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DEMOSPONGIAE OF MINICOY ISLAND (INDIAN OCEAN) — PART 2 ORDER POECILOSCLERIDA

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ABSTRACT

Detailed systematic account of 11 species of Poecilosclerideon sponges referable to 6 families and 8 genera collected from Minicoy Island is presented in this paper.

INTRODUCTION

IN THIS part, the second in this series, the systematics of 11 species of the order Poecilosclerida is dealt with in detail. In general, this order includes a sizable fraction of all the described species and genera of the phylum Porifera, and as in the case of any other collection of Porifera made elsewhere, in Minicoy also the Poecilosclerideon sponges form a major group. Out of a total of 41 species collected from this island, 11 species (*i.e.* 26.8%) come under this order.

ORDER : POECILOSCLERIDA Topsent

Family : *Phorbasidae* de Laubenfels

Echinodictyum longistylum Thomas

(Fig. 1 a)

Echinodictyum longistylum Thomas 1968 a, p. 246, pl. I A, B, pl. II A-C.

Material : One specimen (Reg. No. 9).

Description : Body consists of a flattened stalk bearing foliaceous branches. Total height 30 mm ; branches 3-5 mm wide and 1 - 1.5 mm thick.

Colour : Dark Gray.

Consistency : Leathery.

Osoules and pores, not traceable.

Skeleton consists of main tracts running longitudinally along the stalk and branches. Both main and connective tracts are not well defined. Spongin is present in noticeable quantities. Long styles, projecting from the interior, give a characteristic appearance to the surface.

Spicules : (1) Oxeas (Fig. 1 a^1) Uniformly curved ; size 0.711 × 0.011 mm when well developed. (2) Thin oxeas (Fig. 1 a^2) Size 2.07 × 0.008 mm. (3) Styles (Fig. 1 a^3). Quite characteristic of this species ; head slightly

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developed, size upto 3 × 0.008 mm. (4) Thin styles (Fig. 1a[4]). Setaceous; size upto 0.611 × 0.004 mm (5) Acanthostyles (Fig. 1 a[5]). Head somewhat well developed and spined or granulated throughout. Size 0.105 × 0.004 mm.

Remarks: There is considerable similarity between this species and *Dictyocylindrus lactnatus* Carter (1879 a) from Mauritius with regard to the arrangement of spicules. Morphologically there is considerable similarity between the specimens of *E. longistylum* and *Dictyonella desyphylla* de Laubenfels (1954) from the Palaus (West Central Pacific).

Distribution: Indian Ocean.

Damiriana schmidti (Ridley) (Fig. 1 b)

Crella schmidti Ridley 1884, p. 432, pl. 41, fig. aa.

Damiriana schmidti Levi 1958, p. 30, fig. 25 Tomas 1973, p. 25, pl. 1, fig. 13 (Synonymy).

Material: One specimen (Reg. No. 10).

Description: Body encrusting, thickness 1 - 1.5 mm. Surface conulose, conules 1 - 1.2 mm high and often united to form ridges. Subdermal canals extensive and roofed by dermal membrane.

Colour: Pale gray and consistency, friable. Oscules not traceable; pores minute, about 0.5 mm in diameter.

Dermal skeleton composed of tangentially arranged tylotes and microscleres. Main skeleton is a triangular to rectangular meshed reticulation of oxeas, each side of which is formed of 2-4 oxeas arranged side by side. Spongin is noted only at the tips of the spicules. Thick bands of oxeas or illdefined fibres are also noted at the deeper parts.

Spicules: (1) Tylotes (Fig. 1 b[1]) Dermal; straight with oblong heads. Size 0.182 - 0.221 (0.202 mm) × 0.003-0.005 mm. (2) Oxeas (Fig. 1 b[2]) slightly curved and sharply pointed. Size 0.182 - 0.231 (0.212 mm) × 0.003 - 0.012 (0.008 mm). (3) Sigmas (Fig. 1 b[3]) C or S shaped; chord length varies from 0.008 - 0.016 (0.012 mm); not divisible into two sets. (4) Isochelas (Fig. 1 b[4]) arcuate, chord length varies from 0.018 - 0.032 (0.025 mm).

Distribution: Red Sea, Indian Ocean, Australian region, Pacific Ocean.

Family: *Agelasidae* Verrill

Agelas mauritiana (Carter)

(Fig. 1 c, d)

Agelas mauritianus Ridley and Dendy 1887, p. 164, pl. 29, fig. 10.

