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ILLUSTRATED KEYS AND CHECKLIST OF MARINE ALGAE OF
SAN SALVADOR ISLAND, BAHAMAS: A PROGRESS REPORT

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Our report concerns the progress made to develop illustrated keys and checklists for the marine algae of San Salvador Island, Bahamas, with a focus on the brown (Phaeophyta), green (Chlorophyta), red (Rhodophyta), and blue-green (Cyanophyta) macroalgae that inhabit the Island's "shallow" waters, considered herein as less than 100 feet deep and readily accessible to SCUBA divers. After consultation with Dr. Donald T. Gerace, Director of the CCFL Bahamian Field Station, the authors began to develop simple keys to the Island's marine algal genera, accompanied by original illustrations (by K.L.W.) of at least one representative species for each genus, a checklist of algal species, and collection site and habitat information for each reported species. This reference work is targeted primarily for use by student and faculty visitors to the CCFL Bahamian Field Station on San Salvador Island who have little or no experience with marine algae and would benefit from a simpler reference work than Taylor's (1960) classic Marine Algae of the Eastern Tropical and Subtropical Coasts of the Americas. Yet, this new work will be of interest to more experienced students and faculty due to the original illustrations, genus keys, species checklist, and species collection information.

This presentation focuses on the species checklist being developed for the new reference work. Information for the checklist comes from three sources: a paper by Marshall (1980);

Table I. Number of Genera and Species Recorded from San Salvador Island

	<u>Marshall 1980</u>	<u>Smith 1982</u>	<u>Court & Welk June 1985</u>
Phaeophyta			
no. of genera	10	10	12
no. of species	19	23	30
Chlorophyta			
no. of genera	20	25	30
no. of species	43	62	75
Rhodophyta			
no. of genera	19	32	46
no. of species	27	52	79
Cyanophyta			
no. of genera	n.d.*	n.d.	2
no. of species	n.d.	n.d.	2
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Total genera	49	67	90
Total species	89	137	186

* n.d. = not determined

the holdings of the Hoysradt Herbarium of Hartwick College, Oneonta, NY, compiled by Dr. Robert Smith and his students, with most of the holdings reported in Smith (1982); and the personal collections of the authors. Unfortunately, the actual specimens collected by Marshall for his 1980 paper have been lost, so only his published species list serves as a record of that effort.

Marshall (1980) reported a total of 49 genera and 89 marine algal species from the coastal area of San Salvador Island (see Table I). Marshall did not include in his study "deepwater dredging", "many of the coralline Melobeseae, the myxophyceans, and numerous epiphytic species," or "species from the inland, saline lakes." Smith's (1982) checklist increased the total

number of recorded genera and species to 67 and 137, respectively (Table I). As of this month, June 1985, our search shows a total of 90 genera and 186 species of marine brown, green, red and blue-green algae recorded from San Salvador Island (Table I). Our revised checklist (Table II) also includes several forms and varieties of species identified from the Island, but their taxonomic significance is questionable as some of these morphological differences can be environmentally induced (pers. commun., S. M. Blair).

Most of the new additions to Marshall's (1980) original checklist have occurred with the Chlorophyta and Rhodophyta (Table I). We now record for the green algae an addition of 10 genera and 32 species to Marshall's list, and for the red algae an addition of 27 genera and 52 species to Marshall's list. In Table II are also listed a few of the Cyanophyta genera recorded by us. The blue-greens form a conspicuous part of the marine algal flora for the Island's various habitats, including the upper intertidal rocks, mangrove roots, and submerged rocks and corals. For the brown algae, only 2 genera and 11 species have been added to Marshall's list. It needs to be pointed out that the listing by Marshall (1980) and Smith (1982) of Colpomenia sinuosa for the Island needs to be reevaluated. Specimens identified as this species in the Hoysradt Herbarium were misidentified, having been confused with a similar appearing blue-green alga. This occurrence, coupled with an absence of the alga from our collections and the unfortunate loss of Marshall's collections, leaves the inclusion of this alga in the Island's flora questionable and in need of further study by making

additional seasonal collections. Because methodical, seasonal collecting has not been carried out with the marine algal flora of the Island, its performance could also reveal additional members of the Island's shallow water flora.

