THE ALGAL COMMUNITIES AROUND SANGROBENGI ISLAND,
TAKALAR, SOUTH SULAWESI

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ABSTRACT
An investigation at the Sangrobenyi Island, Takalar, South Sulawesi showed the existence of 22 genera of algae with 6 genera of Chlorophyceae, 4 genera of Phaeophyceae and 12 genera of Rhodophyceae. The dominant seaweed, found during July and August 1993, were Halimeda opuntia, Caulerpa racemosa, Dictyota dichotoma, Gracilaria leichnoides and Hypnea musciformis. Total density of seaweeds (benthic algae) was 607.82 g wet wt/m² with 347.1 g red-algae, 225.62 g green-algae, and 34.69 g brown-algae. A pronounced algal zonation could be seen on Sangrobenyi.

INTRODUCTION
Sangrobenyi is a small island located at the southwestern corner of Sulawesi, off Gileseg, Sangrobenyi Island consist of coral deposits. The distance from the coast to the reef flat boundary is 50 - 200 m. At low-tide the reef flat is exposed, often exposing the algal asets too. The salinity at Sangrobenyi Island is constant (31ppt) and the tide oscillates in the range of 2 m. On the reef flat there were some economic algae, such as Gracilaria, Hypnea, Gelidium, and Eucheuma, which are consumed by local people. Eucheuma sp. is one of the favorite food algae of local inhabitants. The distribution of E. serra in Indonesia is limited, as opposed to the distribution of other Eucheuma species. Besides Indonesia, E. serra occurs around Zanzibar (called "Zanzibar wood") and Japan (Levring et al., 1969). The present study deals with taxonomy and distribution of species. It was carried out with a view to provide baseline data for TMMP studies on food and feeding of herbivorous snails.

MATERIALS AND METHODS
Algae were collected from Sangrobenyi Island in June 1993, and placed in a herbarium. The following investigation was made from July to August 1993. Identification was done with reference to Taylor (1960), Dawson (1946), Bose (1928), and Verheye and Prad'Homme van Reine (1933). Sampling of standing crop was made along transects initiated at the coastline and ending at the fringing coral reef edge. The material was sampled every 30 m in each transect using the square-method with a 5x5 m quadrate. Algae inside the sampling area were harvested, and transferred to a plastic-bag. The depth and the substrate type was noted. Each sample was identified to generic levels and weighed (wet weight). Dominance was calculated as the square root of the percentage of total densities times the relative densities (Saito et al., 1976).

RESULTS AND DISCUSSION

Diversity and Dominance
The material could readily be separated into 44 taxa of algae which consisted of 22 taxa of red-algae (Rhophyceae) in 12 genera, 15 taxa of green-algae (Chlorophyceae) in 9 genera, 7 taxa of brown-algae (Phaeophyceae) in 5 genera (Table 1). The algal flora around Sangrobenyi Island was very diversified. The dominant algae at Sangrobenyi Island was Gracilaria leichnoides, followed by Caulerpa racemosa, Halimeda opuntia and Hypnea. Some species of algae at Sangrobenyi Island, such as Gracilaria leichnoides, Gelidopsis spp., and Gelidium spp. Hypnea musciformis, and Eucheuma serra, all have economic value for local
consumption or trade. Some local inhabitants harvest algae at low tide. Harvesting is done in all seasons of the year. The biggest harvest occurs in July and August. * Dictyota ceratophylla* was harvested in the rainy season from December to February. Other abundant algae were *Ulva spp.*, *Halymenia agardhii*, *Gigartinia* spp., *Laurencia* spp., *Acanthophora dendroides*, *Anamia glomerata*, *Dictyota spp.*, and *Caulerpa* spp.

