Reef-building corals (Cnidaria: Scleractinia) from the Watamu Marine National Reserve, Kenya; an annotated species list

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Lemmens, J.W.T.J. Reef-building corals (Cnidaria: Scleractinia) from the Watamu Marine National Reserve, Kenya; an annotated species list.
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The scleractinian fauna of the Watamu Marine National Reserve, Kenya, was surveyed between November 1982 and April 1983. The survey yielded 276 specimens representing 113 species in 45 genera, which are presented in an annotated checklist. Four genera and 43 species are added to the list of previously known Scleractinia for East-Africa, bringing the number of species recorded for this region to 169. This substantial increase, as well as the high coral diversity of nearby communities, suggests that further additions can be expected.

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Introduction

So far coral studies in the western Indian Ocean mainly focussed on reefs from the Red Sea, the Arabian Gulf, the Maldives and the Mascarene Archipelago (see Wells, 1988, for an overview). By contrast reefs of the East African mainland (Somalia, Kenya, Tanzania and Mozambique) as well as those of Madagascar and the Seychelles have been the subject of only a limited number of coral studies. As a result the coral diversity of these regions is only partly known.

Recent major taxonomic revisions and faunistic overviews of Scleractinia (e.g., Veron & Pichon, 1976; 1979 and 1982; Veron et al., 1977; Veron & Wallace, 1984; Veron, 1986; Scheer & Pillai, 1974; 1983; Pillai & Scheer, 1976) have considerably facilitated identification of species and improved our knowledge on coral faunas and species diversity, although the coral fauna of many regions and islands is still imperfectly known. An initial attempt by Sheppard (1987) to analyse patterns of distribution of Scleractinia throughout the Indo-Pacific area resulted in the recognition of three more or less distinct faunistic regions: 1. the northwestern Indian Ocean (Red Sea to Sri Lanka), 2. a broad equatorial zone including the East African and Asian mainland, and 3. the island groups in the eastern Bay of Bengal. However, incompleteness of available fauna lists, as well as the problems involved in synonymy of species complicated and biased analyses, so that further studies are necessary to draw more definitive conclusions.

The present publication aims to extend the knowledge of the number of genera and species of Scleractinia of the East African region, and, more in particular, the Kenyan coast. This coast is skirted with some extensive stretches of fringing reef and includes the Watamu Marine National Reserve, the first marine park in Africa, established in 1968. It is situated offshore from the popular tourist village Malindi, 110-130
km north of Mombasa, at ca. 3°10'S 40°10'E. The reserve covers ca. 21309 ha; it includes two parks with an area of 1600 ha, a large protected zone around the parks, and an inlet with luxurant growth of mangroves, known as Mida Creek (fig. 1). Although the reserve is one of the largest single expanses of protected reef in the Indian Ocean, and one of the better studied reef areas of the Kenyan coast, its scleractinian fauna has been subject to only a limited number of studies (see Wells, 1988)

Rosen (1971) listed 41 genera of Scleractinia from the East African coast but states that this is a very conservative figure and that the diversity is thought to be comparable to West Pacific reefs. Hamilton (1975) added several genera to the list and listed as many as 140 species. In 1979 the Leopard Reef Expedition (see Green, 1983) added 11 genera to the list of Rosen (including two genera collected by Mrs. L. Didham, a resident of Malindi). Hamilton & Brakel (1984) listed 54 genera, bringing the total number of genera recorded from East Africa to 55 (Leptoseris Milne Edwards & Haime was only reported by Green, 1983). Although the above-mentioned authors have greatly extended the knowledge on the generic diversity of Scleractinia along the East African coast, they do not appear to present a complete record of the coral diversity in the Watamu Malindi region.

The checklist here presented is mainly based on coral collections from the Watamu Reef Expedition (November 1982 - April 1983) by students of the University of Nijmegen, The Netherlands, and forms an concise, improved version of an unpublished MSc thesis by Lemmens and Smeets (1987). Other reports (mainly unpublished MSc theses) that resulted from the expedition deal with coral synecology (Blom et al., 1985; van Katwijk et al., 1993, in press), the impact of soil erosion and the discharge of rivers in the reef area (Van Hoof, 1984; Van der Kerkhof & Giesen, 1983; Giesen & van der Kerkhof, 1983) and the importance of the Malindi and Watamu reefs for tourism and employment (Waning & Hafkenscheid, 1984).

