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A NEW GENUS AND TWO NEW SPECIES OF HAPLOSCLERID SPONGES (PORIFERA: DEMOSPONGIAE) FROM THE TIMOR SEA, NORTHWEST AUSTRALIA

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ABSTRACT: Two new species of the Demospongiae order Haplosclerida are described, *Biminia macrotoxa* sp. nov. (Oceanapiidae), and *Acanthostrongylophora ashmorica*, gen. et sp. nov. (Petrosiidae), obtained from trawls off the northwest coast of Western Australia. Details are provided of other species obtained from the same collection, and held at the Museum of Victoria.

This paper presents descriptions of two previously undescribed sponges, one of which represents a new genus of the order Haplosclerida, both from the northwest coast of Australia. These species are part of a small collection of sponges made by Dr. C. C. Lu, aboard the R.V. *Hai Kung*, during March and April 1981.

The collection came from four localities in the Timor Sea: 1, North of Cape Londonderry, Joseph Bonaparte Gulf at 12° 39'S, 127° 04'E; 2, North of Penguin shoal, Holothuria Banks at 12° 51'S, 125° 44'E; 3, East of Montagu Sound, Bonaparte Archipelago at 13° 59'-14° 10'S, 124° 26'-55'E; 4, North of Barracouta shoals, Ashmore Reef at 12° 18'S, 124° 05'E. Specimens are housed at the Museum of Victoria, Melbourne (NMV) and fragments of each are stored at the Northern Territory Museum (NTM), Darwin. A fragment of one specimen is held at the Zoölogische Museum, Amsterdam (ZMA). Apart from the two new species described here, the collection contains the following sponges, (with locality: and NTM registration number). *Clathria coppingeri* Ridley (loc. 4: NTMZ1493), (Poecilosclerida: Microcionidae); *Echinodictyum asperum* Ridley and Dendy (3: NTMZ1486), and *E. mesenterinum* (Lamarck) (3: NTMZ1489), (Axinellida: Raspailiidae); an unrecognizable (partly macerated) *Oceanapia* sp. (3: NTMZ1482), (Haplosclerida: Oceanapiidae); *Callyspongia (Callyspongia)* sp. (4: NTMZ1494), (Haplosclerida, Callyspongiidae); *Psammocinia* sp. (3: NTMZ1485), (Dictyoceratida: Thorectidae); *Hippospongia* sp. (3: NTMZ1492), and *Hyatella* sp. (1: NTMZ1479), (Dictyoceratida: Thorectidae); *Dysidea* sp. (3: NTMZ1480), (Dictyoceratida: Dysideidae); *Ianthella flabelliformis* (Pallas) (2: NTMZ1497), (Verongida: Ianthellidae); *Caulospongia perfoliata* (Lamarck) (3: NTMZ1490), (Hadromerida, Suberitidae); 5 spp of *Cinachyra* (3: NTMZ1481, 1487, 1488, 1491; 4: NTMZ1496), and *Craniella* sp. (3: NTMZ1483), (Spirophorida: Tetillidae); *Corticum* sp. (3: NTMZ1484), (Homosclerophorida: Plakinidae). Previous records of sponges from the northwest coast and the North West Shelf of Western Australia are described elsewhere (Hooper in press). Terminology follows Van Soest (1980).

SYSTEMATICS

Order HAPLOSCLERIDA Topsent 1928
Family OCEANAPIIDAE Van Soest 1980
Genus **Biminia** Wiedenmayer 1977

Biminia macrotoxa sp. nov.
Figs 1-3

MATERIAL EXAMINED: Holotype NMVF51373 (NTMZ1478 fragment of holotype) from 120 naut. mls North of Cape Londonderry, Joseph Bonaparte Gulf, Timor Sea, Western Australia, lat. 12° 39'S, long. 127° 03'-06'E; Coll. C. C. Lu, R.V. *Hai Kung*, station no. 70032502, trawl, 88 m depth, 25 Mar. 1981. Paratype NTMZ1919 from Catalina Island, East Arm, Darwin Harbour, N.T., lat. 12° 29.5'S, long. 130° 54.5'E; coll. J.N.A. Hooper, SCUBA, 19 m depth, 9 Feb. 1984; mud-sand habitat.