<table>
<thead>
<tr>
<th>Table 1. List of Macroalgae from Songkheang Island, South Sulawesi.</th>
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</thead>
</table>

**CHLOROPHYCACEAE**

- *Cladophoraceae*<br>  *Chlorophyta* LINK.<br>  *Enteromorpha intestinalis* (L.) LINK.
- *Bryopsidaceae*<br>  *Bryopsis LAMOURoux*<br>  *Bryopsis plumosa* (HUSS.) C. AG.
- *Caulerpaceae*<br>  *Caulerpa LAMOURoux*<br>  *Caulerpa racemosa* (FORSSK.) W. & B.<br>  *Caulerpa prolifera* (FORSSK.) J. AG.
- *Codiaceae*<br>  *Codium STACKHOUSE*<br>  *Codium stricticostata* VICK
- *Halimeda LAMOURoux*<br>  *Halimeda epiphyta* LAMY
- *Halimeda cornea* LAMY.
- *Ulva LAMOURoux*<br>  *Ulva complanata* C. AG.

**Valoniacese**

- *Valonia GINNANI*<br>  *Valonia nigrescens* AG.
- *Valonia microphylla KUETZ.*
- *Valonia uncialis* C. AG.

**Bordaieae**

- *Bordaia Bordaia* (HARV) BRÜNN.

**Ulveace**

- *Ulua LAMIN*<br>  *Ulua esponiella* (SETCH) SETCH & GARD.
- *Ulua lateralis* FORSSK.
- *Ulua retroflexa* FORSSK.

**PHAEOPHYCEAE**

**Deitanariaceae**

- *Dictyota LAMOURoux*<br>  *Dictyota dichotoma* (HUSS.) LAMY.
- *Padina ADAMS*<br>  *Padina australis* HAUCK.

**Sargassaceae**

- *Sargassum C. AGARDH*.<br>  *Sargassum hortense* J. AG.<br>  *Sargassum spp.*

**Tariumoche LAMOURoux**

- *Tariumoche australis* (TURNER) J. AG.<br>  *Tariumoche crassulae* (LAM) KUETZ.

**Fucaceae**

- *Hydrocladia BORY*<br>  *Hydrocladia classthecus* (BORY) HOWE.

**RHODOPHYCEAE**

**Rhodomelaceae**

- *Acrasina LAMOURoux*<br>  *Acrasina dendroides* HARV.
- *Acrasina speciosa* (VALE) NOERG.
- *Anemia LAMOURoux*<br>  *Anemia glomerata* C. AG.
- *Laurencia LAMOURoux*<br>  *Laurencia digitata* DAWSON
- *Laurencia splendidum* HOLL.
- *Laurencia nodifica* AG.

**Gelidiales**

- *Gelidium LAMOURoux*<br>  *Gelidium foliosum* LAMX.

**Corallinales**

- *Amphipleura LAMOURoux*<br>  *Amphipleura foliosa* LAMX.

**Ceriodiaceae**

- *Ceriodium LAMOURoux*<br>  *Ceriodium ramosum* LAMX.

**Gelidiaceae**

- *Gelidium LAMOURoux*<br>  *Gelidium sinuatum* (VALE) FREN.
- *Gelidium canescens* (L.) FREN.

**Gigartinales**

- *Gigartina agreeing* (VALE) W.B.

**Granulophycaceae**

- *Halymenia C. AG.
- *Halymenia agardhii* D. TONI.

**Gracilariales**

- *Gracilaria GUEVAR*<br>  *Gracilaria bidispera* HARV.
- *Gracilaria conferta* (LAM) LAM.

**Hypneaceae**

- *Hypnea LAMOURoux*<br>  *Hypnea cervicornis* C. AG.
- *Hypnea musciformis* (KULZ) LAMY.
- *Hypnea americana* (TURN) MONT.

**Soleniales**

- *Solenia LAMIN*<br>  *Solenia robusta* KUETZ.
- *Solenia acuta* J. AG.

**Gigartinales**

- *Gigartina agreeing* (VALE) W.B.

