

# New species of Raspailiidae (Porifera: Demospongiae: Poecilosclerida) from southeast Queensland

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## ABSTRACT

Extensive surveys of the marine benthos throughout tropical Australasia over the past two decades have revealed a large number of sponge species, most of which appear to be new to science. Even in the comparatively well-known Moreton Bay region, we discovered four new species belonging to three genera of the family Raspailiidae, and also increased the number of known species living in this area from three to eleven, in some cases greatly increasing their known distributional range. Other new extralimital records of these species are provided, as is a revised checklist of the Australian raspailiid fauna. □ *Porifera, Demospongiae, Poecilosclerida, Microcionina, Raspailiidae, Raspailia, Aulospongius, Ceratopsion, Sollasella, Echinodictyum, new species, taxonomy, species check list, Moreton Bay, Queensland.*

Over the past decade our knowledge of the tropical Australian sponge fauna has increased substantially thanks to several major benthic surveys (e.g. [http://www.reeffutures.org/topics/biodiversity/seafloor\\_second.cfm](http://www.reeffutures.org/topics/biodiversity/seafloor_second.cfm)), and biodiversity programs, searching for new compounds from nature with potential pharmaceutical properties (e.g. Quinn *et al.* 2002). These surveys have primarily focussed on Queensland waters including the coast, coral reefs and the inter-reef regions of the Great Barrier Reef, to the adjacent 'sea mounts' and off-shore reefs in the Coral Sea, and the Gulf of Carpentaria (e.g. Hooper *et al.* 2002). Prior to these surveys about 430 species had been described from these regions (Hooper & Wiedenmayer 1994), but since then over two thousand morphospecies have been collected, many thought to be new to science.

Amongst the families of Porifera, the family Raspailiidae is moderately diverse, within the class Demospongiae, containing 20 valid genera

(one *incertae sedis*), seven subgenera, and approximately 250 named species worldwide, mainly from shallow waters and a few from abyssal depths (Hooper 2002; and literature therein). From this growing body of literature the Australian raspailiid fauna was assumed to be relatively well known, including a comprehensive taxonomic monograph (Hooper 1991), several subsequent papers on Australian and western Pacific islands faunas (Hooper & Lévi 1993; Hooper *et al.* 1999; Van Soest *et al.* 2006), several more dealing with other aspects of their biodiversity (Hooper & Lévi 1994; Hooper *et al.* 2000), and a synthesis of the family's systematic relationships and their morphological characteristics (Hooper 2002). Together these contributions have described a fauna of 59 species from Australian waters (including territorial seas) up to the present time, but only three species were previously recorded from the Moreton Bay region (Hooper 1991; Hooper & Lévi 1993; Van Soest *et al.* 2006).

Recent collections since the publication of Hooper (1991), particularly the comprehensive collection effort in 2005 during the 'Thirteenth International Marine Biological Workshop - The Marine Fauna and Flora of Moreton Bay', revealed another eight species of raspailiids living in this supposedly well known Moreton Bay fauna, including four new species described here.

Moreton Bay, including faunas inside the Bay and on the oceanic side of North Stradbroke and Moreton Islands, contains some of the most ecologically diverse environments on the east coast of Australia and a rich biota living in a biogeographic transition zone between tropical and temperate influences (Davie & Hooper 1998). Being adjacent to Brisbane (population circa 2 million) the area is probably under immense urban pressure, yet the fauna continues to reveal new discoveries despite many decades of collection effort. This present paper describes new species and records of the family Raspailiidae from this region, and an updated checklist of raspailiid species from Australia.

#### MATERIALS AND METHODS

Specimens were collected by SCUBA, trawls and scientific dredges, and are housed in the collections of the Queensland Museum. Only new material, published since the earlier revision of Australian Raspailiidae (Hooper 1991), is recorded here and readers are referred to that earlier publication for a full listing of examined material. Specimens were prepared for light and SEM microscopy using the usual methods (e.g. Hooper & Van Soest 2006). Spicule measurements are based on 30 spicules of each category and denoted as ranges (and means) of length x width. The systematic assignment follows the 'Systema Porifera' (Hooper & Van Soest 2002). Abbreviations used in the text: AIMS, Australian Institute of Marine Science; CSIRO, Commonwealth Scientific and Industrial Research Organisation; GBR, Great Barrier Reef, Queensland, Australia; NSW, New South Wales; NT, Northern Territory; NTM, Northern Territory Museum; Qld, Queensland; QM, Queensland Museum; WA, Western Australia.

#### SYSTEMATICS

Phylum Porifera Grant, 1836

Class Demospongiae Sollas, 1885  
Order Poecilosclerida Topsent, 1928  
Suborder Microcionina Hajdu,  
Van Soest & Hooper, 1994

Family **Raspailiidae** Nardo, 1833

Raspelidae Nardo, 1833.  
Raspailidae Nardo, 1847.  
Raspailiidae Hentschel, 1923.  
Euryponidae Topsent, 1928.

**Definition.** Microcionina with a special category of smaller ectosomal styles, oxeas or anisoxeas forming discrete bouquets around the protruding larger styles or oxeas.

**Remarks.** Raspailiids are currently assigned to the Poecilosclerida but lack the primary apomorphy (chela microscleres) of this order. They are assigned to the Microcionina based on similarities in morphological and some chemical features with the family Microcionidae in particular (refer to the synthesis provided by Hooper 2002). Genera are differentiated mainly on the basis of three morphological characters: (a) skeletal architecture ranging from axial compression to reticulate, plumo-reticulate or plumose skeletons; (b) the presence or absence of a specialised ectosomal skeleton (apomorphic for the family, whereby brushes of small ectosomal megascleres surround long protruding single choanosomal megascleres); and (c) geometric modifications to echinating megascleres. Full synonymies and diagnoses of all higher taxa are provided by Hooper (2002), with recent additions by Van Soest *et al.* (2006).

Subfamily **Raspailiinae** Nardo, 1833

*Raspailia* Nardo, 1833

**Definition.** Raspailiidae with a more-or-less compressed axial skeleton and a radial, plumose or simply reticulate extra-axial skeleton, with choanosomal spicules consisting of two, three or more different size classes (styles and/or oxeas), and echinating acanthostyles microcionid-like or secondarily modified.

*Raspailia (Raspailia)* Nardo, 1833

**Definition.** *Raspailia* with microcionid-like acanthostyles, myxillid-like acanthostyles or thin vestigial acanthostyles.

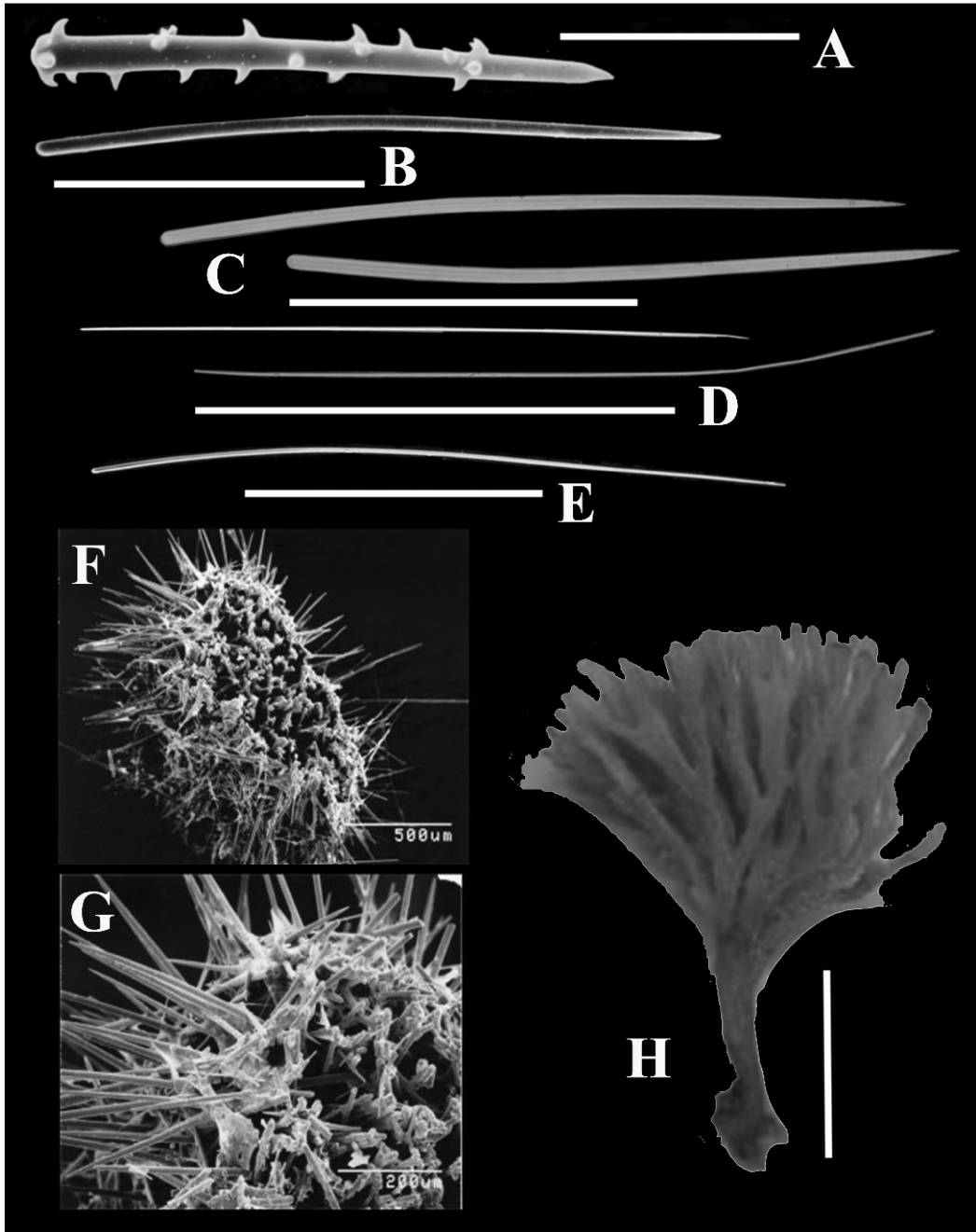


FIG. 1. *Raspailia (Raspailia) scorpa* sp. nov. (holotype QM-G315208). **A**, Echinating acanthostyles (scale bar 50  $\mu$ m). **B**, Choanosomal style (scale bar 200  $\mu$ m). **C**, Choanosomal styles (scale bar 200  $\mu$ m). **D**, Ectosomal styles (scale bar 200  $\mu$ m). **E**, Subectosomal style (scale bar 500  $\mu$ m). **F**, SEM of skeletal structure, showing the axially compressed choanosome and radial subectosomal megascleres. **G**, SEM of ectosome, showing arrangement of ectosomal styles, radial echination of choanosomal styles and reticulation of choanosomal styles. **H**, Holotype (scale bar 2cm).

*Raspailia (Raspailia) scorpa* sp. nov.

(Figs 1, 2A, 8A, Table 1)

**Material Examined.** HOLOTYPE: QM-G315208, Green I, Moreton Bay, Qld, 27°25.5'S., 153°13.5'E., 4 m, 16.03.1999, coll. Marine Parks impoundment.

**Habitat and Distribution.** Coral rubble, 4 m depth range. So far known only from the type locality in Moreton Bay (Fig. 2A).

**Description.** *Shape.* Small arborescent sponge, approximately 5 cm high, resembling a straw broom, with a dense crown of erect, flattened branches, many bifurcating several times at their tips. Branches occur in more than one plane giving a shrub-like appearance. Stalk is 1.8 cm long, 35–55 mm diameter, slightly flattened, firm, with basal holdfast. Branching occurs multiple times and occasionally fuses again towards the top. At the first bifurcation from the stalk the diameter ranges from 4–5 mm. When smaller branches (1.5–3 mm diameter) arise from this common base, they usually divide again 2–3 times, however they retain a similar width (23.5 mm) to the first branch. All branches are flattened equally, and range in thickness from 0.7–1 mm.

*Colour.* Deep red on deck, beige when preserved.

*Oscules.* Not observed.

*Texture and surface characteristics.* Firm but easily torn, slightly rubbery with flexible branches. Surface regular but very hispid.

*Ectosome and subectosome.* Ectosome exceptionally hispid as a result of protruding megascleres of several different categories, Subectosomal styles protrude through the surface up to 2 mm from the ectosome, in regular but sparse intervals. Shorter choanosomal styles protrude for only a small distance (<0.25 mm) through the ectosome but form a dense palisade-like surface layer. Ectosomal styles form a multipicular tangential layer arranged in tangential bundles around the point of insertion of subectosomal styles through the surface. Ectosome and subectosomal regions contain a well developed light brown layer of collagen in contrast to the choanosome which has only a very lightly collagenous mesohyl.

*Choanosome.* Choanosomal skeleton is axially compressed, consisting of a dense reticulation of choanosomal styles with only very few echinating acanthostyles visible. The choanosomal skele-

ton is dense and homogenous throughout the entire section (1.4–2.8 mm × 0.4–0.6 mm), surrounded by a subectosomal region ranging from 0.05–0.25 mm thick. Fibres are not well developed and mesohyl is clear, homogenous and lightly collagenous.

*Megascleres* (refer to Table 1 for dimensions). Ectosomal styles are very fine, sinuous, with evenly rounded bases and sharp points.

Subectosomal styles are very long, thin, usually sinuous, some with very slight subtylote swelling at the base but most evenly rounded bases.

Choanosomal styles are robust, curved at the centre or towards the basal end, most with sharply tapering points but some are slightly telescoped.

Echinating acanthostyles typically have a flattened, only slightly swollen base bearing several recurved spines arising at the very base of the shaft and forming a small clump. Spination along the shaft is very sparse, with a regular continuation of spines extending into the midsection, leaving the point bare. Spines with recurved hooks (3–4 mm long).

**Remarks.** *Raspailia (Raspailia) scorpa* sp. nov. is similar to *R. (R.) gracilis* (Lendenfeld) in gross morphology but differs in most other details (see Hooper 1991: 1206, Fig. 10). Conversely, despite differences in gross morphology *R. (R.) scorpa* is most similar to *R. (R.) phakellopsis* Hooper from the NT and northern WA in its skeletal structure and spicule composition, including the characteristic pattern of spination on echinating acanthostyles. In both species the subectosomal and choanosomal styles radiate in a similar fashion from the densely reticulate axial skeleton. However, the species clearly differ: *R. (R.) scorpa* has ectosomal styles (versus oxeads in *R. phakellopsis*), fewer and more robust and more recurved spines on the acanthostyles, and in the specific dimensions of most megascleres. *Raspailia phakellopsis* also has flattened convoluted leaf-like branches superficially resembling blades of brown alga (Hooper 1991), in contrast the straw broom-shaped growth form of the present species. There is also a contrasting arrangement of ectosomal styles, with *R. (R.) scorpa* having tangential bundles surrounding the protruding subectosomal styles, differing from *R. phakellopsis* which has erect bouquets or brushes typical of many raspailiids.

