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Management of Broodstock Rearing of Vanname Shrimp (Litopenaeus vannamei) at PT Esaputlii Prakarsa Utama, Barru Regency, South Sulawesi

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A B S T R A C T

The purpose of writing this final project is to find out how to manage the maintenance of vannamei shrimp (Litopenaeus vannamei) properly. The types of data used in collecting the required data include primary and secondary data.The data analysis method used to determine the management of vannamei shrimp broodstock (Litopenaeus vannamei) is qualitative descriptive data analysis. Held from January to April 2022 at PT Esaputlii Prakarsa Utama (*benur kita*) Barru Regency, South Sulawesi. The result of this Final Project is the acceptance of broodstock consists of preparation of brood acclimatization maintenance room and preparation of acclimatization basin, brood selection, acclimatization, brood maintenance consists of tub preparation, brood maintenance basin water filling and ablation management, circulation in the brood rearing basin of vannamei shrimp (Litopenaeus vannamei), gonad maturity level, sampling of mated brood, feed management, egg management including egg hatching, The harvest of naupli is up to the counting of naupli

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INTRODUCTION

Fisheries are all activities related to the utilization and management of fish resources and their environment starting from preproduction, production, processing to the marketing process carried out in a fishery business system. The fisheries sector has been known and become the livelihood of most of the world's population. This fishery output can be made in a variety of needs according to human needs and desires. Various series and long processes of the fisheries sector are made into something useful and beneficial for humans such as, shrimp which can be used as food ingredients that contain high nutrition.

Shrimp farming activities in Indonesia have long been carried out by the farming community, namely around the 80s period. The type of shrimp cultivated at the beginning of its development is tiger shrimp (Penaeus monodon) and is prima donna. Amrillah (2014) in Salma, (2017) stated that tiger shrimp production was getting higher through an intensive system until 1990. However, in 1996 there was a decrease in production due to the onset of White Spot Syndrome (WSS) and vibriosis which caused high mortality, thus moving aquaculture experts to find a way out so that shrimp farming production revived.

The availability of quality seeds (fry) is one of the determining factors for the success of shrimp farmed. Benur from nature can only meet 20% of the total shrimp pond needs, while 80% of the shortage is expected from the production of fry hatchery. Wahyuni (2018) said that obstacles in hatchery activities are the lack of quality shrimp broodstock stock, unsuitable food, inadequate larval rearing techniques and management, this causes the production of quality seeds to be still low. One of the efforts to get good quality fry is to always strive so that the hatchery media is always optimal for larval rearing. The contribution of vannamei shrimp is very large, the success of vannamei shrimp is very dependent on economic aspects, namely market demand. The demand for shrimp is very large both local and international markets, also the price of vannamei shrimp is relatively expensive so that the opportunity for vannamei shrimp production business is very potential (Zulfiani, 2016).

One alternative development is cultivation with new varieties, namely vannamei shrimp (Litopenaeus vannamei). Vannamei shrimp is an introduced shrimp which was officially designated as one of the leading commodities in 2001. Atmomarsono et al. (2014) in Salma, (2017) explained that vannamei shrimp (Litopenaeus vannamei) comes from the subtropical regions of the west coast of America, starting from the Gulf of California in northern Mexico to the west coast of Guatemala, El Salvador, Nicaragua, Costa Rica in Central America to Peru in South America. Panjaitan et al. (2014) added that the mother of vannamei shrimp introduced to Indonesia came from Hawaii and Florida. Efforts to maintain this species were carried out in Asia because of the presence of disease-free fry (Specific Pathogen Free) that entered China and Taiwan in early 1995. The advantages of this shrimp are its rapid growth, low feed consumption value or Food Conversion Ratio (FCR), tolerance to high salinity, and can be maintained with high density (Panjaitan et al., 2014).

