

Report on hydroids (Hydrozoa, Cnidaria) in the collection of the Zoological Museum, University of Tel-Aviv, Israel

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Key words: Cnidaria; Hydrozoa; Hydroida; eastern Mediterranean fauna; Red Sea hydroid fauna.

Twenty-eight hydroid species are recorded from the eastern Mediterranean and the northern part of the Red Sea, all material originating from the collections of the Museum of the Zoological Institute, Tel-Aviv University. The collection also included four species that could only be identified to generic level. Though the majority had previously been recorded from either the Mediterranean or the Red Sea, some constitute the first definite record from Israeli coastal waters. All material has been re-deposited in the Tel-Aviv collection; slides and some duplicate samples are in the collections of the National Museum of Natural History (Nationaal Natuurhistorisch Museum, now also incorporating the Rijksmuseum van Natuurlijke Historie), Leiden, the Netherlands.

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Introduction

The collection of Hydroida reported upon below was sent to me for identification several years ago by Dr Y. Benayahu, Zoological Museum, University of Tel-Aviv; additional specimens have intermittently been received. The collection is of interest because it contains a number of samples from Mediterranean waters off Israel, a region poor in hydroid records, though a report on a smaller collection from the same area and also belonging to the Zoological Museum, Tel-Aviv, was previously published by Picard (1950). I have been permitted to make slides for the collections of the National Museum of Natural History [Nationaal Natuurhistorisch Museum (NNM), now incorporating the Rijksmuseum van Natuurlijke Historie (RMNH)], Leiden, the Netherlands; those slides bear a registration number (RMNH Coel. no....) and a slide number and are indicated under 'Material' in the text, along with the registration number of the Tel-Aviv Museum (NS.... and CO....). In such cases where a sample has also been deposited in the NNM collections this has been indicated.

My thanks are due to Dr Y. Benayahu for placing the collection at my disposal and for commenting upon a preliminary draft of this paper. I am grateful to the authorities of the NNM for facilities to carry out my research.

List of species

EUDENDRIIDAE

Eudendrium spec.

SOLANDERIIDAE

Solanderia secunda (Inaba, 1892)

PENNARIIDAE*Pennaria disticha* (Goldfuss, 1820)**TUBULARIIDAE***Tubularia crocea* (L. Agassiz, 1862)**MILLEPIRIDAE***Millepora* spec.**LAFOEIDAE***Hebella parasitica* (Ciamician, 1888)*Hebella scandens* (Bale, 1888)**HALECIIDAE***Halecium beanii* (Johnston, 1838)**AGLAOPHENIIDAE***Aglaophenia acacia* Allman, 1883*Aglaophenia elongata* Meneghini, 1845*Aglaophenia picardi* Svoboda, 1979*Aglaophenia tubiformis* Marktanner-Turneretscher, 1890*Aglaophenia* spec.*Gymnangium eximium* (Allman, 1874)*Macrorhynchia philippina* (Kirchenpauer, 1872)**KIRCHENPAUERIIDAE***Ventromma halecioides* (Alder, 1859)**PLUMULARIIDAE***Nemertesia antennina* (Linnaeus, 1758)*Nemertesia ramosa* (Lamarck, 1816)*Nemertesia tetrasticha* (Meneghini, 1845)**SERTULARIIDAE***Dynamena disticha* (Bosc, 1802)*Sertularella diaphana* (Allman, 1885)*Sertularella ellisii* (Deshayes & Milne-Edwards, 1836)*Sertularella fusiformis* (Hincks, 1861)*Sertularella ornata* Broch, 1933*Sertularella* spec.*Sertularia marginata* (Kirchenpauer, 1864)**THYROSCYPHIDAE***Thyroscyphus fruticosus* (Esper, 1793)**CAMPANULARIIDAE***Campanularia/Clytia* spec.*Clytia gracilis* (M. Sars, 1851)*Obelia dichotoma* (Linnaeus, 1758)*Obelia geniculata* (Linnaeus, 1758)*Orthopyxis integra* (Macgillivray, 1842).

List of localities with species collected
(arranged chronologically)

No data: *Hebella parasitica* (Ciamician, 1888); *Aglaophenia picardi* Svoboda, 1979.

Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn: *Tubularia crocea* (L. Agassiz, 1862);

Aglaophenia tubiformis Marktanner-Turneretscher, 1890; *Dynamena disticha* (Bosc, 1802); *Obelia geniculata* (Linnaeus, 1758); *Orthopyxis integra* (Macgillivray, 1842).

Eilat, Gulf of Aqaba, Red Sea, iv.1951, leg. Ch. Lewinsohn: *Tubularia crocea* (L. Agassiz, 1862).

Tantura, Mediterranean, 10.vii.1951, leg. Ch. Lewinsohn: *Aglaophenia tubiformis* Marktanner-Turneretscher, 1890.

- Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn: *Pennaria disticha* (Goldfuss, 1820); *Aglaophenia tubiformis* Marktanner-Turneretscher, 1890; *Aglaophenia* spec.; *Dynamena disticha* (Bosc, 1802); *Sertularia* spec.; *Sertularia marginata* (Kirchenpauer, 1864); *Campanularia/Clytia* spec.; *Obelia geniculata* (Linnaeus, 1758); *Orthopyxis integra* (Macgillivray, 1842).
- Tantura, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn: *Hebella scandens* (Bale, 1888); *Aglaophenia tubiformis* Marktanner-Turneretscher, 1890; *Dynamena disticha* Bosc, 1802; *Sertularia fusiformis* (Hincks, 1861); *Sertularia marginata* (Kirchenpauer, 1864); *Obelia geniculata* (Linnaeus, 1758); *Orthopyxis integra* (Macgillivray, 1842).
- Tel-Aviv electrical power station, Mediterranean, i.1956, leg. Ch. Lewinsohn: *Tubularia crocea* (L. Agassiz, 1862).
- Tel-Aviv, Mediterranean, i.1956, leg. Ch. Lewinsohn: *Tubularia crocea* (L. Agassiz, 1862).
- Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn: *Eudendrium* spec.; *Aglaophenia picardi* Svoboda, 1979; *Ventromma halecioides* (Alder, 1859); *Sertularia marginata* (Kirchenpauer, 1864); *Obelia geniculata* (Linnaeus, 1758); *Orthopyxis integra* (Macgillivray, 1842).
- Apollonia, Mediterranean, 20.ix.1960, leg. L. Fishelson: *Pennaria disticha* (Goldfuss, 1820).
- Tel-Aviv, Reading, Mediterranean, 28.ix.1960, leg. Nussbaum: *Pennaria disticha* (Goldfuss, 1820).
- Tantura, Mediterranean, 26.ix.1961: *Aglaophenia tubiformis* Marktanner-Turneretscher, 1890.
- Tel Baruch, Mediterranean, 01.iii.1962: *Tubularia crocea* (L. Agassiz, 1862); *Aglaophenia tubiformis* Marktanner-Turneretscher, 1890.
- Off Tira, Mediterranean, 40-45 fms [= 73-82 m], 28.iv.1968, leg. Ch. Lewinsohn: *Sertularella ornata* Broch, 1933.
- Off Haifa, Mediterranean, 30 fms [= 55 m], 29.iv.1968, leg. Ch. Lewinsohn: *Nemertesia tetrasticha* (Meneghini, 1845).
- Ras Burka, Gulf of Aqaba, Red Sea, North facing reef, 05.x.1968, leg. L. Fishelson: *Solanderia crosslandi* (Thornely, 1908).
- Ras Atantur reef, Gulf of Aqaba, Red Sea, 15.x.1968, leg. L. Fishelson: *Distichopora violacea* (Pallas, 1766).
- A-Tur, Gulf of Suez, Red Sea, Stn 11, 06.vii.1969: *Sertularella diaphana* (Allman, 1886).
- El Bilaiyim lagoon, Gulf of Suez, Red Sea, 24.viii.1971, leg. D. Popper: *Macrorhynchia philippina* (Kirchenpauer, 1872).
- Ras Rareb, Gulf of Suez, Red Sea, 24.viii.1971, leg. D. Popper: *Macrorhynchia philippina* (Kirchenpauer, 1872).
- Ras Sudar, Gulf of Suez, Red Sea, 25.x.1971, leg. L. Fishelson: *Macrorhynchia philippina* (Kirchenpauer, 1872).
- Eilat, Gulf of Aqaba, Red Sea, xi.1971, leg. L. Fishelson: *Millepora* spec.
- Ras um Sud, southern tip Sinai, Red Sea, 09.iv.1972, leg. N. Gunderman & D. Popper: *Hebella scandens* (Bale, 1888); *Thyrosocyphus fruticosus* (Esper, 1793).
- Ras Um Sud, southern tip Sinai peninsula, Red Sea, 35 m, 11.iv.1972, leg. N. Gunderman & D. Popper: *Solanderia crosslandi* (Thornely, 1908).
- Ras Um Sud, southern tip Sinai peninsula, Red Sea, 16.x.1972, leg. D. Popper: *Solanderia crosslandi* (Thornely, 1908).
- Ras Kanisa, Gulf of Suez, Red Sea, 1 km off shore, coral reef, 1-2 m, 17.x.1972, leg. Ch. Lewinsohn: *Gymnangium eximium* (Allman, 1874).
- Haifa Bay, Mediterranean, clay and stones, 66 m, 14.v.1974, leg. M. Tom: *Nemertesia ramosa* Lamarck, 1816.
- Haifa Bay, Mediterranean, in *Caulerpa*-beds, 46 m, 14.v.1974, leg. M. Tom: *Eudendrium* spec.; *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Mediterranean, 32°35'30"N-34°59'E, sand-silt, 31 m, 10.vii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845; *Obelia* cf. *dichotoma* (Linnaeus, 1758).
- Haifa Bay, Stn no. 31, 32°53'N 35°04'E, Mediterranean, sand, 10 m depth. 10.vii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 32, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 10.vii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845; *Obelia* cf. *dichotoma* (Linnaeus, 1758).
- Haifa Bay, 32°54'30"N 34°56'30"E, Mediterranean, sand-silt and clay, *Caulerpa* spec., 40 m, 11.vii.1974,

- leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 52, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 33 m, 24.xii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 53, 32°54'30"N 34°56'E, Mediterranean, silt-sand with clay and *Caulerpa scalpelliformis*, 45 m, 25.xii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 56, 32°52'N 34°58'30"E, Mediterranean, sand, 24 m, 25.xii.1974, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 62, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 13.ii.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 66, 32°52'N 34°58'30"E, Mediterranean, sand, 25 m, 16.ii.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 72, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 32 m depth, 28.iv.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845; *Nemertesia tetrasticha* (Meneghini, 1845)
- Haifa Bay, Stn no. 74, 32°53'30"N 34°54'E, Mediterranean, silt and clay with coarse sand and stones, 71 m, 28.iv.1975, leg. M. Tom: *Aglaophenia acacia* Allman, 1883; *Nemertesia tetrasticha* (Meneghini, 1845).
- Haifa Bay, Stn no. 75, 32°54'N 35°54'E, Mediterranean, silt and clay with coarse sand and stones, 65 m, 28.iv.1975, leg. M. Tom: *Aglaophenia tetrasticha* (Meneghini, 1845).
- Haifa Bay, Stn no. 84, 32°54'30"N 34°54'30"E, Mediterranean, silt and clay with coarse sand and stones, 70 m, 11.vi.1975, leg. M. Tom: *Aglaophenia acacia* Allman, 1883
- Haifa Bay, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 12.vi.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 82, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 12.vi.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 83, 32°54'30"N 34°56'E, Mediterranean, silt-sand-clay, *Caulerpa scalpelliformis*, 45 m, 12.vi.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Haifa Bay, Stn no. 86, 32°52'N 34°58'30"E, Mediterranean, sand, 25 m, 12.06.1975, leg. M. Tom: *Aglaophenia elongata* Meneghini, 1845.
- Off Bardawill, 31°15'N 32°41'E, Mediterranean, 9 fms [= 16.5 m], 31.x.1975, leg. Tel-Aviv University: *Aglaophenia elongata* Meneghini, 1845; *Clytia gracilis* (M. Sars, 1851).
- Off Bardawill, 31°27'N 32°46'E, Mediterranean, sand, mud stones, 16 fms [= 29 m], 31.x.1975, leg. Tel-Aviv University: *Aglaophenia spec.*; *Sertularella cf. ellisii* (Deshayes & Milne-Edwards, 1836).
- Dor, Mediterranean, 30.ix.1976, leg. Ch. Lewinsohn: *Aglaophenia tubiformis* Marktanner-Turneretscher, 1980.
- Off Palmakhim, 31°55'N 34°40'E, Mediterranean, 18 m, 24/26.i.1977, leg. B. Galil: *Halecium beanii* (Johnston, 1838); *Obelia geniculata* (Linnaeus, 1758).
- Off Palmakhim, 31°55'N 34°39'E, Mediterranean, 35 m, 24/26.i.1977, leg. B. Galil: *Obelia geniculata* (Linnaeus, 1758).
- Off Palmakhim, Mediterranean, 80 m, 24/26.i.1977, leg. B. Galil: *Nemertesia antennina* (Linnaeus, 1758); *Sertularia marginata* (Kirchenpauer, 1864).
- Off Palmakhim, 31°56'N 34°39'E, Mediterranean, 35 m, 02/04.v.1977, leg. B. Galil: *Aglaophenia elongata* Meneghini, 1845; *Sertularia marginata* (Kirchenpauer, 1864).
- Off Palmakhim, 31°55'N 34°39'E, Mediterranean, 35 m, 23/26.x.1977, leg. B. Galil: *Sertularia marginata* (Kirchenpauer, 1864).
- Ras Gahra, Gulf of Suez, Red Sea, 3 m, 04.vii.1978, leg. Y. Benayahu: *Macrorhynchia philippina* (Kirchenpauer, 1872).
- Off Shiqmona, Mediterranean, on cable, 22.x.1982, leg. E. Spanier: *Pennaria disticha* (Goldfuss, 1820).
- Eilat, Gulf of Aqaba, Red Sea, artificial reef, 20 m, 17.iii.1993, leg. Y. Benayahu: *Pennaria disticha* (Goldfuss, 1820); *Tubularia crocea* (L. Agassiz, 1862).

Description of the material

Family Eudendriidae

Eudendrium spec.

Material.— Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20180: small colony with a single well preserved, sterile hydranth, mixed with *Sertularia marginata* (Kirchenpauer, 1864). Haifa Bay, Mediterranean, in *Caulerpa*-beds, 46 m depth, 14.v.1974, leg. M. Tom. NS 20212: a few branched stems without hydranths, together with *Aglaophenia elongata* Meneghini, 1845.

Remarks.— The recorded material is unfit for proper identification or description.

Family Stylasteridae

Distichopora violacea (Pallas, 1766)

Millepora violacea Pallas, 1766: 258 [type locality: 'Mare Indicum'].
Distichopora violacea; Klunzinger, 1879: 89; Boschma, 1957: 47-49; Boschma, 1959: 134-144, fig. 1, pl. 1 figs. 2-17, pl. 2 figs. 3-8, pl. 4 figs. 1-3, 6-13, pl. 5 figs. 1-4, pl. 6 figs. 1, 2, 4 [synonymy]: Boschma, 1968: 13-14; Cairns, 1988: 108, fig. 1D.
Distichopora fisheri Broch, 1942: 14.

Material.— Ras Atantur reef, Gulf of Aqaba, Red Sea, 15.x.1968, leg. L. Fishelson. NS 4465: two small colonies, 15-20 mm high, one with ampullae.

Remarks.— The smaller specimen is sterile and will remain undescribed. The fertile colony is 20x20 mm, attached by means of a broadened basal disk and branching from the base onward; the branches are circular in cross section and slightly compressed at their tips. The colour of colony is deep violet, gradually turning into white towards the terminal part of the branches. Sides of the branches with fairly deep, distinct sulcus; gastropores large, 275-400 μ m, placed in a longitudinal row flanked on each side by a row of distinct dactylopores with prominent projections. Anterior (frontal) surface of branches with irregular clusters of ampullae. Surface of coenostem rough by presence of closely packed, apically flattened papillae.

The specimens agree with Boschma's description of forma *tenella* (Boschma, 1959: 140). The occurrence of *D. violacea* in the Red Sea has previously been recorded by De Blainville (1834: 416), Klunzinger (1879: 89) and Boschma (1959: 143-144), the latter describing a large material of this species from that area preserved in the Muséum National d'Histoire Naturelle, Paris. Additional Red Sea colonies are described by Boschma (1968: 13-14), also belonging to forma *tenella*.

Family Solanderiidae

Solanderia secunda (Inaba, 1892)

Dendrocoryne secunda Inaba, 1892: 98, figs. 111-113 [type locality: Misaki, Japan].
Solanderia rufescens Jäderholm, 1896: 5, pl. 1 figs. 1-2.
Ceratella minina Hickson, 1903: 114, pl. 13.
Ceratella crosslandi Thornely, 1908: 85.

Solanderia minima; Stechow, 1909: 41; Mergner & Wedler, 1977: 11, pl. 1 fig. 2.

Solanderia crosslandi; Stechow, 1909: 41.

Solanderia secunda; Vervoort, 1962: 516, 526-532, figs. 2b, c, 6-9; Mergner & Wedler, 1977: 11; Bouillon, Wouters & Boero, 1992: 12-13, pls. 5-6, 10-12 [full synonymy].

Material.— Ras Burka, Gulf of Aqaba, Red Sea, North facing reef, 05.x.1968, leg. L. Fishelson. NS 3979; RMNH Coel. no. 26791, slide no. 1890: single colony c. 180 mm high, spread c. 100 mm, with two *Avicula* spec. attached. Probably regenerating colony. Soft parts present but decaying; no gonophores. Ras Um Sud, southern tip Sinai Peninsula, Red Sea, 35 m, 11.iv.1972, leg. N. Gunderman & D. Popper. NS 20174; RMNH Coel. no. 26793, slide no. 1892: one fine colony, spread c. 180 mm, height c. 210 mm, with basal disk. Soft parts present but in bad condition; no gonophores. Ras Um Sud, southern tip Sinai Peninsula, Red Sea, 16.x.1972, leg. D. Popper. NS 9888; RMNH Coel. no. 26792, slide no. 1891: tangled colony 90 mm high, spread c. 50 mm, evidently part of larger colony. Soft parts present; hydranths badly preserved, many male gonophores. Colony with distinct main stem.

Remarks.— The present material agrees with colonies described previously from the Dahlak Archipelago, southern Red Sea, as *Solanderia crosslandi* (Thornely, 1908) (cf. Vervoort, 1967: 20-25, fig. 1, pls. 1-3). Vervoort & Vasseur (1977: 10-11), when describing material of *Solanderia minima* (Hickson, 1903) from Takapoto, French Polynesia, Central Pacific, expressed doubts concerning the validity of the species *Solanderia crosslandi* and *Solanderia minima*, hypothesizing that both species, along with *Solanderia secunda* (Inaba, 1892), might belong to a single, variable species of more general distribution in the Indo-Pacific. The genus *Solanderia* Duchassaing & Michelin, 1846, has since been revised by Bouillon, Wouters & Boero (1992), who also inspected part of the NS 9888 material mentioned above (l.c., pl. 13 fig. 2). The nominotypical species *Solanderia secunda* (Inaba, 1892) according to their views can be classified in three formae that are linked by intermediates: *S. secunda* forma *typica*; *S. secunda* forma *minima* (Hickson, 1903) and *S. secunda* forma *crosslandi* (Thornely, 1908); the material in the Tel-Aviv Museum listed above all belongs to the forma *crosslandi*.

The nominotypical *Solanderia secunda* is widely distributed in the Indo-Pacific (summary in Bouillon, Wouters & Boero, 1992: 13); the forma *crosslandi* has previously been found along the Indian Ocean coasts of Africa and in the Red Sea (Thornely, 1908; Vervoort, 1967).

Family Pennariidae *Pennaria disticha* (Goldfuss, 1820)

Pennaria disticha Goldfuss, 1820: 89 [type locality: Gulf of Naples]; Brinckmann-Voss, 1970: 40, figs. 43-50; Gibbons & Ryland, 1989: 387-388, fig. 5.

Pennaria australis Bale, 1884: 45.

Halocordyle cooperi Warren, 1906: 73, pl. 9.

Halocordyle disticha; Millard, 1975: 41-42, fig. 16C-G; García-Corrales & Aguirre, 1985: 85-96, figs. 1-3; Calder, 1988: 56-60, figs. 43-45 [full synonymy]; Boero & Bouillon, 1993: 261.

Halocordyle disticha var. *australis*; Mergner & Wedler, 1977: 11, pl. 1 fig. 3.

Material.— Tantara, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20193: several stems up to 60 mm high; hydranths with gonophores in all stages of development. NS 20223: fine, pinnate stem 80 mm high with well preserved hydranths and mature gonophores.

