

## 8. Aquaculture of abalone in DSW: To what size can abalones grow with attached diatoms a sole dietary source?

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### 1. Introduction

It was previously reported that continuous aquaculture of abalone and simultaneous cultivation systems of attached dietary diatom were successful using the eutrophic, cool, and clean water properties of Deep Seawater (DSW) (Fukami et al., 1998). In the present study, we will elucidate to what size abalone can grow with attached diatom as a sole dietary source.

### 2. “Column Culturing System”

Systems for culturing abalones and attached diatom were transparent acrylic columns containing many vinyl tubes of 18 mm x 2 cm as substrata for diatoms. However, despite having a large growing area and many diatoms grown in these systems, abalones over 20 mm in shell size were not able to move and feed freely, resulting in cessation of their growth.

Therefore, the systems were revised by increasing size and with the addition of larger tubes (30 mm), after which we started to cultivate juvenile abalones (*Haliotis discus hannai*) (Fig. 1).

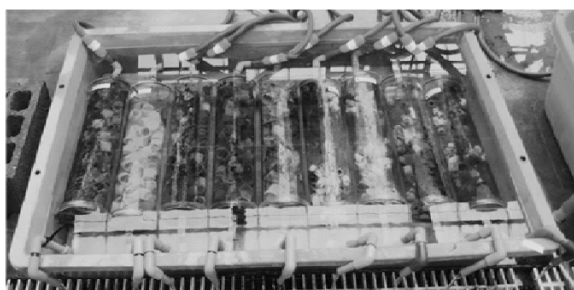


Fig. 1. “Column culturing systems” using transparent acrylic column (12 x 50 cm) containing many vinyl tubes with diameter of 30 mm. Much diatom (brown color) was grow in these systems.

Five individual abalones (20 mm) were put into each column in which attached diatoms had been

incubated previously. DSW was introduced to systems at the rate of 40 times/h. As a result, the abalone grew up to 39 mm, at a daily growth rate (DGR) of 150  $\mu\text{m}/\text{d}$  (Fig. 2).

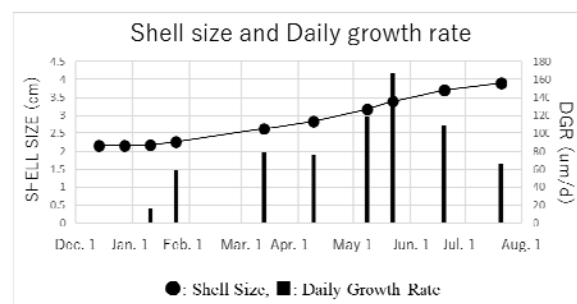


Fig. 2. Changes in shell size and daily growth rate (DGR) of abalone using column culturing systems.

### 3. “Basket Culturing System”

We prepared a new culturing system using a plastic basket of 59x44x24 cm and containing 38 or 50 mm vinyl tubes. Until now, abalones have been grown actively in this system, and they show an average shell size of 34 mm.

### 4. Conclusions

In studies that have been published to date, it has been stated that abalones will not grow up over 10 mm on diatom food, and that they need pieces of seaweed later.

However, the results obtained in the present study show that abalone can grow up to at least 30-40 mm size with attached diatom as the sole dietary source when diatom grow actively in eutrophic DSW and compensate for the consumption by abalone. We will try to establish an abalone aquaculture system using DSW in the future.