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Determination of most suitable mesh size for the enclosures used for *Eucheuma cottonii* farm

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Eucheuma cottonii is a red algae, which is cultivated mainly in Philippines, China, Indonesia and Hawaiian islands and carrageenan is the main product extracted from it. In Sri Lanka currently *Eucheuma cottonii* is cultured within the coastal belts of Jaffna, Kilinochchi and Mannar. Aim of the present study is to determine the best mesh size of the enclosures (cages) to be used for cultivation of *E. cottonii* and to identify the species which are inhabiting in association of the this sea weed cultured within the coast of Dondra, Matara, in Sri Lanka. Daily growth rate of *E. cottonii* was determined and it's carrageenan yield was determined after culturing the seaweed (initial seedling weight 155.67±4.53g) in baskets having three different mesh sizes 1x0.8 cm^2 (M1), 2.2x1.8cm^2 (M2) and 3.5x2.8cm^2 (M3). Three replicates were used for each mesh size and culture programme was carried out for 64 days. Once a week the wet weight of *E. cottonii* each basket and the salinity, pH, temperature, dissolved oxygen (DO), Total Dissolve Solids (TDS) and conductivity in the site selected for the culture programme were recorded. Extraction of carrageenan in the seaweed grown in each basket was extraction by using KOH as a solvent. Dried *Eucheuma cottonii* sample (10.00 g), soaked in distilled water was introduced in to a beaker containing 500.0 mL of 0.5M KOH solution and was heated up to 850Cwhile stirring for 45 minutes. The extraction was precipitated in 90% ethanol for 30 minutes and it was dried by using an oven at 600C, until it recorded a constant weight.

Final wet weights of *Eucheuma cottonii* in each basket were recorded and they were 592 ± 92.45, M3 408.66 ± 189.74 and 397.66 ± 109.86 g in M1, M2 and M3 respectively. Highest wet weight (600±90.9340 g) of Eucheuma cottonii was recorded in one of the baskets with M1 mesh size after 56 days of culture. There were no significant difference ($p>0.05$) among the final weight of the sea weed cultured baskets with three different mesh sizes. Highest daily growth rates (6.316±1.0282 % Day-1) was during the initial phase of the culture period in M2 basket and it decreased towards the final phase of the culture period. Carrageenan yield showed significant difference ($p\leq0.05$) among the baskets with different three mesh sizes, with highest (71.7667±0.32) in M3 and the lowest (47.1667±7.23) in M2. Isopods, shrimp juveniles, crab larvae and fish larvae were identified in all the buckets while coral reef fishes,

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Echinodermata and other seaweed species were observed around the environment where baskets were located although grazing by them was not observed. Epiphytes did not affect for the growth of *Eucheuma cottonii* during the culture period. Since the wave action was quite strong in the area it may have affected the growth of the sea weed together with grazing by herbivores. It can be recommended that the mesh size in M1 bucket is the most suitable for *Eucheuma cottonii* culture, but further studies should be carried out to study the exact impact by grazers..

Keywords: *Eucheuma cottonii*, Carrageenan, Mesh size of enclosures, Daily growth rate