

## BENTHIC MARINE ALGAE FROM MARTINIQUE (LESSER ANTILLES)

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### RESUM

Es presenta un llistat de 149 taxons d'algues bentòniques marines recol·lectats a Martinica (Petites Antilles). Aquest llistat comprèn 53 taxons de Chlorophyta, 17 de Phaeophyceae (Heterokontophyta) i 79 de Rhodophyta. Entre els taxons determinats, 83 són noves cites per Martinica, la qual cosa representa un increment del 77 % de la flora algal marina coneguda fins ara a la illa. Les espècies *Bonnemaisonia hamifera* i *Stylonema cornu-cervi* són citades per primera vegada a l'Atlàntic occidental.

### RESUMEN

Se presenta un listado de 149 taxones de algas bentónicas marines recolectados en Martinica (Pequeñas Antillas). Dicho listado comprende 53 taxones de Chlorophyta, 17 de Phaeophyceae (Heterokontophyta) i 79 de Rhodophyta. Entre los taxones determinados, 83 son nuevas citas para Martinica, lo que representa un incremento del 77 % de la flora algal marina conocida hasta ahora en la isla. Las especies *Bonnemaisonia hamifera* y *Stylonema cornu-cervi* se citan por primera vez para el Atlántico occidental.

### ABSTRACT

A list of 149 taxa of benthic marine algae collected in Martinique (Lesser Antilles) is presented. This list comprises 53 taxa of Chlorophyta, 17 of Phaeophyceae (Heterokontophyta) and 79 of Rhodophyta. Among the determined taxa, 83 are new records for Martinique; this represents an increase of 77 % to the previously known marine algal flora of the island. *Bonnemaisonia hamifera* and *Stylonema cornu-cervi* are new records for the Western Atlantic.

**Key words:** floristic study, Martinique, seaweeds, tropical Western Atlantic.

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## INTRODUCTION

The macroscopic benthic algal flora of Martinique is poorly known. Available information concerning this area is scant and consists only in an historical list of 100 taxa (exsiccata of Hamel & Hamel-Joukov, 1931), and some new references which later appeared in Taylor (1960) and Littler *et al.* (1992).

With the purpose to contribute to the knowledge of the marine algae from the island, we report here on some Chlorophyta, Phaeophyceae (Heterokontophyta) and Rhodophyta, mainly collected in December 1993.

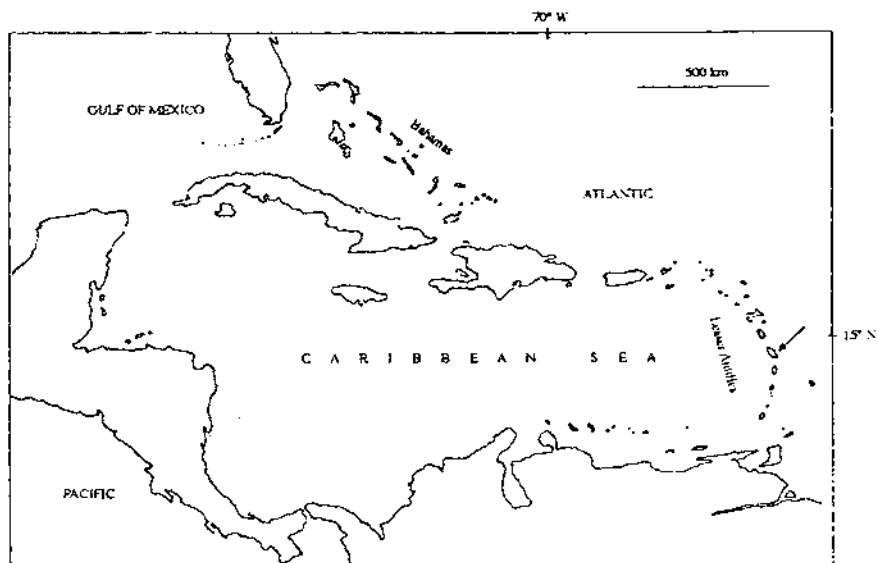


Figure 1. Location of Martinique (arrow) in the Lesser Antilles (a), and situation of the collecting sites on the coast of the island (b).

#### MATERIAL AND METHODS

Martinique is a small tropical island (75 x 35 km) situated in the Lesser Antilles, between the Caribbean Sea and the Western Atlantic. The northern coast, exposed to North trade winds which are dominant in the area, possesses only small indentations. On the other hand, the rest of the island is less windy, possesses a more irregular profile with numerous entrances and small bays, and has extensive areas of mangroves and coral reefs (Fig. 1).

