Annotated checklist of sponges (Porifera) of the South China Sea region.
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ANNOTATED CHECKLIST OF SPONGES (PORIFERA) OF THE SOUTH CHINA SEA REGION

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ABSTRACT. - Many important scientific collections of Porifera have been made within the South China Sea region, commencing in the late 1700s during the era of the ‘spice trade’, but no synthesis or inventory of this fauna had so far been attempted. This annotated systematic checklist of marine sponges contains over 1500 species recorded in the scientific literature (including marine natural products records), or so far unpublished collections known to exist in museums. As for many other marine invertebrate phyla the South China Sea region contains an exceptionally high diversity of sponges, with an expectation that many more species await discovery and description. This checklist indicates that about 5% of the fauna is widely distributed in the Indo-west Pacific, mainly associated with the coral reef fauna, some wide Indo-Pacific species, a few known to be introduced through human activities, whereas most appear to be ‘endemic’ to this region. This latter group is relatively more specialised in its ecological requirements than widespread coral reef species, living on non-reef deeper reefs, soft bottoms, trawl grounds and other habitats which are rarely considered in conservation strategies. These strategies are discussed as they relate to particular characteristics of the sponge fauna.

KEY WORDS. - Porifera, species inventory, South China Sea, biodiversity, conservation strategies.

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INTRODUCTION

Sponges (Porifera) are amongst the most difficult of metazoan phyla to identify. Much of the current taxonomic framework, based largely on skeletal morphology, derives from work published last century. Consequently the classification is laden with species, generic and family synonyms. More recently, contemporary authors have incorporated other forms of biological evidence into this framework but this effort is far from complete. Although contemporary classification and nomenclature are now both approaching stability (at least compared with earlier efforts; see introductions in Hooper & Wiedenmayer, 1994), it is still extremely difficult to resolve much of this new biological evidence (biochemistry, genetic, reproductive cytological etc. data) within the morphologically-based classification.
It is still common for sponges to be misidentified and misplaced within the classification. This makes it very difficult to compile accurate regional species inventories and to determine what proportion of the regional fauna is unique (endemic) and which species are truly widely distributed amongst adjacent biogeographic provinces. Two recent comprehensive inventories of the Australian and New Zealand sponge faunas (Hooper & Wiedenmayer, 1994; Dawson, 1993), were each many years in preparation. These inventories often involved substantial taxonomic revisions, and consequently they were able to resolve nomenclatural complexities and species synonyms for the Australian and New Zealand faunas, and to provide realistic estimates of biodiversity within these provinces. Conversely, attempting something of similar complexity for the South China Sea region is not possible given constraints of time and resources. Instead, we provide a 'database list' of recorded species without attempting to resolve all possible synonyms and misidentifications. Although this product is less desirable than complete taxonomic revisions it does provide us with the groundwork to estimate the magnitude and diversity of this important resource. However, to make this document more useful to subsequent workers, to eventually provide the basis for an accurate and comprehensive inventory, we include ordinal and family diagnoses for each taxon which we believe will allow species encountered in the future to be placed more accurately within the classification. A more comprehensive taxonomic guide to sponges, including generic diagnoses and synonyms, methods of collection and preparation for taxonomy, can be found on the internet at “http://www.qmuseum.qld.gov.au” (Hooper, 1997).

The earliest scientific descriptions of sponges collected from the South China Sea are from the late 1700s to the mid 1800s (Esper, 1797-1830 [revised by Ehlers, 1870]; Grant, 1836; Gray, 1858-70; Bowerbank & Norman, 1869a,b; Harting, 1870; Bowerbank, 1872-1877), based on material usually obtained serendipitously by European merchants trading with private collectors, and occasionally collections made during early scientific and technical surveys (e.g. “La Bonite” expedition to the “Indochina” region in 1838 (Dawydoft, 1952); telegraph cable laying mission by the Great Northern Telegraph Company (with sponges subsequently described by Lindgren, 1897)). Some of this material still survives (albeit as antiquated dry specimens) in the BMNH London, Upsala Museum Sweden and MNHN Paris, with only vague localities given as “East Indies”, “Indochina”, “Cochinchina”, “Indo-Malay region” etc. In most cases published descriptions of these species are very poor, usually not illustrated, and many are still unrecognisable, or at best poorly known, as to their true life characteristics.

During the latter part of the 1800s several European scientific and exploratory expeditions collected many species from this region, with more detailed scientific descriptions provided by Carter (1883-7), Poléjaffe (1884a,b), Ridley & Dendy (1886-7), Sollas (1886-8), Kieschnick (1896-1900), Lindgren (1897-8), Topsent (1897), Schulze (1898) and Thiele (1899-1903). Although scientific interest in sponges continued into the first three decades of this century (Sollas, 1902; Vosmaer, 1902-11; Dragnevitsch, 1905; Lendenfeld, 1907; Hentschel, 1912; Wilson, 1925; Iijima, 1926; Burton, 1928-32; Dendy & Burton, 1926; de Laubenfels, 1935; Dawydoft, 1952 [with sponges identified by Topsent]), only few papers on South China Sea sponges have been published in recent years (see Bibliography below). To date, over 1500 species have been described, or are known to exist in contemporary collections, from this region. However, there are certainly many more species living in the South China Sea region given that it lies in close proximity to the megadiverse fauna centred around the Indo-Malay archipelago (see Hooper & Lêvi, 1994).

The present work provides: (a) an annotated systematic checklist of sponge species described in the scientific literature (including marine natural products literature), specifying locality
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(where known) or broad region of collection; (b) also incorporating a list of identified (but so far unpublished) specimens collected recently from this region, housed in several museums and universities throughout the world; (c) a list of the major repositories of voucher specimens, including the important larger expeditions that visited these waters; and (d) a discussion of known rare or endemic species, predicted areas of highest biodiversity, estimates of the magnitude of the sponge biodiversity, and comments on the conservation and preservation of this biodiversity.

REPOSITORIES OF IMPORTANT COLLECTIONS

Many sponge collections have already been made within the South China Sea region, ranging from old colonial expeditions (dredging, trawling) to contemporary collections using SCUBA and underwater photography. Unfortunately there has never been any coordinated effort to compile a common database of these collections, which are scattered throughout museums and universities worldwide.

Major collections include:

Zoological Museum Amsterdam, Netherlands (ZMA): published and unpublished species collected during the Siboga (1899-1900) and the Dutch-Indonesian Snellius II expeditions (1984-85), and more contemporary collections made by Rob van Soest and associates.

Natural History Museum London, England (BMNH): extensive early collections of sponges from British colonial territories and smaller expeditions in the South China Sea, published by authors such as Bowerbank, Carter, Dendy, Burton, plus more recent collections from Sabah and Brunei made during ecological surveys of reefs by the BMNH in these regions.

Muséum National d’Histoire Naturelle Paris, France (MNHN): small collections made in French colonial waters of the “Indochina” region (Vietnam, Cambodia) published by Topsent, and more recent collections from Zamboanga (Philippines) and Nha Trang (Vietnam) published by Lévi (1961a,b).

Uppsala Museum, Sweden: small collections from “Indochina” (Java to Vietnam), described by Lindgren (1897).

Smithsonian Institution Washington, USA (USNM): these collections include species described by Wilson (1925) from the Albatross expedition, as well as much more extensive, contemporary collections from Malaysia, Singapore, Indonesia, Thailand, Hong Kong and Philippines, possibly comprising thousands of species. These contemporary collections mostly involve primary (or duplicate) voucher specimens used in marine natural product “bioactive” sponge surveys, largely funded by the US National Cancer Institute (NCI), undertaken by several independent groups of chemical researchers (e.g. Australian Institute of Marine Science, Townsville (AIMS); Coral Reef Research Foundation, Chuuk State and Palau (CRRF); Scripps Institute, San Diego; University of Southern California, Santa Cruz; Cancer Research Institute, Arizona State University; and others).
Zoological Reference Collections (Raffles Museum), National University of Singapore (ZRC): small collections of approximately 200 species mainly from the Singapore and northwest Indonesian islands.

Phuket Marine Biological Station, Thailand (PMBS): small collections of approximately 100 species from the Andaman Sea, Gulf of Thailand and Malay peninsula.

Pacific Institute of Bio-organic Chemistry, Vladivostok (PIBOC): moderately large collections of several hundreds of species from Vietnam and northern part of the South China Sea made by the RV Akademik Oparin and other expeditions during the late 1980s and early 1990s.


Institute of Oceanology, Academia Sinica, Qingdao, China (IOAS): collections of approximately 45 species from both shallow and deeper waters in the northern part of the South China Sea (these are appended, compiled independently by Li Jinhe).

Sililran University Marine Laboratory, Dumagette, Philippines: duplicates of collections made by various NCI expeditions comprising approximately 200 species.

Maritime Biology Museum, Oceanographic Institute of Nha Trang, Vietnam: small collection of approximately 100 specimens from waters of Vietnam and Cambodia, presently unidentified (Nguyen Huu Phung, personal communication).

University of Hong Kong: Small collection of approximately 30 species, some published by van Soest (1980) and Pulitzer-Finali (1980) in the proceedings of an international biological workshop on the Hong Kong fauna.

NOTES ON THE SPECIES LIST

The following regions were included in the literature and database searches (annotated 1-7 for each species). Broad regions are: 1 = Cocos, Nicobar and Andaman Islands, Andaman Sea, islands and coast of Burma and western Thailand; 2 = western Malay Peninsula, Singapore, Straits of Malacca, northern Sumatra, northern Java; 3 = Gulf of Thailand, east coast of Thailand, Cambodia, Vietnam, including Paracels Archipelago, Spratly Is., Macclesfield, Atoll de Tizard; 4 = Borneo, Sarawak, Sabah, Brunei; 5 = southern coast of China including Hong Kong; 6 = southeastern Indonesian archipelago; 7 = Philippines, Palawan.

Apart from collections made personally by the author all other species records cited here are taken from the literature and from several computer databases. In many cases no judgement was possible as to their “absolutely correct” generic assignment, or the possibility that they might be junior synonyms of other species (or misidentifications). Very few reliable revisions of this fauna have yet been made, but the species list does provide an indication of the relatively high biodiversity of sponges, and diversity of biological habitats in this region.
Only the major taxonomic works dealing exclusively or mainly with this region have been checked and provided with annotations about localities etc. There are many other species records of sponges from the Indonesian archipelago scattered throughout the vast and mostly antiquated sponge literature. Fortunately, these have already been compiled in a computer database (indicated as ZMA database, Zoological Museum of Amsterdam, The Netherlands). Due to constraints of time most of these isolated records have not been checked from original sources, hence only a general regional locality is provided. This database also includes "preliminary identifications" made by Maurice Burton of the huge Siboga expedition sponge collections (1899-1900), still largely unpublished, with many unpublished (manuscript) species names (indicated as species names in quotes). These records are annotated as Burton MS. Personal collections made by the senior author from southwestern Philippines, Thailand, Malaysian and Cambodian regions (1989-1991), housed in the Queensland Museum Brisbane and Northern Territory Museum Darwin, are annotated QM collection and NTM collection, respectively. Small collections, primarily made for marine natural products chemistry studies, are housed in the Zoological Reference Collection, National University of Singapore (ZRC).

**KEY TO CLASSES AND ORDERS**

1. Mineral skeleton composed of calcitic spicules ........................................ [Class Calcarea] ...... (2)
   - Mineral skeleton composed of six-rayed silica spicules, occurring both individually and fused together ................................................................. [Class Hexactinellida] ...... (5)
   - Mineral skeleton composed of silica spicules and/or spongian fibres ................................................................. [Class Demospongiac] ...... (7)

2. With at least some free triradiate spicules ........................................ [Subclass Calcinea] ...... (3)
   - Spicules are free and sagittal tetracts and monaxonic forms ...... [Subclass Callcaronea] ...... (4)
   - Most spicules are fused ("hypercalcified"), often with tuning fork spicules included (polyphyletic characters) ............ [Orders Murrayonida (Calcinea) and Lithonida (Callcaronea)]

3. Spicules may include triradiate and quadriradiate forms periphery of skeleton has a distinct cortex. ................................................................. [Order Clathrinida, family Leucettidae]
   - Only triradiate spicules present, body plan asconoid ................................................................. [Order Clathrinida, other families]

4. Body plan asconoid ................. [Order Leucosolenida, family Leucosoleniidae]
   - Body plan syconoid or lcuconoid [Order Leucosolenida, other families]

5. Birotrulate microscleres present, hexaster microscleres absent, sponges not attached to substrate but embedded within it on 1 or more long basal spicules ................................................................................................. [Subclass Amphidiscophora, Order Amphidiscosida]
   - Hexaster microscleres present, birotulate microscleres absent, sponges usually fixed to substrate ................................................................. [Subclass Hexasterophora] ...... (6)

6. Parenchymal skeleton consists of fused hexactine spicules forming rigid skeleton ...................... [Order Hexactinosida]
   - Parenchymal spicules are lychnises united together, with centre of each spicule surrounded by 12 struts ......................................................................... [Order Lychniscosida]
   - Parenchymal spicules consist of hexactines usually free within syncytial (acellular) matrix, and with specialized euctosomal hexactines or pentactines with longest ray pointing inwards .... [Order Lyssaxisosida]

7. Skeleton composed of tetraxonid spicules and derivatives with equal rays, megascleres and microscleres undifferentiated, (sometimes spicules are lost completely and sponge may be superficially confused with compound ascidians) ........................................................................................................ [Subclass Homoscleromorpha, Order Homosclerophorida]
- Tetragonid and monaxonid megascleres often occur together, asterose microscleres common, skeleton is usually radial or axially compressed. [Subclass Tetraxonimorpha] (8)
- Monaxonid megascleres, with a diversity of microscleres but never asterose forms. (two order lacking free spicules altogether) [Subclass Ceractinomorpha] (9)

8. Spherical growth form usual, radial pattern of triaenes and oxeas, microscleres signaspires .......

- Large oxeas always present, sometimes with triaenes, radial at surface only, microscleres asterose forms .................................................... [Order Spirophorida]
- Monaxonid spicules only (styles, oxeas, never tetractinal forms), radial at least at surface, microscleres may be absent or may include asterose and monaxonid forms (microxeas, spirasters) ............................................... [Order Astrophyorida]
- Articulated siliceous desma megascleres, with or without free spicules ................................................................................ [Order Hadromerida]

9. With siliceous megascleres and/or microscleres, with spongion fibres ................................... (10)
- Without free spicules, with spongion fibres .............................................................................. (11)

10. Microscleres include cheleae and other diverse forms, megascleres often localized to distinct regions (e.g. inside fibres), sand/detritus may replace megascleres completely ............................................ [Order Poecilosclerida]
- Microscleres typically absent, with main skeleton composed of criss-cross (family Halichondriidae) of monaxonid megascleres (styles, oxeas, strongyles), usually with more organization at surface, or sometimes condensed into an axial skeleton and a plumose or plume-reticulate extra-axial skeleton (family Axinellidae), or plumose-dendritic mineral skeleton (family Dictyonellidae), fibre system poorly developed or absent ........................................................ [Order Halichondrida]
- Microscleres may be absent or include centangulate sigmas, toxas or microxeas, megascleres diactinal usually producing well-formed structure (e.g. isodictyal-reticulate) ........................................................ [Order Haplosclerida]
- Main skeleton composed of well developed spongion fibres cored and/or echinulated by short styles or oxeas with verticillate spines ........................................................................ [Order Agelasida]

11. Lacking mineral skeleton completely (although detritus and contaminating spicules often occur, confusing these with poecilosclerids), with well developed relatively homogeneous spongion fibres forming reticulate skeleton, typically with 2 or 3 different sized networks, consistency not collagenous ................................................. [Order Dictyoceratida]
- Spongion fibres forming reticulate skeleton, with laminated spongion fibres, with distinct pith of fine fibrils, forming reticulate skeleton without differentiation of primary and secondary elements, collagenous consistency, frequently with a live yellow colouration which darkens in contact with the air ................................................................................ [Order Verongida]
- With strongly lamellated spongion fibres forming dendritic skeleton arising from basal attachment ................................................................................ [Order Dendroceratida]
- Without free spicules but with a solid aragonitic cortex producing a series of chambers on top of each other, the youngest (uppermost) chambers lined with living tissue ........................................................ [Order Verticillitida]

**SYSTEMATIC CHECKLIST OF SPONGES**

**Phylum Porifera**

**Subphylum Cellularia**

**Class Demospongiae**

**Definition.** - Sponges with the skeleton composed of spongion fibres alone or together with siliceous spicules (although some “relict sclerosponge” forms have both a basal calcitic skeleton as well as free siliceous spicules). Some groups lack a mineral skeleton entirely
Collagenous filaments or fibrils (forming the ground substance of the intercellular mesohyl) are ubiquitous. Spongins fibres (also composed of collagen) occur in most families, and histological organisation is always cellular (as opposed to syncytial in the Hexactinellida). Choanocytes occupy chambers that are spherical, hemispherical, elongate or branched.

**Remarks.** - Three subclasses of Demospongiae are distinguished on the basis of larval morphology and life cycle strategy (Homoscleromorpha, Tetractinomorpha, Ceractinomorpha), and a fourth (polyphyletic) group, the “sclerosponges” with calcified basal skeletons, is now distributed amongst the existing various families of demosponges. The “sphinctozoa” are also now included in Demospongiae, subclass Ceractinomorpha. There are 13 orders (1 dubious), 71 families and 1005 nominal genera included, although only 507 genera are presently considered to be valid. 481 genera include marine species and 26 genera concern freshwater species (the latter not included in this work).

Demospongiae contain about 95% of living species, with a described fauna already consisting of about 4500-5000 species and an estimated total extant fauna of between 14000-15000 species worldwide.

**Subclass Homoscleromorpha**

**Definition.** - Demospongiae with secondarily derived amphiblastula larvae and viviparous reproduction; skeleton composed of tetraxonid siliceous spicules and derivatives with equal rays (diods, triods, lophate spicules), arranged around choanocyte chambers reflecting the canal structure; no differentiation between megascleres and microscleres although size differences do occur between types of spicules; spicules usually small (100μm or less), not localised to any particular region; choanocyte chambers with large numbers of choanocytes. One order, one family.

**Order Homosclerophorida**

**Definition.** - As for subclass.

**Family Plakinidae Schulze, 1880**

**Definition.** - Encrusting or massive growth forms; simple body structure with aquiferous system varying from simple asconoid construction to more complex folding and elaborate canal systems; mineral skeleton composed of relatively small calcitrops and/or derivatives (diods or triods), often with branched ends (lophotetractines), generally arranged uniformly within sponge; spicules usually surround aquiferous system in regular “alveolar” arrangement; siliceous spicules and spongins fibres absent in one genus (*Oscarella*), having only collagenous fibrillar spongins in mesohyl; choanocyte chambers with 300-500 choanocytes, usually eurypylous, occasionally aphodal; larvac unique amphiblastula type.

**SOUTH CHINA SEA SPECIES.**

*Astroplakina stelligera* Dendy and Burton, 1927:231, fig.2 (W of Mergui Archipelago, 12° N. 130m) (1)

*Oscarella lobularis* Schmidt, 1862 (Indonesia, ZMA database) (6)
**Subclass Tetractinomorpha**

**Definition.** - Demospongiae with parenchymellae or creeping blastula larvae, predominantly oviparous reproduction although in some genera young sponges are incubated within parent and set free as small adults; megascleres tetraxonid and monaxonid, occurring together or separately; microscleres asterose forms and derivatives; skeletal structure usually radial or axially compressed.

**Remarks.** - Three orders of Tetractinomorpha are well established (Astrophorida (also known as Choristida), Hadromerida, and Spirophorida), and a fourth polyphyletic order (“Lithistida”) shows major affinities to, and will probably be merged eventually in, Hadromerida.

**Order Spirophorida**

**Definition.** - Typically with spherical growth form, with tetraxonid and monaxonid megascleres (triaenes, oxeas), in radiate pattern; protoriaenes most common and often protrude from surface; monopodial desmas may be present; microscleres contorted microspined sigmaspires (an apomorphy for the group); reproduction oviparous without a larval stage, or viviparous with production of young adults within parent. Two families included, one with “lithistid” grade of construction.

**Family Tetillidae Sollas, 1886**

**Definition.** - Sponges with a perfect radial skeleton and consequent near spherical form, often referred to as ‘golf ball sponges’: megascleres triaenes and oxeas arranged in radiate pattern; protoriaenes apomorphic for the family, often protruding from the surface; microscleres contorted sigmaspires with minute spines; sometimes other modified triaene spicules also present (amphiclads, calthrops-like); inhalant pores grouped in special pore areas in some genera (poriferous pits or porocalices), unique to the family; reproductive patterns range from extrusion of fertilized eggs (which are fixed to the substrate and develop directly), to oviparous (with incubation of complete young sponges which are then expelled by localised breakdown of the pinacoderm); no free larvae yet described.

**SOUTH CHINA SEA SPECIES.**

*Clathrula arborescens* (Carter, 1869); Burton & Rao, 1932:326; Pattanayak, 1997 (Camorta L., Nicobar Is, 8° 10’ N; Andaman Is; Nicobar and Andaman Islands) (1)

*Clathrula arborescens* (Carter, 1886); Burton & Rao, 1932:326 (Andaman Is); Lévi, 1961: 129; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah; Vietnam; Negros, Zamboanga, Philippines) (1,3,4,6, 7. QM/NTM collection)
Cinachyra barbata Sollas, 1888; Dawydoff, 1952 (Poulo Condore, Phu Quoc, Vietnam) (3)
Cinachyra cavernosa. (Lamarch; Burton & Rao, 1932; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)
Cinachyra maccellata (Sollas, 1888) (off Manila) (7)
Cinachyra malaccensis Sollas, 1902:219, pl.14, fig.2, pl.15. fig.5 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Cinachyra simplex (Sollas, 1888); Burton & Rao, 1932:326 (off Cape Negrais, Burma, 15° 50’N) (1)
Cinachyra voeltzkowi Lendenfeld, 1899; Dragewitsch, 1906:440 (Singapore, 1° 30’N) (2)
Cinachyra sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
Cinachyra sp. (Indonesia, ZMA database) (6)
Cinachyra spp. (Singapore; QM/ZRC collections) (2)
Cinachyra sp (Nha Trang, Vietnam, PIBOC database) (3)
Cinachyrella clavigera (Hentschel, 1912:327); Wilson, 1925:365 (Philippines) (7)
Cinachyrella crustata (Wilson, 1925:367) (Philippines) (7)
Cinachyrella hisruta (Dendy, 1889); Wilson, 1925:363 (Philippines) (7)
Cinachyrella paterifera (Wilson, 1925:375) (Philippines) (7)
Cramiella carteri Sollas, 1888 (Indonesia, ZMA database) (6)
Cramiella similima (Bowerbank); Wilson, 1925:378 (Philippines) (7)
Cramiella sp. (Nha Trang, Vietnam, PIBOC database) (3)
Cramiella sp. nov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)
Paratetilla arcifera Wilson, 1925:380 (Philippines) (7)
Paratetilla baccu (Selenka, 1867); Lindgren, 1897: 485; Lindgren, 1898 (Gasper Straits, Java Sea):
-Burton & Rao, 1932:325; Pattanayak, 1997 (Marble Rocks, Mergui Archipelago; Port Blair, Andaman Is, 11° 50’N; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,2,6)
Samus anonyza Gray, 1867; Sollas, 1902:218 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Tetilla ciliata Wilson, 1925:360 (Philippines) (7)
Tetilla cranium (Mueller, 1789); Burton & Rao, 1932:326; Pattanayak, 1997 (Invisible Bank, Andaman Is, 11° 30’N; off Cape Negrais, Burma, 15° 50’N; Nicobar and Andaman Islands) (1)
Tetilla dactyloidea (Carter, 1889); Carter, 1887:79; Burton & Rao, 1932:326; Pattanayak, 1997 (Port Blair, Andaman Is, 11° 50’N; Nicobar and Andaman Islands; King I., Mergui Archipelago, Burma, 12° 08’N) (1)
Tetilla enoi Brondsted, 1934 (Java, Banda, Indonesia) (6)
Tetilla (Donatia) japonica (Sollas, 1888); Dawydoff, 1952 (Gulf of Tonkin, Cape Saint-Jacques, Vietnam; Indonesia, ZMA database) (3,6)
Tetilla pediferia Sollas, 1888 (Indonesia, ZMA database) (6)
Tetilla ridleyi Sollas, 1888; Sollas, 1902:218 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Tetilla spinosa. Wilson, 1925:361 (Philippines, Indonesia, ZMA database) (6,7)
Tetilla urethrae Kieschnick; Lindgren, 1897: 485; Lindgren, 1898 (Java) (2)
Tetilla zetlandica Carter, 1886 (Indonesia, ZMA database) (6)
Tetilla spp. (Nha Trang, Vietnam, PIBOC database) (3)
Tetilla (‘Chrotella’) sp.nov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)

Family Scleritodermidae Sollas, 1888

Definition. - Bowl, cup-shaped or plate-like growth forms; fused “lithistid” skeleton composed of monopodial desmas (rhizoclones) and free spicules with slender oxeas distributed in tracts within choanosome, sometimes protruding through surface; triaenes absent, presumed secondarily lost; specialised ectosomal skeleton composed of contorted sigmaspires and special ectosomal desmas, also dispersed throughout sponge, sometimes together with minutely spined microstrorganyles.

SOUTH CHINA SEA SPECIES.
Aciculites cf. ciliata Wilson, 1925:463 (Philippines, Indonesia, ZMA database) (6,7)
Aciculites cf. papillata Lévi & Lévi, 1983 (Philippines, Indonesia) (6,7)
Aciculites tubularensis Vacelet & Vasseur, 1965 (Indonesia, ZMA database) (6)
Aciculites sp. (Indonesia, ZMA database) (6)
Amphipleura (‘Taprobane’) herdmani (Dendy, 1905:103); Wilson, 1925:468; Burton, 1928:110 (W of Mergui Archipelago, 13° 04’N, 130m; Philippines; Indonesia, ZMA database) (1,6,7)

Amphipleura stenoe (Levi & Levi, 1983) (Philippines, Indonesia) (6,7)

Scleritoderma flabelliformis Sollas, 1888 (Indonesia, ZMA database) (6)

Scleritoderma nodosum Thiele, 1900 (Indonesia, ZMA database) (6)

**Order Astrophorida**

**Definition.** - Typically with asterose microscleres (but sometimes lost), microxae and microrhabds; with tetractinal megascleres, usually triaes, calthrops, or short-shafted triaes, together with oxeas; with radial skeletal architecture obvious at least at surface; reproduction oviparous although gametes so far described for very few species; larval stages not yet known. Seven families presently included.

**Family Ancorinidae Schmidt, 1870**

**Definition.** - Growth forms either encrusting to massive, or more specialised with spherical body and long inhalant and exhalant tubes at opposite ends (the latter with stellate, spicular, funnel-shaped end); megascleres long-shafted triaes (with shaft directed inwards and clads on surface) and oxea megascleres; microscleres euasters and microrhabds, without stereasters or amphiarthrs.

**SOUTH CHINA SEA SPECIES.**

Anconina simplis (Lendecleld, 1899); Dragnewitsch, 1906:441 (Singapore) (2)

Anconina sp. 941; Sattahip region, Thailand (3, QM/NTM collection)

Asteropus simplex Carter, 1879:349; van Soest, 1980 (Hong Kong, Philippines) (5,7)

Asteropus sp. (Singapore; ZRC) (2)

Dissydinga dissimilis Ridley, 1884 (Indonesia, ZMA database) (6)

Dissydinga nodosa Hentschel, 1912 (Aru Is, Indonesia) (6)

Ecenemia acervus, (Bowerbank, 1862); Burton & Rao, 1932; Pattanayak, 1997 (Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

Ecenemia agglutinans Thiele, 1899 (Indonesia, ZMA database) (6)

Ecenemia baculifera (Carter, 1887:78) (King Is, Mergui Archipelago, Burma, 12° 08’N); Lindgren, 1897: 485; Lindgren, 1898; Burton, 1937:7; Levi, 1961:510 (Zamboanga, Philippines; Java, Indonesia) (1,2,7)

Ecenemia carteri Dendy, 1905: Burton & Rao, 1932:318 (Nankauri, Nicobar Is, 7° 57’N; Andaman Is) (1)

Ecenemia contolosa Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

Ecenemia cribrosa Thiele: Wilson, 1925:24 (Ternate, Moluccas, Indonesia; Philippines) (6,7)

Holocea collectrix Thiele, 1900 (Indonesia, ZMA database) (6)

Holocea valida Thiele, 1900 (Indonesia, ZMA database) (6)

Melophis (‘Asteropus’) sarsinorum (Thiele, 1899); George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah: Banda Sea; Bohol Sea; Philippines) (4,6,7, QN/NTM collection)

*Mystria clavosa* (Ridley, 1884): Lindgren, 1897: 485; Lindgren, 1898; Wilson, 1925:287; Dendy and Burton, 1927:246; Burton & Rao, 1932:311; Brondsted, 1934 (off Cinque Is, Andaman Is, 11° 20’N, 140-240m; Tana Mura Besar, Singapore I, 1° 25’N; Kabusa I, Mergui Archipelago, 12°N; Andaman Is; Vietnam, China Sea, 11° 5’N, Mansfield I, Indonesia; Philippines) (1,2,3,6,7)

*Mystria clavosa* (Dendy & Burton, 1926); Burton & Rao, 1932; Pattanayak, 1997 (Nicobar and Andaman Islands) (1) [perhaps junior homonym of Ridley, 1884 species]

*Mystria (‘Stelletta’) purpurea* (Ridley, 1884); Burton & Rao, 1932; Pattanayak, 1997 (Camorta Is, Nicobar Is, 8° 5’N; ENE of Preparis I, Bay of Bengal, Burma, 15°N; Indonesia, ZMA database; Andaman Islands) (1,6)

*Mystria siemensii* Wilson, 1925:291 (Philippines) (7)

*Mystria sp.nov.*, Dawydoff, 1952 (Vietnam, Cambodia) (3)
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*Penes dendi* (Hentschel, 1912) (Indonesia) (6)

*Penes “diriabadosa”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

*Penes scultzei* Thiele, 1899 (Indonesia, ZMA database) (6, Burton MS)

*Penes sollasi* Thiele, 1900 (Indonesia, ZMA database) (6)

*Penes sp.;* Pinder, 1992 (South China Sea) (5)

*Rhabdastrella* (‘*Diastra*’) *stierastrae*a (Row., 1911) (Indonesia, ZMA database) (6, Burton MS)

*Rhabdastrella* (‘*Aurora*’, *Stelletta*’) *globostellata* (Carter, 1883; Dragnewitsch, 1906:440; Burton & Rao, 1932:317, Pattanayak, 1997 (Singapore; Aberdeen Reef, Andaman Is., 12°N, Nicobar and Andaman Islands; Indonesia, ZMA database) (1,2,6)

*Stelletta arnaensis* Hentschel, 1912 (Aru Is., Indonesia) (6)

*Stelletta aspera* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

*Stelletta brevidens* Topsent, 1897; Desqueyroux-Faunez, 1981 (Ambon, Indonesia) (6)

*Stelletta brevis* Hentschel, 1912 (Aru Is., Indonesia) (6)

*Stelletta brunnnea* Thiele, 1900 (Indonesia) (6)

*Stelletta cavernosa* (Dendy, 1916); Burton & Rao, 1932:311; Pattanayak, 1997 (Nicobar Is.; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

*Stelletta clavata* Ridley, 1884; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Stelletta crassiscopica* Sollas, 1888 (Indonesia, ZMA database) (6)

*Stelletta debilis* Thiele, 1900 (Indonesia, ZMA database) (6)

*Stelletta haecell* Sollas, 1888; Dendy & Burton, 1927:246; Pattanayak, 1997 (8 mts W of Interview L, Andaman Is., 13°9'N, 90:540m; Nicobar and Andaman Islands) (1)

*Stelletta herdmanni* Dendy, 1905 (Indonesia, ZMA database) (6)

*Stelletta japonica* (Lewbohln, 1914) (Indonesia, ZMA database) (6, Burton MS)

*Stelletta longicaudus* Dendy & Burton, 1929 (Indonesia, ZMA database) (6, Burton MS)

*Stelletta mauritiana* Dendy, 1916 (Indonesia, ZMA database) (6)

*Stelletta maxima* Thiele, 1898 (Indonesia, ZMA database) (6)

*Stelletta orientalis* Dendy, 1898; Burton and Rao, 1932:311 (Andaman Is., shallow water) (1)

*Stelletta plagioquadrata* Lévi, 1961:512 (Zambanga, Philippines) (7)

*Stelletta porosa* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

*Stelletta racdicafera* Wilson, 1925:294 (Philippines) (7)

*Stelletta reniformis* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

*Stelletta simplicifurca* (Sollas); Lindgren, 1897:485; Lindgren, 1898; Dawydoff, 1952 (Vietnam, China Sea, 11°5'N, Amoy, China, Taiwan, N. China Sea) (3)

*Stelletta simplicissima* Sollas, 1888; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Stelletta sphaeroides* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

*Stelletta stellifera* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

*Stelletta subtiliss* Sollas, 1888 (Indonesia, ZMA database) (6)

*Stelletta tenuis* Lindgren, 1897:485; Lindgren, 1898 (Java); Deng et al., 1992; Su et al., 1994, 1995a (South China Sea, Taiwan) (2,5)

*Stelletta tenuispicxa* Sollas, 1888 (Indonesia, ZMA database) (6)

*Stelletta ternataentis* Thiele, 1900 (Ternate, Moluccas, Indonesia) (6)

*Stelletta testudinaria* (Ridley, 1884) (6, Burton MS)

*Stelletta topsent* Thiele, 1903 (Indonesia, ZMA database) (6)

*Stelletta trichotriaena* Dendy & Burton, 1927:241, fig.6; Pattanayak, 1997 (Andaman Is., 12°N, 540m; Nicobar and Andaman Islands) (1)

*Stelletta validissima* Thiele, 1900; Burton & Rao, 1932:310; Pattanayak, 1997 (Invisible Bank, Andaman Is., 11°30'N, Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

*Stelletta variohamata* Thiele, 1900 (Indonesia, ZMA database) (6)

*Stelletta spp. (“reduced”);* Burton & Rao, 1932:312 (Macpherson Straits near Chiriyatatapar, Andaman Is., 11°25'N; Paway L., Mergui Archipelago, 11°30'N) (1)

*Stelletta sp.;* Cabero, 1979:19 (Bohol, Philippines) (7)

*Stelletta spp. (Indonesia, ZMA database) (6)

*Stelletta sp. (Singapore; ZRC) (2)

*Stelletta spp. (Nha Trang, Vietnam, PIBOC database) (3)

*Stryphus* sp. nov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Tethyas* colombi*fer* Stewart, 1870 (Indonesia, ZMA database) (6)

*Tethyas* dubia* Wilson, 1925:300 (Philippines) (7)

*Tethyas* radiata* (Marshall, 1880) (Indonesia, ZMA database) (6, Burton MS)
Family Calthropellidae Lendenfeld, 1906

Definition. - Massive to subspherical growth forms; megascleres calthrops and oxeas, with rays of calthrops sometimes more than four or reduced to two, and three rays may be bifurcate; one genus (*Chelotropella*) with radially oriented dichotriaenes; microscleres usually euasters, usually spherasters, but sometimes others.

