

STUDIES ON THE CULTURE OF EUCHEUMA STRIATUM

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of the Requirements for the Degree
Master of Science in Biology

by
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ABSTRACT

Euचेuma striatum, a red alga of commercial value because of its carrageenin content was found to be very sensitive to a number of environmental factors.

While light differences play only a minor role, the algae are very sensitive to salinity, water movement, nutrient content, and the amount of dissolved gases in the surrounding sea water.

Exposure of Euचेuma plants to salinity below 30⁰/oo caused serious damage to the test plants.

Euचेuma striatum can only be cultured in areas where there is sufficient current, but the lack of current can be compensated for by exposing the plants to wave action. This led to certain conclusions regarding the most suitable methods for commercial Euचेuma culture. Euचेuma can be successfully cultured in small rafts or in floating baskets in areas where there is insufficient current for the use of fixed net or strings.

There is evidence that the CO₂-O₂ metabolism in the surrounding water plays an important role in Euचेuma growth. Enriching water with CO₂ caused a better growth.

Euचेuma harvest can be further increased by introducing more nutrients. Fertilizing with phosphate caused a bigger increase in the growth rate than fertilizing with nitrogen. The method of spraying plants after temporarily removing them from the water, was found to be more effective than fertilizing the cultures through the diffusion of fertilizing solutions by the use of clay pots.

The presence of the bacterial disease, locally referred to as "ice-ice," was recognized as a clear indication that certain environmental conditions were unfavorable for Euचेuma culture. Low salinity, in the first place, but also lack of current favors the attack of "ice-ice".

Finally, it was found out that Euचेuma adapts itself to its culture site in such a way that after maintaining seedlings in an area for a sufficient length of time, the cultured plants showed better growth rates and were more resistant to unfavorable conditions than plants recently transferred to the areas.

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Chapter 1

INTRODUCTION

There are about twenty species of Eucheuma described by Weber van Bosse (1928) which are found in the Indo-Pacific area. Of these, two are of utmost commercial importance, Eucheuma striatum Schmitz (Fig. 1) and Eucheuma spinosum (L.) J. Agardh (Fig. 2), the former being predominantly farmed in the southern Philippines.

In the late 1960's, a steep decline in the quantity of the Eucheuma harvest occurred owing to an over-exploitation of the resources to the level of near depletion. This over-harvesting threatened the supply of raw materials for the processing firms utilizing dried Eucheuma for carrageenan production. Consequently, trials were conducted with the aim of cultivating the algae. It was Dr. M. Doty who first undertook experiments in this respect. This is how the Eucheuma culture came into existence. Several experimental sites were established in different places throughout the country, but good results were obtained only in the Sulu area. At this site, pilot farms were established. Besides the actual production, mainly some technical and economic studies were carried out on these farms. These observations led only to rough ideas on culture sites and culture methods.



Fig. 1. Habit of Eucheuma striatum Schmitz



Fig. 2. Habit of Eucheuma spinosum (L.) J. Agardh

Not much is known about the biotic and abiotic factors influencing the growth of Eucheuma in natural or in cultured habitats. Several attempts to establish Eucheuma farms at various sites in the southern Philippines without previous knowledge of the ecological needs of the plants have proved unsuccessful.

This investigation attempts to examine the influence of biotic and abiotic factors on this seaweed. Closely related to the environmental conditions is the method of culturing, which is also dealt with in this study.

This investigation is based on the hypothesis that:

1. Light at different depth and different kinds of substrate affects the growth of this seaweed.
2. Water movement plays an important role in the growth of this seaweed.
3. Salinity when decreased due to dilution from different sources triggers the attack of "ice-ice".
4. Bacterial disease locally known as "ice-ice" sets in when the plant is physiologically weak.
5. Application of additional nutrients enhance the growth of plants.
6. Adaptation of the algae to certain conditions seems possible and its degree is investigated.