Preface

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It's such a great pleasure for me to welcoming all of you on behalf of Faculty of Fisheries and Marine Universitas Airlangga, for the 2nd international conference on fisheries and marine science. The 1st International Conference on Fisheries and Marine Sciences (InCoFiMS) 2018 has been successfully carried out which facilitated hundreds of publications to the Scopus-indexed proceeding of IOP and connected many researchers. The prior experience encourages to improve the quality of the conference through The 2nd InCoFiMS with the broader topic called "Sustainable Fisheries and Marine Development and Management". This expanded level of this conference with the theme of "Sustainable Fisheries and Marine Development and Management" is expected capable of connecting students, lecturers, researchers, government and professionals from across the world to meet, greet, share and discuss about the potential and best practices in the field of fisheries and marine during the period of focusing on SDG's.

The aims of this conference is to developed and improve the goals of Universitas Airlangga to be of the Top 500 University in the world by improving aquaculture and Fisheries Sustainable sector. For this conference, we also cooperate with Scopus Indexed Publisher. In order to assist students, lecturers and researchers in disseminating their findings, to publish selected papers which are expected helping societies to implement the findings in the focus on developing aquaculture and fisheries sustainable.

I strongly hope that all of the participants from around the world enjoy the conference at the Historical City of Surabaya, the second biggest city in Indonesia with competitive economic activities for the future of Fisheries and Marine development.

Once again, I am most grateful for your participant and your support. Thank you

Dr. Ahmad Shofy Mubarok

Chief of 2ND INCOFIMS

Peer review statement

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Peer review statement

All papers published in this volume of *IOP Conference Series: Earth and Environmental Science* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

Cultivation technique of *Chanos chanos* modular system and semi intensive at the center for brackish water aquaculture (BBPBAP) Jepara, Central of Java

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Cultivation technique of *Chanos chanos* modular system and semi intensive at the center for brackish water aquaculture (BBPBAP) Jepara, Central of Java

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Abstract. Milkfish (*Chanos chanos*) is a commodity that has the highest increase in consumption value, which is 24.55%. Milkfish production centers in Indonesia have developed such as in East Java, South Sulawesi, West Java, Central Java, and Southeast Sulawesi (DJPB, 2015). The technology of enlargement and seeding has been mastered and developed in the community, for example modular, semi-intensive and intensive systems. The difference in the growth of modular and semi-intensive milkfish systems has been observed in the Center for Brackish Water Aquaculture (BBPBAP) Jepara, Central Java on 19 December 2018 until 19 January 2019. Since 1 month, milkfish was observed with long, heavy growth parameters, life velocity of milkfish, and water quality. Milkfish enlargement techniques are preparation of ponds, liming, fertilization, stocking of milkfish logs, management of water quality, pest and disease control, and harvesting. Based on observations made, the growth in length and weight of milkfish develops faster using semi-intensive systems compared to modular systems. The semi-intensive system also speeds up the harvest of milkfish, which are generally 6 months to 4 months.

1. Introduction

Milkfish farming in Indonesia shows good prospects [1] that increased production by 9.75% from 2011-2015 with the highest production of 672,196 tons in 2015 2015 [1]. The high production is in line with the shift of consumers in meeting the needs of animal protein from red meat to white meat (fish meat), even the contribution of fish protein to the consumption of animal protein in Indonesian people reaches 57% [3]. Ministry of Maritime Affairs and Fisheries [4] stated that milkfish is a commodity that experienced the highest increase in consumption value in 2009-2013, which is 24, 55%.

Milkfish enlargement and hatchery technology has been mastered and developed in the community. Technically the use of technology is able to double production yields and the efficiency of production factors. In Indonesia, the cultivation technology that is developing is traditional (modular) and semi-intensive technology. Modular system is a way of maintenance by moving from one plot to another before harvest time in the hope that it will be able to optimize water quality and the availability of natural food continuously during [5]. The characteristics of semi-intensive shrimp

ponds are that they have a pond area in a plot of 1-3 ha/plot in a rectangular shape. In the map is equipped with inlet and outlet channels. There is a diagonal that leads from the inlet and empties into the outlet channel on each plot [6].