SOUTH CHINA SEA SPECIES.

*Chalthropella* geodioides Topsent, 1897; Desqueyroux-Faundez, 1981 (Amboi, Indonesia) (6)
*Pachastrissa* sp. 975 (Ko Samui region, Thailand) (3, QM/NTM collection)
*Pachastrissa* (*Pachastrea*) sp. nov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)

Family Coppatiidae Topsent, 1891

Definition. - Encrusting to massive growth forms; megascleres only oxeas forming radial skeleton; triaenes absent; microscleres euasters (never sterrasters), sometimes microxeas and sanidasters; genera related to stellettids but lack triaenes.

SOUTH CHINA SEA SPECIES.

*Cryptolithia* agglutinans Dendy, 1905 (Indonesia, ZMA database) (6) [incertae sedis]
*Cryptolithia* topsenti Thiele, 1900 (Indonesia, ZMA database) (6) [incertae sedis]
*Jaspis* (Doryxepes) *biangulata* (Lindgren, 1897:483); Lindgren, 1898 (Java) (2.6)
*Jaspis* cf. *coriacea* Carter, 1886 (Indonesia, ZMA database) (6)
*Jaspis* distinctus Thiele, 1900 (Indonesia, ZMA database) (6)
*Jaspis johnstonii* (Schmidt, 1862) (Indonesia, ZMA database) (6, Burton MS)
*Jaspis serpenlina* Wilson, 1925 (Philippines, Indonesia, ZMA database) (6.7)
*Jaspis stellifera* Carter, 1879; Dawydoff, 1952 (Vietnam; Indonesia, ZMA database) (3.6)
*Jaspis* sp.; Jung et al., 1995 (South China Sea) (5)
*Jaspis* sp. (Nha Trang, Vietnam, PIBOC database) (3)
*Stellettinopsis* sp. (Singapore; ZRC) (2)
*Stellettinopsis* sp. (Indonesia, ZMA database) (6)

Family Geodiidae Gray, 1867

Definition. - Thickly encrusting, massive to bowl-shaped growth forms; megascleres long shafted trienes and oxeas; sterraster microscleres always present forming superficial ectosomal crust, sometimes also with euasters, microrhabds and spherules.

SOUTH CHINA SEA SPECIES.

*Caminus* chimensis Lindgren, 1897: 485; Lindgren, 1898; Dawydoff, 1952 (Taiwan, China Sea; Vietnam) (3,5)
*Eryliths* corneus Wilson, 1925 (Philippines, Indonesia, ZMA database) (6,7)
*Eryliths* decumbens Lindgren, 1897: 485; Lindgren, 1898 (Java) (2)
*Eryliths* geodioides Burton & Rao, 1932:320, fig.5 (Mergui Archipelago, 130m; Indonesia, ZMA database) (1.6)
*Eryliths* inaequalis Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
*Eryliths* lendenfeldii (Sollas, 1888): Burton & Rao, 1932:320; Pattanayak, 1997 (Andaman Is, Nicobar and Andaman Islands; Indonesia, ZMA database) (1.6)
*Eryliths* nobilis Thiele, 1900 (Indonesia, ZMA database) (6)
*Eryliths* placenta (Gray): Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Geodia* alba Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
*Geodia* alba Kieschnick minor Hentschel, 1912 (Aru Is, Indonesia) (6)
*Geodia* areolata Carter, 1880 (Indonesia, ZMA database) (6)
**Geodia arripiens** Lindgren, 1897: 486; Lindgren, 1898; Dawydoff, 1952 (Vietnam, Cambodia, 11° 5’N) (3)

**Geodia berryi** Sollas, 1888; Thiele, 1899 (Indonesia) (6)

**Geodia cydonium** Mueller var. *berryi* Sollas, 1888; Dawydoff, 1952 (Vietnam, Cambodia) (3)

**Geodia cydonium** (Mueller) *berryi* (Sollas); Lindgren, 1897: 486; Lindgren, 1898 (Vietnam, China Sea, 11° 5’N) (3)

**Geodia distincta** Lindgren, 1897: 486; Lindgren, 1898 (Java Sea, Banda Sea) (2,6)

**Geodia easter** Sollas, 1888 (Indonesia, ZMA database) (6, Burton MS)

**Geodia hirsuta** Sollas, 1888 (Indonesia, ZMA database) (6)

**Geodia inconspicua** (Bowerbank, 1873); Burton & Rao, 1932:322 (ENE Preparis L., Bay of Bengal, Burma, 82m, 15°5’N) (1)

**Geodia japonica spherulifera** Wilson, 1925:317 (Philippines) (7)

**Geodia kuekenhali** Thiele, 1900 (Indonesia, ZMA database) (6)

**Geodia microspinosa** Wilson, 1925 (Philippines, Indonesia, ZMA database) (6,7)

**Geodia (‘Isop’*) nigra** (Lindgren, 1897: 486); Lindgren, 1898; Dawydoff, 1952 (Gaspar Straits, Java Sea; Vietnam) (2,3,6)

**Geodia peramata** Bowerbank, 1873; Burton & Rao, 1932:323 (ENE Preparis L., Bay of Bengal, Burma, 82m, 15°5’N; Indonesia, ZMA database) (1,6)

**Geodia philippinensis** Wilson, 1925:311 (Philippines) (7)

**Geodia (‘Sidonops’) picteti** (Topsent, 1897); Lindgren, 1897: 486; Lindgren, 1898 (Java); Desqueyroux-Faudenz, 1981 (Ambon, Indonesia) (2,6)

**Geodia sparsa** Wilson, 1925:314; de Laubenfels, 1935:335 (Puerta Galera, Philippines) (7)

**Geodia sphairoides** Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

**Geodia sp. 698** (Bohol Sea, Philippines) (7. QM/NTM collection)

**Geodinella sphairastrosa** Wilson, 1925:322 (Philippines, Indonesia, ZMA database) (6,7)

**Pachymatissa** sp.nov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)

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**Family Pachastrellidae** Carter, 1875

**Definition.** - Encrusting, massive and plate-shaped growth forms, with ostia and oscules on opposite sides; megascleres calthrops, short-shafted triaenes, and oxeas; microscleres streptasters of various types (metasters, spirasters and amphiaasters), but never euasters; desmas common in some genera (‘lithistid’ or ‘sublithistid’ grades of construction).

**SOUTH CHINA SEA SPECIES.**

**Brachistaster simplex** Wilson, 1925:471 (Philippines) (7)

**Characea abbreviata** Wilson, 1925:284 (Philippines) (7)

**Dercitus extensa** Dendy, 1905 (Indonesia, ZMA database) (6)

**Dercitus pauper** Sollas, 1902:218, pl.15, fig.1 (Great Redang L., E coast of Malay Peninsula, 5° 50’N) (3)

**Dercitus priscus** Topsent, 1895; Sollas, 1902:218 (Great Redang L., E coast of Malay Peninsula, 5° 50’N) (3)

**Dercitus simplex** (Carter, 1880); Burton & Rao, 1932:309 (Invisible Bank, Andaman Seas, 11° 30’N; Indonesia, ZMA database) (1,6)

**Pachamphiella dentii** Hentschel, 1912; Thomas, 1977 (Andaman Sea, Indonesia) (1,6)

**Pachastrella montifera** Schmidt, 1868 (Indonesia, ZMA database) (6)

**Pachastrella** sp. (Indonesia, ZMA database) (6)

**Poecillastrula ciliata** Wilson, 1925:282 (Philippines) (7)

**Poecillastrula compressa** (Bowerbank, 1864); Dawydoff, 1952 (Vietnam, Cambodia) (3)

**Poecillastrula eccentrica** Dendy & Burton, 1927:238; Pattanayak, 1997 (between N and S Sentinel Is., Andaman Is., 11° 30’N, 440-480m; Nicobar and Andaman Islands) (1)

**Poecillastrula laminaris** Sollas, 1888 (Indonesia, ZMA database) (6)

**Poecilasitra saxicola** Ridley, 1884; Dawydoff, 1952 (Vietnam, Cambodia) (3)

**Poecilasitra tentulaminaris** Sollas; Dendy & Burton, 1927:238; Burton and Rao, 1932:309; Pattanayak, 1997 (W of Mergui Archipelago, 12° 15’N - 13° 04’N, 120-130m; off Cape Negrais, Burma, 80-90m, 15° 57’N; Mergui Archipelago, 130m; Interview L., Andaman Is, 13°N, 90-540m; Table L, Cocos Group, and West L., Andaman Is, 20m, 15° 35’N; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6. Burton MS)
Family Theneidae Sollas, 1886

**Definition.** - Mushroom shaped, more-or-less symmetrical sponges, with root-like bases forming masses of tangled spicules; one or more oscules may be present, and specialized pore areas as well as scattered pores distributed over entire surface; oscules and pore areas may or may not be fringed by projecting spicules; megascleres long-shafted trienes (pro-, dicho- and anatriaenes), oxeas and oxytyloxe megascleres; microscleres streptaster (plesi-, met-, spir- and amphistars), but never euasters; asexually produced buds formed by some species.

**SOUTH CHINA SEA SPECIES.**
- *Thenea andamanensis* Dendy & Burton, 1927:235, pl.3, fig.1, text-fig.4; Pattanayak, 1997 (Andaman Sea, 13° 15’N, 990m; Nicobar and Andaman Islands) (1)
- *Thenea grallata* Sollas, 1888: Wilson, 1925 (Indonesia, ZMA database) (6)
- *Thenea meiotriata* Lendenfeld, 1907 (N. Sumatra) (2)
- *Thenea nictitata* Bowerbank, 1864; Dawydoff, 1952 (Vietnam, Cambodia) (3)
- *Thenea nicoborensis* Lendenfeld, 1907 (N. Sumatra) (2)
- *Thenea wyvillei* Sollas, 1888; Dawydoff, 1952 (Paracels, Vietnam) (3)

Family Thrombidae Sollas, 1888

**Definition.** - Massive sponges with diploidal aquiferous systems; megascleres small, minutely spined triaenes (plagio-, dicho- and trichotriaenes with trifurcate clads), organised in ectosomal region with long shaft directed inwards and small clads tangential to surface, disorganised in choanosomal skeleton; microscleres amphistars.

**Order Hadromerida**

**Definition.** - Relatively cohesive order with uniform spiculation of monaxonid megascleres (monactinal or diactinal); with radially arranged skeleton always obvious at surface if not within choanosome; spongin fibres poorly developed (if at all present); ectosomal spicules typically smaller than choanosomal spicules, usually standing perpendicular to surface and protruding through ectosome; microscleres, if present, euasters, streptasters and derivatives, spirasters or spiraster-like spirules, or peculiar asterose-like discorhabds; all groups oviparous (where known), with development of parenchymella larva (in one case blastula larva) directly in seawater. Twelve families presently included.

Family Chondrillidae Gray, 1872

**Definition.** - Encrusting to massive, liver-like or gelatinous sponges, often mistaken for compound ascidians; surface often smooth with marked cortex, enriched with fibrillar collagen; megascleres secondarily lost; euaster microscleres present or absent.
SOUTH CHINA SEA SPECIES.

Chondrilla (‘Chondrillastra’) australiensis Carter, 1886; Lindgren, 1897: 484; Lindgren, 1898; Dawydoff, 1952; Lévi, 1961: 130 (Vietnam, China Sea, 11° 5’ N; Indonesia, ZMA database) (3,6)

Chondrilla distincta Thiele, 1899 (Indonesia, ZMA database) (6)
Chondrilla enastrea de Laubenfels, 1949 (Indonesia, ZMA database) (6)
Chondrilla grandistellata Thiele, 1899 (Indonesia, ZMA database) (6)
Chondrilla jinensis Hentschel, 1912 (Aru Is, Indonesia) (6)
Chondrilla media Hentschel, 1912 (Aru Is, Indonesia) (6)
Chondrilla mixta Schulze; Lindgren, 1897: 484; Lindgren, 1898; Dawydoff, 1952 (Java; Vietnam) (2,3)

Chondrilla cf. naucula Schmidt, 1870; Dawydoff, 1952 (Vietnam; Indonesia, ZMA database) (3,6)
Chondrilla sacciformis Carter, 1879; Brøndsted, 1934 (Java, Banda, Indonesia) (6)
Chondrilla ternatensis Thiele, 1903 (Indonesia, ZMA database) (6)
Chondrilla sp. (Singapore; ZRC) (2)

Chondrosia cf. lucella de Laubenfels, 1954 (Indonesia, ZMA database) (6)
Chondrosia corticata Thiele, 1899 (Indonesia, ZMA database) (6)
Chondrosia debilis Thiele, 1899 (Indonesia, ZMA database) (6)
Chondrosia cf. reniformis Schmidt, 1862; Dawydoff, 1952 (Vietnam; Indonesia, ZMA database) (3,6)

Family Clionidae Gray, 1867

Definition. - Obligatory excavating or burrowing sponges in calcitic substrata; inhalant ectosomal pores (ostia) localized on papillae protruding through surface; terminal exhalant pores (osculae) on other papillae; megascleres tylostyles or subtylostyles; microscleres microspined oxeas and spirasters, both sometimes absent; following metamorphosis settled larvee burrow into calcareous substratum producing galleries, whereas faster-growing species may overgrow substratum completely, becoming massive, free-living sponges.

SOUTH CHINA SEA SPECIES.

Cliona bacillifera Carter, 1887:76 (King I., Mergui Archipelago, Burma, 12° 08’ N) (1)

Cliona caraboea Carter, 1882 (Indonesia, ZMA database) (6)

Cliona carpenteri (Thomas,1979); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Cliona cf. celata Topsent; Dawydoff, 1952 (Vietnam, Cambodia) (3)

Cliona ensifera (Sollas, 1888) Pattanayak, 1997 (Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

Cliona kempfi (Amandale,1915); Thomas, 1979 Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Cliona lobata (Hancock, 1849) Pattanayak, 1997 (Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

Cliona mucronata (Sollas, 1888); Dawydoff, 1952; Pattanayak, 1997 (Vietnam; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,3,6)

Cliona orientalis Thiele, 1900 (Indonesia, ZMA database) (6)

Cliona quadrata (Hancock, 1849) Pattanayak, 1997 (Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)

Cliona cf. schmidtii Ridley, 1881 (Indonesia, ZMA database) (6)

Cliona vastifica (Hancock, 1849); Dawydoff, 1952; Pattanayak, 1997 (Vietnam; Nicobar and Andaman Islands) (1,3)

Cliona cf. viridis Schmidt, 1862; Dawydoff, 1952 (Vietnam; Indonesia, ZMA database) (3,6)
Cliona sp. (Indonesia, ZMA database) (6)

Cliona sp. 936 (Luzon, Philippines) (7, QM/NTM collection)

Cliona sp. (Singapore; QM/ZRC collections) (2)

Thoosa (Clioniotha) Hancock (Topsent, 1888); Lindgren, 1897: 484; Lindgren, 1898; Dawydoff, 1952; Pattanayak, 1997 (Nicobar and Andaman Islands; Java; Poulo Condore, Réam. Vietnam) (1,2,3)
Family Hemiasterellidae Lendenfeld, 1889

**Definition.** - Encrusting, cup-shaped or branching sponges; megascleres styles, oxeas or both enclosed within compressed axial spongin fibres and plumose to plumo-reticulate extra-axial branches, or sometimes without a definite axis; microscleres eusterasters, smooth or partially micropinnate.

**SOUTH CHINA SEA SPECIES.**
- *Hemiasterella complicata* Topsent, 1919 (Indonesia, ZMA database) (6)
- *Hemiasterella intermedia* Dendy, 1922 (Indonesia, ZMA database) (6)

Family Latrunculiidae Topsent, 1922

**Definition.** - Encrusting, massive, cylindrical to branched morphology, often with special oscula areas, oscules elevated on papillae, or pore sieve-plates lying on surface in deep furrows; megascleres styles, oxeas or strongyles, radial tracts at surface, with axial orientation in stalked forms and more confused tracts in choanosome of massive forms; microscleres peculiar discorhabds (bearing either two whorls of spines, two or three disks on a straight or spined axial rod, and with one swollen spined end, both ends spined, or both ends smooth), often aggregated into dense ectosomal crust (‘cortex’).

**SOUTH CHINA SEA SPECIES.**
- *Diacrurus megaspumorhabdosus* Kelly-Borges & Vacelet, 1995 (Batangas, Philippines) (7)
- *Diacrurus (’Latruncula’) spinopulchrum* Carter, 1886) (Indonesia, ZMA database) (6)
- *Latruncula “debeaufortii”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
- *Latruncula globosa* Vacelet, Vasseur & Lévi, 1976 (Indonesia, ZMA database) (6)
- *Latruncula laevis* Lindgren, 1897: 484; Lindgren, 1898: Dawydoff, 1952 (Vietnam, China Sea, 11°5’N: Cambodia) (2,3)
- *Latruncula lendenfeldi* (Lindgren, 1897)(Indonesia, ZMA database) (6)
- *Latruncula “lovenii”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
- *Latruncula quadrifoliiata* Dendy, 1922 (Indonesia, ZMA database) (6)
- *Latruncula sp.: Jung et al., 1995 (South China Sea) (5)
- *Latruncula sp. (Indonesia, ZMA database) (6)
- *Latruncula sp.: Georgie & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Family Placospongiidae Gray, 1867

**Definition.** - Encrusting to lobate-digitate growth forms; surface often with network of sculptured grooves or plates, often closable, into which ectosomal pores and oscules open; plate-like grooves on surface rendered hard by thick cortex of closely packed sterraster; single layer of upright tylostyles lies in the floor of each groove; megascleres tylostyles, also occurring in tracts within choanosomal skeleton; microscleres sterrasters (spiraster-like) forming both dense surface crust and axial tracts; silica may be pigmented red.

**SOUTH CHINA SEA SPECIES.**
- *Placospongia carinata* Bowerbank, 1858; Lindgren, 1897: 485; Lindgren, 1898 (Gaspar Straits; Indonesia, ZMA database) (2,6)
- *Placospongia melobesioides* Gray, 1867:127; Lindgren, 1897: 485; Lindgren, 1898: Wilson, 1925:322; Dawydoff, 1952 (Gaspar Straits, Java Sea; Baie d’Along, Vietnam; Indonesia, ZMA database; Philippines) (2,3,6,7)
- *Placospongia sp. (Singapore; ZRC) (2)*

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**Family Polymastiidae Gray, 1867**

**Definition.** - Massive, spherical or burrowing sponges, typically with oscular or blind fistules, papillae or plates on upper surface; megascleres usually tylostyles of subtylostyles, typically more than one size category, smaller forming erect surface brushes and larger radiating choanosomal bundles, with smaller spicules in poorly organised arrangement between columns; thin, smooth oxeas also occur in one genus; microscleres rare, if present, including only acanthose microxeas.

**SOUTH CHINA SEA SPECIES.**

*Aetergia* sp.; George & George, 1987 (photo 11) (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

*Polymastia gemmipara* Dendy, 1916 (Indonesia, ZMA database) (6)

*Polymastia mamillata* Mueller; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Polymastia* sp. (Indonesia, ZMA database) (6)

*Polymastia* sp. (Singapore; QM/ZRC collections) (2)

*Radiella* ('Trichostenma') striaticulatum (Wilson, 1925:347) (Philippines) (7)

**Family Spirastrellidae Ridley & Dendy, 1886**

**Definition.** - Growth forms include encrusting, facultative burrowing and excavating sponges, massive, or digitate growth forms, many with surface plates and sometimes with papillae protruding above surface; megascleres tylostyles; microscleres usually spirasters forming ectosomal crust.

**SOUTH CHINA SEA SPECIES.**

*Spirastrella areolata* Lindgren, 1897; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Spirastrella aurivillii* Lindgren, 1897: 484; Lindgren, 1898; Dawydoff, 1952 (Gaspar Straits, Java Sea; Vietnam) (2,3)

*Spirastrella carnosa* Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)

*Spirastrella cocinea* Duchassaing & Michelotti; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

*Spirastrella cunctatrix* Schmidt, 1868; Carter, 1887:75; Van Soest, 1980 (King I., Mergui Archipelago, Burma, 12° 08'N; Indonesia, ZMA database; Hong Kong) (1,5,6)

*Spirastrella cuspidifera* (Lamarck, 1814) (Indonesia, ZMA database) (6)

*Spirastrella decumbens* Ridley, 1884 (Indonesia, ZMA database) (6)

*Spirastrella inconstans* (Dendy, 1887); Sollas, 1902:216, pl.14, fig 3; Lévi, 1961:513; Pattanayak, 1997 (Pulau Bidang, NE of Penang, 5° 30'N; Nicobar and Andaman Islands; Indonesia, ZMA database; Zamboanga, Philippines) (1,2,6,7)

*Spirastrella lucunosa* Kieschnick, 1900; Dragnewitsch, 1906:441 (Singapore, 1° 30'N; Ternate, Moluccas, Indonesia) (2,6)

*Spirastrella pachyspira* Lévi, 1958 (Indonesia, ZMA database) (6)

*Spirastrella purpurea* Ridley, 1884 (Indonesia, ZMA database) (6)

*Spirastrella purpurea* Ridley *glaebrosa* Vosmer, 1911 (Indonesia, ZMA database) (6)

*Spirastrella semilunaris* Lindgren, 1897: 484; Lindgren, 1898 (Java) (2)

*Spirastrella solidia* Ridley & Dendy, 1886; Lindgren, 1897: 484; Lindgren, 1898; Dawydoff, 1952 (Gaspar Straits, Java Sea; Vietnam; Indonesia, ZMA database) (2,3,6)

*Spirastrella spiculifer* Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)

*Spirastrella spinispiralifera* Carter, 1879 (Indonesia, ZMA database) (6)

*Spirastrella tristellata* Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)

*Spirastrella vagabunda* Ridley, 1884; Wison, 1925:343; de Laubenfels, 1935:334 (Puerta Galera, Philippines, Indonesia, ZMA database) (6,7)

*Spirastrella cf. vagabanda* Ridley (Singapore; QM/ZRC collections) (2)

*Spirastrella* sp. (Phuket region, Thailand) (1, QM/NTM collection)

*Spirastrella* sp. 942 (Sattahip region, Thailand) (3, QM/NTM collection)
**Family Stylocordylidae Topsent, 1928**

*Definition.* - Deep water sponges with stalked, asymmetrical, globular or ovoid bodies, characteristically growing on soft substrates; megascleres include two sizes of oxeote spicules, long centrotylote spicules and unusual, short, terminally curved spicules, together producing peculiar radial tracts converging towards stalk, and with spicules disposed along axis within stalk; microscleres absent or may include microxeas, microstrongylies or asters.

**SOUTH CHINA SEA SPECIES.**

Stylocordyla borealis Thompson, 1877 (Indonesia, ZMA database) (6)

**Family Suberitidae Schmidt, 1870**

*Definition.* - Massive, pedunculate, bowl-shaped or encrusting sponges, generally without surface papillae; skeleton radial at surface, without a distinct cortex, but usually choanosome more disorganised, occasionally with loose axial organisation and nonradial in arrangement; megascleres typically tylostyles, subtystylostyles, rarely styles or diactinal forms; tylostyles greatly modified in shape and position of head, being lobate, pear-shaped, drop-shaped or subterminal, or occasionally missing completely; microscleres, if present, may include spined centrotylote rods; reproduction oviparous, with asexual buds or stolons also common.

**SOUTH CHINA SEA SPECIES.**

Aaptos aaptos (Schmidt) nigra Lévi, 1961; 1310 (Vietnam) (3)
Aaptos suberitoides (Brandsted, 1934) (Indonesia, ZMA database) (6)
Aaptos sp.; Do & Erickson, 1983 (Taiwan) (5)
Aaptos sp. (Singapore; ZRC) (2)
Aaptos spp. (Nha Trang, Vietnam, PIBOC database) (3)

Laxosuberites proteus Hentschel, 1909; Dawydoff, 1952 (Aru Is, Indonesia; Vietnam, Cambodia) (3,8)

Laxosuberites *"stiliferus"* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Laxosuberites sp. (Indonesia, ZMA database) (6)
Poterion neptuni Hardwick, 1849; Dawydoff, 1952 (Phu quoq Is, Poulo Condore, Bassac, Gulf of Thailand; Indonesia, ZMA database) (3,6)
Pseudosuberites andrewsi Kirkpatrick, 1900 (Christmas I., Indonesia, ZMA database) (1,6)
Pseudosuberites *"canalis"* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Pseudosuberites cava Sollas, 1902:217, pl.14, fig.6; Burton, 1928:133 (Pulau Bidang, NE of Penang, 5° 30’N; Bally Strait, Malay Archipelago) (1,2)
Pseudosuberites sp. (Indonesia, ZMA database) (6)
Rhizasminella clavata Thiele, 1899 (Indonesia, ZMA database) (6, Burton MS)

Suberites carnosa Johnston; Carter, 1887:74 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

Suberites coronarius Carter, 1882; Carter, 1887:74, pl.7, figs 4-5 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

Suberites cf. domuncula; Dawydoff, 1952 (Vietnam, Cambodia) (3)

Suberites incrustans Keller, 1891 (Indonesia, ZMA database) (6)
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*Suberites japonicus* Thiele, 1899 (Indonesia, ZMA database); Dmitrenok et al., 1988 (Singapore) (2,6, Burton MS)

*Suberites laxosubertes* Sollas, 1902:217, pl.15, fig.4 (Pulau Bidang, NE of Penang, 5° 30’N) (2)

*Suberites lobulata* Lévi, 1961: 132 (Vietnam) (3)

*Suberites muda* (Wilson, 1925:352) (Philippines, Indonesia, ZMA database) (6,7)

*Suberites perfectus* Ridley & Dendy, 1886; Burton, 1928:132 (Bally Strait, Malay Archipelago, 320m) (2)

*Suberites “ridlevi”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

*Suberites tenericus* (Bowerbank, 1864); Dawydoiff, 1952 (Vietnam, Cambodia) (3)

*Suberites trincomaliensis* Carter, 1887:74, pl.6, figs 7-8 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

*Suberites* sp. (Indonesia, ZMA database) (6)

*Suberites* sp. 953 Phuket region, Thailand (1, QM/NTM collection)

*Suberites* sp. 1033 (Negros Oriental, Zamboanga, Philippines) (7, QM/NTM collection)

*Suberites* sp. 327 (Negros Oriental, Philippines) (7, QM/NTM collection)

*Suberites* sp. 615 (W. Mindinao, Bohol Sea, Philippines) (7, QM/NTM collection)

*Suberites* sp. 1667 (Sumbawa, Indonesia) (6, QM/NTM collection)

*Suberites* spp. (Nha Trang, Vietnam, PIBOC database) (3)

*Terpios crucatus* Dendy, 1905 (Indonesia, ZMA database) (6)

*Terpios fujax* Duchassaing & Michelotti, 1864; Sollas, 1902:217 (Pulau Bidang, NE of Penang, 5° 30’N; Indonesia, ZMA database) (2,6)

*Terpios zeteki* (de Laubenfels, 1936) (Kalimantan, Indonesia) (6, QM/NTM collection)

*Terpios* sp. (Indonesia, ZMA database) (6)

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**Family Tethyidae Gray, 1867**

**Definition.** - Typically spherical, less often encrusting or massive growth forms; upper surface often with polygonal plates and oscula-bearing grooves, and cribiform oscules occur at summit of sponge; basal surface often has root-like papillae; megascleres styles or strongyloxea, latter with asymmetrical and/or telescoped ends; spicules not markedly tyloste, frequently occurring in radial tracts; microscleres eustasters (including spherasters and micrasters); asexual reproduction by budding is common.