So far this species is known only from a single specimen from Moreton Bay, despite extensive surveys of the benthic faunas both north and south of this locality over the past decade. It is clearly a sister-species of *Raspailia phakellopsis*, which has a recorded distribution from Darwin, NT, and the Northwest Shelf, WA, both representing another example of east-coast/west-coast sister species pairs (Hooper 1991).

**Etymology.** This species is named for its broom-shaped gross morphology (*L., scorpa*, thin twigs, broom).

***Raspailia (Raspailia) kennedyi* sp. nov.**

(Figs 2A, 3, 8B–C, Table 2)

**Material Examined.** HOLOTYPE: QM-G317177, Moreton Bay, off Toondah Harbour, Cleveland, Qld, 27°30.5'S, 153°18.1'E, 8 m, 2.viii.2000, J.A. Kennedy & T. Wassenberg.

**Habitat and Distribution.** The type specimen was collected from a seawater intake grate at a depth of 8 m. So far known only from the type locality in Moreton Bay (Fig. 2A).

**Description.** *Shape.* Large arborescent sponge on a single erect stalk (30 mm long) with round basal holdfast (13 mm diameter). First branching from the stalk is in one plane, with total branch span 15 cm wide. Numerous erect branches arise from the primary branches in the same plane and spread in one direction only. This may be as a direct result of the constricting sponge habitat (found growing on a grate and thus restricted in direction of growth). Branches separate many times in an irregular pattern and occasionally fuse again, creating a dense flattened shrub-like morphology. There appears to be no distinct pattern for fusion of branches except for proximity of branch growth. Branches have small forked distal tips. Branches vary in length, with the largest 12 cm long, and slightly flattened (25–54 x 21–42 mm). Total sponge height is 15 cm.

*Colour.* Dark mauve-brown alive, darkening in air, and very dark brown in ethanol. Stains ethanol a light brown colour upon preservation.

*Oscules.* Minute (<1 mm) sparsely scattered along the sides of branches.

*Texture and surface characteristics.* Branches are flexible and compressible with a velvety feel, and easily torn. Surface is very hispid. The main stalk is very firm, almost woody, and not flexible.

*Ectosome and subectosome.* Dense bouquets of small ectosomal styles or anisoxeas protrude through the surface at regular intervals surrounding single large subectosomal styles, the latter protruding between 320–700 μm from the surface, visible with the naked eye and creating a very hispid surface. The subectosomal region has a layer of darkly pigmented layer of collagen (200–450 μm).

*Choanosome.* Strong axial compression with multispicular primary tracts of choanosomal styles. Secondary tracts usually lack spicules and consist only of spongin fibres, or some secondary tracts are unispicular. There is a high proportion of acanthostyles regularly echinating the primary tracts, and fibres are well developed and darkly pigmented.

*Megascleres* (refer to Table 2 for dimensions). Structural choanosomal styles are uniform and slightly curved at the centre, with evenly rounded bases and tapering to sharp points.

Subectosomal styles are long and thin, with evenly rounded bases, tapering sharp points, and slightly curved at centre or towards basal end.

Ectosomal styles or anisoxeas are short, very thin, straight or very slightly curved and difficult to see using light microscopy.

Echinating acanthostyles are short and robust, slightly subtylote bases, with small spines concentrated around the tip and covering the basal tyle and the neck of the shaft ranges from bare to lightly covered in short spines. Spines are erect near the basal end and slightly recurved towards the point, about 2 μm long,

**Remarks.** *Raspailia (Raspailia) kennedyi* sp. nov. is typical of the genus in its spicule composition and skeletal structure. The species is similar in shape (spiky surface, arborescent and multiple bifurcate branching, darkly pigmented) and ectosomal structure to *Raspailia vestigifera* Dendy from northern, northwest and central west Australia (see Hooper, 1991: 1215). Ectosomal brushes in both species are typically raspailiid, consisting of very fine styles (some verging on anisoxeas), forming bouquets around protruding single long subectosomal styles. The choanosomal region, however, is better developed in *R. (R.) kennedyi*, with multispicular primary tracts radiating to the surface and secondary spongin or unispic-

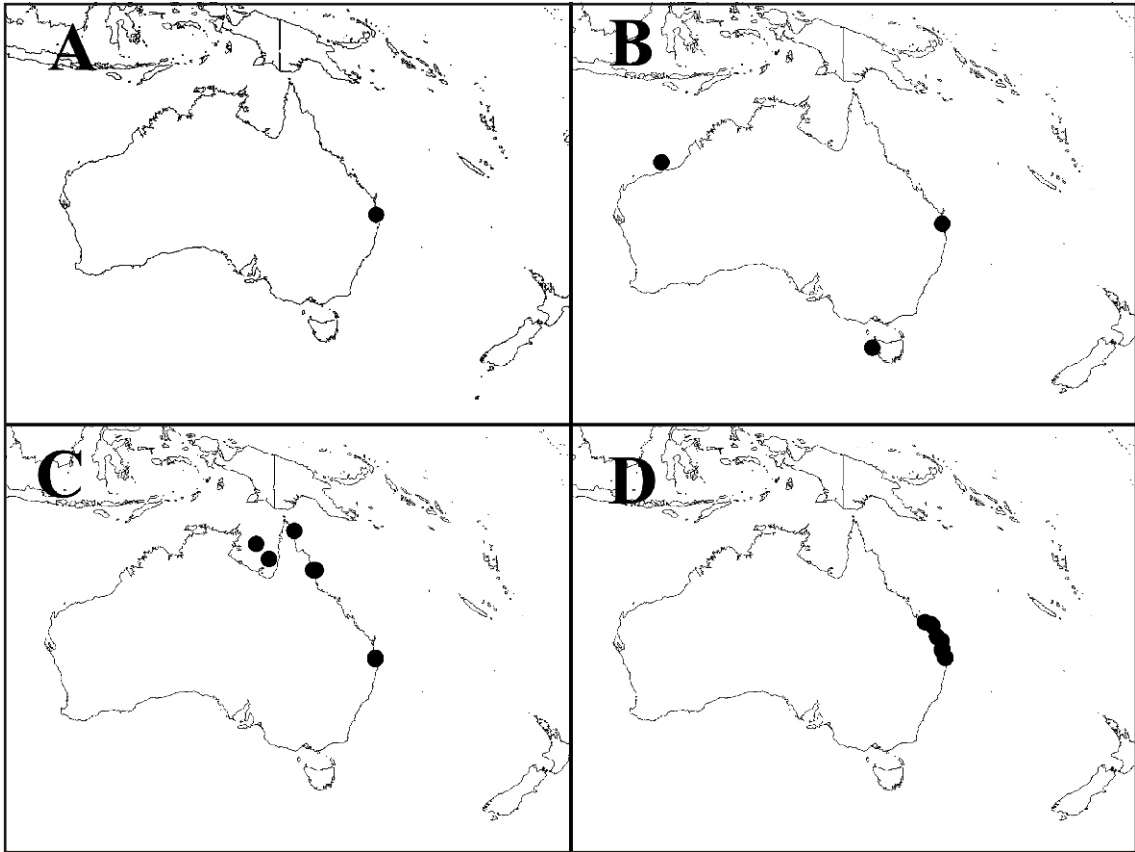


FIG. 2. Maps of wider distributions of *Raspailia* species found in Moreton Bay. A, *R. (Raspailia) scorpa* sp. nov. and *R. (Raspailia) kennedyi* sp. nov. B, *R. (Raspaxilla) compressa*. C, *R. (Parasyringella) australiensis*. D, *Aulospongos similiaustralis* sp. nov.

ular tracts of styles. Moreover, the choanosomal megascleres of *R. vestigifera* are strongylote and the species characteristically has few echinating acanthostyles, differing significantly from *R. (R.) kennedyi*.

**Etymology.** This species is named in appreciation of Mr John Kennedy, collector of the only known specimen of this species, and in recognition of his long and highly productive contributions to sponge biology at the QM.

*Raspailia (Raspaxilla)* Topsent, 1913

**Definition.** *Raspailia* with echinating rhabdostyles geometrically very different from the usually longer choanosomal styles (the latter without any basal rhabd); extra-axial styles forming a radial skeleton perpendicular to the axis; and well differentiated axial and extra-axial skele-

tons (the former compressed, the latter plumo-reticulate and/or radial).

*Raspailia (Raspaxilla) compressa*  
Bergquist, 1970  
(Fig. 2B, 8D)

*Raspailia compressa* Bergquist, 1970: 29–30, text-fig. 3a, pls 7b, 11a.

*Raspailia (Raspaxilla) compressa* – Hooper, 1991: 1245–1248, figs 32–33, table 6.

**Material Examined.** QM-G304878, South side Mudjimba I., off Mooloolaba, Qld, 26°37.02'S, 153°6.15'E, 12 m, J.N.A. Hooper, J.A. Kennedy & S.D. Cook, 30.01.1995. QM-G323281, Pieman Canyon, Southeast Canyons, Tasmania, 41°44.38'S, 144°33.59'E, 176 m, A. Williams CSIRO RV 'Southern Surveyor' SS200404, dredge. Further material as listed in Hooper (1991).

**Habitat and Distribution.** 12–176 m, hard substrata. Known from North Cape, New Zealand

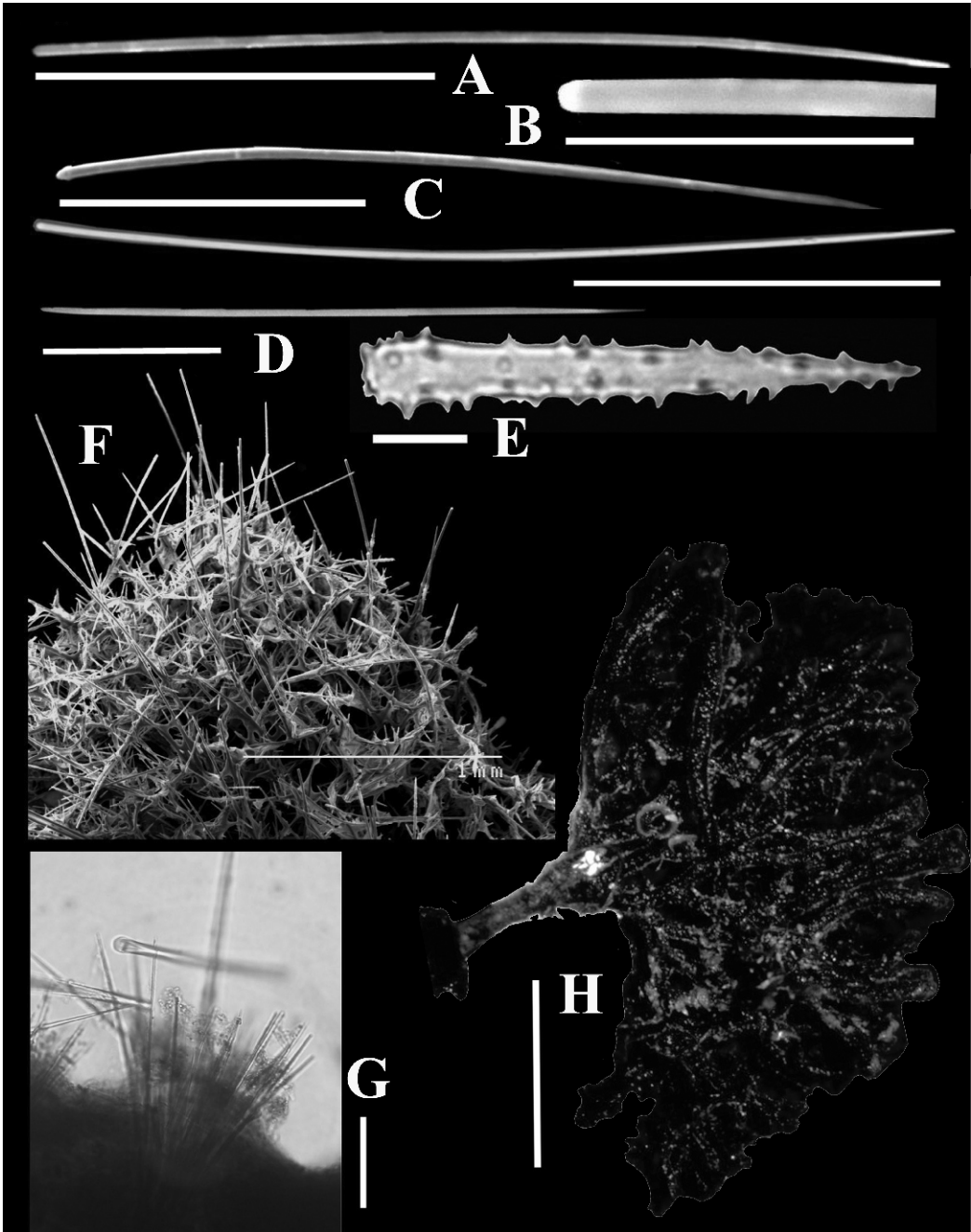


FIG. 3. *Raspailia (Raspailia) kennedyi* sp. nov. (holotype QM-G317177). **A**, subectosomal style (scale bar 500  $\mu$ m). **B**, base of ectosomal style (scale bar 100  $\mu$ m). **C**, choanosomal styles (scale bars 200  $\mu$ m). **D**, ectosomal style (scale bar 100  $\mu$ m). **E**, echinating acanthostyle (scale bar 10  $\mu$ m). **F**, SEM of choanosome and ectosome, showing arrangement of styles in primary tracts and protruding subectosomal styles responsible for the hispid surface (scale bar 1 mm). **G**, light microscopy of bouquets of ectosomal styles surrounding a single subectosomal style (scale bar 100  $\mu$ m). **H**, holotype on deck (scale bar 5 cm).

(type locality), Port Hedland region, WA, SE coast (Southeast Canyons), Tasmania, and the Moreton Bay region, SE Qld.

**Remarks.** This species was initially known only from the New Zealand type locality (Bergquist 1970), and subsequently comprehensively redescribed from deeper waters on the west coast of Australia (Hooper 1991). The new records reported here from deeper waters off the west coast of Tasmania and shallow waters in SE Queensland greatly extends the known range of this species, and indicates from these significantly disjunct distributions that it is probably a member of the temperate fauna, with the Moreton Bay record being a single incursion into subtropical waters, and that it is probably far more widely distributed than presently known. This species characteristically has an arborescent, bifurcating digitate growth form with cylindrical or slightly flattened branches, live colouration yellow-brown to olive-brown, an optically very hispid surface, and firm, barely compressible stalk with branches more flexible.

*Raspailia (Parasyringella)* Topsent, 1928

**Definition.** *Raspailia* which have secondarily lost their echinating megascleres.

*Raspailia (Parasyringella) australiensis*

Ridley, 1884

(Fig. 2C, 8F)

*Raspailia (Syringella) australiensis* Ridley, 1884: 460; Pick, 1905: 18, 35; Vosmaer, 1912: 316. Hooper, 1991: 1256–1259, figs 39–40, table 7.

