

## THE ALGAL COMMUNITIES AROUND SAMALONA ISLAND , UJUNGPANDANG, SOUTH SULA WESI

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### ABSTRACT

An investigation at the Samalona Island, Ujungpandang, South Sulawesi showed the existence of 22 genera of macroalgae with 6 genera of Chlorophyceae, 4 genera of Phaeophyceae and 12 genera Rhodophyceae. The species of algae were identified. The dominant seaweed, found during June to August 1999, were *Halimeda opuntia*, *Caulerpa racemosa*, *Dictyota dichotoma*, *Gracilaria lichenoides* and *Hypnea musciformis*. Total density of seaweed (benthic algae) was 606 g wet weight m<sup>-2</sup> consisting of 347 g red algae, 225 g green algae, and 34 g brown algae. A pronounced algal zonation could be seen on Samalona.

### INTRODUCTION

Samalona is a small island located at the south-western corner of Sulawesi, belonging to the Spermonde Islands. Samalona Island consist of coral deposits. The distance from the coast to the reef flat boundary is 100-200 m. At low-tide the reef flat is exposed, often exposing the algal areas too. The salinity at Samalona Island is constant (31 ppt) and the tide oscillates in the range of 2 m.

Edible, and hence commercially important algae, were found on the reef flat: *Gracilaria*, *Hypnea*, *Gelidium*, and *Euचेuma*, which are consumed by local people. *Euचेuma serra* is one of the favourite food algae of local inhabitants. *E. serra* has a narrow distribution compared to the distribution of other *Euचेuma* species. Besides in Indonesia, *E. serra* occurs around Zanzibar (called "Zanzibar weed") 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 at Samalona Island May 1999 and preserved in a herbarium. The quantitative investigation was made from June to August 1999. Identification was done with reference to Taylor (19660), Dawson (1946), Bosse (1928), and Verheii and Prud'Homme van Reine (1993). Sampling of standing crop was made along transects, which started at the coastline and ended at the fringing coral reef edge. The material was sampled within a 5 x 5 m frame for every 20 m along the transect line. Harvested algae were transferred to a plastic bag. The depth and the substrate type were noted. Each sample was identified to generic level 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 algal flora around Samalona Island is very rich in species. The material could readily be separated into 54 taxa of algae, which consisted of 23 taxa of red algae (Rhodophyceae) in 12 genera, 22 taxa of green algae (Chlorophyceae) in 9 genera, 8 taxa of brown algae (Phaeophyceae) in 5 genera (Table 1).

The dominant algae were *Euचेuma*, followed by *Caulerpa*, *Sargassum* and *Gracilaria*. Other abundant algae were *Halimeda opuntia*, *H. cunneata*, *H. gracilis*,

*Dictyota dichotoma*, *Padina australis*, *Turbinaria ornata*, *T. decurrens*, *Acanthophora dendroides*, *A. spicifera*, *Amphiroa foliaceae*, and *Halymenia agardhii*.

Some species, such as *Caulerpa racemosa*, *Gracilaria confervoides*, *Gracilaria lichinoides*, *Hypnea muciformis*, *Eucheuma edule* and *Eucheuma serra*, all have economic value for local consumption or trade. Local inhabitant harvest algae at low tide all year round with the biggest harvest in July and August. *Eucheuma serra* and *Gracilaria confervoides* are harvested in the rainy season from December to February.

Table 1. List of Macroalgae from Samalona Island, South Sulawesi.

### CHLOROPHYCEAE

#### Cladophoraceae

*Enteromorpha* Link

*Enteromorpha intestinalis* (L.) Link

#### Bryopsidaceae

*Bryopsis* Lamouroux

*Bryopsis plumosa* (Huds.) C.Ag.

#### Caulerpaceae

*Caulerpa* Lamouroux

*Caulerpa racemosa* (Forssk.) W.v.B.

*Caulerpa serrulata* (Forssk.) J.Ag.

*Caulerpa sertularioides* (Vahl.) C. Ag.

#### Codiaceae

*Codium* Stackhouse

*Codium decortiatum* (Wood.) Howe

*Codium edule* Silva

*Codium geppii* Schmitt

*Halimeda* Lamouroux

*Halimeda opuntia* Lamx.