Apollonia, Mediterranean, 20.ix.1960, leg. L. Fishelson. NS 20204: six colonies c. 60 mm high and some

fragments; well preserved hydranths with gonophores.

Tel-Aviv, Reading, Mediterranean, 28.ix.1960, leg. Nussbaum. NS 20201: two pinnate stems, 30 and 45 mm high, with well preserved hydranths and gonophores.

Off Shiqmona, Mediterranean, on cable, 22.x.1982, leg. E. Spanier. NS 20208: bunch of erect, pinnate colonies c. 60 mm high. Stems black; hydranths with young gonophores, slightly deteriorated.

Eilat, Gulf of Aqaba, Red Sea, artificial reef, 20 m, 17.iii.1993, leg. Y. Benayahu. CO 28346; RMNH Coel. no. 26788, slide no. 1887: bunch of colonies c. 60 mm high and some fragments; hydranths with developing gonophores.

Remarks.— The reasons for using the generic name *Pennaria* Goldfuss, 1820, in the combination *Pennaria disticha* Goldfuss, 1820, in contradistinction to *Halocordyle* Allman, 1872, in the combination *Halocordyle disticha* (Goldfuss, 1820) have been taken from Gibbons & Ryland, 1989: 386-387: I agree with those authors that nomenclatorial stability is best served by the use of the specific name *Pennaria disticha* Goldfuss, 1820, for this well known and widely distributed species. The geographical distribution of that species is worldwide in tropical and warm-temperate seas (Gibbons & Ryland, 1989: 386), the water temperature greatly influencing the development and eventual liberation of the gonophores. The species is distributed all over the Mediterranean and the Red Sea area (Brinckmann-Voss, 1970; Boero & Bouillon, 1993; Vervoort, 1967), frequently occurring as fouling organism.

Family Tubulariidae

Tubularia crocea (L. Agassiz, 1862)

Parypha crocea L. Agassiz, 1862: 249, pls. 23, 23a [type locality: Boston Harbor, U.S.A.].

Tubularia crocea; Allman, 1872: 416-417; Brinckmann-Voss, 1970: 28-31, figs. 30-34; Boero & Bouillon, 1993: 261.

Tubularia polycarpa Allman, 1872: 413-414.

Tubularia mesembryanthemum Allman, 1872: 418-420, figs. 83-84; Fenchel, 1905: 570.

Material.— Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn. NS 20220: single detached female hydranth with mature gonophores.

Eilat, Gulf of Aqaba, Red Sea, iv.1951, leg. Ch. Lewinsohn. NS 20187: several stems 15-20 mm high, some attached to stolonial tube. Gonophores present, but condition mediocre. No apparent differences from Mediterranean species, but identification in doubt because of condition of gonophores.

Tel-Aviv electrical power station, Mediterranean, i.1956, leg. Ch. Lewinsohn. NS 20198: small number of stems 30-40 mm high on a twig; many hydranths with mature, male gonophores.

Tel-Aviv, Mediterranean, i.1956, leg. Ch. Lewinsohn. NS 20219: a number of c. 40 mm high unbranched stems bearing expanded hydranths with female gonophores.

Tel Baruch, Mediterranean, 01.iii.1962. NS 20207: single 50 mm high colony with well preserved hydranths bearing developing gonophores.

Eilat, Gulf of Aqaba, Red Sea, artificial reef, 20 m, 17.iii.1993, leg. Y. Benayahu. CO 28347; RMNH Coel. no.26789, slides no. 1888: bunch of stems c. 50 mm high, unbranched, hydranths with male and female gonophores (on separate polyps!).

Remarks.— With the exception of lot NS 20187 all the material has well preserved gonophores, which has made it possible to properly identify the material, using Brinckmann-Voss's enumeration of characters and her listing of differences with the closely resembling *Tubularia larynx* Ellis & Solander, 1786.

This species is known to occur in numbers in the Naples area (Brinckmann-Voss, 1970); its presence has now also been established in the eastern Mediterranean and

the Gulf of Aqaba, Red Sea. Its presence in the Arabian Gulf has previously been established by Shoukr & Abdel-Hamid (1987: 455-460, pl. 1).

Family Milleporidae

Millepora spec.

Material.— Eilat, Gulf of Aqaba, Red Sea, xi.1971, leg. L. Fishelson. NS 20258: basal fragment of larger colony. No ampullae.

Remarks.— This is probably a basal fragment of a colony of *Millepora dichotoma* (Forskål, 1775), but the fragment is too small to permit proper identification. *Millepora dichotoma* is mentioned by Boschma (1968: 9, figs. 1-2) from exactly the same locality (as is also *Millepora platyphylla* Hemprich & Ehrenberg, 1834). For a discussion on and accurate description of both species I refer to Boschma (1948).

Family Lafoeidae

Hebella parasitica (Ciamician, 1888)

Lafoëa parasitica Ciamician, 1880: 673-676, pl. 39 figs. 1-4 [type locality: Triest, Adriatic].

Hebella parasitica; Marktanner-Turneretscher, 1890: 213; Boero, 1980: 133-136, figs. 1-7; Boero & Bouillon, 1993: 263.

Material.— No data. NS 20182; part as RMNH Coel. no. 25238, slide no. 628: fine, small colony composed of gonothecae with perfect hydranths rising from stolon creeping on *Aglaophenia picardi* Svoboda, 1979. No gonothecae.

Remarks.— I have compared this sterile material with undubitable fertile colonies from the Blanes area, Spain and I have been unable to observe differences in hydrothecae or polyps between the two lots. Unfortunately no locality details are known for the Tel-Aviv material, but its presence on *Aglaophenia picardi* Svoboda, 1979, strongly suggests its provenance from the Mediterranean. *A. picardi* occurs throughout the Mediterranean and outside that area has only been observed at some isolated Atlantic localities (vide infra).

Hebella parasitica (Ciamician, 1880) is known from various Mediterranean localities: Triest, Adriatic (Ciamician, 1880); Portofino and Pontetto, near Genua, Italy (Boero, 1980) and Blanes, Spain, 18.ix.1992 (RMNH Coel. no. 26598, slides no. 1736). The gonothecae and curious gonophores, liberated as a reduced medusa developing the gonads on the manubrium, have been described by Boero (1980). It occurs on species of *Aglaophenia* and *Sertularella* but does not appear to be properly parasitic. Its stolons do not penetrate into the tissue of the hosts, as in various other hebellids. It has its main area of distribution in the Mediterranean; the occurrence elsewhere is still slightly doubtful as no gonothecae are known from outside the Mediterranean.

Hebella scandens (Bale, 1888)

Lafoea calcarata A. Agassiz, 1865: 124, 125, 126, 132, figs. 190-193 [hydroid and young medusa only; not

- Lafoea calcarata* A. Agassiz, 1862 = *Laodicea undulata* (Forbes & Goodsir, 1851)].
Lafoea scandens Bale, 1888: 758-759, pl. 13 figs. 16-19 [type locality not specified: Port Stephens and Port Jackson, Australia].
Hebella scandens; Marktanner-Turneretscher, 1890: 214, pl. 3 fig. 16; Millard, 1975: 182-184, fig. 60F-G; Boero & Bouillon, 1993: 263.
Hebella calcarata; Nutting, 1901: 342, 352, 353, 359, 369, 370, 378, figs. 56, 94.
Lictorella scandens; Borradaile, 1905: 836, 840.
Hebellopsis scandens; Hadzi, 1916: 27; Calder, 1991: 43-45, fig. 27 [full synonymy].
Grammaria scandens; Jäderholm, 1919: 7, 31.
Phortis calcarata; Stechow, 1923: 139
Phortis scandens; Stechow, 1923: 139.
Hebella spiralis Nutting, 1927: 208, pl. 40 figs. 4-6.
Hebellopsis sinuosa Vannucci, 1949: 237, pl. 2 fig. 24.
Hebellopsis besnardi Vannucci, 1950: 85, pl. 1 fig. 3.
Hebellopsis calcarata; Yamada, 1959: 96.
Hebella urceolata Millard, 1964: 12, fig. 2A.

Material.— Tantara, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20184; RMNH Coel. no. 26794, slide no. 1893: colony composed of hydrothecae rising from stolons covering stems and hydrocladia of *Sertularia marginata* (Kirchenpauer, 1864). No gonothecae. NS 20192; RMNH Coel. no. 26814, slide no. 1913: colony composed of stolon attached to *Dynamena disticha* (Bosc, 1802); hydrothecae protruding between pairs of hydrothecae of host. NS 20218; RMNH Coel. no. 26822, slide no. 1921: stolon attached to *Sertularia marginata* (Kirchenpauer, 1864); hydrothecae protruding between those of host. Ras um Sud, southern tip Sinai, Red Sea, 09.iv.1972, leg. N. Gunderman & D. Popper. NS 20310; RMNH Coel. no. 36795, slide no. 1894: colony springing from stolon on *Thyroscyphus fruticosus* (Esper, 1793); no gonothecae.

Remarks.— I have convinced myself that both lots mentioned above, originating from Mediterranean and Red Sea, are identical; they agree in detail with the description of Bermuda specimens in Calder (1991: 43-45, fig. 27). In spite of the absence of the gonothecae I feel certain that the Tel-Aviv material belongs in *Hebella scandens* (Bale, 1888). On *Thyroscyphus fruticosus* the colony consists of a creeping stolon giving rise to isolated, almost symmetrical hydrothecae with a rounded bottom and a short, more or less smooth pedicel. On *Sertularia marginata* the creeping stolon is branched, occasionally even free from the substratum and on the axis it bears alternately arranged hydrothecae. On the hydrocladia there are pairs of hydrothecae, each curving over the member of a pair of hydrothecae of its host, resulting in asymmetrical hydrothecae with rounded bottom and short, smooth pedicel. In both lots the hydranths are well preserved and attached to the internal bottom of the hydrothecal wall by means of a sheath of tissue, a short distance above the distinct, ring-shaped diaphragm. There is no ring-shaped perisarcular thickening inside the hydrotheca.

The geographical distribution of *Hebella scandens* is worldwide and has been summarized by Calder (1991: 45): though circumglobal it is restricted to tropical, subtropical and temperate seas. The majority of records are based on material identified by means of vegetative characters, fertile material being only occasionally mentioned. An accurate picture of the geographical distribution, consequently, cannot yet be presented.

The subfamily Hebellinae Fraser, 1912, has recently been discussed by Calder (1991) and will form the subject of a revision by Boero, Bouillon and Kubota, of which I have been privileged to see a preliminary draft. A full discussion of the taxonomic position of both *Hebella parasitica* and *Hebella scandens* will be given in Boero, Bouillon and Kubota's paper, so I refrain from further discussion pending the publication of that report.