Material and Methods

Corals were collected using SCUBA. A substantial part of the collection was photographed in the field before collecting. All specimens were labelled with a plastic tag, cleaned in fresh water and dried before being transported to The Netherlands.

The specimens were identified at the Nationaal Natuurhistorisch Museum (formerly Rijksmuseum voor Natuurlijke Historie, RMNH) in Leiden, the Netherlands. Publications by Veron & Pichon (1976, 1979, 1982), Veron et al. (1977) and Veron & Wallace (1984) were mostly used for identification. Other papers consulted for species identification are: Searle (1956), Lamberts (1982), Scheer & Pillai (1983), Faure (1982) and Hoeksema (1989). Unless stated otherwise, the nomenclature follows Veron (1986).

The collections were deposited in the RMNH and the Zoology Department, University of Nairobi, Kenya.

Annotated species list

The collection consists of 113 species, belonging to 45 genera. All specimens
and their catalogue numbers are listed below. For collecting data see Lemmens & Smeets (1987) or the collection.

Additions to the list of Hamilton & Brakel (1984) are marked with an asterisk *. Species that were not collected during the present study but that were previously reported from East Africa, are also mentioned. Discrepancies between the nomenclature used by Hamilton & Brakel (1984) and by Veron et al. (Veron & Pichon 1976, 1979, 1982; Veron et al., 1977; Veron & Wallace, 1984; Veron, 1986) and Hoeksema (1989) are noted.

POCILLOPORIDAE Gray, 1842

_**Pocillopora*** Lamarck, 1816

_**Pocillopora verrucosa*** (Ellis & Solander, 1786) [= _P. cf. danae_ and _P. cf. elegans_ sensu Hamilton & Brakel, 1984]. 6 specimens: RMNH 17015, 17016, 17017 [tentative identification], 17018 [stunted, heavily build specimen], 17019; Kenya S-32.

_**Pocillopora damicornis*** (Linnaeus, 1758). 1 specimen: RMNH 17020.

Seriatopora Lamarck, 1816

Stylophora Schweigger, 1819

ACROPORIDAE Verrill, 1902
Montipora de Blainville, 1830
*Montipora undata* Bernard, 1897. 1 specimen: RMNH 17048.
*Montipora hispida* (Dana, 1846) [= M. cf. divaricata sensu Lemmens & Smeets, 1987]. 5 specimens: RMNH 17045, 17046, 17050; Kenya O/1, Kenya S-5.

Hamilton & Brakel (1984) reported *M. foveolata* (Dana, 1846) [as M. socialis Bernard, 1897] and *Montipora cf. ramosa* Bernard, 1897. The latter is a heterogeneous species (see Veron & Wallace, 1984).

Acropora Oken, 1815.
Acropora (A.) humilis (Dana, 1846). 2 specimens: RMNH 17024; Kenya B-5.
Acropora (A.) cf. formosa (Dana, 1846) [= A. "formosa" sensu Hamilton & Brakel, 1984] or A. cf. nobilis (Dana, 1846) [= A. intermedia sensu Hamilton & Brakel, 1984; Lemmens & Smeets, 1987]. 4 specimens: RMNH 17040, 17041, 17042; Kenya L-S-91a. Specimens are too small for accurate study of the radial calyces, necessary to distinguish between A. nobilis and A. formosa. Only A. formosa is reported to occur in the western Indian Ocean (Veron, 1986).


*Acropora (A.) horrida* (Dana, 1846). 1 specimen: RMNH 17025.

*Acropora (A.) aculeus* (Dana, 1846) [= ?A. nana sensu Hamilton & Brakel, 1984; A. aculeus, unlike A. nana, has a reported distribution in the western Indian Ocean (Veron, 1986)]. 1 specimen: RMNH 17030.
Acropora (A.) clathrata (Brook, 1891). 1 specimen: RMNH 17031.

*Acropora (A.) diadema* (Dana, 1846). 1 specimen: RMNH 17028.
*Acropora (A.) cf. longicyanthus* (Milne Edwards & Haime, 1860) or A. cf. sarmentosa (Brook, 1892) [= A. cf. rosaria sensu Lemmens & Smeets, 1987]. 1 specimen: RMNH 17036 (a small section of a tip, which complicates distinction between A. longicyanthus and A. sarmentosa).