LITERATURE REVIEW

Wahyuni (2011) explained that vannamei shrimp grows at salinity of 5 g / l to 35 g / l in the temperature range of 24-32 ° C, oxygen content 4 mg / l, water pH 7-8.5. Vannamei shrimp can live with a stocking density of more than 70 heads/m2. The availability of quality seeds (fry) is one of the determining factors for the success of shrimp farmed. Benur from nature can only meet 20% of the total shrimp pond needs, while 80% of the shortage is expected from the production of fry hatchery. Wahyuni (2011) said that obstacles in hatchery activities are the lack of quality shrimp broodstock stock, unsuitable food, inadequate larval rearing techniques and management, this causes the production of quality seeds to be still low. One of the efforts to get good quality fry is to always strive so that the hatchery media is always optimal for larval rearing.

American white shrimp (Litopenaeus vannamei). is one of the shrimp choices that can be cultivated in Indonesia, besides tiger shrimp (Penaeus monodon Fabr). In Indonesia, vannamei shrimp is better known as white shrimp. Panjaitan et al (2014) added that the mother of vannamei shrimp intoducted to Indonesia came from Hawaii and vlorida. The advantages of this shrimp are its rapid growth, low feed consumption value or Food Convention Ratio (FCR), tolerance to high salinity, and can be maintained with high density (Panjaitan et al (2014).

The Indonesian region that develops vanname shrimp commodities is Barru Regency, South Sulawesi Province, the geographical location of Barru Regency is very potential in the development of fishery commodities both capture and cultivation. The existing pond expanse covers an area of 3500 Ha and the potential for marine cultivation is 1,400 Ha (Amal, 2016). To meet the needs of shrimp rearing in Barru Regency ponds, it is necessary to have good and quality seed stocking as a support for the steps to increase the number of shrimp farmers in the area. Based on this description, the author took the title of Management of Vanname Shrimp Rearing (Litopenaeus vannamei) at PT. Esaputlii Prakarsa Utama (Benur Kita) located in Barru District, South Sulawesi Province.

Rearing larvae is one of the important activities in shrimp hatcheries. Rearing larvae starts from stadia nauplius, zoea, mysis to post larvae. Stadia nauplius, which is a new shrimp, does not need outside feed. Feeding began on stadia nauplius5–6, zoea, mysis to stadia post larvae. The critical phase of the larva occurs in stadia zoea, this is usually known as zoea syndrome or weak zoea. Where in this phase the larvae look weak and dirty bodies that can cause death up to 90% (Elovaara 2001).

RESEARCH METHODS

Time and Place

The writing of this final project was carried out from January – April 2022 at PT. Esaputlii Prakarsa Utama Mallusetasi District, Barru Regency, South Sulawesi Province. One of the companies engaged in the business of hatchery vanamei shrimp (Litopenaeus Vannamei).

Data Types and Sources

The types of data used in this final project are:

1. Primary Data is data obtained from practical activities by following and working directly on all series of activities in the rearing of vannamei shrimp broodstock (Litopenaeus Vannamei).
2. Secondary Data, namely data obtained from interviews with field supervisors (technicians), supervisors, as well as various sources of literature both from books and the internet to complete primary data as relevant support, especially the management of vannamei shrimp broodstock maintenance (Litopenaeus Vannamei).

Data Collection Methods

The method used in this final project is a survey, while collecting various literature.

1. Observation, namely making direct observations on vanname shrimp mothers at PT. Esaputlii Main Initiatives
2. Literature Study Data collection based on references to existing books or internet literature related to the management of vanname shrimp rearing.

Data Analysis Methods

The data analysis method used to determine the management of the rearing of vannamei shrimp broodstock (Litopenaeus vannamei). At PT. Esaputlii Prakarsa Utama Kabupaten Barru is a qualitative descriptive data analysis, namely the description of the nature, condition, symptoms of an object under study. Qualitative analysis aims to reveal, explain and describe all activities and activities related to management in the rearing of vannamei shrimp broodstock (Litopenaeus Vannamei).