*Homaxinella australiensis* – Burton, 1934: 42.

**Material Examined.** QM-G303010, NE Cape Grenville, Shelburne Bay, Qld, 11°55.03'S, 143°26.99' E, 51 m, S.D. Cook on FV 'Clipper Bird', 22.iii.1993, trawl. QM-G300814, E of Groote Eylandt, Gulf of Carpentaria, NT/Qld, 13°30.08'S, 138°47.08'E, 54 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 24.xi.1991, trawl. QM-G320826, Gulf of Carpentaria, Qld, 15°20.04'S, 140°19.83'E, 28 m, C. Bartlett & S.D. Cook on CSIRO RV 'Southern Surveyor' 2380403, 24.v.2003, trawl. QM-G320811, Gulf of Carpentaria, Qld, 15°20.03'S, 140°19.83'E, 28 m, C. Bartlett & S.D. Cook on CSIRO RV 'Southern Surveyor' 2380403, 25.v.2003, trawl. Further material as listed in Hooper (1991).

**Habitat and Distribution.** 7–54 m depth, on mud, sand or rubble substrates. Probably widely distributed in tropical north and north-east Australia, with confirmed records so far from

Darwin, Northern Territory (type locality), Groote Eylandt NT and Gulf of Carpentaria, NT/Qld, northern section of the Great Barrier Reef to Moreton Bay, southern Qld (Fig. 2C).

**Remarks.** This species was comprehensively redescribed and illustrated in Hooper (1991), and is recognisable by its long stringy unbranched cylindrical growth form, muddy brown to whitish live colouration, its firm, flexible texture with a woody central stem and fleshy branches, and an optically even but microscopically rugose surface. It was originally recorded from Darwin (Ridley 1881), and subsequently from two other disjunct populations on the outer reefs on the northern section of the Great Barrier Reef, and the southern part of Moreton Bay (Macleay I.) in SE Queensland (Hooper 1991). The new material listed here from the inner far northern GBR and the Gulf of Carpentaria fills in the species' known, previously disjunct distribution.

*Aulospongos* Norman, 1878

**Definition.** Raspailiidae with at least two size classes of rhabdostyles of similar geometry, the larger (smooth or partially spined) core spongin fibres, and the smaller (partially spined) echinate fibres although neither are localised to any region of the skeleton; choanosomal skeletal structure is predominantly plumose, with spicules and fibres amalgamated into bulbous tracts ('fibre-bundles'), more-or-less compacted in the axial skeleton, becoming increasingly plumose as they ascend to the periphery, eventually producing a shaggy, compartmentalised or conulose surface; axial and extra-axial skeletons undifferentiated apart from greater amalgamation of fibre-bundles in the axis.

*Aulospongos similiaustralis* sp. nov.

(Figs 2D, 4, 8E, Table 3)

**Material Examined.** HOLOTYPE: QM-G300079, Shag Rock, SE Corner, North Stradbroke I., Qld, 27°24.5'S, 153°31.4'E, 15 m, 05.ii.1992, J.N.A. Hooper & J. Wilkinson, SCUBA. PARATYPES: QM-G315526, Western tip of Northwest I., Capricorn/Bunker Group, GBR, Qld, 23°18.4'S, 151°42.6'E, 15.7 m, 09.vi.1999, S. Cook *et al.* QM-G317317, Double Rock, Elliot Heads, Qld, 24°53.5'S, 152°29.3'E, 7.8 m, 11.x.2000, S.D. Cook *et al.* QM-G320085, southeast side, Outer Rock, Keppel Is, GBR, Qld, 23°3.5'S, 150°57.1'E, 15.8 m, 05.xi.2002, J.N.A. Hooper *et al.* OTHER MATERIAL. QM-G303218, Amity Pier and boat ramp, N Stradbroke I., 27°24.13'S,



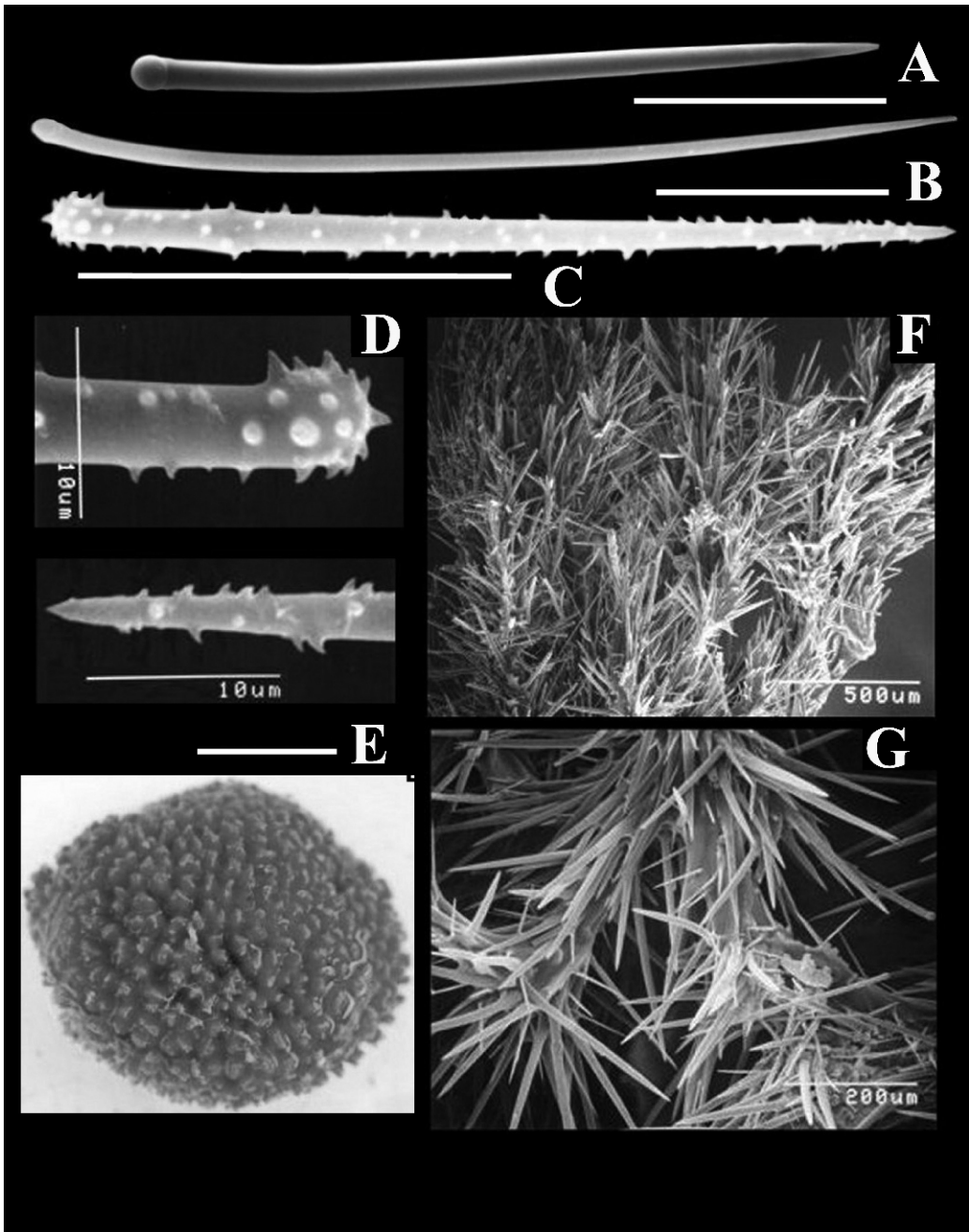


FIG. 4. *Aulospongia similiaustralis* sp. nov. (holotype QM-G300079). **A**, Choanosomal rhabdostyle with slight rhabd and distinct tyle (scale bar 100  $\mu$ m). **B**, Subectosomal subtylostyle (scale bar 50  $\mu$ m). **C**, Acanthostyle (scale bar 50  $\mu$ m). **D**, Basal and distal spination of acanthostyle (scale bar 10  $\mu$ m). **E**, Specimen (QM-G315610) top view (scale bar 5 cm). **F**, SEM of skeletal structure, showing the dense plumose fibre-bundles cored by choanosomal rhabdostyles (scale bar 500  $\mu$ m). **G**, SEM of choanosomal brush, showing arrangement of choanosomal styles and echinating acanthostyles (scale bar 200  $\mu$ m).

153°25.08'E, 11 m, 10.xii.2003, J.N.A. Hooper & S.D. Cook. QM-G304007, north side, Mudjimba I., Mooloolaba, Qld, 26°36.6' S, 153°6.8' E, 11 m, 09.ii.1994, J.N.A. Hooper *et al.* QM-G304879, South Side, Mudjimba I., Mooloolaba, Qld, 26°37' S, 153°6.8'E, 12 m, 30.i.1995, J.N.A. Hooper, J.A. Kennedy & S.D. Cook. QM-G303963, Jew Shoal, Noosa Heads, Qld, 26°21.9'S, 153°6.6'E, 20 m, 9.ii.1994, J.N.A. Hooper *et al.* QM-G315777, North Halls, Sunshine Coast, Qld, 26°20.4' S, 153°4.1' E, 21 m, 13.x.1999, S.D. Cook *et al.* QM-G315732, Jew Shoal, Noosa Heads, Qld, 26°22.3' S, 153°7.3' E, 18 m, 12.x.1999, S.D. Cook *et al.* QM-G317276, Pandanas and Burkitt Points, Bargara, Qld, 24°48.2' S, 152°27.4' E, 6 m, 9.x.2000, S.D. Cook *et al.* QM-G306292, SW side of Little Woody I., Hervey Bay, Qld, 25°20'S, 153°1.5'E, 19 m, 18.xi.1995, J.N.A. Hooper *et al.* QM-G315610, eastern side of Wistari Reef, Capricorn Bunker Group, GBR, Qld, 23°28.5' S, 151°52.5' E, 15 m, 9.vi.1999, M. Garson, J. Simpson, & R. Clarke.

**Habitat and Distribution.** Coral reef, rock or rubble and sandy substrates, 6–21 m depth range. The known species range is from North Stradbroke Island, Moreton Bay, to the Keppel Is., Great Barrier Reef, Qld (Fig. 2D). Recently another single, so far unpublished, specimen of this species was recorded from the East Point Sponge Gardens, Darwin Harbour, NT (B. Alvarez pers. comm.) indicating a much more widespread distribution albeit very rare on the NW coast.

**Description.** *Shape.* Thickly encrusting globular, bulbous, spherical or subspherical sponges, ranging from 4–15 cm diameter and 2.5–6 cm. The globular growth form is composed of densely compartmentalised plumose columns, with columns flattened (24–36 × 0.5–1 mm) and arranged perpendicular to surface.

*Colour.* Bright orange; beige in preservative.

*Oscules.* Not observed.

*Texture and surface characteristics.* Velvety and compressible, can be torn easily. Surface is hispid and perpendicular columns of amalgamated spiculate fibre-bundles are inter-connected by a thin layer of spongin.

*Ectosome and subectosome.* No specialised ectosome is present although larger choanosomal rhabdostyles penetrate the surface arising from the underlying plumose fibre-bundles in the peripheral choanosomal skeleton. The dense arrangement of projecting rhabdostyles produces a disorganised ectosome rather than a palisade-like structure typical of other raspailiids. Subectosomal subtylostyles are also organised in a

plumose arrangement but they are sparsely distributed, predominantly in the peripheral skeleton. A darkly pigmented layer of collagen is present just below the surface, 100–150 μm thick.

*Choanosome.* Each perpendicular column arising from the choanosome to the peripheral skeleton consists of several bundles of amalgamated plumose fibre-bundles (each 50–100 μm in diameter), cored by multispicular tracts of choanosomal rhabdostyles coring and projecting from moderately heavy spongin fibres, and together with moderately abundant echinating acanthostyles form distinctly plumose ascending columns, 300–600 μm in diameter, without any apparent reticulate spicule or fibre interconnections. Spicules are dense and project obliquely from fibres. Long, thin subectosomal subtylostyles project from columns only sparsely. Lightly pigmented collagen is distributed throughout the choanosome.

*Megascleres* (refer to Table 3 for dimensions). Choanosomal rhabdostyles are robust, tapering to sharp points, only slightly rhabdose at the base with curvature proximal to the base. The basal tyle is typically swollen with a subtylote constriction, less often without pronounced swelling and only faint curvature.

Subectosomal subtylostyles are long, thin, often curved at the centre or towards the basal end, with the basal subtylote swelling small but with a pronounced subtylote constriction, and slightly rhabdose base.

Echinating acanthostyles are long, slender, prominently subtylote, with only a very faint rhabdose basal curvature. Small spines evenly distributed along the shaft except for a bare point, and basal tile covered with small spines. Spines are erect or slightly recurved, and less than 1 mm long.

**Remarks.** In its superficial growth form (encrusting bulbous, globular), surface features (conulose or papillose), live colouration (orange or red), possession of slightly rhabdose megascleres, and choanosomal structure (bundles of perpendicular spicule tracts) this species is remarkably superficially similar to *Dragnacidon australe* (Bergquist, 1970) (Halichondrida: Axinellidae). However, these similarities are purely convergent as demonstrated by differences in spicule composition between the two species (with *D.*

*australe* having only styles and oxeas, the former slightly rhabdose). Another superficial comparison is with *Dragmaxia variabilis* (Whitelegge) (Halichondriidae), which has a similar skeletal structure consisting of skeletal columns with spicules obliquely directed towards the surface, but the principal spicules in *A. similiaustralis* are distinctly plumose in formation, choanosomal styles and echinating acanthostyles are both rhabdose (albeit with poorly developed rhabds), and *D. variabilis* also contains trichodragmata and raphides. The new species clearly belongs to *Aulospongus* in having dense plumose fibre-bundles cored by rhabdostyles forming ascending columns, closely arranged at the base of the sponge, and separating completely towards the surface of the sponge, or into compartments, and structural styles and echinating acanthostyles of similar geometry, both characteristic for the genus. In contrast, other raspailiids with rhabdostyles, *Raspailia* (*Raspaxilla*), have choanosomal principal styles geometrically different from echinating acanthostyles, the choanosomal principal styles lack any basal rhabd, and there are no discrete ascending fibre-bundles forming columns but instead with well differentiated axial and extra-axial skeletons (Hooper 2002).

