GENERAL COMMENTS ON SPECIES INVENTORY, FISHERIES, CULTURE AND SOME COMMUNITY FEATURES OF THE PORIFERA IN CUBA

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ABSTRACT

Up to now, 255 species have been reported in Cuba. Confirmed commercial species existing in Cuba are *Hippospongia lachne*, *Spongia obscura*, *S. pertusa*, *S. barbara* and *S. graminea*. The species *Spongia obliqua* and *S. tubulifera* are still considered here as dubious records. Since 1959 to 2000, national commercial sponge extraction varied between 7.5 tons (1966) and 63 tons (1996), with an annual average of 42.4 tons. However, the highest average annual sponge production in Cuba was reported in the period 1920-1929 (500 tons). *Hippospongia lachne* has been historically the main commercial sponge in the Golfo de Batabanó (southwest of Cuba) till 1994, when it began to be substituted by a group of species of *Spongia*. However, *Spongia* species always dominated fisheries in the north central part of Cuba. Pilot experiences on sponge culture in Cuba (using horizontally suspended lines on sea grass beds) have been successful, but not implemented as a well-established economic activity. Commercial sizes (15 cm in diameter) were attained after 18 months and faster growth rates were observed at the line level closest to the bottom (approximately 40 cm from the bottom). Most dominant sponge species for the most outstanding marine habitats of Cuba are given, as well as for a situation of pollution around Havana City. As expected, highest sponge diversity were found in coral reefs and inshore hard grounds. The highest values of community heterogeneity H' (very close to 3.5 natural bells) were found in the coral reefs of Cayo Esquivel (Archipelago Sabana-Camagüey) and Rincón de Guanabo (east of Havana City), in both cases at 20 m depth.

KEY WORDS

Sponge taxonomy, sponge fisheries, sponge culture and community.

RESEARCH ON THE PORIFERA OF CUBA

The Cuban marine sponge fauna has been moderately inventoried and studied from the taxonomic point of view along the south, northwest and north central parts of Cuba. Pioneer papers on Cuban sponge taxonomy are SCHMIDT, 1870, 1879, 1880; HYATT, 1875, 1877; LENDENFELD, 1889; MOORE, 1910; DE LAUBENFELS, 1936; STUART, 1948; DE LAUBENFELS & STORR, 1958 and KAMINSKAIA, 1971. Judging from the consulted literature, around 500 species of sponges are recognized as valid in the Wider Caribbean and it is possible that more than 600 species exist there. So far, 255 sponges have been registered to species level in Cuban waters (ALCOLADO, 1976, 1979a, 1980, 1981, 1984a, 1986, 2002; MONCADA *et al.,* 1984;

BUZNEGO & ALCOLADO, 1987; GOTERA & ALCOLADO, 1987) (Annex). The knowledge on the calcareous sponges (Calcispongiae) of Cuba it is virtually null, and that on the siliceous sponges (Hexactinellida), very scant.

Several recent investigations on sponge communities have been carried out in a number of biotopes of the southwest, northwest, and north central parts of Cuba (ALCOLADO, 1978, 1979b, 1985a, 1985b, 1989, 1990a, 1990b, 1992a, 1992b, 1994, 1999; ALCOLADO & GOTERA, 1985; ALCOLADO & HERRERA-MORENO, 1987). Methodological studies using ecological indexes in sponge communities also have been undertaken (ALCOLADO, 1984b, 1992b, 1994; ALCOLADO, *et al.,* 1994) as well as a work where the family Aplysinidae is analyzed with respect to its halogenated compounds (MAKARIEVA *et al.,* 1981).

STUART (1948) provides interesting information on harvesting and export of commercial sponges during the first half of the Twentieth Century in Cuba. On the other hand, PÁEZ-COSTA (1990a, 1990b, 1990c) offers information on the commercial sponges of Cuba compiled from FAO (1985), specialized literature and from the database of the Ministry of the Fishing Industry. Not less important are the experiences reported but unfortunately unpublished, from R. CARDONA, F. GARCÍA DEL BARCO, L. UBEDA & F. GUTIÉRREZ, that reveal the technical and economic viability of commercial sponge culture in Cuba. PÁEZ-COSTA (1990c) summarizes the actions related with the cultivation of commercial sponges in Cuba being based, partly, on the first two authors' reports. GROVAS-HERNÁNDEZ (1998), and GROVAS-HERNÁNDEZ & OLIVA-MIERES (1999) approach cultivation aspects and fishing, respectively.