Operational Definition

This operational definition is presented to equate the definition or perception of notions related to the terms used in this report.

1. Management is the process of carrying out certain activities by moving others.
2. Maintenance is a combination or action performed to maintain.
3. The parent is a vannamei shrimp (Litipenaus vannamei) that has matured gonads in the female sex produce eggs in males produce sperm.
4. Ablation is the cutting of one of the eye stalks from the female mother of vannamei shrimp (Litipenaus vannamei)
5. Circulation is movement or turnover.
6. Alwordization is an attempt to adjust or adapt an organism to a new environment.

RESULTS AND DISCUSSION

Acceptance of Vannamei Shrimp Parents

Vannamei shrimp broodstock (Litopenaus vannamei) used in PT. Esaputlii Main Initiative Barru is a broodstock imported from Hawaii and Florida. Further developments, due to the high demand for fry and the rapid development of domesticated vannamei parent gonads, hatchery began to use pond cultivation products.

The Management of Master Revenue stipulated at PT. Esaputlii Barru's Main Initiatives include;

1. Preparation of the mother chamber and mother acclimatization bath
   a. The preparation of the main maintenance room includes checking the tub using upox paint that is not easily peeled off in black. Aerai is arranged around the edge of the tub with 16 points.
   b. The main room is equipped with air conditioning, a 4×8 meter tub in rectangular shape with an obtuse angle into the water of 60-80cm.
   c. The room is equipped with a lamp to adjust the bright dark of the room.
2. Preparation of acclimatization baths.
   a. The main acclimatization body uses a round fiber bath with a diameter of 1.8m, a height of 1.2m
   b. The acclimatization bath is equipped with aeration and hoses to carry out water changes at the time of acclimatization of brood.

The management of parent revenue stipulated at PT. Esaputlii Barru's main initiatives include:

a. The newly arrived container is received and placed in the brood reception area around the acclimatization bath.
b. The main container is placed according to the sex of the parent and calculated the number of boxes then opened one by one the rubber fasteners of the parent bag are removed, the parent bag is left for 10-15 minutes in a closed or slightly open state.
c. The mother bag along with its contents simultaneously about 15-20 bags are poured into the acclimatization bath, the intake is carried out until it reaches a density of 150-200 per tub.

Parent Selection

Management of master selection established at PT. Esaputlii Barru's main initiative is the procurement of broodstock imported from suppliers who produce certified parents free of disease-free WSSV TSV and IHHNV in accordance with SNI 01-7153-2018.

The management of the selection of vannamei shrimp broodstock is in accordance with good criteria, namely having a female parent body length ranging from 15.5-17 cm. While the male brood ranges from 17.3 -18 cm. For the weight of the male parent ranges from 30-40 grams while the female parent ranges from 35-40 grams with an age range of 8 months, the parent is included in the criteria of a good parent is a body that is not deformed, bright color, complete and normal organs.

Parental acclimatization is an adjustment process (adaptation to a new environment) carried out when the parent arrives at the hatchery site. The main acclimatization body uses a round fiber bath with a diameter of 1.8 m and a height of 1.2m. The acclimatization bath is equipped with aeration and hoses to perform water changes at the time of acclimatization of the brood.

The management of parent adaptation stipulated at PT. Esaputlii Barru's Key Initiatives include:

1. Slowly adapt the brood by adding sterile seawater, excess seawater is removed through the pipe hose that has been installed
2. Changes in water parameters follow the following periods:
   a. Temperature changes 1°C every 60 minutes.

b. Ph changes 0.1 every 30 minutes.

3. If the temperature and Ph of the acclimatization bath and mother bath water are the same, then the mother can be transferred into the mother bath.

Master Maintenance

The use of parent selection is divided into two, namely tub preparation, tub water filling, brood maintenance.

a. Management of the preparation of the main maintenance basin using detergent mixed with chlorine, rinse with fresh water until clean and dry.
b. The next trough is filled with sterile sea water to a height of 60 cm.

