

BLUE SWIMMING CRAB ENLARGEMENT TECHNIQUE: INSIGHT FROM SMALL-SCALE FISHERY IN THE SOUTH COAST OF PAMEKASAN, MADURA ISLAND

TEKNIK PEMBESARAN RAJUNGAN : WAWASAN PERIKANAN SKALA KECIL DI PANTAI SELATAN PAMEKASAN, PULAU MADURA

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ABSTRACT

Pagagan Village, Pademawu District, and especially members of the "Berkah Capit Biru" fishermen, had the potential to carry out the sustainability of blue swimming crab because of the abundant crab fisheries. The purpose of this research was to encourage fishermen to not always carry out crab fishing activities in nature so nature remained sustainable and to increase the potential of natural and human resources who were enthusiastic about crab enlargement in Pagagan village. This research was conducted from January to May 2022. The crab breeding location measured 8x10 meters, had a substrate of muddy sand, and was in a coastal area bordering a mangrove ecosystem. Wooden stakes woven with bamboo with a netting around them were set higher than the wave. This enlargement technique did not use aeration in the form of wheels but only utilized tidal conditions so that periodic water changes occurred at the site. The stages in the crab enlargement technique are 1) site selection, 2) construction, 3) spreading seeds, 4) feeding, 5) controlling, and 6) harvesting. This enlargement technique is a solution for crab fishermen to meet market stocks.

Keywords: blue swimming crab, enlargement technique, small-scale fishery

ABSTRAK

Desa Pagagan Kecamatan Pademawu khususnya anggota nelayan "Berkah Capit Biru" berpotensi sebagai lokasi pengelolaan perikanan rajungan berkelanjutan karena memiliki hasil perikanan rajungan yang melimpah. Tujuan dari penelitian ini adalah untuk memberikan semangat kepada para nelayan untuk tidak selalu melakukan aktivitas penangkapan rajungan di alam agar alam tetap lestari dan untuk meningkatkan potensi sumber daya alam dan manusia yang antusias terhadap pembesaran rajungan di desa Pagagan. Penelitian ini dilaksanakan pada bulan Januari hingga Mei 2022. Lokasi penangkaran kepiting berukuran 8x10 meter, memiliki substrat pasir berlumpur, dan berada di kawasan pantai yang berbatasan dengan ekosistem mangrove. Tiang-tiang kayu yang dianyam dari bambu dengan jaring di sekelilingnya dipasang lebih tinggi dari gelombang. Teknik perluasan ini tidak menggunakan aerasi berupa roda melainkan hanya memanfaatkan kondisi pasang surut sehingga terjadi pergantian air secara berkala di lokasi. Tahapan dalam teknik pembesaran rajungan adalah 1) pemilihan lokasi, 2) pembangunan, 3) penebaran benih, 4) pemberian pakan, 5) pengendalian, dan 6) pemanenan. Teknik pembesaran ini menjadi solusi bagi nelayan rajungan untuk memenuhi stok pasar.

Kata Kunci: rajungan, teknik pembesaran, perikanan skala kecil

I. INTRODUCTION

Blue swimming crab is one of the important fishery resources in Indonesia, which has high economic value. Crab contains a lot of protein, so the demand for crabs domestically and abroad is increasing. The main export country is America (Aminah, 2010), and usually, the crab that is exported abroad is in the form of processed meat that has been separated from the carapace. According to the Center for Guidance and Testing for Quality of Fishery Products (1995), the results of his research showed that the protein content of male crab meat was higher than female crab meat. Male crab meat contained 16,85 percent, and female crab meat contained 16,17 percent. Pagagan village, Pademawu District, was the potential center for catching crabs because it has an abundant crab fishery.

Catching crabs has been one of the main activities carried out by fishermen in Pagagan Village for around 25 years. It takes about 30-45 minutes from this village to get to the fishing ground using a boat size of approximately 1 GT and diesel fuel of as much as 3-4 liters per day. Generally, fishermen perform catching activities alone, without the use of boat crews. Fishermen usually go to sea after Fajr prayer around 04.30 until 11 o'clock, where their catch lands in the crab collector's stall. The fishing effort that has been carried out so far is felt by fishermen to be quite profitable as their source of income.