Family Haleciidae

Halecium beanii (Johnston, 1838)

Thoa Beanii Johnston, 1838: 120-121, pl. 7 figs. 1-2 [type locality: near Scarborough, U.K.].

Halecium beanii; Cornelius, 1975b: 391-393, fig. 5 [full synonymy]; Mergner & Wedler, 1977: 12, pl. 1 fig. 7; Boero & Bouillon, 1993: 263.

Material.— Off Palmakhim, 31°55'N 34°40'E, Mediterranean, 18 m, 24/26.i.1977, leg. B. Galil. NS 20257; RMNH Coel. no. 26796, slides no. 1895: many c. 40 mm high polysiphonic stems on *Caulerpa* spec. No gonothecae.

Remarks.— The identification of the present material, in absence of the gonothecae, is exclusively based on the appearance of the colonies, that are structurally similar to adult, fertile colonies of that species; the identity, however, must remain doubtful.

Halecium beanii is a cosmopolitan species, recorded worldwide, with exception of the Antarctic, where its occurrence has not been established beyond doubt (Stepan'yants, 1979). Mediterranean records are given by Stechow (1919) and Gili (1986).

Family Aglaopheniidae

All *Aglaophenia* material has been tested with iodine solution for the presence of symbiotic algae; the identifications, moreover, have been checked by Dr. Armin Svoboda, Bochum, Germany. It is also referred to in Svoboda & Cornelius (1991).

Aglaophenia acacia Allman, 1883

Aglaophenia acacia Allman, 1883: 38, pl. 12 figs. 1-4 [type locality: Challenger Stn 75, 38°37'N-28°30'W]; Svoboda, 1979: 79-82, figs. 12d, 13d, 14b, 15d(1-5), 16d; Svoboda & Cornelius, 1991: 14-16, figs. 1, 17a-b, 20a-b, 21a-b [full synonymy]; Boero & Bouillon, 1993: 263.

Material.— Haifa Bay, Stn no. 74, 32°53'30"N 34°54'E, Mediterranean, silt and clay with coarse sand and stones, 71 m, 28.iv.1975, leg. M. Tom. NS 20232; RMNH Coel. no. 25211, slide no. 598: single 90 mm high colony with four ramifications, each three-fold. No corbulae.

Haifa Bay, Stn no. 84, 32°54'30"N 34°54'30"E, Mediterranean, silt and clay with coarse sand and stones, 70 m, 11.vi.1975, leg. M. Tom. NS 20234; RMNH Coel. no. 25212, slide no. 616: stem 75 mm high with three-fold ramifications; no tissue fragments, no corbulae.

Remarks.— The present specimens have been recognized by the mode of ramification; they perfectly fit the descriptions by Svoboda (1979) and Svoboda & Cornelius (1991). There are no symbiotic algae. The distribution of this species in the tropical and subtropical Atlantic is summarised in Svoboda & Cornelius (1991) and includes records from the western Mediterranean (western coast of Italy, southern Spain and Tunisia). Its presence in the eastern Mediterranean has now been put beyond doubt.

Aglaophenia elongata Meneghini, 1845

Aglaophenia elongata Meneghini, 1845: 192, pl. 13 [type locality: northern Adriatic; neotype from SW of

Banjole Island, near Rovinj, Istria, Svoboda, 1979]; Svoboda, 1979: 74, figs. 12c, 13c, 15c, 16c; Svoboda & Cornelius, 1991: 16-17, fig. 2 [full synonymy]; Boero & Bouillon, 1993: 263.
Plumularia elongata; Heller, 1868: 39, pl. 32 fig. 2.
Aglaophenia microdonta Pieper, 1884: 217.

Material.— Haifa Bay, Mediterranean, *Caulerpa* beds, 46 m, 14.v.1974, leg. M. Tom. NS 20212; RMNH Coel. no. 25216, slide no. 625: a few c. 80 mm high stems with frontal ramifications; no corbulae. Mixed with *Eudendrium* spec.

Haifa Bay, 32°35'30"N 34°59'E, Mediterranean, sand-silt, 31 m, 10.vii.1974, leg. M. Tom. NS 20210; RMNH Coel. no. 25215, slide no. 601: several stems c. 150 mm high, some with frontal ramifications; no corbulae. With a few stems of *Obelia* spec., possibly *O. dichotoma* (Linnaeus, 1758).

Haifa Bay, Stn no. 31, 32°53'N 35°04'E, Mediterranean, sand, 10 m depth. 10.vii.1974, leg. M. Tom. NS 20236; RMNH Coel. no. 25222, slide no. 617: three plumes 50-70 mm high and in bad condition. No corbulae.

Haifa Bay, Stn no. 32, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 10.vii.1974, leg. M. Tom. NS 20248; RMNH Coel. no. 25229, slide no. 605: fragmentary colonies 100-150 mm high, some with frontal ramifications; no corbulae. Stems with filamentous algae; many Foraminifera on hydrothecae. NS 20254; RMNH Coel. no. 25206, sample, slide no. 596: many stems 120-200 mm high with some frontal ramifications; no corbulae.

Haifa Bay, 32°54'30"N 34°56'30"E, Mediterranean, sand-silt and clay, *Caulerpa* spec., 40 m, 11.vii.1974, M. Tom. NS 20202; RMNH Coel. no. 25214, slide no. 627: a number of c. 80 mm high stems, some with frontal ramifications; no corbulae. Covered with filamentous algae.

Haifa Bay, Stn no. 52, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 33 m, 24.xii.1974, leg. M. Tom. NS 20230; RMNH Coel. no. 25218, slide no. 629: single unbranched stem 65 mm high; no corbulae. NS 20239; RMNH Coel. no. 25224 (one stem), slide no. 609 (cormoid with 3 prosegments); three stems 70-90 mm high and some fragments; no corbulae.

Haifa Bay, Stn no. 53, 32°54'30"N 34°56'E, Mediterranean, silt-sand with clay and *Caulerpa scalpelliformis*, 45 m, 25.xii.1974, M. Tom. NS 20250; RMNH Coel. no. 25230, slide no. 600: two frontally branched colonies 70 and 150 mm high; female corbulae present.

Haifa Bay, Stn no. 56, 32°52'N 34°58'30"E, Mediterranean, sand, 24 m, 25.xii.1974, leg. M. Tom. NS 20224; RMNH Coel. no. 25226, slide no. 626: several colonies 60-80 mm high with frontal ramifications. NS 20262; RMNH Coel. no. 597: several fragmentary colonies with frontal branching 100-150 mm high; no corbulae.

Haifa Bay, Stn no. 62, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 13.ii.1975, leg. M. Tom. NS 20228; RMNH Coel. no. 25217, slide no. 618: branched colonies up to 60 mm high, no corbulae. Many branches resulting from frontal ramifications, some result from development of young colonies on older stems. NS 20245; RMNH Coel. no. 25277, slide no. 612: two plumes 60 mm high, with frontal branching; no corbulae. NS 20247; RMNH Coel. no. 25228; slide no. 614: frontally branched stem c. 100 mm high and a fragment, no corbulae.

Haifa Bay, Stn no. 66, 32°52'N 34°58'30"E, Mediterranean, sand, 25 m, 16.ii.1975, leg. M. Tom. NS 20231; RMNH Coel. no. 25219, slide no. 593: single plume 75 mm high with many female corbulae.

Haifa Bay, Stn no. 72, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 32 m depth, 28.iv.1975, leg. M. Tom. NS 20256; RMNH Coel. no. 25234, slide no. 610: four stems 60-80 mm high, one with frontal branching, all with female corbulae.

Haifa Bay, Stn no. 82, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 12.vi.1975, leg. M. Tom. NS 20233; RMNH Coel. no. 25220, slide no. 623: several stems c. 100 mm high with frontal ramifications; no corbulae.

Haifa Bay, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 31 m, 12.vi.1975, leg. M. Tom. NS 20235; RMNH Coel. no. 25221, slide no. 611: three stems 80 mm high, one with bifurcation. No corbulae.

Haifa Bay, Stn no. 83, 32°54'30"N 34°56'E, Mediterranean, silt-sand-clay, *Caulerpa scalpelliformis*, 45 m, 12.vi.1975, leg. M. Tom. NS 20238; RMNH Coel. no. 25223, slide no. 624: two stems c. 80 mm high with frontal ramifications; no corbulae. Also some fragments.

Haifa Bay, Stn no. 86, 32°52'N 34°58'30"E, Mediterranean, sand, 25 m, 12.06.1975, leg. M. Tom. NS 20251; RMNH Coel. no. 25231, slide no. 620: fragmentary colony 100 mm high composed of stem and single frontal branch; no corbulae. NS 20252: a few fragmentary stems with frontal ramifications; no corbulae. NS 20253; RMNH Coel. no. 25232, slide no. 604: some badly preserved colonies with frontal branching and a single corbula. NS 20255; RMNH Coel. no. 25233, slide no. 595: stem c. 120 mm high with some frontal branches; no corbulae. NS 20261; RMNH Coel. no. 25235, slide no. 599: several frag-

ments c. 120 mm high with frontal ramifications and a few corbulae.

Off Palmakhim, 31°56'N 34°39'E, Mediterranean, 35 m, 02/04.v.1977, leg. B. Galil. NS 20240; RMNH Coel. no. 25225, slide no. 621: single colony 80 mm high with many frontal ramifications, bearing three squid-eggs. No corbulae.

Remarks.— This species is easily recognized by its mode of ramification and the absence of symbiotic algae. Svoboda & Cornelius (1991: 16-17) draw attention to the fact that in Adriatic and Mediterranean specimens the mesial nematothecae arises in the lower third of the hydrotheca; this peculiarity could be checked in all slides prepared from the above mentioned material.

Aglaophenia elongata appears to be restricted to the Mediterranean; records outside that area should be considered with extreme doubt (Svoboda & Cornelius, 1991: 17). It occurs throughout the whole Mediterranean: East coast of Spain, Tyrrhenian, Ligurian and Adriatic seas as well as the Israeli coast (Svoboda & Cornelius, 1991; present records).

Aglaophenia picardi Svoboda, 1979

Aglaophenia picardi Svoboda, 1979: 1979: 70, figs. 12b, 13b, 15b, 16b [type locality: Rovinj, Istria]; Svoboda & Cornelius, 1991: 29-30, fig. 11 [full synonymy]; Boero & Bouillon, 1993: 263.

Material.— Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20181; RMNH Coel. no. 25213, slide no. 607: four plumes 20-25 mm high, no corbulae. Probably young colonies.