DIAGNOSIS: Sponge oblong globular, firm, smooth, rounded lobate; fistules on upper surface, bifurcate, surmounted by oscula; fistules on under surface, rhizome-like; few oscula also flush with surface; ectosome microscopically hispid, with spongin crust 100-150 μm thick, containing uni- or pauci-spicular subisodictyal spicule tracts; choanosome with multispicular tracts, some vaguely ascending, and uni- or pauci-spicular tracts forming a disorganized subisodictyal reticulation; megascleres oxea, divided (arbitrarily) into two size ranges, 161-260 (204.44 μm, mean) long, 2-7 (4.1 μm) wide, 238-279 (255.8 μm) long, 7-11 (9.4 μm) wide; microscleres: toxa with reflexed tips, 8-82 (43.68 μm) chord length, 0.4-3.5 (1.66 μm) wide at widest point; sigmas, mostly centrangulate, 9-35 (18.76 μm) chord length, 0.5-2.0 (1.14 μm) wide.

DESCRIPTION OF HOLOTYPE: Sponge oblong-discoid, globular to lobate, 120×80×30 mm thick. Colour is light brown-beige in ethanol (Munsell 2.5Y8/4-lighter). Texture is firm, only slightly compressible, and moderately easily broken. Surface is smooth, optically even, with a few rounded lobes or bumps on upper surface, and several holes passing completely through the sponge; holes are 5-12 mm in diameter. Under-surface more convoluted, with rounded lobes and vermiform

