

BIBLIOGRAPHICAL CHECKLIST OF MARINE AND ESTUARINE PHYTOBENTHOS OF ILHA GRANDE, ILHA GRANDE STATE PARK, ANGRA DOS REIS, RIO DE JANEIRO, BRAZIL

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Abstract: This paper is a taxonomically updated floristic inventory and a bibliographical summary of the marine and estuarine benthic flora located in the buffer zone of Ilha Grande State Park, Angra dos Reis, Rio de Janeiro, Brazil (coordinates: latitude 22° 50'S between 23° 20'S and longitude 44° 00'W between 44° 45'W). A total of 26 papers were found dating from 1928 to 2016. The surveys at Ilha Grande can be divided into three periods: a) taxonomical studies at specific points, b) taxonomic inventories in certain areas, c) ecological surveys located in the north/northwest region of the island. A total of 256 phytobenthic taxa were recorded for Ilha Grande, which makes it the richest insular marine benthic flora published on the Brazilian coast. The richest taxonomic division was the Rhodophyta with 156 taxa, followed by the Chlorophyta division with 51 taxa and the Ochrophyta division with 49 taxa. The predominant orders were: red algae: a) Ceramiales (49%); b) brown algae: Ectocarpales (29%); c) green algae: Cladophorales (45%). The most frequent taxa were: green algae: *Ulva flexuosa* Wulfen subsp. *flexuosa* and *Ulva fasciata* Delile (40% each); b) brown algae: *Padina gymnospora* (Kützinger) Sonder (47%), c) red algae: *Gelidium* sp. [= *G. pusillum* (Stackh.) Le Jol. var. *pusillum* (53%)].

Keywords: Seaweed, Benthic marine flora, Taxonomic inventory.

SÍNTESE TAXONÔMICA DO FITOBENTOS MARINHO E ESTUARINO DA ILHA GRANDE, PARQUE ESTADUAL DA ILHA GRANDE, ANGRA DOS REIS, RIO DE JANEIRO, BRASIL

Resumo: Esse artigo é um inventário florístico atualizado taxonomicamente e uma síntese bibliográfica da flora bentônica marinha e estuarina localizada na área de amortecimento do Parque Estadual da Ilha Grande, Angra dos Reis, Rio de Janeiro, Brasil (coordenadas: latitude 22° 50'S entre 23° 20'S e longitude 44°00'W entre 44°45'W). Foram achados 26 trabalhos datados de 1928 a 2016. As pesquisas na Ilha Grande podem ser divididas em três períodos: a) estudos taxonômicos em pontos específicos; b) inventários taxonômicos em determinadas áreas; c) pesquisas ecológicas localizadas na Região norte/nordeste da ilha. Foram registrados 256 táxons fitobentônicos para a Ilha Grande que a torna a mais rica flora bentônica marinha insular publicada do litoral Brasileiro. A divisão taxonômica mais rica foi a Rodófitas com 156 táxons, seguida da divisão Clorófitas com 51 táxons e a divisão Ocrófitas com 49 táxons.

As ordens predominantes foram: algas vermelhas: a) Ceramiales (49%); b) algas pardas: Ectocarpales (29%); c) algas verdes: Cladophorales (45%). Os táxons mais frequentes foram: algas verdes: *Ulva flexuosa* Wulfen subsp. *flexuosa* e *Ulva fasciata* Delile (40% cada); b) alga parda: *Padina gymnospora* (Kützinger) Sonder (47%); c) alga vermelha: *Gelidium* sp. [= *G. pusillum* (Stackh.) Le Jol. var. *pusillum* (53%)].

Palavras-chave: Algas, Flora marinha bentônica, Inventário taxonômico.

INTRODUCTION

Appeltans et al. (2012) underline in their marine taxonomic biodiversity researches the importance of local checklists. For example, Miloslavich et al. (2011) that aimed to estimate the marine biodiversity of the Pacific and Atlantic South America coasts, made clear how limited is the knowledge that is gathered concerning some phyla of the Brazilian marine flora and fauna. The Brazilian marine benthic algae and estuarine algae were distributed and organized in 774 taxa in approximately 9000 taxa of marine biota in a distance of nearly 7500 kilometers. Considering the richness in ecosystems such as coral reefs, mangrove forests and swamps, underwater sand-clay substrates, sandy beaches, rocky shores, seagrass meadows, hyposaline and hypersaline coastal lagoons and estuaries, this amount of species still seems inexpressive. The writers also pointed out that the Brazilian population did not seem to realize the benefits of public biodiversity policies.

The floristic list of Brazilian macroscopic and microscopic algae and cyanobacteria was recently updated, totalizing 29 classes, 1018 genera, 4747 species, 12 subspecies and 1424 varieties (Menezes et al., 2015). However, there are still hundreds of unknown areas in Brazil. There are hundreds of islands in the Brazilian seashore, but in only a small percentage were carried studies to list the diversity of the local marine benthic flora. For example, oceanic islands such as Trindade and Martins Vaz (Pedrini et al. 1989; Nassar, 1994), Fernando de Noronha (Széchy et al. 1989; Pedrini et al. 1992); Atol das Rocas (Oliveira Filho and Ugadim, 1976; Villaça et al. 2006, 2010); Abrolhos (Figueiredo, 2006; Torrano-Silva and Oliveira, 2013) and São Pedro and São Paulo Archipelago (Burgos et al. 2009; Crespo et al. 2014). Also, coastal islands as Santo Aleixo (Carvalho et al. 2013), Santa Catarina Island (Batis-ta, 2012), three islands of Paraná (Pellizzari et al. 2014), Boipeba Island (Moura et al. 2015), among others.

In Rio de Janeiro, studies have yet to complete Marine and estuarine phytobenthos taxonomic inventory, as there is currently an unknown number of undetermined taxa. Presently, the city

of Cabo Frio and its surroundings are the better studied areas in Rio de Janeiro. Brasileiro et al. (2009) in an attempt of synthesis have listed nearly the whole marine benthic flora of Cabo Frio and surroundings. These authors identified 339 taxa, 20 of them being endemic of the region. From the total: 76 taxa of green algae (Chlorophyta), 60 taxa of brown algae (Ochrophyta) and 203 taxa of red algae (Rhodophyta). Cabo Frio is known to be strongly influenced by the upwelling of deep waters phenomenon and that is believed to be the main reason for the local richness in biodiversity. There are records of 34 works registered until 2008, covering 83 sampling sites in the region. As a conclusion of this inventory, Cabo Frio is pointed as one of the richest and more diverse region in the country.

Angra dos Reis and its surroundings are well known by its touristic appeal and potential (beaches, navigation and scuba diving points), its business aspects (nuclear power plants and harbors) and marine and coastal biodiversity conservation zones (Creed et al. 2007). Grande Island is a coastal island situated in a mosaic of eleven conservation zones, therefore being of crucial strategic relevance and playing an important role in the biodiversity conservation initiative. This work is the first to promote a bibliographical taxonomic synthesis of the marine and estuarine phytobenthos located in such an important territorial unity of Rio de Janeiro's south coast.