As might be expected, our revised checklist contains several new records of species and genera from San Salvador Island's marine algal flora, such as the two species of the green alga Siphonocladus, and several species of red algae, including Kallymenia limminghii, Catanelia caespitosa, Coelarthrum albertisii, and Martensia pavonia. Most interesting are algae which appear to be rarely reported from the Caribbean area, for example, the green alga Rhipiliopsis and the red alga Trichogloeopsis.

One other item to note concerning our new marine algal checklist for San Salvador Island is the incorporation of genus and/or species name changes cited in the literature since Taylor's (1960) flora was published. For example, Womersley (1967) showed a need to change the brown alga Pocockiella to Lobophora; van den Hoek (1982) revised the taxonomy of American North Atlantic Cladophora species; and Abbott and Doty (1960) described a new red algal genus, Trichogloeopsis, that had been considered as Liagora before their study. Any other such changes known to us have been recorded in the checklist.

It is expected that the revised checklist presented in this paper will undergo additional changes in the near future, especially an increase in the number of filamentous red and blue-green algae as several remain to be identified. Even without these expected additions, this revised checklist

TABLE II. CHECKLIST OF THE MARINE ALGAE OF SAN SALVADOR ISLAND, BAHAMAS.

FROM:

1. Marshall, H. G. 1980. Marine algae from San Salvador Island, Bahamas, Proc. Biol. Soc. Wash. 93(2):285-290.
2. Holdings of the Hoysradt Herbarium at Hartwick College, Oneonta, NY. Compiled by Dr. Robert R. Smith and his students.
- 2*. Specimens not available in Hoysradt Herbarium for verification, but were recorded from San Salvador Island by Smith (1982) or his students Amy Aldridge, Eric Horgan and Andrew Kuhlberg.
3. Court, G. J. and K. L. Weik. Personal collections through June 1985.

C H L O R O P H Y C E A E

ULOTRICALES

2 Diplochaete solitaria Collins

ULVALES

2* Enteromorpha cf. flexuosa f. submarina Collins & Hervey

2* Enteromorpha cf. prolifera (Muller) J. Agardh

2 Enteromorpha ramulosa (J. E. Smith) Hooker

2 Monostroma oxyspermum (Kützing) Doty

CLADOPHORALES

1,2,3 Anadyomene stellata (Wulfen) C. Agardh

2,3 Chaetomorpha aerea (Dillwyn) Kützing

3 Chaetomorpha brachygona Harvey

2,3 Chaetomorpha linum (Muller) Kützing

1,2,3 Cladophora catenata (Linnaeus) van den Hoek
[= Cl. fuliginosa Kützing]

1,2* Cladophora crispula Vickers

2 Cladophora submarina Crouan frat. ex Schramm & Maze
[= Cl. howei Collins]

1,2* Cladophora vagabunda (Linnaeus) Kützing emend. van den Hoek
[= Cl. fascicularis (Mertens) Kützing]

2,3 Microdictyon marinum (Bory) Silva

2 Microdictyon boergesenii Setchell

DASYCLADALES

1,2,3 Acetabularia crenulata Lamouroux

2 Acetabularia [= Acicularia] schenckii Mobius

1,2,3 Batophora oerstedii J. Agardh

1,2,3 Batophora oerstedii v. occidentalis (Harvey) Howe

1,2,3 Cymopolia barbata (Linnaeus) Lamouroux

1,2 Dasycladus vermicularis (Scopoli) Krasser

1,2,3 Neomeris annulata Dickie

1,2 Neomeris cokeri Howe

1,2* Neomeris mucosa Howe

SIPHONOCLADIALES

1,2* Chamaedoris peniculum (Ellis & Solander) Kuntze

1,2,3 Cladophoropsis membranacea (C. Agardh) Borgesen

1,2,3 Dictyosphaeria cavernosa (Forsskal) Borgesen

2 Ernodesmis verticillata (Kutzing) Borgesen

3 Siphonocladus rigidus Howe

3 Siphonocladus tropicus (Crouan) J. Agardh

2,3 Valonia aegagropila C. Agardh

1,2,3 Valonia macrophysa Kutzing

2 Valonia ocellata Howe

2 Valonia utricularis C. Agardh

1,2,3 Valonia ventricosa J. Agardh

CAULERPALES (incl. "Codiales")