SPONGE FISHERIES

The commercial sponges that the first author confirms as existing in Cuba are *Hippospongia lachne* Laubenfels, *Spongia obscura* Hyatt, *Spongia pertusa* Hyatt, *Spongia barbara* Duchassaing and Michelotti and *Spongia graminea* Hyatt. Records of *Spongia obliqua* Duchassaing and Michelotti (specimen illustrated by MOORE, 1910: Pl. LV, as "Cuba reef sponge", which maybe is not a *S. obliqua*) and *Spongia tubulifera* Lamarck (sponge fragment from Cuba mentioned by TOPSENT, 1930: 48) require more verification, mainly the latter. According to PÁEZ-COSTA (1990b), the harvesting of sponges in Cuba until the late eighties represented 30 % of the world production. The species *H. lachne* (commonly known in Cuba as "esponja hembra" that means "female sponge") was the most important of Cuban commercial sponges for its quality and prevailed in the sponge fishing in the Golfo de Batabanó (southwest of Cuba). Other species that are fished in Cuba are *S. obscura*, *S. barbara*, *S. pertusa* and *S. graminea*, all of which belong to the commonly named "esponjas machos" ("male sponges"). However, the genus *Spongia* has prevailed (80 %) in the sponge fishery around Caibarién (Archipiélago Sabana-Camagüey, north center of Cuba) (Fig. 1).

An analysis of the total harvesting of commercial sponges of Cuba since 1959 up to 1989 - including the data from PÁEZ-COSTA (1990b) and information of the Ministry of the Fishing Industry - shows (after a drop during the period 1959 - 1966, a peak in 1967 and a new drop in 1970), a trend of slow sustained growth with oscillations starting from 1970 (from 17.4 tons in that year up to 62.9 tons in 1989). Starting from 1989, an abrupt decrease of the total harvesting, down to 24.3 tons per

year is observed in 1993. This drop was due to the abrupt decrease of the fishing effort because of a strong economic crisis in the country named "special period", specifically for the great shortage of oil. Since then sponge harvesting increased up to 59 tons in 1996 to decrease again abruptly down to values of 50 - 56 tons per year in the period 1999 - 2001 (Fig. 2). Average landing for 1959 - 2000 is 42.5 tons. The FAO Fishery Yearbooks reports a harvesting of 500 tons in 1935 and a dropt to zero in 1950, after outbreaks of a sponge disease (STUART, 1948).

According to PÁEZ-COSTA (1990b), the highest harvesting always corresponded to the fishing grounds of Caibarién (Archipiélago Sabana-Camagüey), followed by those of the Golfo de Batabanó (southwest of Cuba) and at a lower level by those of Punta Alegre (also in the Archipiélago Sabana-Camagüey, but more to the east) (Figs 2, 3).

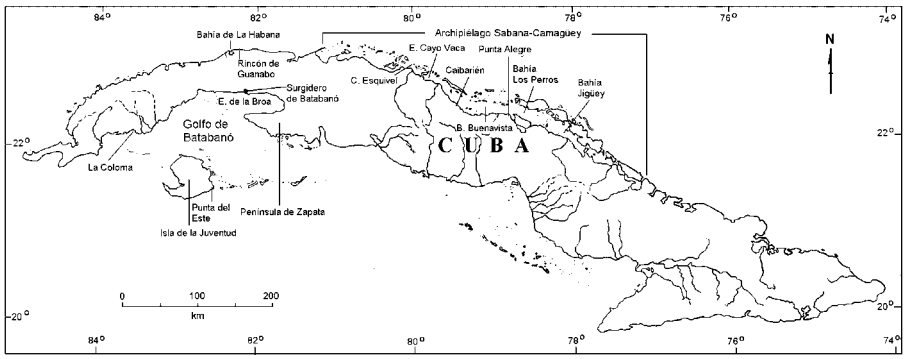

Fig. 1. Map of Cuba showing the locations that are mentioned in the text

STUART (1948) reports for Cuba a production of 200 tons of sponges in 1938 and 45 tons in 1947. He also mentions high export averages of 166 tons for the period 1910 - 1919; 505 tons for 1920 - 1929 and 391 tons for 1930-1939. He reports important annual exports for the years 1940 (428 tons), 1941 (91 tons) and 1943 (104 tons). The lowest exports are reported for the years 1945 (34 tons), 1946 (40 tons) and 1947 (20 tons). STUART (1948) mentions that the decline was due to disease outbreaks ("blight") during 1939 - 1943 and 1945, to a hurricane in 1944, and to a depressed trade because of high prices imposed by fishermen reacting to the high cost of life.

Particularly in the Golfo de Batabanó, from 1985 up to 1990, the fishing effort maintained a fairly stable level, while landings of *H. lachne* fluctuated around the 14 tons per year (GROVAS-HERNÁNDEZ & OLIVA-MIERES, 1999). Meanwhile, the species of *Spongia* were extracted in small quantities, beginning a slight increase in 1990. Starting from 1991 and up to 1993 there was a descent in the fishing operations because of the above mentioned crisis. The landings were low, mainly those of *H. lachne* (Fig. 2).