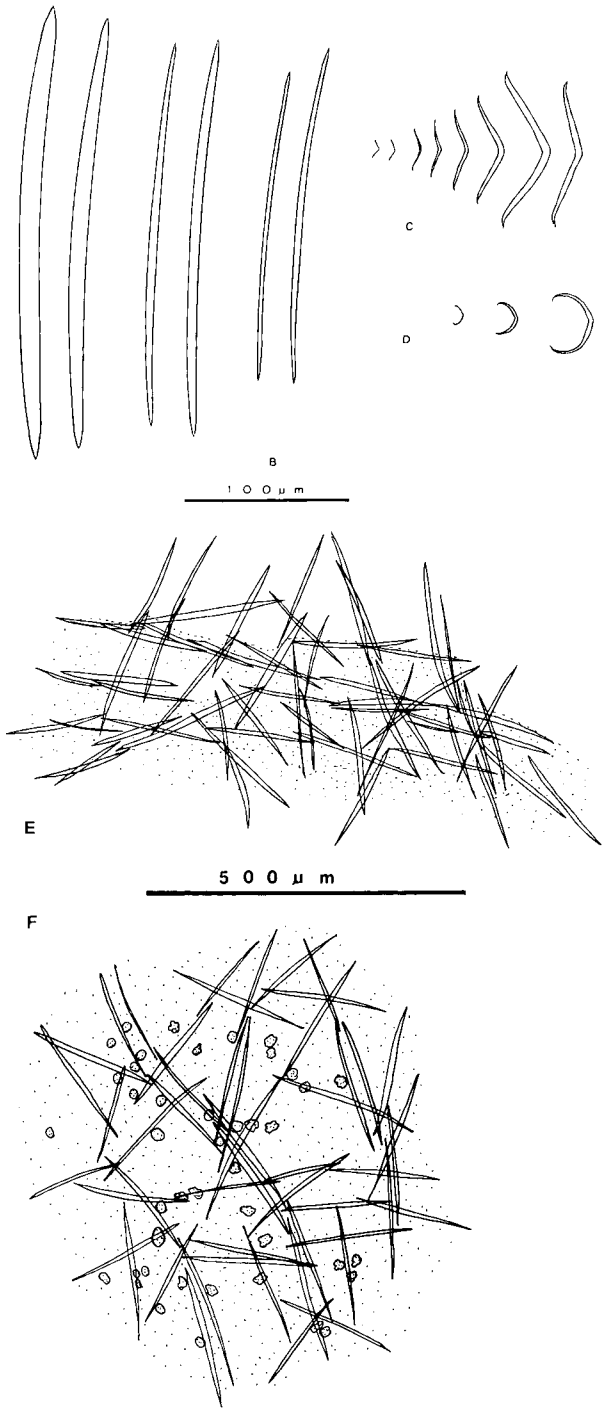

Fig. 1—*Biminia macrotoxa* sp. nov. skeletal components. A, large oxeas. B, smaller oxeas. C, toxas. D, sigmas; skeletal architecture, E, perpendicular section of peripheral skeleton. F, tangential view of ectosomal skeleton.

fistules. Remains of approximately 10 small fistules are present on upper surface, but few are entirely intact;

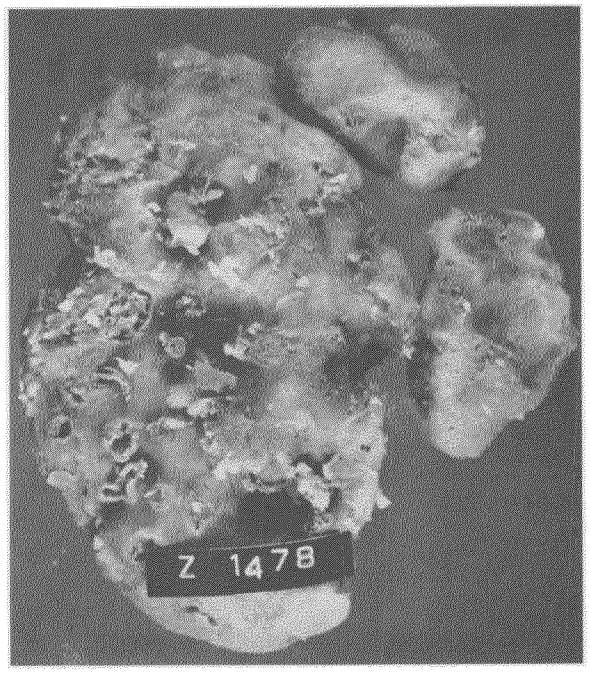

Fig. 2—*Biminia macrotoxa* sp. nov. Holotype NTMZ1478 (NMVF51373). 120×80 mm.

these are 6-10 mm long, 4-5.5 mm in diameter at base, 4-5 mm diameter at apex. Oscula are few, scattered over upper surface, fewer on underside; oscula measure 1.5-4.0 mm in diameter (flush with surface), and 3-4.5 mm in diameter on tips of fistules.

Ectosome is microscopically hispid, with tips of the ultimate spicules from choanosomal tracts poking through the ectosomal crust. The ectosome has a spongin crust, 100-150 µm thick, with a uni- or bi-spicular subisodictyal surface reticulation. In cross-section, the tangential ectosomal skeleton appears to be mainly unispicular, and only occasionally bispicular, with tips of adjacent spicules overlapping slightly. Little to no spongin is present at spicule nodes, and if present, it is always loose (non-fibril) spongin. In transverse-section, the ectosomal skeleton can be seen as occasional meandering bispicular tracts, 20-40 µm wide, with numerous single spicules or uni-spicular tracts crossing at a vaguely triangular or rectangular isodictyal pattern. Subisodictyal architecture of the ectosomal skeleton is partially obscured by the projecting spicules of the choanosomal skeleton.

Spongin is granular, light brown in colour, occurring in ovoid bodies or as an amorphous conglomerate. Although spongin is mainly evenly distributed on ectosome, it is heavier in some regions, particularly at the base of fistules.