Algae were collected by snorkeling and SCUBA diving at different sites of the island, both in the midlittoral and the sublittoral zones (from the surface to 25 m depth) including different habitats (coral reefs, lagoons, seagrass meadows and mangrove roots). Localities are shown in figure 1 and listed in alphabetical order below. The abbreviations used in the checklist are also indicated.

- AA Les Anses d'Arlets; 8, 10 December 93; sublittoral rocky area (down to -6 m).
- AC Anse Céron; 6 December 93; midlittoral and high sublittoral. Rocky bottom.
- AG Anse Gros Raisins; December 92
- IC Ilet Chancel (Robert); 13, 15 December 93; coral reef area.
- IR Ilet des Rats (Robert); October 1992; coral reef area.
- LP Le Precheur; 6 December 93; midlittoral and high sublittoral. Rocky bottom.
- LV Le Vauclin; 3 December 93; midlittoral and high sublittoral. Rocky bottom.
- MA Le Marin; 12 December 93; sublittoral rocky area (down to -6 m).
- MM Le Marin; 12 December 93; mangrove roots.
- PG Petite Grenade; 3 December 93; lagoon and seagrasses meadow (down to -1 m).
- PGM Petite Grenade; 3 December 93; mangrove roots.

- PM Ilet de Petite Martinique (Le Robert); 13 December 93; coral reef area.  
 PS Pointe des Salines; 4 December 93; rocky shore and coral reefs (down to -1 m).  
 RE Le Robert; 13 December 93; lagoon (down to -50 cm).  
 SA Ste. Anne; 8, 9, 11 December 93; -25 m. Rocky bottom.  
 TA Tartane; 7 December 93; midlittoral and high sublittoral. Rocky bottom.

Samples were preserved in 4% formalin-seawater and alcohol and identified in the laboratory. Botanical nomenclature follows Wynne (1986), except for some later changes. Taxonomic identifications are based on Taylor (1960), Cordeiro-Marinho (1978) and Littler *et al.* (1989), but for some genera we have used more specific recent treatments: *Avrainvillea* (Littler & Littler, 1992), *Caulerpa* (Coppejans, 1992), *Dictyota* (Hörnig & Schmetter, 1992), *Galaxaura* (Huisman & Borowitzka, 1990), *Gracilaria* (Oliveira *et al.*, 1983), and *Udotea* (Littler & Littler, 1990).



Specimens have been deposited in the Herbarium of the Department of Ciências Ambientais from the University of Girona, Spain (HGI).

## RESULTS

We identified a total of 149 taxa (144 species) of macroalgae (53 Chlorophyta, 17 Phaeophyta and 79 Rhodophyta). Taxa are listed below.