*Acropora (A.) cf. loripes* (Brook, 1892) [= A. cf. squarrosa sensu Lemmens & Smeets, 1987]. 1 specimen: RMNH 17037.
Of the 16 species of Acropora listed above, most are represented in the collection by one specimen only. The species of the genus Acropora are variable (morphology of colonies varies with habitat and geographical distribution). This, together with the number of species (there are 364 nominal species; see Veron & Wallace, 1984), causes considerable taxonomic problems. Studies by Wallace (1978) and Veron & Wallace (1984) have resulted in a substantial reduction in the number of species. Hamilton & Brakel (1984) further reported A. tenuis (Dana, 1846), A. palifera (Lamarck, 1816), A. cuneata (Dana, 1846), A. florida (Dana, 1846), A. forskalii (Ehrenberg, 1834), A. ocellata (Klunzinger, 1879), A. hemprichi (Ehrenberg, 1834), A. hyacinthus (Dana, 1846), A. spicifera (Dana, 1846), A. cf. corymbosa (Lamarck, 1816) and A. cf. recumbens (Brook, 1892), A. (Isopora) bruegemannii (Brook, 1893) [as A. Bruegemannii uncinata (Brook, 1892)], A. polystoma (Brook, 1891) [as A. massaowiei von Marenzeller, 1906], A. cf. millepora (Ehrenberg, 1834) [as A. cf. squamosa (Brook, 1892)], and A. clathrata (Brook, 1891) [as A. orbicularis (Brook, 1892)].

Astreopora de Blainville, 1830
Astreopora myriophthalma (Lamarck, 1816). 3 specimens: RMNH 17053, 17054; Kenya 0/6.
*Astreopora listeri Bernard, 1896. 1 specimen: RMNH 17057.
*Astreopora randalli Lamberts, 1980. 2 specimens: RMNH 17055, 17056. Both specimens fit Lambert’s (1982) description of A. randalli: a glomerate colony form with smooth surface and round, regular, small (0.1 to 0.14 mm) calical openings.
*Astreopora expansa (Brüggemann, 1877). 1 specimen: RMNH 17058. The explanate shape of specimen RMNH 17058 is characteristic of A. expansa (see Lamberts, 1982).
Astreopora spec. 1 specimen: RMNH 17059. This specimen differs considerably from other specimens of Astreopora in the collection because of its well developed columella.

Veron & Wallace (1984) described only two species of Astreopora while Veron (1986) described six species. No single habitat has been found where more than two species of Astreopora could be distinguished in situ (Veron & Wallace, 1984). A. randalli Lamberts, 1980, and A. expansa Brüggemann, 1877, are mentioned by Veron & Wallace (1984) but not further described. A. randalli and A. expansa here listed and A. profunda Gardiner, 1898 mentioned by Hamilton & Brakel (1984) were not described by Veron (1986).


PORITIDAE Gray, 1842
Porites Link, 1807
Porites (P.) australiensis Vaughan, 1918. 3 specimens: RMNH 17210, 17211; Kenya 0/59.
*Porites (P.) cf. mayeri Vaughan, 1918. 1 specimen: RMNH 17212. The species was so far only reported from Australia (Veron, 1986).
*Porites (P.) cf. densa Vaughan, 1918. 1 specimen: RMNH 17213. The species was so far only reported from Australia (Veron, 1986).
Porites (P.) nigrescens Dana, 1848 [= P. nigrescens sensu Hamilton & Brakel, 1984]. 4 specimens: RMNH 17206, 17207, 17208; Kenya 0/3.
Porites (P.) cyldriaria Dana, 1846 [= P. andrewsi sensu Hamilton & Brakel, 1984]. 1 specimen: RMNH 17209.
Porites spec. 5 specimens: RMNH 17214, 17215, 17216, 17217, 17218.
Hamilton & Brakel (1984) also reported P. cf. *Seychelles* 1 Bernard (sic!), 1905; *P. cf. cocosensis* Wells, 1950; *P. cf. mordax* Dana, 1846, and *P. faustinoi* Hoffmeister, 1929 (none of which are mentioned by Veron & Pichon, 1982, or Veron, 1986); *P. lutea* Milne Edwards & Haime, 1860; *P. somaliensis* Gravier, 1911 [possibly synonymous with *P. lutea* Milne Edwards & Haime; see Veron & Pichon, 1982]; *P. (Synaraea) rus* (Forskal, 1775) [as *P. (S.) convexa* Verrill]; *P. cf lobata* Dana, 1846, *P. murrayensis* Vaughan, 1918; and an unidentified species.

