

## ALGAE FROM SANGROBENGI ISLAND, SOUTH SULAWESI, INCLUDING NEW RECORDS AND A CHECKLIST OF GASTROPODS COLLECTED WITH THE ALGAE

By Eddy Soekendarsi & Slamet Santosa

Department of Biology, Hasanuddin University, Ujung Pandang 90245, Indonesia

### ABSTRACT

A qualitative study of gastropods sampled together with algae from a coral reef flat at Sangrobengi Island between November 1994 and January 1995 (rainy season) revealed 22 taxa of gastropods. *Cypraea* (6 species) was the most dominant genus, followed by *Strombus* (3 species). A total of 66 species of algae have been recorded from the reef (23, 14, and 29 species of green, brown, and red algae, respectively). This number includes 23 new records from this island. The algae and gastropods are specified in checklists.

### INTRODUCTION

Sangrobengi is a small island located at the south-western corner of Sulawesi, off Galesong, ca. 60 km south of Ujung Pandang. The island is part of the Spermonde Archipelago. Sangrobengi Island consists of a small sandy area surrounded by corals which form an extensive reef flat on the leeward side. The reef flat is about 200 m wide. It is drained at low tide, exposing many of the algae to the air. A checklist of algae from the reef flat was presented by Soekendarsi (1994). A steep slope is formed along the exposed outer edge of the reef. The edge of the slope is crowned by blocks of wave-breaking, dead coral. Apparently some blocks have been produced locally (e.g., *Porites lutea*), while other blocks may have been displaced from the lower reef to the top by storms. Numerous crabs and herbivore gastropods hide under these blocks. Gastropods of the genera *Haliotis*, *Strombus*, *Lambis* and *Cypraea* are often found among the corals and algae at Sandrobengi Island. It is the common combination of herbivore snails in Sulawesi (Whitten *et al.* 1978). The present study describes the species of gastropods collected together with algae on the coral reef flat.

### MATERIALS AND METHODS

Qualitative collections were made with a hand-held scraper one time each month in November & December 1994 and January 1995 on Sangrobengi Island, South Sulawesi. The material was identified in fresh condition in the laboratory and deposited in Dept. of Biology, Faculty of Mathematics and Sciences, Hasanuddin University, Ujung Pandang, together with photographs of selected specimens. The gastropods and algae were identified according to descriptions in Bosse (1928), Dawson (1956), Taylor (1960), Dharma (1988, 1992), and Verheij & Prud'Homme van Reine (1993).

### RESULTS

#### Gastropods

13 families, 13 genera and 22 species of gastropods were recorded. *Cypraea* was the dominant genus occurring almost all over the reef flat. Five species of *Cypraea* were identified (Table 1). The genus *Strombus* was second most abundant (3 species) (Table 1).

Other genera represented were *Rhinoclavus* (2 species), *Tectus* (2 species), *Cymatium* (1 species), *Angaria* (1 species), *Nodilittorina*

(1 species), *Astrea* (1 species), *Conus* (1 species), *Hexamplex* (1 species), *Vasum* (1 species), *Vexillum* (1 species), *Cymbiola* (1 species) (Table 1).

**Table 1.** Checklist of Gastropoda from Sangrobengi Island, South Sulawesi

<b>Cypraeidae</b>
<i>Cypraea vitellus</i> L.
<i>Cypraea lynx</i> L.
<i>Cypraea pallidula</i> Gaskoin
<i>Cypraea moneta</i> L.
<i>Cypraea tigris</i> L.
<i>Cypraea pyriformis</i> Gray
<b>Strombidae</b>
<i>Strombus microurceus</i> Kira
<i>Strombus urceus</i> L.
<i>Strombus plicatus</i> Röding
<b>Cerithiidae</b>
<i>Rhinoclavus vergatus</i> L.
<i>Rhinoclavus aspera</i> L.
<b>Cymatiidae</b>
<i>Cymatium mundum</i> Gould.
<b>Trochidae</b>
<i>Tectus conus</i> Gmelin
<i>Tectus fenestratus</i> Gmelin
<b>Angaridae</b>
<i>Angaria delphina</i> Reeve
<b>Littorinidae</b>
<i>Nodilittorina pyramidales</i> Cowrie
<b>Turbinidae</b>
<i>Astrea calcar</i> L.
<b>Conidae</b>
<i>Conus gradathus</i> L.
<b>Muricidae</b>
<i>Hexamplex chicoreus</i> Gmelin
<b>Turbinellidae</b>
<i>Vasum turbinellum</i> L.
<b>Mitridae</b>
<i>Vexillum plicarium</i> L.
<b>Volutidae</b>
<i>Cymbiola (Aulicina) vespertilio</i> L.