During maintenance, water is flowed continuously until it reaches the specified limit.

Ablation of the brood is carried out if the brood is normal, which is characterized by the mother's appetite is stable (1-2 weeks after reception). Ablation is done by cutting off one of the eyes of the female mother using blunt scissors that have been incandescent.

Before and shortly ablation of the mother's eye, the mother was dipped in a 10% oidine solution of 50ppm concentration, for 2-3 minutes. Ablated broods are placed separately with males, brood stocking density is 10-15 heads. The quantity produced is very good and SPF standard means that it has been tested free from disease. The quantitative and qualitative requirements based on SNI 01-7253-2018 can be seen in Table 1 and Table 2.

Table 1. Quantitative Requirements for Vaname Shrimp Mothers, According to SNI 01-7253- 2018, 2022

No	Criteria	Requirement	
		Male	Female
1	Age, minimum (months)	12	12
2	Total body length, minimum (cm)	17	18
3	Body weight, minimum (g)	35	40
4	Production of nauplius, minimal (tail)	-	100.000
5	Nesting period after ablation, maximum (months)	-	6

Source: SNI 01 7253-2021 Mother Shrimp Vaname,2021

Table 2. Qualitative Requirements for Vaname Shrimp Mothers, According to SNI 01 7253-2918, 2022

No	Criteria	Requirement
1	Origin	• Certified overseas parents • Parents of cultivated products that follow breeding rules
2	Color	Brownish and bright clear with a red stripe of the edge of the tip of the uropod
3	Body Shape	The cephalotorax is shorter than the abdomen and the back is straight flat
4	Health	• Virus-free (TSV, WSSV, IHHNV) • Necrosis-free • Limbs are complete and not deformed • The gills are clean and not swollen
5	Body Suppleness	Not flabby and porous
6	Movement	Normal active

Source: SNI 01 7253-2021 Mother Shrimp Vaname, 2021

Information:

TSV = Taura Syndrome Virus,
WSSV = White Spots Syndrome Virus,
IHHNV = Invectious Hypodermal and Hematopoitic Necrosis Virus.

Circulation in Vannamei Shrimp Mother Rearing Tubs

Circulation management in male and female brood maintenance tubs is carried out every day between 06:00 – 07:00 WITA. Circulation is the change of water by draining new water continuously, letting old water be wasted and cleaning the tub by rubbing the walls, aeration, and pool basin using a scoring pad.

The circular movement in circulation activities so that all the remaining dirt in the tub can come out so that the mother of vannamei shrimp does not experience stress from circulation activities.

Gonadal Maturity Level

Measured based on the development of ovaries located on the back or dorsal part of the shrimp body, starting from the carapace to the base of the tail (telson). The ovaries are green to dark green, darkening in color and appearing to expand and develop towards the head (carapace).