Agelas mauritiana de Laubenfels 1954, p. 113, fig. 72. Levi 1961, p. 22, fig. 29, Thomas 1979 a, p. 56, pl. 3 figs. 7, 7A.

Material: One specimen (Reg. No. 11)

Description: The specimen, in shape, resembles *Hyattella cribriformis* (Hyatt) collected from the same locality. Highly cavernous, size 40 × 30 mm and irregular in shape.

Colour: Pale yellow when dry.

Consistency: Compressible with poor resiliency.

Conules well developed at the growing tips only. Older parts more or less glabrous. Wall punctured with circular openings.

Main skeleton is an irregular net work of pale amber coloured fibres ranging in diameter from 0.021 - 0.084 mm. Echinating spicules are noted abundantly at the per pheral parts only and fibres of deeper parts often devoid of such spicules (Fig. 1 c)

Spicules: (1) Styles (Fig. 1 d). Vertically spined; whorls 14-20 in number. Spicules rarely smooth or partly annulated. Size 0.105 - 0.210 (0.160 mm) × 0.006-0.008 (0.007 mm).

Distribution: Red Sea, Indian Ocean, Australian region, Pacific Ocean.

Agelas ceylonica Dendy (Fig. 1 e, f)

Agelas ceylonica Dendy 1905, p. 174, pl. 12, fig. 9. Levi 1961, p. 23, fig. 30. Thomas 1968, Ph.D. Thesis.

Ectyon ceylonica Dendy 1921, p. 73, pl. 6, fig. 2.

Material: One specimen (R. No. 12).

Description: Encrusting, thickness 3 mm (average); size 40 × 25 mm.

Colour: Gray and consistency compressible with good resiliency.

Oscules scattered, diameter about 2 mm average (several other openings looking exactly like oscules are also seen, but they are only the openings of engulfed cirripedes).

Surface conulose, cunules formed by the extremities of main fibres. Compound conules formed by the union of the terminals of several fibres are also noted. Conules often covered by a thin aspiculous dermal membrane.

Both main and connecting fibres are echinated by acanthostyles. Spongin is pale yellow in colour and fibres are never cored by spicules. Echinating spicules are plenty in the peripheral fibres (Fig. 1 f)

Spicules: (1) Styles: (Fig. 1 e) Verticillately spined, whorls 8-24 in number. Smooth or partly annulated styles are also met with. Measurements of styles and those reported by previous workers are given in Table 1.

Distribution: Indian Ocean.

Agelas sp. (Fig. 1 g, h, i)

Material: A small fragment, probably of a tubular specimen (Reg. No. 13)

Description: Surface microscopically hispid, size 3 × 8 mm and thickness 1-1.5 mm.

Colour: Pale brown in formalin (5%).

Consistency: Compressible with poor resiliency.

Ectosome and endosome are not separable (since this is only a fragment, details regarding oscules and pores are not traceable).

The fibres run through the middle part of the well lengthwise and the acanthostyles are arranged on these fibres vertically with their head burried in spongin and tips piercing the surface and the inner part of the wall at right-angles. The fibres are pale yellow in colour and the average diameter is 0.040 mm (Fig. 1 g, h).

Spicules: (1) Styles (Fig. 1 i) Slightly curved and sharply pointed. Spines often blunt; and in 12-18 whorls. Smooth forms are also noted. Size 0.117 - 0.271 (0.239 mm) × 0.008-0.033 (0.025 mm).

TABLE 1. *Spicular measurements (in mm) of* A. ceylonica *recorded by the previous and present authors*

Author and year	Locality	Length of styles	Width of styles
Dendy, 1905	Ceylon	0.24	0.02
Dendy, 1921	Cargados	0.32	0.025
Levi, 1961	Canal Johny	0.080—0.275	0.005—0.015
Thomas, 1968	Gulf of Mannar	0.088—0.4 (0.241)	0.007—0.019 (0.011)
Thomas (in this paper)	Minicoy	0.105—0.357 (0.226)	0.006—0.012 (0.010)

Family : *Myxillidae* Hentschel

Myxilla sp. (Fig. 1 j, k, l)

Material : A small encrustation on a coral. Height about 4 mm ; area occupied 16 × 8 mm (Reg. No. 14).

Description : Surface conulose, conules formed by the extension of primary fibres, at a distance of 0.5 - 1 mm ; and with terminal brush-like spicules. Dermal membrane stretch across the conules.

Colour : Brown when dry.

Consistency : Soft with slight resiliency.