### Algae

The occurrence of algae at Sangrobengi Island depends on season, environment, and human activities at a given time. During this investigation, 14 species of green algae

(Chlorophyceae), 11 species of brown algae (Phaeophyceae), and 10 species of red algae (Rhodophyceae) were identified. Out of these 35 species, a total of 23 species were new records for the Sangrobengi Island. The new records are: 8 species of green algae (*Caulerpa sertularioides*, *Aurainvillea erecta*, *Clorodermis comosa*, *Halimeda macroloba*, *H. simulans*, *H. taenicola*, *H. discoidea*, *Udotea argentea*), 7 species of brown algae (*Padina minor*, *Hormophysa triquetra*, *Sargassum crassifolium*, *S. ilicifolium*, *S. siliquosum*, *S. polycystum*, *Turbinaria decurrens*), and 8 species of red algae (*Acanthophora orientalis*, *Gelidiella acerosa*, *Jania rubens*, *Gracilaria arcuata*, *G. cronopofolia*, *G. verrucosa*, *Kappaphycus alvarezii*, *Hypnea esperi*). Including the new records, a total of 66 species of algae have so far been identified from the reef flat of Sangrobengi Island: 23 species of green algae, 14 species of brown algae, and 29 species of red algae (Table 2).

### DISCUSSION

According to Yamaguchi (1993), adult green snails (*Turbo*) graze on epibenthic micro-algae on surfaces of limestone but the species also ingests macroalgae. Green snail prefers green & red algae (*Enteromorpha*, *Monostroma*, *Ulva*, *Gelidium*, *Gracilaria*, *Hypnea* and *Eucheuma*) to brown algae. Since the exact food sources of the herbivorous gastropods on the present reef flat are unknown, we have not been able to analyse the patterns of co-occurrence of gastropods and algae. *Cypraea*, *Strombus*, and *Tectus* were common herbivores on the reef flat characterised by abundant algal growth (quantified by Soekendarsi 1994). However, some of the collected gastropods are well known carnivores (*Conus gradathus*, *Hexamplex chicoreus*, *Vasum turbinellum*, *Vexillum plicarium*, and *Cymbiola (Aulicina) vespertilio* L.) Regarding carnivorous snails we are in the same situation as with herbivores: the foodweb of the reef flat must be studied in greater detail before it is possible to analyse the interactions.

**Table 2.** Checklist of macroalgae from Sangrobengi Island, South Sulawesi. (1: according to Soekendarsi (1993); 2: according to the present study).