**SOUTH CHINA SEA SPECIES.**

*Tethya* ("Donatia") andamanensis (Dendy & Burton, 1926); Dendy & Burton, 1927:248; Pattanayak, 1997 (off Port Blair, Andaman ls. 11° 40’N, 220m; Nicobar and Andaman Islands) (1)

*Tethya cf. aurantiun* (Pallas, 1766); Cabrery, 1979:18; Cabrery, 1981:26 (Tayabas Bay, Batangas, Quezon, Mindoro Oriental, Marinduque La Union, Ilocos Sur, Ilocos Norte, Philippines) (7)

*Tethya crenatum* Johnston, var. robusta Carter, 1887:79 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

*Tethya* ("Donatia") diploderma (Schmidt, 1870); Brondsted, 1934:5 (Banda, Indonesia); Pattanayak, 1997 (Nicobar and Andaman Islands) (1,6)

*Tethya fissurata* Lendenfeld, 1888 (Indonesia, ZMA database) (6, Burton MS)

*Tethya ingalli* (Bowerbank, 1866); Lindgren, 1897: 483; Lindgren, 1898; Sollas, 1902:215; Wilson, 1925:335; Dawydoiff, 1952 (Vietnam, Cambodia; Great Redang L, E coast of Malay Peninsula, 5° 50’N; Java; Indonesia, ZMA database) (2,3,6)

*Tethya japonica* Sollas; Lindgren, 1897: 483; Lindgren, 1898; Dawydoiff, 1952; Pulitzer-Finali, 1980 (Vietnam, Cambodia; Java; Hong Kong) (2,3,5)

*Tethya* ("Donatia") lyncurium auctorun; Carter, 1887:77 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

*Tethya maca* Selenka, 1879; Sollas, 1902:216 (Pulau Bidang, NE of Penang, 5° 30’N) (2)

*Tethya meygriensis* Carter, 1883:366, pl.15, figs 6-8; Carter, 1887:80 (King L., Mergui Archipelago, Burma, 12° 08’N) (1)

*Tethya max Thiele, 1900 (Indonesia, ZMA database) (6)

*Tethya* ("Donatia"; "Tethyllyme") repens (Schmidt, 1870); Dendy & Burton, 1927:247; Pattanayak, 1997 (Andaman ls. 12°N, 260-960m; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6)
**Family Timeidae Topsent, 1928**

**Definition.** - Encrusting growth form, rarely massive; surface often sculptured by stellate subectosomal drainage canals running to oscules, and characteristically with cortex of densely packed euctasters and single layer of erect tylostyles or tracts of tylostyles running to surface; meegascleres exclusively tylostyles; microscleres include euctasters (including anhestasters and lophasters) or pseudasters (amphiasters). *Diplastrella* has in addition a basal layer of large spiculares with branching rays.

**SOUTH CHINA SEA SPECIES.**

*Diplastrella spiniglobula* Carter, 1879 (Indonesia, ZMA database) (6)  
*Timea capitatostellifera* Carter, 1880 (Indonesia, ZMA database) (6)  
*Timea granulata* Bergquist, 1965 (Indonesia, ZMA database) (6)  
*Timea tetracrics* Hentschel, 1912 (Aru Is, Indonesia) (6)  
*Timea cf. unistellata* Topsent, 1900 (Indonesia, ZMA database) (6)

**Family Trachycladidae Hallmann, 1917**

**Definition.** - Massive or branching growth forms; oscules small (less than 1 mm in diameter); ostia scattered singly or grouped; skeleton condensed in axial region and plumoreticulate in extra-axial region, with ascending multispecific tracts joined at infrequent intervals by single spicules; skeletal tracts composed of spongin fibres enclosing intermixed oxeas, strongyles and styles; microscleres smooth microstrongyles and spined vermiform spiraster-like spirules, rarely of more than two complete turns.  
[no recorded species]

**“Order Lithistida”**

**Definition.** - A problematic, polyphyletic assemblage of sponges, abundant in the Cambrian-Quaternary period, with many Recent relatives (all retaining articulated siliceous desma spicules, producing rigid skeletal structure); desmas classified according to number of secondarily silicified rays (crepis), from one (monocredial) to four (tetracrepidial); many species also with secondary skeletons composed of free spicules indicating phylogenetic relationships (in this sense most orders of living sponges have desma-bearing representatives (living relicts?), and possession of desmas is interpreted as a primitive feature); “lithistids” lacking free spicules are more difficult to assign to other demosponge orders, with desma morphology being the only current diagnostic character. Three suborders with nine families are presently retained in the taxon “Lithistida” awaiting further evidence as to their true affinities.
Suborder Triaenosina

Definition. - Peripheral skeleton of radially arranged triaene megascleres, with amphiatester, spiraster or microrhabd microscleres; with obvious affinities to Hadromerida.

Family Corallistidae Sollas, 1888

Definition. - Massive, fan-shaped, ridge-like and folded plate-like growth forms; rigid skeleton composed of tuberculate or arch-shaped monocrepidial desmas (dicranoclones); free megascleres phyllo-, disco- or dichotriaenes, together with oxeas or strongyles; microscleres streptoscleres (amphiasters, spirasters) or microxeas.

SOUTH CHINA SEA SPECIES.
Callipelta ornata Sollas, 1888 (Indonesia, ZMA database) (6)
Corallistes sp. (Indonesia, ZMA database) (6)
Corallistes sp.nov.: Dawydoff, 1952 (Vietnam, Cambodia) (3)
Macandrewia spinifoliata Lévi & Lévi, 1983 (Philippines, Indonesia) (6,7)

Family Pleromidae Sollas, 1888

Definition. - Cylindrical, vase-shaped or plate-like growth forms; rigid skeleton composed of smooth arch-shaped or armless monocrepidial desmas (megacloons with terminal cupules); free megascleres in ectosomal skeleton dicho- or plagiotriaenes, together with oxeas (or strongyles in one genus); microscleres streptoscleres (amphiasters, spirasters) or microxeas.

SOUTH CHINA SEA SPECIES.
Costifer vasiformis Wilson, 1925:461 (Philippines) (7)
Pleronta sp. (Indonesia, ZMA database) (6)

Family Theonellidae Lendenfeld, 1903

Definition. - Massive, cup-shaped, vase-shaped or cylindrical sponges with a narrow central cavity; desma megascleres fused tetracloons (including tri- or tetracrepidial desmas having four arms that do not have triaenose symmetry); free megascleres include phyllo-, disco- or dichotriaenes; microscleres microxeas, microrhabds or microstrongyles, and streptoscleres (amphiasters or spirasters).

SOUTH CHINA SEA SPECIES.
Discodermia claviformis Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Discodermia emarginata Dendy, 1905:99; Wilson, 1925:455 (Indonesia, ZMA database; Philippines) (6,7)
Discodermia emarginata lanellaris Wilson, 1925:456 (Philippines) (7)
Discodermia gorgonoides (Burton, 1928:109, fig.1); Pattanayak, 1997 (8 mls W of Interview L., Andaman Is., 12° 55’N, 90-540m; Nicobar and Andaman Islands) (1)
Discodermia japonica Doderlein, 1884; Burton & Rao, 1932:306 (off Cape Negrais, Burma, 15° 57’N) (1)
Discodermia panoplia Sollas, 1888 (Indonesia, ZMA database) (6)
Discodermia papillata (Carter, 1880); Burton & Rao, 1932:305; Pattanayak, 1997 (off Cape Negrais, Burma, 15° 57’N and Andaman Is; Nicobar and Andaman Islands) (1)
Discodermia stylifera (Keller, 1891) (Indonesia, ZMA database) (6, Burton MS)
Discodermia tuberosa Dendy, 1922 (Indonesia, ZMA database) (6, Burton MS)
Discodermia sp. (Indonesia, ZMA database) (6)
Kaliopsis "permollis" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Neosiphonia ('Jereopsis') fruticosa Wilson, 1925:458 (Philippines) (7)
Theonella conica KieschNick, 1896 (Ternate, Moluccas, Indonesia) (6)
Theonella "cupola" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Theonella cylindrica Wilson, 1925:454 (SW. Cebu, Philippines; Sulawesi, Indonesia, QM/NTM collection; Singapore, ZRC) (2,6,7)
Theonella incerta Thiele, 1900 (Indonesia, ZMA database) (6)
Theonella invaginata Wilson, 1925:451 (Philippines) (7)
Theonella lacerata Lendenfeld, 1907 (N.Sumatra) (2)
Theonella levior Lendenfeld, 1889 (Indonesia, ZMA database) (6, Burton MS)
Theonella pratti Bowerbank, 1869 (Indonesia, ZMA database) (6)
Theonella pulchrimollia Dendy, 1922 (Indonesia, ZMA database) (6)
Theonella swinhoei Gray, 1868; Wilson, 1925:448; Burton & Rao, 1932:307; Pattanayak, 1997 (Nankauri Harbour, Nicobar Is, 7° 58'N; Nicobar and Andaman Islands; Negros Oriental, Philippines; Indonesia, ZMA database) (1,6,7, QM/NTM collection)
Theonella swinhoei verrucosa Wilson, 1925:448 (Philippines) (7)
Theonella sp. (Indonesia, ZMA database) (6)
Theonella spnov.; Dawydoff, 1952 (Vietnam, Cambodia) (3)

Suborder Rhabdosina

Definition. - Ectosomal megascleres absent but ectosome contains minutely spined microstrongyles, microspined sigma-like microscleres or monocrepidial (one-rayed) disks; affinities with Hadromerida.

Family Cladopeltidae Sollas, 1888

Definition. - Solid, lobate sponges with tubular processes, each tube with an apical oscule; rigid ectosomal skeleton composed of special monocrepidial desmas, branching in one plane, lacking articulations (i.e. desmas without zygoses), whereas monocrepidial desmas in rigid choanosomal skeleton branch in all directions, articulating with adjacent desmas (i.e. with zygoses); free ectosomal megascleres oxytyloite or oxystrongylotes, perpendicular to surface, or tangential to surface at ends of tubular processes; microscleres absent.

SOUTH CHINA SEA SPECIES.

Siphonidiun capitatum Sollas, 1888 (Indonesia, ZMA database) (6)

Family Neopeltidae Sollas, 1888

Definition. - Rounded, massive or papilliform sponges; ectosomal skeleton with monocreddial disks; choanosome with monocrepidial desmas (dicranoclones), with or without free, slender oxaeas; microscleres microxoeas and streptoscleres (amphiasters).

[no recorded species]

Suborder Anoplina

Definition. - Both ectosomal megascleres and microscleres absent; affinities uncertain.
Family Azoricidae Sollas, 1888

Definition. - Cup-shaped, club-shaped, spherical, plate-like or fan-shaped or conical growth forms; rigid skeleton composed of monocrepid desmas, and free skeleton with tracts of monaxonoid megascleres (styles or oxeas) in choanosome; special ectosomal skeleton absent; microscleres absent.

SOUTH CHINA SEA SPECIES.

Leiodermatium crassiscutum Hentschel, 1912 (Aru Is, Indonesia) (6)
Leiodermatium deciduum (Schmidt, 1870); Lendenfeld, 1907 (N. Sumatra) (2)
Leiodermatium lyneus Schmidt, 1870 (Indonesia, ZMA database) (6)
Leiodermatium (‘Azorica’) marginata Sollas. 1888 (Indonesia, ZMA database) (6)
Leiodermatium (‘Azorica’) pfeifferae Carter; Wilson, 1925:465; Burton, 1928:112; Burton & Rao, 1932:308 (Andaman Sea, 13° 16’N; W of Mergui Archipelago, 13° 04’N; Philippines) (1,7)

Family Desmanthidae Topsent, 1893

Definition. - Encrusting to massive growth forms; rigid skeleton with tetracrepidial desmas (tetraclones); free spicules consist of tracts of styles and tylostyles dispersed in choanosome; special ectosomal spicules absent; microscleres absent.

SOUTH CHINA SEA SPECIES.

Desmanthus topsenti Hentschel, 1912 (Aru Is, Indonesia) (6)
Lophacanthus rhabdophorus Hentschel, 1912 (Aru Is, Indonesia) (6)

Family Vetulinidae Lendenfeld, 1903

Definition. - Folded, plate-like growth forms; rigid skeleton composed of acrepid (no rayed) desmas (sphaeroclones); free spicules strongylote megascleres scattered in choanosome; special ectosomal spicules absent; microscleres absent.

SOUTH CHINA SEA SPECIES.

Vetulina cf. stalaacties Schmidt, 1870 (Indonesia, ZMA database) (6)

Subclass Ceractinomorpha

Definition. - Sponges with parenchymella larvae and viviparous sexual reproduction (although with several oviparous ‘enclaves’: Agelasida, Petrosiidae, Axinellidae, Desmoxyidae, Raspailiidae (?)); generally with both spicule skeleton with well developed spongin fibres forming a diversity of skeletal structures (although siliceous spicules lost altogether in 3 orders, and spongin fibres lost in several genera); spicules monaxonic (either monactinal (styles) or diactinal (oxeas-strongyles)), never tetractinal (although modifications to the ends of some monaxonid spicules occur); microscleres diverse (meniscoid, oxeote, toxote, spheres) but never asterose.

Remarks. - Eight orders are differentiated here, although some authors also recognise a ninth (Petrosida), based on the possession of oviparous sexual reproductive strategy, now widely included in the Haplosclerida.
Order Verticillitida

**Definition.** - Demospongiae with ‘sphinctozoan’ grade of construction (solid aragonitic cortex producing a series of chambers on top of each other); living ‘sphinctozoans’ lack free spicules but have cells and larvae resembling those of other Demospongiae.

**Remarks.** - Only one extant order, family and genus (*Vaseletia*) are known, although many more fossil taxa described.

Family Cryptocoeliidae Steinmann, 1982

**Definition.** - Living ‘sphinctozoans’ with solid, cortical aragonitic skeleton consisting of a series of solitary or colonial chambers one on top of the other, with the lowest (oldest) chambers usually partially filled with secondary secretions of aragonite and youngest chambers containing living tissue (including a cuticle and cells such as flattened endopinacocytes and spherule-bearing cells); calcareous chambers contain reinforcement of radially disposed pillars; lining of atrial cavity uninterrupted (prosiphonate), with one chamber growing forward into base of next (younger) chamber, and with numerous thin struts (vesiculae) running from floor to roof of each chamber; struts joined by more or less horizontal crossbars; walls of chambers and atrial lining have trefoil or multifid perforations, with perforations corresponding to location of inhalant pores (ostia), whereas larger (oscular) openings are at apex of chambers with the passage of exhalant water via the atrium; choanocyte chambers aphodal (with a small canal joining chamber to exhalant canal); larvae parenchymellae that develop from a coeloblastula.

[no recorded species]

Order Agelasida

**Definition.** - Oviparous sponges, showing (perhaps superficial) resemblance to commercial bath sponges (*Spongidae*) and biochemical similarities to Axinellidae; growth forms branching, tubular, fan-shaped or massive; well developed spongin-fibre skeleton, forming regular or irregular reticulation; fibres echinatate by short styles or oxeas with verticillate spines; microscleres absent.

**Remarks.** - Two recent families.

Family Agelasidae Verril, 1907

**Definition.** - Growth form ramose, lamellate, tubular or massive, often “honeycomb” reticulate in construction; colour frequently orange or red, texture extremely tough but compressible reflecting high ratio of spongin fibre to spicule; skeletal structure homogeneous, reticulate, with well developed system of large spongin fibres often containing no primary coring spicules but echinatate by unique styles with verticillate spines (acanthoxeas or acanthostrongyles), with some species having geometrically different coring and echinating spicules, and others also having styles; sexual reproduction oviparous.
Family Astroscleridae Lister, 1900

**Definition.** - Bulbous, encrusting or massive subspherical growth forms; basal skeleton composed of aragonite, spherulitic in form (with each spherulite laid down in a cell at the surface of the sponge and is eventually led to a position where it contributes to the general reticulate skeleton of aragonite); intracellular secretion of sclerodermites only found in Astrosclera, whereas in other genera the skeleton is secreted extracellularly; living tissue penetrates reticulation to a depth of about 1 cm, but no tabulae separate the tissue-filled external parts of the skeleton from the interior that is of free living tissue; interior interskeletal spaces generally fill in with secondary deposits of aragonite; siliceous spicules verticillately spined acanthostyles, sometimes secondarily lost.

SOUTH CHINA SEA SPECIES.
*Astrosclera willeyana* Lister, 1900 (Indonesia, ZMA database) (6)

Order Poecilosclerida

**Definition.** - Skeleton with discrete siliceous spicules, although some primitive groups retain a fused basal calcite skeleton or a fused siliceous (desmoid) skeleton, along with free siliceous skeletons; main skeleton composed of megascleres (monactinal, diactinal or both) and spongin fibres in various stages of development; megascleres frequently localised to distinct regions; microscleres include meniscoid forms such as chelae (unique to the order) and sigmas, and other diverse forms (toxas, raphicles, microxeas); most families are viviparous, with uniformly ciliated parenchymella having bare posterior poles (although Raspailiidae is probably oviparous).

**Remarks.** - This order contains more living species than all other Recent Porifera, and includes both marine and some freshwater species. Up to 25 families have been recognised in this order, most being typical in having chelae microscleres, several atypical in lacking these microscleres, but a recent proposed reorganisation of the order, based on phylogenetic parsimony analysis, suggests that only 19 of these may be valid.

Suborder Microcionina

**Definition.** - Poecilosclerida with terminally microspined ecosomal megascleres and up to 5 categories of structural megascleres, most frequently monactinal. Microscleres are palmate chelae, diverse toxas, but sigmas never present.
Family Iophonidae Burton, 1929

**Definition.** - Encrusting, massive, flabellate or digitate growth forms, sometimes burrowing and fistulose; ecyosomal skeleton forming tangential tracts of tyloes or strongyles with microspined bases; choanosomal styles form reticulate (in massive) or plumose skeletons (in encrusting growth forms); echinating spicules present or absent; microscleres include palmate isochelae and toxas (both sometimes lost), occasionally also with other microscleres such as bipocilae, modified anisosclae, microhabds and raphides.

**SOUTH CHINA SEA SPECIES.**

_Acarnus bergquistae_ van Soest, Hooper & Hiemstra, 1991; Topsent, 1897; Dawydoff, 1952; Desqueyroux-Faundez, 1981 (as ‘tortilis’) (Ambon, Indonesia; Vietnam) (3,6)

_Acarnus bieladotylofa_ (Hoshino, 1981); van Soest, Hooper & Hiemstra, 1991 (Borneobank; Banda Sea, Indonesia) (6)

_Acarnus claudel_ van Soest, Hooper & Hiemstra, 1991; Thiele, 1903 (as ‘ternatus’) (Ternate, Moluccas, Indonesia) (6)

_Acarnus primigenius_ Hiemstra & Hooper, 1991 (Sumbawa, Indonesia) (6)

_Acarnus wolfgangi_ Keller, 1889; Kieschnick, 1896; Thiele, 1903; van Soest, Hooper & Hiemstra, 1991 (as ‘ternatus’) (Ternate, Moluccas, Indonesia) (6)

_Cornulina achela_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Cornulina dubium_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Cornulina strepsicrurha_ Lévi, 1961 (Indonesia, ZMA database) (6)

_Damiria australiensis_ Dendy; Lindgren, 1897: 482; Lindgren, 1898; Dawydoff, 1952 (Vietnam, China Sea, 11° 5’N) (3)

_Damiria simplex fistula_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Zyzya fuliginosa_ (Carter, 1880) (Indonesia, ZMA database) (6)

_Zyzya massalis_ (Dendy, 1922) (Sulawesi, Indonesia) (6, QM/NTM collection)

Family Microcionidae Carter, 1875

**Definition.** - Encrusting, massive, lobate, fan-shaped and branching growth forms; ecyosomal skeleton composed of styles or anisoxeas (exceptionally oxaeas), in erect bundles, forming a continuous crust, lying tangential or sparsely dispersed on the surface; subectosomal skeleton relatively poorly developed; choanosomal skeleton with well developed spongin fibres forming hymedesmoid, microcionid, plumose, plume-reticulate, reticulate or axially condensed tracts; spongin fibres cored by smooth or partially spined large styles, and echinated by smooth, wholly- or partially-spined small styles or modified forms (acanthoxeas or acanthostrongyles) embedded perpendicular to fibres; microscleres typically palmate isochelae, sometimes contort and thickened (pseudo-anchorate, -arcuate, or _Isodictya_-like isochelae), and also toxas and occasionally raphides or microxeas; sexual reproduction exclusively viviparous.

**SOUTH CHINA SEA SPECIES.**

_Antho (Plocamia) ridleyi_ (Hentschel, 1912); Hooper, 1996 (Aru I, SE, Indonesia) (6)

_Antho (Plocamia) sp. 1707_ (Kalimantan, Indonesia) (6, QM/NTM collection)

_Artemisina sp._ (Nha Trang, Vietnam, PIBOC database) (3)

_Antho spp._ (Indonesia, ZMA database) (6)

_Clathria (Clathria) "aplysilla"_ Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

_Clathria (Clathria) basilana_ Lévi, 1961 (Sulawesi, Zamboanga, Philippines; Sumba, Indonesia) (6,7, QM/NTM collection)

_Clathria (Clathria) chelifera_ (Hentschel, 1911); Hooper, 1996 (Hon Trung Lon, Vietnam) (3)

_Clathria (Clathria) dubia_ Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Clathria (Clathria) inanchorata Ridley & Dendy, 1886; Kieschnick, 1896; Hooper, 1996 (Ternate, Moluccas, Indonesia) (6)

Clathria (Clathria) meyeri (Bowerbank, 1877); Hooper, 1996 (Irian Jaya, SE. Indonesia) (6)

Clathria (Clathria) peliculosa Whitelegge, 1897 (Indonesia, ZMA database) (6, Burton MS)

Clathria (Clathria) spongodes Dendy, 1922 (Indonesia, ZMA database) (6, Burton MS)

Clathria (Clathria) surculosa (Esper, 1797); Hooper, 1996 (Indonesia) (6)

Clathria (Clathria) "tubulosa" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Clathria (Clathria) spp. (Nha Tran, Vietnam, PBOC database) (3)

Clathria (Isocystia) ecentrica Burton, 1934; Hooper, 1996 (Sumba, SE. Indonesia) (6)

Clathria (Isocystia) sp. 1758 (Manado, Indonesia) (6, QM/NTM collection)

Clathria (Microciona) aceratoobtusa (Carter, 1887); Hooper, 1996 (Ko Samui, Gulf of Thailand; King L, Mergui Archipelago, Burma, 12° 08’ N) (1.3)

Clathria (Microciona) atraranguea (Bowerbank, 1862); Burton & Rao, 1932: 344; Hooper, 1996; Pattanayak, 1997 (off Cape Negrais, Burma, 15° 50’ N; Nicobar and Andaman Islands) (1)

Clathria (Microciona) claudi Hooper, 1996; Lêvi & Lêvi, 1989 (as ‘acanthoaxa’) (Philippines) (7)

Clathria (Microciona) hentschelii Hooper, 1996; Hentschel, 1912 (as ‘lendenfeldi’) (Aru L, SE. Indonesia) (6)

Clathria (Microciona) rhopalophora (Hentschel, 1912); Thomas, 1970; Hooper, 1996 (Cocos-Keeling; Aru L, Indonesia) (1,6)

Clathria (Microciona) similis (Thiele, 1903); Hooper, 1996 (Ternate, Moluccas, Indonesia) (6)

Clathria (Microciona) tetrastyla (Hentschel, 1912); Hooper, 1996 (Aru L, Indonesia) (6)

Clathria (Microciona) thelei (Hentschel, 1912); Hooper, 1996 (Aru L, Indonesia) (6)

Clathria (Microciona) n.sp. (Singapore; QM/NTM collections) (2)

Clathria (Microciona) sp.; George & George, 1987 (photo 3G); Hooper, 1996 (Ternate, Moluccas; Aru L, SE. Indonesia; Bodgaya Islands and Pulau Sipadan, Sabah; Singapore; QM/NTM collections) (2,4,6)

Clathria (Thalysia) aruensis (Hentschel, 1912); Lêvi, 1958; Hooper, 1996 (Aru L, Indonesia) (6)

Clathria (Thalysia) calochela (Hentschel, 1912); Hooper, 1996 (Aru L, SE. Indonesia) (6)

Clathria (Thalysia) “camerata”; Dawydoff, 1952 (Vietnam, Cambodia) (attributed to Ridley, 1884) (3)

Clathria (Thalysia) cervicornis (Thiele, 1903); George & George, 1987 (photo 3G); Hooper, 1996 (Ternate, Moluccas; Aru L, SE. Indonesia; Bodgaya Islands and Pulau Sipadan, Sabah; Singapore; QM/NTM collections) (2,4,6)

Clathria (Thalysia) corallingi Ridleys, 1884; Hentschel, 1912; Brondsted, 1934; Hooper, 1996 (Aru L, SE. Indonesia) (6)

Clathria (Thalysia) coralliophila (Thiele, 1903); Dawydoff, 1952; Hooper, 1996 (Moluccas, Indonesia; Vietnam) (3,6)

Clathria (Thalysia) cratitia (Esper, 1797); Thiele, 1899; Thiele, 1903; Hooper, 1996 (Ternate, Moluccas, Indonesia) (6)

Clathria (Thalysia) distincta (Thiele, 1903); Hentschel, 1912; Hooper, 1996 (Ternate, Moluccas, Indonesia) (6)

Clathria (Thalysia) erecta (Thiele, 1899); Thiele, 1903; Lêvi, 1961; Hooper, 1996 (Ternate, Moluccas; Sulawesi, Indonesia; Vietnam) (3,6)

Clathria (Thalysia) eurya (de Laubenfels, 1954) (Indonesia, ZMA database) (6)

Clathria (Thalysia) fasciculata Wilson, 1925:442; Caberoy, 1981:20; Hooper, 1996 (Sulawesi, Indonesia; Zamboanga, Batangas, Bohol, Pangasinan, Mindoro Oriental, Quezon, Masbate, Philippines) (6,7)

Clathria (Thalysia) filifera (Ridleys & Dendy, 1886); Thiele, 1899; Thiele, 1903; Dragnewitsch, 1906; Dawydoff, 1952; Hooper, 1996 (Singapore; Indonesia; Masbate, Philippines; Vietnam) (2,3,6,7)

Clathria (Thalysia) kieschnickii Hooper, 1996; Kieschnick, 1900 (as ‘cylindricus’) (Ternate, Moluccas, Indonesia) (6)

Clathria (Thalysia) lendenfeldi Ridley & Dendy, 1886; Hentschel, 1912; Hooper, 1996 (AIMS/NCI collection; Andaman Sea, Thailand; Aru L, SE. Indonesia) (1.6, QM/NTM collection)

Clathria (Thalysia) longitoxa (Hentschel, 1912); Hooper, 1996 (Aru L, SE. Indonesia) (6)

Clathria (Thalysia) major Hentschel, 1912; Hooper, 1996 (Aru L, SE. Indonesia) (6)

Clathria (Thalysia) michaelseni (Hentschel, 1912); Hooper, 1996 (Aru L, SE. Indonesia) (6)

Clathria (Thalysia) mutabilis (Topsent, 1897); Desqueyroux-Faundez, 1981; Hooper, 1996 (Ambon, Banda Sea, Indonesia) (6)

Clathria (Thalysia) nuda Hentschel, 1912; Hooper, 1996 (Aru L, Indonesia) (6)
**Family Raspailiidae Hentschel, 1923**

**Definition.** - Encrusting, massive, lobate, fan-shaped or branching growth forms, usually with a very hispid surface; specialised ectosomal skeleton consists of brushes of small thin styles or oxeas, surrounding individual long thick styles or oxeas; choanosal skeleton varies from a compressed axial skeleton, to plumo-reticulate or exclusively reticulate.
structures; spongin fibres usually completely enclose coring spicules (choanosome styles, oxeas or both); fibres echinated by spined styles, or modifications to styles; microscleres usually absent, sometimes single raphides or bundles (trichodragmata); reproduction typically oviparous.

SOUTH CHINA SEA SPECIES.

Acanthostylotella cornuta Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)  
Aulospengus ("Heterectus") villosa (Thiele, 1899) (Indonesia, ZMA database) (6)  
Axechina raspaldoidea Hentschel, 1912; Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Ceratopson axifera (Hentschel, 1912); Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Ceratopson erecta Thiele, 1899 (Indonesia, ZMA database) (6)  
Ceratopson “horrida” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)  
Cymon araneus Hentschel, 1912; Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Echinodictyum aceratus (Carter, 1887):67, pl.5, figs 3-6 (King I., Mergui Archipelago, Burma, 12°08’N) (1)  
Echinodictyum asperum (Ridley & Dendy, 1886): Topsent, 1897; Burton & Rao, 1932:348; Dawydoff, 1952; Lévi, 1961; Desqueyroux-Faundez, 1981; Hooper, 1991; Pattanayak, 1997 (Ross I., Andaman Is, 12°N; Nicobar and Andaman Islands; Ambon, Indonesia, ZMA database; Lingayen Gulf, Philippines; Vietnam) (1,3,6,7)  
Echinodictyum cancellatum (Lamarck, 1814); Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Echinodictyum carlinoides (Lamarck, 1814); Hentschel, 1912 (as ‘glomeratum’); Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Echinodictyum cavernosum Thiele, 1899 (Indonesia, ZMA database) (6)  
Echinodictyum clathratum Dendy, 1905 (Indonesia, ZMA database) (6)  
Echinodictyum conulosum Kieschnick, 1900; Hooper, 1991 (Ternate, Moluccas, Indonesia) (6)  
Echinodictyum flabelliforme Sollas; Dawydoff, 1952 (Vietnam, Cambodia) (3)  
Echinodictyum gorgonoides Dendy; Dawydoff, 1952 (Vietnam, Cambodia) (3)  
Echinodictyum lucuosum Kieschnick, 1900; Hooper, 1991 (Ternate, Moluccas, Indonesia) (6)  
Echinodictyum mesenterinum (Lamarck, 1813); Hooper, 1991 (Negros Orientale, SW. Cebu, Philippines; Aru I., Indonesia; Singapore; QM/ZRC collections) (2,6,7)  
Echinodictyum pulchrum Brundsted, 1934 (Java, Banda, Indonesia) (6)  
Echinodictyum rugosum Hentschel, 1912; Hooper, 1991 (Aru Is, SE.Indonesia) (6)  
Ectyoplaxis tabula (Lamarck, 1813); Hooper, 1991 (SE. Indonesia, ZMA database) (6)  
Endectyon (‘Hemectyon’) fruticosus Dendy, 1887. Phuket region, Thailand (1, QM/NTM collection)  
Endectyon fruticosus Dendy aruensis (Hentschel, 1912); Hooper, 1991 (Aru Is, SE.Indonesia; Phuket, Thailand) (1,6)  
Euryxyn clavatum Topsent, 1896; Hooper, 1991 (Indonesia, ZMA database) (6)  
Raspuilia (Clathriodendron) sp. 973 (Ko Samui region, Thailand) (3, QM/NTM collection)  
Raspuilia (Raspuilia) hispidus (Montagu, 1818); Carter, 1887:66 (King I., Mergui Archipelago, Burma, 12°08’N) (1)  
Raspuilia (Raspuilia) vestigifera Dendy, 1896 (Sulawesi, Indonesia) (6, QM/NTM collection)  
Raspuilia (Rapuilia) viminalis (Schmidt, 1862); Burton & Rao, 1932; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)  
Raspuilia (Raspuilia) sp. 1772 (Palawan, Philippines) (7, QM/NTM collection)  
Raspuilia sp. (Nha Trang, Vietnam, PIBOC database) (3)  
Raspuilia sp.nov.: Dawydoff, 1952 (Poulo-Dama, Vietnam) (3)  
Raspuilia (Syringella) australiensis Ridley, 1884; Hooper, 1991 (Indonesia, ZMA database) (6)  
Raspuilia (Syringella) nudus (Hentschel, 1911) (Sulawesi, Indonesia; Singapore) (2,6, QM/NTM/ZRC collections)  
Raspuilia (Syringella) sp. 949 (Phuket region Thailand) (1, QM/NTM collection)  
Raspuilia (Syringella) sp. 1644 (SW. Cebu, Pulangbato, Philippines) (7, QM/NTM collection)  
Raspuilia (‘Parasyringella’) clathrata Ridley, 1884 (Indonesia, ZMA database) (6, Burton MS)  
Thrincophora cervicornis Ridley & Dendy, 1886; Hentschel, 1912 (as ‘rhaphidophora’); Hooper, 1991 (Philippines; Sulawesi, Aru I., SE.Indonesia) (6,7, QM/NTM collection)  
Thrincophora incrustans Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)  
Trikentriphon elegans Lendenfeld, 1887 (Indonesia, ZMA database) (6, Burton MS)  
Trikentriphon flabelliforme Hentschel, 1912; Hooper, 1991 (Aru Is, SE.Indonesia) (6)
**Family Rhabderemiidae Topsent, 1928**

**Definition.** - Encrusting, massive, bulbous or digitate growth forms; skeleton without axial compression, usually plumose or plumo-reticulate, composed of light spongin fibres cored by bouquets of entirely smooth, slightly spined or entirely spined rhabdostyles; microscleres are normal or contort sigmas, microstyles and thraustoxeas (all with or without microspines).

