

## GASTROPODS ASSOCIATED WITH THREE GENERA OF MACROALGAE

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### ABSTRACT

The study was conducted at islands on the west-side of South Sulawesi. Macroalgae of the genera *Caulerpa*, *Gracilaria* and *Eucheuma* were sampled together with their molluscan fauna by means of plastic bags tied around the base of the algae. A total of 36 genera of gastropods were found on the three genera of algae. The genera *Heliacus*, *Clypeomorus*, *Cerithium*, *Pyrene*, *Columbella*, *Mitra*, and *Morula* were present on all three genera of algae. *Cerithium* and *Rhinoclavis* were the most common herbivores on *Gracilaria* and *Caulerpa*, while *Littorina* was the most common herbivore on *Eucheuma*. On an average, herbivorous and carnivorous genera were equally frequent.

### INTRODUCTION

Information on gastropods occurring on macroalgae is limited, although it is well known that many herbivorous species depend on algae for food and as a substratum for laying of eggs, and carnivorous species prey on herbivores associated with the algae (Nontji, 1987). The aim of this study was to investigate if certain species of gastropods were associated with specific genera of macroalgae.

### MATERIALS AND METHODS

Samples were collected randomly in the afternoon (after sunset) and early morning (before sunrise). Algae were placed in clear plastic bags, which were tied at the base. The algae together with associated fauna were cut from the substratum. Formaldehyde 4% was used for preservation of both gastropods and macroalgae. Identification of gastropods was done to the generic level using Dharma (1988a, b), Houbrick (1992), and Keen (1971). Macroalgae were identified according to Taylor (1972) and Trono & Fortes (1988). The species of gastropods present on algae was analysed by their relative frequency (Curtis, 1959 in Mueller-Dombois and Ellenberg, 1974).

### RESULTS

We found 36 genera of gastropods in 2 classes, 4 orders, 23 families on the three genera of macroalga (Table 1).

A total of 28 genera were found on the red algae *Gracilaria*. -The genus *Cerithium* had the highest relative frequency (18%), followed by *Cypraea* (13%), *Morula* (11%), and *Rhinoclavis* (10%). The lowest relative frequency was found for *Euchelus*, *Turbo*, *Littorina*, *Tectarius*, *Plinices*, *Natica*, *Tonna*, *Pissania*, *Turris*, and *Atys*.

A total of 21 genera of snails were present on *Caulerpa*. The genus *Pyrene* had the highest relative frequency (20%), followed by *Littorina* (14%) and *Mitra* (12%). The lowest relative frequency was found for *Trochus*, *Turbo*, *Cypraea*, *Strombus*, *Chantarus*, *Conus*, *Peristina* and *Terebra*.

A total of 13 genera were found on *Eucheuma*. The genera *Cerithium* and *Engina* had the highest relative frequency (21%) followed by *Rhinoclavis* (19%). The lowest relative frequency was found for the order Archaeogastropoda (0%).

The genera *Heliacus*, *Clypeomorus*, *Cerithium*, *Pyrene*, *Columbella*, *Mitra*, and *Morula* were present on all three genera of algae.

Table 1. Checklist of macrogastropodes on three genera of common macroalgae (*Caulerpa*, *Gracilaria*, and *Eucheuma*)

Class	Order	Family	Genus	Relative frequency				
				<i>Caulerpa</i>	<i>Gracilaria</i>	<i>Eucheuma</i>		
Proso-branchia	Archeo-gastropoda	Neritidae	<i>Nerita</i>	0.000	0.870	0.000		
		Trochidae	<i>Euchelus</i>	0.000	0.435	0.000		
			<i>Clanculus</i>	8.791	0.000	0.000		
			<i>Trochus</i>	1.099	2.174	0.000		
			<i>Monilea</i>	2.198	0.000	0.000		
		Meso-gastropoda	Turbinidae	<i>Turbo</i>	1.099	0.435	0.000	
			Architectoniidae	<i>Heliacus</i>	1.297	1.729	2.128	
				Cerithiidae	<i>Clypeomorus</i>	5.495	8.696	6.383
					<i>Rhinoclavis</i>	0.000	10.000	19.149
			<i>Cerithium</i>		2.198	18.261	21.277	
	Cypraeidae		<i>Cypraea</i>	1.099	13.913	0.000		
	Littorinidae		<i>Littorina</i>	14.286	0.435	0.000		
			<i>Tectarius</i>	0.000	0.435	0.000		
	Naticidae		<i>Polinices</i>	0.000	0.435	0.000		
			<i>Natica</i>	0.000	0.435	0.000		
	Potamididae		<i>Cerithidea</i>	3.191	1.288	2.083		
	Strombidae		<i>Strombus</i>	1.099	1.304	0.000		
	Tonnidae	<i>Tonna</i>	0.000	0.435	0.000			
	Turritelliidae	<i>Turritella</i>	0.000	1.304	0.000			
	Neo-gastropoda	Buccinidae	<i>Engina</i>	0.000	0.000	21.277		
			<i>Pissania</i>	0.000	0.435	0.000		
			<i>Pollia</i>	0.000	0.000	2.128		
			<i>Chantarus</i>	1.099	0.000	0.000		
		Collumbellidae	<i>Pyrene</i>	20.879	8.261	2.128		
			<i>Columbellae</i>	6.593	2.174	6.383		
		Conidae	<i>Conus</i>	1.099	0.000	8.511		
		Costellariidae	<i>Vexillum</i>	0.000	0.870	0.000		
			<i>Zierliana</i>	2.198	3.478	0.000		
		Fascioliariidae	<i>Peristina</i>	1.099	0.000	0.000		
		Mitridae	<i>Mitra</i>	12.088	1.304	2.128		
		Muricidae	<i>Morula</i>	3.297	11.304	4.255		
		Terebridae	<i>Terebra</i>	1.099	0.000	0.000		
		Turridae	<i>Clavus</i>	0.000	0.870	0.000		
<i>Turris</i>			0.000	0.435	0.000			
Volutidae		<i>Melo</i>	0.000	9.130	4.255			
Opisto-branchia	Cephalospidae	Buttidae	<i>Alys</i>	9.890	0.435	0.000		

## DISCUSSION

According to Dharma (1988a) all the recorded genera of gastropods are common in shallow water and intertidal areas. The three genera *Cerithium*, *Cypraea*, and *Rhinoclavis* were common on the red algae *Gracilaria*. They are herbivorous and probably feeding on it. *Morula* was also common but this genus is carnivorous (Dance, 1977) probably feeding on the herbivores. Similarly, *Cerithium*,

*Rhinoclavis* and *Engina* were common on the *Eucheuma*. The first two are herbivores while *Engina* is carivorous. *Pyrene*, *Littorina* and *Mitra* had the highest relative frequency of occurrence on the green alga *Caulerpa*. *Littorina* is herbivorous while the two others are carnivorous.

Our study indicates that most genera of gastropods were associated with all three genera of algae. However, some genera of snails were only found on certain species of

algae indicating a preference which might be related to the existence of specific food webs. Carnivore and herbivore snails were found in equal proportions indicating that the algae both may serve as a food source for herbivores as well as a preying ground for carnivores. The most complex web was recorded on *Gracilaria* while the least complex web was found on *Euchema*.

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