9. Land-based tank cultivation of *Meristotheca papulosa* using deep seawater

°Shinnosuke Teruya, Hirofumi Kubo

(Okinawa Prefectural Deep Sea Water Research Center)

1. Introduction

Meristotheca papulosa, Phylum Rhodophyta (the red seaweeds), are wild harvested for food such as seaweed salad. In Kochi prefecture, land-based tank cultivation using deep seawater was attempted because of the decrease of natural resources. However, it has been reported that practical cultivation was difficult because the miscellaneous algae such as diatoms or *Ectocarpus* spp. cover *Meristotheca papulosa*. In this study, we aimed to develop land-based tank cultivation method that was labor-saving and had low environmental impact using living a small shellfish which feed on miscellaneous algae.

2. Methods

The basic culture methods were carried out using the following methods: a 30L tank was used, the water temperature was 20 °C, the seawater exchange rate was 16 vol / day, and starting wet weight was 100 g. Factors for examining culture conditions were tested with 4 test groups. For the comparative culture conditions, the following 8 factors were examined: (1) Selection of miscellaneous alga feeding shellfish, (2) Effect of spherical net (such as landry net), (3) shading effect, (4) capacity, (5) LED irradiation time, (6) seawater exchange rate, (7) aerateion, (8) growth comparison between the two morphologically different types.

3. Results

(1) The selection test of miscellaneous alga-feeding shellfish indicated three of the six shellfishes fed and removed the diatoms (Fig. 1). However, when only putting shellfish in the tank, it was difficult for the shellfish to adhere to *Meristotheca papulosa*, and the miscellaneous algae removal effect was low. (2) In the spherical net effect test, *Meristotheca papulosa* and small shellfish were enclosed in the spherical net. As a result, prevention of falling off of small shellfish and the promotion of adhesion were attempted, which resulted in increased diatom removal effect. (3) In the shading test, it was found that growth without light shielding was the fastest growing. (4) In the storage capacity test, 50 - 300 g of alga was added to the laundry net, and the experimental plot of 50 g indicated the highest specific growth rate. (5) In the LED irradiation time test, the specific growth rate increased in order of 24 hours, 12 hours, 6 hours, 0 hours. (6) In the seawater exchange rate test, conditions were examined at 1 to 16 vol / day, and it was found that 4.0 vol / day or more was necessary. (7) In the aeration test, the test was conducted in absence, medium, medium (12 hours), large, and medium growth was the fastest (Fig. 2). (8) In growth comparison test by forms, the growth comparison was carried out separately for the spherical type and the flat type, and the flat type grew faster.

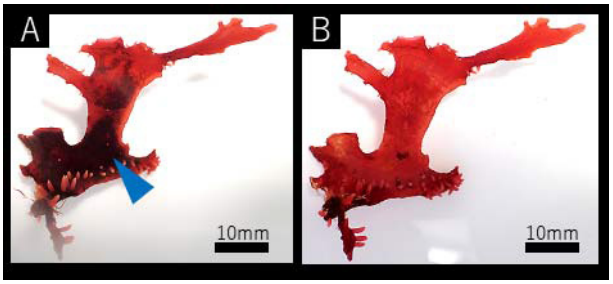

Fig. 1. Adhesion of diatoms to *M. papulosa* and its appearance after removal. 1-A. Condition of diatom adhesion. Arrowhead indicates diatom area. 1-B. Diatom removal status one day after shellfish input.

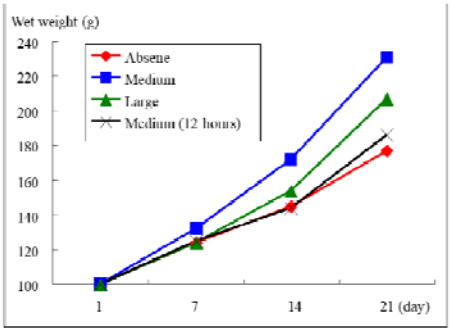

Fig. 2. Results of aeration test. The specific growth rate of the test plot of "middle" was 3.99 % / day.