

THE COMMUNITIES OF *GALAXAURA* (CHAETANGIACEAE, RHODOPHYTA) AT THE CAPE VERDE ISLANDS

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With 2 figures and 1 table

ABSTRACT. The communities of *Galaxaura* are predominant among the dendroid algal communities of the Cape Verde Islands. These are found all around the islands; the most abundant species are *Galaxaura oblongata* and *G. lapidescens*, which are specially common on shallow waters: the first predominates at exposed shores and rocky bottoms, while *G. lapidescens* is more often found on sheltered shores and on rocky-muddy bottoms.

INTRODUCTION

The communities of *Galaxaura* Lamouroux are the most conspicuous at shallow waters of the Cape Verde Islands. Although 6 species were recorded by ASKENASY (1896), only 2 are found at most places of the islands. These communities lay in great extensions mainly on rocky bottoms (OTERO-SCHMITT, 1993), as well as on sandy and muddy bottoms, where they develop in great extensions which include a great number of companion and accidental species, mainly those developed on the turf strata or as epibiotic.

As most works dealing with the seaweeds of the Cape Verde Islands are floristic (PRUD'HOMME VAN REINE, 1984), in this work a contribution to seaweed communities is carried out.

MATERIAL AND METHODS

Several samples of the communities of *Galaxaura* were collected at 12 localities of the islands of Sal, Santiago, San Vicente and Brava (Cape Verde Islands) during May 1987. Inventories, using the scales of cover and sociability of BRAUN-BLANQUET (1979), were carried out at those localities, specially where *Galaxaura* fronds were found profusely growing.

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RESULTS

As result of the inventories carried out (Table 1), two kind of communities of *Galaxaura* can be clearly differentiated; both species were only found growing together at 2 places.

1) The first group includes those inventories in which *Galaxaura oblongata* (ELLIS et SOLANDER) Lamouroux is the dominant seaweed. This species forms the most widespread community at the islands (Fig. 1), and is specially abundant in rocky bottoms, salt waters and from semiexposed to exposed shores.

2) The second group includes those inventories which are dominated by *G. lapidescens* (ELLIS et SOLANDER) Lamouroux. This community is usually found only in great patches in muddy-rocky bottoms of semiexposed shores (Fig. 2).

The 21st Inventory of these communities, has a very high cover of *Lithophyllum* sp., and a low cover of *G. lapidescens*; this could be explained because the presence of *Cidaris* sp., which grazes unselectively on the seaweeds, favouring the development of *Lithophyllum*.

Most species are common to both groups of inventories; *Dictyota dichotoma* (HUDSON) Lamouroux is specially abundant in most of them, and *Jania adhaerens* Lamouroux only at the most exposed places. Besides, there is an high number of companion species, with a low cover or presence, which are found at most turf communities of the Cape Verde Islands: these include *Ceramium flaccidum* (KÜTZING) Ardissonne, *Cottoniella filamentosa* (HOWE) BOERGESEN, *Hypnea cervicornis* J. AGARDH, *Lyngbya* sp. and *Heterosiphonia crispella* (C. AGARDH) WYNNE.

The cover of Coelentera is low, as these communities are typical of slightly muddy rocky bottoms, where the mud prevents the develop of corals.

DISCUSSION

Although most seaweed communities at the Cape Verde are turf, those of *Galaxaura* are rather conspicuous and, therefore, easier to recognise as individualized communities.

In opposition to the ecology of these species at La Graciosa (Canary Islands) (VIERA, 1985), at the Cape Verde Islands both *Galaxaura* species were found developing in great communities, not just as isolated fronds. Besides, *G. lapidescens* is more often found in patches at the Canary Islands, while at the Cape Verde Islands this species is only locally found growing like a community and, more often, intermixed within other communities. However, at Hierro Island (Canary Islands), *G. oblongata* is occasionally found growing on exposed infralittoral walls (GIL-RODRIGUEZ & WILDPRET DE LA TORRE, 1980). According to FELDMANN (1946), the species of this genus at the Cape Verde Islands belong to the Tropical-Atlantic phytogeographic region, which could explain the lack of well

developed communities of *Galaxaura* at the Canary Islands.

It can be concluded that the main difference between both kind of *Galaxaura* communities is in their characteristic species, while the substrata is quite similar to both communities. The small differences found among the turf species growing in the substrata are set through the substrate structure and the wave exposition. More detailed inventories would be needed to check properly these small differences, specially at those places in which both species are growing together, in which should be possible to set with more precision the autoecology of both *Galaxaura* species and, therefore, of their communities. Besides, their epibiotic composition is quite similar (OTERO-SCHMITT & SAN JUAN, 1992) although, because the texture of the fronds, the epiphytic cover is slightly bigger on *G. oblongata*.