**Algal density and relative frequency of class.**

Total algal density from the transect was 607.82 g/m² wet weight from which red-algae made up 347.51 g/m², green-algae 225.62 g/m², and brown-algae 34.66 g/m² (Table 2, Fig. 1).
Table 2. Total density (g/m²), relative density (%), frequency (%), and taxa dominating at the Sangrobeni Island in terms of standing crop.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Density (g/m²)</th>
<th>Frequency (%)</th>
<th>Dominating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhodophyceae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aiptasia</td>
<td>42.01</td>
<td>6.91</td>
<td>25.00</td>
</tr>
<tr>
<td>Eucheuma</td>
<td>49.03</td>
<td>8.06</td>
<td>6.25</td>
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<tr>
<td>Galaxaura</td>
<td>1.25</td>
<td>0.20</td>
<td>6.25</td>
</tr>
<tr>
<td>Cystoseira</td>
<td>14.00</td>
<td>2.05</td>
<td>57.50</td>
</tr>
<tr>
<td>Gigartinaea</td>
<td>1.27</td>
<td>0.21</td>
<td>6.25</td>
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<tr>
<td>Gracilaria</td>
<td>77.33</td>
<td>12.72</td>
<td>68.75</td>
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<tr>
<td>Halimeda</td>
<td>41.87</td>
<td>6.80</td>
<td>29.06</td>
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<tr>
<td>Hypnea</td>
<td>56.96</td>
<td>9.37</td>
<td>43.75</td>
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<tr>
<td>Laurencia</td>
<td>2.64</td>
<td>0.36</td>
<td>11.25</td>
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<tr>
<td>Rhodymenia</td>
<td>7.60</td>
<td>1.15</td>
<td>12.50</td>
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<td>Phaeophyceae</td>
<td></td>
<td></td>
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<td>Dictyota</td>
<td>23.32</td>
<td>3.51</td>
<td>25.00</td>
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<td>Hypothecium</td>
<td>1.91</td>
<td>0.31</td>
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<td>Hydractinia</td>
<td>4.56</td>
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<td>Syringodium</td>
<td>11.47</td>
<td>1.88</td>
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<td>Chlorophyceae</td>
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<tr>
<td>Botryocladia</td>
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<td>0.11</td>
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<td>Cystoclonium</td>
<td>113.29</td>
<td>18.57</td>
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<td>Cadophora</td>
<td>6.36</td>
<td>1.05</td>
<td>12.50</td>
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<td>Enteromorpha</td>
<td>1.69</td>
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<td>Halimeda</td>
<td>8.47</td>
<td>1.45</td>
<td>37.50</td>
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<tr>
<td>Ulosa</td>
<td>15.27</td>
<td>2.51</td>
<td>50.00</td>
</tr>
</tbody>
</table>

Figure 1. Density comparision of red-algae, green-algae, and brown-algae at the Sangrobeni Island.

The economically important alga had the following densities. Gracilaria 77.33 g/m² (12.72% of total density/m²), Hypnea 56.96 g/m² (9.37%), Eucheuma 49.01 g/m² (8.06%), and Gelidium 14.00 g/m² (2.30%) (Fig. 2).

Figure 2. Economically valuable macroalgae at the Sangrobeni Island.

The relative frequency of the various classes with respect to the number of genera was red-algae 50%, green-algae 34%, and brown-algae 16%. In terms of relative weight, the red-algae made up 57%, green-algae 37%, and brown-algae 6%.

Zonation

The algal zone at the Sangrobeni Island was determined by the type of substrates: sand, dead-coral reef, or live-coral reef. In the present study area, the inner side of the coral reef edge had a marked algal ridge. The width of the sand zone was about 50-100 m. The algal ridge in the dead-coral zone was about 25-200 m wide, fading towards the living-coral area on the coral reef edge.

The alga that lived on the sand were Hypnea, Gracilaria, Ulva, Halimeda, Cystoclada, Bouldiera, and Enteromorpha. The sand zone zone some seagrasses were found: Enhalus echinatae, Halodule tritau, Thalassia sp., and Cymodocea sp. Almost all the dominant algae occurred in the dead-coral zone, such as Gracilaria lichenides, Hypnea musciformis, Gelidium sp., and Acarinophora dendroides. The species Laurencia sp., Gigartina sp., Bracynema palmata, Amansia glutinata, Halimeda agaritana, and Amphiroa foliacea were also found here. Eucheuma serra was found on the coral rocks, at the fringe coral reef edge.

The border between the living-coral reef and the dead-coral zone was dominated by Gracilaria lichenides. This alga sticks to seagrass such as Amphibolis sp., a marine Spermatophyta growing in the wave-break area.
REFERENCES


Calluna vulgaris (L., 1758). PMBC 1464.

Drawing by Patarat Singlan.