**SOUTH CHINA SEA SPECIES,**

*Rhabderemia acanthostyla* Thomas, 1968; Hooper, 1990 (as ‘conniosa’ Lévi MS); van Soest & Hooper, 1993 (Salayer; Sumbawa; Take Karlarang; Sulawesi, Indonesia; Nha Trang, Vietnam) (3,6)

*Rhabderemia forcipula* (Lévi & Lévi, 1989); van Soest & Hooper, 1993 (Mindoro, Philippines; Phuket region, Thailand) (1, QM/NTM collection,7)

*Rhabderemia indicus* Dendy, 1905; van Soest & Hooper, 1993 (Ko Samui, Gulf of Thailand; Indonesia, ZMA database) (3,6)

*Rhabderemia proliferata* (Annandale, 1915); Thomas, 1979; van Soest & Hooper, 1993; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

**Suborder Myxillina**

**Definition.** - Poecilosclerida with microscleres consisting of tridentate-derived chelae, but never toxas; ectosomal megascleres are diactinal, although aniso-terminations commonly occur, and terminal spination of these spicules is absent, or if present they are usually coarse or irregular.

**Family Anchinoidea Topsent, 1928**

**Definition.** - Encrusting, massive and branching sponges; surface with characteristic groups of pores (areoles); megascleres are smooth diactinal spicules (oxyeotes or strongylotes), grouped together or scattered in the ectosome but never forming a crust, lying perpendicular, tangential, or paratangential to the surface; choanosomal diactinal spicules (usually identical to those in the ectosome but sometimes reduced to only acanthostyles), form thick plumose or plumo-reticulate tracts in the choanosome, with only poorly developed spongion fibres, and echinated by 1-2 sizes of acanthose styles; microscleres include arcuate isochelae, bipocilli and sigmas, never toxas or raphides.

**SOUTH CHINA SEA SPECIES,**

*Hamigeru ternatensis* Thiele, 1899 (Indonesia, ZMA database) (6)

*Kirkladittu spiculophila* (Burton & Rao, 1932;332, pl.18, fig.5); Pattanayak, 1997 (Port Blair, Andaman Is, 11° 50’N; West Andaman Is; Nicobar and Andaman Islands) (1)

*Phorbas (‘Pronax’) arborescens* (Topsent, 1897); Desqueyroux-Faudrè, 1981 (Ambon, Indonesia) (6)

*Phorbas* sp. (Indonesia, ZMA database) (6)

**Family Coelosphaeridae Hentschel, 1923**

**Definition.** - Spherical, club-shaped, tubular, and cushion-shaped growth forms, frequently burrowing or excavating coralline substrates (with long, open and/or blind fistules on upper surface bearing oscules and ostia poking above the substrate); ectosomal skeleton a tangential crust of smooth diactinal (usually tylote) spicules, occasionally secondarily lost; choanosomal skeleton reduced, composed of a delicate reticulation of smooth or acanthose styles,
occasionally oxes or strongyles, forming plumoreticulate tracts and cavernous internal chambers; microscleres include sigmas, arcuate isochelae, occasionally modified to unguiferous, thamaatose or birotulate forms; toxas absent.

SOUTH CHINA SEA SPECIES.

*Acanthodorx fibrosa* Lévi, 1961 (SW.Cebu, Philippines; Sulawesi, Zamboanga, Indonesia) (6,7, QM/NTM collection)

*Coeoecarteria singaporense* (Carter, 1883:326, pl.13, fig.17); Lindgren, 1897, 1898 (Singapore, 1°15′N, China Sea); Dwydoff, 1952 (Vietnam); Lévi, 1961:518 (Zamboanga, Philippines) (2,3,6,7)

*Coelosphaera dichela* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Coelosphaera dichela Hentschel gracilis* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Coelosphaera ('Histoderma') fucoides* (Topsent, 1897); Burton & Rao, 1932:354 (off Cape Negrais, Burma, 15°50′N, 80-90°m) (1)

*Coelosphaera ('Histoderma') navicelligera* (Ridley & Dendy, 1886); Lindgren, 1897:482; Lindgren, 1898; Dwydoff, 1952 (Vietnam, China Sea, 11°5′N; Indonesia, ZMA database) (3,5,6)

*Coelosphaera navicelligera* Ridley arnensis Hentschel, 1912 (Aru Is, Indonesia) (6)

*Coelosphaera toxifera* Wilson, 1925:435 (Philippines) (7)

*Coelosphaera sp.* (Indonesia, ZMA database) (6)

*Ectyodorx sp.* 946 (Phuket region, Thailand) (1, QM/NTM collection)

*Ectyodorx sp.* 1001 (SW., Cebu, Philippines) (7, QM/NTM collection)

*Ectyodorx sp.* 1281 (Sulawesi, Indonesia) (6, QM/NTM collection)

*Forcepsia mertoni* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Lissodendoryx arenaria* Dondy, 1905 (Indonesia, ZMA database) (6)

*Lissodendoryx aspera* (Bowerbank, 1875); Hofman & van Soest, 1995:89 (Ambon, Moluccas, Ternate, Aru Is., Sulawesi, Indonesia) (6, QM/NTM collection)

*Lissodendoryx bifacialis* Lévi & Lévi, 1983 (Indonesia, ZMA database) (6)

*Lissodendoryx facoides* Topsisent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)

*Lissodendoryx grata* (Thiele, 1903); Hofman & van Soest, 1995:84 (Ternate, East of Komodo 8°35′S 119°34′2′E, Indonesia, ZMA database) (6)

*Lissodendoryx isodictulosis* (Carter, 1882) (Indonesia, ZMA database; Quezon, Philippines) (6,7)

*Lissodendoryx "lingua"* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

*Lissodendoryx microcellulosa* Hofman & van Soest, 1995:96 (N Cape Komodo, Indonesia, ZMA database) (6)

*Lissodendoryx paucispinata* (Ridley & Dendy, 1886); Hofman & van Soest, 1995:85 (Indonesia, ZMA database) (6)


*Lissodendoryx schmidtii* Ridley, 1884 (Indonesia, ZMA database) (6)

*Lissodendoryx similis* Thiele, 1899; Burton & Rao, 1932:331; Hofman & van Soest, 1995:90 (Marble Rocks, Mergui Archipelago, 11°33′N; Jack and Una Is, Mergui Archipelago, 11°40′N; Ambon, Madras, Kema, Celebes, Moluccas, Jeda Is., Indonesia, ZMA database) (1,6)

*Lissodendoryx tawitiensis* Wilson, 1925:332 (Philippines, Indonesia, ZMA database) (6,7)

*Lissodendoryx ternatensis* (Thiele, 1903); Hofman & van Soest, 1995:92 (Ternate, Moluccas, Balikpapan, Kalimantan, Indonesia, ZMA database) (6)

*Lissodendoryx timorensis* Hofman & van Soest, 1995:95 (NE of Timor, Indonesia, ZMA database) (6)

*Lissodendoryx sp.* (Indonesia, ZMA database) (6)

**Family Crambiidae Lévi, 1963**

*Definition.* - Encrusting or massive growth forms; ectosomal megascleres consist of smooth subtylostyles, usually standing perpendicular to surface; choanosomal megascleres are smooth or acanthose styles-tylostyles forming hymedesmoid, plumose or plumoreticulate skeletal structures, with a secondary interlocking desma ("sublithistid") skeleton common; microscleres anchorate or unguiferous isochelae.
SOUTH CHINA SEA SPECIES.
Monanchora chatatirata Carter; Lévi, 1961; 135 (Vietnam; Pulangbato, Palawan, Philippines; Sulawesi, Indonesia) (3,6,7, QM/NTM collection)
Monanchora diacantha de Laubenfels, 1935:331 (Puerta Galera, Philippines) (7)
Monanchora viridis Kieschmick, 1900 (Ternate, Moluccas, Indonesia) (6)
Monanchora anguliculata Dendy, 1922 (Indonesia, ZMA database) (6)
Monanchora sp. (Indonesia, ZMA database) (6)
Monanchora sp. (Singapore; QM/ZRC collections) (2)
Monanchora sp. (Nha Trang, Vietnam, PIBOC database) (3)

Psammocella elegans (Dendy, 1916); Burton & Rao, 1932;334, pl.18, fig.7; Pattanayak, 1997 (off N coast of Table L, Cocos Is. Andaman Is. 14°10’N; Mergui Archipelago, 32m, 12°N; Nicobar and Andaman Islands; Indonesia, ZMA database) (1.6)
Psammocella rigida (Bowerbank, 1874) (Indonesia, ZMA database) (6, Burton MS)

Family Crellidae Hentschel, 1923

Definition. - Encrusting, massive, club-shaped and branching growth forms; choanosomal skeleton regularly reticulate or plomo-reticulate, composed of bundles of smooth oxea; ectosomal skeleton with a thick crust of tangentially placed acanthostyles and/or acanthoxea; acanthose spicules may also be embedded perpendicular to skeletal tracts and/or erect on basal spongion (= echinating basal acanthostyles), and dispersed within the choanosome between the tracts of smooth diactines; microscleres arcuate isochelae, antischelae and sigmas.

SOUTH CHINA SEA SPECIES.
Crella cyathophora Carter, 1886 (Indonesia, ZMA database) (6)
Crella "myxilloides" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Crella sp. (Indonesia, ZMA database) (6)
Crella sp. 1019 (Negros Oriental, Philippines) (7, QM/NTM collection)
Crellidae gen. nov. 1020 (Negros Oriental, Philippines) (7, QM/NTM collection)

Family Hymedesmiidae Topsent, 1928

Definition. - Persistently encrusting growth form; oscules and ostia usually on papillae, or ostia grouped over subdermal cavities; spined bases of intermingled large choanosomal styles and smaller acanthostyles embedded in a basal layer of spongion, standing perpendicular to the substrate; smooth, often polytylote, diactinal (tornotes, anisotornotes or oxae) or sometimes monactinal spicules (styles), occur singly or form bundles on the surface; microscleres palmate, arcuate or unguiferous isochelae, sigmas, forceps, and sometimes also anisochelae; toxas never present.

SOUTH CHINA SEA SPECIES.
Hymedesmia hallezi Topsent, 1900; Sollas, 1902;216 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Hymedesmia merttoni Hentschel, 1912 (Aru Is, Indonesia) (6)
Hymedesmia parvispicula Burton & Rao, 1932;351, fig.16 (Mergui Archipelago) (1)
Hymedesmia parvispicula Vacelet, Vasseur & Lévi, 1976 (Indonesia, ZMA database) (6)
Hymedesmia prostrato Thiele, 1903 (Indonesia, ZMA database) (6)
Hymedesmia sp. (Sattahip Navy base region, Thailand) (3, QM/NTM collection)
Hymedesmia spp. (Indonesia, ZMA database) (6)
Family Myxillidae Topsent, 1928

Definition. - Encrusting, massive, fan-shaped and branching sponges; specialised ectosomal skeleton composed of diactinal tylostyles or tornotes with smooth or microspined, slightly swollen bases, arranged as bouquets or lying paratangential or perpendicular to the surface; choanosomal skeleton composed of isotropic, anisotropic or plumose tracts of smooth or partially spined monactinal or diactinal choanosomal megascleres (or choanosomal spicules replaced within the skeleton by ectosomal megascleres), sometimes echinated by small acanthose styles; spongin development variable, usually consisting of light spongin cementing spicule together at their nodes, but sometimes with heavy fibres; microscleres anchorate isochelae and/or derivatives (spatulate, unguiferous or birotulate chelae, sometimes anisochelate), sometimes together with palmate isochelae, smooth sigmas and forceps.

SOUTH CHINA SEA SPECIES.
Amphilectus furcatus Vosmaer, 1880 (Indonesia, ZMA database) (6, Burton MS)
Amphilectus pilorum Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Demiriopsis bronstedti (Burton, 1928:124); Pattanayak, 1997 (Andaman Is, 260-580m, 12°N; Nicobar and Andaman Islands) (1)
Desmacidon fragilis Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
Desmacidon fruticosum (Montagu, 1818) Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
Desmacidon nodosus Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
Desmacidon tenuistriatus Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
Desmacidon reptans Ridley & Dendy, 1886; Lindgren, 1897: 482; Lindgren, 1898; Dawydoff, 1952 (Vietnam, China Sea, 11° 5’N) (3)
Desmapsamma cf. anchorata Carter, 1882 (Indonesia, ZMA database) (6)
Hymenactis landbecki Hentschel, 1916 (Aru Is, Indonesia) (6)
Iotrochota baculifera (Ridley, 1884): Lindgren, 1897, 1898; Burton & Rao, 1932:353; Dawydoff, 1952; Lévi, 1961:518; Pattanayak, 1997 (NW side of Spiteful Bay, near Leader Point, Nicobar Is, 8°N; Sattahip region, Thailand; Nicobar and Andaman Islands; Vietnam; China Sea; Indonesia, ZMA database, Zamboanga, Philippines; Singapore; QM/ZRC collections) (1,2,3,6,7)
Iotrochota birotulata; Jung et al., 1995 (South China Sea) (5)
Iotrochota purpurea Bowerbank, 1875; Dawydoff, 1952 (Vietnam; Indonesia, ZMA database) (3,6)
Iotrochota sp. (Nha Trang, Vietnam, PIBOC database) (3)
Isodictya simulans Bowerbank; Carter 1887:69, pl.6, figs 1-2 (King I., Mergui Archipelago, Burma, 12° 08’N) (1)
Myxilla dendi Burton, 1959 (Indonesia, ZMA database) (6)
Myxilla ranosa Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Myxilla (‘Dendoryx’) molla (Lindgren, 1897: 482); Lindgren, 1898 (Hirudo Straits, China Sea) (3)
Myxilla rosacea Lindgren, 1897; Dawydoff, 1952 (Vietnam, Cambodia) (3)
Myxilla (‘Dendoryx’) rosacea var. japonica (Ridley & Dendy, 1886); Lindgren, 1897: 482; Lindgren, 1898 (Hirudo Straits, China Sea) (3)
Myxilla (‘Stelodoryx’) “regularis” (Burton, unpublished MS name) (Indonesia, ZMA database) (6, Burton MS)
Myxilla sp. (Nha Trang, Vietnam, PIBOC database) (3)

Family Phoriospongiidae Lendenfeld, 1888

Definition. - Encrusting, massive, flabellate or digitate growth forms; Ectosomal skeleton frequently absent, replaced by arenaceous or spicular detritus, but typically with areolate oscular sieve plates on surface; ectosomal and choanosomal megascleres undifferentiated, usually strongyles (sometimes secondarily lost); choanosomal spicules are auxiliary megascleres (of ectosomal origin), whereas principal spicules are absent; microscleres arcuate isochelae, sometimes modified to unguiferous or birotulate forms.
SOUTH CHINA SEA SPECIES.

Batzella sp. (Indonesia, ZMA database) (6)
Chondropsis arenifera (Carter, 1886) (Indonesia, ZMA database) (6, Burton MS)
Chondropsis conica (Lendenfeld, 1889) (Indonesia, ZMA database) (6, Burton MS)
Ectyobatella enigmatica (Burton & Rao, 1932; 332, pl.18, fig.6); Pattanayak, 1997 (Nicolobar I., 7°N; Nicobar and Andaman Islands) (1)

*Hemmymycale* sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Psammoclemencia (‘Psammopemencia’) “marshalli” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Strongylacidon sansibarense Lendenfeld, 1908 (Indonesia, ZMA database) (6)
Strongylacidon stellariderrna Dendy, 1924 (Indonesia, ZMA database) (6)
Strongylacidon sp. 1287 (Sulawesi, Indonesia) (6, QM/NTM collection)

Family Tedaniidae Ridley & Dendy, 1886

**Definition.** - Encrusting, massive or digitate sponges; choanosomal skeleton predominantly plumo-reticulate or even plumose, composed of tracts of smooth or spined monactinal megascleres, or smooth diactinal megascleres, enclosed within light or moderate spongin fibres, or with no visible fibres and spicules merely cemented together at their nodes; ectsosomal spicules are diactinal, tylotes or strongyles, usually with spined bases, lying tangential, paratangential or erect on the surface, although usually not in bundles; microscleres onychaetes; chelae are absent.

SOUTH CHINA SEA SPECIES.

*Hemiaulina wilsoni* Hentschel, 1912 (Indonesia, ZMA database) (6)
*Tedania actiniformis* Ridley & Dendy, 1886; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Tedania anhelans* (Lieberkuhn, 1859); Burton & Rao, 1932; Pulitzer-Finali, 1980 Pattanayak, 1997 (Nicolobar and Andaman Islands; Indonesia, ZMA database; Hong Kong) (1,5,6)
*Tedania brevispicula* Thiele, 1903; Lévi, 1961: 136 (Vietnam; Indonesia, ZMA database) (3,6)
*Tedania coralliophila* Thiele, 1903 (Indonesia, ZMA database) (6)
*Tedania digitata* Schmidt; Lindgren, 1897: 481; Lindgren, 1898; Dawydoff, 1952 (Vietnam, China Sea, 11° 5’N; Sulawesi, Indonesia) [possibly a junior synonym of *Tedania anhelans*] (3,6, QM/NTM collection)
*Tedania dirhaphis* Hentschel, 1912 (Aru Is, Indonesia) (6)
*Tedania infundibuliformis* Ridley & Dendy, 1886; Dawydoff, 1952 (Paracels Is) (3)
*Tedania meandrica* Thiele, 1903 (Indonesia, ZMA database) (6)
*Tedania nigrescens* (Schmidt, 1862); Burton & Rao, 1932:352 (Marble Rocks, Jack and Una Is, Mergui Archipelago, 11° 40’N; Cincque I. and E end of Macpherson Straits, Andaman Is, 11° 15-30’N) [possibly a junior synonym of *Tedania anhelans*] (1)
*Tedania reticulata* Thiele, 1903 (Indonesia, ZMA database) (6)
*Tedania sp. (Phuket region, Thailand) (1, QM/NTM collection)
*Tedania sp. 956 (Phuket region, Thailand) (1, QM/NTM collection)
*Tedania sp. 958 (Phuket region, Thailand) (1, QM/NTM collection)
*Tedania sp. 956 (Negros Oriental, Philippines) (7, QM/NTM collection)
*Tedania sp. 985 (Sulawesi, Indonesia) (6, QM/NTM collection)
*Tedania sp. (Nha Trang, Vietnam, PIBOC database) (3)

Suborder Mycalina

**Definition.** - Poecilosclerida with microscleres consisting of sigmanicistra derivatives and megascleres being subtylostyles, with swollen bases and faintly constricted necks (mycalostyles), usually of a single smooth category (never echinating).
Family Cladorhizidae de Laubenfels, 1936

**Definition.** - Small symmetrical sponges mostly found in the abyssal zones, with diagonal, radiating supporting processes and basal root adaptations for living in soft sediments; choanosomal skeleton consists of an axis composed of monactinal (styles) or occasionally diactinal megascleres (oxees), from which radiating extra-axial tracts diverge to the ectsosome; microscleres include isochelae, sigmas, forceps or spear-shaped microstyles.

**SOUTH CHINA SEA SPECIES.**
- Chondrocladia clavata Ridley & Dendy, 1886 (Indonesia, ZMA database) (6, Burton MS)
- Chondrocladia crinita Ridley & Dendy, 1887 (Indonesia, ZMA database) (6)
- Chondrocladia “tetthyoides” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
- Cladorhiza depressa Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
- Cladorhiza pentacrinus Dendy, 1884 (Indonesia, ZMA database) (6, Burton MS)
- Cladorhiza spp. (Indonesia, ZMA database) (6)

Family Guitarridae Burton, 1929

**Definition.** - Encrusting, massive or ramose growth forms; special ectosomal spicules absent, but choanosomal spicules may protrude through surface; choanosomal skeleton is reticulate, isodictyal-reticulate or plumoreticulate, with a single category of subtylostyles; microscleres placochelae and modifications, sometimes also with palmate isochelae and sigmancistras.

**SOUTH CHINA SEA SPECIES.**
- Guitarna indica Dendy, 1916 (Indonesia, ZMA database) (6)

Family Desmacellidae Ridley & Dendy, 1886

**Definition.** - Encrusting, massive, cup-shaped, fan-shaped and branching growth forms; megascleres usually styles, sometimes also including oxeas or strongyles; spicules typically enclosed within plumose, reticulate, halichondroid-reticulate or compressed axial fibres; microscleres are diverse, always consisting of sigmas, and often including microxeas of several sizes, raphides in bundles or individually, toxas, microstrongyles and spheres.

**SOUTH CHINA SEA SPECIES.**
- Biennia arveensis Hentschel, 1912 (Aru Is, Indonesia) (6)
- Biennia democratica Sollas, 1902:213, pl.15, fig.9 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
- Biennia “eignimatica” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
- Biennia fistulosa Topsent, 1897; Pulitzer-Finali, 1980; Desqueyroux-Faunoez, 1981 (Ambon, Indonesia; Hong Kong) (5,6)
- Biennia forix Topsent, 1897; Sollas, 1902:213; Desqueyroux-Faunoez, 1981; Lévi, 1961: 134 (Pulau Bidang, NE of Penang, 5° 30’N; Vietnam; Sulawesi. Ambon, Indonesia) (2,3,6, QM/NTM collection)
- Biennia fragilis Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
- Biennia humilis Thiele, 1903 (Indonesia, ZMA database) (6)
- Biennia liposigma (Burton, 1928:120); Pattanayak, 1997 (Andaman Is, 540m, 12°N; Nicobar and Andaman Islands; Indonesia, ZMA database) (1,6, Burton MS)
- Biennia megalosigma Hentschel, 1912 (Aru Is, Indonesia) (6)
- Biinnia megalosigma lipophaeae Hentschel, 1912 (Aru Is, Indonesia) (6)
- Biennia trichaphis Topsent, 1897; Desqueyroux-Faunoez, 1981 (Ambon, Indonesia) (6)
- Biennia truncata Hentschel, 1912 (Aru Is, Indonesia) (6)
**Hamacanthidae Gray, 1872**

**Definition.** - Encrusting to massive sponges; skeleton consists of a tangential ectosomal and reticulate choanosomal skeletal components, composed of monactinal (styles), diactinal (oxeas), or both sorts of megascleres producing multiprincipal tracts and forming irregular, plumo-reticulate or reticulate structures, with little or no associated spongins; scattered monactinal or diactinal megascleres, or bundles of these spicules, occur within the mesohyl; microscleres sharp-toothed diancistras or cyrtancistras, sometimes with toxas, individual or bundles of raphides (trichodragmata), or sigmas.

**Family Mycalidae Lundbeck, 1905**

**Definition.** - Encrusting, massive, fan-shaped, cup-shaped and branching growth forms; subectosomal sculpturing, grooves and ridges often found on the surface, within which are usually found the ostia; skeleton radially arranged, plumose or plumo-reticulate, composed of styles or oxeas enclosed in spongins fibres; without specialised ectosomal spicules, although choanosomal spicules may form dense brushes at the surface; microscleres anisochelae, but may also include many other forms - palmate isochelae with geometric modifications, sigmas, toxas and raphides.

**SOUTH CHINA SEA SPECIES.**

*H. pyriformis* Burton, unpublished MS name (Indonesia, ZMA database) (6)

*H. sp.* (Indonesia, ZMA database) (6)
Mycale crassissima Dendy, 1905; Lévi, 1961: 134; Pattanayak, 1997 (Nicobar and Andaman Islands; Vietnam; Indonesia, ZMA database) (1,3,6)

Mycale dendyi (Row, 1911) (Indonesia, ZMA database) (6, Burton MS)

Mycale euplectielloides Row, 1911 (Indonesia, ZMA database) (6)

Mycale euplectielloides regularis Wilson, 1925:427 (Philippines) (7)

Mycale gelatinosa (Ridley & Dendy, 1886) (Indonesia, ZMA database) (6, Burton MS)

Mycale grandis Gray, 1867 (Indonesia, ZMA database) (6)

Mycale graveleyi Burton, 1937 (Indonesia, ZMA database) (6)

Mycale indica (Carter, 1887:72, pl.6, figs 3-6; Burton & Rao, 1932:327; Pattanayak, 1997 (King I., Mergui Archipelago, Burma, 12° 08’ N; Snod I., Mergui Archipelago, 12°N; Ross I., Andaman Is., 12° 09’ N; Nicobar and Andaman Islands) (1)

Mycale cf. laevis Carter, 1882 (Indonesia, ZMA database) (6)

Mycale “lagenoides” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Mycale macrosigma (Lindgren, 1897: 482); Lindgren, 1898 (Korea Straits, China Sea) (3)

Mycale madraspatana Annandale, 1914 (Indonesia, ZMA database) (6)

Mycale massa oceanica Topsent, 1904 (Indonesia, ZMA database) (6, Burton MS)

Mycale “menylloides” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Mycale moluccensis Thiele, 1903 (Indonesia, ZMA database) (6)

Mycale monochontrata Burton & Rao, 1932 (Indonesia, ZMA database) (6)

Mycale (‘Esperella’) murrayi (Ridley & Dendy, 1887); Dragnewitsch, 1906:441 (Singapore, 1° 30’ N) (2)

Mycale obscura Hentschel, 1912 (Aru Is, Indonesia) (6)

Mycale orientalis Topsent, 1897; Desqueyroux-Faudrene, 1981 (Ambon, Indonesia) (6)

Mycale (Zygomycale) parishii (Bowerbank, 1875); Burton & Rao, 1932:328 (south portion of Malacca Straits, 1°N); George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah; Indonesia, ZMA database) (2,4,6)

Mycale (‘Esperella’) pellucida (Ridley, 1884); Dawydoff, 1952 (Vietnam, Cambodia) (3)

Mycale (‘Esperella’) philippensis (Dendy); Lindgren, 1897: 482; Lindgren, 1898; Dawydoff, 1952; Pulitzer-Finali, 1980 (Vietnam, China Sea, 11° 5’ N; Hong Kong) (3,5)

Mycale phyllophila Hentschel, 1911; van Soest, 1980 (Hong Kong, Indonesia) (5,6)

Mycale (‘Espera’) plumosa (Carter, 1882); Carter, 1887:72 (King I., Mergui Archipelago, Burma, 12° 08’ N) (1)

Mycale rhaphidotoxa Hentschel, 1912 (Aru Is, Indonesia) (6)

Mycale (Paresperella) sceproides (Keller, 1891) (Indonesia, ZMA database) (6, Burton MS)

Mycale “setosa” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Mycale cf. suecca Row, 1911 (Indonesia, ZMA database) (6)

Mycale sulcata arnensis Hentschel, 1912 (Aru Is, Indonesia) (6)

Mycale (‘Esperella’) sulevoida (Sollas, 1902:213, pl.14, figs 8-9, pl.15, fig. 10) (Pulau Bidang, NE of Penang, 5° 30’ N; Indonesia, ZMA database) (2,6)

Mycale temuixstrongylata Hoshino, 1981 (Indonesia, ZMA database) (6)

Mycale temuixspiculata Dendy, 1905 (Indonesia, ZMA database) (6)

Mycale spp. (Indonesia, ZMA database) (6)

Mycale spp.; Tanaka et al., 1993 (Gulf of Thailand) (3)

Mycale sp.; van Soest & Verseveldt, 1987 (Komodo. 8°S 119°E, Indonesia) (7)

Mycale sp. 952 (Phuket region Thailand) (1, QM/NTM collection)

Mycale sp. 959 (Phuket region Thailand) (1, QM/NTM collection)

Mycale sp. 971 (Ko Samui region, Thailand) (3, QM/NTM collection)

Mycale sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Mycale sp. 1283 (Sulawesi, Indonesia) (6, QM/NTM collection)

Mycale sp. 1284 (Sulawesi, Indonesia) (6, QM/NTM collection)

Mycale spp. (Singapore; QM/ZRC collections) (2)

Ulo.su angulosa (Lamarck, 1814) (Indonesia, ZMA database) (6)

Ulo.su sp. (Indonesia, ZMA database) (6)

Order Halichondrida

Definition. - Choanosomal skeleton composed of styles, oxeas, strongyles or intermediate spicules; spicules not usually functionally localised to any particular region of the skeleton;
skeletal structures range from disorganised plumoreticulate, criss-crossed “halichondroid skeleton" to distinctly compressed axis (or basal) region and a differentiated extra-axial (radial, plumose or plumoreticulate) region; spongin fibres usually poorly developed or absent; ectosomal skeleton sometimes organised into a tangential layer of spicules or erect spicule bundles, with minimal collagenous spongin, typically with large subectosomal cavities; microscleres sparse including only raphides, microxeas, or spined microxeas with a central bend.

Family Axinellidae Carter, 1875

**Definition.** - Encrusting, massive, branching, fan-shaped and tubular growth forms; encrusting species may consolidate sedimentary particles at the surface of the substratum; surface usually hispid from projecting spicules; megascleres styles, oxeas, strongyles (sometimes sinuous) in all combinations; skeleton typically divided into distinct axial (or basal in encrusting forms) and extra-axial components; main skeleton typically condensed in axis, consisting of smooth straight spicules in most genera, or tuberculate or spined, annular, flexuous, U-shaped or vermiform strongyles in some genera; extra-axial skeleton plumose or plumoreticulate, with tracts of smooth straight spicules, sometimes rhabdose spicules arising perpendicular to the axis and ascending to the surface; axial and extra-axial differentiation may be reduced (vestigial), but rudiments of these structures are always present; microscleres usually absent, although a few genera have raphides or microraphides, sometimes forming bundles (trichodragnata); reproduction oviparous.