The demand for crabs is still mostly met by the catches of fishermen in the sea obtained with traditional fishing gear (Nugraha, 2011). The fishing activities carried out by fishermen in Pagagan Village are quite different from those carried out by fishermen in other villages, namely, they use environmentally friendly fishing gear in the form of bamboo bubu, which is cheaper, easier to get, and easier to operate. However, the nature of this fishing gear means that it does not last long, so fishermen often

remanufacture it to replace damaged fishing gear, which requires periodic costs. The crab fishermen in Pagagan Village have around 180 to 350 traps per fisherman, which are divided into several sets according to the wishes of each fisherman.

The capture process is carried out every day at the fishing ground, according to the trap points that have been stocked previously. It begins with the process of withdrawing all the traps in each setting, then arranging the traps on the boat while putting the bait into the traps. After the withdrawal process is complete, the fishermen will look for another location to spread the traps, which will be lifted the next day.

Fishermen in Pagagan Village have realized that if they continue to carry out fishing activities in nature, it will result in a decrease in the stock of crab resources (Seno *et al.*, 2018). Therefore, it is very necessary to apply such enlargement techniques that can be a solution for small crab fishermen in fulfilling market activities that do not always depend on crab stocks in nature, fishing season factors, and the distance of the fishing ground that is getting farther. In addition, to take advantage of the natural and human resource potential in Pagagan Village, where people have a passion for managing crabs so that they remain sustainable. The purpose of this research was to encourage fishermen to not always carry out crab fishing activities in nature so nature remained sustainable and to increase the potential of natural and human resources who were enthusiastic about crab enlargement in Pagagan village.

II. RESEARCH METHODS

2.1. Time and Place of Research

This study was conducted from January to May 2022 with the target Berkah Capit Biru group of fishermen in Pagagan Village, Pademawu District, which is

composed of 20 fishermen and have carried out fishing activities for around 25 years.

These waters are one of the most significant crab habitats in Southeast Sulawesi. The life cycle of crabs occurs in these waters since they mate and release their eggs in deep waters (spawning ground). The eggs hatch and develop into larvae (zoea), then grow into juveniles in shallow waters - the intertidal zone (nursery ground), and reach juvenile and adult sizes (fishing ground), then mate again (La Sara *et al.*, 2016).

2.2. Material and Data

These fishermen depend entirely on the catch of crabs using traps, with a boat size of approximately 1 GT and diesel fuel consumption of up to 3–4 liters per day. When it's not crab season, some fishermen from this group usually switch professions to fish, construction workers, and others. The implementation of this activity is carried out by providing socialization to fishermen about crab enlargement techniques. It is hoped that members who participate in this socialization can transfer their knowledge to other fishermen so that they can be an example for the surrounding community, especially the crab fishermen in Pagagan Village, Pademawu District.

2.3. Data Analysis

The crab enlargement technique that will be carried out is by utilizing the waters in the coastal area of Pagagan Village so that we only rely on the tidal conditions of seawater as a natural change of water. The stages of the activity are: 1) site selection, 2) construction, 3) spreading seeds, 4) feeding, 5) controlling, and 6) harvesting.

III. RESULT AND DISCUSSION

The technique of enlargement of crabs in the coastal area of Pamekasan, especially in Pagagan Village, begins with community service activities in the form of training trials of crab enlargement for fishermen which will be held on January 31, 2022 (Figure 1).

The crab enlargement technique that will be carried out is in the form of a location or cage with walls made of nets supported by wooden stakes, while the bottom of the cage is in the form of a water base, which can be called pen culture (Effendi, 2004). In this enlargement trial, we did not use a waterwheel, but we simply used the tides to replace the water in the location. The crab enlargement techniques that have been carried out are as follows,



Figure 1. Crab Enlargement Training (Source : Indonesian Blue Swimming Crab Association).

