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New Species and a New Species-group of the Coral Genus *Acropora* (Scleractinia : Astrocoeniina : Acroporidae) from Indo-Pacific Locations

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Abstract

Eleven new species of the circum-tropical coral genus *Acropora* (Scleractinia : Astrocoeniina : Acroporidae) are described from material collected during a study of the biogeography of the genus worldwide. Previously known Indo-Pacific species of this genus mostly have broad distributions. The newly described species have been overlooked because they have more restricted distributions and in some cases they occur in deeper, rarely sampled, habitats; they thus contribute new information for assessment of the ecology and distribution patterns of the genus. Seven of the new species have low numbers of radial corallites relative to axial corallite number, a phenomenon uncommon amongst well-known (and widely distributed) species. It is suggested that this character would result in low reproductive output and may be responsible for the limited range of the species concerned. The new species are assigned to existing species-groups and a new species-group is suggested to accommodate two new species and three other valid species.

Introduction

The coral genus *Acropora* has been revised twice in recent years, with reference primarily to eastern Australian hermatypic species (Wallace 1978; Veron and Wallace 1984). These works established criteria for placing in synonymy species names representing ecological variants within species that are recognisable as continuous in the field. Several species have been described since 1984 (e.g. Wells 1987; Veron 1990; Latipov 1992). The species occurring in eastern Australia (with the exception of one or two of the new species described by Veron and Wallace 1984) all have broad Pacific or Indo-Pacific distributions, but many other species have more limited distributions and were not revised.

As part of a worldwide revision of the distribution and taxonomy of *Acropora*, new material, which does not fit the morphological ranges of described species, is being discovered. Eleven of these new species are described below.

Veron and Wallace (1984) grouped the Australian species of *Acropora* (*Acropora*) into 14 'non taxonomic' species-groups, on the basis of shared characters. The species herein described are allocated to this scheme, and a new species-group is nominated to accommodate two new species and three other valid species.

Ecological and Biogeographical Implications

The new species-group (*A. elegans* group) consists of species that have sparsely distributed radial corallites, among other characters. Four other new species are assigned to the *Acropora loripes* species-group, and each of these species has branches that bear very few radial corallites, often consisting of a long axial corallite bearing no radial corallites at all. In all of these species, the radial to axial corallite ratio is thus very low. These species contrast greatly with most of the widely distributed species of *Acropora*, in which radial

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corallites are packed densely along a branch and the ratio of radial to axial corallites is very high. Since each mature radial polyp produces a set of gametes (Wallace 1985), it could be predicted that these new species, because of the low overall number of corallites, would have very low fecundity. (Even if the long axial corallites of these species carry a large number of gametes, it is unlikely that this could exceed the gametes carried by hundreds of radial corallites.) The low fecundity could be an important factor contributing to the restricted distribution of these species.

All members of the *Acropora elegans* species-group occur in deep water (deeper than 20 m), on banks or shoals. This is a habitat that is largely unsampled for *Acropora* and differs from typical habitats in which reproduction of *Acropora* has been studied (e.g. Wallace 1985; Wallace and Christie 1992; Fadlallah *et al.* 1992; Kenyon 1992; Shimada and Yokochi 1992; Dai *et al.* 1994; Hayashibara *et al.* 1993; Shimoike *et al.* 1994). It is likely that life-history characteristics of these species will differ from those of typical, shallow-water *Acropora*.

Methods

Except where noted, all specimens described are located in the Museum of Tropical Queensland, Australia (MTQ), a branch of the Queensland Museum. Type specimens of *Acropora cardenae* Wells, 1987, were received on loan from the United States National Museum (USNM); specimens of the Natural History Museum, London (BM), and the Museum National d'Histoire Naturelle, Paris (PM), were examined in 1975. Specimens were examined by light microscopy using a Wild M8 microscope with fibre-optic lighting. All new type material was examined and photographed with the Phillips XL20 scanning electron microscope at James Cook University. Distribution maps were prepared from the specimen-based RBASE database in the Museum of Tropical Queensland using the MAPINFO GIS package.

Terminology used is as described in Wallace (1978) and Veron and Wallace (1984). Other abbreviations in the text are for the Indonesian Institute of Sciences (LIPI) and the Western Australian Museum (WAM).