Strategies to increase production, namely the regulation of the level of density, good environmental conditions, adequate feeding and the right density will increase fish growth. The main differences from the modular and semi-intensive systems are feeding, fish density, pond construction and milkfish growth. Therefore, this study was conducted to find out the techniques of milkfish enlargement directly and the differences in the growth of milkfish in the modular and semi-intensive systems at the Center for Brackish Aquaculture Fisheries (BBPBAP) Jepara.

2. Materials and methods

2.1. Place and time

This study was conducted on December 17, 2018 - January 31, 2019 at BBPBAP, Jepara, Central Java.

2.2. Study methods

The work method used in this study is to use the active participation method. Data is collected by observation, direct interviews with related parties, and literature study.

3. Results and discussion

3.1. Water quality management

Water quality in milkfish enlargement ponds in BBPBAP Jepara is measured every day and then averaged every day. This measurement aims to determine water conditions and fluctuations that can affect the growth of milkfish. Water quality measurement data can be seen in Figure 1 and 2 below.

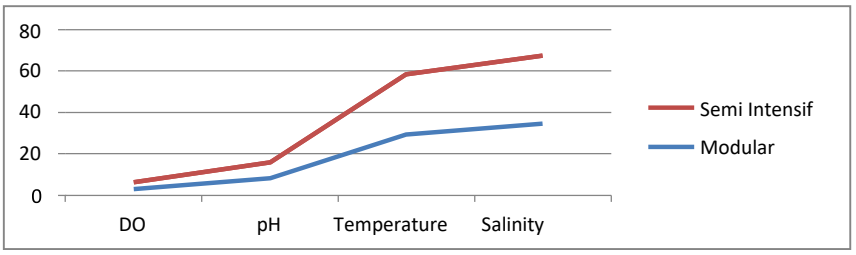

Figure 1. Morning water quality measurement results (06.30-07.00).

Salinity in modular ponds is higher than in semi-intensive systems because water changes are very rare. Increased rainfall in the second week resulted in dilution of pond water added and decreased salinity. [7] The good salinity for growth of milkfish ranges from 20-30 ppt. Salinity in modular and semi-intensive systems on average experiences the same fluctuations. The pH value obtained in milkfish ponds requires monitoring because according to [1], the acidity level of milkfish ponds ranges from 7.5 to 8.5. The pH of modular systems is on average higher than semi- intensive systems. [8] The added that daily fluctuations in pH less than 0.5 can cause physiological disorders, ammonia toxicity levels and the presence of natural food such as mosses, plankton, and klekap.

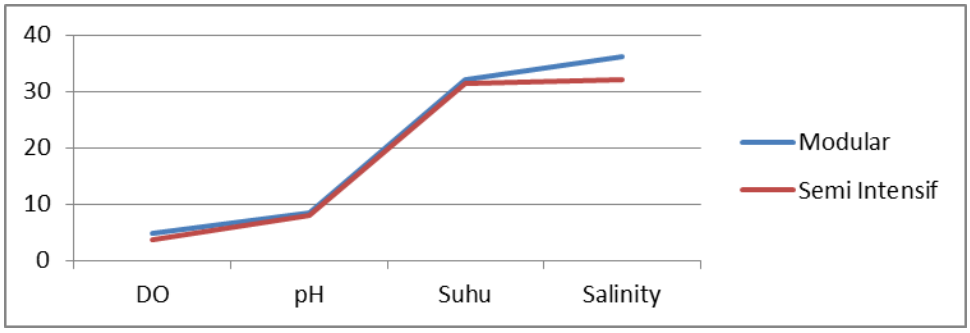

Figure 2. Afternoon water quality measurements results (17.30-18.00).

Temperature in ponds of modular and semi-intensive systems is higher in the afternoon than in the morning because there is accumulation of heat during the day. The temperature in the modular system ponds is also higher than in semi-intensive systems. [9] Solar radiation, temperature, air, weather, and climate will influence the amount of water temperature. [10] The optimum temperature for milkfish cultivation is 29-30ºC, with a threshold below 26ºC and a range above 32ºC. The dissolved oxygen content in the morning is lower in modular ponds than in semi-intensive ponds due to the accumulation of carbon dioxide. Carbon dioxide accumulation in modular ponds originating from milkfish and primary producers is dense while semi-intensive ponds are originated from milkfish and primary producers that are not too dense. The conveyed the level of dissolved oxygen in water influenced by organisms in the area including plankton as primary productivity. Oxygen fluctuations between day and night in a waters are an indicator of the density of organisms including plankton as primary productivity [8].