Abbreviatures used on TABLE 1:

Localities

- Cal: Calhau, San Vicente I.
- Cas: Praia do Cascalho, Sal I.
- CVe: Cidade Velha, Santiago I.
- Faj: Porto da Faja, Brava I.
- Fur: Baia da Furna, Brava I.
- Par: Baia de Parda, Sal I.
- Ped: Baia da Pedrinha, Brava I.
- PPa: Porto da Parede, Sal I.
- RXu: Rabo de Xunco, Sal I.
- Sal: Salamansa, San Vicente I.
- TaS: Tarrafal (South), Santiago I.

Exposition degree

- E: Exposed
- LS: Low sheltered
- QS: Quite sheltered
- SE: Semiexposed

Substrate

- e: epiphyte
- I: epizoic
- Lit: Lithothamnia
- M: Muddy bottom
- R: Rocky bottom
- R-C: Rocky bottom with corais
- R-S: Rocky bottom with sand

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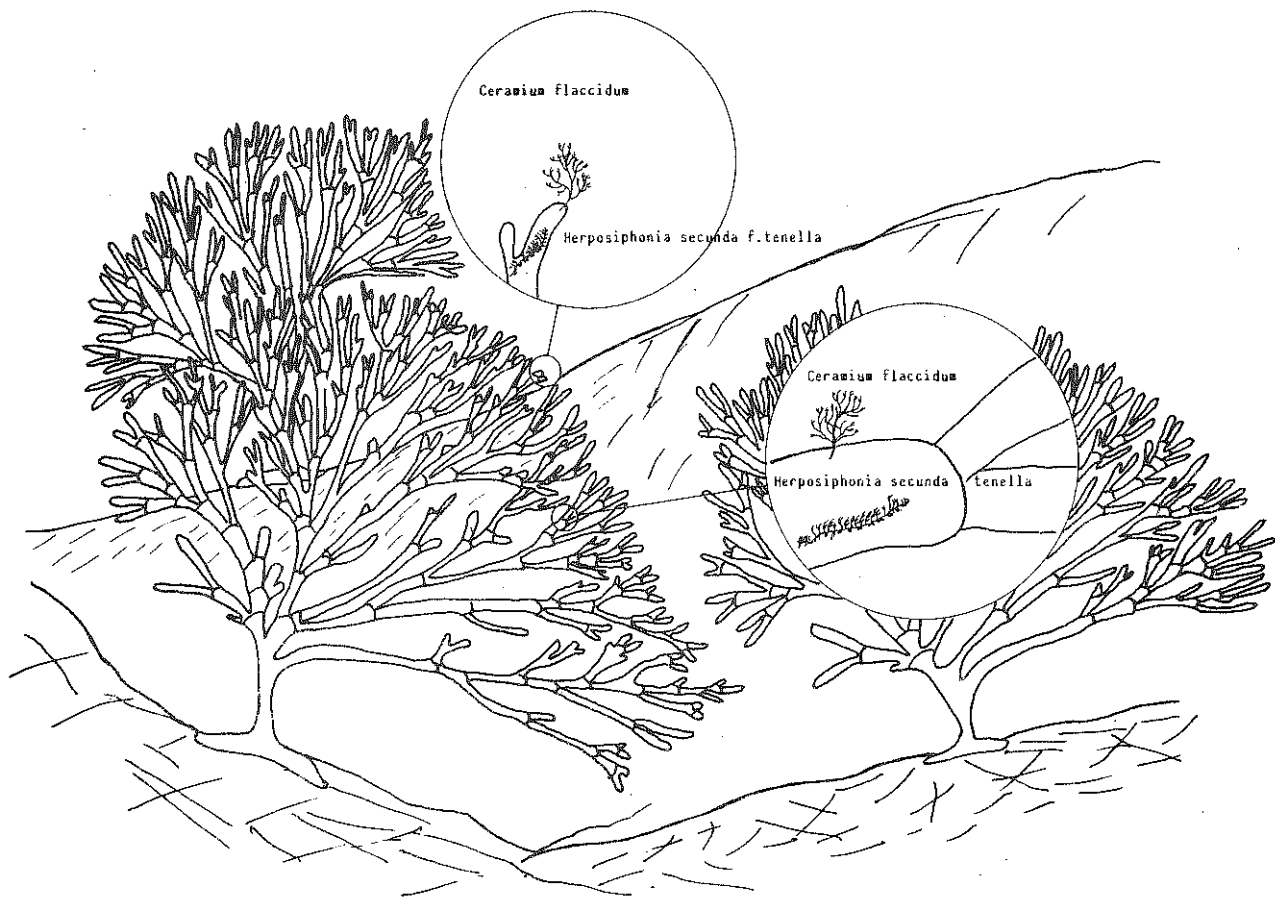


Figure 1 - Detail of the community of *Galaxaura oblongata*, showing its two most abundant epiphytes.