PÁEZ-COSTA (1990b) refers that in the Golfo de Batabanó the harvesting of species of *Spongia* was increased since 1994 because they were still abundant (they were scarcely extracted before). He also comments that *H. lachne* was close to the "stabilization phase" (level of harvesting that is supposed to be sustainable), and that

in some areas its populations declined due to both overfishing and environmental degradation.

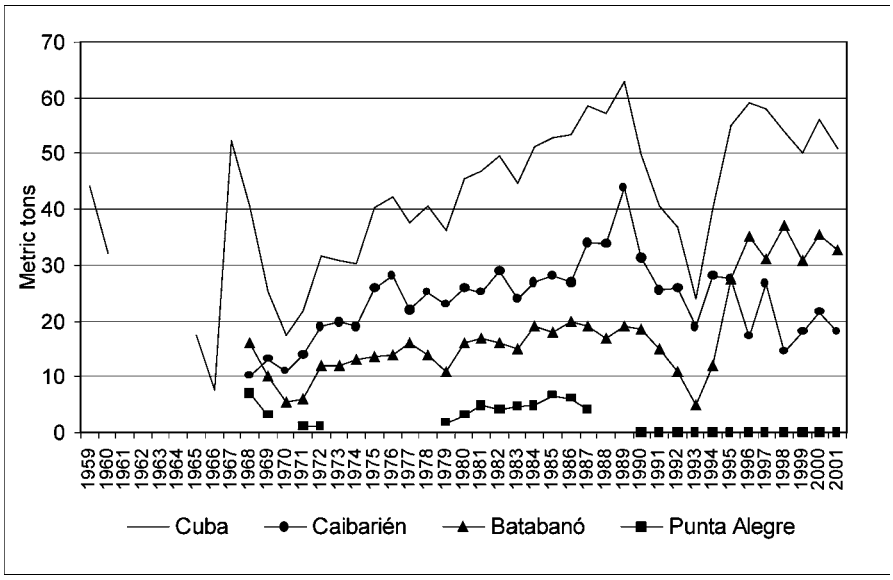

Fig. 2. Commercial sponge landings from 1959 to 2001. Data from 1968-1989 come from PÁEZ-COSTA (1990b).

According to GROVAS-HERNÁNDEZ & OLIVA-MIERES (1999), an increase of the fishing effort began in 1994 reaching the same levels of the eighties, that led to a harvesting of *Spongia* spp. up to levels never seen before in the Golfo de Batabanó (already comparable with those of *H. lachne* in 1994 and higher afterwards). This higher effort was encouraged by more favorable payments to fishermen and by the fact that species of *Spongia* were already more abundant than *H. lachne*. Before, the harvesting of *Spongia* spp. was restricted by quotas and this species lacked appeal for its insufficient fishing remuneration (Fig. 3).

The minimum allowed diameter for fishing *H. lachne* in Cuba is 35.6 cm; for *S. obscura* (*macho cueva*), 30.6 cm; and for *S. pertusa, S. barbara* and *S. graminea*, 20.8 cm (PÁEZ-COSTA, 1990b). GROVAS-HERNÁNDEZ & OLIVA-MIERES (1999) recommend to keep this regulation in force.

According to the information about sponge fishing ground distribution (National Atlas of Cuba 1970), that of PÁEZ-COSTA (1990b) and the authors' data, on the Archipiélago Sabana-Camagüey, the populations of commercial sponges are already virtually lost at Ensenada de Cayo Vaca, the western half of Bahía Buenavista, Bahía Los Perros y Bahía Jigüey. In the Golfo de Batabanó they are lost in the south of La Coloma, west of the Ensenada de la Broa, east of the Isla de la Juventud and in the soutwestern end and south center of the Península de Zapata. The causes include organic pollution (that destroys the seagrass beds and transforms them into muddy bottoms with high organic load), hypersalinization (in the bays of Jigüey and Los Perros), increased sedimentation, and bottom transformation by shrimp trawls.