**SOUTHERN CHINA SEA SPECIES.**

*Acanthella aurantiaca* Keller, 1889; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Acanthella carteri* Dendy, 1889 (Indonesia, ZMA database) (6)
*Acanthella cavernosa* Dendy, 1922 (widespread throughout South China Sea) (1-7; most collections)
*Acanthella costata* Kieschnick, 1896 (Ternate, Moluccas, Indonesia; Batangas, Mindanao, Zamboanga Philippines) (6,7, QM/NTM collection)
*Acanthella hispida* Pulitzer-Finali, 1980 (Hong Kong) (5)
*Acanthella pulcherrima* Ridley & Dendy, 1886 (Indonesia, ZMA database) (6)
*Acanthella vulgata* Tanita, 1960; Caberoy, 1981:24 (Zamboanga, Batangas, Davao del Norte, Mindoro Occidental, Marinduque, Quezon, La Union, Ilocos Sur, Ilocos Norte Philippines) (7)
*Acanthella sp.;* George & George, 1987 (Bodgaya Islands and Pulau Sipad, Sabah) (4)
*Auletta lyrate* (Innes), var. *brevispica* Dendy, 1905; Burton, 1928:128, pl.1, fig.10 (W of Elphinstone I., Mergui Archipelago, 12° 15'N, 120m) (1)
*Auletta* sp. 960 (Phuket region, Thailand) (3, QM/NTM collection)

*Axinella* *aquariformis* Dendy, 1905 (Indonesia, ZMA database) (6)
*Axinella* *amensis* Hentschel, 1912 (Aru Is, Indonesia) (6)
*Axinella* *carteri* Dendy, 1889 (widespread throughout South China Sea) (1-7; most collections)
*Axinella* *dominantyi* (Lévi, 1961) (Zamboanga Norte, Philippines) (7, QM/NTM collection)
*Axinella* *dominii* Bowerbank, 1873 (Indonesia, ZMA database) (6)
*Axinella* *echinidea* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
*Axinella* *euctinema* Hentschel, 1912 (Aru Is, Indonesia) (6)
*Axinella* *mastigophora* Schmidt; Lindgren, 1897: 483; Lindgren, 1898; Dawydoff, 1952 (Taiwan, China Sea, Vietnam) (3,5)
*Axinella* cf. *polyloides* Schmidt; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Axinella* *proliferans* Ridley, 1884 (Indonesia, ZMA database) (6, Burton MS)
*Axinella* *tenduinitata* Dendy. 1905 (Indonesia, ZMA database) (6)
*Axinella* *virgulosa* Carter, 1887:68, pl.5, fig.11 (King I., Mergui Archipelago, Burma, 12° 08'N) (1)
*Axinella* *virgulosa* var. *massa* Carter, 1887:68, pl.7, figs 6-7 (King I., Mergui Archipelago, Burma, 12° 08'N) (1)
*Axinella* *vulgata* Thiele, 1899 (Indonesia, ZMA database) (6)
*Axinella* sp. 882 (Phuket region, Thailand) (1, QM/NTM collection)
Axinella sp. 955 (Phuket region, Thailand) (1, QM/NTM collection)

Axinella sp. 1640 (Sulu Sea, Philippines) (7, QM/NTM collection)

Axinella sp. 1769 (Pulangbato, Philippines) (7, QM/NTM collection)

Axinella sp. (Singapore: QMZRC collections) (2)

Axinella spp. (Nha Trang, Vietnam, PIBOC database) (3)

Brabaris columnata (Burton, 1928:130, pl.2, fig.1); Pattanayak, 1997 (Andaman Sea, 13°17’N, 180°; Nicobar and Andaman Islands) (1)

Brabaris durissimma Burton, 1928:131, pl.2, fig.2 (W of Elphinstone I., Mergui Archipelago, 12°15’N, 120m) (1)

Brabaris ligulata Burton, 1928:132, pl.2, fig.3 (W of Elphinstone I., Mergui Archipelago, 12°15’N, 120m) (1)

Brabaris vermiculata Topsent, 1897; Dawydoff, 1952; Desqueyroux-Faudouze, 1981 (Ambon, Indonesia; Vietnam) (3,6)

Brabaris sp. (Indonesia, ZMA database) (6)

Draugmaea ciliata (Wilson, 1925:341); de Laubenfels, 1935:332 (Puerta Galera, Philippines) (7)

Draugmaea ensifera (Lamarck, 1814) (Indonesia, ZMA database) (6, Burton MS)

Hoxolinea acanthoides Lévi, 1961:515 (Zamboanga, Philippines) (7)

Hoxolinea sp. 974 (Ko Samui region, Thailand) (3, QM/NTM collection)

Perissinaelu “cactoides” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Phakellia atypica Lévi, 1961:516 (Zamboanga, Philippines) (7)

Phakellia cavernosa Dendy 1922 (Phuket region, Thailand) (1, QM/NTM collection)

Phakellia conchosa Dendy, 1921 (Negros I, Philippines) (7, QM/NTM collection)

Phakellia fusc忽视 Zeng et al., 1991b,c; Fu et al., 1991b; Pinder, 1992 (South China Sea) (5)

Phakellia stipitata (Carter, 1881) (Suluwesi, Indonesia)

Phakellia sp.; Wu et al., 1990 (South China Sea) (5)

Phakellia sp. 948 (Phuket region, Thailand) (1, QM/NTM collection)

Phakellia sp. 961 (Phuket region, Thailand) (1, QM/NTM collection)

Phakellia sp. (Indonesia, ZMA database) (6)

Phakellia sp. 1285 (Suluwesi, Indonesia) (6, QM/NTM collection)

Phakellia sp. (Singapore: QMZRC collections) (2)

Pleccosoma valida Thiele, 1899 (Indonesia, ZMA database) (6)

Pseudaxinella massa Carter, 1887 (Indonesia, ZMA database) (6)

Ptilocaulus flexibilis Lévi, 1961:132 (Vietnam) (3)

Ptilocaulus cf. spiculifera (Lamarck, 1813) (Indonesia, ZMA database) (6)

Reniochalinia sp. 1643 (Cebu, Philippines) (7, QM/NTM collection)

Rhaphodolaea topsentii Hentschel, 1912 (Aru Is, Indonesia) (6)

Styliella flabelliformis (Hentschel, 1912) (SW, Cebu, Philippines) (7, QM/NTM collection)

Styliella sp. 943 (Phuket region, Thailand) (1, QM/NTM collection)

Stylotella agminata (Ridley) Halfman, 1914; Lévi, 1961:514 (Zamboanga, Philippines) (7)

Stylotella digitata gracilis Hentschel, 1912 (Aru Is, Indonesia) (6)

Stylotella flabelliformis Hentschel, 1912 (Aru Is, Indonesia) (6)

Stylotella surbortoides Brondsted, 1934 (Aru Is, Indonesia) (6)

Tragosia cf. infundibuliformis (Bowerbank); Dawydoff, 1952 (Vietnam, Cambodia) (3)

**Family Desmoxyidae Hallmann, 1917**

**Definition.** - Encrusting, massive or branching sponges; megascleres are monactinal (styles), diactinal (oxeas), or both, contained within widely spaced multispecific spongin fibres, or with little or no spongin associated, forming reticulate tracts, with poorly developed or no axial compression and poorly differentiated axial and extra-axial skeletons (notably disorganised or slightly plumose); ectosomal skeleton a crust or palisade of smaller oxoetes with spines (occasionally smooth); microscleres smooth or spined microxeas, often centrangular or strongly bent at the centre, and sometimes raphides in groups (trichodragmata) or singly, and in one genus acanthose cladotoxa and birotules are also present.
SOUTH CHINA SEA SPECIES.

_Hissagia petrosoides_ Dendy, 1922 (Indonesia, ZMA database) (6)

_Hissagia striatula_ (Lamarck, 1813) (Indonesia, ZMA database) (6)

_Hissagia sp._ (Indonesia, ZMA database) (6)

_Hissagia nassalis_ Carter, 1885 (Bohol Sea, Philippines) (7, QM/NTM collection)

_Hissagia mixta_ (Henschel, 1912) (Pulangbato, Negros Oriental, SW. Cebu, Philippines) (7, QM/NTM collection)

_Hissagia_ (Dendropsis) _mixta_ (Henschel, 1912) (Aru Is, Indonesia) (6)

_Myrmekioderma granulata_ (Esper, 1794) (Indonesia, ZMA database) (6, Burton MS)

**Family Dictyonellidae van Soest, Diaz & Pomponi, 1990**

**Definition.** - Choanosomal skeleton lacking any axial compression or marked differentiation between axial and extra-axial regions, but has spongin-enforced dendritic or plumose choanosomal spicule tracts and a fleshy conulose surface; no ectosomal mineral skeleton; megascleres include oxeas, styles or both in equal proportion; microscleres absent.

SOUTH CHINA SEA SPECIES.

_Dictyocelidae australiensis_ Pulitzer-Finali, 1982 (Aru Is, Indonesia) (6)

_Dictyocelidae_ spp. (Indonesia, ZMA database) (6)

_Lioseia arenosa_ Vacelet & Vasseur, 1971 (Indonesia, ZMA database) (6)

_Lioseia paradoxa_ Thiele, 1899 (Indonesia, ZMA database) (6)

_Scolotus toxotes_ Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)

**Family Halichondriidae Vosmaer, 1887**

**Definition.** - Encrusting to massive growth forms, sometimes with specialised fistules on the upper surface; principle megascleres are oxeas, sometimes with accessory styles; choanosomal skeleton consists of a high density of spicules arranged in vague, poorly defined, directionless tracts (“halichondroid” structure), or spicules in complete confusion; there is often marked subectosomal or vestibular cavities; microscleres usually absent, occasionally raphides.

SOUTH CHINA SEA SPECIES.

_Amphirhoinopsis excavans_ (Carter, 1887:77, pl.5, figs 12-15) (King L., Mergui Archipelago, Burma. 12° 08’N; Indonesia, ZMA database) (1,6)

_Amphirhoinopsis foetida_ (Dendy); Lévi, 1961: 138 (Vietnam) (3)

_Amphirhoinopsis_ (‘_Ciocultipterus_’) _oculata_ (Kieschnick, 1896) (Ternate, Moluccas, Indonesia) (6)

_Amphirhoinopsis saeciformis_ (Thiele, 1903) (Indonesia, ZMA database) (6)

_Amphirhoinopsis_ (‘_Ciocultipterus_’) _subaceratus_ (Ridley & Dendy, 1886) (Indonesia, ZMA database) (6)

_Amphirhoinopsis_ spp. (Indonesia, ZMA database) (6)

_Amphirhoinopsis_ (‘Prostyllissa’) _foetida_ (Dendy, 1889) Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

_Axinysa_ (‘_Pseudaxisyna_’) _oculata_ (Wilson, 1925) (Philippines, Indonesia, ZMA database) (6,7)

_Axinysa_ aplysinosides_ (Dendy, 1922) (Indonesia, ZMA database) (6)

_Axinysa_ (‘_Leucophloeus_’) _fenestratus_ (Ridley, 1884); Burton, 1928:127; Dawydoff, 1952 (Bally Strait, Malay Archipelago, 320m; Vietnam; Indonesia, ZMA database) (2.3,6)

_Axinysa_ sp. (Singapore; ZRC) (2)

_Axinysa_ (‘_Leucophloeus_’) sp.nov.; Dawydoff, 1952 (Poulo Condore, Vietnam) (3)

_Ciocultipterus_ _foetida_ (Dendy); Lindgren, 1897: 483; Lindgren, 1898; Dawydoff, 1952 (China Sea, Mergui Archipelago; Poulo Condore, Vietnam) (1,3)

_Ciocultipterus_ _melichlorae_ Sollas, 1902:214, pl.14, fig.1, pl.15, fig.8 (Pulau Bidang, NE of Penang, 5° 30’N) (2)

_Ciocultipterus_ _rutila_ Sollas, 1902:215, pl.14, fig.7 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Ciocalypta sp. 1286 (Sulawesi, Indonesia) (6, QM/NTM collection)
Ciocalypta sp. (Singapore; QM/ZRC collections) (2)
Collocytopita digitata Dendy, 1905 (Indonesia, ZMA database) (6)
Didiscus antisoiscus Vacelet & Vasseur, 1971 (Indonesia, ZMA database) (6, Burton MS)
Didiscus sp. (Indonesia, ZMA database) (6)
Didiscus aceratus (Nha Trang, Vietnam; PIBOC database) (3)
Epipolasis sulcensis Wilson, 1925 (Philippines, Indonesia, ZMA database) (6,7)
Epipolasis sp. (Indonesia, ZMA database) (6)
Epipolasis sp. (Nha Trang, Vietnam; PIBOC database) (3)
Halichondria armata Lindgren, 1897: 480; Lindgren, 1898 (China Sea, 20°5′N) (3)
Halichondria auro Lindgren, 1897: 480; Lindgren, 1898 (Java Sea and Gaspar Straits) (2)
Halichondria berquqistae Hooper et al., 1997 (Sulawesi, Indonesia) (6, QM/NTM collection)
Halichondria birotulata Higgins, 1877; Carter, 1887:72 (King I., Mergui Archipelago, Burma, 12°08′N) (1)
Halichondria cartilaginea (Esper, 1794) (Indonesia, ZMA database) (6, Burton MS)
Halichondria cl. panicea Johnston, 1842:114; Carter, 1887:69; Wilson, 1925:396; Dawydoff, 1952; Dmitrienok et al., 1988 (King I., Mergui Archipelago, Burma, 12°08′N; Philippines; Vietnam) (1,3,7)
Halichondria symbiotica Lévi, 1961: 140 (Vietnam) (3)
Halichondria variabilis Lindgren, 1897: 480; Lindgren 1898; Wilson, 1925:396; Dawydoff, 1952 (Vietnam, 11°5′N, Gaspar Strait, Java; Philippines) (2,3,7)
Halichondria tyleri Bowerbank, 1873 (Indonesia, ZMA database) (6)
Halichondria sp. 965 (Phuket region, Thailand) (1, QM/NTM collection)
Halichondria sp. 969 (Ko Samui region, Thailand) (3, QM/NTM collection)
Halichondria sp. 1710 (Kalimantan, Indonesia) (6, QM/NTM collection)
Halichondria sp. 1717 (Kalimantan, Indonesia) (6, QM/NTM collection)
Halichondria sp. (Singapore; ZRC) (2)
Halichondria sp. (Singapore; ZRC) (2)
Halichondria spp. (Singapore; QM/ZRC collections) (2)
Halichondria spp. (Nha Trang, Vietnam; PIBOC database) (3)
Hymeniacidon contulida (Topset): Lindgren, 1897: 483; Lindgren, 1898 (Gaspar Straits, Java Sea) (2)
Hymeniacidon fenestratus (Ridley): Lindgren, 1897: 483; Lindgren, 1898 (Vietnam, China Sea, 11°5′N) (3)
Hymeniacidon heliophila (Parker, 1910:2); Cabero, 1981:18 (Quezon, South Cotabato, Philippines) (7)
Hymeniacidon “assimilis”: Dmitrienok et al., 1988 (Singapore) (2)
Hymeniacidon spp. (Indonesia, ZMA database) (6)
Petronica massalis (Dendy, 1905); Burton, 1928:110; Pattanayak, 1997 (8 mls W of Interview L., Andaman Is, 90-540m, 13°N; Nicobar and Andaman Islands) (1)
Spongiosorites (“Trachysexis”) halichondrioides (Dendy, 1905); Burton, 1928:118; Pattanayak, 1997 (Bally Strait, Malay Archipelago; N Sentinel Is, Andaman Is, 260-500m, 11°40′N; Nicobar and Andaman Islands; Philippines) (1,2,7)
Spongiosorites “orientalis” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Spongiosorites spp. (Phuket region, Thailand) (1, QM/NTM collection)
Spongiosorites sp. 968 (Phuket region, Thailand) (1, QM/NTM collection)
Topsentia armata (Lindgren, 1897) (Indonesia, ZMA database) (6)
Topsentia cavernosa (Topset, 1897), Desqueyrroux-Fuande, 1981 (Ambon, Indonesia) (6)
Topsentia dura Lindgren, 1897: 481; Lindgren, 1898 (Java Sea) (2)
Topsentia glabratu Keller, 1891 (Indonesia, ZMA database) (6)
Topsentia granulata Keller, 1891 (Indonesia, ZMA database) (6)
Topsentia indica Hentschel, 1912 (Aru Is, Indonesia) (6)
Topsentia salomonensis Dendy, 1905 (Indonesia, ZMA database) (6)
Topsentia variabilis (Lindgren, 1897) (Indonesia, ZMA database) (6)
Topsentia spp. (Indonesia, ZMA database) (6)
Order Haplosclerida

**Definition.** - Main skeleton is partially or entirely composed of an isodictyal reticulation of spongin fibres and/or spicules, with uni- to multispiracular tracts of diactinal spicules forming triangular, rectangular or polygonal meshes; megascleres are exclusively oxote or strongylote, bonded together with collagenous spongin or enclosed within spongin fibres; microscleres, if present, may include sigmas (frequently centriangulate), smooth toxas or microxeas.

**Remarks.** - Nine families of sponges are included (five marine and four freshwater, of which seven are viviparous, with parenchymella bearing various patterns of ciliation, one oviparous group (Petrosiidae), and one freshwater family is uncertain (Lubomirskiidae).

**Family Callyspongiidae de Laubenfels, 1936**

**Definition.** - Encrusting, massive, vase-shaped, tubular, fan-shaped and branching growth forms; surface characteristically sculptured with conules or ridges, and usually has an optically visible lace-like reticulation of spicules and/or fibres lying tangential to the surface; ectosomal skeleton a two dimensional tangential reticulation of close-set primary, secondary and sometimes tertiary spongin fibres, sparsely cored with small or vestigial oxae or strongyles; choanosomal skeleton more widely spaced, composed of a reticulation of primary ascending (bi- or multispiracular) and secondary connecting spongin fibres (uni- or aspicular), composed of well developed fibres, cored by oxae or strongyles; spongin characteristically abundant; megascleres sometimes vestigial, with blackened axial canals, absent entirely or replaced by sand grains; microscleres, if present, include only toxas.

**SOUTH CHINA SEA SPECIES.**

*Callyspongia* (*Cladochalina*) aurantiaca (Lendenfeld, 1887); Dragnevitsch, 1906:444 (Singapore, 1° 30’N) (2)
*Callyspongia* barodenxis Burton, 1959 (Indonesia, ZMA database) (6)
*Callyspongia claviformis* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
*Callyspongia confoederata* (Ridley, 1884); Lévi, 1961: 144 (Vietnam; Indonesia, ZMA database) (3,6)
*Callyspongia dendi* Burton, 1931 (Indonesia, ZMA database) (6)
*Callyspongia diffusa* Ridley, 1884; Lévi, 1961:525 (Indonesia, ZMA database, Zambanga, Philippines) (6,7)
*Callyspongia diffusa* Ridley affinis Hentschel, 1912 (Aru Is, Indonesia) (6)
*Callyspongia doorae* Brondsted, 1934 (Java, Banda, Indonesia) (6)
*Callyspongia elegans* Thiele, 1899 (Indonesia, ZMA database) (6)
*Callyspongia* (*Euplacrilla*) elongata (Ridley & Dendy, 1886) (Indonesia, ZMA database) (6, Burton MS)
*Callyspongia erecta* Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
*Callyspongia* (*Cladochalina*) euplar (Lendenfeld, 1887); Dragnevitsch, 1906:444 (Singapore, 1° 30’N) (2)
*Callyspongia cf. fallax* Duchassaing & Michelotti, 1864 (Indonesia, ZMA database) (6)
*Callyspongia fibrosa* (Ridley & Dendy, 1886); Lévi, 1961: 144 (Vietnam; Indonesia, ZMA database) (3,6)
*Callyspongia folioides* Bowerbank, 1875 (Indonesia, ZMA database) (6)
*Callyspongia fragilis* Kieschnick, 1900 (Ternate. Moluccas, Indonesia) (6)
*Callyspongia globosa* Pulitzer-Finali, 1980 (Hong Kong) (5)
*Callyspongia joubini* Topsent, 1897; Desqueyroux-Faundeau, 1981 (Ambo, Indonesia) (6)
*Callyspongia “lindgreni”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
*Callyspongia lobata* Brondsted, 1934 (Java, Banda, Indonesia) (6)
*Callyspongia melior* Topsent, 1897; Desqueyroux-Faundeau, 1981 (Ambo, Indonesia) (6)
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*Callyspongia mollis* Topsent, 1897; Desqueyroux-Faunédez, 1981 (Ambon, Indonesia) (6)
*Callyspongia monilata* Ridley, 1884; Wilson, 1925:417 (as *Dactylocladina exigua samarensis*); Lévi, 1961: 143 (Vietnam; Indonesia, ZMA database; Philippines) (3, 6, 7)
*Callyspongia murata* Ridley, 1884 (Indonesia, ZMA database) (6)
*Callyspongia mucricata* (Ridley, 1884) (Indonesia, ZMA database) (6, Burton MS)
*Callyspongia nudifera* Hentschel, 1912 (Aru Is. Indonesia) (6)
*Callyspongia orientinis* Pulitzer-Finali, 1980 (Hong Kong) (5)
*Callyspongia parva* Desqueyroux, 1984 (Indonesia, ZMA database) (6)
*Callyspongia pseudofibrina* Desqueyroux, 1984 (Indonesia, ZMA database) (6)
*Callyspongia pulvinatae* (Lindgren, 1897); Lindgren, 1898; van Soest, 1980 (Java, Hong Kong) (2, 5)
*Callyspongia ridleyi* Burton, 1934 (Indonesia, ZMA database) (6)
*Callyspongia robusta* Ridley, 1884 (Indonesia, ZMA database) (6)
*Callyspongia schulzii* Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
*Callyspongia spinifera* Carter, 1886 (Indonesia, ZMA database) (6)
*Callyspongia subarmigera* Ridley, 1884; Lévi, 1961:526 (Indonesia, ZMA database, Zamboanga, Philippines) (6, 7)
*Callyspongia teretensis* Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
*Callyspongia (‘*Euchalinia*’) typica* (Lendenfeld, 1887); Dragnevitsch, 1906:444 (Singapore, 1° 30’S) (2)
*Callyspongia vaginalis* (Lamarck, 1814); Cabero, 1979:17; Cabero, 1981:19 (SE Negros I, Palawan, Pangasinan. Quezon, Batangas, Philippines) (7, QM/NTM collection)
*Callyspongia spp.* (Indonesia, ZMA database) (6)
*Callyspongia sp.* 138 (Sattahip and Phuket regions, Thailand) (1, 3, QM/NTM collection)
*Callyspongia sp.* 938 (Sattahip Navy Base region, Thailand) (3, QM/NTM collection)
*Callyspongia sp.:* George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
*Callyspongia sp.* (Singapore: ZRC collections) (2)
*Callyspongia spp.* (Nha Trang, Vietnam, PIBOC database) (3)
*Siphonochalinina crassiflora* Dendy, 1899:82; Wilson, 1925:414 (Philippines) (7)
*Siphonochalinina flexa* Pulitzer-Finali, 1980 (Hong Kong) (5)
*Siphonochalinina truncata* Lindgren, 1897: 481; Lindgren, 1898; Dawydoff, 1952 (Vietnam, China Sea, 11° 5’N) (3)
*Siphonochalinina sp.:* George & George, 1987 (photo 2C) (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

**Family Chalinidae Gray, 1867**

**Definition.** - Encrusting, massive, cup-shaped, fan-shaped and branching growth forms, usually with spongy and delicate consistency; when present ectosomal skeleton consists of a special, tangential, unilayered, unispicular, isotropic reticulation of oxeas bound by nodal spongium; choanosomal skeleton consists of an isodictyal reticulation of uni- or paucispicular primary tracts of oxeas, rarely multispicular, interconnected by uni- or paucispicular secondary tracts, and spicules are bonded together at their nodes of junction by small amounts of collagenous spongium, or they may be fully enclosed within light spongium fibres and form more robust reticulations; microscleres, if present, include only sigmas or toxas; parenchymella larvae are incubated and are completely and uniformly ciliated or have a bare posterior cap fringed by longer cilia.

**SOUTH CHINA SEA SPECIES.**

*Acervochalinina confusa* Dendy, 1922 (Indonesia, ZMA database) (6)
*Acervochalinina sp.* (Indonesia, ZMA database) (6)
*Chadocorece aculeata* Pulitzer-Finali, 1982 (Indonesia, ZMA database) (6)
*Dendroxea sp.* (Indonesia, ZMA database) (6)
*Gelliush amboinesis* Lévi, 1961: 142 (Vietnam) (3)
*Gelliush angulatus vassiformis* Wilson, 1925:367 (Philippines) (7)
*Gelliush centranthomulus* Solias, 1902:212, pl.15, fig.6 (Great Redang I., E. coast of Malay Peninsula, 5° 50’S) (3)

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Gellius fibulata Schmidt, 1862; Dragnewitsch, 1906:442 (Singapore, 1° 30' N) (2)
Gellius flagellifer (Ridley & Dendy, 1886); Burton, 1928:114; Pattanayak, 1997 (Andaman Sea, 13° 15'59" N, 340-1200m; Nicobar and Andaman Islands) (1)
Gellius megastoma (Burton, 1928); Burton, 1932:115, pl.1, fig.1; Pattanayak, 1997 (Andaman Is. 12°N, 260-580m; Nicobar and Andaman Islands) (1)
Gellius ridleyi Hentschel; Lévi, 1961:142 (Vietnam, Zamboanga, Lingayen Gulf, Philippines) (3, 7)
Gellius strongylatus Lindgren, 1897: 481; Lindgren 1898 (Hirudo Straits, China Sea) (3)
Gellius toxius Topsent, 1897; Dawydoff, 1952; Pulitzer-Finali, 1980 (Vietnam, Cambodia, Malaysia, Hong Kong) (2, 3, 5)
Gellius sp. 1018 (Zamboanga, Philippines) (7, QM/NTM collection)
Gellius sp. 1032 (Bohol Sea, Philippines) (7, QM/NTM collection)
Gellius spp (Nha Trang, Vietnam, PIBOC database) (3)
Haliclona ambocensis Lévi, 1961 (Indonesia, ZMA database) (6)
Haliclona bandae Bronnstedt, 1934 (Java, Banda, Indonesia) (6)
Haliclona carteri Burton, 1959 (Indonesia, ZMA database) (6)
Haliclona cerebrum Burton, 1928 (Indonesia, ZMA database) (6)
Haliclona clathrata Dendy, 1895; Dawydoff, 1952; Caberooy, 1981:17 (Vietnam, Indonesia, ZMA database) (3, 6, 7)
Haliclona compacta (Ridley & Dendy, 1886) (Indonesia, ZMA database) (6, Burton MS)
Haliclona "connlosa" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Haliclona cratere Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Haliclona ("Signadocia") pycnoeformis (Esper, 1794); Van Soest, 1980 (Hong Kong, Indonesia, ZMA database) (5, 6)
Haliclona delicatula (Dendy, 1889) (Indonesia, ZMA database) (6, Burton MS)
Haliclona digitata Baer, 1906 (Indonesia, ZMA database) (6)
Haliclona elastica Kieschnick, 1900 (Ternate, Moluccas, Indonesia) (6)
Haliclona fascicera (Hentschel, 1912:398); Wilson, 1925:413 (Aru Is, Indonesia; Philippines) (6, 7)
Haliclona flabello-digitata Burton, 1934; Caberooy, 1981:18 (Batangas, Philippines) (7)
Haliclona flagellifer Ridley & Dendy, 1886 (Indonesia, ZMA database) (6)
Haliclona forcipata Thiele, 1903 (Indonesia, ZMA database) (6)
Haliclona glaberrima Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)
Haliclona hispida Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)
Haliclona incrassata Hentschel, 1912 (Aru Is, Indonesia) (6)
Haliclona irregularis Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Haliclona jagusa Bowerbank, 1866 (Indonesia, ZMA database) (6)
Haliclona korema (Dendy, 1895:238); Caberooy, 1981:16 (Mindoro Oriental, Quezon, Batangas, Marinduque, Philippines) (7)
Haliclona "lieberkuehni" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Haliclona ligulata (Whitelegge, 1901:74); Caberooy, 1981:18 (Batangas, Philippines) (7)
Haliclona "longispicaulus" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Haliclona madrepora Dendy, 1889 (Indonesia, ZMA database) (6)
Haliclona microsgina Dendy, 1916 (Indonesia, ZMA database) (6)
Haliclona minima (Lendenfeld, 1889) (Indonesia, ZMA database) (6, Burton MS)
Haliclona minor Dendy, 1916 (Indonesia, ZMA database) (6)
Haliclona mirabilis (Bowerbank, 1866) (Indonesia, ZMA database) (6, Burton MS)
Haliclona "montagni" Bowerbank, 1866 (Indonesia, ZMA database) (6)
Haliclona nigra Burton, 1929 (Indonesia, ZMA database) (6)
Haliclona ("Chalinula") oculata var. fibrosa (Carter), 1887:66 (King L., Mergui Archipelago, Burma, 12° 08' N) (1)
Haliclona ("Rhaplipsia") pallida (Ridley); Su et al., 1996 (South China Sea) (5)
Haliclona cf. permollis (Bowerbank, 1866:278); Caberooy, 1981:18 (Quezon, South Cotabota, Philippines) (7) [misidentification for a European species]
Haliclona pigmentifera Burton, 1905 (Indonesia, ZMA database) (6)
Haliclona pulvinar Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)
Haliclona "rectangularis" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Haliclona sexchellensis Dendy, 1922 (Indonesia, ZMA database) (6)
Haliclona similis Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)
Haliclona "siphonella" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Haliclona sorongae Bronnstedt, 1934 (Java, Banda, Indonesia) (6)
Haliclona ("Chalinula") spinifera (Carter, 1887:66, pl.5, figs 1-2) (King L., Mergui Archipelago, Burma, 12° 08' N) (1)
Haliclona subarmigera (Ridley); Lindgren, 1897: 481; Lindgren, 1898; Dawydoﬀ, 1952 (Vietnam, China Sea, 11° 5’ N) (3)

Haliclona subcapitata Lévi, 1961: 527 (Zamboanga, Philippines) (7)

Haliclona tabernaculosa Row, 1911 (Indonesia, ZMA database) (6)

Haliclona teniniramosa Burton, 1930 (Indonesia, ZMA database) (6)

Haliclona temispicata Burton, 1934 (Indonesia, ZMA database) (6)

Haliclona toxipus Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)

Haliclona toxophorii Hentschel, 1912 (Aru Is, Indonesia) (6)

Haliclona toxotes Hentschel, 1912 (Aru Is, Indonesia) (6)

Haliclona variata Bowerbank, 1875 (Indonesia, ZMA database) (6)

Haliclona variabilis (Dendy, 1890: 353); Cabero, 1981: 15 (Batangas, Quezon, Marinduque, Philippines) (7)

Haliclona vasoformis Wilson, 1925 (Philippines, Indonesia, ZMA database) (6, 7)

Haliclona venusta Bowerbank, 1875 (Indonesia, ZMA database) (6, Burton MS)

Haliclona violacea de Laubenfels, 1950 (Indonesia, ZMA database) (6)

Haliclona “weberi” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Haliclona zamboangae Lévi, 1961: 527 (Zamboanga, Philippines) (7)

Haliclona (‘Adocia’) sp. 950 (Phuket region Thailand) (1, QM/NTM collection)

Haliclona (‘Adocia’) sp. 967 (Phuket region, Thailand) (1, QM/NTM collection)

Haliclona (‘Adocia’) sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Haliclona (‘Adocia’) sp.; Lévi, 1961: 528 (Zamboanga, Philippines) (7)

Haliclona sp.; Zeng et al., 1995b,c (South China Sea) (5)

Haliclona spp. (Indonesia, ZMA database) (6)

Haliclona sp. 937 (Sattahip region, Thailand) (3, QM/NTM collection)

Haliclona sp. 945 (Phuket and Ko Samui regions Thailand) (1, 3, QM/NTM collection)

Haliclona sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Haliclona sp.; Lévi, 1961: 145 (Vietnam) (3)

Haliclona sp.; Lévi, 1961: 145 (Vietnam) (3)

Haliclona sp. 1022 (Negros Oriental, Philippines) (7, QM/NTM collection)

Haliclona sp. 1031 (SW, Cebu L, Philippines) (7, QM/NTM collection)

Haliclona sp. 1705 (Kalimantan, Indonesia) (6, QM/NTM collection)

Haliclona spp. (Singapore; QM/ZRC collections) (2)

Haliclona spp. (Nha Trang, Vietnam, PIBOC database) (3)

Haliclona (‘Sigmiodocia’) sp. 49 (Phuket and Ko Samui regions, Thailand) (1, 3, QM/NTM collection)

Reniera aquaeductus Schmidt infundibularis Ridley & Dendy; Lindgren, 1897: 481; Lindgren, 1898 (Edam, Java) (2)

Reniera australis Lendenfeld, 1888; Dragnewitsch, 1906: 443 (Singapore, 1° 30’ N) (2)

Reniera baeri (Wilson, 1925); de Laubenfels, 1935; Pulitzer-Finali, 1980 (Philippines; Indonesia; Hong Kong) (5, 6, 7)

Reniera camerata Ridley, 1884; Dawydoﬀ, 1952 (Vietnam, Cambodia; Indonesia, ZMA database) (3, 6)

Reniera cinerea (Grant) (Indonesia, ZMA database) (6)

Reniera crateriformis Carter, 1882; Carter, 1887: 71 (King L, Mergui Archipelago, Burma, 12° 08’ N) (1)

Reniera cribriformis (Ridley, 1884); Dawydoﬀ, 1952 (Vietnam; Indonesia, ZMA database) (3, 6)

Reniera devidia (Topsent, 1906); Dawydoﬀ, 1952 (Vietnam; Indonesia, ZMA database) (3, 6)

Reniera fistulosos (Bowerbank, 1866); Dawydoﬀ, 1952 (Vietnam; Indonesia, ZMA database) (3, 6)

Reniera impexa Schmidt, 1868; Dragnewitsch, 1906: 443 (Singapore, 1° 30’ N) (2)

Reniera madreporea Dendy; Lindgren, 1897: 481; Lindgren, 1898; Dawydoﬀ, 1952 (Java; Vietnam) (2, 3)

Reniera rosea (Bowerbank, 1866); Dawydoﬀ, 1952 (Vietnam; Indonesia, ZMA database) (3, 6)

Reniera scyphanoideas (Lamarck); Lindgren, 1897: 481; Lindgren, 1898; Dawydoﬀ, 1952 (S of Amoy, China Sea; Vietnam) (3)

Reniera sp.; Sollas 1902: 210, pl. 14, ﬁg. 5 (Pulau Bidang, NE of Penang, 5° 30’ N) (2)

Reniera sp.; Sollas 1902: 210, pl. 15, ﬁg. 11 (Great Redang L, E coast of Malay Peninsula, 5° 50’ N) (3)

Reniera sp.; Sollas 1902: 211 (Pulau Bidang, NE of Penang, 5° 30’ N) (2)

Reniera sp.; Sollas 1902: 211 (Pulau Bidang, NE of Penang, 5° 30’ N) (2)

Reniera sp.; Sollas 1902: 211, pl. 15, ﬁg. 3 (Pulau Bidang, NE of Penang, 5° 30’ N) (2)
Reniera sp.; Sollas 1902:211 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Reniera sp.; Sollas 1902:212 (Pulau Bidang, NE of Penang, 5° 30’N) (2)
Reniera sp. 948 (Phuket region, Thailand) (1, QM/NTM collection)
Reniera sp.; van Soest, 1980 (Hong Kong) (5)

**Family Niphatidae Van Soest, 1980**

**Definition.** - Encrusting, massive, fan-shaped, vase-shaped and branching growth forms, often with chimney-like oscular processes; ecosomal skeleton consists of a dense multispiracular, three-dimensional, paratangential reticulation of diactinal spicules (oxeas or strongyles), usually more compact than the choanosomal skeleton; erect spicule brushes characteristically at the surface; choanosomal skeleton a reticulation of ascending and transverse-connecting spongin fibres, cored by multispiracular tracts of oxeas; interstitial spicules also common; microscleres, if present, are sigmas or microxeas.