The growth of milk fish can be determined by sampling the length and weight which is done once every 16 days. Growth sampling is done by measuring the total length of milkfish manually using a ruler, then weighed one by one to determine the development of body weight. Sampling is carried out during maintenance and before harvest with the aim of determining the size of production and also plays a role in determining the price of fish produced. Milkfish growth sampling data can be seen in the following Figures 3 and 4.

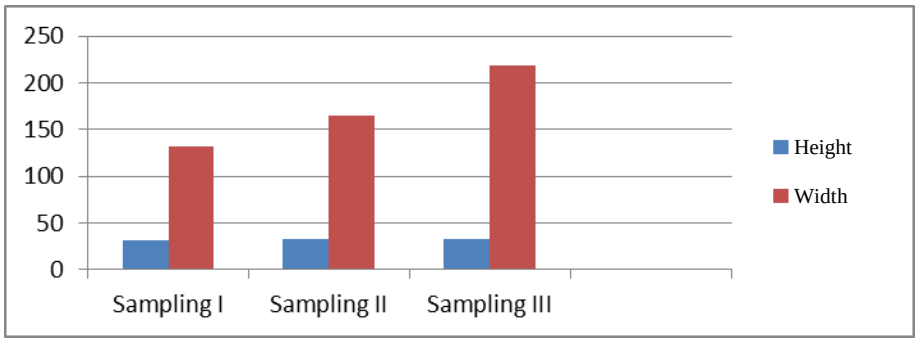

Figure 3. Sampling of Modular milkfish pond growth.

The growth in length and absolute weight of milkfish in modular ponds is lower than in semi-intensive ponds because modular ponds do not use artificial feed (pellets) while the same density is 12,000 heads. The speed of growth depends on the amount of feed consumed, the amount of protein content contained in the feed, water quality, and other factors such as heredity, age and endurance and the ability of the fish to use feed. When protein is low, slow fish growth can occur [11].

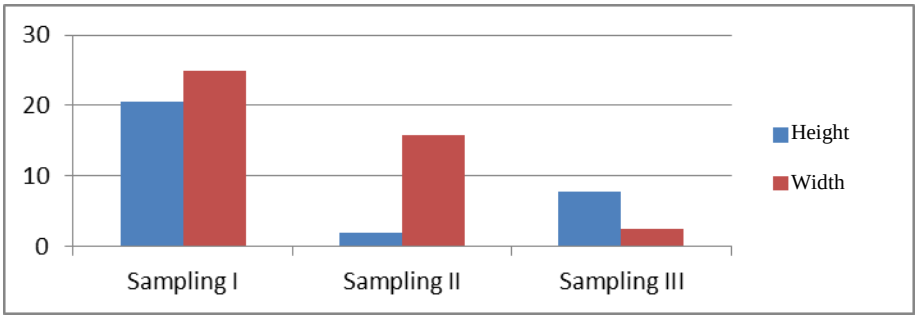

Figure 4. Sampling of semi-intensive milkfish pond growth.

Protein plays an important role in the preparation of fish tissue and organs [12]. Milkfish survival rate in modular and semi intensive ponds 83% higher than standard 80% [13]. The low survival of a cultivation biota is influenced by several factors, one of which is inappropriate feed nutrition [14]. This is supported [15] which states that fish have a great immune system against disease as long as their body condition is not weakened by a cause.

Based on the growth sampling and milkfish enlargement techniques above, the modular and semi-intensive systems have a number of differences that can be seen in Table 1 below.

Table 1. Differentiations of modular and semi intensive system

Difference	Modular system	Semi intensive system
Feed	-	+
Ferris wheel	-	+
Maintenance Duration	6 Month	3 Month
Pond construction	Traditional	HDPE plastic
Growth	Late	Fast

4. Conclusion

Based on studies that have been carried out at BBPBAP Jepara, it can be concluded that: 1) differences in modular and semi-intensive systems in terms of pellet use, pond construction, wheel availability, growth, and duration of maintenance and 2) semi-intensive system is more effective to increase the growth of milkfish and shorten the duration of aquaculture.

5. References

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