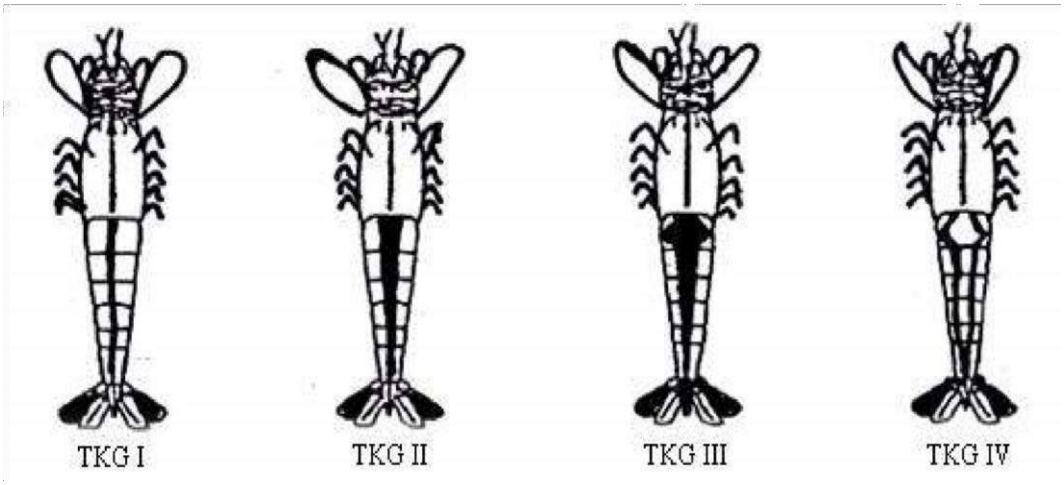

Figure 1. Gonad Maturity Level of Vaname Shrimp, 2017
(Source : Motoh, 2017)

Figure 2. Gonadal Mature Female, 2022
(Source : PT. Esaputlli Main Initiative, 2022)

According to Susanto et al (2018), TKG in shrimp is as follows:

a. TKG I: The ovary line appears blackish-green which then enlarges. At the end of TKG I the line clearly appears in the form of a thick straight line.
b. TKG II: The color of the ovaries is getting clearer and thicker. The end of TKG II ovaries form bubbles on the first abdominal segment.
c. TKG III: Several more bubbles form so that the ovaries have several bubbles on the abdominal segment. The bubbles on the first segment form branches to the left and right that resemble half crescents. This level is the last phase before the shrimp release their eggs.
d. TKG IV: Part of the ovary looks pale which means an egg has been released. The gonadal maturity of male shrimp is determined by the perfect development of petasma and usually contains spermatopora.

From the levels above, it can be concluded that the characteristics of gonadal mature female shrimp parents are if they have entered TKG III.

Sampling of Mating Parents

Mating behavior in vannamei shrimp is influenced by several environmental factors such as water temperature, state, light intensity, salt content, and several biological factors such as density and kelaamine ratio. In vannamei shrimp (mating) occurs when the shrimp is molting and the female shrimp has not developed the ovaries, so the sperm released is stored in telikum but in vannamei shrimp, if the female shrimp matures the ovaries that look orange and emit pheromones.

Figure 3. Fertilized Female Brood, 2022
(Source: PT. Esaputlli Key Initiatives 2022)

Sampling management. The first method, the female and male parents are separated, after the female mother matures the gonads are selected (06:00 – 07:00) then moved to the male mother tub, after mating the mother immediately takes and transferred to the spawning tub (11:00 – 12:00).

While the second method, the female and male are mixed in one tub, after the female mother matures gonads and mating occurs (11:00 – 12:00), then immediately taken and transferred to the spawning tub. The process of sempling mothers who have mated at pt.esaputlii main initiative is carried out at 15:00 WITA. The sampling process of mature gonadal parents must be done carefully so that male sperm attached to their telicum are not released and so that the mother is not stressed.

Feed Management

The quality and quantity of egg feed and fry is determined by the successful maturation of the gonads. The success of gonadal maturity is greatly influenced by feed (wahyuni 2018). Good feed for brood brupa fresh feed that contains protein, cholesterol and vitamins that are sufficient so as to maintain body resistance data to disease, growth and development of gonads, parent feed can be squid, shellfish and sea worms. Before feeding at PT. Esaputlii the main

initiative of barru, the brood maintenance bath is first cleaned of dirt and residual feed residue. The feed given is first weighed and cleaned. The method of feeding is stocked directly in the parent maintenance container evenly using the dose that has been determined.

Equitable feeding management can avoid the occurrence of feed struggles. If the fight for feed can be avoided, then the nature of cannibalism will be more controllable. The situation of fighting for feed will be sharper and more striking if the size of the shrimp varies greatly. The frequency of feeding can be seen in Table 3.