Choanosome is cavernous only below fistules, with cavities and canals measuring 150-550 µm in diameter, but is mostly densely packed with an irregular or subisodictyal reticulation of (vaguely ascending)

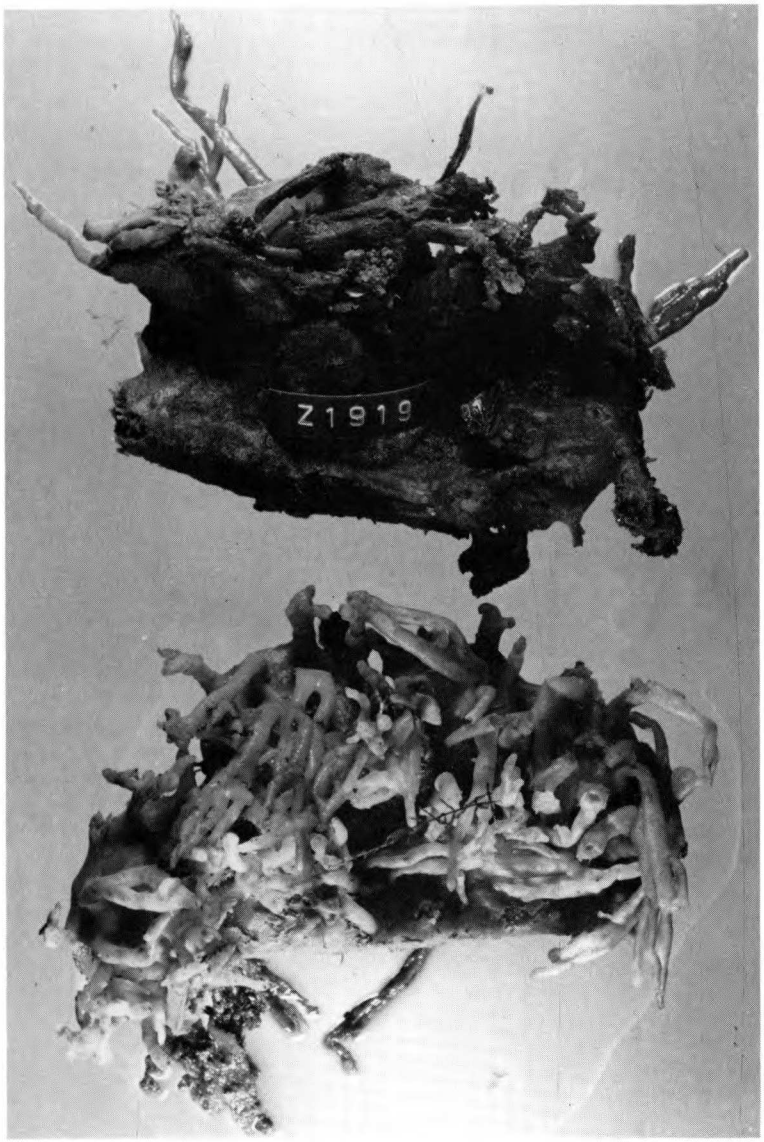

Fig. 3 – *Biminia macrotoxa* sp. nov. Paratype NTMZ1919 130 × 150 mm. Specimen cut in half. Upper portion shows under-surface; lower portion shows fistules on upper-surface.

multispicular tracts, 70-110 μm wide, consisting of 5-10 spicules abreast. Many multispicular tracts terminate at surface, with ultimate spicules projecting through ectosome. These are crossed by uni- or pauci-spicular tracts, 10-40 μm in width, or other non-ascending multispicular tracts, sometimes forming rectangular meshes, but mostly irregular and confused. Spicule tracts are thickest and most densely packed on inner surface of fistule walls, 80-150 μm thick, with up to 15 spicules abreast. Choanosomal spongin is mainly only visible around multispicular tracts, but patches of light spongin occur haphazardly throughout choanosome.

SKELETAL COMPONENTS (N = 25): Megascleres. Oxeas arbitrarily divided into two categories based on size; smaller variety fusiform, always sharply pointed, symmetrical, 204.44 μm long, 4.1 μm wide (mean), (range: 161-260 × 2-7 μm respectively); larger size category fusiform to hastate, sharply pointed, a few with slightly constricted or bluntly rounded ends, rarely with asymmetrical ends; 255.8 μm long, 9.4 μm wide (mean), (range: 238-279 × 7-11 μm respectively).