*Halimeda cunneata* Hering

*Halimeda gracilis* (J.Ag.) Harv.

*Halimeda macrophysa* Linn.

*Halimeda tuna* Lamx.

*Udotea* Lamouroux

*Udotea argentea* Zanardini

*Udotea flabellum* (Ellis & Solander) Howe

#### Valoniaceae

*Valonia* Ginnani

*Valonia aegagropila* C. Ag.

*Valonia macrophysa* Kuetz.

*Valonia utricularis* C. Ag.

*Boodlea* Murr.

*Boodlea composita* (Harv.) Brand.

#### Ulvaceae

*Ulva* Linn.

*Ulva expansa* (Setch.) Setch. & Gard.

*Ulva lactuca* Forssk.

*Ulva fasciata* Delile

### PHAEOPHYCEAE

#### Dictyotaceae

*Dictyota* Lamouroux

*Dictyota dichotoma* (Huds.) Lamx.

*Padina* Adamson

*Padina australis* Hauck.

#### Sargassaceae

*Sargassum* C. Agardh

*Sargassum histrix* J.Ag.

*Sargassum crassifolium* J. Ag.

*Turbinaria* Lamouroux

*Turbinaria ornata* (Turner) J. Ag.

*Turbinaria decurrens* Bory

*Turbinaria conoides* (J.Ag.) Kuetz.

#### Punctariaceae

*Hydroclathrus* (Bory)

*Hydroclathrus clathratus* (Bory) Howe

### RHODOPHYCEAE

#### Rhodomelaceae

*Acanthophora* Lamouroux

*Acanthophora dendroides* Harv.

*Acanthophora spicifera* (Vahl.) Boerg.

*Amansia* Lamouroux

*Amansia glomerata* C. Ag.

*Laurencia* Lamouroux

*Laurencia diegoensis* Dawson

*Laurencia splendens* Holl.

*Laurencia nidifica* Ag.

#### Galaxauraceae

*Galaxaura* Lamouroux

*Galaxaura cohaerens* Kjell.

*Galaxaura fruticulosa* Kjell.

#### Corralinaceae

*Amphiroa* Lamouroux

*Amphiroa foliaceae* Lamx.

#### Gelidiaceae

- Gelidium* Lamouroux  
*Gelidium rigidum* (Vahl.) Grev.  
*Gelidium cartilagineum* (L.) Grev.  
*Gelidiopsis* Schm.  
*Gelidiopsis rigida* (Vahl.) W.v.B.  
**Grateloupiaceae**  
*Halymenia* C. Ag.  
*Halymenia agardhii* De Toni  
**Gracilariaceae**  
*Gracilaria* Greville  
*Gracilaria blodgettii* Harv.  
*Gracilaria confervoides* (Linn.) Grev.  
*Gracilaria lichinoides* (Linn.) Harv.  
**Hypneaceae**  
*Hypnea* Lamouroux  
*Hypnea cervicornis* J. Ag.  
*Hypnea musciformis* (Wulf.) Lamx.  
*Hypnea valentiae* (Turn.) Mont.  
**Solieriaceae**  
*Euclidean* J. Ag.  
*Euclidean edule* Kuetz.  
*Euclidean serra* J. Ag.  
*Euclidean alvarezii* Doty  
**Gigartinaceae**  
*Gigartina* Stackhouse  
*Gigartina affinis* Harv.

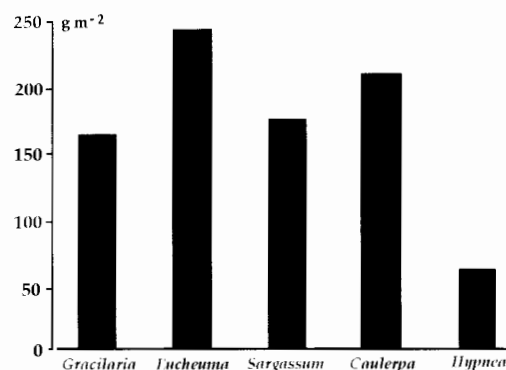
*Algal density and relative frequency  
of classes.*

Total algal biomass collected along the transect was 1495 g wet weight  $m^{-2}$  of which red algae made up 719 g, green algae 390 g, and brown algae 385 g (Table 2; Figure 1).