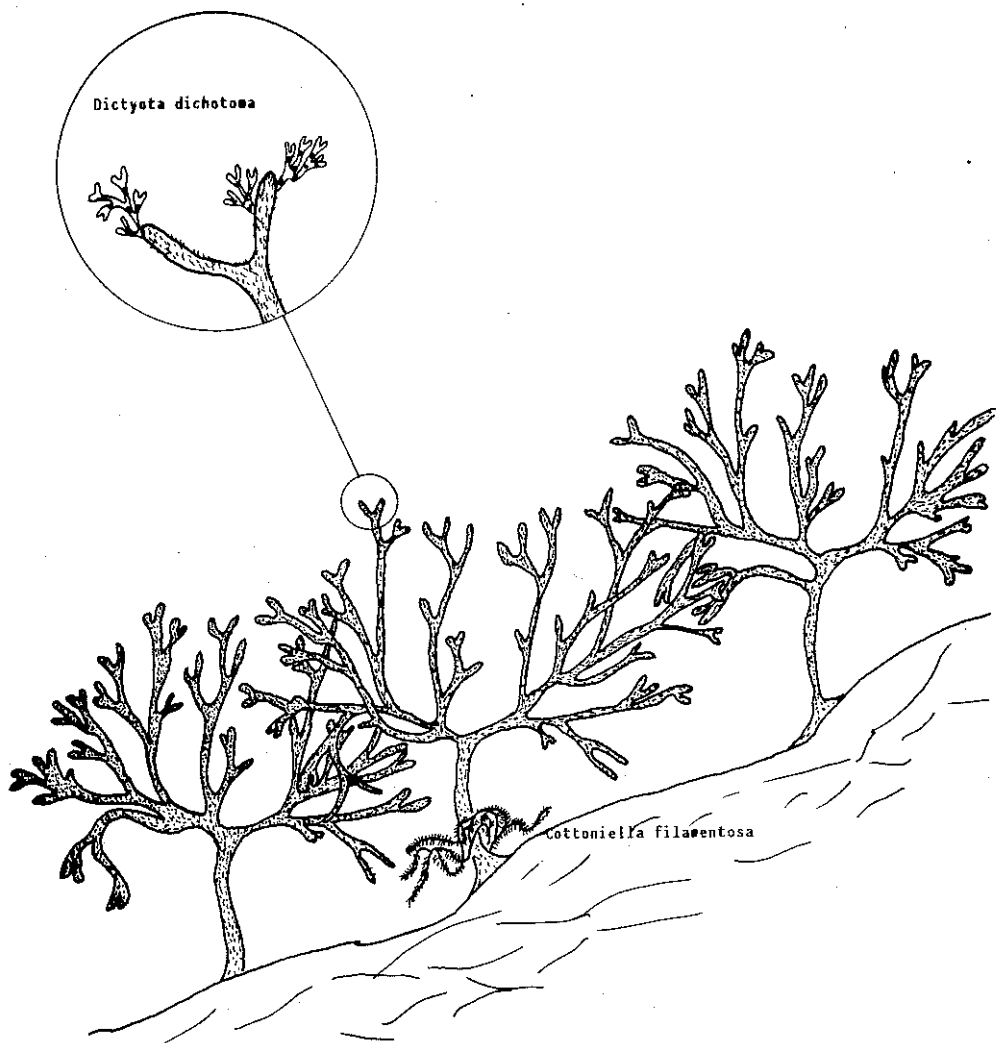


Figure 2 - Detail of the community of *Galaxaura lapidescens*; note the different surface -when compared with *G. oblongata*- which avoids the develop of most epyphytic seaweeds on their fronds.

TABLE 1 - *Galaxaura* communities.