Microscleres. Toxas abundant, tricurvate, smooth mostly sharply bent at midsection, some rounded at bends, all with reflexed tips, variable size range; distributed throughout sponge, mostly associated with spongin; 43.68 μm chord length, 1.66 μm at widest point (mean), (range 8-82 × 0.4 – 3.5 μm respectively). Sigmas abundant, smooth, mostly centrangulate, few rounded C-shaped, variable size range; distribution as for toxas; 18.76 μm chord length, 1.14 μm at widest point (mean), (range 9-35 × 0.5 – 2.0 μm respectively).

DESCRIPTION OF PARATYPE: Sponge massive, lobate

TABLE 1
COMPARISON OF NEW AND KNOWN SPECIES OF *Biminia*
All measurements in micrometres unless otherwise indicated

	B. macrotoxa sp. nov.	*B. toxophila* (Dendy)	*B. stalagmitica* Wiedenmayer	*B. ooita* Hoshino
shape:	oblong, lobed	irregular, fusiform, tuberous	semi-encrusting base	spherical, massive
fistules:	bifurcate, on upper surface; rhizome-like on under surface; (6-60 × 4-8 mm)	2, tapering at each end (6-55 × 4 mm)	low or compound, some with oscula; rhizome-like fistules on under-surface (2-17 × 2-10 mm)	numerous, on upper surface only (20-40 × 6-8 mm)
surface:	smooth, lobed, even, microscopically hispid	uneven, irregular	smooth, velvety, microscopically hispid	smooth, even
texture:	firm, slightly compressible	rigid, brittle	tough, stiff	slightly compressible
ectosome:	100-150	'thin'	300-500	50-70
oxeas:	94-279 × 1.5-11	300 × 12	100-155 × 3.5-5	180-218 × 7-9
toxas:	8-82 × 0.4-3.5	57 or smaller	10-32 × 1	14-35 × 1
sigmas:	9-35 × 0.5-2	16.4	11-32 × 1	up to 45
source:	present study	Dendy, 1922, p. 45	Wiedenmayer, 1977. p. 124	Hoshino, 1981, p. 122
locality:	Timor Sea, Western Australia and Darwin, Northern Territory	Providence, Seychelles, Indian Ocean	Bimini, Western Bahamas	Ooita, Japan

base, 130 × 150 × 20-30 mm thick. Colour grey alive and in spirit (Munsell 5YR 7/2-lighter). Texture is compressible, easily broken. Surface as for holotype. Undersurface with several fistules, up to 60 mm long, 6 mm diameter, with terminal bifurcations, rhizome-like. Upper surface with numerous elongate hollow fistules, up to 60 mm long, 8 mm diameter, mostly with bifurcate tips, some surmounted by terminal oscula, others ending blindly; white alive, beige to grey in ethanol (5YR 8/2-lighter to 5YR 7/2).

Skeletal components (N = 25). Megascleres: oxeas 166.9 μm long, 2.73 μm wide (mean) (range: 94-197 × 1.5-4 μm respectively); 201.05 μm long, 8.1 μm wide (171-230 × 6-10 μm respectively). Microscleres: toxas 31.45 μm chord length, 1.48 μm maximum width (11-63 × 0.5-3 μm respectively); sigmas 16.15 μm chord length, 1.4 μm maximum width (11-24 × 0.5-2 μm respectively).

ETYMOLOGY: The specific name refers to the relatively large toxon microsclere which is found in this species.