**SOUTH CHINA SEA SPECIES.**

Aka mucosa (Bergquist, 1965); Phuket region, Thailand (AIMS/NCI collection); Indonesia (ZMA database) (1,6, QM/NTM collection)

Aka sp.; George & George, 1987 (as ‘Siphonodictyon’) (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Aka sp. 962 (Phuket region, Thailand) (1, QM/NTM collection)

Aka spp. (Indonesia, ZMA database) (6)

Aka sp. 1633 (SW. Cebu, Philippines) (7, QM/NTM collection)

Aka sp. (Singapore; ZRC) (2)

Amphimened conica Brondsted, 1924 (Indonesia, ZMA database) (6)

Amphimened (‘Pachychalinata’) fibrosa (Ridley & Dendy, 1886); Lindgren, 1897: 481; Lindgren, 1898; Dragnewitsch 1906:444; Wilson, 1925:411; Dawydoif, 1952 (Singapore, 1° 30’N; Vietnam, China Sea, 11° 5’N, Java) (2,3)

Amphimened (‘Pachychalinata’) fragilis (Ridley & Dendy, 1886); Lindgren, 1897: 481; Lindgren 1898; Dawydoif, 1952 (Java Sea; Vietnam) (2,3)

Amphimened (‘Pachychalinata’) melior (Ridley & Dendy, 1886); Dawydoif, 1952 (Vietnam, Cambodia) (3)

Amphimened melior Ridley & Dendy tabulifera Lindgren, 1897: 481; Lindgren, 1898 (Vietnam, China Sea, 11° 5’N) (3)

Amphimened (‘Pachychalinata’) megalorrhapitis (Ridley & Dendy, 1886); Lindgren, 1897: 481; Lindgren, 1898; Dawydoif, 1952 (Vietnam, China Sea, 11° 5’N) (3)

Amphimened cf. viridis Duchassaing & Michelotti, 1864 (Indonesia, ZMA database) (6)

Amphimened sp. 881 (Sattahip Navy Base region, Thailand) (3, QM/NTM collection)

Amphimened sp. 1894 (Sulawesi, Indonesia) (6, QM/NTM collection)

Amphimened spp. (Indonesia, ZMA database) (6)

Amphimened (‘Pachychalinata’) spinulosa Lendenfeld, 1887; Dragnewitsch, 1906:444 (Singapore, 1° 30’N) (2)

Amphimened (‘Pachychalinata’) sp.; Zeng et al., 1996 (South China Sea) (5)

Amphimened spp. (Nh Trang, Vietnam; PIBOC database) (3)

Cribrochalinata chinensis Pulitzer-Finali, 1980 (Hong Kong) (5)

Cribrochalinata koremella (de Laubenfels, 1954) (Singapore; ZRC) (2)

Cribrochalinata olemda (de Laubenfels, 1954) (Kalimantan, Indonesia) (6, QM/NTM collection)

Cribrochalinata sp. 1023 (SW. Cebu I., Philippines) (7, QM/NTM collection)

Cribrochalinata sp. 1025 (Negros Orientale, SW. Cebu I., Philippines) (7, QM/NTM collection)

Cribrochalinata sp. 792 (Negros Orientale, Philippines) (7, QM/NTM collection)

Cribrochalinata sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Cribrochalinata sp.; George & George, 1987 (photo 3F)(Bodgaya Islands and Pulau Sipadan, Sabah) (4)

Cribrochalinata sp. (Singapore; ZRC) (2)

Cribrochalinata sp. (Singapore; ZRC) (2)

Cribrochalinata sp. (Singapore; ZRC) (2)

Geliodes callista de Laubenfels; Lévi, 1961: 141 (Vietnam) (3)
Gellides fibroreticulata Dendy, 1916 (Indonesia, ZMA database) (6)
Gellides fibrosa (Wilson, 1925:388); de Laubenfels, 1935:329 (Philippines) (7)
Gellides fibulata (Ridley, 1884); Burton, 1928:115; Dawydoff, 1952; Lévi, 1961: 141; Pattanayak, 1997 (Cinque L., Andaman Is, 11° 25’N, Nicobar and Andaman Islands; Indonesia, ZMA database; Vietnam; Singapore; QM/ZRC collections) (1,2,3,6)
Gellides fibulatus (Carter 1881); Burton, 1928; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)
Gellides gracilis Hentschel, 1912; George & George, 1987 (Bodgaya Islands and Palau Sipadan, Sabah; Aru Is, Indonesia) (4,6)
Gellides hallucata Thiele, 1903 (Indonesia, ZMA database) (6)
Gellides macrospiculata Hentschel, 1912 (Aru Is, Indonesia) (6)
Gellides obtusa Hentschel, 1912 (Aru Is, Indonesia) (6)
Gellides petroestoides Dendy, 1905 (Indonesia, ZMA database) (6)
Gellides pumila (Lendenfeld, 1887); van Soest, 1980 (Hong Kong, Indonesia, ZMA database) (5,6)
Gellides spinosella Thiele, 1899; Dragnetwitsch, 1906:442 (Singapore, 1° 30’N) (2)
Gellides tricuspidatus Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Gellides spp. (Indonesia, ZMA database) (6)
Gellides sp. 1595 (Bohol Sea, Philippines) (7, QM/NTM collection)
Gellides sp. 964 (Phuket region, Thailand) (1, QM/NTM collection)
Gellides sp. 1759 (Sulawesi, Indonesia) (6, QM/NTM collection)
Gellides spp. (Singapore: QM/ZRC collections) (2)
Gellides sp.nov.: Dawydoff, 1952 (Cape Varella, Vietnam) (3)
Niphates brevispiculifera (Ridley, 1905) (Indonesia, ZMA database) (6)
Niphates spp. (Indonesia, ZMA database) (6)
Niphates sp.: Pettit et al., 1996 (Singapore) (2)
Niphates sp. 1026 (Bohol Sea, Philippines) (7, QM/NTM collection)
Niphates sp. 1713 (Kalimantan, Indonesia) (6, QM/NTM collection)
Niphates sp. (Singapore; ZRC) (2)
Niphates sp. (Singapore; ZRC) (2)
Niphates sp. (Singapore; ZRC) (2)
Niphates spp. (Singapore; QM/ZRC collections) (2)
Niphates spp. (Nha Trang, Vietnam, PIBOC database) (3)

Family Phloeodictyidae Carter, 1882

Definition. - Encrusting, massive, lobate, or more frequently spherical and tubular growth forms buried in the substrate, usually with fistules on upper surface bearing apical oscules, occasionally excavating coralline substrates; ectosomal skeleton multilayered, irregular, tangential reticulation of diactinal spicules (oxeas or strongyles), forming a distinct, usually detachable, parchment-like crust; choanosomal skeleton an irregular reticulation of diactinal spicules forming multispiricular tracts, typically producing a pulpy effect, with or without spongine fibres, together with an irregularly dispersed isotropic reticulation of single spicules scattered between these major tracts; microscleres may include centrangulate sigmas and toxas.

SOUTH CHINA SEA SPECIES.

Calyp helevata (Burton, 1928:117); Pattanayak, 1997 (off Cinque L., Andaman Is, 240-340m, 11° 25’N; Nicobar and Andaman Islands) (1)
Calyx (‘Vagacia’) imperialis (Dendy, 1922) (Indonesia, ZMA database) (6)
Oceanapia amboinensis Topsent, 1897; Desqueyroux-Faudenz, 1981 (Ambon, Indonesia) (6)
Oceanapia (‘Phloeodictyon’) eugayamense (Wilson, 1925:420) (Philippines; Indonesia, ZMA database) (6,7)
Oceanapia crassispicula Kieschnick, 1896 (Ternate, Moluccas, Indonesia) (6)
Oceanapia duru Vacelet & Vasseur, 1971 (Indonesia; ZMA database) (6)
Oceanapia elastica Keller, 1891 (Indonesia; ZMA database) (6)
Oceanapia caysonii (Ridley, 1884) (Indonesia, ZMA database) (6, Burton MS)
**Octocorallia**

- *Octocorallia inermis* Dendy, 1922 (Indonesia, ZMA database) (6)
- *Octocorallia (‘Phloeodictyon’) cf. isodictyiforme* (Carter, 1882); Carter, 1887:69 (King 1. Mergui Archipelago, Burma. 12° 08’ N) (1) [misidentification for a European species]
- *Octocorallia fragilis* Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)
- *Octocorallia media* Thiele, 1900 (Indonesia, ZMA database) (6)
- *Octocorallia mollis* (Dendy, 1895) (Indonesia, ZMA database) (6, Burton MS)
- *Octocorallia pellucida* (Ridley, 1884) (Indonesia, ZMA database) (6, Burton MS)
- *Octocorallia “petrosia”* Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
- *Octocorallia polyvivipara* Dendy. 1922 (Indonesia, ZMA database) (6)
- *Octocorallia (‘Phloeodictyon’) patridesima* (Lamarck); Wilson, 1925:419 (Philippines) (7)
- *Octocorallia ramayi* (Lendenfeld); George & George, 1987 (photo 3C) (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
- *Octocorallia renieroides* Burton, 1934 (Indonesia, ZMA database) (6)
- *Octocorallia sagittaria* (Sollas, 1902:212); Hooper, Kelly-Borges & Riddle, 1993 (Pulau Bidang, NE of Penang, 5° 30’ N: AIMS/NCI collection, Ko Samui region, Thailand (QM/NTM collections): Singapore (QM/ZRC collections) (2.3)
- *Octocorallia toxophila* Dendy, 1922 (Indonesia, ZMA database) (6)
- *Octocorallia tuberosa* Dendy, 1922 (Indonesia, ZMA database) (6)
- *Octocorallia zoologica* Dendy, 1905 (Indonesia, ZMA database) (6)
- *Octocorallia spp.* (Indonesia, ZMA database) (6)
- *Octocorallia sp.* 1712 (Kalimantan, Indonesia) (6, QM/NTM collection)
- *Octocorallia sp.* 618 (Kalimantan, Indonesia) (6, QM/NTM collection)
- *Octocorallia spp.* (Singapore; QM/ZRC collections) (2)
- *Octocorallia (‘Pachypellina’) fibrosa gracilis* (Wilson, 1925:412) (Philippines) (7)
- *Pellina integra* Topsent, 1897; Desqueyroux-Faundez, 1981 (Ambon, Indonesia) (6)

**Family Petrosiidae van Soest 1980**

**Definition.** - Typically massive, vase-shaped or volcano-shaped sponges, sometimes encrusting, bulbous, and less commonly branching growth forms; texture characteristically stony, brittle, reflecting that in most species siliceous spicules are clearly dominant over spong; ectosomal skeleton an isotropic reticulation of single spicules or spicule tracts forming a crust, giving the surface a smooth appearance; choanosomal skeleton more-or-less a regular isotropic reticulation of multispiricular tracts, without distinction between primary or secondary tracts, bound together with minimal spong; forming oval meshes; microscleles may include microxeas and microstrongyles; reproduction oviparous.

**SOUTH CHINA SEA SPECIES.**

- *Acanthostrongylophora asinorica* Hooper, 1985 (Indonesia, ZMA database) (6)
- *Petrosia chaliniformis* Thiele, 1899 (Indonesia, ZMA database) (6)
- *Petrosia contigua* Thiele, 1899 (Indonesia, ZMA database) (6)
- *Petrosia crustata* Wilson, 1925:408 (Philippines) (7)
- *Petrosia denissima* Dendy, 1905 (Indonesia, ZMA database) (6)
- *Petrosia dura* (Nardo); Dawydoі, 1952 (Vietnam, Cambodia) (3)
- *Petrosia elasica* (Keller); Lindgren, 1897: 480; Lindgren, 1898; Dawydoі, 1952 (Gaspar Straits, Java; Vietnam) (2,3)
- *Petrosia ficiformis* Olivii, 1791 (Indonesia, ZMA database) (6)
- *Petrosia expansa* Thiele, 1903 (Indonesia, ZMA database) (6)
- *Petrosia expansa Thiele argvensis* Hentschel, 1912 (Aru Is., Indonesia) (6)
- *Petrosia hebes* (Lendenfeld, 1890) (Indonesia, ZMA database) (6)
- *Petrosia ingens* Thiele, 1899 (Indonesia, ZMA database) (6)
- *Petrosia lignosa* Wilson, 1925:403 (Philippines) (7)
- *Petrosia microcea* Vacclet, Vasseur & Lévi, 1976 (Indonesia, ZMA database) (6)
- *Petrosia nigricans* Lindgren, 1897: 480; Lindgren, 1898 (Java) (2)
- *Petrosia pulvillo* Thiele, 1899 (Indonesia, ZMA database) (6)
- *Petrosia rava* Thiele, 1899 (Indonesia, ZMA database) (6)
Petrosia seriata (Hentschel); Lévi, 1961: 140 (Vietnam) (3)
Petrosia similis (Ridley & Dendy), var. compacta Ridley & Dendy, 1887; Dragnewitsch, 1906:443;
Hentschel, 1912; Dawydoff, 1952; Lévi, 1961:529 (Singapore, 1° 30’N; Aru Is, Indonesia; Vietnam)
(2,3,6,7)
Petrosia similis granulosa Wilson, 1925:406 (Philippines, Indonesia, ZMA database) (6,7)
Petrosia similis seriata Hentschel, 1912 (Aru Is, Indonesia) (6)
Petrosia strongylophora Thiele, 1903 (Indonesia, ZMA database) (6)
Petrosia truncata aruensis Hentschel, 1912 (Aru Is, Indonesia) (6)
Petrosia spp. (Indonesia, ZMA database) (6)
Petrosia sp. 113 (Phuket region, Thailand) (1, QM/NTM collection)
Petrosia sp. 963 (Phuket region, Thailand) (1, QM/NTM collection)
Petrosia sp. 966 (Phuket region, Thailand) (1, QM/NTM collection)
Petrosia sp. 1021 (Negros Orientale, Philippines) (7, QM/NTM collection)
Petrosia sp. 1634 (SW Cebu, Philippines) (7, QM/NTM collection)
Petrosia sp. 1601 (Sulawesi, Indonesia) (6, QM/NTM collection)
Petrosia sp. (Singapore; ZRC) (2)
Petrosia spp. (Singapore; QM/ZRC collections) (2)
Petrosia spp. (Nha Trang, Vietnam, PIBOC database) (3)
Strongylophora durissima Dendy, 1922 (Indonesia, ZMA database) (6)
Strongylophora sp. (Indonesia, ZMA database) (6)
Strongylophora sp. (Singapore; ZRC) (2)
Xestospongia carbonaria (Lamarck, 1815) (Indonesia, ZMA database) (6)
? Xestospongia ("Protoschmidtia") cereum (Burton, 1928:116, pl.1, fig.2); Pattanayak, 1997 (8 mls
W of Interview L., Andaman Is, 90-540m, 13°N; off Cinque L., Andaman Is, 240-340m, 11° 25’N;
Nicobar and Andaman Islands) (1)
Xestospongia exigua (Kirkpatrick, 1900); George & George, 1987 (Bodgaya Islands and Pulau Sipadan,
Sabah; Indonesia, ZMA database); (Singapore; QM/ZRC collections) (2,4,6)
Xestospongia exigua "samarensis" Burton, unpublished MS name (Indonesia, ZMA database) (6
Burton MS)
Xestospongia cf. exigua (Kirkpatrick); (Singapore; QM/ZRC collections) (2)
? Xestospongia ("Protoschmidtia") expansa (Thiele, 1903); Burton, 1928:116 (NW of Cape Negrais,
Bay of Bengal, Burma, 16° 45’N, 2600m) (1)
Xestospongia cf. mammillata Pulitzer-Finali, 1982 (Indonesia, ZMA database) (6)
Xestospongia testudinaria (Lamarck, 1814); Pattanayak, 1997 (Sattahip region, Thailand; Nicobar
and Andaman Islands); George & George, 1987; Li et al., 1981 [as "muta"] (Bodgaya Islands and
Pulau Sipadan, Sabah; Indonesia, ZMA database); (Singapore; QM/ZRC collections) (1,2,3,4,6)
Xestospongia testudinaria fistulophora Hentschel, 1912; Wilson, 1925:401 (Aru Is, Indonesia;
Philippines) (6,7)
Xestospongia cf. testudinaria (Lamarck) (Singapore; QM/ZRC collections) (2)
Xestospongia "wiedenmayeri"; Pinder, 1992 (South China Sea) (5)
Xestospongia sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
Xestospongia sp. 947 (Phuket region, Thailand) (1, QM/NTM collection)
Xestospongia sp. 954 (Phuket region, Thailand) (1, QM/NTM collection)
Xestospongia spp. (Indonesia, ZMA database) (6)
Xestospongia sp. 1897 (Sulawesi, Indonesia) (6, QM/NTM collection)
Xestospongia sp. (Singapore; ZRC) (2)
Xestospongia spp. (Nha Trang, Vietnam, PIBOC database) (3)

Order Dictyoceratida

Definition. - “Keratose sponges” lacking mineral spicules, although detritus and contaminating spicules may be acquired; sponges usually tough, difficult to tear, and frequently with differences in pigmentation between the surface and subectosomal regions; main skeleton a reticulation of spongin fibres, often organised into primary, secondary and sometimes tertiary networks; fibres usually homogenous or lightly laminated in cross-section, with or without central pith, and collagenous spongin filaments may be scattered within the mesohyl; larvae are large, incubated parenchymella, evenly covered with short cilia except
at one pole where tufts of large flagella occur, and both poles have rings of pigmented cilia-free cells.

Remarks. - Four families are included in the dictyoceratids, differentiated by their fibre characteristics, although there is currently some debate about whether Dysideidae should be included here or with the Dendroceratida (based on affinities inferred by comparative choanosomal ultrastructures and supporting chemical evidence for affinities to dendroceratids).

Family Dysideidae Gray, 1867

Definition. - Encrusting, massive or branching growth forms, typically with conulose surface; surface conulose developed to various degrees, often characteristically sculptured by tangential sponge fibres cored by sand, giving it a delicate lace-like appearance; texture usually soft and compressible, sometimes brittle due to interstitial detritus; choanosome a wide reticulation of spongion fibres, concentrically stratified although to varying degrees; fibres laminated and cored by a central pith, but this may be obscured by abundant detritus which is frequently incorporated into the spongion fibres; mesohyl contains only light collagen; choanocyte chambers are large and eurypyllous.

SOUTH CHINA SEA SPECIES.

Dysidea arenicola Bergquist, 1965 (Indonesia, ZMA database) (6)
Dysidea cinerea Keller, 1889; van Soest, 1980 (Indonesia, ZMA database, Hong Kong) (5,6)
Dysidea elastica Brounsted, 1934 (Java, Banda, Indonesia) (6)
Dysidea ("Spongeli") elastica (Schulze), var. massa Schulze, 1879; Dragnewitsch, 1906:443 (Singapore, 1° 30'N) (2)
Dysidea fragilis (Montagu, 1818); Dawydoff, 1952 (South and Central Annam, Poulo Dama, Vietnam); Cabrero, 1979: 16; Cabrero, 1981:12 (Indonesia, ZMA database; Quezon, Philippines); Su et al., 1993a, 1995a,b; Zhong et al., 1993 (South China Sea, Taiwan) (3,5,6,7)
Dysidea ("Spongeli") fragilis Schulze, var. fasciculata (Wilson, 1925:476) (Philippines) (7)
Dysidea ("Spongeli") fragilis Schulze, var. tubulosa (Schulze, 1879); Dragnewitsch, 1906:442 (Singapore, 1° 30'N) (2)
Dysidea granulosa Bergquist, 1965 (Indonesia, ZMA database) (6)
Dysidea herbacea (Bergquist, 1889); Dawydoff, 1952 (South and Central Annam, Poulo Dama, Vietnam); George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah); Pinder, 1992 (South China Sea (Indonesia, ZMA database)) (3,4,5,6)
Dysidea ("Spongeli") pallescens (Keller, 1889); Dawydoff, 1952 (South Annam, Vietnam) (3)
Dysidea ramoglorerata Carter, 1887:64 (mud flats, King I., Mergui Archipelago, Burma, 12° 08'N) (1)
Dysidea ramoglorerata var. ramoglorerata Carter, 1887:65 (King I., Mergui Archipelago, Burma, 12° 08'N) (1)
Dysidea ramoglorerata var. granulata Carter, 1881; Carter, 1887:65 (King I., Mergui Archipelago, Burma, 12° 08'N) (1)
Dysidea reticulata Thiele, 1899 (Indonesia, ZMA database) (6)
Dysidea sp.; Zhong et al., 1992 (South China Sea) (5)
Dysidea sp.; Su et al., 1993b (South China Sea) (5)
Dysidea sp. 16 (Phuket region, Thailand) (1, QM/NTM collection)
Dysidea sp. 229 (Sattahip and Phuket regions, Thailand) (1,3, QM/NTM collection)
Dysidea sp. 940 (Sattahip region, Thailand) (3, QM/NTM collection)
Dysidea sp. (Indonesia, ZMA database) (6)
Dysidea sp. 1709 (Kalimantan, Indonesia) (6, QM/NTM collection)
Dysidea spp. (Singapore: QM/ZRC collections) (2)
Enteropogon lobata Bergquist, 1965 (Indonesia, ZMA database) (6)
Enteropogon sp. (Indonesia, ZMA database) (6)
Spongionella ("Spongeli") monoprocta (Lévi, 1961: 145) (Vietnam) (3)
Spongionella spp. (Singapore: QM/ZRC collections) (2)
Family Ircinidae Gray, 1867

Definition. - Massive, lobate, spherical, digitate, cup shaped, encrusting growth forms, always with a conulose surface, except in forms with an organised superficial sand crust where conules may be reduced to mammiform protruberances; fibres making up anastomosing skeleton laminated in cross section with a central pith region, often obscured by large quantities of debris incorporated into fibres and interstitially; skeleton irregularly arranged; primary fibres always fasciculate, often forming very complex arrays; secondary fibres generally uncored; a third element consists of fine collagen filaments dispersed in wavy tangled tracts throughout the mesohyl; filaments have terminal knobs, sometimes studded with lepidocrocite granules, composed of collagen distinct from that found in the mesohyl matrix or in the fibres; presence of filaments makes the sponge very tough, almost impossible to tear; choanocyte chambers spherical and diploidal; mesohyl only lightly infiltrated with collagen (like the Spongidae).

SOUTH CHINA SEA SPECIES.

Ircinia anomala Dendy, 1905 (Indonesia, ZMA database) (6, Burton MS)
Ircinia arenaria Hentschel, 1912 (Aru Is, Indonesia) (6)
Ircinia "atrovirens" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Ircinia eluvosa (Ridley, 1884); Dawydoff, 1952 (Vietnam, Cambodia) (3)
Ircinia erecta Lendenfeld, 1889 (Indonesia, ZMA database) (6, Burton MS)
Ircinia conulosa Lendenfeld, 1889 (Indonesia, ZMA database) (6, Burton MS)
Ircinia dendroides Padějaff, 1884; Lévi, 1961:531 (Indonesia, ZMA database; Palawan, Philippines) (6,7)
Ircinia dendroides "dura" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Ircinia echinata Keller, 1889 (Indonesia, ZMA database) (6)
Ircinia fasciulata (Pallas, 1766:361); Cabrero, 1981 (Kalayangi, Pitogo, Quezon, Zamboanga, Pangasinan, Batangas, Masbate, Philippines) (7)
Ircinia fusca Carter, 1880 (Indonesia, ZMA database) (6)
Ircinia "grosa" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Ircinia mutans Wilson, 1925:491 (Philippines) (7)
Ircinia pinna Hentschel, 1912; van Soest, 1980 (Indonesia, Hong Kong) (5,6)
Ircinia ramodigitata Burton, 1934 (Indonesia, ZMA database) (6)
Ircinia ramosa (Keller, 1889); George & George, 1987 (Bodgaya Islands and Palau Sipadan, Sabah; Indonesia, ZMA database) (4,6)
Ircinia schulei Dendy, 1905 (Indonesia, ZMA database) (6)
Ircinia simplicicima (Sollas); Dawydoff, 1952 (Vietnam, Cambodia) (3)
Ircinia speciosa Hentschel, 1912 (Aru Is, Indonesia) (6)
Ircinia tuberosa Dendy, 1905 (Indonesia, ZMA database) (6, Burton MS)
Ircinia variabilis (Schmidt); Wilson, 1925:494; Dawydoff, 1952 (Philippines, Vietnam, Cambodia) (3,7)
Ircinia spp. (Indonesia, ZMA database) (6)
Ircinia ("Hircinia") sp.; Carter, 1887:63 (King L, Mergui Archipelago, Burma, 12° 08’N) (1)
Ircinia sp. 1 (Phuket region, Thailand) (1, QM/NTM collection)
Ircinia sp. (Singapore: ZRC collections) (2)
Ircinia sp. (Singapore: QM/ZRC collections) (2)
Ircinia sp. (Nha Trang, Vietnam, PIBOC database) (3)
Psammocinia arenosa Lendenfeld, 1889 (Indonesia, ZMA database) (6, Burton MS)
Psammocinia "ragosa" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Psammocinia sp. (Singapore: ZRC) (2)
Sarcothraulus ("Sienospongina") aligera (Burton, 1928:135, pl.2, fig.6) (W of Mergui Archipelago, 13° 04’N, 130m) (1)
Family Thorectidae Bergquist, 1978

**Definition.** - Sponge body often tubular organised around a series of long cylindrical canals, and stalked; yellowish or brick-red internal pigmentation with dark exterior common; surface often armoured in complex fashion, frequently thrown into ridges and hollows; where unarmoured the surface is conulose and may resemble Spongiidae; spongin fibres making up the anastomosing skeleton are laminated in cross-section, with clear zones of disjunction between successive layers; central region with more diffuse pith, not sharply disjunct from the investing more dense layer (as is the pith in Verongida), but merges into the outer layer; pith always evident in the primary fibres and may or may not extend into the secondary elements of the skeleton; fibres often extremely regular with almost perfectly rectangular meshes; some fibres extremely stout; primary fibres may be greatly reduced in number, absent in one genus; choanocyte chambers spherical and diplodal.

**SOUTH CHINA SEA SPECIES.**

*Aplysinopsis elegans* Lendenfeld, 1885 (Indonesia, ZMA database) (6)

*Cacospongia* sp. (Indonesia, ZMA database) (6)

*Cacospongia* sp.: Carter, 1887:64 (King L., Mergui Archipelago, Burma, 12° 08’ N) (1)

*Fasciaplysisnopsis reticulata* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Fasciospongia cava* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Fasciospongia caypectelloides* Hentschel, 1912 (Aru Is, Indonesia) (6)

*Fasciospongia pulcherrima* (Ridley, 1884): Dawydoff, 1952 (Paracels Archipelago, Spratly Is, Macclesfield, Atoll de Tizard) (3)

*Fasciospongia* (*’Stelospongia’*) sp.; Sollas, 1902:220 (Great Redang Is., E. coast of Malay Peninsula, 5° 50’ N) (3)

*Hyrtios elegans* Thiele, 1899 (Indonesia, ZMA database) (6)

*Hyrtios erecta* (Keller, 1889): Dawydoff, 1952 (Pulo Condore: Réam, Vietnam; Indonesia, ZMA database) (3,6)

*Hyrtios* sp. (Indonesia, ZMA database) (6)

*Hyrtios* sp. 796 (Phuket region, Thailand) (1, QM/NTM collection)

*Luffariella geometrica* Kirkpatrick, 1900 (Phuket region, Thailand) (1, QM/NTM collection)

*Luffariella variabilis* Poljeau, 1884 (Indonesia, ZMA database) (6)

*Luffariella herdmani* (Dendy, 1905) (Indonesia, ZMA database) (6, Burton MS)

*Simenospongia* spp. (Indonesia, ZMA database) (6)

*Thorectia* sp. 957 (Phuket region, Thailand) (1, QM/NTM collection)

Family Spongiidae Gray, 1867

**Definition.** - Encrusting, massive, cup-shaped and branching sponges, including the commercial ‘bath-sponges’; surface typically conulose or with a distinct sand cortex; texture compressible, fibrous, resilient except where heavily sand encrusted, and interior is rough to touch reflecting the density of spongin skeleton in relation to soft tissue; choanosomal skeleton consists of reticulate spongin fibres, usually organised into a hierarchy of sizes: the primary elements are reduced in some genera and completely absent in one; fibres homogenous in cross section, showing no tendency to fracture around planes of concentric laminations, lacking a central pith but often incorporating detritus and foreign spicules into the spongin skeleton; choanocyte chambers small and diplodal.

