

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

*by M Nisa*

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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 [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



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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.

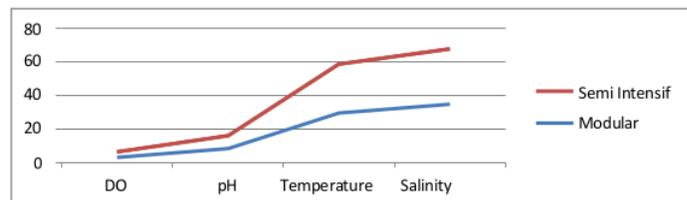
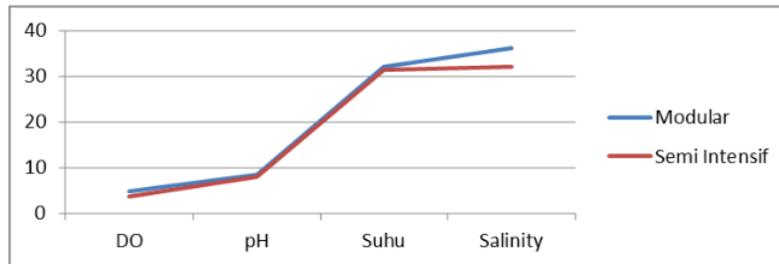


Figure 1. Morning water quality measurement results (06.30-07.00).

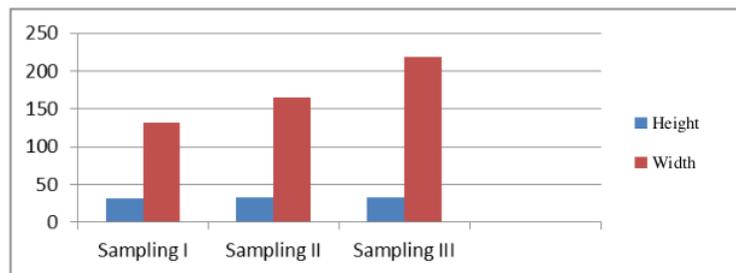
Salinity in modular ponds is higher than in semi-intensive systems because water changes are very rare. Increased rainfall in the second week resulted in dilution of pond water added and decreased salinity. [7] The good salinity for growth of milkfish ranges from 20-30 ppt. Salinity in modular and semi-intensive 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).

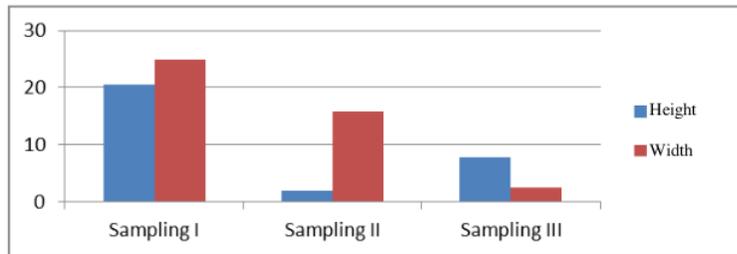
Temperature in ponds of modular and semi-intensive systems is higher in the afternoon than in the morning because there is accumulation of heat during the day. The temperature in the modular system ponds is also higher than in semi-intensive systems. [9] Solar radiation, temperature, air, weather, and climate will influence the amount of water temperature. [10] The optimum temperature for milkfish cultivation is 29-30°C, with a threshold below 26°C and a range above 32°C. 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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GENERAL COMMENTS

**Instructor**

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## RUBRIC: 6TH-8TH SCIENCE ARGUMENT (CER)

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### CLAIM

Take an arguable position on the scientific topic and develop the essay around that stance.

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ADVANCED	The essay introduces a precise, qualitative and/or quantitative claim based on the scientific topic or text(s), regarding the relationship between dependent and independent variables. The essay develops the claim and counterclaim fairly, distinguishing the claim from alternate or opposing claims.
PROFICIENT	The essay introduces a clear, qualitative and/or quantitative claim based on the scientific topic or text(s), regarding the relationship between dependent and independent variables. The essay effectively acknowledges and distinguishes the claim from alternate or opposing claims.
DEVELOPING	The essay attempts to introduce a qualitative and/or quantitative claim, based on the scientific topic or text(s), but it may be somewhat unclear or not maintained throughout the essay. The essay may not clearly acknowledge or distinguish the claim from alternate or opposing claims.
EMERGING	The essay does not clearly make a claim based on the scientific topic or text(s), or the claim is overly simplistic or vague. The essay does not acknowledge or distinguish counterclaims.