MATERIALS AND METHODS

Grande Island (coordinates ranging from latitude 22° 50' S to 23° 20' S, longitude 44° 00' W to 44° 45' W) is an island of Angra dos Reis municipality, south of Rio de Janeiro State. It has approximately an area of 65.258 ha and a perimeter of 350 kilometers (Creed et al. 2007). Grande's Island geographic location is presented in Figure 1. The island housed a penitentiary, Candido Mendes high-security prison, for nearly ninety years and it was after its demolition that Grande Island became a distinguished touristic destination. During this period, there was an enormous development of others distinct activities besides the touristic appeal. Nowadays, the Grande Island Bay houses two nuclear power plants (Angra I and Angra II), Angra dos Reis's Harbor, Verol-

me Shipyard, a Petrobras' s oil terminal, Sepetiba Harbor and an iron ore terminal property of MBR -Minerações Brasileiras Reunidas. Due to the island natural beauty and exotic and diverse fauna and flora, there are eleven conservation zones within its territory. In spite of it, unfortunately not enough studies have been carried out on the island aiming to catalog the native species, so the government and the researchers do not know where to focus their efforts and attention concerning conservation programs (INEA, 2013).

Oceanographic reviews and studies on the island are also very limited. Belo et al. (2002) have studied in their works the seabed topography and sedimentation process of the Grande Island Bay and have observed eight different sedimentary patterns in the seafloor sediment surface. Rocky shores, seafloor channels, bathymetric depressions, marine terraces and zones with low gradient slopes are some of the geological features that appears on the bay seafloor.

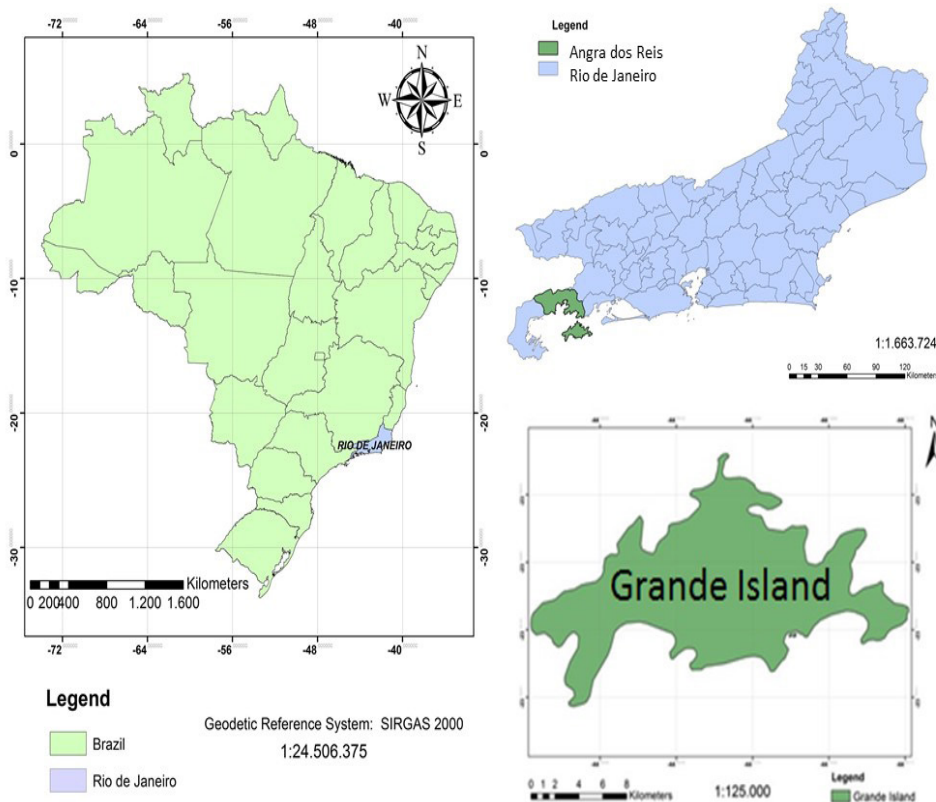


Figure 1 - Grande Island geographic location.

The taxonomic update of the current work's taxa is in accord with the following works and authors: Wynne (2011) and Guiry & Guiry (2008), the exception being taxa that were specifically altered afterwards such as *Hypnea* (Nauer et al., 2014^a); *Gracilaria* (Lyra et al. 2015); *Centroceras* and *Ceramium* (Barros-Barreto et al. 2006). During the development of Appendix 1, it was searched for works who contends information about algae taxa for de island, for this search as used the key-words: "Grande Island", "algae", "phyto-benthic", "marine flora", "estuarine flora", "Ilha Grande State Park", also was used the PEIG management plan and personal database. Among

twenty-four works found in the literature, the sixteen most relevant works that provided information regarding the benthic flora were chosen based on the covered territory and biodiversity found. Those sixteen are the more recent works, sharing the same bibliographical references of the ones left out and adding new references for Grande Island.

Feldmann (1937) and Cheney (1977) indices of benthic marine flora were chosen for comparative analysis between Grande Island and others insular and coastal areas of the Brazilian coastline. Feldmann index is calculated by dividing the number of red algae taxa by the number of brown

algae taxa (VR/O). The Feldmann index sets values higher than four for tropical areas do and lower for temperate areas (Feldmann (1937). For Cheney index, the number of red algae taxa was added to green algae taxa and then divided by brown algae taxa (VR+VC/O). The Cheney index sets values higher than six for tropical areas do and lower for temperate areas (Cheney, 1977). The marine flora from oceanic islands was not included for comparison for being isolated from the continent and therefore presenting characteristics far too different from the coastal islands. It was included in this work only coastal islands that, for having taxonomic inventories of green, brown and red algae, could allow the use of both indices. For that reason, Santo Aleixo Island and Itamaracá Island, both from Pernambuco State, were not included due to the absence of red, brown algae inventory for the first, and brown algae inventory for the second. Falcão et al (1992) argued that the indices would be inappropriate for Grande Island and the rest of Brazil because the majority of the benthic Brazilian flora studied until the time was not considered tropical. In spite of it, the indices were still used in the present work for comparison purposes.

RESULTS

Grand Island marine and estuarine benthic flora was studied and described in three phases: a) occasional taxonomic studies during the twentieth and twenty first centuries, b) taxonomic inventories of determined areas, c) studies mainly of ecological nature located on the north/northwest side of the island.

Three works are part of the twentieth century period: Howe 1928 and Costa 1962 (both field research and work) and Mitchel et al. 1979 (a synthesis of green algae). Five others are from the twenty first century period: four of them being field research (Cassano et al. 2004, 2006, 2008, Cassano 2009) and one of synthesis (Creed 2009). The four works that included sampling activities mentioned only casual occurrences of the island's taxa in a context of wider areas where Grande Island is situated.

The second phase is the one that presents studies made specifically for the island's territory (Nassar 1987, Falcão et al. 1992, Gestinari et al.

1998, Mena 2005, Figueiredo and Tâmega 2007). The authors with more studying areas were Figueiredo and Tâmega (2007) with fifteen areas, followed by Falcão et al. (1992) with nine research areas. The remaining visited few sampling sites (1-6).