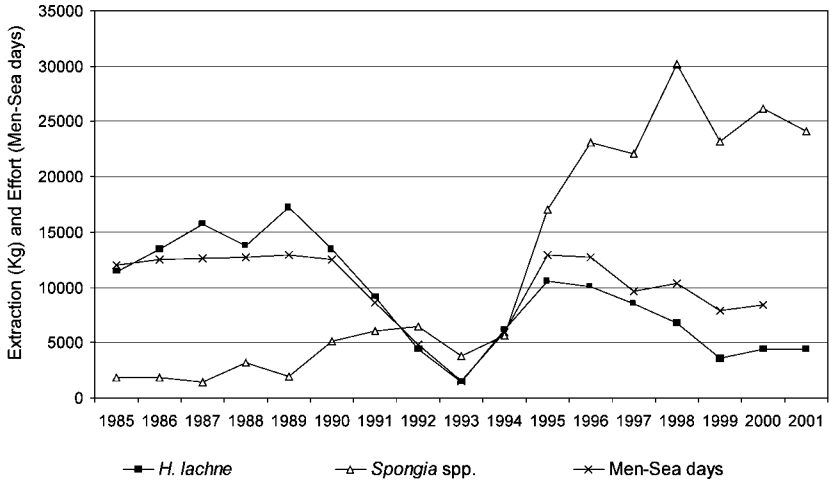

Fig. 3. Commercial sponge extraction and fishing effort in the Golfo de Batabanó (1985-2001). Data come, in part, from GROVAS-HERNÁNDEZ & OLIVA-MIERES, 1999.

SPONGE CULTURE

Since the 19th Century there already existed ideas about developing sponge culture in Cuba (VILARÓ, 1890). The first successful attemps in sponge culture in Cuba were achieved in 1965 by CARDONA (unpubl. data). The last culture experiences in Cuba have been successful (GARCÍA DEL BARCO, 1972; UBEDA, 1980, FERNANDO GUTIÉRREZ, pers. comm.), however it is not a well established activity yet. Indeed, at the moment sponge culture is not being practiced, what we believe is due to rather subjective causes.

Sponge culture in Cuba is carried out on shallow bottoms less than 4 m deep. The method selected in by the last mentioned authors is the suspended culture of sponge fragments of 1000 cm^3 (10 cm in sides) threaded with a needle along nylon lines (1.2 - 2 mm of diameter). The strings are held horizontally preferably by pairs of galvanized iron tubes (1.5 to 2 m long) nailed 0.4 - 0.7 m into the bottom, and separated 7 m. In another variant the strings are sustained also tied horizontally to galvanized iron tubes 5 m long also in horizontal position located parallelly 5 m apart (FERNANDO GUTIÉRREZ, pers. comm.). On the other hand, GROVAS-HERNÁNDEZ (1998) proposes that the sponge fragments be kept separated between them by pairs of knots denominated gasas by fishermen (misspelling of Spanish word "asa" that means "loop"), instead of the way it has been usually done, since the sponges exhibit a significantly faster growth rate, and the coalition of adjacent seeds can diminish cultured sponge quality.

FERNANDO GUTIÉRREZ (pers. comm.) observed that sponge fragments reached commercial size (15 cm in diameter) or they duplicate their weight (approximately 42 g) after 18 months, and quintuple it after 36 months. He also found that the sponges

of the lines closest to the bottom (30 - 40 cm of height) grew significantly faster than those of the lines above. The valuable study (regrettably unpublished) carried out by this researcher revealed a mortality of only 5 %, the profitability of the suspended culture in ecologically appropriate areas, and the feasibility to achieve the self-sufficient supply of "seeds" in the culture after 36 months. In an inedit report to the Ministry of Fishery Industry, S. Docampo mentions the profitability of the sponge culture method achieved. In PÁEZ (1990c) statistics are shown on the best quality of cultured sponges, and more details on sponge culture in Cuba are given. According to this author the advantages of sponge culture are:

- Better quality and more rounded shape of sponges.
- Simplification of the industrial process when minimizing the need of cutting and trimming the sponges.
- Higher value in the international market.
- Selection of areas with better conditions for sponge growth.
- Greater development of the near wild stocks.
- Selection of the sizes wanted in the crops.
- Better work conditions for fishermen.

SOME GENERAL FEATURES OF THE SPONGE COMMUNITIES OF CUBA

In Cuba, as elsewhere, sponges are present practically in all the marine habitats, in which they tend almost always to occupy one of the first places in biomass. Sponge species diversity is higher in coral reefs, diminishing successively in inshore hardgrounds, sandy and sandy-muddy seagrass beds, mangrove roots, muddy seagrass beds and lastly in muddy flats where only a few species can survive the strong sedimentation and the excessively soft consistency of the bottom.

In shallow reef areas, less than 7 m deep, the most common species are *Aplysina fistularis, Clathria virgultosa, Cliona caribbaea*f. *aprica, Chondrilla nucula, Scopalina ruetzleri, Cliona vesparia* and *Spirastrella coccinea*. In the deeper parts of the reefs (7 - 35 m), they are *Aplysina cauliformis, C. caribbaea*f. *aprica, Ectyoplasia ferox, Iotrochota birotulata, Mycale laevis, Niphates amorpha, Aiolochroia crassa* and *S. ruetzleri*. Other species that sometimes dominate here are *A. fistularis, Callyspongia vaginalis, C. nucula* and *Niphates digitalis* (ALCOLADO, 1990b).

