EFFECT OF THE DRY SEASON ON GROWTH, PRODUCTION OF SEAWEED KAPPAPHYCUS ALVAREZII IN TESABELA WATERS, KUPANG REGENCY, EAST NUSA TENGGARA, INDONESIA

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ABSTRACT

Kappaphycus alvarezii is red seaweed (Rhodophyceae) which is a superior commodity of aquaculture in Indonesia. The development of seaweed cultivation areas can be influenced by the biophysical environmental conditions of the waters and climatic conditions. One limiting factor in the cultivation of *Kappaphycus alvarezii* is the time of cultivation. The purpose of this study is the influence of the dry season on the growth and production of *Kappaphycus alvarezii* seaweed. Primary data collected in this study include data on seaweed cultivation patterns and cultivation time, namely growth and production data of *Kappaphycus alvarezii*. Secondary data were obtained from various related agencies including the Climatology Meteorological Agency and the Office of Maritime Affairs and Fisheries. The collected data is analyzed and discussed descriptively accompanied by pictures. The results of this study indicate that the productivity of seaweed development land is strongly influenced by climatic conditions. The existence of climate change both nationally and globally (El Niño and La Niña) greatly affects the time pattern of marine culture in Tesabela. *Kappaphycus alvarezii* cultivation time generally occurs in months where rainfall is low, namely air temperature (27°C - 30°C), salinity 29-31 ppm, pH 7-7.5. The average relative growth rate for 29°C: 55.7 gr / week%. Temperature of 31°C: at 50.9 gr / week%, temperature at 32°C – 33°C at 40.6 gr / week%, while at temperature 34°C– 35°C at 29.7 gr / week%. while production at 29°C was 72.4 kg gr / m² / six weeks, temperature 31°C is 70 kg / m² / 6 week, temperature 32°C, temperature 33°C is 67.8 kg / m² / six weeks, while temperature is 34 – 35°C is 31.7 kg / m² / six weeks.

KEYWORDS: *Kappaphycus Alvarezii*, Growth, Production, Season, Water Quality

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INTRODUCTION: BACKGROUND

The dry season can affect the depletion of the volume of water resulting in water turbidity. Changes in this season will affect the life of marine biota, such as its effect on seaweed *Kappaphycus alvarezii*. This type of *Kappaphycus alvarezii* seaweed has important economic value because it is a producer of carrageenan. In industry and trade, carrageenan can be used as a raw material for the pharmaceutical, cosmetic, food and other industries (Oedjoe, 2009).

Oceanographic ocean conditions are strongly influenced by monsoons and cross currents. These conditions resulted in three seasons, namely the west season (December-February), the east season (June-August) and the transition season. Yulianto (2004) states that losses on seaweed cultivation are caused by the appearance of the change of seasons from the west to the east season or vice versa. The success of seaweed cultivation depends not only on the method and suitability of the location of the waters, among others, also determined by the season.

The influence of the season will result in suboptimal growth, production and quality of seaweed. In the dry season the nutrient concentration will be higher than the rainy season so the plankton density is also low (Krismono & Yayuk 2007: 108). This condition is caused by the dry season with high temperatures which has light penetration and high salinity and evaporation. The effect of the dry season affects the quality of the waters. Water quality is a supporting factor for seaweed growth. For this reason, research on the effect of the dry season on the growth and sea weed production of *Kappaphycus alvarezii*

METHOD

The research location of *Kappaphycus alvarizii* was conducted in Tesabela waters in position $102^{\circ}52',28''$ - $10^{\circ}18,9'$ BT and $00^{\circ}16'54,1''$ - $0^{\circ}16,96'$ LS (Figure 1)

Figure 1: Tesabela Village Research Location.