Family **ACROPORIDAE** Verrill

Genus *Acropora* Oken, 1815

Type species: *Millepora muricata* Linnaeus, 1758.

The *Acropora humilis* Group

Species with limited branching, giving a sturdy corymbose growth form; radial corallites dimidiate or nearly so; coenosteum a dense arrangement of fine spinules without elaborated tips.

Acropora pocilloporina, sp. nov.

(Figs 1, 2)

Material Examined

Holotype. G44042, Society Is, Moorea, 17°35′S,149°50′W, 8 m depth, Nov. 1992, coll. Mary Gleason.

Paratypes. G36077, Cook Is, Rarotonga, 21°05′S,159°45′W, exposed on top of reef, 21.ix.1984, coll. G. Paulay; G35947, Cook Is, Mauke, 18 m depth, 20°10′S,157°15′W, 18.xii.1984, coll. G. Paulay; G35534, –37, –8, Society Is, Moorea, Tiahura, 17°35′S,149°50′W, 12–25 m depth, 2.xi.1990, coll. Patricia Hutchings.

Other material. **Cook Islands**: G35928, G36031, G36100, Niue; G36113, Rarotonga; G35851, G36099, Mauke; **Society Islands**: G35536, G35538, **Tuamotu Archipelago**: G35533, G35534, G35551. **Pitcairn Islands**: G35746, G35747.

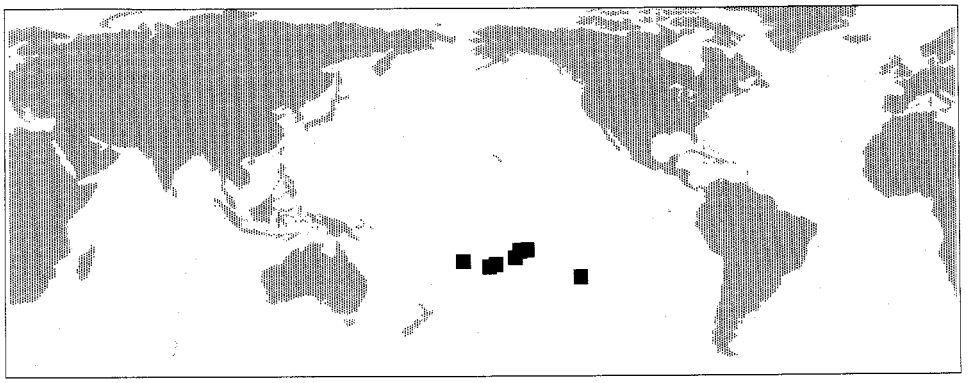


Fig. 1. *Acropora pocilloporina*, sp. nov.: distribution from MTQ database.

Skeletal Characteristics

Corallum. Corymbose from a central growing point. Branches up to 12 mm diameter. Some branches appear broader at the tips because of proliferating branchlets around the main axial corallite.

Corallites. Axial corallites outer diameter 2·1–2·6 mm, inner diameter 0·7–0·9 mm; primary septa present up to ½ R, directives obvious; secondary septa absent or some just visible as short points. Radial corallites dimidiate or tubular with dimidiate openings, mixed sizes, crowded on branch.

Coenosteum. Dense arrangement of fine, unelaborated spinules throughout.

Field Characteristics

Low sturdy corymbose colonies whose branches have a prickly appearance because of the mixture of radial corallite sizes; colour brown.

Remarks

This species is placed with the *Acropora humilis* species-group because of its dimidiate radial corallites, and its coenosteal type.

Etymology

Named because of a superficial appearance reminiscent of the coral *Pocillopora*, due to the expanded branch tops and the prominent radial corallites.

The *Acropora aspera* Group

Species with lipped radial corallites; coenosteum costate on radial corallites and reticulate between corallites.

Acropora indiana, sp. nov.

(Figs 3, 4)

Material Examined

Holotype. G46445, Western Australia, Rowley Shoals, Mermaid Reef, 17°06′S,119°36′E, reef flat, coll. E. Turak, 5.ix.1993.