In the greatest depths (between 30 and 35 m), *A. cauliformis, Ircinia felix* and *E. ferox* have been the most common and frequent species. In the deeper sandy-rocky reef terrace the common species are usually *Phoriospongia rubra, Oceanapia stalagmitica* and *Tectitethya crypta* (ALCOLADO, 1990b).

In areas influenced by organically and chemically polluted waters and silts of Havana Bay and of the Almendares and Quibú rivers (both in Havana City), a remarkable dominance in number of *Clathria venosa* and *I. birotulata* f. *musciformis* was observed by ALCOLADO & HERRERA-MORENO (1987) at depths of 10 - 15 m.

In mangrove roots the most common Porifera are *Tedania ignis, Lissodendoryx isodictyalis, Dysidea etheria, S. ruetzleri, Hyrtios proteus, Haliclona manglaris* and *Mycale microsigmatosa*. In a lesser degree also stand out *Haliclona implexiformis, Clathrina primordialis, Halichondria melanodocia, I. felix, Stelleta kallitetilla* and *Spongia* spp. (ALCOLADO, 1990b).

The most common species in the seagrass beds and sandy bottoms of Cuba are *A. fistularis* f. *fulva, Cliona varians, C. vesparia, H. proteus,* and *C. nucula*. In a lesser degree also stand out *Hyrtios violacea, T. ignis, Clathria schoenus, S. ruetzleri, I. felix, Amphimedon viridis, Geodia gibberosa, Spongia obscura* and *D. etheria*. In muddy bottoms, the most common sponges are *H. melanodocia, C. nucula, Suberites aurantiaca, Mycale angulosa, Niphates ramosa* and *Timea squamata*. In smaller quantity we also have *T. ignis, A. fistularis* f. *fulva,* and *D. etheria* (ALCOLADO, 1990b).

During dives on board of minisubmersibles ("Argus" in 1983 and "Johnson Sea Link II" in 1997), in the bathyal areas of the northwest and south of Cuba, it has been observed that the most common sponges are *Dactylocalyx pumiceus* (150 - 470 m), species of *Pachastrella* (290 - 700 m) and several lithistid species. One patch was densely populated by *Pheronema annae* (370 - 560 m). A yellow encrusting sponge on rock, that could not be collected, was very frequently observed. Between 100 and 150 m in depth *Ceratoporella nicholsoni, Stromatospongia vermicola, S. norae* and *Discodermia polydiscus* were usually plentiful.

In Cuban coral reefs the highest values of Shannon's H' heterogeneity index (calculated with natural logarithms) were 2.000, 3.031, 3.362, 3.344 and 3.507 (natural log base) for depths of 1 - 2, 5, 10, 15 and 20 m, respectively. All of them, except the first one, were obtained in the Archipiélago Sabana-Camagüey. The highest value (3.507 natural bells) was obtained at Cayo Esquivel, in the same archipelago (ALCOLADO, 1999). A very similar value was also observed at 20 m depth in Rincón de Guanabo, east of Havana City (ALCOLADO, 1989). For seagrass beds, ALCOLADO (1985b) found that the highest heterogeneity was 1.85 (natural log base), in the Golfo de Batabanó; for inshore hardgrounds, 3.40 (natural log base), in the same gulf (ALCOLADO, 1985b, 1990a); and for mangrove habitats, 2.370 (natural log base) in Punta del Este, southeast of Isla de la Juventud (ALCOLADO, 1985a).

