Creation of Artificial Seaweed Forest Using Discharged Deep Seawater

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We studied how to make artificial seaweed forest around area in discharged deep seawater in Gosung where is located in Marine Deep Seawater Center. We are also aiming to study culturing seaweed in tank based on land and coastal area using artificial reef in Gangneung area. I am working Gangneung-Wonju Nat. University. Our government appointed Gangneung city as a green coastal city 4 years ago and then they are thinking to establish Deep seawater center.
The marine environment and seaweed vegetation in relation to barren ground were surveyed by doing field research along the Eastern Coast from Pusan to Samchuk, Gangneung, Sokcho and the DMZ (the direction of the Kuroshio Current along the East Sea of Korea). Marine algal vegetation was measured by seaweed biomass, percent cover of benthic algal distribution. The percent cover of the folioce algae in Gosung, in the northern part of the Gangwon area, was very high (50%). Species richness in discharged area of deep sea waters was also very high than controlled area.
The percent cover of barren ground which was distributed on the upper layers of CCA increased to over 50%.

A. *Kjellmania crassifolia* kelp bed in Gangneung area. B. *Dictyota* turf and crustose coralline alga pavement in barren ground area. C. Dominant crustose coralline algae in Galnam area. D. *Sargassum* is the only large seaweed surviving in the crustose coralline dominated barren ground.
Laminaria and Agarum have crowded Kjellmaniellas native habitat leading to much lower numbers of Kjellmaniella communities. The kelp bed is now replaced with Agarum cribrosum and Othontalia corymbifera.
Algal flora and communities depends on depths in Gangneung coastal area in May 2011. A-C : Sageunjin 5m, 10m, 15m, D-E : Sacheon 5m, 10m, F : Intertidal zone in Sageunjin

Coralline algae and folioce algae underwater Sageunjin 5m ad 10m while dominated crustose coralline algae in 15m. Sacheon 5m - Laminaria community formed : Sacheon 15m – crustose coralline algae dominated
- **Sargassum** and *Ecklonia* transplanted in Artificial Reefs.
- After 3 months at underwater, depths 7m; *Colpomenia, Petalonia, Undaria, Acrosouium, Gracilaria* which are seasonal species. After 8 months, added *Argarum* and *Ceramium* genus and *Dictyota* and *Lomentaria*, *Grateloupia* were distributed after 11 months.
- Early stages in artificial reefs, not distributed crustose coralline algae while dominated on natural rocks. *Dictyota* and *Argarum* which are tolerance speecies to grazing pressure.
Seedling making and transplantation in artificial Reef

Attachment of spore

Application

Formation of seaweed bed

transplant in artificial reef

- Availability of crust seedling
Eisenia and Ecklonia beds

Eisenia bicyclis

Ecklonia cava

Sargassum beds