\* First record for Martinique

### CHLOROPHYTA

* <i>Avrainvillea longicaulis</i> (Kützting) Murray & Boodie	MA, SA
<i>Avrainvillea nigricans</i> Decaisne	IC
<i>Avrainvillea rawsonii</i> (Dickie) Howe	AA, IC, MA, PM, PS
* <i>Bryopsis hypnoides</i> Lamouroux	PM
<i>Bryopsis pennata</i> Lamouroux	AC, IC, PG, TA
* <i>Bryopsis pennata</i> var. <i>leprairiei</i> (Kützting) Collins & Hervey	IC, TA
* <i>Bryopsis pennata</i> var. <i>secunda</i> (Harvey) Collins ex Hervey	AC, PM, RE
* <i>Caulerpa ambigua</i> Okamura	IC
<i>Caulerpa cupressoides</i> (West in Vahl) C. Agardh	AA, PS, SA
* <i>Caulerpa mexicana</i> Sonder ex Kützting	IC
<i>Caulerpa prolifera</i> (Forsskål) Lamouroux	PS
<i>Caulerpa racemosa</i> (Forsskål) J. Agardh	IC, PM, PS, SA
* <i>Caulerpa racemosa</i> var. <i>peltata</i> (Lamouroux) Eubank	IC
* <i>Caulerpa serrulata</i> (Forsskål) J. Agardh	AA, SA
<i>Caulerpa sertularioides</i> (S.G. Gmelin) Howe	IC, SA
* <i>Caulerpa sertularioides</i> f. <i>longiseta</i> (Bory) Svedelius	MA, PS, SA, TA
<i>Caulerpa taxifolia</i> (Vahl) C. Agardh	IC, PG, PM, SA
<i>Caulerpa verticillata</i> J. Agardh	IC, PS
<i>Chaetomorpha linum</i> (O.F. Müller) Kützting	AA, LV, PG, TA
* <i>Cladocephalus luteofuscus</i> (Howe) Børgesen	IC, PS
* <i>Cladophora sericea</i> (Hudson) Kützting	IC
* <i>Cladophora submarina</i> P. & H. Crouan	IC
* <i>Cladophora vagabunda</i> (Linnaeus) van den Hoek	PG, SA
<i>Cladophoropsis membranacea</i> (C. Agardh) Børgesen	PS
* <i>Codium intertextum</i> Collins & Hervey	IC
<i>Codium isthmocladum</i> Vickers	SA
<i>Codium isthmocladum</i> ssp. <i>clavatum</i> (Collins and Hervey) Silva	IC
* <i>Codium repens</i> P. & H. Crouan ex Vickers	PS
* <i>Codium spongiosum</i> Harvey	IC
<i>Dictyosphaeria cavernosa</i> (Forsskål) Børgesen	IC, MA, PM, PS
* <i>Enteromorpha compressa</i> (Linnaeus) Greville	LV
<i>Enteromorpha flexuosa</i> (Wulfen ex Roth) J. Agardh	AA, PG
* <i>Enteromorpha multiramosa</i> Bliding	IC, PG, RE
<i>Ernodesmis verticillata</i> (Kützting) Børgesen	AC, PS

	<i>Halimeda discoidea</i> Decaisne	IC
*	<i>Halimeda goreau</i> Taylor	IC
	<i>Halimeda incrassata</i> (Ellis) Lamouroux	AA, IC, MA, SA
	<i>Halimeda opuntia</i> (Linnaeus) Lamouroux	IC, MA, PM, SA, TA
	<i>Halimeda simulans</i> Howe	AA, IC, MA, SA, TA
*	<i>Halimeda tuna</i> (Ellis & Solander) Lamouroux	SA
*	<i>Pedobesia lamourouxii</i> (J. Agardh) J. Feldmann, Loreau, Codomier & Couté	IC
	<i>Penicillus capitatus</i> Lamarck	IC, MA, PS
*	<i>Penicillus dumetosus</i> (Lamouroux) Blainville	IC, PS, SA, TA
*	<i>Penicillus pyriformis</i> A. & E.S. Gepp	AA, IC, SA
*	<i>Rhipilia tomentosa</i> Kützting	IC, PS
*	<i>Udotea caribaea</i> D.S. Littler & M.M. Littler	SA
*	<i>Udotea cyathiformis</i> Decaisne f. <i>sublittoralis</i> D.S. Littler & M.M. Littler	PS
	<i>Udotea flabellum</i> (Ellis & Solander) Howe	AA, MA, SA, TA
*	<i>Udotea luna</i> D.S. Littler & M.M. Littler	SA
*	<i>Udotea unistratea</i> D.S. Littler & M.M. Littler	SA
	<i>Ulva fasciata</i> Delile	AC
*	<i>Valonia utricularis</i> (Roth) C. Agardh	PS
	<i>Ventricaria ventricosa</i> (J. Agardh) Olsen & West	AA, PS, PM, SA, TA

## PHAEOPHYCEAE

	<i>Dictyopteris delicatula</i> Lamouroux	AC, IC, PG, PM, PS, RE
*	<i>Dictyopteris jamaicensis</i> Taylor	TA
	<i>Dictyota bartayresiana</i> Lamouroux	IC, MA, TA
	<i>Dictyota cervicornis</i> Kützting	AA, IC, SA, TA
	<i>Dictyota dichotoma</i> (Hudson) Lamouroux var. <i>intricata</i> (C. Agardh) Greville	PM
*	<i>Dictyota menstrualis</i> (Hoyt) Schnetter	AC, IC, PS, TA
	<i>Dictyota pulchella</i> Hörnig & Schnetter	IC, PM, PG, PS
*	<i>Ectocarpus siliculosus</i> (Dillwyn) Lyngbye	PG
	<i>Lobophora variegata</i> (Lamouroux) Papenfuss ex E.C. Oliveira	IC, PG, PM, SA
*	<i>Padina gymnospora</i> (Kützting) Sonder	AA, IC, PS, PM, SA
*	<i>Padina pavonica</i> (Linnaeus) Thivy in Taylor	IC, MA, PM
*	<i>Sargassum hystrix</i> J. Agardh var. <i>spinulosum</i> (Kützting) Grunow	LV, PS, PG
*	<i>Sargassum polyceratum</i> Montagne	PG, PS, IC, LV
	<i>Spatoglossum schroederi</i> (C. Agardh) Kützting	TA
	<i>Sphacelaria tribuloides</i> Meneghini	AC
*	<i>Stypopodium zonale</i> (Lamouroux) Papenfuss	IC, SA
*	<i>Zonaria tournefortii</i> (Lamouroux) Montagne	IC, PS, TA