The third phase is made of ecological researches (Oliveira 2002, Silva and Coutinho 2007, Lages et al. 2012, Mangelli and Creed 2012, Assis 2013); these works were mostly studies about the structures of local communities in determined rocky shores of an exclusive beach. Therefore, their results are not representative of the entire island. Nowadays, taxonomists visit different parts of the island and collect samples of local flora, as Torrano-Silva et al. (2014), and mention new occurrences as in the case of the calcareous red seaweed *Paulsiviella huveorum* Woelkerling, Sartoni & Boddi and *Hypnea brasiliensis* P. Jesus, F. Nauer & J. M. Nunes by Jesus et al. (2016).

Appendix 1 presents the taxa's nomenclature updated, references of occurrence of the sixteen more recent works that showed more taxa information and their respective authors. Grande Island was the main subject of sixteen works, including 256 taxa. These data was retrieved from forty-one different locations spread along the whole island. Aventureiro Beach was the richest location presenting a number of ninety taxa and Abrahão Beach the less diverse with only three taxa.

The more frequent taxa reported by taxonomic division were: a) within the Chlorophyta: *Ulva flexuosa* Wulfen subsp. *flexuosa* and *Ulva fasciata* Delile with 40% each; b) Ochrophyta: *Padina gymnospora* Kützing) Sonder with 47% and *Caniastrocarpus cervicornis* (Kützing) De Paula & De Clerck f. *cervicornis*, *Colpomenia sinuosa* (Roth) Derbès & Solier, *Sargassum vulgare* C. Agardh and *Sphacelaria tribuloides* Meneghini with 33% each; c) Rhodophyta: *Gelidium* sp. [= *Gelidium pusillum* (Stackh.) Le Jol. var. *pusillum*] with 53% and *Asparagopsis taxiformis* (Delile) Trevisan de Saint-Léon with 47%.

Table 1 reveals the predominance of red algae with 155 taxa (60%), followed by green algae with 51 taxa (21%) and then brown algae with 49 taxa (19%). The Phytogeographic index of Feldman and Cheney us, respective, 3,16 and 4,20.

Tab. 1 - Results of Feldman (FI) and Cheney (CI) indices for marine phytobenthos of the selected coastal islands

AUTHORS	NUMBER OF TAXA IN EACH TAXONOMIC DIVISION						INDICES	
	CHLOROPHYTA	%	OCHROPHYTA	%	RHODOPHYTA	%	FI.	CI.
PRESENT WORK	51	21	49	19	155	60	3,16	4,20
MOURA ET AL. (2015)	52	34	21	13	83	53	3,95	4,19
PELLIZZARI ET AL. (2014)	27	19	22	16	90	65	4,09	5,31
BATISTA (2012)	31	20	34	22	90	58	2,64	3,55
FALCÃO ET AL. (1992)	26	20	28	22	74	58	2,70	3,60

In table 2 was documented the following orders: Ceramiales with 49%, followed by Corallinales (15%). Regarding the Ochrophyta division, the following orders were reported: Ectocarpales

with 29%, followed by Fucales (27%) and then Dictyotales (26%). In the Chlorophyta division, Cladophorales with 45% and Bryopsidales (29%).

Tab. 2 - Quantitative representation of orders documented within the Rhodophyta, Ochrophyta and Chlorophyta divisions of Grande Island, A. dos Reis, RJ.

RHODOPHYTA				OCHROPHYTA		CHLOROPHYTA	
ORDERS	%	ORDERS	%	ORDERS	%	ORDERS	%
BANGIALES	3	GRACILARIALES	5	ASTEROCLADALES	2	BRYOPSIDALES	29
ERYTHROPELTIDALES	1	HALYMENIALES	3	SCYTOHAMNALES	4	DASYCLADALES	2
ACROCHAETIALES	1	NEMALIALES	2	DICTYOTALES	26	CLADOPHORALES	45
BONNEMAISSONIALES	1	PEYSSONNELIALES	2	ECTOCARPALES	29	SIPHONOCLADALES	4
CERAMIALES	49	PLOCAMIALES	1	FUCALES	27	CTENOCLADALES	2
COLACONEMATALES	1	RHODYMENIALES	5	RALFSIALES	2	ULVALES	18
CORALLINALES	15	SEBDENIALES	1	SPHACELARIALES	10		
GELIDIALES	6	STYLONEMATALES	1				
GIGARTINALES	5						

DISCUSSION

The occurrence of 256 taxa in Grande Island, despite lacking a meticulous and specific study covering the four seasons of the year, grants the island the title of richest of the country. Other islands that have been carefully studied, such as Santa Catarina Island by Batista (2012) and some islands from Parana's coast by Pelizzari et al. (2014), were reported less rich in diversity with 163 and 139 taxa respectively. The probable explanation is that Grande Island still preserves its marine and estuarine waters in good condition.

The fact that only official cars are allowed in the few dirty roads, the absence of real estate business and the limited access to the beaches contributed to its natural and almost savage condition. It is more than certain that the absence of sewage disposal in natura in the insular perimeter may also guarantee the diversity of the phytobenthic flora of the island (Inea, 2013).

Through the synthesis and nomenclature update of the taxa cited for Grande Island, it was identified some mistakes and misused names that were then corrected. This negligence has been occurring among the studies of the Brazilian ben-

thick flora because the taxonomy field has been treated as a science of minor importance within the Brazilian botanic science and oceanography (Pedrini et al. 2013). The international literature regarding Brazilian marine phytobenthos has been frequently presenting taxonomic mistakes, the majority occurring in ecological researches of the benthic flora. In the Brazilian taxonomic literature, the inadequate use of the names has also been happening frequently. The citation of *Cladophora capensis* (C. Agardh) De Toni was not confirmed by Leliart et al. (2012), it was confirmed instead a taxa very similar, *Cladophora rupestris* (Linnaeus) Kützinger. Another case was the misapplication of the name *Champia compressa* Harvey, that according to Amado et al. (2003) occurs only in Europe, being in fact *Champia vieillardii* Kuetzing the proper citation for Brazil. According to Falcão et al (1992), the species cited as *Heterodasya crispella* is actually the species *Heterosiphonia crispella* (C. Agardh) M.Wynne.

Among all islands, within phytobenthos citations, there is always predominance of red algae, followed by brown algae and at last green algae, except for Abrolhos (Torrano-Silva and Oliveira, 2013). Grande Island is considered the richest of them all with 256 taxa. Although recent studies by Torrano-Silva and Oliveira (2013) on Abrolhos has included only macroalgae, past studies have documented microscopic red, brown and green algae (Villça et al. 2006). Fernando de Noronha Archipelago it's considerably well studied regarding benthic marine algae (Széchy et al. 1989, Pedrini et al. 1992, Villça et al. 2006, Burgos 2011) and even so, there are currently only 171 documented taxa for the area. This number is not unexpected, as oceanic islands are believed to have a less diversity flora in comparison to coastal islands, fact that was verified in this present work. Even the inventorying of coastal islands as Boipeba Island (Moura et al. 2015) in Bahia with 159 taxa and Paraná's islands with 139 taxa (Pellizzari et al. 2014) showed a lower number of documented taxa than Grande Island.