- 1,2 Avrainvillea longicaulis (Kützing) Murray & Boodle
- 1,2,3 Avrainvillea nigricans Decaisne
- 2,3 Avrainvillea rawsoni (Dickie) Howe
- 2,3 Bryopsis pennata Lamouroux
- 1,2,3 Caulerpa cupressoides (West) C. Agardh
- 2*,3 Caulerpa cupressoides v. lycopodium (J. Agardh) Weber-van Bosse
- 2 Caulerpa cupressoides v. lycopodium f. alternifolia Weber-van Bosse
- 2 Caulerpa cupressoides v. lycopodium f. intermedia Weber-van Bosse
- 2,3 Caulerpa cupressoides v. mamillosa (Montagne) Weber-van Bosse
[some specimens were C. vickersiae Børgesen in Hoysradt Herbarium]
- 2 Caulerpa cupressoides v. mamillosa f. nuda Weber-van Bosse
- 2 Caulerpa cupressoides v. serrata (Kützing) Weber-van Bosse
- 2,3 Caulerpa cupressoides v. turneri Weber-van Bosse
- 1,2,3 Caulerpa mexicana (Sonder) J. Agardh
- 2* Caulerpa paspaloides (Bory) Greville
- 1,2 Caulerpa paspaloides v. compressa (Weber-van Bosse) Howe
- 2,3 Caulerpa peltata Lamouroux
- 1,2*,3 Caulerpa prolifera (Forsskål) Lamouroux
- 2,3 Caulerpa prolifera f. obovata J. Agardh
- 1,2,3 Caulerpa racemosa (Forsskål) J. Agardh
- 2 Caulerpa racemosa v. clavifera (Turner) Weber-van Bosse
- 3 Caulerpa racemosa v. macrophysa (Forsskål) J. Agardh
- 2 Caulerpa racemosa v. uvifera (Turner) Weber-van Bosse
- 2 Caulerpa serrulata (Forsskål) J. Agardh emend. Børgesen
- 1,2* Caulerpa sertularioides (Gmelin) Howe
- 2,3 Caulerpa sertularioides f. brevipes (J. Agardh) Svedelius
- 2 Caulerpa sertularioides f. corymbosa Taylor

- 2 Caulerpa sertularioides f. farlowii (Weber-van Bosse) Børgesen
- 1,2,3 Caulerpa verticillata J. Agardh
- 2* Caulerpa vickersiae Børgesen
- 2 Cladocephalus scoparius Howe
- 1,2*,3 Codium isthmocladum Vickers
- 1,2 Codium taylori Silva
- 1,2 Halicystis osterhoutii L.R. & A.H. Blinks
- 2,3 Halimeda discoidea Decaisne
- 2 Halimeda favulosa Howe
- 3 Halimeda goreauii Taylor
- 1,2,3 Halimeda incrassata (Ellis) Lamouroux
- 2 Halimeda incrassata f. gracilis Børgesen
- 1,2,3 Halimeda lacrimosa Howe
- 1,2 Halimeda monile (Ellis & Solander) Lamouroux
- 2 Halimeda monile f. cylindrica (Børgesen) Collins & Hervey
- 2 Halimeda monile f. robusta (Børgesen) Collins & Hervey
- 1,2 Halimeda opuntia (Linnaeus) Lamouroux
- 2* Halimeda opuntia f. cordata (J. Agardh) Barton
- 2 Halimeda opuntia f. minor Vickers
- 2 Halimeda opuntia f. triloba (Decaisne) Barton
- 2 Halimeda scabra Howe
- 2,3 Halimeda simulans Howe
- 1,2,3 Halimeda tuna (Ellis & Solander) Lamouroux
- 1,2,3 Penicillus capitatus Lamarck
- 2 Penicillus capitatus f. elongatus (Decaisne) Gepp
- 2 Penicillus capitatus f. laxus Børgesen

- 1,2* Penicillus dumetosus (Lamouroux) Blainville
 2 Penicillus lamourouxii Decaisne
 1,2,3 Penicillus pyriformis A. & E.S. Gepp
 2 Penicillus pyriformis f. explantus Børgesen
 1,2* Rhipilia tomentosa Kützing
 3 Rhipiliopsis [=Siphonoclathrus] stri (Earle & Young) Farghaly & Denizot
 1,2 Rhipocephalus oblongus (Decaisne) Kützing
 1,2,3 Rhipocephalus phoenix (Ellis & Solander) Kützing
 2 Rhipocephalus phoenix f. brevifolius A. & E.S. Gepp
 2 Rhipocephalus phoenix f. longifolius A. & E.S. Gepp
 2 Udotea conglutinata (Ellis & Solander) Lamouroux
 1,2,3 Udotea cyathiformis Decaisne
 1,2,3 Udotea flabellum (Ellis & Solander) Lamouroux
 1,2 Udotea spinulosa Howe
 1,2,3 Udotea sublittoralis Taylor