DISCUSSION: The genus *Biminia* was erected by Wiedenmayer (1977, p. 124) for two species, *Oceanapia toxophila* (Dendy 1922), the type-species, and *Biminia stalagmitica* Wiedenmayer. Both species have a spongin-enforced, tangential, ectosomal crust and fistules, typical of *Oceanapia* Norman species, but differ from that genus in having toxas as well as sigmas for microscleres. Wiedenmayer notes also that *Biminia* shows similarity to *Orina* Gray, in the haplosclerid family Haliclonidae (*sensu* Van Soest 1980) particularly in spiculation, but differs from Orina, and other haliclonids, by the presence of blind fistules, a denser, more heterogeneous main skeleton lacking definite ascending spicule tracts, and a compound, often multilayered ectosomal crust (Wiedenmayer 1977, p. 125, Van Soest 1980, p. 85, 114). Hoshino (1981, p. 121) described a third species, *Biminia ooita* from Japan. All three species differ from *Biminia macrotoxa*, sp. nov. in most details of morphology and in skeletal measurements (Table 1). The validity of *Biminia* has been questioned by Van Soest (1980, p. 115), as he suggests that the presence of toxa may not be of sufficient importance to distinguish taxa at the generic level, and that *Biminia* is probably a junior synonym of *Oceanapia*. *Biminia* may be an artificial grouping but in practice offers a convenient basis for separation and differentiation of a large group of *Oceanapia*-like forms, one group with toxa (*Biminia*), the other without toxa (*Oceanapia*).

Family PETROSIIDAE Van Soest 1980

Acanthostrongylophora gen. nov.

DIAGNOSIS: Petrosiidae, with a lamellate-isotropic, heavily-meshed reticulation of spicule tracts cored by thick strongyles, and fewer, thin oxeas. Choanosome cavernous, spongin light, crumb-of-bread texture. Ectosome with an irregular subrectangular loose reticulation of megascleres. Microscleres microstrongyles, with minute microspines covering surface.

Acanthostrongylophora ashmorica sp. nov.

Figs 4, 5

MATERIAL EXAMINED: Holotype NMVF51374;

(NTMZ1495, Z.M.A. fragments of holotype) from north of Barracouta Shoals, Ashmore Reef, Timor Sea, Western Australia, lat. 12° 18′-19′S, long. 124° 04′-06′E; Coll. C. C. Lu, R.V. *Hai Kung*, station no. 70033105, trawl, 80-91 m depth, 31 Mar. 1981. Other Specimens: NTMZ1779 from west of Port Hedland, Western Australia, lat. 19° 4.2′S, long. 118° 54.0′E, coll. T. Ward, CSIRO R.V. *Soela* station no. 122, trawl, 82 m depth, 29 Aug. 1983; NTMZ1884 from west of Port Hedland, Western Australia, lat. 19° 2.2′S, long. 118° 4.1′E, coll. T. Ward, CSIRO R.V. *Soela* station no. 136, trawl, 84 m depth, 1 Oct. 1983. (Both specimens fragmented).