Cheney and Feldman Indices, according to Falcão et al. (1992) should be applied with reservation on researches concerning the marine and benthic flora of Brazilian insular environments, especially on Grande Island. Those authors have carefully performed comparative studies between Grande Island's flora and the flora of other Brazilian and foreign locations and have concluded that the marine coastal flora of Grande Island and some others locations (cf. Batista, 2012, Santa Catarina Island, Brazil) could not be considered as tropical for not reaching the value of four for the Feldmann Index and six for the Cheney Index. This present work's data, even working with double the taxa for coastal islands and oceanic islands, confirmed the conclusion presented by Falcão et al. (1992). None of the phycological flora of insular Brazilian areas would be considered tropical according to Feldmann (1937) and Che-

ney (1977) methods of classification, except for the phytobenthos of Paraná's islands (Feldmann Index value: 4,09). As conclusion, the Feldmann Index may apply for the south region of Brazil, but it still demands more recent and updated taxonomic studies.

The predominant taxonomic orders, by division, documented in ten works about marine phytobenthos of eight different Brazilian marine coastal islands were selected for comparison purposes with the results encountered in this present work [Atol das Rocas, Fernando de Noronha Archipelago and São Pedro e São Paulo Archipelago by Villça et al. (2006) and Burgos et al. (2009), Abrolhos Archipelago by Torrano-Silva e Oliveira, (2013), Boipeba Island by Moura et al. (2015), Trindade and Martim Vaz Archipelago by Pedrini et al. (1989) and Nassar (1994), Paraná's coastal islands by Pellizzari et al. (2014), Santa Catarina Island by Batista (2012)].

The orders that were predominant in the pre-set synthesis are Cladophorales with 45% within the Chlorophyta division, Ectocarpales with 29% within the Ochrophyta division and Ceramiales with 49% within the Rhodophyta division. The Ceramiales order is the one that has always been predominant within the Rhodophyta division in all the works selected, maybe for being a taxa with a lot of species within [(e.g. Atol das Rocas 60%, according to Villça et al. (2006) and 56% by Villça et al.(2010); São Pedro and São Paulo Archipelago (ASPSP) with 50%, according to Burgos et al. (2009) and Villça et al. (2006); Fernando de Noronha Archipelago (40%), by Villça et al. (2006); Santa Catarina Island (50%), by Batista (2012)]. As for the Ectocarpales order, the predominance only occurred in the marine flora of ASPSP (Burgos et al. (2009) and Villça et al. (2006) and of Santa Catarina Island (Batista, 2012), as in the remaining islands the predominant order were the Dictyotales. Considering green algae, the Cladophorales predominance matched the data from Paraná, Santa Catarina and Atol das Rocas (Villça et al. 2006), but in the others the Bryopsidales dominated. The orders that predominated in each of the three divisions were the ones that usually are more common and frequent (Pedrini et al. 1989; Nassar 1994; Villça et al. 2006; Pellizzari et al. 2014). The Cladophorales predominated within the Chlorophyta division only in Santa Catarina's coastal islands (Batista 2012), Paraná's islands (Pellizzari et al. 2014) and Atol das Rocas (Villça et al. 2006). The Bryopsidales exceeded in oceanic islands [for ex. Trindade and Martim Vaz's islands, by Pedrini et al. (1989) and Nassar (1994), in ASPSP, according to Burgos et al. (2009) and Villça et al. (2006) except in Boipeba Island (Moura et al., 2015)].

The major contribution to the taxonomic inventory of Grande's Island marine and estuarine benthic flora was given by the second phase of studies (local researches). The first phase's

works were written because of sporadic visits mainly of foreign scientists (Howe, 1928) or zoologists (Costa, 1962). Only the second phase was relevant in terms of taxonomic contributions. Even so, the majority of these works covered only determined and limited areas of the island centered in its north region (Falcão et al. 1992), south region (Gestinari et al. 1992) or central region (Mena 2005). Only Figueiredo and Tâmega (2007) that set fifteen sampling points distributed along the island's littoral and still only one time in summer and winter. The third phase's studies of ecological nature were in too specific and sporadic points and in a rocky shore, and its results cannot be interpreted as a good representation of the totality nor be generalized for the adjacent areas. Studies regarding crustose calcareous red algae are still inexistent. However, Tâmega et al. (2015) did studied it in the Queimada Grande Island, a location quite near to Grande Island. The outcome was the identification of *Lithophyllum corallinae*, *L. stictaeforme* e *Hydrolithon reinboldii*. Through an intensification of taxonomic researches of crustose coralline algae in Grande Island, the number of documented taxa could increase even more.

There are still a lot to be done when considering taxonomic and ecological aspects, being the final goal to create a specialized database to aid in biodiversity monitoring programs and in conservation and environmental control.

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APPENDIX 1

Appendix 1. List of algae taxa determined among the sixteen works . Legend: 1= Falcão et al (1992), 2 = Gestinari et al. (1998), 3 = Oliveira(2002), 4 = Cassano et al. (2004), 5 = Mena (2005), 6 = Széchy et al. (2005), 7 = Silva & Coutinho (2005), 8 = Cassano (2007), 9 = Figueiredo & Tâmega (2007), 10 = Lages et al. (2011), 11= Mangelli & Creed (2010), 12 = Assis (2013), 13 = Nauer et al. (2014a), 14 = Torrano-Silva et al. (2014), 15 = Tamega et al. (2015), 16 = Jesus et al. (2016)

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Phylum: Chlorophyta																
Class: Ulvophyceae																
Order: Ctenocladales																
Family: Ulvellaceae																
<i>Ulvella viridis</i> (Reinke) R. Nilsen, C.J. O'Kelly & B. Worsley = <i>Acrochaete viridis</i> (Reinke) R. Nilsen = <i>Entocladia viridis</i> Reinke					5											
Order: Ulvales																
Family: Gayraliaceae																
<i>Gayralia oxysperma</i> (Kützinger) K.L. Vinogradov ex Scagel et al. = <i>Ulvaria oxysperma</i> (Kützinger) Bliding	1	2														
Family: Ulvaceae																
<i>Ulva clathrata</i> (Roth) C. Agardh = <i>Enteromorpha clathrata</i> (Roth) Greville		2														
<i>Ulva compressa</i> Linnaeus = <i>Enteromorpha compressa</i> (Linnaeus) Nees		2														
<i>Ulva fasciata</i> Delile	1	2	3		5	6			9							
<i>Ulva flexuosa</i> Wulfen subsp. <i>flexuosa</i> = <i>Enteromorpha flexuosa</i> , <i>E. lingulata</i>	1	2	3		5	6					12					
<i>Ulva flexuosa</i> subsp. <i>paradoxa</i> (C. Agardh) M.J. Wynne = <i>Enteromorpha paradoxa</i> (C. Agardh) Kützinger	1				5											
<i>Ulva lactuca</i> Linnaeus	1	2			5		7				12					
<i>Ulva linza</i> Linnaeus = <i>Enteromorpha linza</i> (L.) J. Agardh		2														
<i>Ulva</i> sp.									9							
Class: Siphonocladophyceae																
Order: Cladophorales																
Family: Anadyomenaceae																
<i>Anadyomene stellata</i> (Wulfen in Jacq.) C. Agardh	1				5											
Family: Cladophoraceae																