Paratypes. G39763, Western Australia, Ningaloo Marine Pk, Coral Bay, 23°07′S,113°45′E, 1 m depth, coll. S. Turner, 8.vii.1990; G40792, Timor Sea, 12°30′S,123°35′E, coll. R. Kelley, May 1992;

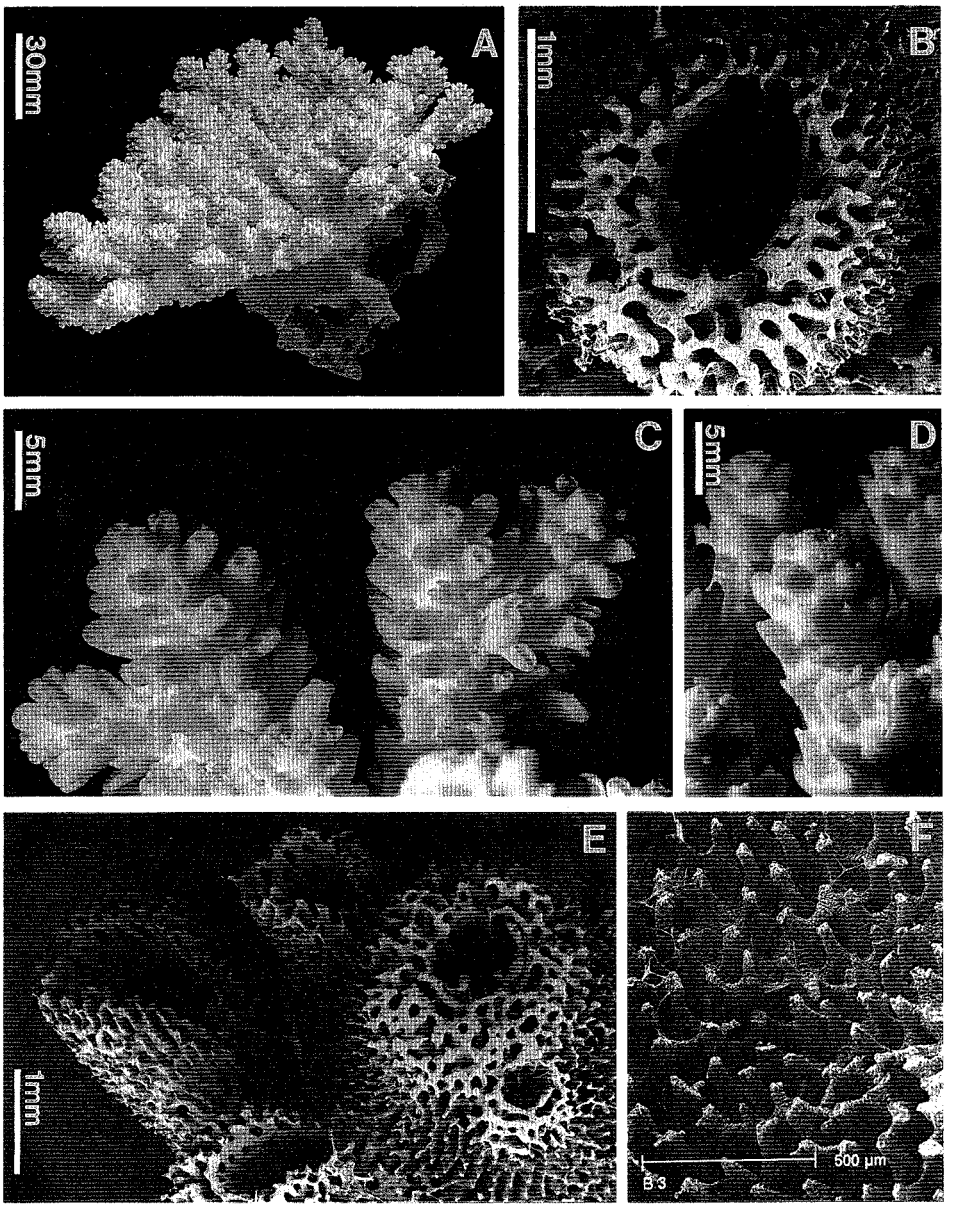


Fig. 2. *Acropora pocilloporina*, sp. nov. *A, B, C, E, F,* holotype G44042; *D*, paratype G36077: *A*, whole corallum; *B*, SEM of radial corallite; *C,D*, detail of branches showing radial corallites; *E*, SEM of branch tip, showing axial and radial corallites; *F*, SEM of coenosteum.