*Goniopora* de Blainville, 1830
*Goniopora djiboutiensis* Vaughan, 1907. 1 specimen: RMNH 17099.
*Goniopora somaliensis* Vaughan, 1907. 1 specimen: RMNH 17098.
*Goniopora cf. minor* Crossland, 1952. 1 specimen: RMNH 17097. The species has so far only been reported from the central Indo-Pacific region (Veron, 1986).
*Goniopora* spec. 1 specimen: RMNH 17100.

Hamilton & Brakel (1984) only reported an unidentified species of *Goniopora.*

*Alveopora* de Blainville, 1830
*Alveopora cf. fenestrata* (Lamarck, 1816). 3 specimens: RMNH 17203, 17204, 17205.
*Alveopora cf. spongiosa* Dana, 1846. 2 specimens: RMNH 17201, 17202.

Although the small sizes of *Alveopora* specimens complicated identification, two groups could be distinguished, tentatively identified as *A. cf. fenestrata* (with relatively large corallites, a less conspicuous fenestration, and deep calyces) and *A. cf. spongiosa* (with small calyces and clear fenestration). Veron & Pichon (1982) give an overlap in calyx size for the two species. Both species were so far only known from Australia and the western Pacific (Veron, 1986).

Hamilton & Brakel (1984) only reported *A. allingi* Hoffmeister, 1925 [as *A. mortenseni* Crossland, 1952].

*Psammocora* Dana, 1846
*Psammocora superficialis* Gardiner, 1898. 1 specimen: RMNH 17003.

Hamilton & Brakel (1984) also reported *P. nierstraszi* van der Horst, 1921.

*Coscinaraea* Milne Edwards & Haime, 1848
*Coscinaraea columna* (Dana, 1846). 5 specimens: RMNH 17079, 17080, 17081, 17082; Kenya O/61. Specimen RMNH 17079 agrees with the description of *C. ostraformis* van der Horst, 1922 (non Wells, 1954) by Scheer & Pillai (1983) and resembles specimen RMNH 13971 (identified as *C. ostraformis* by G. Scheer). *C. ostraformis* is is possibly a deep water ecomorph of *C. columna* (see Veron & Pichon, 1979), or of *C. monile* Forskål, 1775 (see Scheer & Pillai, 1983) The taxonomic position remains unsettled.

*Coscinaraea monile* Forskål, 1775. 2 specimens: RMNH 17078. *Coscinaraea monile* is endemic to the Red Sea and the Indian Ocean (Veron & Pichon, 1979) and was previously reported from East Africa by Didham (see Green, 1983) and Hamilton & Brakel (1984).

*Pavona* Lamarck, 1801
*Pavona decussata* (Dana, 1846) [= *P. cf. decussata* sensu Hamilton & Brakel, 1984]. 1 specimen: RMNH 17063. 1 specimen: RMNH 17065.
*Pavona explanulata* (Lamarck, 1816). 3 specimens: RMNH 17061, 17062; Kenya O/36.
"Pavona varians" Verrill, 1864. 3 specimens: RMNH 17066, 17067; Kenya J-9.
"Pavona venosa" (Ehrenberg, 1834). 2 specimens: RMNH 17060; Kenya O/35.
"Pavona maldivensis" Gardiner, 1905. 3 specimens (17068, 17069; Kenya H-5).
"Pavona cf. frondifera" Lamarck, 1816. 2 specimens: RMNH 17070; Kenya S-35. P. frondifera (see Hamilton & Brakel, 1984; Faure, 1982) is not described by Veron & Pichon (1979) or Veron (1986).

Hamilton & Brakel (1984) also reported P. venosa (Ehrenberg, 1834) [as P. (Polyastra) obtusata Quelch] and P. divaricata Lamarck. The latter species (see also Faure, 1982; Antonius et al, 1990) is not described by Veron & Pichon (1979).

"Leptoseris" Milne Edwards & Haime, 1849
*"Leptoseris explanata" Yabe & Sugiyama, 1941. 1 specimen: RMNH 17072.
*"Leptoseris mycetoseroides" Wells, 1954. 2 specimens: RMNH 17071; Kenya O/57.