The economically important algae had the following biomasses: *Gracilaria* 165.7 g  $m^{-2}$  (11.0 % of the total density  $m^{-2}$ ), *Hypnea* 60.2 g  $m^{-2}$  (4.0 %), *Euclidean* 245.5 g  $m^{-2}$  (16.4 %), *Sargassum* 175.6 g  $m^{-2}$  (11.7 %) and *Caulerpa* 210.6 g  $m^{-2}$  (14.09 %).

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 wet weight the red algae made up 57%, green algae 37%, and brown algae 6%.

Figure 1. Density comparisons of red algae, green algae, and brown algae at the Samalona Island.



*Zonation*

The type of substrate determined the algal zonation at the Samalona Island: 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 m. The algal ridge in dead coral zone was about 25-100 m wide, fading towards the living coral area on the coral reef edge.

Algal genera occurring on sand were: *Hypnea*, *Gracilaria*, *Ulva*, *Halimeda*, *Caulerpa*, *Boodlea* and *Enteromorpha*. Behind the sand zone some seagrasses were found: *Enhalus acroides*, *Halodule triata*, *Thalassia sp.*, and *Cymodocea sp.* Almost all the dominant algae occurred in the dead coral zone, such as *Gracilaria lichenoides*, *Hypnea musciformis*, *Gelidiopsis rigida*, and *Acanthophora dendroides*. The species *Laurencia diegoensis*, *L. splendens*, *L. nidifica*, *Gigartina affinis*, *Amansia glomerata*, *Halymenia agardhii*, and *Amphiroa foliaceae* were also found here. *Euclidean serra* was found on the coral rocks, at the fringing coral reef edge.

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

TAXA	Density (g m <sup>-2</sup> )	Dens. (%)	Freq. (%)	Dom.
<b>CHLOROPHYCEAE</b>				
<i>Enteromorpha</i>	2.8	0.1	15.0	0.74
<i>Bryopsis</i>	15.4	1.0	5.0	4.00
<i>Caulerpa</i>	210.6	14.0	70.0	54.48
<i>Codium</i>	5.4	0.3	11.6	1.40
<i>Halimeda</i>	100.8	6.7	78.3	26.08
<i>Udotea</i>	2.2	0.1	38.3	0.57
<i>Valonia</i>	2.2	0.1	11.6	0.58
<i>Boodlea</i>	5.3	0.3	31.6	1.37
<i>Ulva</i>	45.5	3.0	68.3	11.78
<b>PHAEOPHYCEAE</b>				
<i>Dictyota</i>	42.7	2.8	26.6	11.06
<i>Padina</i>	80.9	5.4	85.0	20.94
<i>Sargassum</i>	175.6	11.7	28.3	45.43
<i>Turbinaria</i>	80.3	5.3	60.0	20.78
<i>Hydroclathrus</i>	5.6	0.3	45.0	1.45
<b>RHODOPHYCEAE</b>				
<i>Acanthophora</i>	44.2	2.9	30.0	11.44
<i>Amansia</i>	13.4	0.9	38.3	3.48
<i>Amphiroa</i>	53.7	3.6	45.0	13.90
<i>Euclima</i>	245.5	16.4	58.3	63.49
<i>Galaxaura</i>	25.0	1.6	36.6	6.47
<i>Gelidiopsis</i>	12.55	0.8	31.6	3.25
<i>Gelidium</i>	30.00	2.0	41.6	7.76
<i>Gigartina</i>	8.90	0.6	15.0	2.30
<i>Gracilaria</i>	165.7	11.0	73.3	42.87
<i>Halymenia</i>	40.8	2.7	51.6	10.56
<i>Hypnea</i>	60.2	4.0	38.3	15.58
<i>Laurencia</i>	19.0	1.2	26.6	4.93

Table 2.

Total density (g m<sup>-2</sup>), relative density (Dens. %), frequency (Freq. %), and calculated dominance of taxa (Dom.) at the Samalona Island.

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