The present species is most similar to *A. tubulatus* (Bowerbank, 1873), described from the western Indian Ocean to Sri Lanka, in possessing discrete surface conules produced by fibre-bundles and columns, a red or pinkish live colouration, and both having poorly developed rhabdose bases on both choanosomal rhabdostyles and echinating acanthostyles. The two species differ in other aspects, with *A. tubulatus* having some reticulate aspicular fibres interconnecting ascending columns, a massive tubular or subspherical growth form, lacking subectosomal styles but having instead smaller ectosomal raphiform styles, and patterns of spination and specific dimensions of spicules differing substantially (Table 3) (Hooper *et al.* 1999). In its spination *A. similiaustralis* is unusual amongst *Aulospongus* in having echinating acanthostyles more or less completely and evenly spined (similar to *Raspailia* species), whereas these spicules in most *Aulospongus* species have a smooth base and spined only or predominantly on the distal part of the shaft and point. Refer to Hooper *et al.*

(1999) for a comparison with other known species of *Aulospongus*.

**Etymology.** This species is named for its remarkable superficial resemblance to *Dragmacidon australe* (Bergquist, 1970), formerly allocated to *Pseudaxinella*.

*Sollasella* Lendenfeld, 1887

**Definition.** Raspailiidae with strong axial column of confusedly aligned oxeas and styles, and with extra-axial columns of short oxeas and long and short styles positioned at right angles to the axial column. At the surface there is a characteristic ornamentation of polygonally arranged inhalant (?) pores and the oxeas form a continuous palisade of brushes of oxeas pierced by long styles. A low proportion of short acanthostyles may be present.

*Sollasella moretonensis* Van Soest *et al.*, 2006  
(Fig. 5A, 9A)

*Sollasella moretonensis* Van Soest, Hooper, Beglinger & Erpenbeck, 2006: 140–143, figs 4–5, Table 2.

**Material Examined.** Specimens as listed in Van Soest *et al.* (2006).

**Habitat and Distribution.** This species is moderately common in waters outside and adjacent to Moreton Bay, extending up to Noosa on the Sunshine Coast, associated with muddy substrata at the base of coral reefs, with a known depth range of 11–31 m (Fig. 5A).

**Remarks.** All known material of this species was recently described and published by Van Soest *et al.* (2006), with the holotype (QM-G303227), paratype and six specimens collected from the eastern side of North Stradbroke I. (type locality, 27.40083°S, 153.53°E) up to the northern end of the Sunshine Coast (26.3461°S, 153.067°E), one from Shelburne Bay, north Qld (11.61722°S, 143.06889°E), and one very disjunct specimen from the vicinity of Cape Jaubert, north coast of WA (19.76667°S, 118.21667°E). As noted in Van Soest *et al.* (2006), the two isolated records in Shelburne Bay and Cape Jaubert were from commercial and scientific trawls made in deeper muddy substrates, and suggest that the species may have a wider distribution than presently known, or a disjunct distribution in tropical Australia, although this pattern is still unclear given that there has been intensive sampling of areas in between without trace of this species.

The species is very distinctive morphologically. It is bright orange to orange-brown in life, with a vasiform to fan-shaped growth form bearing rounded 'lumpy' margins, usually attached to the substrate by a short cylindrical woody hold-fast. Texture is harsh, slightly hispid, firm and stiff, and the surface has a distinctive polygonal plate-like pattern formed by shallow pits surrounding low conules, each perforated by an oscule with a raised lip at its apex, pigmented more darkly than the surrounding area, and reminiscent of typical *Polymastia* surface patterns.

**Subfamily Thrinacophorinae Hooper, 2002**

*Ceratopsis* Strand, 1928

**Definition.** Raspailiidae lacking echinating spicules, having an axially compressed choanosomal skeleton with reticulate fibres cored by sinuous styles or anisoxeas and a well differentiated radial extraaxial skeleton cored by longer megascleres.

*Ceratopsis clavatum* Thiele, 1898

(Fig. 5B, 9B)

*Ceratopsis clavata* Thiele, 1898: 57, pl.5, fig.23, pl.8, fig.42a-c.

*Ceratopsis clavata* – Hooper, 1991: 1328, table 18.  
Hooper & Lévi, 1993: 1287–1291, figs 35–37, table 15.

**Material Examined.** NORTHERN NSW: QM-G301426, The Nursery/ Cod Hole, NE of Julian Rocks, Byron Bay, 28°36.13'S, 153°37.12'E, 17m, J.N.A. Hooper & S.D. Cook, 3.ii.1993. SOUTHEAST QLD: QM-G301289, Hanlon Light, Moreton Bay, 27°28.5'S, 153°20.9'E, 10 m, J.N.A. Hooper & S.D. Cook, 3.xi.1992. QM-G303975, North side of Mudjimba I., off Mooloolabah, 26°36.12'S,

153°6.15'E, 11 m, J.N.A. Hooper *et al.*, 9.ii.1994. QM-G320226, precise locality unknown, Deception Bay, Moreton Bay, Qld, QDPI Fisheries, FV 'Southern Intruder' Scallop Survey, 11.x.2002, trawl. GREAT BARRIER REEF, QLD: QM-G303862, S Triangle Reef, Hook Reef, Whitsunday region, 19°49.03'S, 149°7.02'E, 28 m, J. Hooper & L.J. Hobbs, 9.xii.1993. QM-G304371, NW of Lizard I., W. of Underwood Shoal, 14°35.02'S, 145° 20.13'E, 24 m, DPI on FV 'Gwendoline May', 9.iv.1994, trawl. QM-G320714, Mid Reef, Howick Group, 14°26.89'S, 144°52.88'E, 23 m, J. Hooper, *et al.*, 3.vii.2003. QM-G320792, Houghton Reef, Howick Group, 14°31.19'S, 144° 58.89'E, 20 m, J.N.A. Hooper *et al.*, 3.vii.2003. QM-G304918, QM-G304916, precise locality unknown, N. Coleman, 13.v.1994. QM-G306716, Petricola Shoals, NE. of Lizard I., 14°37.13'S, 145°28.08'E, 23 m, J. Hooper & P.A. Tomkins, 6.iii.1996. CORAL SEA TERRITORIES, off QLD: QM-G320588, Wilson Reef, 13°40.36'S, 144°13.59'E, 36 m, J.N.A. Hooper *et al.*, 1.vii.2003. QM-G320634, Davie Reef, 13°59.22'S, 144°26.47'E, 23m, J.N.A. Hooper *et al.*, 1.vii.2003. QM-G320685, Munro Reef, 14° 18.15'S, 144°48.81'E, 23 m, J.N.A. Hooper *et al.*, 2.vii.2003. PAPUA NEW GUINEA: QM-G312952, Keppel Point, Hood Bay, SE Papuan Lagoon, 10°8.13'S, 147° 54.15'E, 35 m, J.N.A. Hooper & M. Kelly, 16.xii.1996. QM-G312936, 12 mile sandbank, Kupiano, SE Papuan Lagoon, 10°11.05'S, 148°10.13'E, 20 m, J.N.A. Hooper & M. Kelly, 15.xii.1996. Further material as listed in Hooper (1991) and Hooper & Lévi, (1993).

**Habitat and Distribution.** Coral and rock substrates, 10–130 m depth (deeper samples from New Caledonia). Possibly very widely distributed in the tropical and subtropical Indo-west Pacific although so far only with confirmed distributions reported from Sagami Bay, Japan (type locality), south-west lagoon of New Caledonia (Hooper & Lévi 1993), Southern Papua New Guinea Barrier Reef, Coral Sea territories, Great

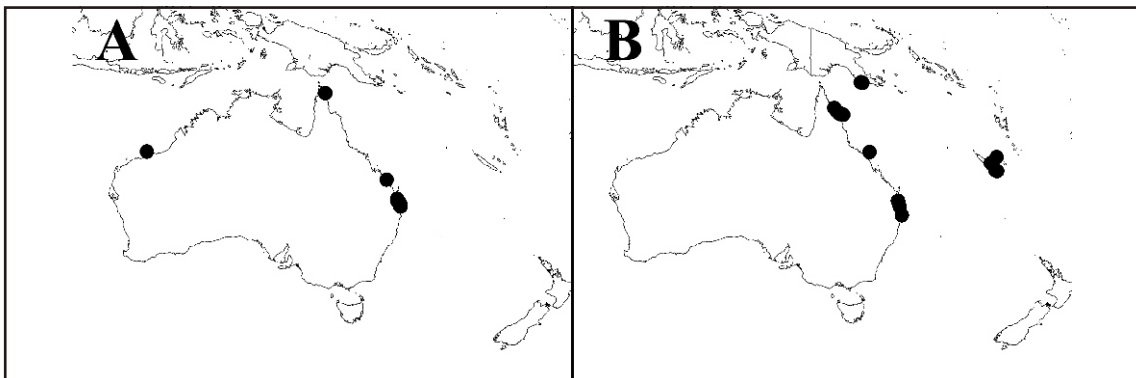


FIG. 5. Maps of wider distributions of raspailiid species found in Moreton Bay. A, *Sollasella moretonensis*. B, *Ceratopsis clavata*.

Barrier Reef, South East Qld to northern NSW (present study) (Fig. 5B).

**Remarks.** This species is well-recognisable by its yellow to pale orange colouration in life, an arborescent digitate morphology ranging from bushy to elongate digitate or whip-like, and a prominently conulose surface. It was comprehensively redescribed by Hooper & Lévi (1993) from New Caledonian and Moreton Bay specimens, with the present study greatly extending its known distribution from southern PNG to subtropical eastern Australia.

### Subfamily Echinodictyinae Hooper, 2002

#### *Echinodictyum* Ridley, 1881

**Definition.** Raspailiidae with an exclusively reticulate choanosomal skeleton, without any trace of axial compression, cored exclusively by smooth oxneas, and vestigial radial extra-axial and ectosomal skeletons.

#### *Echinodictyum asperum* Ridley & Dendy, 1886

(Fig. 6A, 9C)

*Echinodictyum asperum* Ridley & Dendy, 1886: 477. Ridley & Dendy, 1887: 165, pl.32, fig.2; Whitelegge, 1897: 328–329; Topsent, 1897: 446, pl.20, fig.23; Burton & Rao, 1932: 348; Lévi, 1961: 524, fig.15; Desqueyroux-Faundez, 1981: 757, table II; Hooper, 1984: 55; Hooper, 1991: 1353–1356, figs 86–87, 110c, table 20.

**Material Examined.** MORETON BAY REGION, QLD: QM-G303197, Conjevoi Reef, off Sovereign Beach, east of Moreton I, 27°16.13'S, 153°25.08'E, 14 m, J.N.A. Hooper & S.D. Cook, 1.vi.1993. GREAT BARRIER REEF, QLD: QM-G314132, Lady Musgrave I., inside lagoon wall near entrance, 23°53.99'S, 152°24.62'E, 11 m, J.N.A. Hooper *et al.*, 25.ii.1998. FAR NORTH QLD: QM-G303055, NE Cape Grenville, Shelburne Bay, 11°40.03'S, 143°4.03'E, 28 m, S.D. Cook on FV 'Clipper Bird', 25.iii.1993, trawl. QM-G303064, NE Cape Grenville, Shelburne Bay, 11°25.13'S, 143°52.03'E, 23 m, S.D. Cook on FV 'Clipper Bird', 27.iii.1993, trawl. QM-G316939, Torres Strait, 10°24.6'S, 142°41.40'E, 20 m, C. Bartlett on RV 'Gwendoline May', 13.i.2004, trawl. NORTHERN TERRITORY: QM-G303358, Stephen's Rock, West Arm, Darwin Harbour, 12°29.17'S, 130°47.18'E, 19 m, J.N.A. Hooper & L.J. Hobbs, 24.ix.1993. QM-G310228, Darwin Harbour, 12°17.58'S, 130°28.44, 13 m, Australian Institute of Marine Science NCI group, 20.viii.1987. QM-G313317, North of Bathurst Is, Arafura Sea, 11°19.98'S, 130°12.18'E, depth unknown, T. Wassenberg, CSIRO, 10.iii.1997, dredge. QM-G303566, Vernon Is, SSE of

Lyne Reef, 12°7.0'S, 130°59.0'E, 30 m, Conservation Commission of the Northern Territory, 11.x.1993, dredge. QM-G301203, Flattop Bank, NE Joseph Bonaparte Gulf, Timor Sea, 12°16.0'S, 129°15'E, 32 m, J.N.A. Hooper, 17.v.1992, dredge. WESTERN AUSTRALIA: QM-G306039, NE of Dampier, 19°14.12'S, 117°36.10'E, 98 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 1.ix.1995, dredge. PALAU ISLANDS: QM-G306396, QM-G306397, Kaibakku Tunnel, Ngeteklou, 7°19.08'N, 134°29.0'E, 8 m, J.N.A. Hooper, 14.xii.1995. FEDERATED STATES OF MICRONESIA: QM-G301245, Mortlock Is, Etal Atoll, NE section of lagoon, Chuuk, 5°34.09'N, 153°33.05'E, 22 m, Coral Reef Research Foundation, 9.vi.1992. Further material as listed in Hooper (1991).

**Habitat and Distribution.** This species is mostly found associated with hard rock and dead coral substrates, from subtidal to deeper water reefs (6–96 m depth). It is widely distributed from Tahiti to India, and from Chuuk Atoll to southeast Qld (Fig. 6A).

**Remarks.** This species has a wide distribution within the tropical Indo-west Pacific, with specimens examined from Papiete, Tahiti (type locality) (Ridley & Dendy 1886, 1887), to Tuticorin, India (Burton & Rao 1932), Tuvalu (Whitelegge 1897), Indonesia (Topsent 1897; Desqueyroux-Faundez 1981), Philippines (Lévi 1961), north-west Australia and Northern Territory (Hooper 1991), Chuuk, Palau and along the northeast coast of Australia from Torres Strait to the Moreton Bay region (present study). This is the first record of this species from the east coast of Australia. Interestingly, there is not yet any confirmed record of this species within the Gulf of Carpentaria, despite some significant sampling effort there, with an apparently disjunct distribution of western (west of the Wessel Islands, NT) and eastern populations (southeast of the Torres Straits, Qld). The species is characterised by a light brown to grey brown live colouration, with honeycomb-like dense reticulation of flattened branches forming spherical or irregular lobate masses, occasionally arborescent, with a firm, compressible but difficult to tear texture, and an optically uneven surface that is cavernous from the close-meshed reticulate branches.

#### *Echinodictyum conulosum* Kieschnick, 1900 (Fig. 6B, 9D)

*Echinodictyum conulosum* Kieschnick, 1900: 570–1. Hooper, 1991: 1370–1373, figs 95–96, 110h, table 24.