The genus was previously reported from East Africa by Green (1983).

"Gardineroseris" Scheer & Pillai, 1974
"Gardineroseris planulata" (Dana, 1846) [= Gardineroseris planulata and Agariciella minikoensis sensu Hamilton & Brakel, 1984]. 4 specimens: RMNH 17073, 17074, 17075; Kenya O/16.

"Pachyseris" Milne Edwards & Haime, 1849
"Pachyseris speciosa" (Dana, 1846). 3 specimens: RMNH 17076, 17077; Kenya E-2.

Hamilton & Brakel (1984) also reported an unidentified species of Pachyseris, while P. rugosa Lamarck, 1801 has been reported from the Mascarene Archipelago (Faure, 1982; see also Veron, 1986).

Fungiidae

"Fungia" Lamarck, 1801
*"Fungia (Cycloseris) costulata" (Ortmann, 1889) [= Cycloseris costulata sensu Lemmens & Smeets, 1987]. 4 specimens: RMNH 17083, 17084, 17085; Kenya S-85.
"Fungia (Funga) fungites" (Linnaeus, 1758). 4 specimens: RMNH 17086, 17087, 17088; Kenya O/42.
*"Fungia (Diaseris) scutaria" (Lamarck, 1801) [as F. (Pleuractis) paumotensis sensu Lemmens & Smeets, 1987]. 2 specimens: RMNH 17090, 17091.

In a recent revision of the Fungiidae, Hoeksema (1989) synonymized the genera Cycloseris Milne Edwards & Haime, 1849, and Diaseris Milne Edwards & Haime, 1849, and lowered their status to subgenera of the genus Fungia.

Hamilton & Brakel (1984) also reported Fungia (Cycloseris) fragilis (Alcock, 1893) [as Cycloseris cf. patellaformis (Boschma, 1923)], F. (C.) distorta Michelin, 1842 [as Diaseris distorta (Michelin, 1843)], F. (Pleuractis) scutaria (Lamarck, 1801), F. (Verillifungia) repanda (Dana, 1846) and F. (V.) concinna Verrill, 1864 [as F. (V.) plana (Studer, 1877)].

"Herpolitha" Eschscholtz, 1825

"Podabacia" Milne Edwards & Haime, 1849
"Podabacia crustacea" (Pallas, 1766). 3 specimens: RMNH 17095, 17096; Kenya J-6.
**OCULINIDAE** Gray, 1847

*Galaxea* Oken, 1815


**PECTINIIDAE** Vaughan & Wells, 1943

*Echinophyllia* Klunzinger, 1879


*Echinophyllia* spec. 2 specimens: RMNH 17298, 17299. Two species of *Echinophyllia* (*E. aspera, E. echinate* Saville-Kent, 1871, are known from the western Indian Ocean (Veron, 1986). RMNH 17298 and 17299 could not be further identified.

*Oxypora* Saville-Kent, 1871

*Oxypora lacera* (Verrill, 1864). 4 specimens: RMNH 17300, 17301, 17302; Kenya O/73.

*Mycedium* Oken, 1815


*Pectinia* Oken, 1815


All *Pectinia* specimens in the present collection have a more or less uniform shape with long meanders of 12 to 20 mm width, a conspicuous columella, thin septo-costae and small ridges with dentations to five mm long. They fit the description of *P. lactuca* by Veron (1979), but differ from central Indo-Pacific specimens in the RMNH collection identified as *P. lactuca*.

**MUSSIDAE** Ortmann, 1890

*Blastomussa* Wells, 1961


*Cynarina* Brüggemann, 1877

*Cynarina lacrymalis* (Milne Edwards & Haime, 1848). 2 specimens: RMNH 17285; Kenya S-84.

*Acanthastrea* Milne Edwards & Haime, 1848

*Acanthastrea echinata* (Dana, 1846). 5 specimens: RMNH 17286, 17287, 17288, 17289; Kenya S-78.

*Acanthastrea* cf. *lordhowensis* Veron & Pichon, 1979. 1 specimen: RMNH 17290. The specimen is too small to be identified with certainty; the small, irregular calyces with steep walls closely resemble those of *Acanthastrea* spec. sensu Veron & Pichon (1979), later named *A. lordhowensis* Veron & Pichon, 1982, after more specimens were collected around Hong Kong. So far *A. lordhowensis* had not been found in the Indian Ocean.