Inventory number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Locality	TaS	PPa	Ped	CVe	Faj	RXu	Cal	PPa	Ped	Faj	Cal	TaS	Cal	Par	Ped	Faj	RXu	Sal	Cas	Cas	Fur	
Date	4-V	0-IV	9-V	13-V	7-V	18-V	16-V	0-IV	9-V	7-V	6-V	8-V	16-V	2-V	9-V	7-V	18-V	7-V	20-V	0-V	8-V	
Substrate	R	R-S	Lil	R	R	R	R	P	R-C	R	R-S	R	R-S	R	R	R-S	M	R	R	R	R	
Exposition degree	E	SE	LS	QE	E	QE	QE	SE	QE	E	QE	E	QE	E	LS	QE	QE	QE	LS	LS	LS	
Depth (m)	-2	-3	-2	-4	-10	-5	-3	-1.5	-4	-8	-4	-5	-6	-2	-1	-3	-8	-4	-6	-5	-1.5	
Inclination (%)	15	5	20	5	5	10	15	5	30	50	0	30	20	5	5	15	5	10	5	0	15	
Aspect	S	SO	NNE	NE	0	NE	E	SO	NNE	0	E	NNE	E	NE	NNE	0	NE	N	0	0	SE	
Area (dm ²)	4	4	4	4	2	4	2	1	1	2	4	4	4	2	2	2	4	4	2	4	2	4
Cover	95	90	90	85	75	85	100	75	80	70	85	90	90	75	80	90	70	70	85	75	75	
Number of species	3	6	9	10	11	6	6	8	8	16	15	11	13	7	11	18	8	9	10	7	7	
<i>Galaxaura oblongata</i>	4.5	2.4	4.5	4.5	1.2	3.5	5.5	1.2	1.2	2.5	2.2	2.2	3.5									
<i>Galaxaura lapidescens</i>													2.1	1.2	2.2	1.2	3.1	2.3	2.4	1.2	2.3	1.2
<i>Dictyota dichotoma</i>					1.2	1.2	1.1	1.1	+ 2.5	1.2	1.4		+ 2.3	+ 1.4	1.3	1.1	2.5					
<i>Jania adhaerens</i>				tc				+ 2.4	1.2	+			+ 1.2	1.2								
<i>Ceramium flaccidum</i>	tc			+		tc				tc	tc		tc			tc	tc	tc				
<i>Cottoniella filamentosa</i>		+				+		tc		+	tc		tc			+	1.2					
<i>Hypnea cervicornis</i>			+	+	+					+	2.4	+			+	+					+	
<i>Lynghya</i> sp.			tc			tc	tc			tc	tc	tc			+							
<i>Heterosiphonia crispella</i>				+				tc	+	tc	tc					tc				+	+	
<i>Platysiphonia delicata</i>							+						tc								+	
<i>Lithophyllum retusum</i>		+									+		+									
<i>Laurencia majuscula</i>					1.1								+	+				1.2				
<i>Jania capillacea</i>				1.2												1.2					+	
<i>Lithophyllum</i> sp.							1.3															4.5
<i>Spyridia hypnoides</i>					+					+			tc									
<i>Asparagopsis taxiformis</i>						+		+	+													
<i>Callithamnion</i> sp.								tc		tc	+		tc		tc							
<i>Bryopsis myosurroides</i>									tc	+	+				+	+						
<i>Fosliella farinosa</i>				tc				tc	tc	+								tc		tc		
<i>Oscillatoria</i> spp.		tc		tc																	+	
<i>Polysiphonia subtilissim</i>			tc		tc								tc									
<i>Calothrix</i> sp.			+				tc						tc									
<i>Erythrocladia irregularis</i>				tc									tc								tc	
<i>Champia parvula</i>										+						tc					+	
<i>Centroceras clavulatum</i>										+						+						
<i>Ceramium nitens</i>																tc					+	+
<i>Caulerpa sertularioides</i>																					+	
Animals																						
<i>Millepora</i> sp.			2.5			+					+					2.5			+	1.2		
<i>Ciderastrea</i> sp.			1.3	+		+										+	+			+		
<i>Parazoanthus</i> sp.																				+		
<i>Cidaris</i> sp.																						+

Accidental species {Species inventora number, cover.sociability}: *Cystoseira sonderi* (5 +), *Porolithon* sp. (3, 1.3), *Erythrotrichia carnea* (3 +), *Herposiphonia secunda* f. *tenella* (4, 10+), *Sargassum vulgare* (5 +), *Stylonema alsidii* (5 +), *Hypnea valentiae* (5, 21+), *Gelidiella* sp. (10 *Caulerpa webbiana* (10, 16 +), *Anabaena* sp. (10, 16 +), *Halodictyon mirabile* (10, 16 +), *Peyssonmelia harveyana* (11 +), *Laurencia intercedia* (11, 20), *Asterocystis ornata* (12 +), *Wrangelia argus* (12 1.3), *Liagora valida* (13+), *Lobophora variegata* (14, 15 +), *Anadyomene stellata* (15, 21 +), *Ulva rigida* (16, +), *Spermothamnion gorgoneum* (16 +), *Nemastoma confussum* (16+), *Liagoropsis schrammii* (17 +), *Scytonema* sp. (17 +), *Callithamnion cf. roseum* (19 +), *Botryocladia botryoides* (20 +), *Brachytrichia balani* (21+) and *Peyssonmelia rubra* (21+).