## RHODOPHYTA

	<i>Acanthophora muscoides</i> (Linnaeus) Bory	IC
	<i>Acanthophora spicifera</i> (Vahl) Børgesen	AA, IC, MA, PG, PM
*	<i>Agardhiella subulata</i> (C. Agardh) Kraft & Wynne	IC, RE

<i>Amansia multifida</i> Lamouroux	IC, PM
<i>Amphiroa fragilissima</i> (Linnaeus) Lamouroux	AA, IC, MA, PM, PS
<i>Amphiroa tribulus</i> (Ellis & Solander) Lamouroux	AA, IC, MA, PS
* <i>Anotrichium tenue</i> (C. Agardh) Nägeli	PS
<i>Asparagopsis taxiformis</i> - ' <i>Falkenbergia hillebrandii</i> ' (Bornet) Falkenberg stadium	IC
* <i>Bonnemaisonia hamifera</i> Hariot	TA
<i>Botryocladia occidentalis</i> (Børgesen) Kylin	IC
* <i>Botryocladia pyriformis</i> (Børgesen) Kylin	IC
<i>Bryothamnion seaforthii</i> (Turner) Kützing	LV, TA
<i>Bryothamnion triquetrum</i> (S.G. Gmelin) Howe	IC, LV, TA
<i>Caloglossa leprieurii</i> (Montagne) J. Agardh	PGM
<i>Ceramium diaphanum</i> (Lightfoot) Roth	PG, SA
* <i>Ceramium fastigiatum</i> (Roth) Harvey f. <i>flaccida</i> H.E. Petersen	PG
* <i>Ceramium leutezbergii</i> Schmidt	PG
* <i>Champia parvula</i> (C. Agardh) Harvey	IC
* <i>Champia salicornioides</i> Harvey	PS
* <i>Chondria curvilineata</i> Collins & Hervey	PG
* <i>Chondria dasyphylla</i> (Woodward) C. Agardh	AA
* <i>Chondria collinsiana</i> Howe	PG
* <i>Coelothrix irregularis</i> (Harvey) Børgesen	AC, IC, MA, SA
<i>Cryptonemia crenulata</i> (J. Agardh) J. Agardh	IC, SA
* <i>Dasya antillarum</i> (Howe) Millar	IC, SA
<i>Dictyurus occidentalis</i> J. Agardh	TA
<i>Digenea simplex</i> (Wulfen) C. Agardh	IC, MA, PM, PS
* <i>Erythrotrichia carnea</i> (Dillwyn) J. Agardh	IC, PG
<i>Galaxaura marginata</i> (Ellis & Solander) Lamouroux	AA, SA
<i>Galaxaura marginata</i> var. <i>linearis</i> Lamouroux	PG
<i>Galaxaura rugosa</i> (Ellis & Solander) Lamouroux	AA, MA, PS, IC, RE
* <i>Gelidium floridanum</i> Taylor	PG
* <i>Gelidium pusillum</i> (Stackhouse) Le Jolis	AC, PG
<i>Gelidiella acerosa</i> (Forsskål) J. Feldmann & Hamel	AA, IC, PS
* <i>Gelidiopsis gracilis</i> (Kützing) Vickers	IC
* <i>Gracilaria bursa-pastoris</i> (S.G. Gmelin) Silva	PG
<i>Gracilaria damaecornis</i> J. Agardh	IC, PS
<i>Gracilaria domingensis</i> Sonder ex Kützing, pro. syn.	IC, RE, TA
<i>Gracilaria ferox</i> J. Agardh	SA
* <i>Gracilaria folifera</i> (Forsskål) Børgesen	AA, PG, SA, IC
* <i>Gracilaria venezuelensis</i> Taylor	PG, RE
* <i>Grateloupia doryphora</i> (Montagne) Howe	AA, AC, LP, TA
<i>Grateloupia filicina</i> (Lamouroux) C. Agardh	AA, AC, PG, SA
<i>Gymnogongrus tenuis</i> (J. Agardh) J. Agardh	AC, IC
* <i>Haliptilon subulatum</i> (Ellis & Solander) Johansen	IC
* <i>Herposiphonia secunda</i> (C. Agardh) Ambronn f. <i>secunda</i> (C. Agardh) Falkenberg	PG, PS
<i>Herposiphonia secunda</i> f. <i>tenella</i> (C. Agardh) Wynne	IC