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Chaetomorpha aerea</i> (Dillwyn) Kützing	1	2			5	6			9							
<i>Chaetomorpha antennina</i> (Bory) Kützing	1	2							9							
<i>Chaetomorpha brachygona</i> Harvey		2			5											
<i>Chaetomorpha capillaris</i> (Kützing) Børgesen	1															
<i>Chaetomorpha gracilis</i> Kützing					5											
<i>Chaetomorpha minima</i> Collins & Herv.	1				5											
<i>Chaetomorpha nodosa</i> Kützing	1				5											
<i>Chaetomorpha</i> sp.												12				
<i>Cladophora brasiliiana</i> G.Martens						6										
<i>Cladophora rupestris</i> (L.) van den Hoek		2			5	6										
<i>Cladophora catenata</i> (L.) Kützing		2														
<i>Cladophora coelothrix</i> Kützing		2			5											
<i>Cladophora corallicola</i> Børgesen	1	2														
<i>Cladophora montagneana</i> Kützing		2			5											
<i>Cladophora prolifera</i> (Roth) Kützing	1	2			5											
<i>Cladophora pellucidoidea</i> C.Hoek						6										
<i>Cladophora vagabunda</i> (L.) van den Hoek	1	2			5	6										
<i>Cladophora</i> sp. 1			3													
<i>Cladophora</i> sp. 2									9							
<i>Cladophora</i> sp. 3												12				
<i>Rhizoclonium africanum</i> Kützing		2														
<i>Rhizoclonium riparium</i> (Roth) Kützing	1		3													
Order: Siphonocladales																
Family: Boodleaceae																
<i>Boodlea composita</i> (Harvey) F. Brand					5											
<i>Cladophoropsis membranacea</i> (Agardh) Børgesen	1	2	3		5											
Class: Bryopsidophyceae																
Order: Bryopsiales																

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Family: Bryopsidaceae																
<i>Bryopsis pennata</i> J. V. Lamouroux	1	2			5				9			12				
<i>Bryopsis plumosa</i> (Hudson) C.Agardh		2							9							
Family: Derbesiaceae																
<i>Derbesia marina</i> (Lyngbye) Solier	1															
Family: Codiaceae																
<i>Codium decorticatum</i> (Woodward) M.A.Howe	1	2							9							
<i>Codium intertextum</i> Collins & Hervey	1	2				6			9		11					
<i>Codium isthmocladum</i> Vickers					5											
<i>Codium taylori</i> P. C. Silva	1	2			5		7		9							
Family: Caulerpaceae																
<i>Caulerpa fastigiata</i> Montagne	1	2	3		5				9							
<i>Caulerpa racemosa</i> (Forsskal) J.Agardh	1	2			5				9		11					
<i>Caulerpa sertularioides</i> (S.G.Gmelin) M.A.Howe									9							
<i>Caulerpa scalpelliformis</i> (R. Br. ex Turner) C. Agardh = <i>C. scalpelliformis</i> f. <i>denticulata</i>					5											
<i>Caulerpa ambigua</i> Okamura= <i>Caulerpella ambigua</i> (Okamura) Prud' homme & Lokhorst		2														
Family: Dichotomosiphonaceae																
<i>Avrainvillea elliottii</i> A. Gepp & E. Gepp	1				5											
Family: Udoteaceae																
<i>Boodleopsis pusilla</i> (Collins) W.R.Taylor, A.B. Joly, & Bernatowicz	1				5											
<i>Boodleopsis vaucheroidea</i> Calderón-Sáenz & Schletter				4	5											
Class: Dasycladeophyceae																
Order: Dasycladales																
Family: Polyphysaceae																
<i>Acetabularia schenckii</i> K. Möbius	1															
Total Chlorophyta 51																
Phylum: Ochrophyta																

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Class: Phaeophyceae																
Order: Asterocladales																
Family: Asterocladaceae																
<i>Asterocladon rhodochortonoides</i> (Børgesen) Uwai, Nagasato, Motomura & Kogame = <i>Asteronema rhodochortonoides</i> (Børgesen) D.G.Müller & Parodi					5											
Order: Dictyotales																
Family: Dictyotaceae																
<i>Canistrocarpus cervicornis</i> f. <i>cervicornis</i> (Kützing) De Paula & De Clerck = <i>Dictyota</i> <i>cervicornis</i> , <i>Dictyota pardalis</i>	1	2			5	6			9							
<i>Canistrocarpus crispatus</i> = <i>Dictyota crispata</i> J. V. Lamouroux					5											
<i>Dictyopteris delicatula</i> J. V. Lamouroux	1	2			5			9								
<i>Dictyopteris plagiogramma</i> (Montagne) Vickers	1				5											
<i>Dictyota ciliolata</i> Kützing = <i>Dictyopteris ciliolata</i> Olhar Wynne	1	2			5			9								
<i>Dictyota crenulata</i> J. Agardh = <i>Dictyota jamaicensis</i> W.R. Taylor	1															
<i>Dictyota menstrualis</i> (Hoyt) Schnetter, Horing, & Weber-Peukert = <i>Dictyota dichotoma</i> (Hudson) J.V. Lamouroux	1						7	9			12					
<i>Dictyota mertensii</i> (Mart.) Kützing	1				5											
<i>Dictyota</i> spp.									10							
<i>Lobophora variegata</i> (J.V. Lamouroux) Womersley ex E.C. Oliveira	1					6		9								
<i>Padina gymnospora</i> (Kützing) Sonder = <i>Padina vickersiae</i> Hoyt	1	2			5	6	7	9	10							
<i>Padina</i> sp.											12					
<i>Spatoglossum schroederi</i> (C. Agardh) Kützing	1				5											
Order: Sphacelariales																
Family: Sphacelariaceae																
<i>Sphacelaria brachygonia</i> Montagne	1	2				6										
<i>Sphacelaria rigidula</i> Kützing	1	2			5	6										
<i>Sphacelaria tribuloides</i> Menegh.	1	2			5	6					12					
<i>Sphacelaria</i> sp.											12					