Off Bardawill, 31°15'N 32°41'E, Mediterranean, 9 fms [= 16.5 m], 31.x.1975, leg. Tel-Aviv University. NS 20308; RMNH Coel. no. 25237, 2 slides no. 594: several c. 70 mm high, unbranched stems, no corbulae. Rising from stolon creeping on sponge fragment. Also on sponge characteristic species of *Stephanoscyphus*. On stem of *A. picardi* a colony of *Clytia gracilis* (M. Sars, 1851), with gonothecae.

No data. NS 20282; RMNH Coel. no. 25238, 2 slides no. 628: six stems 20-35 mm high, unbranched, rising from short stolon; no corbulae. On stems stolon of *Hebella parasitica* (Ciamician, 1888).

Remarks.— The species is recognized by the absence of a prosegment in the caulus and the absence of symbiotic algae. It occurs throughout the Mediterranean though not being endemic for that area as suggested by Boero & Bouillon (1993: 263). Additional records are from the Canaries, from Bilbao, northern Spain, the Cape Verdes and the Black Sea (Svoboda & Cornelius, 1991: 30).

Aglaophenia tubiformis Marktanner-Turneretscher, 1890

Aglaophenia tubiformis Marktanner-Turneretscher, 1890: 269-270, pl. 7 figs. 4, 5, 6, 17 (including variety) [type locality: Gulf of Rijeka, northern Adriatic]; Svoboda, 1979: 90, figs. 12h, 13h, 14d, 15h, 16h, pls. 5a, b, 6, 8, 9a(1, 2); Svoboda & Cornelius, 1991: 34-36, figs. 14, 25a [full synonymy]; Boero & Bouillon, 1993: 263.

Material.— Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn. NS 20183; RMNH Coel. no. 25210, slide no. 630: unbranched colony c. 25 mm high, rising from stolon creeping on alga; no corbulae. NS 20222; RMNH Coel. no. 25242, slide no. 606: unbranched plumes 15-20 mm high rising from stolon creeping on algae. No corbulae.

Tantura, Mediterranean, 10.vii.1951, leg. Ch. Lewinsohn. NS 20200; RMNH Coel. no. 25239, slide no. 622: c. 15 plumes, maximum height 45 mm, rising from stolon creeping on algae. No branching, no corbulae.

Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20188; RMNH Coel. no. 25209, sample and slide no. 608: many young colonies 15-20 mm high rising from stolon on algae. NS 20224; RMNH Coel. no. 25243, slide no. 613: young colonies c. 20 mm high rising from stolon on algae, some stems dichotomously branched. Mixed with *Orthopyxis integra* (Macgillivray, 1842).

Tantura, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20186; RMNH Coel. no. 25240, slide no. 615: three plumes c. 20 mm high, one dichotomously branched; no corbulae.

Tantura, Mediterranean, 26.ix.1961. NS 20203; RMNH Coel. no. 25207, sample and slide no. 602: dichotomously branched colonies c. 80 mm high, basal parts invested by sponge, no corbulae.

Tel-Baruch, Mediterranean, 01.iii.1962. NS 20205; RMNH Coel. no. 25241, slide no. 619: dichotomously branched colonies rising from a small tuft of stolonial tubes, maximum height 65 mm. Many female corbulae.

Dor, Mediterranean, 30.ix.1976, leg. Ch. Lewinsohn. NS 20637; RMNH Coel. no. 25208, sample and two slides no. 603: dense patch of dichotomously branched colonies c. 80 mm high; no corbulae.

Remarks.— This species is recognized first of all by the presence of symbiotic algae; it is distinguished from the second Mediterranean algae-harbouring species, *Aglaophenia harpago* Von Schenck, 1963, by the absence of intersegments in the caulus; moreover *A. harpago* has exclusively been found on sea-grasses (*Posidonia oceanica* and *Cymodocea* spp.).

Symbiotic algae have been demonstrated in all above mentioned specimens of *A. tubiformis* that have recognizable rests of coenosarc.

The geographical distribution of *A. tubiformis* includes the eastern subtropical-temperate Atlantic (Morocco to Brittany) and the whole Mediterranean. It does not occur in the Black Sea and does not seem to reach the British Isles (Svoboda & Cornelius, 1991: 36).

Aglaophenia spec.

Material.— Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20196: unidentifiable, small colonies on Bryozoa together with *Campanularia/Clytia* spec. and *Sertularella* spec.

Off Bardawill, 31°27'N 32°46'E, Mediterranean, sand, mud, stones, 16 fms [= 29 m], 31.x.1975, leg. Tel-Aviv University. NS 20309: mutilated stems amongst colonies of *Sertularella ellisii* (Deshayes & Milne-Edwards, 1836); young colonies of that species developing on stems.

Remarks.— Mutilated specimens unfit for proper identification.

Gymnangium eximium (Allman, 1874)

Taxella eximia Allman, 1874: 179 [type locality: coast of Ceylon (Sri Lanka)].

Halicornaria saccaria Allman, 1876: 277-278, pl. 15 fig. 4, pl. 22 figs. 1-2.

Halicornaria bipinnata Allman, 1876: 279-280, pl. 22 fig. 5, pl. 23 fig. 2.

Lytocarpus longicornis Allman, 1883: 45-47, pl. 19 figs. 4-6.

Halicornaria flabellata Marktanner-Turneretscher, 1890: 278-279, pl. 6 fig. 14.

Halicornaria intermedia Billard, 1913: 65, fig. 53, pl. 4 fig. 37.

Gymnangium eximium; Mergner & Wedler, 1977: 22-24, fig. 3, pl. 6 fig. 40, pl. 9 fig. 62; Rees & Vervoort, 1987: 156-162, figs. 36-37, 38c [full synonymy].

Material.— Ras Kanisa, Gulf of Suez, Red Sea, 1 km off shore, coral reef, 1-2 m, 17.x.1972, leg. Ch. Lewinsohn. NS 20636; RMNH Coel. no. 26802, slide no. 1901: single fine specimen, 40x50 mm, with basal disk; no gonothecae.

Remarks.— Synonymy, variability and geographical distribution of this species are discussed by Rees & Vervoort (1987: 156-162); previous records from the Red Sea, whence the species has repeatedly been reported, are also given there.

Macrorhynchia philippina (Kirchenpauer, 1872)

Aglaophenia (*Macrorhynchia*) *Philippina* Kirchenpauer, 1872: 29, 45-46, pl. 1 fig. 26, pl. 2 fig. 26, pl. 7 fig. 26 [type locality: Manila, Philippines].

Lytocarpus philippinus; Kirkpatrick, 1890: 604; Mergner & Wedler, 1977: 24-26, pl. 6 fig. 43, pl. 12 figs. 80-81.

Lytocarpia philippina; Stechow, 1919: 132-134, fig. Z1.

Macrorhynchia philippina; Stechow, 1923: 241; Rees & Vervoort, 1987: 177-180.

Material.— El Bilaiyim lagoon, Gulf of Suez, Red Sea, 24.viii.1971, leg. D. Popper. NS 8307; RMNH Coel. no. 26803, slide no. 1902: several fragments c. 80 mm high of a larger colony; phylactocarps with gonothecae are present.

Ras Rareb, Gulf of Suez, Red Sea, 24.viii.1971, leg. D. Popper. NS 20311; RMNH Coel. no. 26804, slides no. 1903: large c. 120 mm high colony and smaller fragment. Phylactocarps with gonothecae present.

Ras Sudar, Gulf of Suez, Red Sea, 25.x.1971, leg. L. Fishelson. NS 8333; RMNH Coel. no. 26805, slide no. 1904: single 130 mm high colony with forked stem; no phylactocarps, no gonothecae.

Ras Gahra, Gulf of Suez, Red Sea, 3 m, 04.vii.1978, leg. Y. Benayahu. NS 18930; RMNH Coel. no. 26806, slides no. 1905: single colony or branch, without basal part, 170 mm high. Phylactocarps with gonothecae present.

Remarks.— This well known species has a wide, circumtropical distribution in the Atlantic, Indian and Pacific Oceans; it is common in the Red Sea, whence it has previously been recorded by Mergner & Wedler (1977); Rees & Vervoort (1987) record the species from the nearby Gulf of Aden.

Family Kirchenpaueriidae **Ventromma halecioides** (Alder, 1859)

Plumularia halecioides Alder, 1859: 353, pl. 12 figs. 1-4 [type locality: Cullercoats, Northumberland, near low tide mark]; Hincks, 1868: 306-307, pl. 67 figs. 2, 2a-c.

Ventromma halecioides; Stechow, 1923: 220; García-Corrales, Aguirre Inchaurre & González Mora, 1978: 51-53, fig. 23; Cornelius, Manuel & Ryland, 1990: 154, fig. 4.23.

Plumularia irregularis Millard, 1958: 210-212, fig. 13A-C.

Kirchenpaueria irregularis; Millard, 1975: 370-372, fig. 118D-G.

Not *Plumularia halecioides* Vervoort, 1967: 45-46, fig. 13 [= *Plumularia setacea* (L. 1758), epizootic form].

Material.— Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20179; RMNH coel. no. 26807, slides no. 1906: a number of young colonies c. 5 mm high on algae. Some gonothecae present on base of axis. NS 20181: small colonies 8 mm high and young, developing colonies; no gonothecae. Several stems with beginning polysiphony. Mixed with a few specimens of *Orthopyxis integra* (Macgillivray, 1842) and *Obelia geniculata* (Linnaeus, 1758).