*Lobophyllia* de Blainville, 1830

*Lobophyllia hemprichii* (Ehrenberg, 1834) [= *L. hemprichii* and *L. cf. costata* sensu Hamilton & Brakel, 1984]. 2 specimens: RMNH 17291, 17292.

*Lobophyllia hattitai* Yabe, Sugiyama & Eguchi, 1936. 1 specimen: RMNH 17293.

**MERULINIDAE** Verrill, 1866

*Hydnophora* Fischer de Waldheim, 1807


Hamilton & Brakel (1984) also reported H. cf. rigida (Dana, 1846) [as H. cf. columnellata Rehberg, 1892].

Merulina Ehrenberg, 1834
Merulina ampliata (Ellis & Solander, 1786). 2 specimens: RMNH 17283; Kenya O/32.

FAVIIIDAE Gregory, 1900
Favia Oken, 1815


Favites Link, 1807
Favites chinensis (Verrill, 1866). 1 specimen: RMNH 17233. [= F. melicerum (Ehrenberg) sensu Hamilton & Brakel, 1984]  
Favites pentagona (Esper, 1794). 2 specimens: RMNH 17231, 17232.  

Goniastrea Milne Edwards & Haime, 1848


Platygyra Ehrenberg, 1834
Platygyra lamellina Ehrenberg, 1834. 3 specimens: RMNH 17240, 17241; Kenya O/22.

Hamilton & Brakel (1984) and Didham (see Lemmens & Smeets, 1987) also reported *P. daedalea* (Ellis & Solander, 1786).

Leptoria Milne Edwards & Haime, 1848
Leptoria phrygia (Ellis & Solander, 1786). 1 specimen: RMNH 17242.

Oulophyllia Milne Edwards & Haime, 1848

All specimens of *Oulophyllia* in the present collection have broad meanders (up to 20 mm wide), gradually descending walls with conspicuous dentation and approximately 8 septa/cm. They differ considerably from specimens in the RMNH, collected in SW Sulawesi, Indonesia, by Moll (1983). Faure (1982) distinguished two
species, viz. *O. crispa* and *O. aspera*, Quelch, 1886, but these are considered synonymous by Veron et al. (1977).

**Montastrea** de Blainville, 1830


**Diploastrea** Matthai, 1914

*Diploastrea heliopora* (Lamarck, 1816). 2 specimens: RMNH 17255, 17256.

**Leptastrea** Milne Edwards & Haime, 1848


*Leptastrea purpurea* (Dana, 1846). 1 specimen: RMNH 17258.

*Leptastrea transversa* Klunzinger, 1879. 5 specimens: RMNH 17260, 17261, 17262, 17263; Kenya O/15. Previously only known from New Caledonia and Australia (Veron, 1986).

*Leptastrea cf. pruinosa* Crossland, 1952. 1 specimen: RMNH 17257. Previously only known from New Caledonia and Australia (Veron, 1986).

**Cyphastrea** Milne Edwards & Haime, 1848

*Cyphastrea serailia* (Forskal, 1775). 4 specimens: RMNH 17264, 17265, 17266 [tentative identification as the specimen somewhat resembles *C. chalcidium* Forskal, 1775]; Kenya O/13.

*Cyphastrea microphthalmia* (Lamarck, 1816) [= *C. forskaliana* (Milne Edwards & Haime) in Hamilton & Brakel, 1984]. 1 specimen: RMNH 17267.

Hamilton & Brakel (1984) also reported *C. chalcidium* (Forskal, 1775).

**Echinopora** Lamarck, 1816

*Echinopora lamellosa* (Esper, 1795). 2 specimens: RMNH 17276; Kenya O/47.

*Echinopora gemmacea* (Lamarck, 1816). 7 specimens: RMNH 17268, 17269, 17270, 17271, 17272, 17273; Kenya O/52.


Veron & Pichon (1977) stated that: "differences between *E. lamellosa*, *E. hirsutissima* and *E. gemmacea* are less conspicuous in the western Pacific than in the Indian Ocean. These observations tend to support the hypothesis that the evolution of *E. gemmacea* is more advanced in the Red Sea and western Indian Ocean than in the western Pacific".