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Sphacelaria</i> spp.									9							
Order: Fucales																
Family: Sargassaceae																
<i>Sargassum cymosum</i> C.Agardh	1								9							
<i>Sargassum cymosum</i> var. <i>nanum</i> E.de Paula & E.C.Oliveira		2														
<i>Sargassum filipendula</i> C. Agardh	1				5				9							
<i>Sargassum filipendula</i> C. Agardh var. <i>pinnatum</i> Grunov					5											
<i>Sargassum furcatum</i> Kützing	1					6			9							
<i>Sargassum hystrix</i> J.Agardh									9							
<i>Sargassum ramifolium</i> Kützing									9							
<i>Sargassum vulgare</i> C. Agardh	1				5	6			9			12				
<i>Sargassum vulgare</i> C. Agardh var. <i>foliosissimum</i> (Lamouroux) C. Agardh		2														
<i>Sargassum</i> sp. 1							7									
<i>Sargassum</i> sp. 2							7									
<i>Sargassum</i> sp. 3											11					
<i>Sargassum</i> spp.										10						
Order: Ectocarpales																
Family: Acinetosporaceae																
<i>Feldmannia indica</i> (Sond.) Womersley & A. Bailey					5											
<i>Feldmannia irregularis</i> (Kützing) Hamel = <i>Hincksia irregularis</i>	1	2			5	6										
<i>Feldmannia simplex</i> (P.L.Crouan & H.M.Crouan) G.Hamel	1	2														
<i>Feldmannia</i> sp. = <i>Ectocarpus</i> sp.											10					
<i>Hincksia conifera</i> (Børgesen) Abbott					5											
<i>Hincksia mitchelliae</i> (Harvey) P.C.Silva = <i>Feldmannia mitchelliae</i> (Harvey) H.-S.Kim	1	2			5							12				
Family: Chordariaceae																
<i>Elachistiella leptonematoides</i> Cassano, Yonesh. & M.J Wynne = <i>Leptonematella fasciculata</i> (Reinke) P.C.Silva		2														
<i>Levringia brasiliensis</i> (Montagne) A.B.Joly	1	2														

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Family: Scytosiphonaceae [Chnoosporaceae]																
<i>Chnoospora minima</i> (Hering) Papenfuss	1	2							9							
<i>Colpomenia sinuosa</i> (Roth) Derbès & Solier	1	2			5	6			9							
<i>Colpomenia</i> sp.												12				
<i>Petalonia fascia</i> (O.F.Müll.) Kintze					5		7									
<i>Rosenvingea intricata</i> (J.Agardh) Børgesen	1								9							
<i>Rosenvingea sanctae-crucis</i> Børgesen	1				5											
Order: Ralfsiales																
Family: Neoralfsiaceae																
<i>Neoralfsia expansa</i> (J.Agardh) P.-E.Lim & H.Kawai ex Kraft = <i>Ralfsia expansa</i> (J.Agardh) J.Agardh	1	2						7	9							
Order: Scytothamnales																
Family: Asteronemataceae																
<i>Asteronema breviarticulatum</i> (J.Agardh) Ouriques & Bouzon = <i>Hincksia breviarticulata</i> (J.Agardh) P.C.Silva	1	2							9							
Order: Scytothamnales																
Family: Bachelotiaceae																
<i>Bachelotia antillarum</i> (Grunov) Gerloff	1	2			5											
Total Ochrophyta 49																
Phylum: Rhodophyta																
Class: Stylonematophyceae																
Order: Stylonematales																
Family: Stylonemataceae																
<i>Stylonema alsidii</i> (Zanardini) K. M. Drew	1				5	6										
Class: Compsopogonophyceae																
Order: Erythropeltidales																
Family: Erythrotrichiaceae																

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Erythrotrichia carnea</i> (Dillwyn) J.Agardh	1	2			5	6										
<i>Sahlingia subintegra</i> (Rosenv.) Kornmann					5	6										
Class: Bangiophyceae																
Order: Bangiales																
Family: Bangiaceae																
<i>Bangia fuscopurpurea</i> (Dillwyn) Lyngbye = <i>Bangia atropurpurea</i> (Mertens ex Roth) C.Agardh		2														
<i>Bangiopsis dumontioides</i> (P.L.Crouan & H.M.Crouan) V.Krishnmurthy					5											
<i>Pyropia acanthophora</i> E.C.Oliveira & Coll = <i>Porphyra acanthophora</i> v. <i>acanthophora</i>	1	2	3						9							
<i>Porphyra pujalsiae</i> Coll & E.C.Oliveira									9							
Class: Florideophyceae																
SubClass: Corallinophycidae																
Order: Corallinales																
Family: Hapalidaceae																
<i>Melobesia membranacea</i> (Esper) J.V. Lamouroux					5											
Family: Corallinaceae sub Mastophoroideae																
<i>Hydrolithon reinboldii</i> (Weber-van Bosse & Foslie) Foslie															15	
<i>Pneophyllum fragile</i> Kützing					5											
Family: Corallinaceae sub Corallinoideae																
<i>Arthrocardia variabilis</i> (Harv.) Weber Boss = <i>A. gardneri</i> ; <i>A. flabellata</i> ; <i>A. stephensonii</i>	1	2			5				9							
<i>Jania adhaerens</i> J. V. Lamouroux	1	2			5	6			9			12				
<i>Jania capillacea</i> Harvey					5				9							
<i>Jania cubensis</i> Mont ex. Kützing.= <i>Halitilon cubense</i> (Mont. ex Kützing) Garbary & H.W.Johansen		2														
<i>Jania prolifera</i> A.B. Joly		2														
<i>Jania crassa</i> (Linnaeus) J.V. Lamouroux = <i>Jania Rubens</i> (Linnaeus) J.V. Lamouroux	1	2			5				9					14		
<i>Jania subulata</i> (J.Ellis & Sol.) Sond = <i>Halitilon subulatum</i> (J.Ellis & Solander) H.W. Johansen	1															

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Family: Corallinaceae sub Lithophylloideae																
<i>Amphiroa anastomosans</i> Weber-van Bosse						6										
<i>Amphiroa beauvoisii</i> Lamouroux		2			5	6			9							
<i>Amphiroa brasiliiana</i> Decaisne		2			5											
<i>Amphiroa fragilissima</i> (L.) J.V. Lamouroux	1				5	6								14		
<i>Amphiroa</i> sp. 1														14		
<i>Amphiroa</i> sp.2												12				
<i>Lithophyllum corallinae</i> (P.Crouan & H.Crouan) Heydrich															15	
<i>Lithophyllum stictaeforme</i> (Areschoug) Hauck															15	
<i>Lithophyllum incrustans</i> Philippi						6										
<i>Paulsilvella huveorum</i> Woelkerling, Sartoni & Boddi														14		
<i>Titanoderma</i> sp.						6										
SubClass: Nemaliophycidae																
Order: Acrochaetiales																
Family: Acrochaetiaceae																
<i>Acrochaetium microscopicum</i> (Nägeli ex Kützing) Nägeli = <i>Audouinella microscopica</i> (Nägeli ex Kützing) Woelkerling	1				5	6										
<i>Acrochaetium unipes</i> Børgesen = <i>Audouinella unipes</i> Børgesen					5											
Order: Colaconematales																
Family: Colaconemataceae																
<i>Colaconema hypneae</i> (Børgesen) A.A. Santos & C.W.N. Moura = <i>Acrochaetium hypneae</i> Børgesen					5											
Order: Nemaliales																
Family: Galaxauraceae																
<i>Dichotomaria marginata</i> (J.Ellis & Solander) Lamarck = <i>Galaxaura marginata</i> (Ellis & Solander) J.V.Lamouroux	1	2			5				9	10						
<i>Tricleocarpa cylindrica</i> (J. Ellis & Sol.) Huisman & Borow									9							