Oscules and pores not traceable. The skeleton consists of coarse primary fibres connected by secondaries in a scalariform pattern. The diameter of primaries varies from 0.05 - 0.08 mm and that of secondaries, from 0.04 - 0.06 mm. The primaries and secondaries are uniformly cored with strongyles and echinated with acanthostyles. The microsclers are found in plenty in the dermal parts. Spongin is pale yellow in colour (Fig. 1 j, k).

Spicules : (1) Strongyles or styles (Fig. 1 1^1, 1^2). They are seen coring the fibres and also in the dermal part. Stylote modifications are sparsely noted. Size 0.147 - 0.193 (0.176 mm) × 0.004 mm. (2) Acanthostyles (Fig. 1 1^3, 1^4) Two types are noted ; the dimensions are (i) 0.063 × 0.008 mm and (ii) 0.134 × 0.012 mm. (3) Isochelas (Fig. 1 1^5) Semicircular, chord, 0.025 mm.

Family : *Tedaniidae* Ridley and Dendy

Tedania anhelans (Lieberkuhn) (Fig. 1 m)

Tedania anhelans Thomas 1973, p. 29, pl. 1, fig. 15 (Synonymy).

Material : One specimen (Reg. No. 15).

Description : Body encrusting ; thickness 1-1.5 mm. Surface conulose, conules 1-1.5 mm high ; sometimes unite together to form ridges.

Colour : Gray when dry and with friable, consistency.

Spicules : (1) Styles (Fig. 1 m^1) Slightly curved and sharply pointed. Size 0.199 - 0.245 (0.233 mm) × 0,006 × 0.008 (0.007 mm). (2) Tornotes (Fig. 1 m^2) Straight with oblong and spined heads. Size 0.182 - 0.235 (0.221 mm) × 0.004 mm. (3) Onychaetes (Fig. 1 m^3) Slender, one end wider than the other ; size 0.099 - 0.184 mm.

Distribution : Cosmopolitan.

Family : *Ophlitaspongiidae* de Laubenfels

Clathria reinwardti Vosmaer (Fig. 1 o)

Clathria reinwardti Bergquist 1969, p. 184, pl. 4, fig. 2.

Material : Two specimens (Reg. No. 16).

Description : Specimen (branches ?) laterally compressed and flattened at the growing tips. Diameter 10 mm average. Length 70 mm and 110 mm respectively.

Colour : Pale gray when dry.

Consistency : Compressible.

Surface irregularly ridged ; ridges extensive and oblique with deep valleys in between. Oscules small, diameter about 0.5 mm and situated in the valleys found in between the ridges. Surface microscopically hispid due to the presence of dermal brushes.

Both primaries and secondaries are cored and echinated alike. The terminal part of primaries and the outer most secondaries support the dermal skeleton, which is composed of either erect or tangentially placed spicules. The dermal skeleton, in dry condition, forms a white encrustation over the surface.

Spicules : (1) Styles (Fig. 1 o^1) Slightly curved and sharply pointed. Size 0.128 - 0.281 (0.240 mm) × 0.005 - 0.014 (0.01 mm). (2) Achanthostyles (Fig. 1 o^5) Stout with blunt or pointed tips (Acanthostrongyles are very

