Practical Study on Coastal Zone Development Using Charcoal Plates

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Introduction

Coastal zone development is looked at not only as a form of environmental development but also as a hopeful means of water purification and CO2 fixing. This project was started to establish simple practical technology for growing seaweed using porous charcoal plates of high absorptivity.

Overview of Results

As part of efforts to establish practical technology for growing seaweed, charcoal plates were installed on existing underwater structures. The experiment was tried on the water intake (no wild seaweed) and discharge outlet (wild seaweed over half area) of Kansai Electric Power's Miyazu Energy Research Center and an artificial reef at Hatasaki (heavily covered in wild seaweed).
Three techniques were used to install the charcoal plates on the reef: tying down with rope, gluing down with waterproof bonding agent and bolting down. After three years of regular monitoring, other than some (less than 5%) of the glued-down plates coming loose, installation was sound.

To follow seaweed growth, the number of insertions were compared between the charcoal plates and commercially available seaweed insertion materials submerged at Hatasaki where wild seaweed was thick. The charcoal plates located on the coastal side of the reef where wild seaweed was thick did not show any particular superiority in the number of juveniles, but on the offshore side where wild colonies were thinner, the plates were slightly better for drawing juveniles. The results suggested that the charcoal absorption effect could promote insertion even with minimal conceptacles released by mature seaweed and that coastal development using charcoal plates would be an effective way to promote seaweed growth in nearby sea area where there is a small amount of wild seaweed.

However, this technique was not effective in areas where there existed only a very small amount of wild seaweed or none at all, like on the water intake and discharge outlet.

Conclusions

Studies are currently underway at the discharge outlet to establish an effective technique for growing seaweed in areas where little wild seaweed grows. This includes analyses of factors behind migration distances of conceptacles that are being conducted in a tank and plans to sample optimal transplanting conditions in terms of time period and quantity of stocks, in which charcoal plates with seedlings will be moved from a tank to sea area where seaweed does not grow spontaneously. If results indicate the charcoal plates to be an effective way of promoting seaweed growth, this method should contribute to environmental protection in coastal areas.