3.1. Site Selection

The first step that must be taken is the site selection for the enlargement of the crab. This stage is the first step that must be considered in determining the success of the crab cultivation business. The selection of the location of crab enlargement as much as possible must be adjusted to the living habits or the original habitat of the type of crab to be cultivated. At this stage, what needs to be considered is the depth of the water, the source of the water, the shape of the bottom of the water, protection from currents, and security (Setiyowati & Retna, 2018). The site made for the crab enlargement is in the coastal area adjacent to the mangrove plant at the coordinates of 7.22929 LS-113.49912 BT in Pagagan Village. The water depth at the enlargement location is about 80 to 100 cm, so that at low tide, the water in the location still exists with the substrate of muddy sand, while the water source in that location is quite dependent on the tides of seawater so that the water in the location changes continuously. Protection from currents is provided by providing several sacks (woven bamboo), which are arranged and layered twice to make them more robust, and also by giving some used car tires, which are planted near wooden stakes to further maintain the security of the location from blows of waves.

3.2. Construction

The second stage, namely the manufacture of the construction, begins with the installation of wooden stakes and nets that have a mesh size above 25 millimeters, which are installed by connecting each item of the net in accordance with the length and width of the location. Installation of nets up to the height of the stakes installed, where the bottom of the nets are immersed into the seabed to a depth of 0.5 meters with the aim of preventing the crabs from breaking out of the rearing location by digging the seabed. The location of crab rearing is in protected shallow sea waters, especially in shallow areas (about 1-3 meters at high tide) and flat areas (mud flats or reef flats) with a tidal range that is not too wide (1-2 meters). Wooden stakes are driven higher than the highest tide (HHWL, higher high water level), so this enlargement location does not sink at high tide (Setiyowati & Retna, 2018). Wooden pegs are installed or made crosswise to make them stronger to withstand the waves (Figure 2).

This enlargement technique does not use aeration in the form of a wheel but simply takes advantage of the tidal conditions of seawater so that the water changes in the location experience periodic changes in water.



Figure 2. Enlargement Location in Pagagan Village (Source : Indonesian Blue Swimming Crab Association).

3.3. Spreading Seeds

We get the crab seeds that will be stocked from the Jepara Brackish Cultivation Water Cultivation Fishery Center because the crab seeds have been selected so that the seeds to be stocked are included in the choice of superior crab seeds that will affect the success of the crab cultivation business. The size enlargement trial location in Pagagan Village has an area of 8 by 10 meters. The size of the location made is small, so it is recommended by the Jepara Brackish Cultivation Water Cultivation Fishery Center technician that it can only be filled with 5000 seeds because if filled with crab seeds with more numbers, it will be narrow for crabs that move actively and to avoid the nature of crabs that eat each other (cannibals). Before spreading the seeds, we need to check the pH and salinity of the waters, which need to be acclimatized first (Figure 3).

In addition, efforts should be made to prepare some dry coconut leaves to be put into the enlargement location, the goal is that the crab seeds can also stick to or hide between the coconut leaves. This is also in

accordance with the Technical Guideline for Cultivation of Crab in Ponds, which states that healthy seeds, usually after being stocked, will swim for protection or shelter (Brackfish Cultivation Water Cultivation Fishery Center of Takalar, 2013).

3.4. Feeding

According to (Setiyowati & Retna, 2018), a cultivation system that has a low density of 0.1 fish per square meter unit (m^2) does not need to require feeding because the crab can live by relying on the presence of natural food contained in the system. However, to stimulate the growth of small crabs, it is necessary to give them additional feed from the outside in the form of trash fish (small fish that have been processed by drying). Feeding in Pagagan Village is given 2-3 times a day (Figure 4). Feeding management during the crab enlargement process must be adjusted according to portions. The feed dose is 100% up to 10% of the biomass weight. The dose of feed is given following the recommendations of Brackish Cultivation Water Cultivation Fishery Center of Takalar.



Figure 3. Distribution of Crab Seeds (Source : Indonesian Blue Swimming Crab Association).



Figure 4. Feeding Process (Source : Indonesian Blue Swimming Crab Association).