### EVIDENCE

Include relevant facts, definitions, and examples to back up the claim.

---

ADVANCED	The essay supplies sufficient relevant, accurate qualitative and/or quantitative data and evidence related to the scientific topic or text(s) to support its claim and counterclaim.
PROFICIENT	The essay supplies relevant, accurate qualitative and/or quantitative data and evidence related to the scientific topic or text(s) to support its claim and counterclaim.
DEVELOPING	The essay supplies some qualitative and/or quantitative data and evidence, but it may not be closely related to the scientific topic or text(s), or the support that is offered relies mostly on summary of the source(s), thereby not effectively supporting the essay's claim and counterclaim.
EMERGING	The essay supplies very little or no data and evidence to support its claim and counterclaim, or the evidence that is provided is not clear or relevant.

### REASONING

Explain how or why each piece of evidence supports the claim.

---

ADVANCED	The essay effectively applies scientific ideas and principles in order to explain how or why the cited evidence supports the claim. The essay demonstrates consistently logical reasoning and understanding of the scientific topic and/or text(s). The essay's explanations anticipate the audience's knowledge level and concerns about this scientific topic.
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PROFICIENT	The essay applies scientific reasoning in order to explain how or why the cited evidence supports the claim. The essay demonstrates logical reasoning and understanding of the scientific topic and/or text(s). The essay's explanations attempt to anticipate the audience's knowledge level and concerns about this scientific topic.
DEVELOPING	The essay includes some reasoning and understanding of the scientific topic and/or text(s), but it does not effectively apply scientific ideas or principles to explain how or why the evidence supports the claim.
EMERGING	The essay does not demonstrate clear or relevant reasoning to support the claim or to demonstrate an understanding of the scientific topic and/or text(s).

## FOCUS

Focus your writing on the prompt and task.

---

ADVANCED	The essay maintains strong focus on the purpose and task, using the whole essay to support and develop the claim and counterclaims evenly while thoroughly addressing the demands of the prompt.
PROFICIENT	The essay addresses the demands of the prompt and is mostly focused on the purpose and task. The essay may not acknowledge the claim and counterclaims evenly throughout.
DEVELOPING	The essay may not fully address the demands of the prompt or stay focused on the purpose and task. The writing may stray significantly off topic at times, and introduce the writer's bias occasionally, making it difficult to follow the central claim at times.
EMERGING	The essay does not maintain focus on purpose or task.

## ORGANIZATION

Organize your writing in a logical sequence.

---

ADVANCED	The essay incorporates an organizational structure throughout that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. Effective transitional words and phrases are included to clarify the relationships between and among ideas (i.e. claim and reasons, reasons and evidence, claim and counterclaim) in a way that strengthens the argument. The essay includes an introduction and conclusion that effectively follows from and supports the argument presented.
PROFICIENT	The essay incorporates an organizational structure with clear transitional words and phrases that show the relationship between and among ideas. The essay includes a progression of ideas from beginning to end, including an introduction and concluding statement or section that follows from and supports the argument presented.
DEVELOPING	The essay uses a basic organizational structure and minimal transitional words and phrases, though relationships between and among ideas are not consistently

clear. The essay moves from beginning to end; however, an introduction and/or conclusion may not be clearly evident.

EMERGING

The essay does not have an organizational structure and may simply offer a series of ideas without any clear transitions or connections. An introduction and conclusion are not evident.

## LANGUAGE

Pay close attention to your tone, style, word choice, and sentence structure when writing.

---

ADVANCED

The essay effectively establishes and maintains a formal style and objective tone and incorporates language that anticipates the reader's knowledge level and concerns. The essay consistently demonstrates a clear command of conventions, while also employing discipline-specific word choices and varied sentence structure.

PROFICIENT

The essay generally establishes and maintains a formal style with few possible exceptions and incorporates language that anticipates the reader's knowledge level and concerns. The essay demonstrates a general command of conventions, while also employing discipline-specific word choices and some variety in sentence structure.

DEVELOPING

The essay does not maintain a formal style consistently and incorporates language that may not show an awareness of the reader's knowledge or concerns. The essay may contain errors in conventions that interfere with meaning. Some attempts at discipline-specific word choices are made, and sentence structure may not vary often.

EMERGING

The essay employs language that is inappropriate for the audience and is not formal in style. The essay may contain pervasive errors in conventions that interfere with meaning, word choice is not discipline-specific, and sentence structures are simplistic and unvaried.