**CARYOPHYLLIIDAE** Gray, 1847

**Plerogyra** Milne Edwards & Haime, 1848

*Plerogyra sinuosa* (Dana, 1846). 5 specimens: RMNH 17310, 17311, 17312, 17313, 17314.

**Physogyra** Quelch, 1884

*Physogyra lichensteini* Milne Edwards & Haime, 1851. 1 specimen: RMNH 17315.

**Gyrosomilia** Milne Edwards & Haime, 1851

*Gyrosomilia interrupta* (Ehrenberg, 1834). 3 specimens: RMNH 17316, 17317, 17318.

The genus *Gyrosomilia* is endemic to the western part of the Indian Ocean and the Red Sea (Veron, 1986).
Dendrophylliidae

Turbinaria Oken, 1815

Turbinaria frondens (Dana, 1846) [= T. cf. frondens sensu Hamilton & Brakel, 1984]. 2 specimens: RMNH 17327, 17328. The species was previously only known from east of the Nicobar Islands (Veron, 1986).

*Turbinaria reniformis* Bernard, 1896. 3 specimens: RMNH 17324, 17325, 17326. The species was previously considered absent from the western Indian Ocean (Veron & Pichon, 1979).

Hamilton & Brakel (1984) in addition reported *T. mesenterina* (Lamarck, 1816), *T. crater* (Pallas, 1766) and Turbinaria spec. The name *T. crater* is ambiguous and has been used for young colonies of other Turbinaria species especially *T. frondens, T. mesenterina* and *T. reniformis* (Veron & Pichon, 1979).

Tubastrea Lesson, 1829

Tubastrea aurea (Quoy & Gaimard, 1833) [= T. coccinea sensu Hamilton & Brakel, 1984]. 2 specimens: RMNH 17319, 17320.

Tubastrea cf. diaphana Dana, 1846. 2 specimens: RMNH 17321, 17322. Specimens were collected at 21-22 m depth.

Tubastrea micrantha Ehrenberg, 1834. 1 specimen: RMNH 17323 [calyces sometimes more than 5 mm deep, otherwise the specimen fits the description of Scheer & Pillai (1983)].

Identification of specimens of this genus follows Scheer & Pillai (1983) and Searle (1956).

Discussion

Apart from the genera and species listed above, a number of other Scleractinia were previously recorded from East Africa (see Hamilton & Brakel, 1984), but not collected during the present study: *Stylocoeniella armata* (Ehrenberg, 1834); possibly *Coeloseres mayeri* Vaughan, 1918 (further only reported from the central Indo-West-Pacific region; Veron, 1986); *Anomastrea irregularis* von Marenzeller, 1908; *Siderastrea* spec.; *Halomitra pileus* (Linaeus, 1758) [as *H. philippinensis* Studer, 1901; see Veron & Pichon, 1979]; *Polyphyllia tulipina* (Lamarck, 1801) (see Hoeksema, 1989); *Caulastrea tumida* Mattei, 1928; *C. furcata* Dana, 1846; *Astreosmilia connata* Ortmann, 1892; *Trachyphyllia geoffroyi* Audouin, 1826; *Culicia cuticulata* Klunzinger, 1879 (not mentioned by Veron, 1986); *Symphyllia* spec.; *Heteropsammia cochlea* (Spengler, 1781) [as *H. cochlea* (Spengler) and *H. michelini* (Milne Edwards & Haime, 1848); see Veron & Pichon, 1979].

As a result of the present study five genera are added to the species list of Hamilton & Brakel (1984), viz. *Leptoseris* Milne Edwards & Haime, 1849, *Blastomussa* Wells, 1961, *Cynarina* Brüggemann, 1877, *Montastrea* de Blainville, 1830, and *Diploastrea* Mattei, 1914. Of these, the genus *Leptoseris* was previously collected in the Watamu Marine National Reserve by the Leopard Reef Expedition (see Green, 1983). The total number of genera recorded from East Africa now amounts to 56 (*Diaseris* and *Cycloseris* now have subgeneric status, *Agariciella minikoinsis* is synonymous with *Gardineroseris planulata*; see species list).

The annotated species list here presented also adds 43 species to the list of Hamilton & Brakel. Combining the two lists, and removing all synonyms according to recent revisions (as indicated in the annotated species list), the total number of
scleractinian species reported thus far from East Africa currently amounts to 169; an increase of about 27% on the previously known diversity.


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