P H A E O P H Y C E A E

ECTOCARPALES

- 1,2* Ectocarpus elachistaeformis Heydrich

DICTYOTALES

- 2 Dictyopteris delicatula Lamouroux
 1,2,3 Dictyopteris justii Lamouroux
 2,3 Dictyota bartayresii Lamouroux
 1,2 Dictyota cervicornis Kützing
 1,2,3 Dictyota dentata Lamouroux
 1,2,3 Dictyota dichotoma (Hudson) Lamouroux

- 1,2 Dictyota divaricata Lamouroux
 2 Dictyota linearis (C. Agardh) Greville
 2 Dictyota volubilis Kützing sensu Vickers
 2*,3 Dilophus alternans J. Agardh
 1,2,3 Lobophora [= Pocockiella] variegata (Lamouroux) Womersley
 2 Padina haitiensis Thivy ex Taylor
 1,2,3 Padina jamaicensis (Collins) Papenfuss
 [= P. sanctae-crucis Børgesen]
 2 Padina perindusiata Thivy ex Taylor
 1,2 Padina vickersiae Hoyt
 1,2,3 Styopodium zonale (Lamouroux) Papenfuss

CHORDARIALES

- 1,2* Elachistea minutissima Taylor

SCYTOSIPHONALES

- 1,2* Colpomenia sinuosa (Roth) Derbès & Solier
 2* Rosenvingea sanctae-crucis Børgesen

FUCALES

- 1,2 Sargassum filipendula C. Agardh
 1,2 Sargassum fluitans Børgesen
 2 Sargassum furcatum Kützing
 1,2,3 Sargassum natans (Linnaeus) J. Meyen
 1,2,3 Sargassum platycarpum Montagne
 2 Sargassum polyceratium Montagne
 1,2 Sargassum pteropleuron Grunow
 2 Sargassum vulgare C. Agardh
 1,2,3 Turbinaria tricostata Barton
 1,2,3 Turbinaria turbinata (Linnaeus) Kuntze

R H O D O P H Y C E A E

NEMALIALES (inc. ⁴Gelidiales)

- 2,3 Asparagopsis taxiformis (Delile) Trevisan
- 3 Galaxaura rugosa (Ellis & Solander) Lamouroux
- 2 Galaxaura squalida Kjellman
- 2* Galaxaura subverticillata Kjellman
- 2,3 Gelidiella acerosa (Forsskål) Feldmann & Hamel
- 2,3 Liagora ceranoides Lamouroux
[was Dudresnaya sp. or D. bermudensis for some Hoysradt Herb. specimens]
- 2,3 Liagora farinosa Lamouroux
- 2,3 Liagora pinnata Harvey
[was Liagora pedicellata for some Hoysradt Herbarium specimens]
- 2,3 Trichogloeopsis [= Liagora] pedicellata (Howe) Abbott & Doty
- 2* Wurdemannia miniata (Draparnaud) Feldmann & Hamel

CRYPTONEMIALES

- 1,2 Amphiroa fragilissima (Linnaeus) Lamouroux
- 2 Corallina cubensis (Montagne) Kützing
- 1,2 Corallina subulata Ellis & Solander
- 3 Dudresnaya cf. bermudensis Setchell
- 1,2* Fosliella chamaedoris (Foslie & Howe) Howe
- 1,2* Fosliella farinosa (Lamouroux) Howe
- 2 Fosliella lejolisii (Rosanoff) Howe
- 3 Kallymenia limminghii Montagne
- 2 Jania adherens Lamouroux
- 2 Jania capillacea Harvey

- 2 Jania cf. rubens (Linnaeus) Lamouroux
[was J. pumila Lamouroux in Hoysradt Herbarium]
- 2 Melobesia membranacea (Esper) Lamouroux
- 2*,3 Neogoniolithon [= Goniolithon] strictum (Foslie) Setchell & Mason