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A.Townsend = <i>Galaxaura oblongata</i> (Ellis & Solander) J.V.Lamouroux	1															
SubClass: Rhodymeniophycidae																
Order: Bonnemaisoniales																
Family: Bonnemaisoniaceae																
<i>Asparagopsis taxiformis</i> (Delile) Trevisan de Saint-Léon	1	2			5	6			9	10	11					
<i>Asparagopsis</i> = <i>Falkenbergia</i>										10						
Order: Ceramiales																
Family: Callithamniaceae																
<i>Aglaothamnion boergesenii</i> (Aponte & D.L Ballant.) L' Hardy-Halos & Rueness = <i>Callithamnion byssoides</i> Arnott ex Harvey		2			5											
<i>Aglaothamnion cordatum</i> (Borgesén) Feldm.-Mas = <i>Callithamnion neglectum</i> (Feldmann-Mazoyer) Wynne	1															
<i>Aglaothamnion felipponei</i> (M. Howe) Aponte, Ballantine & J.N.Norris = <i>Callithamnion felipponei</i> Howe	1	2														
<i>Aglaothamnion uruguayense</i> (W.R.Taylor) N.E.Aponte, D.L.Ballantine & J.N.Norris = <i>Callithamnion uruguayense</i> W.R Taylor	1	2			5											
Family: Ceramiaceae																
<i>Centroceras gasparrini</i> (Meneghini) Kützing = <i>Centroceras clavulatum</i> (C.Agardh) Montagne	1	2			5	6			9			12				
<i>Centrocerocolax ubatubensis</i> A.B.Joly					5											
<i>Ceramium brasiliense</i> A.B.Joly	1	2														
<i>Ceramium brevizonatum</i> H.Petersen	1	2														
<i>Ceramium brevizonatum</i> H.Petersen var. <i>caraibicum</i> H.E.Petersen & Børgesen					5	6										
<i>Ceramium codii</i> (H.Richards) Mazoyer		2			5											
<i>Ceramium comptum</i> Børgesen	1	2			5	6										
<i>Ceramium deslongchampii</i> Chauv. ex Duby = <i>Ceramium strictum</i> Harvey		2			5											

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Ceramium diaphanum</i> (Lightf.) Roth = <i>Ceramium tenuissimum</i> (Roth) Areschoug, nom. illeg.		2			5	6										
<i>Ceramium luetzelburgii</i> O.C. Schmidt	1	2			5											
<i>Ceramium tenerrimum</i> (G.Martens) Okamura	1	2			5	6										
<i>Ceramium vagans</i> P.C.Silva = <i>Ceramium vagabundum</i> E.Y.Dawson, nom. illeg.	1	2			5	6										
<i>Ceramium</i> sp. 1			3													
<i>Ceramium</i> sp. 2								9								
<i>Gayliella transversalis</i> (F.S.Collins & Hervey) T.O.Cho & Fredericq = <i>Ceramium flaccidum</i> (Harvey ex Kützing) Ardissone		2			5	6										
<i>Gayliella</i> sp. (= <i>Ceramium dawsonii</i> A.B.Joly)	1	2			5											
Family: Dasyaceae																
<i>Dasya rigidula</i> (Kützing) Ardiss. = <i>Dasya brasiliensis</i> E.C.Oliveira Filho & Y.Y.Braga	1	2			5	6			9							
<i>Dasya corymbifera</i> J. Agardh	1	2							9							
<i>Dasya</i> sp. 1	1															
<i>Dasya</i> sp. 2												12				
<i>Heterosiphonia crispella</i> (C. Agardh) M. J. Wynne	1	2			5											
Family: Delesseriaceae																
<i>Caloglossa leprieurii</i> (Montagne) G. Martens	1		3		5											
<i>Taenioma perpusillum</i> (J.Agardh) J.Agardh	1															
Family: Rhodomelaceae																
<i>Acanthophora spicifera</i> (M.Vahl) Børgesen	1				5				9	10		12				
<i>Bostrychia calliptera</i> (Montagne) Montagne		2														
<i>Bostrychia moritziana</i> (Sond. ex. Kützing) J.Agardh = <i>Bostrychia radicans</i> f. <i>moniliformis</i> Post	1	2			5											
<i>Bostrychia radicans</i> (Montagne) Montagne in Orbigny = <i>Bostrychia radicans</i> f. <i>radicans</i>		2			5											
<i>Bostrychia binderi</i> Harvey	1	2	3		5				9							

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Bryocladia cuspidata</i> (J.Agardh) De Toni		2														
<i>Bryocladia thyrsgera</i> (J.Agardh) F. Schmitz	1	2			5											
<i>Chondria atropurpurea</i> Harvey		2										12				
<i>Chondria floridana</i> (F.S.Collins) M.A.Howe												12				
<i>Chondria leptacremon</i> (Melvill) De Toni					5											
<i>Chondria polyrhiza</i> F.S.Collins & Hervey	1								9							
<i>Chondria</i> sp.	1															
<i>Herposiphonia secunda</i> (C.Agardh) Ambrohn = <i>Herposiphonia secunda</i> f. <i>secunda</i>	1	2			5	6										
<i>Herposiphonia tenella</i> (C. Agardh) M. J. Wynne = <i>Herposiphonia secunda</i> f. <i>tenella</i> (C.Agardh) M.J.Wynne	1	2			5											
<i>Laurencia caduciramulosa</i> Masuda & Kawaguchi								8								
<i>Laurencia dendroidea</i> J.Agardh = <i>Laurencia arbuscula</i> , <i>L. filiformis</i> , <i>L. cf. obtusa</i>		2			5				9	10		12				
<i>Laurencia intricata</i> J.V.Lamouroux = <i>Laurencia implicata</i> J.Agardh		2														
<i>Laurencia oliveirana</i> Yoneshigue		2														
<i>Laurencia</i> sp. 1	1															
<i>Laurencia</i> sp. 2											11					
<i>Laurencia</i> sp. 3							7									
<i>Laurencia</i> sp. 4												12				
<i>Lophocladia trichocladus</i> (C.Agardh) F.Schmitz	1															
<i>Murrayella pericladus</i> (C. Agardh) F. Schmitz	1				5											
<i>Neosiphonia ferulacea</i> (Suhr ex J.Agardh) S.M.Guimarães & M.T.Fujii = <i>Polysiphonia ferulacea</i> Suhr ex J.Agardh	1	2			5	6			9	10						
<i>Neosiphonia howei</i> (Hollenberg) Skelton & G.R.South = <i>Polysiphonia howei</i> Hollenberg	1	2	3		5	6										
<i>Neosiphonia sphaerocarpa</i> (Børgesen) M. S. Kim & I.K. Lee					5											
<i>Neosiphonia tepida</i> (Hollenberg) S.M.Guimarães & M.T.Fujii = <i>Polysiphonia tepida</i> Hollenberg		2														
<i>Ophidocladus simpliciusculus</i> (P.L.Crouan & H.M.Crouan) Falkenberg	1	2														