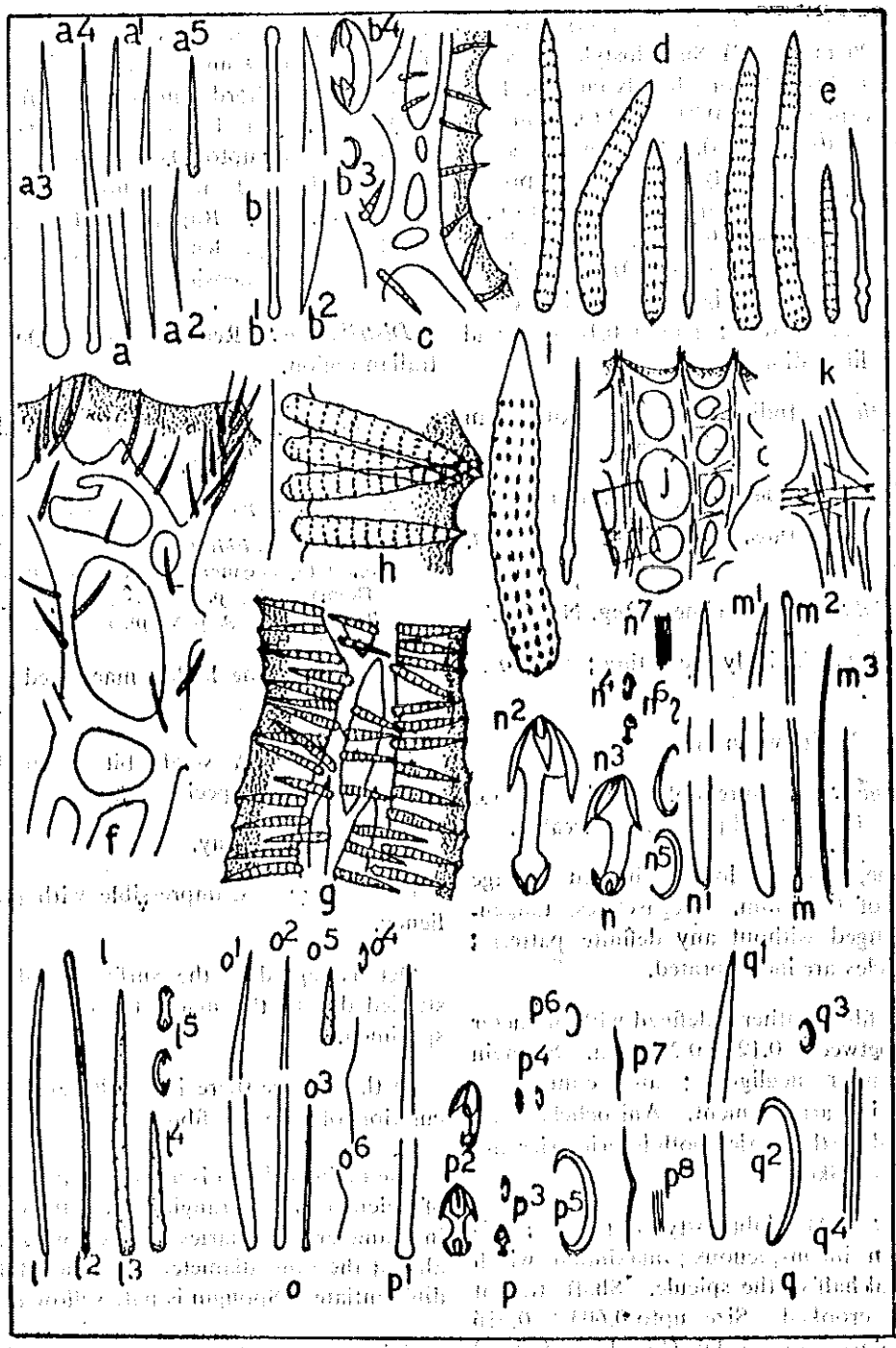

Fig. 1. Species of Poecilosclerideae sponges. a. *Echinodictyum longistylum*; b. *Damiriana schmidti*; c & d. *Agelas mauritiana*; e & f. *A. ceylonica* g, h & i. *Agelas* sp, j, k & l. *Myxilla* sp, m. *Tedania anhelans*; n. *Mycale grandis*; o. *Clathria reinwardti*; p. *Zygomycale parishii* and q. *Biemna fortis*.

rare). Size 0.06-0.09 (0.078 mm) × 0.004 - 0.007 (0.006 mm). (3) Subtylostyles or styles (Fig. 1 o²) Straight or slightly curved, head rarely with spines. Size 0.21 - 0.32 (0.24 mm) × 0.004 - 0.008 (0.007 mm). (4) Dermal styles (Fig. 1 o³) Shaft slightly curved, head prominent and with minute spines. Size 0.1 - 0.14 (0.12 mm) × 0.002 - 0.004 mm. (5) Isochelas (Fig. 1 o⁴) Chord Length 0.016 mm, fairly common. (6) Toxas (Fig. 1 o⁶) With a curve at the central portion ; length 0.18 mm and with hair-like dimensions.

Distribution : Indian Ocean, Australian region.

Mycale grandis Gray (Fig. 1 n)

Mycale grandis Thomas 1973, p. 35, pl. 2, fig. 7. (Synonymy).

Material : One specimen (Reg. No. 17).

Description : Thickly encrusting ; size 20 × 20 × 6 mm.

Colour : White when dry.

Consistency : Compressible with poor resiliency. Oscules and pores not traceable.

Ectosome, well developed with an average thickness of 0.08 mm. Megascleres, tangentially arranged without any definite pattern ; sand particles are incorporated.

Primary fibres rather illdefined with diameter varying between 0.121 - 0.261 mm. Spongin content rather negligible ; and connectives irregular in arrangement. Anisochelas are often found partly burried both in primaries and secondaries alike.