* <i>Hydrolithon farinosum</i> (Lamourouc) Ponrose & Chamberlain	IC, AA, PM
* <i>Hydropuntia cornea</i> (J. Agardh) Wynne	PG
* <i>Hydropuntia crassissima</i> (P. & H. Crouan in Schramm & Mazé) Wynne	IC, PS, PM
<i>Hypnea musciformis</i> (Wulfen in Jacquin) Lamouroux	AA, AC, IC, PG, PS
* <i>Hypnea spinella</i> (C. Agardh) Kützing	AA, IC, PG, IR
* <i>Jania adhaerens</i> Lamouroux	IC
* <i>Jania capillacea</i> Harvey	IC, MA, PM
* <i>Kallymenia westii</i> Ganesan	PS
* <i>Laurencia corallopsis</i> (Montagne) Howe	IC
<i>Laurencia intricata</i> Lamouroux	AA
<i>Laurencia obtusa</i> (Hudson) Lamouroux	SA, PS
<i>Laurencia papillosa</i> (C. Agardh) Greville	IC, MA, PM
* <i>Laurencia poiteaui</i> (Lamouroux) Howe	PS, IC
<i>Liagora ceranoides</i> Lamouroux	AA
<i>Martensia fragilis</i> Harvey	AA, IC, SA
* <i>Melobesia membranacea</i> (Esper) Lamouroux	PG
<i>Murrayella pericladus</i> (C. Agardh) Schmitz	PG
<i>Ochtodes secundiramea</i> (Montagne) Howe	AC, PS
* <i>Osmundaria obtusiloba</i> (C. Agardh) R.E. Norris	IC, LV
* <i>Peyssonnelia conchicola</i> Piccone & Grunow	IC
* <i>Petroglossum undulatum</i> Schneider in Schneider & Searles	IC
* <i>Polysiphonia binneyi</i> Harvey	PG
* <i>Polysiphonia denudata</i> (Dillwyn) Greville ex Harvey in Hooker	PG
* <i>Polysiphonia subtilissima</i> Montagne	PG, SA
* <i>Predaea feldmannii</i> Børgesen	IC
* <i>Solieria filiformis</i> (Kützing) Gabrielson	IC
<i>Spyridia filamentosa</i> (Wulfen) Harvey in Hooker	IC, PG, PS
* <i>Stylonema alsidii</i> (Zanardini) Drew	AA, IC, PG, SA
* <i>Stylonema cornu-cervi</i> Reinsch	PG
* <i>Trichogloea herveyi</i> Taylor	PS
<i>Tricleocarpa oblongata</i> (Ellis & Solander) Huisman & Borowitzka	AA, IC, MA, PS
* <i>Wrangelia penicillata</i> (C. Agardh) C. Agardh	IC

## DISCUSSION

Hamel & Hamel-Joukov (1931) reported the presence of 100 taxa of macroscopic marine algae from Chlorophyta, Phaeophyceae (Heterokontophyta) and Rhodophyta from Martinique. Taylor (1960) suppressed the taxa not identified to the species level, and the taxa considered as uncertain records, and added some others. Later, Littler *et al.* (1992) added 2 new records for the island. In all, 108 species were cited previously to this work from the coasts of Martinique. In our checklist, we report 149 taxa of these three taxonomic divisions; 83 taxa (81 species) are recorded for the first time from Martinique (29 Chlorophyta, 9 Phaeophyceae and 45

Rhodophyta). This represents an increase of 77 % to the previously known marine algal flora of Martinique. *Bonnemaisonia hamifera* and *Stylonema cornu-cervi* are new records for the Western Atlantic.

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