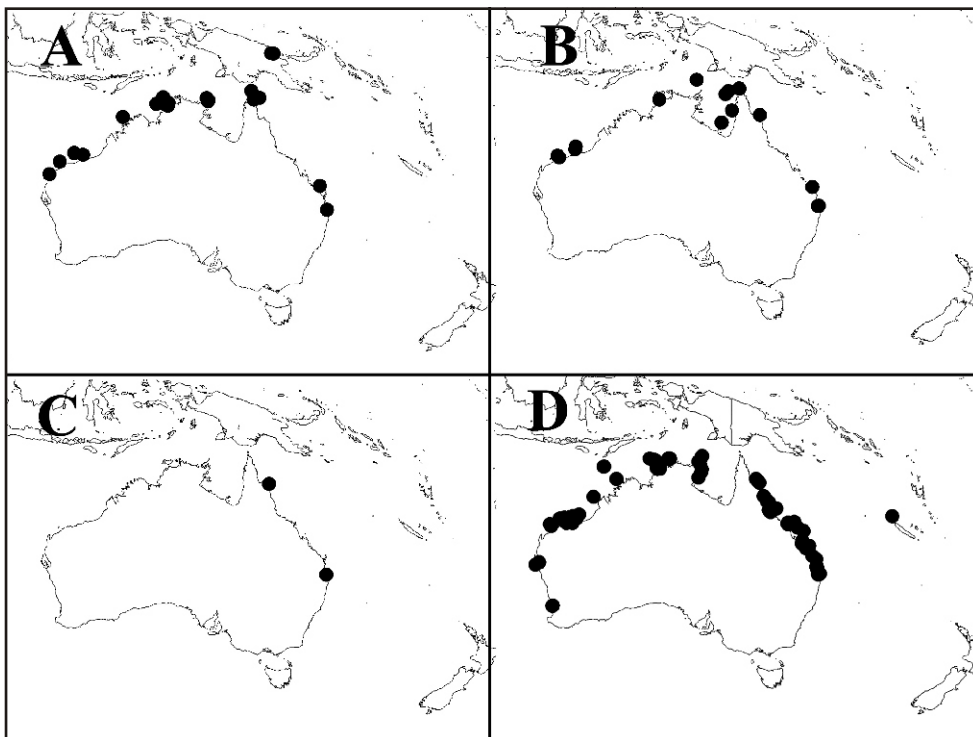


FIG. 6. Maps of wider distributions of *Echinodictyum* species found in Moreton Bay. A, *E. asperum*. B, *E. conulosum*. C, *E. luteum* sp. nov. D, *E. mesenterinum*.

**Material Examined.** SOUTHEAST QLD: QM-G317169, off Toondah Harbour, Cleveland, 27°30.91'S, 153°18.19'E, 8 m, J.A. Kennedy & T. Wassenberg, 2.viii.2000. QM-G317228, Myora Light, west side of North Stradbroke I, Moreton Bay, 27°28.10'S, 153°24.07'E, 1 m, J.N.A. Hooper, 26.ix.2000. QM-G320278, Wellington Point, Moreton Bay, 27°30'S, 153°15'E, 1 m, S.A. List-Armitage, 15.iv.2003. CENTRAL QLD: QM-G317265, inshore reef at Pandanas and Burkitt Points, Bargara, 24°48.47'S, 152°27.72'E, 6 m, S.D. Cook *et al.*, 9.x.2000. FAR NORTH QLD: QM-G321041, Torres Strait, 10°51.0'S, 142°7.8'E, 16 m, C. Bartlett on FV 'Gwendoline May', 9.xi.2004, trawl. Further material as listed in Hooper (1991).

**Habitat and Distribution.** Shallow coastal and shallow offshore rock reefs, in mud or areas with high sedimentation rates; 1–84 m depth. Tropical and subtropical distribution from the Port Hedland region, WA, around to SE Qld (Fig. 6B).

**Remarks.** Even though Kieschnick's (1900) paper concerned species mainly from Ambon, Indonesia, the label on the holotype in the Phyletisches Museum in Jena, Germany (PMJ

POR85) indicates that it was collected from Thursday I., Torres Strait. It was subsequently redescribed from extensive collections from mainly inshore turbid localities extending from the Northwest Shelf of WA, Darwin, NT, Gulf of Carpentaria, Qld, to the inner GBR, Qld (Hooper 1991). Present records extend this distribution substantially along the northeast coast of Australia to Moreton Bay, Qld. The species is jet black or black with a purple tinge when alive, usually silt covered in shallow water specimens, and has a cavernous reticulate growth form typical of *Echinodictyum* being elongate, conical, lobate or digitate, with short basal stalk. The texture is firm and flexible, and the surface is covered with numerous large conulose projections with pointed furry tips.

*Echinodictyum luteum* sp. nov.

(Figs 6C, 7, 9E, Table 4)

**Material Examined.** HOLOTYPE: QM-G304769, Nymph I., West of Lizard I., Great Barrier Reef, Qld, 14°39.0'S,

145°13.1'E, 17 m depth J.A. Kennedy, DPI Fisheries FV 'Gwendolyn May', 04.ix.1994, trawl. PARATYPES: QM-G317152, off Toondah Harbour, Cleveland, Moreton Bay, Qld, 27°30.91'S, 153°18.19'E, 8 m, J.A. Kennedy & T. Wassenberg, 02.viii.2000. QM-G306395, Kaibakku Tunnel Ngeteklou, Palau 7°19.08'N, 134°29.0'E, 8 m, J.N.A. Hooper, 14.xii.1995.

**Habitat and Distribution.** Found on rocky substrate and sheltered overhangs, from 8–17 m depth. The species is rare and the three known specimens are widely disjunctly distributed, from Moreton Bay, SE Qld, the northern Great Barrier Reef and Palau (Fig. 6C).

**Description.** *Shape.* Stalked, with a small basal attachment (1–3 cm long, up to 1 cm in diameter) and shrub-like body composed of partially or fully fused anastomosing branches, forming a close-meshed reticulate club or fan (6–14 cm high, 8–13 cm wide).

*Colour.* Yellow to yellow-brown both in life, and in ethanol, which it stains a light yellow.

*Oscules.* Not observed.

*Texture and surface characteristics.* Soft, fleshy and compressible sponge with cavernous reticulate structure. Tips of conules thrown up into points which give shaggy appearance, and are easily torn.

*Ectosome and subectosome.* Ectosome membranous, without any specialised raspailiid skeleton, but with a tangential layer of oxes in sparsely confused arrangement lying immediately below the ectosome.

*Choanosome.* Primary and secondary tracts are multipiscular and form an irregular yet well-defined reticulation with cavernous meshes. Individual oxes are scattered throughout the choanosome within a lightly collagenous mesohyl. Primary and secondary tracts are regularly echinated by long slender acanthostyles.

*Megascleres* (refer to Table 4 for dimensions). Primary oxes are long and thick, slightly curved centrally, with tapering sharp points.

Secondary oxes are significantly thinner, less prominently curved than primary oxes, and with blunter points.

Echinating acanthostyles are long, slender, mostly straight, with a slight subtylote swelling. Pattern of spination varies along the length of the spicule, being light and regular on the

shaft, becoming more concentrated at the base and tip. Base is covered in clumped blunt and sharp spines, mostly erect, few recurved. The neck, below the tyle, has fewer erect sharp spines and few small blunt spines. Spination decreases in the upper-midsection of the shaft where they are erect and pointed, and then increases to larger recurved thorny spines along the lower-midsection and these continue to the point. The larger spines are up to 3 m long.

**Remarks.** *Echinodictyum luteum* sp. nov. is unusual within the genus in its live yellowish colour, whereas most species are darkly pigmented (black, purple, dark brown), including a heavily pigmented mucus (Hooper 1991). This species also has characteristic long, slender and peculiarly spined acanthostyles, with spination varying from sharp and erect on the basal end to strongly recurved and thorny on the distal end. The morphology of acanthostyles was found to be a useful character to differentiate species of *Echinodictyum*, in an otherwise fairly homogeneous and morphologically depauperate group of sponges (Hooper 1991). In this character *E. luteum* sp. nov. is marginally most similar to *E. clathratum* Dendy from the Indian Ocean. Hooper (1991) provides a synopsis and illustrations of all known *Echinodictyum* species.

The significant disjunct distribution of this species from southeast Queensland, the Great Barrier Reef and Palau is also remarkable, and the species appears to be rare, with the assumption that it may occur in between this extensive geographic ranges. The only notable difference between Queensland and Palau specimens is the latter has marginally larger acanthostyles (Table 4).

**Etymology.** This species is named for its unusual colouration (from Latin *luteus*, yellow).

*Echinodictyum mesenterinum* (Lamarck, 1814)  
(Fig. 6D, 9F)

*Spongia mesenterina* Lamarck, 1814: 444.

*Echinodictyum mesenterinum* – Carter, 1882: 114; Ridley, 1884b: 185; Topsent, 1932: 101; Hooper, 1984: 55; Hooper, 1991: 1379–85, figs 100–103, 110i, table 25.

*Spongia bilamellata* Lamarck, 1816: 436 (in part, var. á).

*Echinodictyum bilamellatum* –Ridley, in Ridley & Duncan, 1881: 493, pl. 28, figs 1–6; Ridley, 1884: 454; Hentschel, 1911: 385; Hallmann, 1912: 299,

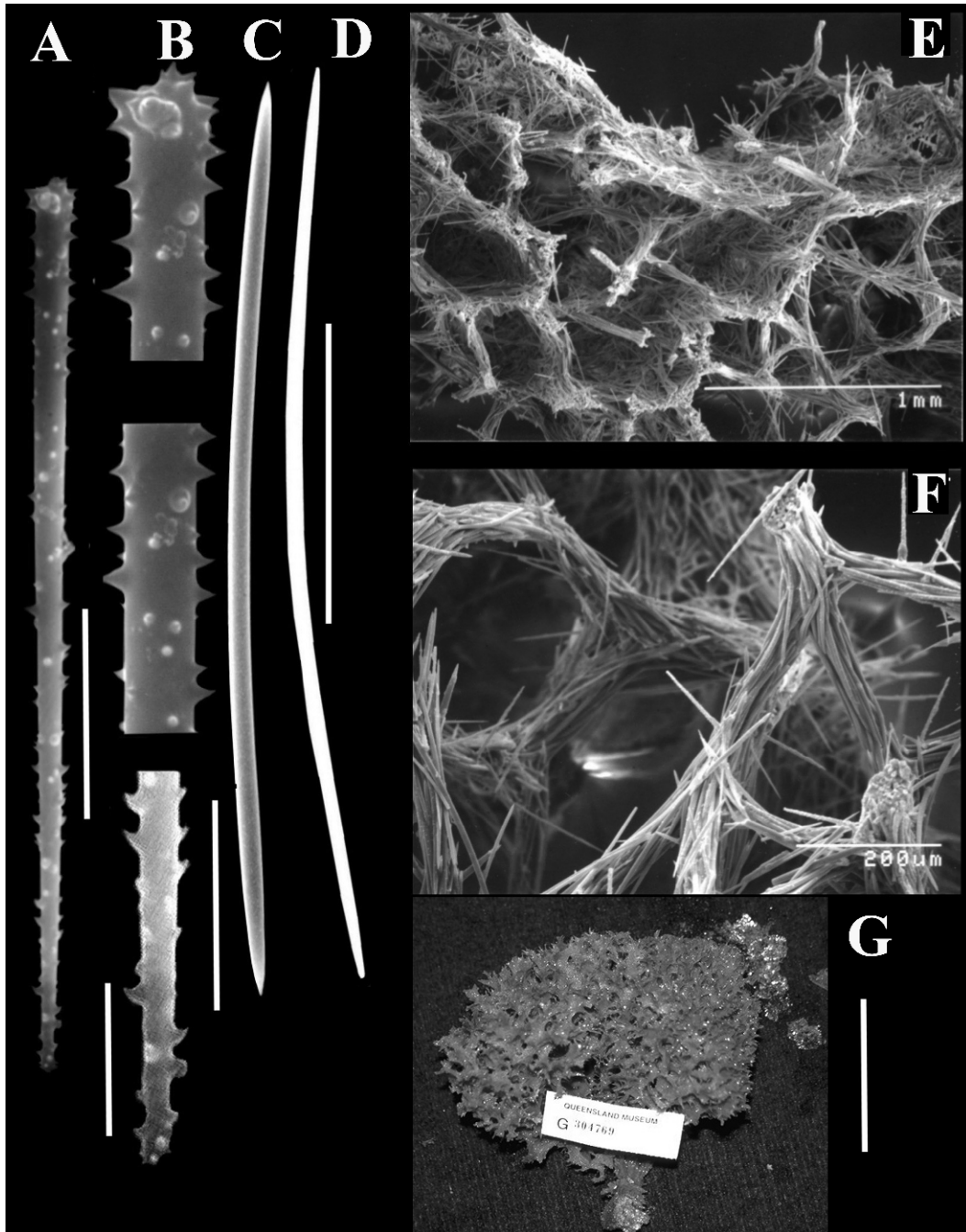


FIG. 7. *Echinodictyum luteum* sp. nov. (holotype QM-G304769). **A**, Echinating acanthostyle (scale bar 25  $\mu$ m). **B**, Spination pattern on echinating acanthostyle (scale bar 10  $\mu$ m). **C**, Primary choanosomal oxea (scale bar 100  $\mu$ m). **D**, Secondary choanosomal oxea (scale bar 100  $\mu$ m). **E**, SEM of skeletal structure, showing reticulation of multispicular tracts (scale bar 1 mm). **F**, SEM of choanosome, showing arrangement of oxeas and echination of acanthostyles (scale bar 200  $\mu$ m). **G**, holotype on deck (scale bar 8 cm).