Table 3. Management of Vannamei Broodstock Feeding at PT Esaputlii Pakarsa Utama, 2022

No	Types of feed	Feed frequency	Requirement
1	Sea worm	3×	11:00, 20:00, 23:00
2	Squid	2×	08:00, 18:00

Source : PT.Esaputlli Prakarsa Utama 2022.

Before the squid is cleaned first by removing the head and stomach contents then cut into small pieces measuring 1×1cm then added additional supplements in the form of scott's emulsion, vitamin B complex, vitamin C, nature-E. To increase the immunity of shrimp and accelerate the maturity rate of the parent gonads. The additional sausage supplements given can be massaged in table 4.

Table 4. Parent feed supplement at PT Esaputlii Prakarsa Utama, 2022

No	Mother feed supplements	Dose / kg of feed
1	Scott's emulsion	1 ml
2	Nature-E	1 capsul
3	Vitamin B	1 capsul
4	Vitamin C	10 g

Source : PT.Esaputlli Prakarsa Utama 2022.

These additional supplements are only added to squid, while for worms do not need to be given additional supplements, because worms already have a fairly good content, besides that worms also secrete mocus or mucus, making it difficult to absorb vitamins. The protein content of sea worms and squid is high so it is good for sparking and stimulating dinad maturation in females.

Egg Management

The degree of fertilization and hatching is largely determined by the quality of sperm and the ability to attach to the telikum and hatching medium (temperature and salinity). Some failures that may occur are the absence of fertilization caused by immature females or damage to spermatophores.

Mating broods are characterized by the attachment of sperm to telikum, transferred into a spawning trough with a density of 4 heads. 1-2 hours later the mother will release the eggs. The next day the brood is removed and returned to its maturation trough. While the eggs are evenly aerated and cleaned of dirt and

mucus left behind. The eggs will hatch 12-16 hours from spawning and are harvested the next day.

Naupli whose harvest has reached stadia 4 and are considered strong to move. The goal is to reduce mortality in the transfer process. Naupli are generally phosinative in nature . This trait is usually used for Naupli harvesting techniques. The electric beam is placed somewhere outside the tub wall so that it can penetrate the tub wall and stimulate the naupli to approach the ray.

Naupli harvesting is done by placing a lamp on top of the hatchery basin because the naupli is positively fitotaksis. After the naupli are assembled, harvesting is carried out and accommodated in a fiber bath with a volume of 500 liters. The calculation is carried out by sampling by taking 5 times a 100 ml sampling bottle. The harvested naupli are put in fry maintenance troughs or can be sold to hatcheries that have pre-ordered.

During the egg hatching process, egg sampling calculations are carried out, this is done to determine the number of eggs released by the female or fecundity of the mother in 1 hatching basin. The calculation is carried out using the sampling method by taking a sample of 0.25 liters as much as 3 repetitions, then the calculation is done manually by pouring little by little sample water on a petri dish and to facilitate the calculation of the sample, the cup is coated with a field of view board and calculated using a counter. Naupli calculation PT. Esaputlii Barru Main Initiative is carried out in the morning after naupli harvesting. The addition of seawater to the petridisk before the calculation of the naupli is carried out which aims to make the naupli die so as to facilitate the counting process.

CONCLUSION

Based on the results of the discussion from the previous chapter, it can be concluded:

1. Master Maintenance Management at PT Esaputlii Pakarsa Utama Barru includes:
   - Reception of broodstock includes preparation of maintenance room and brood acclimatization bath and preparation of acclimatization bath.
   - Brood selection, acclimatization
   - Maintenance of brood including preparation of troughs and water filling of brood maintenance basins, and management of ablation.
   - Circulation in vannameii shrimp broodstock maintenance basin
   - Gonadal maturity level
   - Sampling of mated ovaries
   - Feed management
   - Egg management includes egg hatching, naupli harvesting to naupli counting.
2. Management of Parent Maintenance at PT Esaputlii Prakarsa Utama Barru, has met the company's SNI and SOP.

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