Remarks.— This species is easily recognized by the structure of the colony, the shape of the nematothecae and the barrel-shaped, corrugated gonothecae with flattened top. Though the present material is predominantly monosiphonic some colonies are basally polysiphonic. In the monosiphonic parts the axis is divided into

articles each bearing a single, distal apophysis, supporting the hydrocladium; the various apophyses are alternately arranged; a nematotheca occurs slightly above the axil on the article. The hydrocladia are composed of hydrothecate internodes, though proximal or distal parts of internodes may be separated to form a short ahydrothecate internode. The hydrocladia usually insert directly on the apophyses, though occasionally a short basal internode is developed. The part of the internode above the axil with the adcauline hydrothecal wall may be separated from the rest of the internode by means of an oblique septum; it may be directed away from the rest of the internode. The hydrotheca has slightly diverging walls and a circular rim making an angle of 45° with the axis of the internode. One nematotheca is found on the internode slightly below the hydrothecal bottom; a second nematotheca occurs on the distal portion of the internode behind or above the hydrotheca; this nematotheca is found on a separate (ahydrothecate) internode if the distal portion of the internode is split off. The nematothecae are elongated ovoid, monothalamic structures attached by means of a short, stubby pedicel or pedestal; the nematophore protrudes from the theca through a hole at the apex. They are consequently not bithalamic (as described by Millard, 1975: 372, for *Kirchenpaueria irregularis* and García-Corrales et al., 1978: 52, for *Ventromma haleciooides*). I have followed García-Corrales et al. (1978) in synonymizing *Plumularia irregularis* Millard, 1958 [= *Kirchenpaueria irregularis* (Millard, 1958) in Millard, 1975] with *Ventromma haleciooides*, retaining for the moment its position in the genus *Ventromma* Stechow, 1923, recently placed into the synonymy of *Kirchenpaueria* Jickeli, 1883 (cf. Bouillon, 1985: 169). The various genera of Kirchenpaueriidae Millard, 1962, are in need of critical redefinition. The structure of the nematothecae in *Ventromma haleciooides* agrees with that observed in *Kirchenpaueria bonnevieae* (Billard, 1906) (= *Plumularia triangulata* Totton, 1930), *Kirchenpaueria bonnevieae simplex* Billard, 1930, and *Kirchenpaueria ventruosa* (Billard, 1911) (cf. Ramil & Vervoort, 1992) but differs from that of the scale-shaped infracalycine 'nematotheca' observed in *Kirchenpaueria pinnata* (Linnaeus, 1758).

Ventromma haleciooides is widely distributed in tropical, subtropical and temperate parts of the Atlantic and Pacific (cf. Van Gemerden-Hoogenveen, 1965). In the Mediterranean it occurs plentifully, penetrating the Suez Canal area (Billard, 1926). It is quite variable (Billard, 1904: 180-191, figs. 54-68) and can easily be confused with developing colonies of *Plumularia setacea* (Linnaeus, 1758) that may have an almost identical colony structure but differ in the shape and arrangement of the nematophores.

Family Plumulariidae *Nemertesia antennina* (Linnaeus, 1758)

Sertularia antennina Linnaeus, 1758: 811 [type locality not specified: "in Oceano"]; Ellis & Solander, 1786: 45-46.

Antennularia antennina; Hincks, 1868: 280-281, pl. 61.

Nemertesia antennina; Cornelius, Manuel & Ryland, 1990: 152, 154, fig. 4.22; Ramil & Vervoort, 1992: 163-169, figs. 42a-r, 43a-h [full synonymy]; Boero & Bouillon, 1993: 264.

Material.— Off Palmakhim, Mediterranean, 80 m, 24/26.i.1977, leg. B. Galil. NS 20243; RMNH Coel. no. 26808, slide no. 1907: several stems 60-70 mm high and a few fragments. Hydrocladia heteromerously segmented. No gonothecae.

Remarks.— The stems are unbranched and have indications of transverse nodes in the upper (youngest) parts; there are many nematothecae. The apophyses are strictly tetrastichous and moderately long, having a distinct though shallow 'mamelon' and two pairs of nematothecae: one pair almost axillary and one pair just above the 'mamelon'. Occasionally there is a further, unpaired nematotheca on the rest of the apophysis. The hydrocladia are heteromerously segmented, inserting on the apophysis by means of an ahydrothecate internode bearing one nematotheca. The hydrothecate internode has a proximal unpaired nematotheca and a pair of nematothecae besides the hydrothecal rim. Hydrotheca small, with fully adnate adcauline wall and distinctly undulated rim; the abcauline hydrothecal wall is shorter than the (fused) adcauline wall. The majority of the ahydrothecate internodes have two nematothecae, occasionally placed on two separate internodes (division of the original, ahydrothecate internode with two nematothecae). Ahydrothecate internodes of normal length bearing a single nematotheca also occur, although in small number.

I have convinced myself that this material is identical with some of the Atlantic colonies described by Ramil & Vervoort (1992: 166, fig. 43f, BALGIN Stn DR 153, Strait of Gibraltar). The description in that paper gives a good impression of the variability of this species as well as of the irregularities in structure of the hydrocladia resulting from regeneration or repair of broken internodes.

The species, of cosmopolitan distribution, has previously been recorded from the Mediterranean (Stechow, 1919; Ramil & Vervoort, 1992; Boero & Bouillon, 1993), though chiefly from the western part.

Nemertesia ramosa (Lamarck, 1816)

Antennularia ramosa Lamarck, 1816: 123 [type locality not specified: "habite dans l'Océan"]; Hincks, 1868: 282-283, pl. 62.

Nemertesia ramosa Lamouroux, 1816: 164; Cornelius, Manuel & Ryland, 1990: 154, fig. 4.22; Ramil & Vervoort, 1992: 173-176, fig. 44a-f [full synonymy]; Boero & Bouillon, 1992: 264.

Material.— Haifa Bay, Mediterranean, clay and stones, 66 m, 14.v.1974, leg. M. Tom. NS 20213; RMNH Coel. no. 26810, slide no. 1909: two unbranched, sterile fragments, 15 and 45 mm high. All internodes thecate.

Remarks.— This material has been kept separate from *Nemertesia tetrasticha* (Meneghini, 1845) for the following reasons:

1. The axis, though monosiphonic, has thick periderm and shows no division in internodes. The number of nematothecae is reduced, one is found on the axis directly above the insertion of the apophyses.

2. The apophyses are strictly arranged in verticils of three, alternating with previous and following verticil of apophyses, resulting in a hexastichous arrangement of the apophyses along the stem.

3. The 'mamelon', though elevated, is less prominent than in the material brought here to *Nemertesia tetrasticha*.

The fragments are mutilated, as a result the hydrocladia are composed of maximally three internodes that do not differ from those described in *N. tetrasticha*, the absence of the distal nematotheca in the hydrothecate internodes, consequently,

could not properly be checked.

The geographical distribution of this largely eastern Atlantic species probably includes the whole Mediterranean, though existing records chiefly refer to the western part (Stechow, 1919; Broch, 1933; Ramil & Vervoort, 1992). Non-fertile specimens of this species can easily be confused with *Nemertesia tetrasticha*; the identification of the present, incomplete material is doubtful!

Nemertesia tetrasticha (Meneghini, 1845)

Aglaophenia (*Lowenia*) *tetrasticha* Meneghini: 1845: 12, 15, pl. 14 fig. 2 [type locality: northern Adriatic].
Antennularia tetrasticha; Marktanner-Turneretscher, 1890: 260, pl. 6 fig. 10.

Material.— Off Haifa, Mediterranean, 30 fms [= 55 m], 29.iv.1968, leg. Ch. Lewinsohn. NS 5553; RMNH Coel. no. 26809, slide no. 1908: unramified, young colony c. 90 mm high; hydrocladia di-tristichous, monomerously segmented; basal tuft of stolonal fibres present. No gonothecae.

Haifa Bay, Stn no. 72, 32°53'30"N 34°59'E, Mediterranean, silt-sand, 32 m, 28.iv.1975, leg. M. Tom. NS 20229; RMNH Coel. no. 26812, slide no. 1911: stem fragment of young colony, 40 mm high, one side-branch. No gonothecae.

Haifa Bay, Stn no. 74, 32°53'30"N 34°54'E, Mediterranean, silt and clay with coarse sand and stones, 71 m, 28.iv.1975, leg. M. Tom. NS 20246; RMNH Coel. no. 26811, slide no. 1910: stem fragment of young colony 40 mm high. Verticils not yet formed. No gonothecae.

Haifa Bay, Stn no. 75, 32°54'N 35°54'E, Mediterranean, silt and clay with coarse sand and stones, 65 m, 28.iv.1975, leg. M. Tom. NS 20237; RMNH Coel. no. 26813, slide no. 1912: colony fragment 50 mm long with tetrastichous, monomerous hydrocladia; no distal nematotheca.

Remarks.— The material listed above has been identified as *Nemertesia tetrasticha* mainly because of the structure of axis and hydrocladia. The axis, in all specimens, is monosiphonic and broken up into distinct internodes, separated by rings of thinner perisarc. Each internode bears a pair or pairs of opposite apophyses, resulting in tetrastichous arrangement of the hydrocladia, or bears a single to more apophyses in alternate arrangement, resulting in a plume-shaped colony with pinately arranged hydrocladia. The apophyses are moderately long, with a prominent, apically narrowing 'mamelon' and two pairs of nematotheca, one pair almost axillary, the second pair slightly above the 'mamelon'; there is also a nematotheca on the axis slightly above the insertion of each apophysis. The internodes are homomerously segmented and all hydrothecate, bearing besides the hydrotheca a proximal nematotheca and a pair of nematothecae at the hydrothecal rim. The hydrotheca is cup-shaped, the abcauline wall decidedly longer than the (completely fused) adcauline wall, the plane of the rim consequently being inclined adcaudally. The hydrocladia insert directly on the apophyses without intermediate article. The structure of the internodes is quite uniform in all the material, no irregularities have been observed.

This species seems to be almost exclusively restricted to the Adriatic and eastern Mediterranean, but it can, in sterile condition, be easily confused with *Nemertesia ramosa*, particularly with young colonies of that species. Kirchenpauer's (1876: 29) old record of this species from Madeira has never been confirmed.

Family Sertulariidae
***Dynamena disticha* (Bosc, 1802)**

Sertularia disticha Bosc, 1802: 101, pl. 29 fig. 2 [type locality: Atlantic Ocean (on algae)].

Dynamena cornicina McCrady, 1859: 204; Vervoort, 1967: 40-42, fig. 11; Millard, 1975: 261-263, fig. 86A-E.

Dynamena disticha; Picard, 1958: 2; Calder, 1991: 93-96, fig. 50 [full synonymy].

Material.— Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn. NS 20220: small, unbranched stem with three pairs of hydrothecae, between *Obelia geniculata* (Linnaeus, 1758) on alga. No gonothecae.

Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20195; RMNH Coel. no. 26816, slide no. 1915: unbranched stems springing from stolon creeping on algae. Gonothecae present on stolon and basal part of stems. Mixed with a few colonies of *Obelia geniculata* (Linnaeus, 1758). NS 20226; RMNH Coel. no. 26817, slide no. 1916: young, unbranched stems 3-5 mm high springing from stolon on algae; no gonothecae.

Tantura, Mediterranean, 05.vii.1955, Leg. Ch. Lewinsohn. NS 20192; RMNH Coel. no. 26814, slide no. 1913: unbranched colonies c. 10 mm high rising from stolon creeping on algae (*Caulerpa spec. et al.*). Gonothecae present along axis. With *Hebella scandens* (Bale, 1888). NS 20225; RMNH Coel. no. 26815, slide no. 1914: unbranched stems 8-10 mm high rising from stolon creeping on fragment of algae; gonothecae on stolon and basal part axis.