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ANNEX

List of sponges recorded from Cuba

Phylum Porifera Grant, 1836
Class Hexactinellida Schmidt, 1870
Order Amphidiscosida Schrammen, 1924
Pheronema annae (Leidy, 1869)
Hyalonema kentii Schmidt, 1880
Order Lyssacinosida Zittel, 1877
Euplectella cf. *jovis* Schmidt, 1880
Order Hexactinosida Schrammen, 1903
Lefroyela crispa (Schmidt, 1870)
Margaritella coeloptychoides Schmidt, 1880
Myliusia callocyathus Gray, 1859
Myliusia conica (Schmidt, 1880)
Claviscopulia facunda (Schmidt, 1870)
Cyrtaulon sigsbeei (Schmidt, 1880)
Order Lychniscosida Schrammen, 1903
Dactylocalyx pumiceus Stutchbury, 1841
Scleroplegma lanterna Schmidt, 1880
Scleroplegma seriatum Schmidt, 1880
Neoaulocystis superstes (Schmidt, 1880)
Incertae sedis
Diaretula cornu Schmidt, 1880
Diaretula muretta Schmidt, 1880
Diplacodium mixtum Schmidt, 1880
Class Demospongiae Sollas, 1885
Order Homosclerophorida Dendy, 1905
Plakortis angulospiculatus (Carter, 1879)
Plakortis zyggompha (Laubenfels, 1936)
Order Astrophorida Sollas, 1888
Ancorina megastylifera (Winterman-Kilian & Kilian, 1984)
Asteropus album (Alcolado & Gotera, 1986)
Asteropus brasiliensis Hajdu & van Soest, 1992
Asteropus niger Hajdu & van Soest, 1992
Penares solidissima (Wilson, 1902)
Stelleta fibrosa (Schmidt, 1870)
Stelleta kallitetilla (Laubenfels, 1936)
Stelleta pudica (Wiedenmayer, 1977)
Erylus bahamensis Pulitzer-Finali, 1986
Erylus ministrongylus Hechtel, 1965
Erylus trisphaerus (Laubenfels, 1953)
Geodia gibberosa Lamarck, 1815
Geodia megastrella Carter, 1876
Geodia neptuni (Sollas, 1886)
Geodia papyracea Hechtel, 1965
Geodia thomsoni Schmidt, 1870
Pachastrella abyssi Schmidt, 1870
Calthropella lithistina Schmidt, 1880
Order Spirophorida Lévi, 1973
Cinachyrella alloclada (Uliczka, 1929)
Cinachyrella kuekenthali (Uliczka, 1929)
Order Lithistida van Soest, 1988
Discodermia amphiaster Schmidt, 1879
Discodermia dissoluta Schmidt, 1880
Discodermia inscripta (Schmidt, 1879)
Discodermia perfecta (Schmidt, 1879)
Discodermia polydiscus Du Bocage, 1869
Racodiscula asteroides Von Zittel, 1878
Racodiscula clava (Schmidt, 1879)
Corallistes typus Schmidt, 1870
Aciculites cribrophora (Schmidt, 1880)
Aciculites higginsi Schmidt, 1879
Amphibleptula madrepora Schmidt, 1879
Scleritoderma paccardi Schmidt, 1879
Setidium obtectum Schmidt, 1879
Siphonidium ramosum (Schmidt, 1870)
Leiodermatium pfeiferae (Carter, 1873)
Order Chondrosida Kobluk & van Soest, 1989
Chondrilla nucula Schmidt, 1862
Chondrosia collectrix (Schmidt, 1870)
Chondrosia reniformis Nardo, 1847
Order Hadromerida Topsent, 1894
Cliona amplicavata Rützler, 1974
Cliona aprica Pang, 1973
Cliona caribbaea Carter, 1882
Cliona cf. *celata* Grant, 1826
Cliona cuspidifera (Lamarck, 1814)
Cliona delitrix Pang, 1973
Cliona lampa Laubenfels, 1950
Cliona langae Pang, 1973
Cliona laticavicola Pang, 1973
Cliona cf. *mucronata* Sollas, 1888
Cliona paucispina Rützler, 1974
Cliona cf. *peponaca* Pang, 1973
Cliona schmidti (Ridley, 1881)
Cliona varians (Duchassaing & Michelotti, 1864)
Cliona vermifera Hancock, 1867
Cliona vesparia (Lamarck, 1815)
Spirastrella coccinea (Duchassaing & Michelotti, 1864)
Spirastrella cunctatrix Schmidt, 1868
Placospongia intermedia (Sollas, 1888)
Timea perastra Laubenfels, 1936
Timea squamata (Schmidt, 1870)
Timea stellata (Schmidt, 1870)
Polymastia nigra Alcolado, 1984
Polymastia sol (Schmidt, 1870)
Aaptos aaptos Schmidt, 1864
Aaptos lithophaga (Wiedenmayer, 1977)
Suberites aurantiaca (Duchassaing & Michelotti, 1964)
Terpios cf. *fugax* Duchassaing & Michelotti, 1864
Tectitethya crypta (Laubenfels, 1949)
Tethya actinia Laubenfels, 1950
Tethya aurantium (Pallas, 1766)
Order Agelasida Hartman, 1982
Agelas dispar Duchassaing & Michelotti, 1864
Agelas dispar cf. *clavaeformis* (Carter, 1883)