3.5. Controlling

At certain periods, it is necessary to control, both in terms of location and water. Almost every time, the fishermen control all locations because it is feared that the construction of the nets will be damaged, so it is necessary to supervise so that the crabs that are cultivated do not leave the location. In addition, it is necessary to control pests or predators from outside that enter the location. As for the waters, every week the water quality is controlled, namely pH and salinity. Looking at the water quality parameters recommended by the Brackish Cultivation Water Cultivation Fishery Center Takalar (pH in the range of 7-9 and salinity 15–35 ppt), the water quality data obtained at this enlargement location is in the pH range of 7.5–8.2 and the salinity is 23–30 ppt, so it can be concluded that the quality of these waters is still in the category suitable for crab enlargement. Monitoring or sampling activities are carried out once a

month at the beginning of each month, and the average sampling results are shown in Table 1, which is then depicted in a graphic form (Figure 5).

Figure 5 shows that the crab growth rate, both in terms of weight and width, continues to increase per month. The increase in growth rate, both weight and carapace width, indicated that the crab was in good condition (Susanto *et al.*, 2004). In March-April, there was a slight increase, probably because the amount of feed given was quite small as the size of the crabs was still very small and because it was feared that the ammonia content in the rearing location would be high. Entering April, the amount of feed given began to increase because the nature of the crabs was very voracious and their eating activities were not influenced by time, meaning that the crabs were quite responsive to feed even though it was given at night (Rahmansyah & Usman, 1993).

Table 1. Average Growth of Sampling Blue Swimming Crab Harvesting in 2022

Month	Weight Data (grams)	Width Data (centimeters)
March	4.3	4.0
April	13.4	6.2
May	77.6	10.8

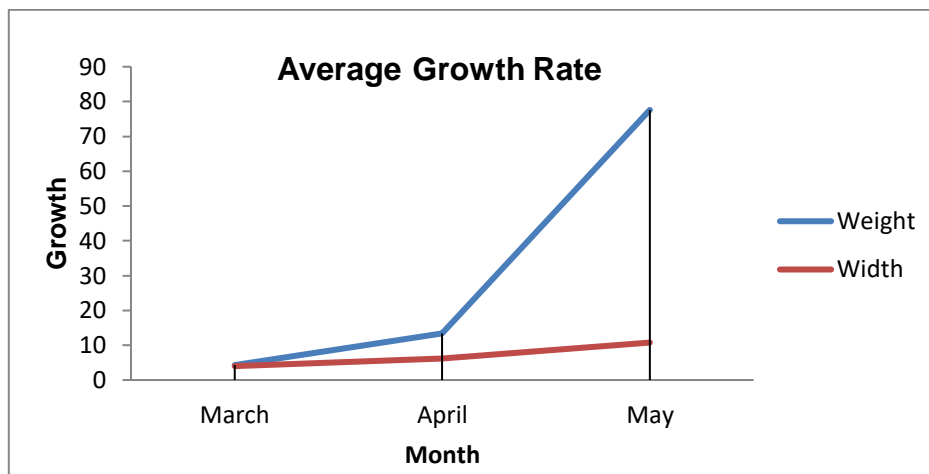


Figure 5. Growth Rate Chart of Blue Swimming Crab Harvesting in 2022.

3.6. Harvesting

Harvesting activities are carried out when the seawater conditions are receding. But before that, it is necessary to spread the trap to the enlargement location so that some of the crabs enter the trap. After that, the water in the rearing location must be removed with the help of a water pump, and a joint selection is also carried out by the fishermen in the enlargement location for fear that there are still crabs hiding in the substrate. After that, it is cleaned before being sold to collectors. The result obtained at harvest was around 18 kg with a total of 233 crabs.

IV. CONCLUSION

APRI (the Indonesian Blue Crab Association), in collaboration with the Berkah Capit Biru group of fishermen, seeks to preserve the blue crab through an experiment on crab enlargement. The enlargement area measuring 8x10 meters was made by sticking wooden stakes followed by some bamboo and woven as a barrier to the net that was installed around the site to make it stronger from the waves. The stages in the crab enlargement technique are 1) site selection, 2) construction, 3) spreading seeds, 4) feeding, 5) controlling, and 6) harvesting. The results

obtained during the harvest and the increasing development of the blue swimming crab indicated that the level of crab survival at the grow-out location was suitable. Slowly but surely, these efforts can preserve crabs and maintain stocks in nature.

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