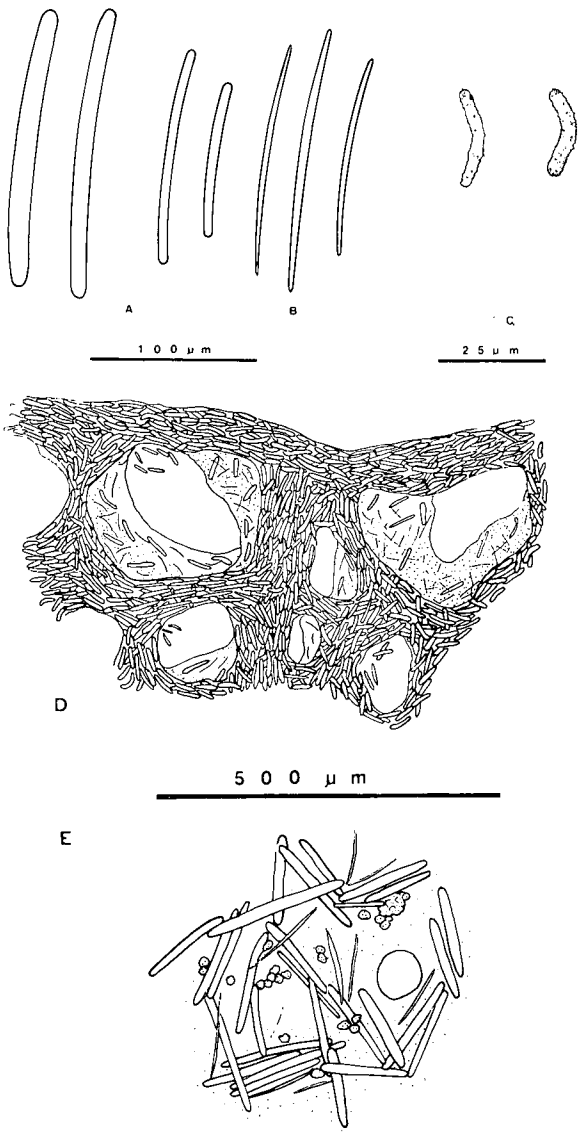

Fig. 4—*Acanthostrongylophora ashmorica* gen. et sp. nov. skeletal components. A, strongyles. B, oxeas. C, microstrongyles; skeletal architecture. D, perpendicular section of peripheral skeleton. E, tangential view of ectosomal skeleton.

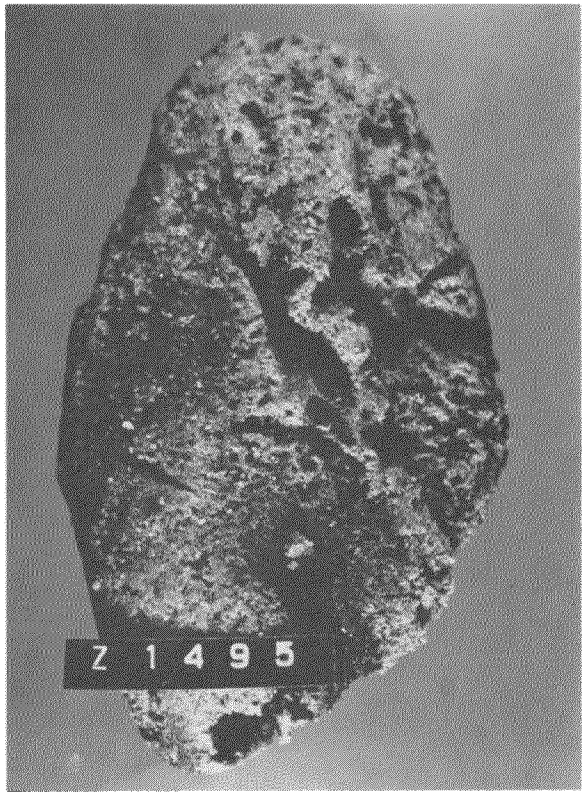

Fig. 5—*Acanthostrongylophora ashmorica* gen. et sp. nov. Holotype NTMZ1495 (NMVF51374) 150×80 mm.

DIAGNOSIS: Sponge massive, erect; firm, crumb-of-bread texture; sculptured, grooved surface; oscula large, flush with surface; thin transparent ectosome with subrectangular reticulation of loose megascleres and few microscleres; the choanosome is a heavily meshed reticulation of multispicular tracts, forming irregular ovoid meshes, halichondroid in places; megascleres are strongyles, 105-174 µm (153.36 µm, mean) long, 5-12 µm (8.28 µm) wide, and thin oxeas 98-173 µm (139.56 µm) long, 1-4 µm (2.44 µm) wide; microscleres are granular (minutely microspined) microstrongyles, 16-23 µm (1.88 µm) long, 1.5-4 µm (3.08 µm) wide.

DESCRIPTION OF HOLOTYPE: Sponge massive, elongate, oblong-cylindrical, probably erect (only portion of sponge was collected), measuring 150×80×90 mm at its widest. Colour is yellow-brown, slightly variegated, darker in grooves and ridges than on smoother areas of the surface (Munsell 5YR 3/4 to 2.5Y 8/4 in ethanol). Texture is firm to stony, barely compressible, but slightly brittle and relatively easy to crumble (and consequently difficult to section). In general, the consistency of the sponge resembles aggregated bread crumbs. The surface is shaggy, optically uneven, with a few large, deeply sculptured grooves and holes. Several large

oscula are present, not confined to any particular region of the surface, 7-15 mm in diameter.

