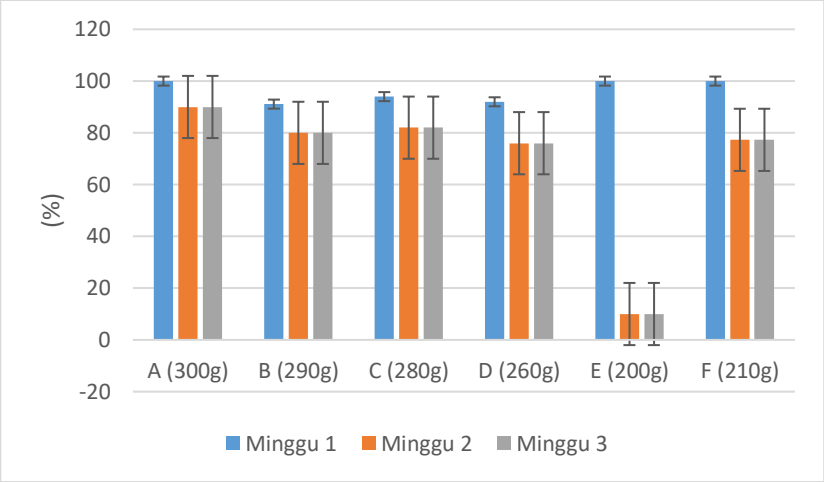

Figure 13. Survival Rate Graph (SR)

Based on Figure 13, it shows that the survival rate of mud crabs kept at field practice location 2 is not in accordance with the company target, namely around 96.10%, this is due to several problems that occurred in the first week of the rearing period. It is suspected that these deaths were caused by the large number of crabs experiencing stressful conditions. This was confirmed by (Adila et al., 2020) that the deaths that occurred at the start of rearing were caused by the acclimatization process being too short and resulting in many mangrove crabs experiencing stress and death.

This can be clearly seen in the graph above for each block, all of them showed a decrease or in other words experienced deaths in the 2nd week, but block E (200g) showed a significant decrease due to mass deaths. According to (Hastuti et al., 2019) the size and age of mangrove crabs greatly influence their body's endurance or ability to adapt. Therefore, the mass death in block E measuring (200g) was an impact due to decreased water quality and due to the condition of mud crabs which experienced stress and were less able to adapt to the conditions of the rearing environment.

However, the treatment carried out can overcome this problem and prevent a decrease in survival or prevent mass death of mangrove crabs. In the 2nd week and 3rd week the survival rate remained in good condition by looking at the graph of each block experiencing a stable condition or no deaths or a constant survival percentage at an average of 68.80%. By treating water quality management, mass deaths can be stopped and crab survival can be maintained. Basically, the crab apartment method should be able to reduce the occurrence of deaths due to cannibalism which is a problem of the low survival rate of crabs in fattening mud crabs, this is in accordance with what was stated by (Setyati et al., 2019).

Food Conversion Ratio (FCR)

By using natural food, namely fresh trash fish food, in the maintenance of fattening mud crabs, feed management will have an influence on the amount of fresh fish food needed to be used in one cycle. The amount of feed required during maintenance can be seen in Figure 14.

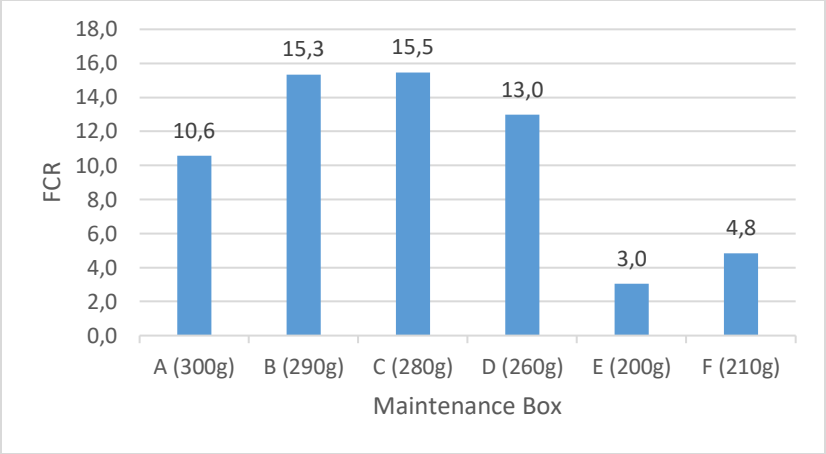

Figure 14. FCR During Maintenance

Based on the results of calculating the feed convergence ratio (FCR) in the picture above, it can be seen that the difference in the amount of feed required for each rearing box is due to the different sizes of each box requiring a different amount of feed. Apart from that, the thing that causes the high need for food is because during the maintenance period there is a decrease in water quality which causes the condition of the mud crabs to experience stress so that their appetite decreases and this has an impact on the amount of food that is not eaten. Therefore, the total feed requirement for maintenance is still relatively high, but it is necessary to control feeding to reduce the feed conversion ratio (FCR). Using the method of controlling appetite and calculating the amount of feed given based on needs will reduce the swelling of the feed conference ratio (FCR) value and make better use of the feed provided. Because the higher the feed convergence ratio (FCR), the less efficient the amount of feed given is, this is confirmed by (Adila et al., 2020) saying that a good feed convergence ratio (FCR) is 17.6.

CONCLUSION AND SUGGESTION

Conclusion

Based on the results of the analysis and discussion, it can be concluded as follows:

1. The techniques for fattening mud crabs at the Bone Crab Palace, South Sulawesi, starting from the preparation stage, seed selection, acclimatization, stocking, maintenance to harvest, are quite good, but there are still some things that need to be addressed and improved in terms of better handling and controlling water quality. Good.
2. The performance of mud crab cultivation at Bone Crab Palace, South Sulawesi is still relatively good with almost uniform growth, showing a good live growth rate with Avirage Daily Growth (ADG) of 2 – 3 g/day. The survival rate (SR) is still not good, namely 68.8% of the company's target of 95%.

Suggestion

Based on the results of the discussion and conclusions, the following can be recommended:

1. Technical aspects, there is still a lot that needs to be addressed and improved in terms of technique, both in terms of controlling water quality, maintenance methods and selecting good seeds.

2. Cultivation performance, in terms of growth rate, is quite good but still needs to be improved in terms of handling and maintenance because in terms of survival rate (SR) it is still not good compared to the company's target.

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