Agelas citrina Gotera & Alcolado, 1986
Agelas clathrodes (Schmidt, 1870)
Agelas conifera (Schmidt, 1870)
Agelas cylindricus (Carter, 1883)
Agelas flabelliformis (Carter, 1883)
Agelas sceptrum (Lamarck, 1815)
Agelas schmidti
Agelas wiedenmayeri Alcolado, 1984
Ceratoporella nicholsoni (Hickson, 1911)
Stromatospongia vermicola Hartman, 1969
Stromatospongia norae Hartman, 1969
Hispidopetra miniana Hartman, 1969
Order Halichondrida Vosmaer, 1885
Acanthella cubensis (Alcolado, 1984)
Auletta sycinularia Schmidt, 1870
Axinella corrugata (George & Wilson, 1919)
Axinella morchella Wiedenmayer, 1977
Axinella nanaspiculata Hartman, 1955
Axinella polycapella Laubenfels, 1953
Axinella pomponiae Álvarez, van Soest & Rützler, 1998
Axinella waltonsmithi (Laubenfels, 1953)
Bubaris incrustata (Alcolado & Gotera, 1986)
Phakellia folium Schmidt, 1870
Phakettia foliaformis (Lehnert & van Soest, 1996)
Dragmacidon reticulata (Ridley & Dendy, 1886)
Dragmacidon tubulosa (Alcolado & Gotera, 1986)
Svenzea zeai (Álvarez, van Soest & Rützler, 1998)
Ptilocaulis walpersi (Duchassaing & Michelotti, 1864)
Didiscus oxeata Hechtel, 1983
Higginsia strigilata (Lamarck, 1813)
Myrmekioderma gyroderma (Alcolado, 1984)
*Myrmekioderma styx*Laubenfels, 1953
Dictyonella funicularis (Rützler, 1981)
Scopalina hispida (Hechtel, 1965)
Scopalina ruetzleri (Wiedenmayer, 1977)
Halichondria corrugata Díaz, Pomponi & van Soest, 1993
Halichondria lutea Alcolado, 1984
Halichondria melanodocia Laubenfels, 1936
Hymeniacidon caerulea Pulitzer-Finali, 1986
Spongosorites siliquaria van Soest & Stentoft, 1988
Order Poecilosclerida Topsent, 1928
Antho clopetaria (Schmidt, 1870)
Artemisina melana van Soest, 1984
Clathria arcifera (Schmidt, 1880)
Clathria calla (Laubenfels, 1934)
Clathria cf. *dentata* Topsent, 1889
Clathria echinata (Alcolado, 1984)
Clathria minutus (van Soest, 1984)
Clathria oxeotus (van Soest, 1984)
Clathria schoenus (Laubenfels, 1936)
Clathria spinosa (Wilson, 1902)
Clathria venosa (Alcolado, 1984)
Pandaros acanthifolium Duchassaing & Michelotti, 1864
Cyamon vickersi (Bowerbank, 1864)
Ectyoplasia ferox (Duchassaing & Michelotti, 1864)
Eurypon laughlini Díaz, van Soest & Pomponi, 1993
Eurypon viridis (Topsent, 1889)
Phorbas amaranthus Duchassaing & Michelotti, 1864
Coelosphaera hechteli van Soest, 1984
Coelosphaera microraphida Alcolado, 1984
Coelosphaera raphidifera Hechtel, 1969
Forcepia cf. *grandisigmata* van Soest, 1984
Lissodendoryx isodictyalis (Carter, 1882)
Desmapsamma anchorata (Carter, 1882)
Holopsamma helwigi Laubenfels, 1936
Iotrochota birotulata (Higgin, 1877)
Xytopsues osburnensis (George & Wilson, 1919)
Tedania ignis (Duchassaing & Michelotti, 1864)
Acarnus deweerdtae van Soest, Hooper & Hiemstra, 1991
Acarnus innominatus Gray, 1867
Acarnus nicoleae van Soest, Hooper & Hiemstra, 1991
Monanchora arbuscula (Duchassaing & Michelotti, 1864)
Batzella rosea van Soest, 1984
Phoriospongia rubra (Alcolado, 1984)
Strongilacidon poriticola van Soest, 1984
Crella chelifera van Soest, 1984
Mycale angulosa (Duchassaing & Michelotti, 1864)
Mycale laevis (Carter, 1882)
Mycale laxissima (Duchassaing & Michelotti, 1864)
Mycale magnirhaphidifera van Soest, 1984
Mycale microsigmatosa Arndt, 1927
Mycale? *scarlatum* (Alcolado, 1984)
Biemna caribea Pulitzer-Finali, 1886
Biemna cribaria (Alcolado & Gotera, 1986)
Desmacella campechiana (Topsent, 1889)
Desmacella pumilio Schmidt, 1870
Merlia normani Kirkpatrick, 1908
Neofibularia nolitangere (Duchassaing & Michelotti, 1864)
Ceratopsion rugosum (Schmidt, 1870)
Order Haplosclerida Topsent, 1928
Haliclona coerulea (Hechtel, 1965)
Haliclona curacaoensis van Soest, 1980
Haliclona implexiformis (Hechtel, 1965)
Haliclona manglaris (Alcolado, 1984)
Haliclona molitba Laubenfels, 1949
Haliclona pseudomolitba Weerdt, Rützler & Smith, 1990
Haliclona tubifera (George & Wilson, 1919)
Niphates alba van Soest, 1980
Niphates amorpha Wiedenmayer, 1977
Niphates digitalis (Lamarck, 1814)
Niphates erecta Duchassaing & Michelotti, 1864
Niphates ramosa (Carter, 1882)
Niphates recondita (Wiedenmayer, 1977)
Amphimedon caribica (Pulitzer-Finali, 1986)
Amphimedon complanata (Duchassaing, 1850)
Amphimedon compressa Duchassaing & Michelotti, 1864
Amphimedon viridis Duchassaing & Michelotti, 1864
Cribrochalina dura (Wilson, 1902)
Cribrochalina vasculum (Lamarck, 1814)
Rhaphisia menzeli Little, 1963
Callyspongia arcesiosa Laubenfels, 1936
Callyspongia armigera (Duchassaing & Michelotti, 1864)
Callyspongia debilis Wiedenmayer, 1977
Callyspongia fallax Duchassaing & Michelotti, 1864
Callyspongia pallida Hechtel, 1965
Callyspongia plicifera (Lamarck, 1813)