Ectosome is thin, transparent (where it is intact), containing scattered pores, 40-65 μm in diameter, and an irregular, sub-rectangular reticulation of loose strongyles, interdispersed with oxeas and globular deposits of light spongin. The nodes of adjacent spicules are not connected by spongin; few microstrongyles are seen on the ectosome.

Spongin, where visible, is extremely light, occasionally granular, sometimes aggregated into ovoid bodies, and brown in colour.

Choanosome is cavernous in places, consisting of an irregular, heavy-meshed reticulation of thick spiculetracts, 100-150 μm wide, fully cored by thick strongyles. Reticulation forms vaguely ovoid meshes, which are sometimes indiscernable from the halichondroid mass of single strongyles and oxeas which occur between many meshes. Mesh size ranges from 150 to 730 μm in diameter, sometimes containing light spongin, invariably containing loose megascleres, rarely microstrongyles.

SKELETAL COMPONENTS ($N=25$): Megascleres. Strongyles straight to symmetrically curved; variable in size and thickness; mostly evenly rounded, but some are strongyloxeote, with slightly tapering extremities; 153.36 μm long, 8.28 μm wide (mean), (range: 105-174 × 5-12 μm respectively). Oxeas invariably thin, curved, mostly fusiform, sharp-pointed, some are hastate, approaching strongyloxeas, with slightly rounded or bluntly-pointed extremities; 139.56 μm long, 2.44 μm wide (mean), (range 98-173 × 1-4 μm respectively).

Microscleres. Microstrongyles few, small, rounded extremities, slightly curved or straight; all with a granular appearance, produced by minute microspines covering the surface, resembling thick spirasters; 18.8 μm long, 3.08 μm wide (mean), (range: 16-23 × 1.5-4 μm respectively).

DESCRIPTION OF OTHER SPECIMENS: Two specimens, both fragmented, formerly elongate to globular, approximately 60-80 × 50-60 × 40-60 mm at widest point. Colour as for holotype. Texture is barely compressible, but very easily crumbled. Surface is shaggy, crumb-of-bread.

SKELETAL COMPONENTS: Megascleres.Strongyles ($N=25$) 159.05 μm long, 9.65 μm wide (mean) (range: 130-177 × 6-12 μm respectively). Oxeas ($N=25$) 133.7 μm long, 3.9 μm wide (79-170 × 2-6 μm respectively). Microscleres. Microstrongyles rare ($N=10$) 18.8 μm long, 3.2 μm wide (17-23 × 2-5 μm respectively).

ETYMOLOGY: This species is named for its first locality of collection, Ashmore Reef, Timor Sea.

DISCUSSION: *Acanthostrongylophora ashmorica* gen. et sp. nov. is closely related to the genus *Strongylophora* Dendy 1905, but differs in having acanthose microstrongyles. It also differs from other species of *Strongylophora*, except the type species of that genus, *S. durissima* Dendy 1905, in having a crumb-of-bread texture with a shaggy uneven surface. Apart from these characters, the present species may be differentiated from other members of *Strongylophora* as follows. *S. durissima* from Ceylon, Madagascar and Aldabra, has larger strongyles (260 × 20 μm), and smaller oxeas (28 × 2 μm); *S. strongylata* (Thiele 1903) from Indonesia, is digitate, has larger strongyles (325 × 20 μm), and smaller oxeas (40 μm long); *S. dendyi* Hechtel 1969 from Barbados, is encrusting, has two distinct sizes of large strongyles (205 × 7, 110 × 5 μm respectively), and smaller oxeas (22 × 1.5 μm); *S. davilai* Alcolado 1979 from Cuba, has small oxeas (30 μm long); and *S. hartmani* van Soest 1980 from Barbados, has larger strongyles (340 × 34 μm), and two sizes of oxeas (252 × 6, 91 × 4 μm respectively). Van Soest (1980, p. 78, 136) provides a more detailed summary of the diagnostic characters for these species. Altogether *A. ashmorica* is most similar to *S. durissima*, which has an Indian Ocean distribution.

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