**SOUTH CHINA SEA SPECIES.**

*Carteriospongia* “flabelliformis” Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

*Carteriospongia foliacea* (Pallas, 1766); Caberoy, 1979:15; Caberoy, 1981:8; Dawydoff, 1952 (Indonesia, ZMA database; Philippines; Vietnam; Cambodia) (3,6,7)
Carteriospongia otahitica Ehlers; Dawydoff, 1952 (Paracels Archipelago, Spratly Is., Macclesfield, Atoll de Tizard) (3)

Carteriospongia penimitula (Lamarck, 1814) (Indonesia, ZMA database) (6)

Carteriospongia radiata (Hyatt, 1877); Lévi, 1961:530 (Indonesia, ZMA database; Zamboanga, Philippines) (6.7)

Carteriospongia robusta (Keller, 1889) (Indonesia, ZMA database) (6, Burton MS)

Carteriospongia siticate Lendenfeld, 1885 (Indonesia, ZMA database) (6)

Carteriospongia supraculata (Lendenfeld, 1889) (Indonesia, ZMA database) (6, Burton MS)

Carteriospongia sp. (Indonesia, ZMA database) (6)

Coscinodiscus sp. (Indonesia, ZMA database) (6)

Dactylospongia elegans Thiele, 1899; Lopez et al., 1994 (Indonesia, ZMA database; South China Sea; Singapore; ZRC) (2,5,6)

Dactylospongia sp. (Singapore; ZRC) (2)

Hippopospongia cerebrum (Manila region, Philippines) (7, QM/NTM collection)

Hippopospongia fistulosa Lendenfeld, 1889; Lévi, 1961:529 (Zamboanga, Philippines) (7)

Hippopospongia mollissima Lendenfeld, 1889; Dragnewitsch, 1906:446 (Singapore, 1° 30'N) (2)

Hippopospongia sp. (Indonesia, ZMA database) (6)

Hyattella clathrata (Carter, 1881) (Indonesia, ZMA database) (6)

Hyattella intestinalis (Lamarck 1814) (Phuket region, Thailand; AIMS/NCI collection; Indonesia, ZMA database) (1,6, QM/NTM collection)

Hyattella sp. 398 (Bohol Sea, Philippines) (7, QM/NTM collection)

Hyattella sp. (Singapore; QM/ZRC collections) (2)

Phyllospongia aliena Wilson, 1925:481 (Philippines) (7)

Phyllospongia coriacea Thiele, 1899 (Indonesia, ZMA database) (6)

Phyllospongia dendi Lendenfeld, 1885 (Indonesia, ZMA database) (6)

Phyllospongia ecoscula Lévi, 1961:530 (Zamboanga, Philippines) (7)

Phyllospongia foliaceae (Pallas, 1766:395): Pattanayak, 1997 (Nicobar and Andaman Islands); George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah; SW. Cebu, Manila region, Philippines); Zeng et al., 1991a,d; Fu et al., 1991a,c, 1992a,b; Fu et al., 1993a,b; Su et al., 1995a (South China Sea, Taiwan) (1,4,5,7)

Phyllospongia pulchra Thiele, 1899 (Indonesia, ZMA database) (6)

Phyllospongia papyracea (Esper, 1794); Lévi, 1961:530 (Indonesia, ZMA database; Zamboanga Norte, Philippines) (6,7, QM/NTM collection)

Phyllospongia verrucularis Lendenfeld, 1885 (Indonesia, ZMA database) (6)

Phyllospongia sp.; Wan et al., 1996 (South China Sea) (5)

Phyllospongia spp.; Dawydoff, 1952 (Paracels Archipelago, Spratly Is., Macclesfield, Atoll de Tizard; Vietnam, Cambodia) (3)

Spongia ceylonensis Dendy, 1905: van Soest, 1980 (Hong Kong, Indonesia; ZMA database) (5,6)

Spongia digitata Sollas, 1902:220, pl.14, fig.4, pl.15, fig.2 (Great Redang L., E. coast of Malay Peninsula, 5° 50'N) (3)

Spongia cf. equina (Schmidt); Dawydoff, 1952 (Vietnam, Cambodia) (3)

Spongia irregularis Lendenfeld, 1885; Dawydoff, 1952 (Indonesia, ZMA database; Vietnam, Cambodia) (3,6,7)

Spongia irregularis mollior Topsent, 1897; Desquercoux-Fauendez, 1981 (Ambon, Indonesia) (6)

Spongia ("Eupongia") irregular var. sarigamensis (Wilson, 1925:486) (Philippines) (7)

Spongia irregularis villosa Hentschel, 1912 (Aru Is, Indonesia) (6)

Spongiaocardia Lendenfeld, 1885 (Indonesia, ZMA database) (6)

Spongia officinalis Linnaeus, 1794; Carter, 1887:63; Wilson, 1925:484; Lévi, 1967:529; Cabrero, 1979:14; Cabrero, 1981:7 (King L., Mergui Archipelago, Burma, 12° 08'N; Phuket region, Thailand; Negros Oriental, Mindanao, Sulu, Philippines; Indonesia, ZMA database) (1,6,7, QM/NTM collection)

Spongia officinalis var. Adriatica Schulze, 1879; Dragnewitsch, 1906:445 (Singapore, 1° 30'N) (2)

Spongia officinalis var. rotunda (Hyatt, 1877); Sollas, 1902:220; Dragnewitsch, 1906:445 (Great Redang L., E. coast of Malay Peninsula, 5° 50'N; Singapore, 1° 30'N) (2,3)

Spongia sp. (Singapore; QM/ZRC collections) (2)

Spongia tubulifera Larnarck, 1814 (Indonesia, ZMA database) (6)

Spongia zimocca Schmidt, 1862; Dragnewitsch, 1906:445 (Singapore, 1° 30'N) (2)

Spongia sp.; Utkina & Veselova, 1990 (South China Sea) (5)

Spongia sp. 262 (Phuket region, Thailand) (1, QM/NTM collection)

Spongia sp. 1711 (Kalimantan, Indonesia) (6, QM/NTM collection)

Spongia spp. (Nha Trang, Vietnam; PIBOC database) (3)
Order Dendroceratida

**Definition.** - “Keratose sponges”, without mineral spicules, with dendritic or reticulate skeleton, and fibres originate from a basal plate, without any obvious differences between primary and secondary spongin fibre elements; fibres are strongly laminated, with distinct pith; larvae are incubated parenchymella, evenly ciliated, with or without a posterior tuft of long flagella.

**Remarks.** - Three families are traditionally included here, distinguished by their respective fibre development and skeleton arrangement.

Family Darwinellidae Merejkowsky, 1879

**Definition.** - Encrusting, massive, lobate, lamellate and erect columnar growth forms; choanosomal fibre skeleton, where present, is completely dendritic and sometimes supplemented by spongin spicules not attached to the primary skeleton; in massive species these fibres always arise from a flat basal spongin plate; one genus lacks spongin fibres but has the ecosphere reinforced with collagenous fibrils; fibres have laminated bark surrounding the central pith; the pith is usually well developed but in 1 genus it is replaced by detritus; choanocyte chambers are eurypylous.

SOUTH CHINA SEA SPECIES.

_Aphysilla cf. rosea_ Barrois, 1876: Dawydoff, 1952 (Vietnam, Cambodia; Indonesia, ZMA database) (3,6)

_Aphysilla sulfuracea_ Schulze, 1878:404; Cabrero, 1981:13 (Tabayas Bay, Batangas, Quezon, Marinduque, Philippines) (7)

_Aphysilla sp._ (Indonesia, ZMA database) (6) (Indonesia, ZMA database) (6)

_Aphysilla sp._ 1714 (Kalimantan, Indonesia) (6, QM/NTM collection)

_Chelonaplysilla cf. betinensis_ Zea & van Soest, 1986

_Chelonaplysilla erecta_ Keller, 1889 (Indonesia, ZMA database) (6)

_Chelonaplysilla noveus_ (Carter, 1876); Lévi, 1961: 147 (Vietnam; Indonesia, ZMA database) (3,6)

_Darwinella australiensis_ Carter, 1885 (Indonesia, ZMA database) (6)

_Darwinella sp._ 1030 (Negros Oriental, Philippines) (7, QM/NTM collection)

_Dendrilla lacunosa_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Dendrilla lendenfeldi_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Dendrilla membranosa_ (Pallas); Dawydoff, 1952 (Vietnam, Cambodia) (3)

_Dendrilla mertoni_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Dendrilla rosea digitata_ Brondsted, 1934 (Java, Banda, Indonesia) (6)

_Dendrilla rosea typica_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Dendrilla sp._; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)

_Dendrilla sp._ 1716 (Kalimantan, Indonesia) (6, QM/NTM collection)

_Dendrilla sp._ 221 (Phuket region Thailand) (1, QM/NTM collection)

_Dendrilla sp._; Dawydoff, 1952 (Paracels Archipelago, Spratly Is, Macclesfield Is, Atoll de Tizard) (3)

_Hexadella indica_ Dendy, 1905 (Indonesia, ZMA database) (6)

_Hexadella purpurea_ Burton, 1937 (Indonesia, ZMA database) (6)

_Hexadella sp._ (Indonesia, ZMA database) (6)

_Pleraplysilla australiensis_ Hentschel, 1912 (Aru Is, Indonesia) (6)

_Pleraplysilla sp._; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
Family Dictyodendrillidae Bergquist, 1980

Definition. - Growth form varies from spreading with digitate projections, to lobate or stalked forms; texture is delicate and cavernous; choanosomal skeleton has prominently reticulate spongins fibres which may be augmented by incorporation of free spongins spicules in one genus; fibres often dark purple, red, or black, and contrasts with the soft tissue which is either pale or densely and uniformly pigmented; fibre structure is heavy, concentrically laminated and pithed, but pith may be obscured by the incorporation of detritus into fibres; choanocyte chambers are large, eurypylous.

SOUTH CHINA SEA SPECIES.
Dictyodendrilla membranosa (Pallas, 1766) (Indonesia, ZMA database) (6)
Dictyodendrilla "praetensa" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)
Igernella mirabilis Lévi, 1961 (Indonesia, ZMA database) (6)

Family Halisarcidae Vosmaer, 1885

Definition. - Thin growth form, soft texture, gelatinous surface; fibrous skeleton absent entirely; choanocyte chambers consist of specialised wide-mouthed, extended tubular and branched eurypylous forms; parenchymella larvae are simple, lacking long terminal cilia; often confused with didemnid ascidians.

SOUTH CHINA SEA SPECIES.
Halisarca sp.: Dawydoff, 1952 (Vietnam, Cambodia) (3)

Order Verongida

Definition. - "Keratose sponges" lacking spicules, typically fleshy and soft, with pigment that oxidizes to purple colouration; skeleton with large, widely spaced spongins fibres forming dendritic or reticulate structures; fibres may be aggregated (fasciculated) into bundles; no differentiation of primary and secondary elements, and detritus is only rarely incorporated into fibres; fibres have a laminated cortical (bark) region and a distinct central pith of fine spongins fibrils, but the cortex may be reduced or disappear entirely in some species; mesohyl contains abundant collagenous fibrils.

Remarks. - Three families are known, all of which are thought to be oviparous.

Family Aplysinidae Carter, 1875

Definition. - Encrusting, massive, club-shaped and fan-shaped growth forms; reticulate, anastomosing spongins fibres produce polygonal meshes, not organised into one plane; fibres have normal bark and pith elements, without foreign detritus, and the collagenous spongins matrix is dense; choanocyte chambers small, spherical and diplodal.

SOUTH CHINA SEA SPECIES.
Aplysina mollis Row, 1911 (Indonesia, ZMA database) (6)
Aplysina mollis aruensis Hentschel, 1912 (Ara Is, Indonesia) (6)
Aplysina sp.: George & George, 1987 (Bodgaya Islands and Puluq Sipadan, Sabah) (4)
Family Druinellidae Lendenfeld, 1889

**Definition.** - Lobate and club-shaped sponges; pigmentation frequently sulphur yellow that usually oxidizes to purple, although some species have superficial pink to purple coloration and a beige to pale yellow interior; skeleton with dendritic fibres, widely spaced or greatly reduced in relation to the heavy collagenous spongina matrix, sometimes supplemented by spongina spicules; fibres with strong bark elements, and fibres have the pith component emphasised over the bark, which is typically reduced or absent; choanocyte chambers small, spherical and diplodal.

**SOUTH CHINA SEA SPECIES.**
- *Aplysina* sp.: George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
- *Aplysina* sp.: Jung et al., 1995 (South China Sea) (5)
- *Aplysina* sp. (Indonesia; ZMA database) (6)

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Family Ianthellidae Hyatt, 1875

**Definition.** - Lobate and fan-shaped, stalked growth forms common; pigmentation ranges from typically sulphur yellow, deep orange to deep purple with oxidation to deep purple; fibre skeleton, where present, is reticulate and frequently compressed into 2 dimensions, radiating from the contracted basal attachment; fibres typically large, particularly towards the base of the sponge, containing cellular elements in distinctive concentric annuli occurring mainly in the bark component of each fibre; choanocyte chambers large and eurypylous, sac-shaped, varying between genera from simply elongate to occasionally branched.

**SOUTH CHINA SEA SPECIES.**
- *Ianthella basta* (Pallas, 1766); Wilson, 1925:475; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah; Indonesia; ZMA database; Philippines) (4,6,7)
- *Ianthella flabelliformis* (Pallas, 1766); Wilson, 1925:474; Dawydoff, 1952 (Paracels Archipelago, Spratly Is, Macclesfield, Atoll de Tizard; Cabooy, 1981:9 (Indonesia; ZMA database, Philippines) (3,6,7)
- *Ianthella* sp. 1706 (Kalimantan, Indonesia) (6, QM/NTM collection)

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Class Calcarea

**Definition.** - With exclusively calcitic spicules ranging from discrete monactinal, diaactinal, triactinal or tetractinal spicules, to reticulate skeletons composed of fused crystalline calcite spicules; megascleres and microscleres are not differentiated; skeleton and aquiferous system occurs in three grades of construction: (1) asconoid, with simple tubular construction.
Hooper et al.: Sponges of the South China Sea

(olynthus), without folding of the body wall, with thin walls pierced externally by ostia, leading to tubular water canals (porocyte canals) opening onto a central choanocyte-line cavity (choanoderm), connected to the exterior, at the apex of the sponge, by a single osculum; (2) syconoid construction produced by folding of both the exterior (pinacoderm) and interior (choanoderm) walls, producing choanocyte chambers to lie within the body wall rather than only lining the central atrium as in more simple asconoid structures, but these chambers open directly onto the atrium; (3) leuconoid, found in most sponges (including the Demospongiae), with complex folding and in which the choanocyte chambers are oval and isolated in a maze of canals within the body wall, with chambers opening onto branching and complex excurrent canals: sexual reproduction in Calcarea is exclusively viviparous.

**Remarks.** - The Calcarea contains two subclasses, 5 orders, 18 families, 98 nominal genera (63 of which are apparently valid), and an estimated fauna of between 400-500 species worldwide. All species are marine.

**Subclass Calcinea**

**Definition.** - Regular triradiate spicules, equiangular and equiradiate or exceptionally parasagittal or sagittal, and a basal system of quadriradiates; most species have at least some spicules with the rays and angles between the rays being equal, with or without monactinal or diactinal free spicules; young sponges may have only triradiate spicules; choanocytes basinucleate, nuclei spherical, and basal body of flagellum not adjacent to the nucleus; larvae are entirely ciliated hollow blastula (coeloblastulae).

**Order Clathriniida**

**Definition.** - Skeleton composed exclusively of free spicules, without hypercalcified non-spicular reinforcements or spicule tracts.

**Remarks.** - Six families are currently recognised.

**Family Clathrinidae Minchin, 1900**

**Definition.** - Essentially tubular organisation, with continuous choanoderm lining all internal cavities; growth is by longitudinal median divisions and anastomosis of tubes to form large units called the cormus; neither a common cortex nor a well-defined inhalant and exhalant aquiferous system.

**SOUTH CHINA SEA SPECIES.**

*Clathrina coriacea* (Montagu, 1818); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

*Clathrina* sp.; George & George, 1987 (Bodgaya Islands and Pulau Sipadan, Sabah) (4)
SOUTH CHINA SEA SPECIES.

*Percichara canaliculata* Burton & Rao, 1932:304, pl.18, fig.1 (2 mls NW of Torres Straits, Mergui Archipelago, 80m, 11° 50’N) (1)

*Percichara heterorhaphis* (Poljacek, 1884); Burton, 1930 (Ubian, Jedan, Sumbawa, Rotti, Indonesia); Burton & Rao, 1932:304; George & George, 1987 (Off Rutland L., Andaman Is, 70m, 11° 25’N; Bodgaya Islands and Pulau Sipadan, Sabah) (1,4,6)

*Lencetia hueckeliana* Poljacek, 1884; Dawydoff, 1952 (Vietnam, Cambodia) (3)

**Order Murrayonida**

*Definition.* - Reinforcement of the skeleton composed of either spicule tracts, calcareous plates or a rigid aspicular skeleton; canal system leuconoid; diapasons (tuning-fork shaped triradiates) or modified biradiates present and generally fasciculated.

**Remarks.** - There are 3 families and only 3 known species.

**Family Murrayonidae Kirkpatrick, 1910**

*Definition.* - Choanosomal skeleton composed of a rigid calcareous aspicular network; cortex composed chiefly of overlapping calcareous scales, with tuning-fork spicules below.

[no recorded species]

**Family Paramurrayonidae Vacelet, 1967**

*Definition.* - Choanosomal skeleton composed of bundles of diapasons (tuning-fork triradiates) without any rigid structure; cortical skeleton composed chiefly of a superficial layer of overlapping calcareous scales and an internal layer of free calcareous plates.

[no recorded species]

**Family Lelapiellidae Borjevic, Boury-Esnault & Vacelet, 1990**

*Definition.* - Choanosomal skeleton composed of bundles of biradiates without any rigid structure; cortical skeleton composed chiefly of a tangential layer of tripods (triradiates) and curved oxeotes (biradiates).

[no recorded species]

**Subclass Calcaronea**

*Definition.* - Calcarea with incubated amphiblastula larvae flagellated only on the anterior half; nuclei of choanocytes apical, and the flagellum arises directly from the nucleus; spicules are triradiate and sagittal (two rays are paired and the third ray is longer than the others), as well as free monaxonic (monactinal or diactinal) forms; aquiferous system ranges from asconoid to leuconoid grades of construction.

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Order Leucosoleniida

**Definition.** - Only with free spicules, without calcified non-spicular reinforcements.

**Remarks.** - With seven families.

**Family Leucosoleniidae Minchin, 1898**

**Definition.** - Asconoid, erect growth forms, with long, individual, clustered, oscular tubes arising from stolon-like system of basal tubes; tubes may have diverticuli and often arborescent; monaxon spicules always present; triradiates, if present, typically bilateral, sagittal, inequiaangular in form (where two of the rays form a pair, while the third differs in some way), and with the crystalline optic axis never vertical but always inclined to the facial plane of the rays; choanocytes with flagellum arising directly from the pear-shaped nucleus, situated at or near the apex of the cell; choanocytes line central cavity (spongocoele) of the individual tubes; larvae are amphiblastulae.

**SOUTH CHINA SEA SPECIES.**
- *Leucosolenia blanda* Polycraft, 1884; Dawydioff, 1952 (Vietnam, Cambodia) (3)
- *Leucosolenia coriacea* (Montagu, 1818); Burton, 1930 (Saleyer, Saley Bay, Indonesia) (6)
- *Leucosolenia macraster* (Lendenfeld, 1885); Burton, 1930 (Karkaralong Is, Indonesia) (6)
- *Leucosolenia* (Lencilla) sp. nov.; Dawydioff, 1952 (Vietnam, Cambodia) (3)

**Family Amphoriscidae Dendy, 1892**

**Definition.** - Massive, tubular, ovoid and spherical growth forms, grouped together, never solitary (one genus (*Syculmis*) has a root-like tuft of oxeas and anchoring quadriradiates); ectosomal cortex is distinct and supported by tangentially placed radiates, with or without oxeas; ectosomal radiates may have the large arm directed inwards, forming the main part of the choanosomal skeleton; no articulated choanosomal skeleton present, but leuconoid forms may have quadriradiates scattered in the choanosome and large quadri- or triradiates below the atrium (subgastral spicules); nuclei of choanocytes probably always apical; choanocyte chambers asconoid, elongate and radially arranged, or small, spherical and irregularly scattered in the choanosome (leuconoid).

**SOUTH CHINA SEA SPECIES.**
- *Leucilla australiensis* (Carter, 1886); Burton, 1930 (Banda, Indonesia) (6)

**Family Grantiidae Dendy, 1892**

**Definition.** - Encrusting, lobate, tubular, sac-shaped, ovoid, spherical, vase-shaped and many other growth forms, either solitary or grouped and sessile, substipitate, or stipitate; surface with a distinct dermal cortex and a proper cortical skeleton of tangential radiates, sometimes supplemented by, and occasionally replaced by, oxeas; ectosomal cortex sometimes with quadriradiates in association with choanosomal triradiates; skeleton of the chamber layer ranging from regularly articulate to irregularly scattered, and typically with subgastral sagittal radiates; some subdermal pseudosagittal triradiates may occur but these are derived from normal choanosomal spicules, and do not form a continuous distinct layer as in the
Heteropiidae: subgastral quadriradiates, if present, always associated with chamber-layer skeleton containing confused triradiates; nuclei of collared cells probably always apical; choanocyte chambers asconoid, elongate and radially arranged, or small, spherical and irregularly scattered in the choanosome (leuconoid).

**SOUTH CHINA SEA SPECIES.**

*Anamixilla irregularis* Burton, 1930 (Bima, Indonesia) (6)
*Anamixilla torresi* (Póléjaeff, 1884); Burton, 1930 (Banda, Ambon, Samau, Indonesia) (6)
*Aphroceras alciornis* Gray, 1858 (Hong Kong) (5)
*Granititia compressa* Flemming; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Leuconia pamilla* Schmidt; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Leuconia loricata* Póléjaeff, 1884; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Leuconia capillata* (Póléjaeff, 1884); Burton, 1930 (Banda, Indonesia); Dawydoff, 1952 (Indonesia, Philippines, Vietnam) (3,6,7)
*Leuconia solida* (Schmidt, 1862); Van Soest, 1980 (Hong Kong) (5)
*Uteopsis argentea* Póléjaeff, 1884; Burton, 1930 (Samau, Indonesia); Dawydoff, 1952 (Atoll de Tizard, Itu Aba) (3,6)

**Family Heteropiidae Dendy, 1893**

**Definition.** - Massive, tubular, pear-shaped and branching growth forms, occurring as solitary sponges or in groups; continuous cortex, pierced by ostia and reinforced by asymmetrical triradiate spicules with unequal angles, covers the entirely choanocyte chamber layer; inarticulated or articulated tubular skeleton characterised by a distinct subcortical zone formed by pseudosagittal triactines, but articulated choanosomal spicule skeleton may be present or absent; cortical triradiate spicules probably originate from articulate chamber skeleton, through reorientation of the spicules, so that one of the paired rays becomes the sagittal ray and the latter pairs up with the remaining ray; choanocyte chambers asconoid, elongate and radially arranged, or spherical and irregularly scattered in the choanosome (leuconoid).

**SOUTH CHINA SEA SPECIES.**

*Grantetta sibogae* Burton, 1930 (Indonesia) (6)
*Heteropita striata* Hozowa; Dawydoff, 1952 (Vietnam, Cambodia) (3)
*Heteropita striata* Hozawa minor Burton, 1930 (Indonesia) (6)

**Family Lepidoleuconidae Vacelet, 1967**

**Definition.** - Minute rounded sponges; ectosomal skeleton (exopinacoderm) consists of several layers of overlapping (not fused) triangular or rounded scales, derived from triradiate spicules; surface has a single osculum surrounded by several layers of quadriradiate spicules and diactines, and ostia surrounded by triradiates and microdiactinal spicules; choanosome lacks megascleres but has microquadriiradiates scattered; basipinacoderm region (at the base of the sponge) has scales and triactines; tuning fork spicules or sagittal triactines never present; choanocytes with apical nuclei; larvae are amphiblastulae.

[no recorded species]
Family Sycettidae Dendy, 1892

Definition. - Tubular, spherical, flask-shaped, ovoid and branching growth forms, either solitary or in groups; ectosomal cortex is continuous and strengthened by tangential spicules, but these do not cover the choanocyte chamber layer; choanosomal spicules, supporting choanocyte chambers, have an articulated arrangement of overlapping sagittal triradiates, with the angle between the paired rays larger than the angles between each paired ray and the long, unpaired ray; sagittal triradiates have the longest ray pointing to the exterior of the sponge, and form a layer beneath the spongocoel lining (referred to as the subgastral position); choanocytes usually confined to the radial chambers in the adult, and probably always with apical nuclei; choanocyte chambers asconoid, arranged radially around a central cavity (spongocoel), with ends of chambers projecting into ectosomal surface.

SOUTH CHINA SEA SPECIES.
Leucosia barbata (Duchassaing & Michelotti, 1864): Burton & Rao, 1932; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Sycon raphanus Schmidt: Dawydoff, 1952 (Gulf of Tonkin, Vietnam) (3)

Family Staurorrhaphidae Jenkin, 1908

Definition. - Solitary, tubular sac-shaped growth forms with well-developed spicule fringe around terminal oscule; continuous cortex covers the choanosome, perforated by ostia; ectosomal tetractines never present, and tangential atrial skeleton present only in oscular region; subatrial quadriradiates (‘chiactines’) present and equiangular; symmetrical and asymmetrical triradiates and oxes scattered freely within choanosomal skeleton, projecting through cortex; aquiferous system is syconoid or leuconoid.

[no recorded species]

Order Lithonida

Definition. - Generally restricted to shaded habitats such as caves and tunnels; massive reinforced calcitic (hypercalcified) skeleton, together with tuning fork spicules and sagittal tetractines as free spicules; larvae are amphiblastulae; choanocytes are apinucleate.

Family Lelapiidae Dendy & Row, 1913

Definition. - Tubular, sessile growth forms; surface even, non-hispid; apical oscule with fringed margin; ectosomal skeleton of tangential sagittal triradiates and microxeas set at right angles to surface; skeleton of the chamber layer composed of large scattered oxes, loose bundles of tuning-fork spicules and more rarely bundles of slender oxes, and subgastral sagittal triradiates; choanosomal skeleton composed of tangential sagittal triradiates and more rarely sagittal quadriradiates.

[no recorded species]
Family Minchinellidae Dendy & Row, 1913

**Definition.** - Encrusting and lamellate growth forms; oscules may be supported by di-, tri- and tetractinal spicules; choanosome with a rigid skeleton of fused quadriradiate spicules cemented together, or formed by intertwined rays of the triradiate and quadriradiate spicules at the base of the sponge; free spicules may include tri- and quadriradiates, monactinal or diactinal and tuning fork spicules, some or all of in the ecosomal skeleton; subgastral sagittal radiates apparently absent; nuclei of choanocytes are apical; larvae are amphiblastulae; canal system in all known forms is leuconoid.

[no recorded species]

Family Petrobionidae Borojevic, 1979

**Definition.** - Hemispherical or conical growth forms; ecosomal skeleton contains sagittal triradiates, tuning fork spicules and quadriradiates, some of which also extend into the mesohyl; basal skeleton composed of spherulitic units of calcite, fused together to form hemispherical mass, each unit with terminal osculum surrounded by collars of quadriradiates; living tissue penetrates into the calcitic mass only for short distances, and free spicules in the mesohyl include microdiactines; triradiates, with a rudimentary fourth ray, also occur at the base of living tissue; nuclei of choanocytes are apical; larvae are amphiblastulae.

[no recorded species]

Subphylum Symplasma

**Class Hexactinellida**

**Definition.** - Skeleton composed of six-rayed siliceous spicules (hexacts), occurring individually or fused together, usually forming rigid lattice-like skeletons; body wall has a cavernous structure, with living tissue stretching across a framework around the cavities like a membrane; this tissue is syncytial, on both the dermal region (pinacoderm) and in the choanosome, in which the multinucleolate protoplasm is not divided into cells; uniflagellated choanocytes are absent from this class of sponges, and the choanocytes are really only collar–flagellum units lining cylindrical chambers (hence they are referred to as “flagellated chambers” rather than “choanocyte chambers” as in the classes Calcarea and Demospongiae); these unusual choanocytes are embedded in the membraneous protoplasm stretched between spicules by “plugged bridges”; spicules occur in three different regions, and the localization of particular spicule types to particular areas is very precise; three zones differentiated: (1) lying on or just below the dermal membrane (dermal); (2) lying within the trabeculae (parenchymal); (3) lying below the membrane around the atrial cavity (gastral); diverse geometry of megascleres and microscleres; unlike other classes of sponges axial canals of spicules are always square in cross-section; larvae are incubated parenchymellae.

**Remarks.** - The Hexactinellida is divided into 2 subclasses, 4 orders, 19 families, 113 nominal genera [of which 101 are currently recognised but many may be synonyms], and an estimated 450-500 living species are found worldwide.
Subclass Amphidiscophora

Definition. - With birotulate microscleres but lacking hexaster microscleres; sponges embedded in soft sediments by single or tufts of basal monactine spicules, not attached directly to substratum; flagellated chambers are continuous at their openings, not sharply marked off from each other as in other classes of sponges.

Remarks. - One Recent order (Amphidiscosida), containing three families.

Order Amphidiscosida

As for subclass.

Family Hyalonematidae Gray, 1857

Definition. - Spheroïd or ovoid bodies, although actual shape can be very variable; tufts of long basal spicules anchor sponges into soft sediments, each bearing a terminal “anchor” (consisting of an inverted-conical swelling bearing a circle of several short teeth); basal spicules compactly bundled and twisted dextrally, forming a single basal tuft extending into sponge body and forming a compact axial columnella; apical end of basal spicules produce a small projection called the gastric cone; exhalant canals open on top of the body around the columnella or gastric cone and are sharply set off from the inhalant surface by the oscular margin; four separate exhalant canals may open around the columnella, or the entire exhalant region may be either inwardly depressed or outwardly bulging to form a “gastral” cavity, sometimes covered by a lattice-like sieve plate; neither uncinate spicules nor scepters are present; marginal prostals are pinular rhabdiactines (i.e. diactinal with the distal end spined); pleural prostals are smooth diactines; choanosomal supporting spicules are mostly rhabdodactines, often occurring in association with macrohexactines or macropentactines.

SOUTH CHINA SEA SPECIES.