GIGARTINALES

- 3 Catenella caespitosa (Withering) Irvine
[= C. repens (Lightfoot) Batters]
- 2* Gracilaria blodgettii Harvey
- 1,2* Gracilaria cervicornis (Turner) J. Agardh
- 2 Gracilaria cylindrica Børgesen
- 1,2 Gracilaria foliifera (Forsskål) Børgesen
- 1,2* Gracilaria verrucosa (Hudson) Papenfuss
- 1,2,3 Hypnea musciiformis (Wulfen) Lamouroux
- 2 Hypnea spinella (C. Agardh) Kützing
- 1,2 Solieria filaformis (Kützing) Gabrielson
[= Agardhiella tenera (J. Agardh) Schmitz]

RHODYMENIALES

- 1,2* Botryocladia occidentalis (Børgesen) Kylin
- 2,3 Champia parvula (C. Agardh) Harvey
- 3 Coelarthrum albertisii (Piccone) Børgesen
- 2,3 Coelothrix irregularis (Harvey) Børgesen
- 2 Lomentaria baileyana (Harvey) Farlow

CERAMIALES

- 1,2,3 Acanthophora spicifera (Vahl) Børgesen
- 3 Bostrychia binderi Harvey
- 1,2*,3 Bostrychia montagnei Harvey
- 1 Bostrychia tenella (Vahl) J. Agardh

- 2* Bryocladia thyrsigera (J. Agardh) Schmitz
- 1,2 Bryothamnion triquetrum (Gmelin) Howe
- 2 Callithamnion halliae Collins
- 1,2*,3 Caloglossa leprieurii (Montagne) J. Agardh
- 1,2,3 Centroceras clavulatum (C. Agardh) Montagne
- 2 Ceramium byssoides Harvey
- 2,3 Ceramium nitens (C. Agardh) J. Agardh
[was C. subtile in Hoysradt Herbarium]
- 1,2* Ceramium subtile J. Agardh
- 3 Chondria atropurpurea Harvey
- 2 Chondria dasyphylla (Woodward) C. Agardh
- 2,3 Chondria littoralis Harvey
- 2 Chondria tenuissima (Goodenough & Woodward) C. Agardh
- 3 Dasya baillouviana (Gmelin) Montagne
[= D. pedicellata (C. Agardh) C. Agardh]
- 2* Dasya harveyi Ashmead
- 2 Dasya mollis Harvey
- 2,3 Dasyopsis antillarum Howe
- 1,2,3 Digenia simplex (Wulfen) C. Agardh
- 2,3 Haloplegma duperreyi Montagne
[was Martensia pavonia in Hoysradt Herbarium]
- 2 Herposiphonia bipinnata Howe
- 2 Herposiphonia secunda (C. Agardh) Ambronn
- 2,3 Heterosiphonia gibbesii (Harvey) Falkenberg
- 2 Laurencia corallopsis (Montagne) Howe
- 2 Laurencia intricata Lamouroux
- 2 Laurencia microcladia Kützing
- 1,2 Laurencia obtusa (Hudson) Lamouroux

- 1,2*,3 Laurencia papillosa (Forsskål) Greville
 3 Martensia pavonia (J. Agardh) J. Agardh
 1,2* Polysiphonia denudata (Dillwyn) Kützing
 3 Polysiphonia ferrulacea Suhr
 3 Polysiphonia havanensis Montagne
 1,2,3 Polysiphonia howei Hollenberg
 1,2*,3 Polysiphonia subtilissima Montagne
 2* Spyridia aculeata (Schimper) Kützing
 1 Spyridia aculeata v. hypneoides J. Agardh
 1,2* Tiffaniella [= Spermothamnion] gorgoneum (Montagne) Doty & Menez
 2,3 Thuretia borneti Vickers
 1,2* Wrangelia argus Montagne
 2 Wrangelia bicuspidata Børgesen
 1,2,3 Wrangelia penicillata C. Agardh

C Y A N O P H Y C E A E

OSCILLATORIALES

- 2,3 Rivularia sp./ Calothrix crustacea Schousboe & Thrust sensu Drouet
 [was Colpomenia sinuosa for Hoysradt Herbarium specimens]
 3 Lyngbya sp./ Schizothrix mexicana Gomont sensu Drouet

illustrates the growing awareness of the richness of San Salvador Island's marine algal flora; a richness facilitated by its diverse habitats and hydrographic conditions.

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