	1	2		1	2
<b>CHLOROPHYCEAE</b>					
<b>Cladophoraceae</b>					
<i>Enteromorpha intestinalis</i> (L.) Link	+			+	+
<b>Bryopsidaceae</b>					
<i>Bryopsis plumosa</i> (Huds.) C. Ag.	+	+		+	
<b>Caulerpaceae</b>					
<i>Caulerpa racemosa</i> (Forssk.) W.v.B.	+	+			
<i>Caulerpa serrulata</i> (Forssk.) J.Ag.	+	+			
<i>Caulerpa sertularioides</i> (Gmelin) Howe	+				
<b>Codiaceae</b>					
<i>Avrainvillea erecta</i> (A.) E. S. Gepp.	+				
<i>Codium isthmocladum</i> Vick	+				
<i>Clorodermis comosa</i> (Bory) Howe	+				
<i>Halimeda opuntia</i> Lamx	+				
<i>Halimeda tuna</i> Lamx	+	+			
<i>Halimeda macroloba</i> Decaisne	+				
<i>Halimeda simulans</i> Howe	+				
<i>Halimeda taenicola</i> Taylor	+				
<i>Halimeda discoidea</i> Decaisne	+				
<i>Udotea conglutinata</i> C. Ag.	+				
<i>Udotea argentea</i> Zanardini	+				
<b>Valoniaceae</b>					
<i>Valonia aegagropila</i> C. Ag.	+				
<i>Valonia macrophysa</i> Kuetz	+	+			
<i>Valonia utricularis</i> C. Ag.	+				
<i>Boodlea composita</i> (Harv.) Brand.	+				
<b>Ulvaceae</b>					
<i>Ulva expansa</i> (Setch.) Setch. & Gard.	+				
<i>Ulva lactuca</i> Linnaeus	+	+			
<i>Ulva reticulata</i> Forssk.	+				
<b>PHAEOPHYCEAE</b>					
<b>Dictyotaceae</b>					
<i>Dictyota dichotoma</i> (Huds.) Lamx	+	+			
<i>Padina australis</i> Hauck.	+	+			
<i>Padina minor</i> Yamada	+				
<b>Sargassaceae</b>					
<i>Hormophysa triquetra</i> C. Ag.	+				
<i>Sargassum histrix</i> J. Ag.	+				
<i>Sargassum</i> spp.	+				
<i>Sargassum crassifolium</i> J. Ag.	+				
<i>Sargassum ilicifolium</i> (Turner) J. Ag.	+				
<i>Sargassum siliquosum</i> J. Ag.	+				
<i>Sargassum polycystum</i> C. Ag.	+				
<i>Turbinaria ornata</i> (Turner) J. Ag.	+	+			
<i>Turbinaria conoides</i> (J. Ag.) Kuetz				+	+
<i>Turbinaria decurrens</i> Bory				+	
<b>Punctariaceae</b>					
<i>Hydroclathrus clathratus</i> (Bory) Howe				+	
<b>RHODOPHYCEAE</b>					
<b>Rhodomelaceae</b>					
<i>Acanthophora dendroides</i> Harv.				+	
<i>Acanthophora spicifera</i> (Vahl.) Boerg				+	
<i>Acanthophora orientalis</i> Lamx				+	
<i>Amansia glomerata</i> C. Ag.				+	
<i>Laurencia diegoensis</i> Dawson				+	
<i>Laurencia splendens</i> Holl.				+	+
<i>Laurencia nidifica</i> Ag.				+	
<b>Galaxauraceae</b>					
<i>Galaxaura cohaerens</i> Kjell.				+	
<b>Corralinaceae</b>					
<i>Amphiroa foliacea</i> Lamx				+	
<b>Gelidiaceae</b>					
<i>Gelidiella acerosa</i> (Forssk.) Feldman				+	
<i>Gelidium rigidum</i> (Vahl.) Grev.				+	
<i>Gelidium cartilagineum</i> (L.) Grev.				+	
<i>Gelidiopsis rigida</i> (Vahl.) W.v.B.				+	
<i>Jania rubens</i>				+	
<b>Grateloupiaceae</b>					
<i>Halymenia agardhii</i> De Toni				+	
<b>Gracilariaceae</b>					
<i>Gracilaria blodgettii</i> Harv.				+	
<i>Gracilaria confervoides</i> (L.) Grev.				+	
<i>Gracilaria lichinoides</i> (L.) Harv.				+	
<i>Gracilaria arcuata</i> Zanardini				+	
<i>Gracilaria cronopofolia</i> J. Ag.				+	
<i>Gracilaria verrucosa</i> (Huds.) Papenfuss				+	
<i>Kappaphycus alvarezii</i> (Doty) Doty				+	
<b>Hypneaceae</b>					
<i>Hypnea espery</i> Bory				+	
<i>Hypnea cervicornis</i> J. Ag.				+	
<i>Hypnea musciformis</i> (Wulf.) Lamx				+	
<i>Hypnea valentiae</i> (Turn.) Mont.				+	
<b>Solieriaceae</b>					
<i>Euचेuma edule</i> Kuetz				+	+
<i>Euचेuma serra</i> J. Ag.				+	
<b>Gigartinaceae</b>					
<i>Gigartina</i> sp.				+	

Previously, 43 genera of algae have been identified from Sangrobengi Island (Soekendarsi 1994). The present study revealed 35 genera. However, 23 out of these 35 genera were new records for the island. Species of *Halimeda* (green algae), *Sargassum* (brown algae), and *Gracilaria* (red algae) were more common during this investigation. The difference in algal composition between the study in 1994 and the present study is related to the study period. This investigation was carried out in the rainy

season while the first study took place in the dry season. According to Taylor (1960), several green algae (*Halimeda*), brown algae (*Sargassum*), and red algae (*Gracilaria*) grow well in the rainy season.

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