Chilaronema sibogae Ijima, 1926 (Indonesia) (6)

Hyalonema aculeatum (Schulze, 1894); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema affine (Marshall, 1875); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema (Cyliconema) apertum macrrenthali Schulze, 1895; Ijima, 1926 (Indonesia) (6)

Hyalonema (Leptonema) flagelliferum Ijima, 1926 (Indonesia) (6)

Hyalonema (Eulyalonema) intermedium Ijima, 1926 (Indonesia) (6)

Hyalonema indicum (Schulze, 1894); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema (Eulyalonema) keianum Ijima, 1926 (Indonesia) (6)

Hyalonema (Cyliconema) keiensis Ijima, 1926 (Indonesia) (6)

Hyalonema (Coscinonema) kirkpatricki Ijima, 1926 (Indonesia) (6)

Hyalonema lanella (Schulze, 1900); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema martabanense (Schulze, 1900); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema masoni (Schulze, 1894); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema nicobaricum (Schulze, 1904); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema pirov Schulze, 1894; Dendy & Burton, 1927:230 (between N and S Sentinel Is, Andaman Is, 11° 30’N, 480m) (1)

Hyalonema rapi (Schulze, 1900); Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Hyalonema (Coryxonema) rotundum Ijima, 1926 (Indonesia) (6)
**Family Monorhaphididae Ijima, 1927**

**Definition.** - Body cylindrical or rounded, with sieve-like membranes along one side of the body covering openings to the aquiferous system; whole body is perched on the end of a huge single basal anchoring spicule, undoubtedly the largest siliceous structure produced by any animal; most choanosomal megascleres are stauractines, with a single short ray perpendicular to the long axis of the spicule, although sometimes this short ray is absent producing a pseudodiactinal spicule; prostals are absent (except for the elongated basal spicule), and uncinates are moderately common.

**SOUTH CHINA SEA SPECIES.**

*Monorhaphis chuni* Schulze, 1904; Ijima, 1926 (Indonesia) (6)

*Monorhaphis sp.*: Burton & Rao 1932:302 (Port Blair, Andaman Is. 11° 35’N) (1)

**Family Pheronematidae Gray, 1870**

**Definition.** - Thick-walled vase-shaped, or columnar and lamellate growth forms; oscules single, terminal, or grouped and dispersed on opposite sides of lamellae, or grouped into sieve-plates and scattered indiscriminately; dermal spicules are scepters derived from marginal prostals (i.e. spicules projecting around the oscules) and pleural prostals (i.e. spicules projecting from the sides of the body); choanosomal spicules are uncinates and scepters, and hexactine and/or pentactines support the choanosome; basal spicules have bidentate terminal anchors, and tufts of basal spicules are never twisted nor do they form axial columns.

**SOUTH CHINA SEA SPECIES.**

*Pheronema echinatum* Ijima, 1926 (Indonesia) (6)

*Pheronema giganteum* Schulze, 1886; Ijima, 1926 (Indonesia) (6)

*Pheronema weberi* Ijima, 1926 (Indonesia) (6)

*Pheronema raphanus* (Schulze, 1894); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

*Pheronema sp.*: Dendy & Burton, 1927:229 (between N and S Sentinel Is, Andaman Is, 11° 30’N, 480m) (1)

*Semperella cucumis* (Schulze, 1864); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

*Semperella similis* Ijima, 1926 (Indonesia) (6)

*Sericolophus reflexus* Ijima, 1894; Ijima, 1926 (Indonesia) (6)
Subclass Hexasterophora

Definition. - Hexasters microscleres present, birotultrte microscleres absent; growth forms are diverse, usually fixed to substratum by a basal attachment; basal spicules, when present, consist of pentactines or anisodiactines usually in tufts.

Remarks. - Three extant orders and twelve families are recognized.

Order Hexactinosida

Definition. - Rigid parenchymal skeleton produced by fusion of hexactines; dermal and gastral spicules usually pentactines, with the unpaired ray directed inwards, or sometimes stauractines, and these spicules are usually connected by tissue only.

Family Aphrocallistidae Gray, 1867

Definition. - Vase-shaped or branching tubular growth forms; oscules on outpockets on the side walls; lateral wall dicyonal framework perforated by a system of tubular cavities (diarhyses), running radially through the skeleton; each cavity occupied by a single lobate flagellated chamber; cavities arranged in alternating or regularly hexagonal groups; dicyonal framework between cavities forms irregular meshes; choanosomal hexactines regular or compressed laterally so that all six rays lie in one plane; dermal spicules are hexactines or pentactines, with teeth on the distal ray; gastral spicules similar to dermals, or they are rhabdodiactines (curved diactinals); hexaster microscleres include oxy-, tylo- onycho- or discohexasters; scopules and uncinates always present.

SOUTH CHINA SEA SPECIES.

*Aphrocallistes beatrix* (Gray 1858); Schulze, 1902; Ijima, 1926; Dendy & Burton, 1927:226; Burton & Rao, 1932:302; Pattanayak, 1997 (off Port Blair, Andaman Is., 11° 40'N, 220m; 13 mls SW of North Sentinel Is., Andaman Is., 11° 30'N; off N Sentinel Is., Andaman Is., 11° 40'N, 500m; Nicobar and Andaman Islands; Indonesia) (1,6)

*Aphrocallistes bocagei* (Wright, 1870); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

*Aphrocallistes ramosus* (Schulze, 1886); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Family Aulocalycidae Ijima, 1927

Definition. - Vaseform, spherical or tubular growth forms; main osculum above a number of lateral oscules on the sides; skeletal framework with irregular meshes, lacking canals in the dicyonal framework; hexactines inserted individually into dicyonal framework, with spicule rays frequently elongated and curved, intersecting one another at various angles, and fused together at points of their intersection (the rays often connected by synapticulae), or where they are laterally apposed or terminate by abutting on others; dermal and gastral spicules always pentactines; discohexasters always present, with or without oxyhexasters; scopules rarely present; uncinates present or absent.
Family Craticulariidae Rauff, 1893

**Definition.** - Cup-shaped growth forms; lateral wall skeleton has a dictyonal framework traversed by two sets of tubular cavities entering radially from opposite sides, running parallel but in opposite directions, forming an alternating longitudinal series originating either from the dermal or gastric sides of the framework (epirhyses or aporhyses, respectively); dermal and gastric spicules pentactines with toothed distal rays; scopules, oxyhexasters and discohexasters present; uncinates absent.

[no recorded species]

Family Euretidae Zittel, 1877

**Definition.** - Funnel-shaped, tubular and vase-shaped growth forms, the latter with tubular branches opening to the exterior through accessory oscules on the sides of vases and opening internally into a wide common gastric cavity; lateral wall of skeleton three dimensional dictyonal framework similar to Farreidae, although meshes always small, triangular, quadrangular or irregular, and certain nodes give off more than six internodal beams; body wall usually not canalized, and generally unaccompanied by aporhysis; dermal spicules pentactine or hexactines, with teeth on distal ray, or sometimes secondarily absent; gastric spicules either pentactines or hexactines, similar in form to dermal spicules; microscleres include diverse hexasters, scopules and uncinates; clavules absent, sarules rarely present.

SOUTH CHINA SEA SPECIES.
*Eurete freelandi* Ijima, 1926 (Indonesia) (6)
*Eurete marshalli* Schulze, 1886; Ijima, 1926 (Indonesia) (6)
*Eurete schmidtii treubi* Ijima, 1926 (Indonesia) (6)
*Eurete schmidtii kampeni* Ijima, 1926 (Indonesia) (6)
*Eurete trechylocus* Ijima, 1926 (Indonesia) (6)
*Leftroyella ceramensis* Ijima, 1926 (Indonesia) (6)
*Myliastra callocahythus* Gray, 1859; Ijima, 1926 (Indonesia) (6)
*Myliastra verrucosa* Ijima, 1926 (Indonesia) (6)
*Pararete buliense* Ijima, 1926 (Indonesia) (6)
*Pararete farreopsis farreopsis* (Carter, 1877); Ijima, 1926 (Indonesia) (6)
*Pararete farreopsis fragiferum* Ijima, 1926 (Indonesia) (6)
*Pararete farreopsis subglobosum* Ijima, 1926 (Indonesia) (6)
*Pararete farreopsis jakosalemi* Ijima, 1926 (Indonesia) (6)
*Pararete freeri* Ijima, 1926 (Indonesia) (6)
*Pararete kangeanganum* Ijima, 1926 (Indonesia) (6)
*Pararete semperi* (Schulze, 1886); Ijima, 1926 (Indonesia) (6)
*Periphragella parva* Ijima, 1926 (Indonesia) (6)
*Periphragella irregularis* Ijima, 1926 (Indonesia) (6)
*Pleurochiorium cornutum* Ijima, 1926 (Indonesia) (6)
Family Farreidae Gray, 1872

**Definition.** - Funnel-shaped and tubular, simple or branched growth forms; branching tubes all approximately equal in width, each branch ending with an oscule; lateral wall of skeleton a single layer of paratangential dicyontal framework, with no or little space for canals but consisting of a secondary quadratic skeletal mesh consisting of nodes which are all a hexactin centre; six internodal beams radiate from these nodes, usually laterally apposed and amalgamated combinations of two rays, each from adjacent hexactins; this typically regularly-meshed structure may become irregular due to accretion of dicyontal hexactins, in indefinite orientation, formed after the primary framework is established; dermal and gastral spicules pentactines; uncinates usually present; microscleres include oxyhexasters, tylohexasters and discohexasters; sceptules present usually in the form of sarule, lonchiole or clavule, sometimes including monactinal triaxons, but lacking scopules; flagellated chambers laterally branched.

**SOUTH CHINA SEA SPECIES.**
- *Farrea halitensis* Ijima, 1926 (Indonesia) (6)
- *Farrea lendenfeldi* Ijima, 1926 (Indonesia) (6)
- *Farrea nodulosa* Ijima, 1926 (Indonesia) (6)
- *Farrea occa* Carter; Dendy & Burton, 1927:226; Schulze, 1902 (8 mls W of Interview I., Andaman Is., 13°N, 90-540m; N Sentinel I., Andaman Is., 11° 30' N, 500m) (1)
- *Farrea occa erecta* Ijima, 1926 (Indonesia) (6)
- *Farrea occa clavigera* Schulze, 1886; Ijima, 1926 (Indonesia) (6)
- *Farrea occa subclavigera* Ijima, 1926 (Indonesia) (6)
- *Farrea occa mammillata* Ijima, 1926 (Indonesia) (6)
- *Farrea occa cuspisata* Ijima, 1926 (Indonesia) (6)
- *Farrea occa owensii* Ijima, 1926 (Indonesia) (6)
- *Farrea spirifera* Ijima, 1926 (Indonesia) (6)
- *Farrea spp.*; Ijima, 1926 (Indonesia) (6)

Family Tretodictyidae Schulze, 1886

**Definition.** - Thick-walled cup-shaped, funnel-shaped or plate-like growth forms, or reticulate masses of branching tubes or solid cylinders; lateral wall dicyontal framework composed of irregular tri- or quadrangular meshes with multiradiate nodes, marked by development of extensive canal system (schizorhyses) containing labyrinths of flagellated chambers; chambers interconnecting and/or dividing and branching, running from gastral side (covered by a membrane) to dermal side of dicyontal framework (the latter covered by seive-like membrane); diverse hexaster microscleres present; uncinates and scopules also present.

**SOUTH CHINA SEA SPECIES.**
- *Anomochoinea expansa* Ijima, 1926 (Indonesia) (6)
- *Anomochoinea globosa* Ijima, 1926 (Indonesia) (6)
- *Hexactinella lata* (Schulze, 1886); Ijima, 1926 (Indonesia) (6)
- *Hexactinella lingua* Ijima, 1926 (Indonesia) (6)
- *Hexactinella minor* (Dendy & Burton, 1927:227, fig. 1); Pattanayak, 1997 (8 mls W of Interview I., Andaman Is., 13°N, 90-540m; Nicobar and Andaman Islands) (1)
- *Hexactinella rugosa* Ijima, 1926 (Indonesia) (6)
- *Hexactinella spongiosa* Ijima, 1926 (Indonesia) (6)
- *Hexactinella vermicularosa* Ijima, 1926 (Indonesia) (6)
- *Psilocdyx wilsoni* Ijima, 1926 (Indonesia) (6)
- *Sclerothamnopsis schulzei* Ijima, 1926 (Indonesia) (6)
- *Sclerothamnus clausi* Marshall, 1875; Ijima, 1926 (Indonesia) (6)
- *Tretodictyum pannicosum* Ijima, 1926 (Indonesia) (6)
- *Tretodictyum scheauneni* Ijima, 1926 (Indonesia) (6)
Order Lychniscosida

**Definition.** - Sponges firmly attached to substratum; parenchymal megascleres lychniscs, or derivatives, united in a rigid framework; central part of each spicule surrounded by twelve struts arranged like the edge of an octahedron.

Family Aulocystidae Schulze, 1886

**Definition.** - Ovoid and bulbous stalked growth forms, with branching and rejoining aquiferous tubes and interconnected canals; external surface with secondarily produced layer consisting of a feltwork of fine rays from projecting stauractines and pentactines; dermal and gastral pentactines present; microscleres include oxy-, disco- and graphiohexasters.

SOUTH CHINA SEA SPECIES.

Neouaulyctis zittelii zittelii (Marshall & Meyer, 1877); Ijima, 1926 (Indonesia) (6)

**Family Dactylocalycidae Gray, 1867**

**Definition.** - Vasiform growth forms with folded walls; lychniscs of dictyonal framework of lateral wall secondarily fused producing a “pseudohexactinosidan” skeleton; dermal pentactines and hexactines present, and free hexactines also occur as parenchymal spicules; microscleres include oxy- and discohexasters; uncinates and scopules absent.

[no recorded species]

Order Lyssacinosida

**Definition.** - Parenchymal megascleres vary from hexactines to rhabdodiaactines, usually occurring free in tissues, sometimes secondarily fused to form rigid framework; dermal spicules consist of a single layer of large pentactines or hexactines, with single, long, proximal ray directed inwards, or with a layer of small dermal spicules overlying larger hypodermal pentactines, with the unpaired ray extending inwards.

**Family Caulophacidae Schulze, 1886**

**Definition.** - Solitary or branching, cup-shaped and mushroom-shaped growth forms, with the stalk firmly attached to substratum; dermal skeleton with small hexactines, sometimes pentactines bearing spined proximal rays; hypodermal spicules pentactines and sometimes rhabdodiaactines; parenchymal spicules hexasters and rhabdodiaactines; microscleres include disco-, onycho- or oxyhexasters, sometimes with strobiloplumicomes.
Family Euplectellidae Gray, 1867

Definition. - Tubular, massive or cup-shaped growth forms ("venus flower baskets"), often with many open oscules; bases either stalked, firmly attached to substratum, or with tufts of monactinal or anisodiactinal basal spicules; dermal skeleton has large hexactinal spicules (derrnalia) with proximal ray longest; hypodermal spicules absent; parenchymal spicules hexactines with two to six rays; hexasters diverse, including floricomes, graphio-, oxy- and onychohexasters.

SOUTH CHINA SEA SPECIES.

Bolosoma cayam Ijima, 1926 (Indonesia) (6)

Euplectella aspergillum Owen; Burton & Rao, 1932;302; Caberoy, 1979;20; Pattanayak, 1997 (N. Andaman Is., 13° 10'N; Nicobar and Andaman Islands; Cebu Is., Philippines) (1)

Euplectella ('Eudictyon') "elegans" Burton, unpublished MS name (Indonesia, ZMA database) (6, Burton MS)

Euplectella regalis (Schulze, 1900); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Euplectella simplex (Schulze, 1895); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

Euplectella timorensis Ijima, 1926 (Indonesia) (6)

Euplectella sp.; Dawydoff, 1952 (Paracels Archipelago; Singapore region) (2,3)

Euplectella sp.; Dawydoff, 1952 (Spratly Is) (3)

Regadrella cylindrica Ijima, 1926 (Indonesia) (6)

Family Leucopsacidae Ijima, 1903

Definition. - Thick-walled cup-shaped or ovoid, stalked growth forms; body anchored to substratum by basal spicules; dermal skeleton has large dermal pentactines with unpaired ray directed inwards, without hypodermal spicules; parenchymal spicules hexactines and rhabdodiactines; microscleres hexasters including discohexasters, sigmatocomes, floricomes, but not oxyhexasters.

SOUTH CHINA SEA SPECIES.

Chaunoplectellus stellata Ijima, 1926 (Indonesia) (6)

Leucopsacas scoliodocus Ijima, 1926 (Indonesia) (6)

Family Rossellidae Gray, 1872

Definition. - Cup-like or sac-shaped growth forms, often with a stalk, attached directly to substratum, or with basal processes, or with tufts of pentactinal basal spicules; secondary oscules may be present in addition to main terminal oscule; dermal skeleton with small roughened pentactines, stauractines or rhabdodiactine spicules, having similar rays and not markedly spined; distal rays of dermal spicules, if developed, similar to remaining rays and not markedly spined; hypodermal spicules pentactines or rhabdodiactines or both, sometimes protruding through surface so that spicule rays form veil-like covering over the sponge; parenchymal spicules hexactines and/or rhabdodiactines; microscleres oxy- and discohexasters, sometimes discoctasters.
SOUTH CHINA SEA SPECIES.

*Bathydorus pedunculatus* Ijima, 1926 (Indonesia) (6)

*Lophocaulyx spinosa* (Schulze, 1900); Schulze, 1902; Pattanayak, 1997 (Nicobar and Andaman Islands) (1)

*Lophocaulyx salivaus* Ijima, 1926 (Indonesia) (6)

*Lophocaulyx sp.*; Dawydoff, 1952 (Vietnam, Cambodia) (3)

*Staurocalyx celebicus* Ijima, 1926 (Indonesia) (6)

**INCERTAE SEDIS AND OTHER INVALID NAMES**

SOUTH CHINA SEA SPECIES.

*Cacochalinia typica* Lendenfeld, 1887; Dragnewitsch, 1906; 443 (Singapore, 1° 30' N) (2)

*Coscinospongia thomasi* (Sollas, 1888; 307); Wilson, 1925: 460 (Indonesia, ZMA database; Philippines) (6,7)

"Cryptospongia enigmatica" (Burton, 1928: 133, pl. 2, fig. 5); Pattanayak, 1997 (off Ten Degree Channel, S of Andaman ls, 2090 m, 10° N; Nicobar and Andaman Islands) (1) [this is a stalk of a gorgonian, not a sponge]

*Polyfibrosa australis* (Lendenfeld) *conulata* Lévi, 1961: 146 (Vietnam) (3)

*Seliscophon cionellides* Doderlein, 1883; Burton & Rao, 1932: 308 (N. of King L, Mergui Archipelago, 12° 48' N) (1) [incertae sedis within “Lithistida”]

*Siphonidiella densi* Burton, 1928: 112, fig. 3 (W of Mergui Archipelago, 13° 04’ N) (1) [incertae sedis within “Lithistida”]

*Tretolophus panicens* Sollas, 1888 (Indonesia, ZMA database) (6) [incertae sedis within “Lithistida”]

**DISCUSSION**

The inventory of sponges living in the South China Sea region is already substantial, consisting of more than 1500 species described in the literature and/or known from contemporary, unpublished collections. On the basis of these recent collections, particularly those acquired under US National Cancer Institute (NCI) funding, we estimate that sponge biodiversity in this region is much higher - possibly three times greater - than presently known.

This estimate is realistic given that NCI collections, for example, were restricted to samples of about one kilogram wet weight (an optimal requirement for biochemical analysis and elucidation of active molecular compounds), which virtually excluded the diverse encrusting and cryptic faunas.

However, accurate estimates of sponge diversity for the whole region are difficult to make for several reasons. There have been only a few comprehensive studies using modern collection methods. These mainly concern small embayments and reefs (e.g. Phuket in Thailand; Dumaguette in the Philippines) (Hooper, unpublished data), and whilst these may provide accurate inventories for small local faunas, these data cannot necessarily be extrapolated to larger regions. Unfortunately, so far, there have not been any comprehensive, modern taxonomic inventories made for broader regions within the South China Sea, and we still do not know the extent of regional endemism for species, nor the taxonomic relationships between species from adjacent biogeographic provinces. There has never been a taxonomic specialist based in this region studying the sponge fauna for any significant period, who could provide these sorts of data. Most existing collections have been made opportunistically, or as a coincidental by-product from other studies.
We do know that the Indo-Malay ('East Indies') fauna contains the highest diversity of any marine provinces for several marine invertebrate phyla (Briggs, 1987), with more recent empirical support provided by scleractinian coral distributions (Veron, 1995). It is likely, although not yet certain, that this is also true for sponges. Lévi (1979) suggested that the Indo-Malay archipelago may be the centre of dispersal for Indo-west Pacific species, and Hooper & Lévi (1994) suggested that sponges showed higher apparent regional endemism than many other marine phyla; they were heterogeneous in their local regional distributions (possibly related to stringent ecological requirements); and they were probably most diverse in the Indo-Malay archipelago (although there are also areas outside this archipelago in which faunas show comparable ‘megadiversity’). Each of these points has implication in estimating biodiversity, and in determining appropriate conservation and preservation strategies for these resources in the South China Sea region.

**Low cosmopolitanism:** Only about 5% of sponge species appear to be truly widely dispersed across the Indo-Pacific (usually associated with the distribution of coral reefs themselves), whereas most species have much higher regional endemism (apparently restricted to relatively small embayments, remote island groups and isolated patches of reef on the continental shelves).

Within the South China Sea there are a number of species that are known to have wide Indo-Pacific distributions and most of these are found in coral reef habitats (e.g. Cinachyra australiensis, “Jaspis stelligera” (which is neither a Jaspis, nor conspecific with “stelligera”; Kennedy, in prep.). Spirastrella vagabunda, Terpios fagas, Astrosclera willeyana, Clathria (Microciona) atrasanguinea, Clathria (Thalysia) vulpina, Iotrochota baculifera, Tedania anhelans, Bienna tubulata, Acanthella cavernosa, Axinella carteri, Hahlonia ('Sigmadocia') cymaeformis, Gelliodes fibulatus, Xestospongia testudinaria, Dysidea herbacea, Phyllospongia papryracea, Carteriosponge foliascens, Dactylosponge elegans, Hyrtios erecta). Some species have clearly been introduced through human activities, such ship bilgewater and transport of shells used in oyster farming (e.g. Mycale (Zygomycale) parishii, Tetilla dactyloidea, Cliona vestifica). However, most species are only known from relatively restricted ranges within this broad region (‘apparent endemics’), and many of these probably have relatively more specialised ecological requirements.

**High ecological specialisation:** Long thought to be ‘ecological generalists’, most sponges associated with coral reefs appear to have far more stringent ecological requirements and microhabitat distributions than previously acknowledged. Observations on heterogeneity amongst adjacent reef assemblages (Hooper, 1994) suggest that species composition may be more dependent upon reef geomorphology, and the availability of particular niches, than on the proximity of adjacent reef systems.

The diversity of geomorphological structures and other habitat types in shallow-waters may partially explain the observations of higher sponge diversity in shallow-waters than in the relatively more homogenous deeper-waters, but there are undoubtedly other important factors that must be considered, as discussed below. Areas of high biodiversity value (and consequently traditionally legislated for protection and preservation by governments and other agencies), chiefly concern reef systems. Sponges are not substantially different in this regard except that, in general, they are more obvious and perhaps more diverse outside reef structures (such as at the base of reefs, in lagoonal areas, and on the submerged reefs lying on the continental shelf, surrounding the emergent coral reefs). Consequently, in designing appropriate models for species and habitat protection, which would include the sponge
biodiversity, it is important to consider these non-emergent reef structures associated with, or in proximity to, coral reef systems.

There are many specialised niches utilised by sponges, such as excavating soft and hard sediments (e.g. *Spirastrella vagabunda*), boring calcareous substrates (e.g. *Cliona lobata*), growing on, and smothering living corals (e.g. *Chondrilla australiensis, Iotrochota baculifera*), growing only in dimly lit or dark caves (e.g. *Astrosclera willeyana*), in seagrass beds (e.g. *Callyspongia ridleyi*), commensal with bivalves (e.g. *Monachora unguiculata*), commensal with cnidarians (e.g. *Mycate sp.* (sensu van Soest & Verseveldt, 1987)), anchored in deep soft sediments (e.g. *Poterion neptuni*), etc. The distribution of these sponges is presumably closely linked to the distribution and availability of the habitats themselves. Preservation of genetic diversity necessarily involves protection of all these types of habitats.

**High speciation:** An increasing number of apparently widely distributed sponge ‘morpho-species’ have since been discovered to be genetically distinct, allopatric sibling species (with restricted, localised distributions), presumably with speciation consequent to isolation (but perhaps also with the potential to rehybridise in the event of re-contact with parent populations, as in the case with scleractinarian corals (Veron, 1995)). Isolation, local extinctions, and speciation are predominant in the more transitory shallow-water environments, whereas in more stable deeper-water habitats species may be both more widely distributed and persistent (i.e. the many Mesozoic relict species described from deeper-waters by Lévi & Lévi (1983a,b, 1988)).

Consequently, whilst shallow-waters may contain a greater diversity of species, deeper-water assemblages usually contain a greater proportion of endemic species (Lévi & Lévi, 1983a,b, 1988; review in Hooper & Lévi, 1994). There are also many genera and families of sponges restricted to either shallow- or deeper-waters, with apparently very little mixing between these communities (Boury-Esnault & Lopes, 1985).

To maximise the outcomes during the implementation of a conservation strategy (i.e. to protect as many biological and genetic resources as possible using finite resources), regions containing high concentrations of various species are usually targeted (e.g. shallow-water coral reef systems). Whilst these areas are certainly more visible, and perhaps more readily susceptible to current human impacts, they do not necessarily contain the most unique genetic resources (i.e. species with the greatest taxonomic and genetic divergence). Marine reserves systems should contain strategies to preserve both diversity and endemism.

**High apparent endemism:** For sponges, probably more so than other marine phyla, we still know so little about marine biogeography. It is still uncertain whether closely adjacent marine biogeographic provinces are stable, and in which faunal composition is predominantly historical in origin (e.g. through tectonic events; Briggs, 1987), or ephemeral and predominantly influenced by changing patterns of water circulation, as for the scleractinarian corals (Veron, 1995). Probably both influences are important to the modern-day sponge distributions. Neither are we certain about the longevity of sponge individuals, recruitment rates, and the extent and capability of adults to disperse, nor the mobility and longevity of sponge larvae and asexual reproductive products. We do know, however, that there are many distinct regional sponge faunas throughout the Indo-west Pacific. Some faunas are separated from each other only by relatively narrow physical barriers yet contain dramatically divergent species’ assemblages (e.g. Sahul Shelf, NW. Australia, and southern Indonesia (Hooper, 1994); east and west coasts of Palawan, Philippines (Hooper, unpublished data)), whereas
differences between faunas in other adjacent provinces may be more subtle (e.g. northern and southern regions of the Philippines).

There are several obvious, important endemic species in the South China Sea region that do not appear to have close relatives in adjacent provinces (such as the huge vase-shaped *Poterion neptuni*), whereas most ‘apparent endemics’ have at least some sister species elsewhere in the Indo-Pacific region (e.g. *Diacarnus megaspiniorhabdosa* from the Philippines (and Papua New Guinea) and *D. bellae* from the west central Pacific (Kelly-Borges & Vacelet, 1995); *Clathria basilana* from the Philippines and Indonesia (Lévi, 1961; van Soest, 1989) and *C. oxyphila* from SE. Australia (Hooper, 1996); and *Acarnus primigenius* from Indonesia and *A. ternatus* from N. Australia (van Soest et al., 1991)). It is not presently possible to provide a realistic estimate of levels of species endemism for this region, but it would certainly be in the vicinity of many hundreds to over one thousand species.

There are so far no known endemic genera or families of sponges restricted to the South China Sea, which is not surprising given its claim as the centre for dispersal within the Indo-Pacific (Lévi, 1979).

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**BIBLIOGRAPHY**


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APPENDIX

Demospongiae and Hexactinellida of the South China Sea
in the Institute of Oceanology, Academia Sinica.

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The Hexactinellida listed here were collected over the last 40 years by the Institute of Oceanology, comprising 13 species, 2 possibly new. The Demospongiae were collected by the Chinese-German Conjoint Project on a marine biological survey of Hainan Island during 1991-92 to investigate the intertidal, subtidal and shallow water fauna, comprising more than one hundred specimens in 29 species (1 probably new).

Class Demospongiae

Order Spirophorida
Family Tetillidae
Terillu leptodermata Sollas, 1886
Cinachyra albaobtusa Lendenfeld, 1907

Order Astrophorida
Family Ancorinidae
Rhabdistrella (‘Stelleta’) globostellata (Carter, 1883)

Order Hadromerida
Family Tethyidae
Tethya aurantium (Pallas, 1766)
Family Polymastidae
Polymastia robusta Bowerbank, 1861
Family Spirastrellidae
Spirastrella cuneatix Schmidt, 1868

Order Agelasida
Family Agelasidae
Agelas robusta Pulitzer-Finali, 1982

Order Poecilosclerida
Family Mycalidae
Mycale adhaerens (Lambe)
Mycale (‘Zygomycall’) parishii (Bowerbank, 1875)
Family Desmacellidae
Bienna fortis (Topsen, 1897)
Bienna “peripeduncula” MS name, possibly new
Family Myxillidae
Iotrichostyla tota de Laubenfels, 1951

Order Halichondrida
Family Halichondriidae
Halichondria panicea Johnston, 1842 [misidentification of an Indo-Pacific species for a N. Atlantic species]

Order Haplosclerida
Family Chalinidae
Adocia caminata Bergquist, 1980
Haliclona (Sigmadocia) cymiformis (Esper, 1794)
Haliclona melior (Ridley & Dendy)
Haliclona (‘Rhaphisia’) pallida (Ridley, 1895)
Haliclonula tufa (Ridley)
Reniera cinerea (Grant)

**Family Callyspongiidae**
*Callyspongia* diffusa (Ridley, 1884)
*Callyspongia ridleyi* Burton, 1934

**Family Niphatidae**
Gelliodes incrustans Dendy, 1905

**Order Dictyoecratida**
**Family Dysideidae**
*Dysidea fragilis* (Montagu, 1818)
*Spongionella gracilis* Vosmaer, 1883

**Family Spongiidae**
*Hyattella intestinalis* (Lamarck, 1814)
*Spongia officinalis* Linnaeus, 1794
*Spongia hispida* Lendenfeld, 1888

**Order Verongida**
**Family Druinellidae**
*Druinella ('Psammoplysilla') purpurea* (Carter, 1880)

**Family Aplysinidae**
*Aplysina fistularis* (Pallas)

**Class Hexactinellida**
**Subclass Amphidiscophora**

**Order Amphidiscosida**
**Family Hyalonematidae**
*Hyalonema (Pteronema) topsenti* Ijima, 1926

**Family Pheronematidae**
*Pheronema carpenteri* (Thompson, 1877)
*Pheronema "aslanstuncatum"* MS name, possibly new
*Semperella similis* Ijima, 1926
*Semperella "monacinalis"* MS name, possibly new

**Family Monorhaphididae**
*Monorhaphis* sp.

**Subclass Hexasterophora**

**Order Hexactinosida**
**Family Farreidae**
*Farrea occa* Carter

**Family Euretidae**
*Pararete faroeensis faroeensis* (Carter)

**Family Aphrocallistidae**
*Aphrocallistes beatrix* (Gray, 1858)
*Aphrocallistes ramosus* (Schulze, 1886)

**Order Lyssacinosida**
**Family Euplectellidae**
*Euplectella oweni* Herklot & Marshall, 1868
*Euplectella marshalli* Ijima, 1895
*Euplectella timorensis* Ijima, 1926