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Palisada perforata</i> (Bory) K.W.Nam = <i>Laurencia papillosa</i> (C.Agardh) Greville	1	2			5											
<i>Palisada flagellifera</i> (J.Agardh) K.W.Nam = <i>Laurencia flagellifera</i> ; <i>L. cf flagellifera</i>		2							9							
<i>Polisiphonia subtilissima</i> Montagne	1	2			5							12				
<i>Polysiphonia decussata</i> Hollenberg	1															
<i>Polysiphonia denudata</i> (Dillwyn) Greville ex Harvey in Hooker		2				6										
<i>Polysiphonia havanensis</i> Montagne	1	2														
<i>Polysiphonia scopulorum</i> Harvey var. <i>scopulorum</i>					5				9							
<i>Polisiphonia</i> sp.	1															
<i>Pterosiphonia parasitica</i> (Hudson) Falkenberg		2														
<i>Pterosiphonia pennata</i> (C.Agardh) Sauvageau = <i>Polysiphonia pennata</i> (C.Agardh) J.Agardh	1	2			5				9							
Family: Spyridiaceae																
<i>Spyridia clavata</i> Kützing	1				5											
<i>Spyridia filamentosa</i> (Wulfen) Harv. in Hook	1				5							12				
<i>Spyridia hypnoides</i> (Bory de Saint-Vincent) Papenfuss					5											
Family: Wrangeliaceae																
<i>Gymnothamnion elegans</i> (Schousb. ex C. Agardh) J. Agardh					5											
<i>Ptilothamnion speluncarum</i> (Collins & Herv.) D.L. Ballant & M.J. Wynne					5											
<i>Spermothamnion nonatoi</i> A. B. Joly					5	6										
<i>Spongoclonium caribaeum</i> (Børgesen) M.J. Wynne = <i>Pleonosporium polystichum</i> E.C Oliveira	1				5											
<i>Wrangelia argus</i> (Montagne) Montagne	1	2			5				9							
<i>Wrangelia penicillata</i> (C. Agardh) C. Agardh					5											
Order: Gelidiales																
Family: Gelidiaceae																
<i>Gelidium crinale</i> (Turner) Gaillon					5	6						12				
<i>Gelidium floridanum</i> W.R Taylor	1	2			5				9							
<i>Gelidium</i> sp. = <i>Gelidium pusillum</i> (Stackh.)Le Jol.	1	2	3		5	6			9	10		12				

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Parviphycus tenuissimus</i> (Feldmann) Santel.= <i>Parviphycus pannosus</i> (Feld.) G.Furnari						6						12				
<i>Parviphycus trinitatensis</i> (W.R. Taylor) Wynne = <i>Gelidiella trinitatensis</i> W.R.Taylor	1	2							9							
Family: Gelidiellaceae																
<i>Gelidiella acerosa</i> (Forsskål) Feldmann & G.Hamel									9							
<i>Gelidiella</i> sp.									9							
Family: Pterocladaceae																
<i>Pterocladia caerulescens</i> (Kützing) Santel.& Hommers.					5											
<i>Pterocladia capillacea</i> (S.G Gmel.) Santel. & Holmmers = <i>Pterocladia capillacea</i> (S.G.Gmelin) Bornet	1	2							9							
<i>Pterocladia bartlettii</i> (W.R.Taylor) Santelices = <i>P. taylorii</i> (Joly) Santelices = <i>Gelidiella taylorii</i> A.B.Joly									9							
Order: Gigartinales																
Family: Cystocloniaceae																
<i>Hypnea brasiliensis</i> P. B. Jesus, F. Nauer & J. M. C. Nunes																16
<i>Hypnea cenomyce</i> J. Agardh					5											
<i>Hypnea cervicornis</i> J.Agardh	1	2										13				
<i>Hypnea pseudomusciformis</i> (Wulfen in Jacqu.) J.V.Lamouroux = <i>Hypnea musciformis</i> (Wulfen) J.V.Lamouroux	1	2			5				9			12				
<i>Hypnea spinella</i> (C. Agardh) Kützing	1	2			5	6			9	10						
<i>Hypnea</i> sp.1												13				
<i>Hypnea</i> sp. 2												13				
Family: Phylloporaceae																
<i>Gymnogongrus griffithsiae</i> (Turner) Mart.	1	2	3		5											
Family: Gigartinaceae																
<i>Chondracanthus acicularis</i> (Roth) Frederica = <i>Gigartina acicularis</i> (Roth) J.V.Lamouroux	1	2	3		5	6										
<i>Chondracanthus teedei</i> (Mertens ex Roth) Fredericq = <i>Gigartina teedii</i> (Mertens ex Roth) J.V.Lamouroux		2														
Family: Solieriaceae																

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Meristotheca gelidium</i> (J.Agardh) E.J.Faye & M.Masuda = <i>Meristiella gelidium</i> (J.Agardh) D.P.Cheney & P.W.Gabrielson									9							
<i>Solieria filiformis</i> (Kützing) P. W. Gabrielson	1				5				9							
Order: Gracilariales																
Family: Gracilariaceae																
<i>Gracilaria caudata</i> J.Agardh					5											
<i>Gracilaria cervicornis</i> (Turner) J.Agardh					5											
<i>Gracilaria domingensis</i> (Kützing) Sonder ex Dickie	1															
Order: Halymeniales																
Family: Halymeniaceae																
<i>Grateloupia doryphora</i> (Montagne) M. Howe					5											
<i>Grateloupia filicina</i> (J.V. Lamouroux) C. Agardh	1	2			5											
<i>Grateloupia</i> sp.												12				
<i>Halymenia rosea</i> M.A. Howe & W.R.Taylor									9							
Order: Sebdeniales																
Family: Sebdeniaceae																
<i>Sebdenia flabellata</i> (J.Agardh) P.G.Parkinson									9							
Order: Peyssonneliales																
Family: Peyssonneliaceae																
<i>Peyssonnelia boudouresquii</i> Yonesh.					5											
<i>Peyssonnelia rosa-marina</i> Boudour. & Denizot					5											
<i>Peyssonnelia</i> sp.									9							
Order: Plocamiales																
Family: Plocamiaceae																
<i>Plocamium brasiliense</i> (Greville) M.A.Howe & W.R.Taylor	1															
Order: Rhodymeniales																
Family: Rhodymeniaceae																
<i>Botryocladia wynnei</i> Ballantine									9							

Appendix 1. Continued.

	Authors															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Rhodymenia pseudopalmata</i> (J.V.Lamouroux) P.C. Silva		2							9							
Family: Champiaceae																
<i>Champia minuscula</i> A.B.Joly & Ugadim	1															
<i>Champia parvula</i> (C. Agardh) Harvey	1	2			5	6										
<i>Champia salicornioides</i> Harvey		2														
<i>Champia vieillardii</i> Kutzing = <i>Champia compressa</i> Harvey	1	2			5	6			9							
<i>Gastroclonium parvum</i> (Hollenberg) C.F.Chang & B.M.Xia	1								9							
Family: Lomentariaceae																
<i>Ceratodictyon planicaule</i> (W.R.Taylor) M.J.Wynne = <i>Gelidiopsis planicaulis</i> (W.R.Taylor) W.R.Taylor	1	2			5	6										
<i>Ceratodictyon variabile</i> (Grev. ex J. Agardh) R.E Norris = <i>Gelidiopsis gracilis</i> ; <i>G. variabilis</i>	1	2			5	6			9							
<i>Lomentaria corallicola</i> Børgesen					5	6										
Total Rhodophyta 156																

Total of the 3 phyla: 256