Remarks.— I have accepted Calder's (1991) synonymy for this variable species. The present material all consists of unbranched stems rising from a creeping stolon; no hydrocladia are developed. This material agrees with Stechow's description of *Sertularia densa* (1919: 93, fig. J¹); this species falls into the synonymy of *Dynamena disticha* (Bosc, 1802) (cf. Billard, 1925; Picard, 1958; Calder, 1991). The species has a circumglobal distribution in tropical, subtropical and temperate regions of the Atlantic, Pacific and Indian Oceans. It has previously been recorded from the Israeli Mediterranean coast by Picard (1958); it is widely distributed in the whole Mediterranean.

***Sertularella diaphana* (Allman, 1885)**

Thuiaria diaphana Allman, 1885: 145, pl. 18 figs. 1-3 [type locality: Moreton Bay, Queensland, Australia].

Sertularella diaphana; Billard, 1925: 157-160, pl. 7 figs. 12-13; Calder, 1991: 101-103, fig. 53 [full synonymy].

Material.— A-Tur, Gulf of Suez, Red Sea, Stn 11, 06.vii.1969. NS 20206; RMNH Coel. no. 26819, slide no. 1918: colony composed of four stems c. 40 mm high, rising from communal basal portion; each stem with pinnately arranged hydrocladia; no gonothecae.

Remarks.— For a discussion of the synonymy of this species and its many forms and varieties I refer to Billard (1925) and Calder (1991). The present material probably represents a regenerating colony of which the polysiphonic axis was broken; a number of smaller monosiphonic stems springs from a thicker, polysiphonic basal portion. Though the material is sterile it undoubtedly belongs here, confirming fully with Billard's (1925) and Millard's (1975) descriptions.

Sertularella diaphana has a circumglobal distribution in subtropical and tropical parts of the Atlantic, Pacific and Indian Oceans. According to Millard (1975) the species occurs along the coasts of Natal and Moçambique from Durban northwards; I have been unable to trace previous records from the Red Sea.

Sertularella ellisii (Deshayes & Milne-Edwards, 1836)

Sertularia Ellisii Deshayes & Milne-Edwards, 1836: 142-143 [type locality: ?Isle of Sheppey, N coast of Kent, England].

Sertularella ellisii; Stechow, 1923: 193-194, fig. D¹b; Ramil, Parapar & Vervoort, 1992: 503-507, figs. 6, 7 [full synonymy].

Sertularella gaudichaudi p.p. Cornelius, 1979: 282-284, fig. 20.

Sertularella gaudichaudi García-Corrales, Aguirre Inchaurre & González Mora, 1980: 30-33, fig. 20.

Material.— Off Bardawill, 31°27'N 32°46'E, Mediterranean, sand, mud, stones, 16 fms [= 29 m], 31.x.1975, leg. Tel-Aviv University. NS 20309; RMNH Coel. nos. 26797 and 26798, slides nos 1896 and 1897: fragmentary stems c. 35 mm high with some hydrocladia; no gonothecae. Young, 8 mm high unbranched colonies developing on stem of *Aglaophenia* spec.

Remarks.— For the reasons to apply the name *Sertularella ellisii* (Deshayes & Milne-Edwards, 1836) to this material we refer to Ramil, Parapar & Vervoort, 1992; it agrees with Atlantic material described and figured in that paper (1992: 504-505, fig. 6a). Undubitable material of this species originates from the Atlantic and Mediterranean coasts of France and Spain (Ramil, Parapar & Vervoort, 1992); it is well distributed along the Spanish Mediterranean coast. So far no records are known from the eastern Mediterranean, though Picard (1958) records *S. ellisii* forma *lagenoides* (= *Sertularella lagenoides* Stechow 1919: 86-87, fig. C¹) from the Israeli Mediterranean coast. This form must probably be sunk into the synonymy of *Sertularella ellisii*.

Sertularella fusiformis (Hincks, 1861)

Sertularia fusiformis Hincks, 1861: 253, pl. 6 figs. 7-8 [type locality not specified: (South) Devon].

Sertularella fusiformis; Hincks, 1868: 243, pl. 47 fig. 4; Ramil, Parapar & Vervoort, 1992: 507-511, figs. 8-10 [full synonymy].

Sertularella gaudichaudi p.p. Cornelius, 1979: 282, 284, fig. 20.

Material.— Tantara, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20191; RMNH Coel. no. 26799, slide no. 1898: unbranched stems 8-10 mm high on algae; no gonothecae. With *Orthopyxis integra* (Macgillivray, 1842).

Remarks.— The sparse material has been identified as such using the criteria outlined in Ramil, Parapar & Vervoort (1992); in structure it agrees fully with specimens figured in that paper on figs. 8a and 10. The geographical distribution is also discussed in that paper, being mainly restricted to temperate and subtropical parts of the Atlantic (besides dispersed records from the Indian Ocean and the eastern Pacific). In the western Mediterranean the species has been found along the Spanish coasts, but I have so far seen no records from the Eastern Mediterranean.

Sertularella ornata Broch, 1933

Sertularella fusiformis f. *ornata* Broch, 1933: 74-76, fig. 29 [type locality: Split, Adriatic].

Sertularella fusiformis var. *ornata*; Picard, 1950: 194; Picard, 1955: 192.

Sertularella ellisi var. *ornata*; Picard, 1956: 265, fig. 3f.

Sertularella gaudichaudi f. *ornata*; Boero & Fresi, 1986: 146; García-Carrascosa, Escarti & Silvestre, 1987: 370, fig. 1I, J.

Sertularella ornata; Medel Soteras, García & García-Gómez, 1991: 526-528, fig. 10.

Material.— Off Tira, Mediterranean, 40-45 fms [= 73-82 m], 28.iv.1968, leg. Ch. Lewinsohn. NS 5508; RMNH Coel. no. 26801, slide no. 1900: several unbranched stems 15-20 mm high, on empty *Pecten* shell; no gonothecae.

Remarks.— The specimens agree with descriptions given by Broch (1933, as *Sertularella fusiformis* f. *ornata*) and Medel Soteras, García & García-Gómez, 1991. The geographical distribution seems to be exclusively or almost exclusively Mediterranean: Split, Adriatic (Broch, 1933), Bay of Marseille (Picard, 1950), Castiglione, Algeria (Picard, 1955), Portofino Promontory, Italy (Rossi, 1961; Boero & Fresi, 1986), Islas Columbretes, Gulf of Valencia, Spain (García-Carrascosa, Escarti & Silvestre, 1987) and both sides of the Strait of Gibraltar, viz. Ceuta and Isla la Tarifa (Medel Soteras, García & García-Gómez, 1991). This is the first record from the eastern Mediterranean.

Sertularella spec.

Material.— Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20196: unidentifiable young colonies on Bryozoa together with *Aglaophenia* spec. and *Campanularia/Clytia* spec.

Sertularia marginata (Kirchenpauer, 1864)

Dynamena marginata Kirchenpauer, 1864: 13, fig. 8a-c [type locality: Mare Pacificum (on algae)].

Desmoscyphus inflatus Versluys, 1899: 42, figs. 11-13.

Sertularia marginata; Bale, 1913: 125 [not *Sertularia marginata* Allman, 1877 = *Synthecium marginatum* (Allman, 1877)]; Picard, 1958: 2; Van Gernerden-Hoogveen, 1965: 130; Medel Soteras, García & García-Gómez, 1991: 514-516, fig. 5.

Sertularia inflata; Vervoort, 1959: 281-284, figs. 39-41; Vervoort, 1968: 48-52, figs. 23-24.

Tridentata marginata; Calder, 1991: 107-109, figs. 56-57 [full synonymy].

Material.— Tantura, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20197; RMNH Coel. no. 26820, slide no. 1919: many pinnate colonies 10-15 mm high, springing from stolon creeping on algae; a few gonothecae on stem. NS 20221; RMNH Coel. no. 26821, slide no. 1920: pinnate colonies 15-20 mm high, rising from stolon creeping on algae; some gonothecae on stem.

Tantura, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20184; RMNH Coel. no. 26794, slide no. 1893: colonies 10-15 mm high rising from stolon creeping on algae. No gonothecae, but with dense cover of *Hebella scandens* (Bale, 1888). NS 20218; RMNH Coel. no. 26822, slide no. 1921: small 5-12 mm high colonies rising from stolon creeping on algae; no gonothecae. With *Hebella scandens* (Bale, 1888).

Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20180; RMNH Coel. no. 26823, slide no. 1922: eight pinnate colonies 15-20 mm high springing from stolon creeping on algae; no gonothecae. Mixed with *Eudendrium* spec. and unidentifiable *Clytia* spec.

Off Palmakhim, 31°55'N 34°40'E, Mediterranean, 18 m, 24/26.i.1977, leg. B. Galil. NS 20257; RMNH Coel. no. 26824, slide no. 1923: several plumes c. 30 mm high on rhizoid of *Caulerpa* spec.; no gonothecae.

Off Palmakhim, 31°55'N 34°40'E, Mediterranean, 18 m, 02/04.v.1977, leg. B. Galil. NS 20242; RMNH Coel. no. 26825, slides no. 1924: large bunch of big colonies some as high as 60 mm, pinnate, no gonothecae. Mixed with Bryozoa; small, sterile athenate on some of stems.

Off Palmakhim, 31°55'N 34°39'E, Mediterranean, 35 m, 23/26.x.1977, leg. B. Galil. NS 20241; RMNH Coel. no. 26826, slide no. 1925: c. 20 colonies 20-25 mm high rising from stolon on algae, abundant gonothecae present along stem.

Remarks.— This species has a wide circumglobal distribution in tropical and subtropical parts of the Atlantic, Pacific and Indian Oceans (Van Gernerden-Hoogveen,

1965; Vervoort, 1966; Medel Soteras, García & García-Gómez, 1991). In the Mediterranean there are principally records from the eastern part that are specified by Picard (1958) though he thinks it unlikely that the species penetrated into the Mediterranean by means of the Suez Canal as it is fully absent from the Suez Canal zone. Picard also cites the presence of this species from almost identical localities as those specified above: the Israeli Mediterranean coast. Medel Soteras, García & García-Gómez (1991) record the species from the entrance to the Mediterranean: Strait of Gibraltar.

Family Thyroscyphidae
Thyroscyphus fruticosus (Esper, 1793)

Spongia fruticosa Esper, 1793: 188 [type locality not specified].