Callyspongia tenerrima Duchassaing & Michelotti, 1864
Callyspongia vaginalis (Lamarck, 1813)
Petrosia pellasarca (Laubenfels, 1934)
Petrosia weinbergi van Soest, 1980
Strongylophora davilai Alcolado, 1979
Xestospongia carbonaria (Lamarck, 1813)
Xestospongia muta (Schmidt, 1870)
Xestospongia subtriangularis (Duchassaing, 1850)
Aka brevitubulata (Pang, 1973)
Aka coralliphaga (Rützler, 1965)
Aka siphona (Laubenfels, 1949)
Aka xamaycaense (Pulitzer-Finali, 1986)
Calyx podatypa (Laubenfels, 1934)
Oceanapia bartschi (Laubenfels, 1934)
Oceanapia fistulosa (Bowerbank, 1873)
Oceanapia nodosa (George & Wilson, 1919)
Oceanapia peltata (Schmidt, 1870)
Oceanapia stalagmitica (Wiedenmayer, 1977)
Order Dictyoceratida Minchin, 1900
Hippospongia gossypina (Duchassaing & Michelotti, 1864)
Hippospongia lachne Laubenfels, 1936
Hyattella cavernosa (Pallas, 1766)
Spongia barbara Duchassaing & Michelotti, 1864
Spongia graminea Hyatt, 1877
Spongia obliqua ? Duchassaing & Michelotti, 1864
Spongia obscura Hyatt, 1877
Spongia pertusa Hyatt, 1877
Spongia tubulifera ?Lamarck, 1814
Hyrtios proteus Duchassaing & Michelotti, 1864
Hyrtios violacea (Duchassaing & Michelotti, 1864)
Smenospongia aurea (Hyatt, 1875)
Smenospongia conulosa Pulitzer-Finali, 1986
Ircinia campana (Lamarck, 1816)
Ircinia felix (Duchassaing & Michelotti, 1864)
Ircinia hummelincki van Soest, 1978
Ircinia strobilina (Lamarck, 1816)
Dysidea etheria Laubenfels, 1936
Dysidea fragilis (Montagu, 1818)
Dysidea janiae (Duchassaing & Michelotti, 1864)
Order Dendroceratida Minchin, 1900
Chelonaplysilla cf. *erecta* Tsurnamal (1967)
Darwinella rosacea Hechtel, 1965
Igernella notabilis (Duchassaing & Michelotti, 1864)
Halisarca caerulea Vacelet & Donadey, 1987
Order Verongida Bergquist, 1978
Aplysina archeri (Higgin, 1825)
Aplysina cauliformis (Carter, 1882)
Aplysina fistularis (Pallas, 1766)
Aplysina lacunosa (Lamarck, 1814)
Aplysina ocracea Alcolado, 1984
Verongula gigantea (Hyatt, 1875)
Verongula reiswigi Alcolado, 1984
Verongula rigida (Esper, 1794)
Aiolochroia crassa (Hyatt, 1875)
Class Calcarea Bowerbank, 1864
Order Clathrinida Hartman, 1958
Clathrina primordialis (Haeckel, 1872)
Order Leucosoleniida Hartman, 1958
Leucandra aspera (Burton, 1963)