- 1914: 267; Dendy & Frederick, 1924: 504; Topsent, 1932: 69, 101, pl. 6, fig. 5; Topsent, 1933: 23; Burton, 1938: 15, 20; Guiler, 1950: 7.
- Kalykteron elegans* Lendenfeld, 1888: 216; Hallmann, 1914: 267.
- Echinodictyum elegans* – Hallmann, 1912: 171, pl. 23, fig. 1, text-fig. 35.
- Kalykteron silex* Lendenfeld, 1888: 217; Hallmann, 1914: 267.
- Echinodictyum topsenti* de Laubenfels, 1936: 63.
- Thalassodendron typica* – Whitelegge, 1901: 86 (in part); Hallmann, 1912: 171, 203. [Not *Thalassodendron typica* Lendenfeld, 1888: 233].
- Echinonema vasplicata* Carter, 1882: 114; Ridley, 1884: 454; Hentschel, 1911: 385.
- Material Examined.** SOUTHEAST QLD: G315659, Sunshine Reef, Sunshine Coast, 26°24.77'S, 153°8.08'E, 27 m, S.D. Cook *et al.*, 11.x.1999. QM-G300883, Myora Reef, North Stradbroke I., Moreton Bay, 27°28.08'S, 153°24.10'E, 8 m, J. Hooper & S. Cook, 14.iv.1992. QM-G301280, off Banana Bouy to Pat's Point, 27°33.08'S, 153°20.05'E, 3 m, K. Lamprell, M. Norman & C. Eddie, 1.x.1992, dredge. QM-G301303, E. side Peel I., Moreton Bay, 27°30'S, 153°24.0'E, 3 m, J. Hooper & S. Cook, 3.xi.1992. QM-G301304, Myora Light, W side North Stradbroke I., 27°28.10'S, 153°24.07'E, 4 m, J. Hooper & S. Cook, 3.xi.1992. QM-G303222, 1.85 nm off Peel I., 3.8 nm off Cleveland, Moreton Bay, 27°28.10'S, 153°20.08'E, 10 m, J.N.A. Hooper & S.D. Cook, 3.vi.1993, trawl. QM-G303238, Middle Reef, nth of North Stradbroke I., 27°24.05'S, 153°31.99'E, 30 m, J.N.A. Hooper & J.A. Kennedy, 4.vi.1993. QM-G313405, QM-G313409, Dunwich, North Stradbroke I., 27°30'S, 153°24.0'E, 1 m, S.D. Cook, 18.viii.1997. QM-G317154, QM-G317168, off Toondah Harbour, Cleveland, 27°30.91'S, 153°18.19'E, 8 m, J.A. Kennedy & T. Wassenberg, 2.viii.2000. QM-G320272, Wellington Point, Moreton Bay, 27°30'S, 153°15'E, intertidal, S. List-Armitage *et al.*, 15.iv.2003. QM-G303998, QM-G304004, N side of Mudjimba I., off Mooloolabah, Sunshine Coast, 26°36.12, 153°6.15'E, 11 m, J.N.A. Hooper *et al.*, 9.ii.1994. QM-G315107, Outer Gneerings, Sunshine Coast, 26°39.45'S, 153°12.89'E, 28 m, J.N.A. Hooper *et al.*, 15.x.1998. QM-G303959, Jew Shoals, Noosa Heads, Sunshine Coast, 26°21.15'S, 153°6.10'E, 20 m, J.N.A. Hooper *et al.*, 9.ii.1994. QM-G315107, Outer Gneerings, Sunshine Coast, 26°39.45'S, 153°12.90'E, 27.9 m, J.N.A. Hooper *et al.*, 15.x.1998. QM-G315659, Sunshine Reef, off Sunshine Coast, 26°24.77'S, 153°8.08'E, 27 m, S.D. Cook *et al.*, 11.x.1999. QM-G315764, North Halls, off Sunshine Coast, 26°20.77'S, 153°4.0'E, 21 m, S.D. Cook *et al.*, 13.x.1999. QM-G306244, S side Woody I., Hervey Bay, 25°20.07'S, 152°59.10'S, 3 m, J.N.A. Hooper *et al.*, 17.xi.1995. QM-G306288, Sponge Gardens, SW of Little Woody I., Hervey Bay, 25°20.02'S, 153°1.08'E, 19 m, J.N.A. Hooper *et al.*, 18.xi.1995. GREAT BARRIER REEF, QLD: QM-G307500, N side Polmaise Reef, Capricorn-Bunker Group, 23°33.05'S, 151°39.15'E, 12 m, J.N.A. Hooper *et al.*, 12.viii.1996. QM-G307750, NE Point, Crab Spit, Low Isles, fore reef, 16°23.13'S, 145°34.05'E, 18 m, J.N.A. Hooper *et al.*, 16.i.1997. QM-G307862, SE tip of Wooded Islet, Low Isles, 16°23.13'S, 145°34.0'E, 16 m, J.N.A. Hooper *et al.*, 18.i.1997. QM-G314363, Curacao I. on west side, Palm Islands Group, 18°40.82'S, 146°32.62'E, 30 m, S.D. Cook *et al.*, 22.i.1999. QM-G314727, NE corner of Little Lindeman I., 20°25.32'S, 149°2.56'E, 22 m, S.D. Cook *et al.*, 2.vi.1999. QM-G314787, Cid Harbour, Whitsunday I., 20°16.82'S, 148°55.59'E, 18 m, S.D. Cook *et al.*, 2.vi.1999. QM-G314841, Alcyonarian Point, Hook I., Whitsunday Group, 20°3.93'S, 149°55.41'E, 15 m, S.D. Cook *et al.*, 3.vi.1999. QM-G314919, Catern Bay, Border I., Whitsunday Group, 20°9.16'S, 149°2.54'E, 30 m, S.D. Cook *et al.*, 4.vi.1999. QM-G315420, Chauvel Reef, 20°49.54'S, 150°20.13'E, 19 m, S.D. Cook *et al.*, 7.vi.1999. QM-G317316, Double Rock, Elliott Heads, 24°53.88'S, 152°29.53'E, 7.8 m, S.D. Cook *et al.*, 11.x.2000, SCUBA. QM-G317381, NE of Bustard Head, 23°53.92'S, 151°50.53'E, 31 m, QDPI Fisheries, 8.x.2000, trawl. QM-G317988, NE of Gladstone, 23°41.73'S, 151°31.09'E, 25 m, QDPI Fisheries, Scallop Survey on FV 'Seadar Bay', 18.x.2001, trawl. QM-G318409, Pompey Reefs, 21°22.68'S, 151°14.88'E, 19.2 m, S.D. Cook *et al.*, 18.ii.2000. QM-G319404, NE of Gladstone, 23°39.06'S, 151°33.04'E, 29 m, QDPI Fisheries Scallop Survey on FV 'C-King', 18.x.2001, trawl. QM-G319430, E of Gladstone, 23°51.59'S, 151°41.39'E, 30 m, QDPI Fisheries Scallop Survey on FV 'C-King', 19.x.2001, trawl. QM-G320125, Man and Wife I., Keppel Islands, 23°7.08'S, 150°59.45'E, 17.4 m, J.N.A. Hooper *et al.*, 6.xi.2002. QM-G320208, Big Peninsula, Great Keppel I., 23°9.03'S, 150°58.4'E, 12 m, J.N.A. Hooper *et al.*, 7.xi.2002. QM-G320241, QDPI Scallop Survey 106 Shot 41, 22°45.68'S, 151°4.73'E, QDPI Fisheries Scallop Survey on FV 'Southern Intruder', 15.x.2002, trawl. QM-G320741, Mid Reef, Howick Group, 14°26.89'S, 144°52.88'E, 23 m, J.N.A. Hooper *et al.*, 3.vii.2003. QM-G320757, Houghton Reef, Howick Group, 14°31.19'S, 144°58.89'E, 20 m, J.N.A. Hooper *et al.*, 3.vii.2003. QM-G321570, Sykes Reef, Heron I., 23°27.07'S, 152°2.33'E, 19.2 m, S.D. Cook *et al.*, 8 m, 9.xi.2004. QM-G321700, eastern end, NorthWest I., 23°26.0'S, 151°36.49'E, 20.8 m, S.D. Cook *et al.*, 10.xi.2004. QM-G321765, Rock Cod Shoal, 23°40.62'S, 151°37.10'E, 14 m, S.D. Cook *et al.*, 11.xi.2004. QM-G321821, SW of Fitzroy I., 16°55.59'S, 145°59.29'E, 20 m, S.D. Cook *et al.*, 24.xi.2004. QM-G321858, Normandy I., N end of Frankland Is, 17°12.24'S, 146°4.45'E, 13 m, S.D. Cook *et al.*, 25.xi.2004. QM-G321913, Gibson Reef, 17°18.35'S, 146°20.65'E, 24 m, S.D. Cook *et al.*, 26.xi.2004. QM-G321955, Hall-Thompson Reef, 17°36.58'S, 146°26.51'E, 15 m, S.D. Cook *et al.*, 26.xi.2004. CORAL SEA TERRITORIES. QM-G320434, Melville Passage, Tydeman Reef, 13°59.37'S, 144°29.95'E, 32 m, J.N.A. Hooper *et al.*, 29.vi.2003. QM-G320648, Munro Reef, 14°18.15'S, 144°48.81'E, 23 m, J.N.A. Hooper *et al.*, 2.vii.2003. GULF OF CARPENTARIA, NT: QM-G300780, E of Gove Peninsula, 13°48.03'S, 136°21.04'E, 18.8 m,

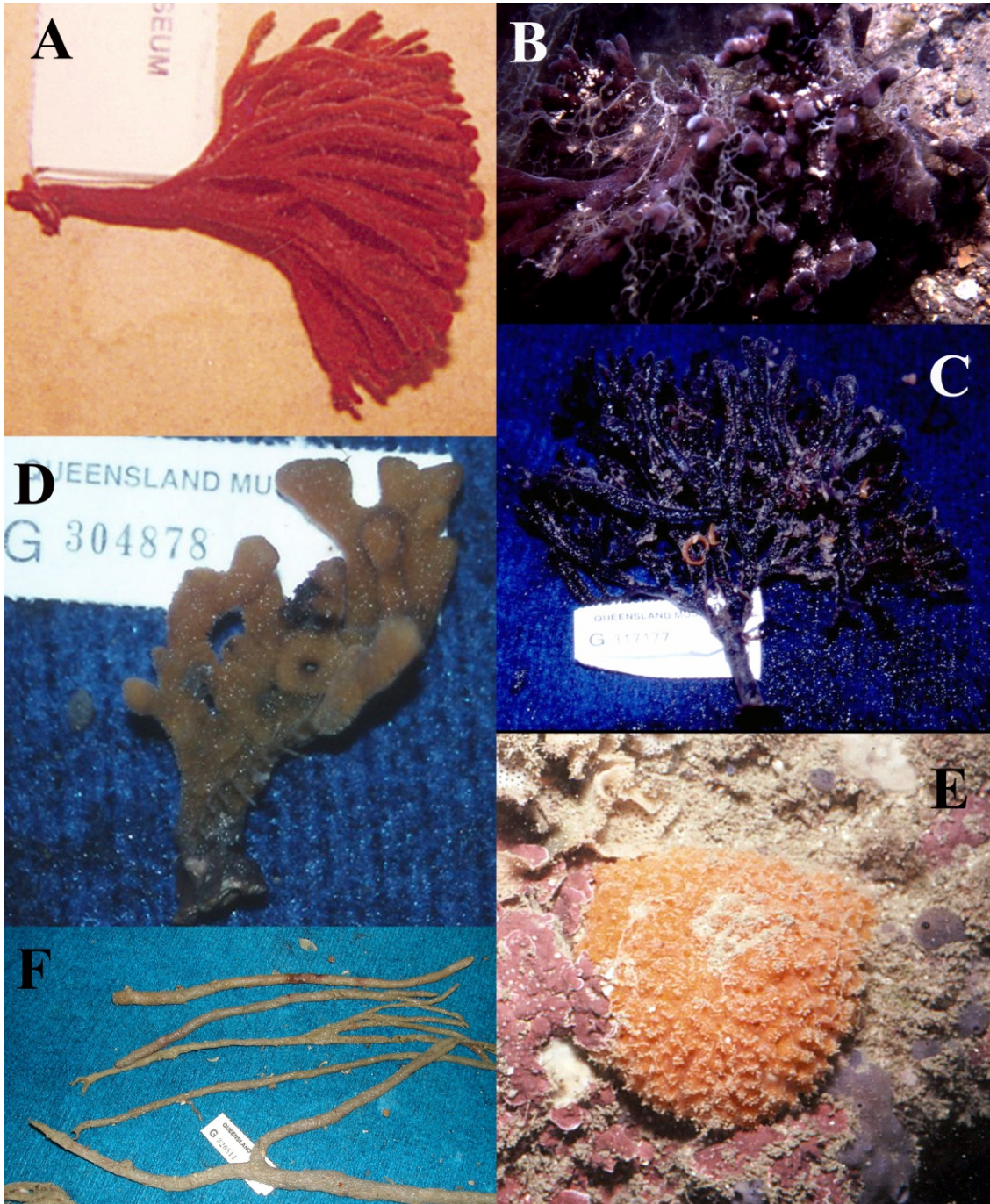


FIG. 8. Moreton Bay Raspailiidae fauna. **A**, *Raspailia (Raspailia) scorpa* sp. nov. (holotype, QM-G315208, on deck, from Moreton Bay). **B–C**, *Raspailia (Raspailia) kennedyi* sp. nov. (holotype, QM-G317177, alive and on deck, from Moreton Bay). **D**, *Raspailia (Raspaxilla) compressa* Bergquist (QM-G304878, on deck, from Mooloolaba). **E**, *Aulospongos similiaustralis* sp. nov. (QM-G303963, in situ, from Noosa). **F**, *Raspailia (Parasyringella) australiensis* Ridley (QM-G320811, on deck, Gulf of Carpentaria).

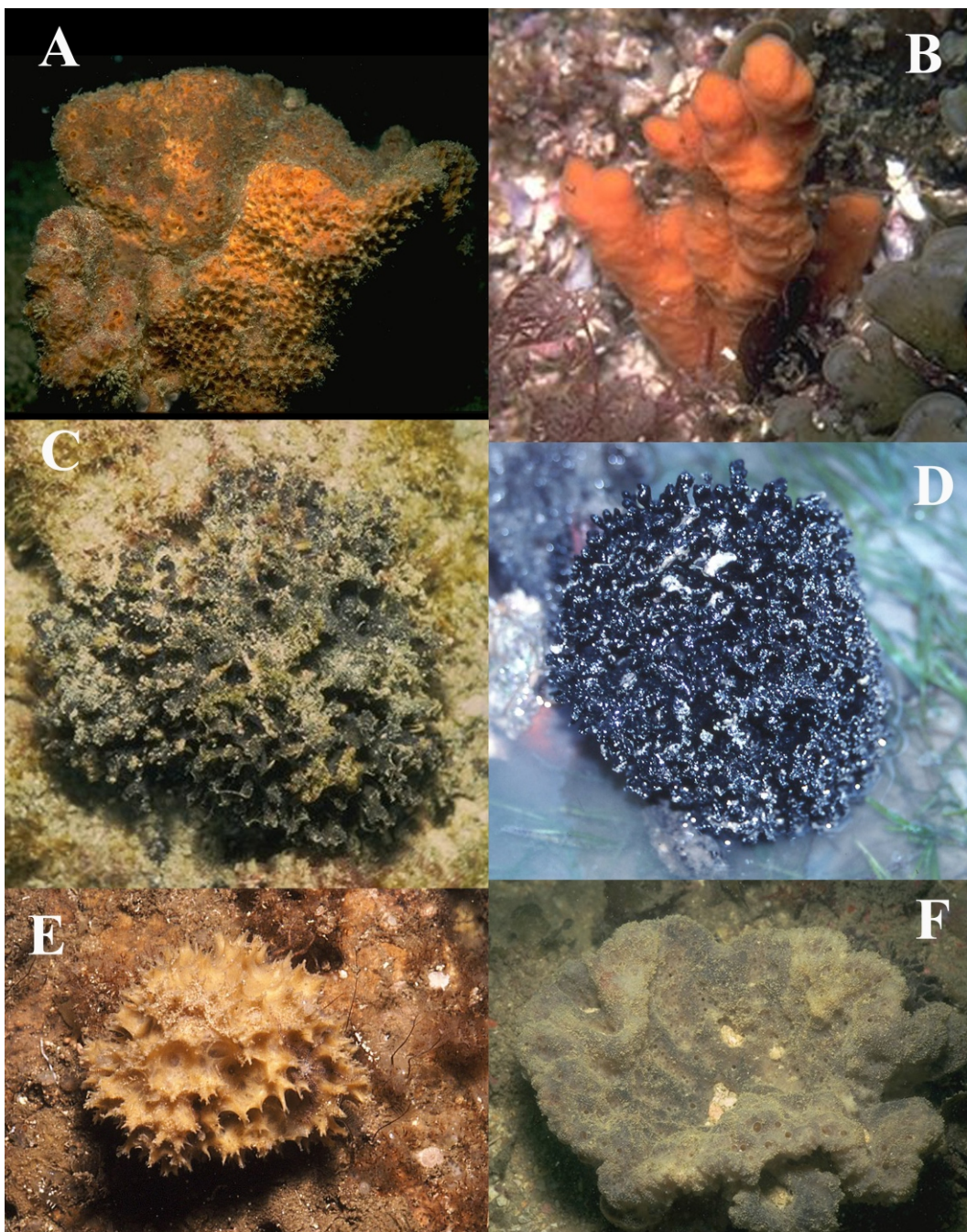


FIG. 9. Moreton Bay Raspailiidae fauna. **A**, *Sollasella moretonensis* Van Soest, Hooper, Beglinger & Erpenbeck (holotype, QM-G303227, in situ, from North Stradbroke I.). **B**, *Ceratopsis clavata* Thiele (specimen, QM-G301426, from Byron Bay). **C**, *Echinodictyum asperum* Ridley & Dendy (specimen, QM-G303197, in situ, from Moreton I.). **D**, *Echinodictyum conulosum* Kieschnick (specimen, QM-G317228, intertidal, from North Stradbroke I.). **E**, *Echinodictyum luteum* sp. nov. (paratype, QM-G306395, in situ, from Palau). **F**, *Echinodictyum mesenterinum* (Lamarck) (specimen, QM-G303959, in situ, Noosa).