Spicules : (1) Subtylostyles (Fig. 1 n¹) Head often inconspicuous ; maximum width at the distal half of the spicule. Shaft straight or slightly crooked. Size upto 0.603 × 0.016 mm. (2) Large anisochelas (Fig. 1 n²) Lateral teeth long and pointed ; or even suppressed. Chord length upto 0.135 mm. (3) Medium anisochelas (Fig. 1 n³) Chord length varies from 0.025-0030 mm. (4) Small anisochelas (Fig. 1 n⁴) Chord length varies from 0.014 - 0.018 mm. (5) Large sigmas (Fig. 1 n⁵) Chord length upto 0.056 mm. (6) Small sigmas (Fig. 1 n⁶) Chord length upto 0.018 mm. (7) Raphides (Fig. 1 n⁷) In bundles, average length of 0.177 mm and with hair-like dimensions.

Distribution : Red Sea, Indian Ocean, Australian region.

Zygomycale parishii (Bowerbank)

(Fig. 1 p)

Raphiodesma parishii Bowerbank 1875, p. 283.

Zygomycale parishii Hechtel 1965, p. 48, pl. 5, fig. 3 (Synonymy) ; Thomas 1968, Ph.D. Thesis; Thomas 1973, p. 38, pl. 2, fig. 10 (Synonymy). Thomas 1979 A, p. 58, pl. 3, fig. 11.

Material : One highly macerated specimen (Reg. No. 18).

Description : A small bit resembling the part of a lamellar specimen.

Colour : Pale gray.

Consistency : Compressible with poor resiliency.

Details regarding the surface could not be studied due to the macerated condition of the specimen.

At the surface there is a well developed reticulation of spicular fibres.

The main skeleton is an irregular reticulation of spicular fibres, ranging from 0.06 - 0.2 mm in diameter. Primaries and secondaries have almost the same diameter and hence difficult to differentiate. Spongin is pale yellow in colour.

Spicules : (1) Subtylostyles or styles (Fig. 1 p¹) Shaft slightly curved and sharply pointed. Head prominent. Size 0.211-0.377

(0.299 mm) × 0.003 - 0.012 (0.007 mm). (2) Large anisochelas (Fig. 1 p^2) Usually in rosetts. Chord length varies from 0.035 - 0.052 (0.042 mm). (3) Small anisochelas (Fig. 1 p^3) Chord length upto 0.021 mm. (4) Isochelas (Fig. 1 p^4) Chord length 0.008 mm ; extremely rare. (5) Large sigmas (Fig. 1 p^5) Chord length upto 0.08 mm. (6) Small sigmas (Fig. 1 p^6) Chord length upto 0.033 mm. (7) Toxas (Fig. 1 p^7) With an angle at the centre length upto 0.08 mm. (8) Raphides (Fig. 1 p^8) In groups, size 0.015 - 0.029 mm.

Distribution : Atlantic Ocean, Indian Ocean, Pacific Ocean, Australian region.

Family : *Amphilectidae* de Laubenfels

Biemna fortis (Topsent) (Fig. 1 q)

Desmacella fortis Topsent 1897, p. 463, pl. 21, fig. 30
Biemna fortis Burton 1930, p. 523 (Synonymy), Thomas 1968, Ph. D. Thesis.

Material : One specimen (Reg. No. CMFRI — S. 74).

Description : Massive with finger shaped branches arising from the upper part. The massive part was found burried in sand.

Colour : Sandy gray.

Consistency : Compressible when fresh.

Surface hispid, the tips of branches conulose.

Skeleton consists of illdefined bands of spicules running towards the surface. These bands are inter-connected by spicules scattered in an irregular fashion.

Spicules : (1) Styles (Fig. 1 q^1) Slightly curved and sharply pointed. Size 1.2 × 0.025 mm when well developed. (2) Sigmas (Fig. 1 q^2, q^3). Two types are often seen. (a) Large sigmas C or S shaped, chord length varies from 0.084 - 0.113 (0.09 mm) × 0.003 - 0.007 mm. (b) Small sigmas Chord length from 0.016 - 0.028 mm. (3) Raphides (Fig. 1 q^4) In groups ; individual length upto 0.15 mm and with hair-like dimensions.

Ecological notes : This species is rather common in the lagoon. The massive basal part of the specimen is found burried in sand and the branches which are visible outside, are often covered with a thick layer of silt or fine sand.

Distribution : Red Sea, Indian Ocean, Australian region.

For References please see Part 3 in this Volume.