This research was conducted from May to August 2019. The technology used for aquaculture is the long line method. The initial seed weight of *K.alvarezii* weighs 100 g / clump tied to a 100 cm long ris cord with a distance of 20 cm between grass points. Each treatment was repeated three times. Data was collected by weighing the wet weight of seaweed once every 7 days for 45 days. Growth parameters include daily growth rate (weight), productivity and carrying capacity of waters for seaweed cultivation, in the form of water quality. Specific Growth Rate is calculated using the formula $SGR = \frac{\ln W_t - \ln W_0}{t} \times 100\%$ (Andersen, 2005),

While Productivity is calculated using the formula: Seaweed Production (P) = $W_t - W_0 / A$ (Sediadi and Budiajo, 2000).

Where:

A = Area of maintenance (m^2)

P = Seaweed production (kg / m^2)

W_t = Final weight of seaweed (kg)

W_0 = initial weight of seaweed (kg)

t = cultivation time

RESULTS AND DISCUSSIONS

Water Quality

Water quality is a supporting factor for seaweed growth. Water quality data at the study site (Table 1) are as follows: the average temperature at the same location is 30⁰C – 34⁰ C. Dissolved oxygen (Dissolved Oxygen) of 5.40 - 6.70 ppm generally shows a normative value like table 1.

Table 1: Water Quality at Tesabela

No	Parameter	Research Sites	Quality Standards (Kep.Men LH, 2004)
1	Temperature (⁰ C)	29 -34	29-31
2	Salinity(ppm)	30 -36	30-33
3	DO (ppm)	5,40 – 6,70	> 5 ppm
4	pH	5,7 – 8,5	7,00 – 8,50.
5	Brightness (m)	1,0 – 5	1-10
6	Current (Cm/det)	20-32	20-30
7	Nitrat (ppm)	0,005	0,008
8	Fosfat (ppm)	0,04557	0,015

The water temperature in Tesabela during the study was 30⁰ C – 34⁰ C. While the optimum temperature for *K.alvarezii* was around 29⁰ C – 30⁰C in April - June 2019 (Figure 2). As explained by (Kep.Ment LH, 2014) that the temperature for the growth of *K.alvarezii* seaweed 29⁰ C– 31⁰ C. According to SNI (7579.2: 2010) that *K.alvarezii* seaweed can live in a temperature range of 27⁰C-30⁰C. Ambas (2006) further stated that *K.alvarezii* could still tolerate temperature fluctuations of 40⁰C. The pH range is 5.7 - 8.5 or the average pH is 7.1. This pH value is still as described by Kep. Men LH (2004), which is 7.00 - 8.50 (Like in Figure 2 and 3)

Figure 2: K. Alvarezii Condition at 290C - 30 0 C in Tesabela Waters, April –June 2019.

Figure 3: K. Alvarezii condition at 320C – 35 0C in Tesabela Waters, Juli - Agustus 2019.

GROWTH AND PRODUCTION OF KAPPAPHYCUS ALVAREZII

Production of Kappaphycus Alvarezii

The production of *K.alvarezii* at the temperature of the waters of 29 °C - 30°C were 72.4kg gr / m² / 6weeks, the temperature of 31 °C were 70 kg / m² / 6weeks, the temperature were 32 °C, the temperature of 33 °C was 67.8 kg / m² / 6weeks, while the temperature is 34 °C - 35 °C were 31.7 kg / m² / 6 weeks.

Specific Growth Rate of Kappaphycus Alvarezii

The results of the analysis show that there are significant differences ($p \leq 0,05$) for places and seasons at specific growth rates. The average specific growth rate for 29 °C – 30 °C waters was 55.7 g / week%. temperature of 31 °C at 50.9 gr / week%, temperature at 32 °C, temperature at 33 °C at 40.6 gr / week%, while at temperature 34 - 35 °C at 29.7 gr / week%. The low growth is due to the influx of the dry season from June to August 2019 with temperatures around 33 °C - 35 °C.

CONCLUSIONS

Season and water quality of affect the growth and production of *K. alvarezii*. The highest growth and production at temperatures of 29 °C - 30 °C on April – June. In April - June there were no ice-ice disease

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