S.D. Cook on CSIRO RV 'Southern Surveyor', 23.xi.1991, trawl. QM-G300792, E of Gove Peninsula, 12°37.02'S, 136°49.05'E, 26 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 23.xi.1991, dredge. QM-G300818, E of Groote Eylandt, 13°1.08'S, 136°43.0'E, 22 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 23.xi.1991, trawl. NORTHERN TERRITORY. QM-G303326, East Point Bommies, Darwin Harbour, 12°24.08'S, 130°48.13'E, 10 m, J.N.A. Hooper & L.J. Hobbs, 23.ix.1993. QM-G303429, Mandorah Jetty, Darwin Harbour, 12°26.1'S, 130°46.02'E, 9 m, J.N.A. Hooper & L.J. Hobbs, 25.ix.1993. QM-G313318, N of Bathurst I., Arafura Sea, 11°19.98'S, 130°12.18'E, 40 m, T. Wassenberg CSIRO, 10.iii.1997, trawl. QM-G314244, Arafura Sea, north of Cape Wessel, 10°45'S, 136°52.0'E, 53 m, S.P. Leys on CSIRO RV 'Southern Surveyor', 24.ix.1998, trawl. WESTERN AUSTRALIA. QM-G304585, Monkey Mia, Eastern Bluff, Peron Peninsula, Shark Bay, 25°48'S, 113°45'E, subtidal, R. Smolker, Univ. Southern California, 21.vi.1994. QM-G306004, SW of Cape Jaubert, 19°27.13'S, 117°20.05'E, 86 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 31.viii.1995, trawl. QM-G306009, NE of Dampier, 19°34.08'S, 117°14.15'E, 74 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 31.viii.1995, trawl. QM-G306173, SW of Broome, 19°24.15'S, 118°3.03'E, 68 m, S.D. Cook on CSIRO RV 'Southern Surveyor', 6.ix.1995, trawl. NEW CALEDONIA. QM-G304705, Isle de Sable, 19°15'S, 163°48.0'E, 11 m, J. Vacelet, 25.iv.1989. SINGAPORE. QM-G313102, Pulau Tembakul (Kusu I.), Freyberg Channel, 1°13.08'N, 103°51.12'E, 18.7 m, J.N.A. Hooper & J.A. Kennedy, 2.v.1997. MALAYSIA. QM-G321087, SW peninsular, centre of bay W of T. Melano, 2°1.7'N, 109°39.2'E, 8 m, N.J. Pilcher, Marine Research Foundation, 30.v.2003. VIETNAM: QM-G300050, Off Han Rai I., Gulf of Thailand, 9°43.12'N, 104°20.10'E, 4 m, Y. Yakovlev on USSR RV 'Akademik Oparin', 29.x.1987. PHILIPPINES. QM-G304786, NW side Olango I., off Cebu, 10°16.05'N, 124°2.03'E, 23 m, Coral Reef Research Foundation, 8.ii.1994. Further material as listed in Hooper (1991).

**Habitat and Distribution.** Subtidal and shallow coastal rock, live and dead coral reefs, with a known bathymetric distribution from intertidal to 86 m depth. This species has a circum-Australian distribution, and also widely distributed throughout the Indo-west Pacific (see records also from Hooper 1991), and it is particularly common in tropical waters on both sides of the continent. The present study greatly expands the known distribution along the Great Barrier Reef down to Moreton Bay. The type locality is unknown other than 'Australian Seas', Peron and Lesueur collection (Fig. 6D).

**Remarks.** This species has been comprehensively redescribed by Hooper (1991), including its morphological variability across its extensive

distribution, which from the present samples has expanded into the northwestern and southwestern Pacific. The species has a very characteristic growth form that has become aptly known as 'birds nest'. Sponges are typically erect, vase-form or cup-shaped, on a short stalk or attached to substratum directly. Live colouration is also fairly consistent and evenly pigmented dark purple or blue-purple throughout, varying only slightly depending on water depth and clarity. Texture is very harsh, only slightly compressible or flexible, and difficult to tear.

## DISCUSSION

The present study increases the raspailiid fauna of the Moreton Bay region from three to eleven species including four new species; increases the known Australian fauna to 63 species; and significantly expands the known geographic ranges of many of these. Of the Moreton Bay species three are known only so far from this region and the southern Great Barrier Reef. Three other species extend into the northern tropical waters of the Northern Territory and/or Western Australian region, and five species have more extensive Indo-west Pacific distributions (Table 5). The occurrence of local (apparent) endemic species in the Moreton Bay region is well-known, with the region being a major biogeographic transition zone between the southern (Peronian) and northern (Solanderian) faunas. In addition to having a peculiar mix of both temperate and tropical species (e.g. Eudean *et al.* 1956), the region is known to contain approximately 30 species of marine invertebrates found nowhere else, and which probably represent relics from once more widespread habitats, or still remain undetected in other enclaves along the coast (Davie & Hooper 1998). Most of the sponges studied here belong to the tropical fauna are at the southern-most point in their distributions. This number of apparent endemic species is likely to rise significantly with an increased taxonomic effort in this region, as demonstrated by the present discovery of new sponge species from what was thought to be a relatively well known fauna.

## LITERATURE CITED

Bergquist, P.R. 1970. The Marine fauna of New Zealand: Porifera, Demospongiae, Part 2 (Axinellida and

- Halichondrida). New Zealand Department of Scientific and Industrial Research Bulletin. *New Zealand Oceanographic Institute Memoir* **197**: 1–85.
- Burton, M. 1934. Sponges. Pp. 1–58. *In, Further Zoological Results of the Swedish Antarctic Expedition 1901–1903. Vol. 3(2)* (Norstedt and Söner: Stockholm).
1938. Non-calcareous sponges. *Australian Antarctic Expedition 1911–14, Scientific Reports (C. Zoology and Botany)* **9(5)**: 5–23.
- Burton, M. & Rao, H.S. 1932. Report on the shallow-water marine sponges in the collection of the Indian Museum. *Records of the Indian Museum* **34**: 299–356.
- Carter, H.J. 1882. New Sponges, Observations on old ones, and a proposed New Group. *Annals and Magazine of Natural History* (5) **10**: 106–125.
- Davie, P.J.F. & Hooper, J.N.A. 1998. Patterns of biodiversity in the marine invertebrate and fish communities of Moreton bay. Pp. 331–346. *In, Tibbets, I. R., Hall, N. J. & Dennison, W. D. (Eds), Moreton Bay and Catchment.* (University of Queensland Press: Brisbane).
- Dendy, A. & Frederick, L.M. 1924. On a Collection of Sponges from the Abrolhos Islands, Western Australia. *Journal of the Linnean Society of London, Zoology* **35**: 477–519.
- Desqueyroux Faundéz, R. 1981. Revision de la collection d'éponges d'Amboine (Moluques, Indonésie) constituée par Bedot et Pictet et conservée au Muséum d'Histoire Naturelle de Genève. *Revue Suisse de Zoologie* **88(3)**: 723–764.
- Endean, R., Kenny, R. & Stephenson, W. 1956. The ecology and distribution of intertidal organisms on the rocky shores of the Queensland mainland. *Australian Journal of Marine and Freshwater Research* **7(1)**: 88–146.
- Erpenbeck, D., Hooper, J.N.A., List-Armitage, S.E., Soest, R.W.M. Van, Degnan, B. & Wörheide, G. 2007. Affinities of the family Sollasellidae (Porifera, Demospongiae). II. Molecular evidence. *Contributions to Zoology* **76(2)**: 95–102.
- Guiler, E.R. 1950. Notes on Tasmanian marine sponges. *Records of the Queen Victoria Museum, Launceston* **3(2)**: 5–14.
- Hallmann, E.F. 1912. Report on the Sponges obtained by the FIS 'Endeavour' on the Coasts of New South Wales, South Australia, Queensland, and Tasmania, 1909–10 Part 1. *Zoological Results of the Fishing Experiments carried out by the F.I.S. 'Endeavour' 1909–10* (2): 117–300.
1914. A Revision of the Monaxonid Species described as new in Lendenfeld's 'Catalogue of the Sponges in the Australian Museum' Part 1. *Proceedings of the Linnean Society of New South Wales* **29**: 263–315.
- Hentschel, E. 1911. Tetraxonida 2 Teil. Pp. 279–393. *In, Michaelsen, W. & Hartmeyer, R. (Ed.), Die Fauna Südwest-Australiens.* Volume 3 (G. Fischer: Jena).
1923. Erste Unterabteilung der Metazoa Parazoa Einziger Stamm und einzige Klasse der ersten Unterabteilung: Porifera = Schwämme. Pp. 307–417. *In, Kükenthal, W. (Ed.), Handbuch der Zoologie.* 1 (Walter de Gruyter & Co.: Berlin, Leipzig).
- Hooper, J.N.A. 1984. A new genus and two new species of haplosclerid sponges (Porifera: Demospongiae) from the Timor Sea, northwest Australia. *Proceedings of the Royal Society of Victoria* **96(2)**: 55–60.
1991. Revision of the Family Raspailiidae (Porifera: Demospongiae), with description of Australian Species. *Invertebrate Taxonomy* **5(6)**: 1179–1415.
2002. Family Raspailiidae Hentschel, 1923. Pp. 469–510. *In, Hooper, J.N.A. & Soest, R.W.M. Van (Eds), Systema Porifera. A Guide to the classification of sponges.* (Kluwer Academic/ Plenum Publishers: New York, Boston, Dordrecht, London, Moscow).
- Hooper, J.N.A. & Lévi, C. 1993. Poecilosclerida from the New Caledonia lagoon (Porifera: Demospongiae). *Invertebrate Taxonomy* **7(5)**: 1221–1302.
1994. Biogeography of Indo-west Pacific sponges: Microcionidae, Raspailiidae, Axinellidae. Pp. 191–212. *In, Soest, R.W.M. van, Kempen, T.M.G. van & Braekman, J.-C. (Eds), Sponges in Time and Space.* (Balkema: Rotterdam).
- Hooper, J.N.A. & Soest, R.W.M. Van (Eds), 2002. *Systema Porifera. A Guide to the classification of sponges.* Vols 1 & 2 (Kluwer Academic/ Plenum Publishers: New York, Boston, Dordrecht, London, Moscow).
2006. A new species of *Amphimedon* (Porifera, Demospongiae, Haplosclerida, Niphathidae) from the Capricorn-Bunker Group of Islands, Great Barrier Reef, Australia: target species for the 'sponge genome project'. *Zootaxa* **1314**: 31–39.
- Hooper, J.N.A. & Wiedenmayer, F. 1994. Porifera. Pp. 1–621. *In, Wells, A. (Ed.), Zoological Catalogue of Australia.* Vol. 12. (CSIRO Australia: Melbourne).
- Hooper, J.N.A., Kennedy, J.A. & Quinn, R.J. 2002. Biodiversity 'hotspots', patterns of richness and endemism, and taxonomic affinities of tropical Australian sponges (Porifera). *Biodiversity and Conservation* **11(5)**: 851–885.
- Hooper, J.N.A., Kennedy, J.A. & Van Soest, R.W.M. 2000. Annotated checklist of sponges (Porifera) of the South China Sea region. *Raffles Bulletin of Zoology, Supplement* **8**: 125–207.
- Hooper, J.N.A., Lehnert, H. & Zea, S. 1999. Revision of *Aulospongius* Norman and review of Raspailiidae with rhabdostyles (Porifera: Demospongiae). *Memoirs of the Queensland Museum* **43(2)**: 649–708.