Thyroscyphus fruticosus; Spletstösser, 1929: 7-30, 122, figs. 1-11, 13-27 [synonymy]; Vervoort, 1967: 35-38, figs. 8-9; Millard, 1975: 323-325, fig. 104; Mergner & Wedler, 1977: 18, pl. 2 fig. 14; Gibbons & Ryland, 1989: 425-427, fig. 40 [synonymy]; Boero & Bouillon, 1993: 264.

Thyroscyphus vitiensis Marktanner-Turneretscher, 1890: 210, pl. 3 fig. 10.

Material.— Ras um Sud, southern tip Sinai, Red Sea, 09.iv.1972, leg. N. Gunderman & D. Popper. NS 20310; RMNH Coel. no. 26795, slide no. 1894: fragment 80 mm high, branched; no gonothecae. With *Hebella scandens* (Bale, 1888).

Remarks.— I have followed Gibbons & Ryland (1989) in synonymizing *Thyroscyphus vitiensis* Marktanner-Turneretscher, 1890, with *Thyroscyphus fruticosus* (Esper, 1893). The geographical distribution of this species includes tropical and subtropical parts of Atlantic, Indian and Pacific Oceans and has been summarized previously by Billard (1925), Leloup (1935) and Van Gernerden-Hoogeveen (1965). The species is quite common throughout the Red Sea (summary in Vervoort, 1967); the present record fits in the pattern of geographical distribution in that area. The records of this species from the Mediterranean seem to be entirely based on Marktanner-Turneretscher's old record from the Adriatic (1890: 205-206, as *Campanularia fruticosa*); this observation has never been confirmed.

Family Campanulariidae
Campanularia/Clytia spec.

Material.— Tantara, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20196: unidentifiable, young specimens on Bryozoa, together with *Aglaophenia* spec. and *Sertularella* spec.

Clytia gracilis (M. Sars, 1851)

Laomedea gracilis p.p. M. Sars, 1850: 138 [type locality: Lofoten, Norway]; M. Sars, 1857: 160, pl. 2 figs. 1-3, 5.

Campanularia pelagica Van Breemen, 1905: 205-209, fig. 18.

Laomedea gracilis Leloup, 1952: 155-157, fig. 88.

Laomedea pelagica; Vervoort, 1946: 285-288, fig. 126; Vervoort, 1959: 313-315, fig. 55b-c; Vervoort, 1972: 91-92, fig. 26c.

Clytia gracilis; Cornelius & Östman, 1986: 163-167; Calder, 1991: 54-57, fig. 31 [full synonymy].

Material.— Off Bardawill, 31°15'N 32°41'E, Mediterranean, 9 fms [= 16.5 m], 31.x.1975, leg. Tel-Aviv University. NS 20308; RMNH Coel. no. 25237, slide no. 594: small colony consisting of hydrothecae and a few smooth gonothecae rising from stolon creeping on *Aglaophenia elongata* Meneghini, 1845.

Remarks.— For a discussion concerning the tangled nomenclature of this species I refer to Cornelius & Östman (1986); the usage of the binomen *Clytia gracilis* (M. Sars, 1850) has since been validated by the International Commission on Zoological Nomenclature (Anonymous, 1988). Because of its frequent confusion with *Clytia hemisphaerica* (Linnaeus, 1767) it is not possible to state accurately the geographical distribution of this species, but it might well be just as widely distributed as that species. It occurs along the whole of the mainland coast of Europe, including the Mediterranean, extending from the Barents Sea (Naumov, 1960) as far south as Morocco (Patriti, 1970); it has also been recorded off the British coasts, be it from only three localities. In the North Sea plankton the pelagic colony is not rare. So far Mediterranean records have been restricted to the western part (Picard, 1958; García-Corrales, Aguirre Inchaurre & González Mora, 1978; Ramil & Vervoort, 1992); the species has now also been established in the eastern part. Widely distributed records are also known from the Pacific and Indian Oceans (summary in Calder, 1991), probably also including the Fiji Islands (Gibbons & Ryland, 1989).

***Obelia dichotoma* (Linnaeus, 1758)**

Sertularia dichotoma Linnaeus, 1758: 812 [type locality: 'in Oceano', narrowed by Cornelius, 1975b, to the coast of southwest England].

Obelia dichotoma; Hincks, 1868: 156-157, pl. 28 figs. 1, 1a-b; Cornelius, 1990: 550-555, figs. 2-3; Calder, 1991: 72-76, fig. 38 [full synonymy]; Ramil & Vervoort, 1992: 243-244, fig. 68c.

Laomedea dichotoma; Vervoort, 1946: 292-294, fig. 128.

Obelia dichotoma p.p. Cornelius, 1975a: 265-272, figs. 3-4; 1982: 117-119,

Material.— Haifa Bay, Str 32, 32°35'30"N 34°59'E, Mediterranean, sand-silt, 31 m, 10.vii.1974, leg. M. Tom. NS 20210; RMNH Coel. no. 25215, slide no. 601: a few colonies together with *Aglaophenia elongata* Meneghini, 1845, may belong to this species. Identification doubtful.

Remarks.— Cosmopolitan species widely distributed throughout the Mediterranean

(García-Corrales, Aguirre Inchaurre & González Mora, 1978, part of their material; Ramil & Vervoort, 1992; Broch, 1933). The definite occurrence of this species off the Israeli coast has not yet been established.

***Obelia geniculata* (Linnaeus, 1758)**

Sertularia geniculata Linnaeus, 1758: 812 [type locality probably Dover, Kent, England; on fucoid algae].

Obelia geniculata; Hincks, 1868: 149-151, pl. 25 figs. 1, 1a; Cornelius, 1975a: 272-278, figs. 1, 5 [full synonymy]; Cornelius, 1982: 119-120; Cornelius, 1990: 555-557, fig. 4.

Laomedea geniculata; Vervoort, 1946: 294-298, figs. 129-131.

Material.— Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn. NS 20189: small, 3-4 mm high colonies rising from stolon creeping on algae. Many gonothecae present, exclusively on stolon. N.B.

Stained specimen. NS 20194: developing colony on fragment of alga; no gonothecae. NS 20220: small fertile colony on algae, together with *Dynamena cornicina* McCrady, 1858.
 Tantara, Mediterranean, 08.vii.1954, leg. Ch. Lewinsohn. NS 20195: small colony without gonothecae together with *Dynamena disticha* (Bosc, 1802), on algae.
 Tantara, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20185: a number of young colonies 2-3 mm high, springing from stolon creeping on algae. No gonothecae. NS 20190: colonies several mm high from stolon creeping on algae; no gonothecae.
 Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20181: a few small colonies from creeping stolon, no gonothecae. Mixed with *Ventromma halecioides* (Alder, 1852) (bulk) and a few hydrothecae of *Orthopyxis integra* (Macgillivray, 1842).
 Off Palmakhim, 31°55'N 34°40'E, Mediterranean, 18 m, 24/26.i.1977, leg. B. Galil. NS 20257: many small, fine colonies on thallus of *Caulerpa* spec. No gonothecae.
 Off Palmakhim, 31°55'N 34°39'E, Mediterranean, 35 m, 24/26.i.1977, leg. B. Galil. NS 20249; RMNH Coel no. 26827, slide no. 1926: large number of 3-5 mm high stems from stolon creeping on c. 20 mm long stem or rhizoid fragment. Some gonothecae on stolon.

Remarks.— This is a cosmopolitan species of wide distribution throughout the Mediterranean (García-Corrales, Aguirre Inchaurre & Gonzalez Mora, 1978, et al.). Its presence off the Israeli coast has previously been established by Picard, (1958).

Orthopyxis integra (Macgillivray, 1842)

Campanularia integra Macgillivray, 1842: 465 [type locality: mouth of River Don, Aberdeen, Scotland, on *Tubularia indivisa* Linnaeus, 1758]; Vervoort, 1946: 274-276, figs. 120-121.
Campanularia caliculata Hincks, 1853: 178-179, pl. 5 fig. B; Hincks, 1868: 164-167, pl. 51 fig. 2.
Campanularia compressa Clarke, 1877: 214, pl. 8 figs. 5-6.
Orthopyxis compressa; Picard, 1958: 1.
Orthopyxis integra; Rees & Thursfield, 1965: 103-103; Cornelius, 1982: 60-67, fig. 6 [full synonymy].

Material.— Atlit, Mediterranean, summer 1946, leg. Ch. Lewinsohn. NS 20199; RMNH Coel. no. 26828, slide no. 1927: several hydrothecae rising from stolon creeping on algae; some gonothecae on stolon. NS 20227; RMNH Coel. no. 26829, slides no. 1928: many hydrothecae springing from a stolon creeping on algae; some gonothecae on stolon.
 Tantara, Mediterranean, 05.vii.1955, leg. Ch. Lewinsohn. NS 20190: small colony composed of creeping stolon and a few hydrothecae, on algae. No gonothecae. NS 20191; RMNH Coel. no. 26800, slide no. 1899: several hydrothecae rising from stolon on algae; no gonothecae. With *Sertularella fusiformis* (Hincks, 1861).
 Akhziv, Mediterranean, 26.vi.1960, leg. Ch. Lewinsohn. NS 20181: a few hydrothecae springing from a creeping stolon; no gonothecae. Mixed with *Ventromma halecioides* (Alder, 1852) (bulk) and a few stems of *Obelia geniculata* (Linnaeus, 1758).

Remarks.— In spite of the fact that much of the available material is sterile there can in my opinion be no reasonable doubt that it should be identified with *Orthopyxis integra* (Macgillivray, 1842); it agrees in detail with the description given by Cornelius (1982). Though the shape of the hydrothecae varies to some extent they all have a more or less thickened hydrothecal wall (considerably thickened in some specimens), leaving the circular and at times slightly everted hydrothecal rim untouched. There is a distinct subhydrothecal spherule; the pedicel is irregularly wrinkled or indistinctly ringed, particularly in its distal part. The gonothecae are strongly laterally compressed with flattened apex and are attached to the stolon by means of a short pedicel. Those that have been inspected are more broadly triangular than figured by Cornelius (1982, fig. 6c). In the NS 20199 material the blastostyle has two developing

medusa buds; in that from NS 20227 the gonothecae are almost empty, containing remnants only of the blastostyle; some of the (empty) gonothecae are larger, almost goblet-shaped and less laterally compressed. Both types occur on the same stolon and may point towards morphological difference between male and female gonothecae. This, however, could not be checked, both types being spent.

This species is widely distributed over all oceans ('nearly cosmopolitan', Cornelius, 1982), including the Mediterranean. The species has previously been reported from off the Israeli coast by Picard (1958, as *Orthopyxis compressa*).

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