- Kieschnick, O. 1900. Kieselschwämme von Amboina. Pp. 545–582. In, Semon, R. (Ed.) *Zoologische Forschungsreisen in Australien und den Malayischen Archipel ... ausgeführt in den Jahren 1891– 1893*. Volume 8 (Denkschriften Medizinisch Naturwissenschaftliche Gesellschaft: Jena).
- Lamarck, J.B.P. De Monet 1814. Sur les polypiers empâtés. *Annales du Muséum d'Histoire naturelle, Paris* **20**: 294– 312, 370– 386, 432– 458.
1816. *Histoire naturelle des animaux sans vert bres*. Volume 2. (Verdi re: Paris).
- Laubenfels, M.W. De 1936. A discussion of the sponge fauna of the Dry Tortugas in particular, and the West Indies in general, with material for a revision of the families and orders of the Porifera. Carnegie Institute of Washington Publication. *Papers of the Tortugas Laboratory* **30**(467): 1–225.
- Lendenfeld, R.Von 1887. Die Chalineen des australischen Gebietes. *Zoologische Jahrbücher, Jena* **2**: 723–828.
1888. *Descriptive catalogue of the sponges in the Australian Museum, Sydney*. (Taylor and Francis: London).
- Lévi, C. 1961. Spongiaires des Iles Philippines, principalement récoltés au voisinage de Zamboanga. *Philippines Journal of Science* **88**(4): 509– 533.
- Nardo, D. 1833. Auszug aus einem neuen System der Spongiarien, wornach bereits die Aufstellung in der Universitäts - Sammlung zu Padua gemacht ist. Vol. (*Isis, oder Encyclopädische Zeitung, von oken: Jena*).
- Pick, F.K. 1905. Die Gattung *Raspailia*. *Archiv für Naturgeschichte* (1905): 1– 48.
- Quinn, R.J., De Almeida Leone, P., Guymmer, G. & Hooper, J.N.A. 2002. Australian biodiversity via its plants and marine organisms. A high-throughput screening approach to drug discovery. *Pure Applied Chemistry* **74**(4): 519–526.
- Ridley, S.O. 1881. XI Spongiida. Horny and Siliceous Sponges of Magellan Straits, S.W. Chili, and Atlantic off S.W. Brazil. Pp. 107–137, 140–141. In, Gunther, A. (Ed.), *Account of the Zoological Collections made during the Survey of H.M.S. 'Alert' in the Straits of Magellan and on the Coast of Patagonia*. *Proceedings of the Zoological Society of London*. 1881
1884. Spongiida. *Report on the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. 'Alert' 1881*. 2. Vol. (British Museum (Natural History): London).
- Ridley, S.O. & Dendy, A. 1886. Preliminary Report on the Monaxonida collected by the HMS 'Challenger'. *Annals and Magazine of Natural History* (5)**18**: 325–351, 470–493.
1887. Report on the Monaxonida collected by HMS 'Challenger' during the Years 1873–76. Pp. 1275. *Report on the Scientific Results of the Voyage of H.M.S. 'Challenger' during the Years 1873–76*. **20** (Her Majesty's Stationery Office: London, Edinburgh, Dublin).
- Ridley, S.O. & Duncan, P.M. 1881. On the genus *Plocamia*, Schmidt, and on some other sponges of the Order Echinonemata with descriptions of two additional new species of *Dirrhopalum*. *Journal of the Linnean Society, London* **15**: 476–497.
- Soest, R.W.M. Van, Hooper, J.N.A., Berlinger, E. & Erpenbeck, D. 2006. Affinities of the family Sollasellidae (Porifera, Demospongiae). I. Morphological evidence. *Contributions to Zoology* **75**(3/4): 133–144.
- Strand, E. 1928. Miscellanea nomenclatorica zoologica et palaeontologica. *Archiv für Naturgeschichte, Berlin* **92A**(B): 31–36.
- Thiele, J. 1898. Studien über pazifische Spongien I Heft. *Zoologica* **24**: 1– 72.
- Topsent, E. 1897. Spongiaires de la Baie d'Amboine Voyage de MM M Bedot et C Pictet dans l'Archipel Malais. *Revue Suisse de Zoologie* **4**: 421– 487.
1913. Spongiaires provenant des Campagnes Scientifiques de la Princesse Alice dans les Mers du Nord (1898–1899, 1906–1907). *Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert Ier Prince Souverain de Monaco* **45**: 1– 67.
1928. Spongiaires de l'Atlantique et de la Méditerranée provenant des croisières du Prince Albert Ier de Monaco. *Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert Ier Prince Souverain de Monaco* **74**: 1– 376.
1932. Éponges de Lamarck conservées au Muséum de Paris Deuxième partie (I). *Archives du Muséum National d'Histoire Naturelle* (6)**8**: 61– 124.
1933. Éponges de Lamarck conservées au Muséum de Paris Fin (I). *Archives du Muséum National d'Histoire Naturelle* (6)**10**: 1– 60.
- Vosmaer, G.C.J. 1912. On the distinction between the genera *Axinella*, *Phakellia*, *Acanthella* ao. *Zoologische Jahrbücher, Jena Supplement* **15**: 307–322.
- Whitelegge, T. 1897. The sponges of Funafuti. *Memoirs of the Australian Museum* **3**: 323–332.
1901. Report on sponges from the coastal beaches of New South Wales. *Records of the Australian Museum* **4**(2): 1–70 [55–118].

**ERRATUM: MEMOIRS OF THE QUEENSLAND MUSEUM — NATURE 54(1)**

**New species of Raspailiidae (Porifera: Demospongiae: Poecilosclerida) from southeast Queensland**

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Text to be added at the end of page 22 of *Memoirs of the Queensland Museum — Nature*, volume 54(1).

TABLE 1. Comparisons in the range (and mean) spicule measurements between *Raspailia* (*Raspailia*) *scorpa* sp. nov. and the allied *R. (R.) phakellopsis* Hooper 1991.

Material	Ectosomal styles	Choanosomal styles	Subectosomal styles	Echinating acanthostyles
<i>R. (R.) scorpa</i> sp. nov. (holotype QMG315208)	210-350 × 1-2 µm (315.8 × 1.9 µm)	290-460 × 10-11 µm (378.0 × 11.0 µm)	1000-1600 × 5-13 µm (1288.6 × 9.0 µm)	80-140 × 4-5 µm (125.8 × 4.9 µm)
<i>R. (R.) phakellopsis</i> (holotype NTM Z1950)	173-302 × 0.5-3 µm (231.0 × 1.5 µm)	311-465 × 9-8 µm (392.7 × 13.2 µm)	820-1835 × 8-17 µm (1349.6 × 12.4 µm)	125-156 × 5-9 µm (133.2 × 7.1 µm)

TABLE 2. Range (and mean) of spicule measurements in *Raspailia* (*Raspailia*) *kennedyi* sp. nov.

Material	Choanosomal styles	Subectosomal styles	Ectosomal styles (anisoxeas)	Echinating acanthostyles
Holotype QMG317177	350-830 × 9-12 µm (497 × 8.53 µm)	900-1200 × 7-9 µm (1077 × 8.2 µm)	140-290 × 1-2 µm (203.50 × 1.66 µm)	50-70 × 4-6 µm (61.43 × 4.9 µm)

TABLE 3. Range (and mean) spicule measurements in specimens of *Aulospongia similiaustralis* sp. nov. and comparison with related species of *Aulospongia*.

Material	Choanosomal styles	Subectosomal tylostyles	Echinating acanthostyles
Holotype QMG300079	230-380 × 9-20 µm (300.3 × 10.8 µm)	690-1120 × 4-10 µm (925.6 × 9.7 µm)	70-255 × 2-8 µm (97.9 × 4.4 µm)
Paratypes QMG315526	150-350 × 8-20 µm (248.3 × 11.8 µm)	780-1260 × 10 µm (974.6 × 10 µm)	60-120 × 5-7 µm (87.3 × 5.1 µm)
QMG317317	210-435 × 10-20 µm (342.1 × 16.1 µm)	800-1200 × 6-11 µm (955.7 × 9.4 µm)	82-150 × 5-10 µm (101.2 × 6.8 µm)
QMG320085	180-370 × 6-20 µm (292.2 × 14.1 µm)	720-1110 × 6-10 µm (932.2 × 8.7 µm)	65-130 × 3-6 µm (85.4 × 4.6 µm)
Specimens QMG304007	150-340 × 12-20 µm	950-1300 × 8-15 µm	85-125 × 4-5 µm
QMG304879	240-370 × 10-20 µm	850-1050 × 10-15 µm	80-130 × 6-12 µm
QMG303963	190-345 × 15-20 µm	800-1100 × 5-10 µm	80-120 × 5- µm
QMG317276	310-430 × 18-20 µm	900-1250 × 5-10 µm	80-125 × 7-11 µm
QMG306292	270-440 × 8-25 µm	790 1200 × 4-11 µm	80-165 × 5-10 µm
QMG315777	280-400 × 4-10 µm	900-1410 × 6-15 µm	90-130 × 6-8 µm
QMG315732	270-370 × 9-18 µm	700-1400 × 5-15 µm	80-130 × 5-7 µm
QMG315610	175-390 × 7-20 µm	800-1350 × 4-16 µm	80-130- × 3-5µm
<i>A. tubulatus</i> (Bowerbank 1873) (data from Hooper <i>et al.</i> 1999)	304-462 × 16-24 µm	Absent (ectosomal styles: 212-250 × 2-3 µm)	109-126×5-10 µm

TABLE 4. Range (and mean) spicule measurements for specimens of *Echinodictyum luteum* sp. nov.

Material	Primary choanosomal oxeas	Secondary choanosomal oxeas	Echinating acanthostyles
QMG304769 holotype	205-440 × 5-11µm (269.8 × 7.37µm)	140-320 × 2-6µm (204.8 × 3.76µm)	90-135 × 4-7µm (117.6 × 4.84µm)
QMG317152 paratype	150-580 × 5-13µm (247.5 × 8.75µm)	110-425 × 1-7µm (223.8 × 3.96µm)	105-130 × 3-8µm (115.6 × 5.96µm)
QMG306395 paratype	200-500 × 4-11µm (287 × 6.12µm)	170-400 × 1-2µm (220.27 × 1.33µm)	120-180 × 4-8µm (141.48 × 5.6µm)

TABLE 5. Updated checklist of Raspailiidae recorded from Australian territorial waters (1, Dampierian Province, Geraldton (Western Australia) to Cape York (Queensland). 2, Solanderian Province, Cape York (Queensland) to Coffs Harbour (New South Wales). 3, Peronian Province, Coffs Harbour (New South Wales) to shallow coastal regions of northern Victoria and deeper waters off northeastern Tasmania. 4, Maugean Province, Bass Strait and shallow waters of Tasmania. 5, Flindersian Province, western Victoria to Geraldton (Western Australia). 6, Australian Antarctic and subantarctic Territories. Provinces after Bennett & Pope (1957). Data modified and updated from Hooper (1991).

Species	1	2	3	4	5	6	Other locality
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>atropurpurea</i> (Carter, 1885)			×	×			
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>echinata</i> Whitelegge, 1907			×				
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>kennedyi</i> sp. nov.		×					
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>gracilis</i> (Lendenfeld, 1888)			×				
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>phakellopsis</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>pinnatifida</i> (Carter, 1885)				×			
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>scorpa</i> sp. nov.		×					
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>tenella</i> (Lendenfeld, 1888)			×				
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>vestigifera</i> Dendy, 1896	×			×	?		
<i>Raspailia</i> ( <i>Raspailia</i> ) <i>wilkinsoni</i> Hooper, 1991		×					New Caledonia, Vanuatu
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>arbuscula</i> (Lendenfeld, 1888)	×		×				New Zealand
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>bifurcata</i> Ridley, 1884	×	×	×				
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>cacticutis</i> (Carter, 1885)				×			
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>darwinensis</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>desmoxyiformis</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>keriontria</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>melanorhops</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Clathriodendron</i> ) <i>paradoxa</i> Hentschel, 1911					×		
<i>Raspailia</i> ( <i>Raspa×illa</i> ) <i>compressa</i> Bergquist, 1970	×	×			×		New Zealand
<i>Raspailia</i> ( <i>Raspa×illa</i> ) <i>frondula</i> (Whitelegge, 1907)			×				
<i>Raspailia</i> ( <i>Raspa×illa</i> ) <i>reticulata</i> Hooper, 1991		×					



New Raspailiidae Sponges from SE Qld

TABLE 5. continued ...

Species	1	2	3	4	5	6	Other locality
<i>Raspailia</i> ( <i>Raspa</i> × <i>illa</i> ) <i>wardi</i> Hooper, 1991	×						
<i>Raspailia</i> ( <i>Parasyringella</i> ) <i>australiensis</i> Ridley, 1884	×	×					
<i>Raspailia</i> ( <i>Parasyringella</i> ) <i>clathrata</i> Ridley, 1884		×					
<i>Raspailia</i> ( <i>Parasyringella</i> ) <i>elegans</i> (Lendenfeld, 1887)	×						
<i>Raspailia</i> ( <i>Parasyringella</i> ) <i>nuda</i> Hentschel, 1911	×						
<i>Raspailia</i> ( <i>Parasyringella</i> ) <i>stelliderma</i> (Carter, 1885)				×			
<i>Raspailia</i> ( <i>Hymenaphiopsis</i> ) <i>irregularis</i> Hentschel, 1914						×	
<i>Aulospongius similiaustralis</i> sp. nov.		×					
<i>Sollasella digitata</i> Lendenfeld, 1888			×				
<i>Sollasella moretonensis</i> Van Soest, Hooper, Beglinger & Erpenbeck, 2006	×	×					
<i>Ectyoplasia frondosa</i> (Lendenfeld, 1887)	×		?				
<i>Ectyoplasia tabula</i> (Lamarck, 1814)	×				×		
<i>Ectyoplasia vannus</i> Hooper, 1991	×						
<i>Endectyon elyakovi</i> Hooper, 1991	×	×					
<i>Endectyon fruticosum aruense</i> (Hentschel, 1912)	×						Indonesia, Thailand
<i>Endectyon thurstoni</i> (Dendy, 1887)	×						E coast India
<i>Endectyon xerampelina</i> (Lamarck, 1932)							Unknown, possibly Australia
<i>Trikenion flabelliforme</i> Carter, 1882	×				?		Indonesia, PNG
<i>Cyamon aruense</i> Hentschel, 1912	×						Indonesia
<i>Eurypon graphidiophorum</i> Hentschel, 1911					×		
<i>Amphinomia sulphurea</i> Hooper, 1991	×						
<i>Ceratopsion dichotomum</i> (Whitelegge, 1907)			×				
<i>Ceratopsion axiferum</i> (Hentschel, 1912)	×						Indonesia
<i>Ceratopsion clavatum</i> Thiele, 1898		×					Japan, New Caledonia, Papua New Guinea
<i>Ceratopsion montebelloense</i> Hooper, 1991	×						
<i>Ceratopsion palmatum</i> Hooper, 1991	×						New Caledonia
<i>Thrinacophora cervicornis</i> Ridley & Dendy, 1886	×						Indonesia, Philippines
<i>Axechina raspailioides</i> Hentschel, 1912	×						Indonesia
<i>Echinodictyum arenosum</i> Dendy, 1896				×			
<i>Echinodictyum asperum</i> Ridley & Dendy, 1886	×	×					Indo-Pacific, Tahiti to Gulf of Manaar, Chuuk to northern Australia
<i>Echinodictyum austrinus</i> Hooper, 1991					×		
<i>Echinodictyum cancellatum</i> (Lamarck, 1814)	×	×					Indonesia
<i>Echinodictyum carlinoides</i> (Lamarck, 1814)		×					Indonesia
<i>Echinodictyum clathrioides</i> Hentschel, 1911	×				×		
<i>Echinodictyum conulosum</i> Kieschnick, 1900	×	×					

TABLE 5. continued ...

Species	1	2	3	4	5	6	Other locality
<i>Echinodictyum costiferum</i> Ridley, 1884		×					
<i>Echinodictyum fruticosum</i> Hentschel, 1911	×						
<i>Echinodictyum lacunosum</i> Kieschnick, 1898		×					
<i>Echinodictyum luteum</i> sp. nov.		×					Palau
<i>Echinodictyum mesenterinum</i> (Lamarck, 1814)	×	×	×	×	×		Indo-west Pacific: Philippines, New Caledonia, Singapore, Malaysia, Vietnam
<i>Echinodictyum nidulus</i> Hentschel, 1911	×				×		
<i>Echinodictyum rugosum</i> Ridley & Dendy, 1886	×						Indonesia