G46415–18, Indonesia, Banda Sea, Manukang (Suanggi) I., 04°19′S,130°42′E, reef flat, coll. C. C. Wallace, J. Wolstenholme, 15.x.1993; WAM–10–94, Western Australia, Scott Reef, 14°00′S, 121°50′E, coll. E. Turak, 31.viii.93 (WAM); G46444, Western Australia, Rowley Shoals, Mermaid Reef, 17°06′S,119°36′E, reef flat, coll. E. Turak, 4.ix.1993; G47037, Indonesia, Banda Sea, Ambon I., Hukurila Beach, 03°47′S,128°15′E, 2–4 m depth, coll. C. C. Wallace and J. Wolstenholme, 26.x.1993.

Skeletal Characteristics

Corallum. From a central to side attachment thick branches radiate horizontally and then extend vertically as thick cones (subhorizontal growth). Proximal branch diameter up to 3·0 cm. Branch densely covered by lipped radial corallites.

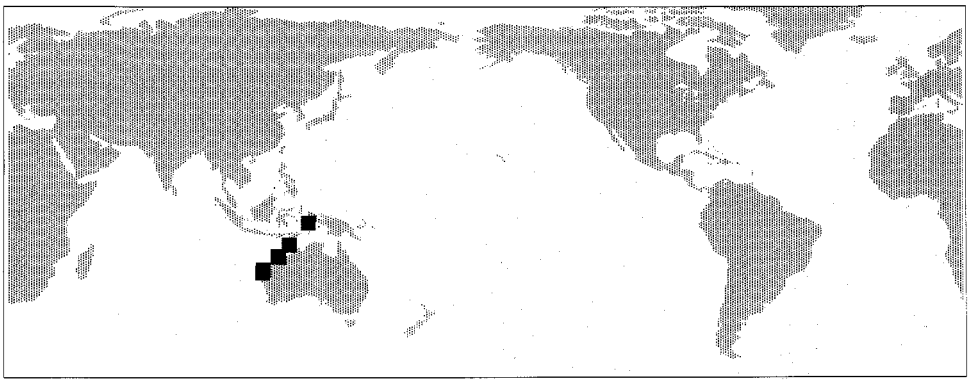


Fig. 3. *Acropora indiana*, sp. nov.: distribution from MTQ database.

Corallites. Axial corallites outer diameter 2·7–3·4 mm, inner diameter 0·8–1·6 mm; both septal cycles fully developed, primary septa up to 1/3 R, secondary septa to 1/4 R. Radial corallites crowded on branches, mostly similar in size, with strong lower lip, occasional small immersed corallites between these; both septal cycles developed: distal radial corallites on branches have primary septa to 1/3 R and secondaries to 1/4 R; towards bases of branches the primary septa reach the centre of the corallites.

Coenosteum. Costate on radial corallite lips, reticulate between corallites.

Field Characteristics

This species has only been found in shallow reef flat situations, where it occurs as semi-encrusting, limited-branching colonies with subhorizontal growth. Its general colony shape as well as its green coloration make it superficially similar to *A. robusta* (see Veron and Wallace 1984). Colours: bright green or greenish cream.

Remarks

Radial corallite shapes of this species are most similar to those of *Acropora aspera*, but the thicker dimensions of the branches and corallites and the colony shape, which is more limited than that of *A. aspera*, distinguish it.

Etymology

Named for the Indian Ocean.

The *Acropora selago* Group

Species distinguished by the presence of a cochleariform radial corallite shape.

Acropora loisetteae, sp. nov.
(Figs 5, 6)

Material Examined

Holotype. G46442, Western Australia, Scott Reef, 14°00′S, 121°50′E, depth 8 m, coll. E. Turak, 31.viii.1993.

Paratypes. G46443, same data as holotype; WAM–11–94, same data as holotype (WAM).

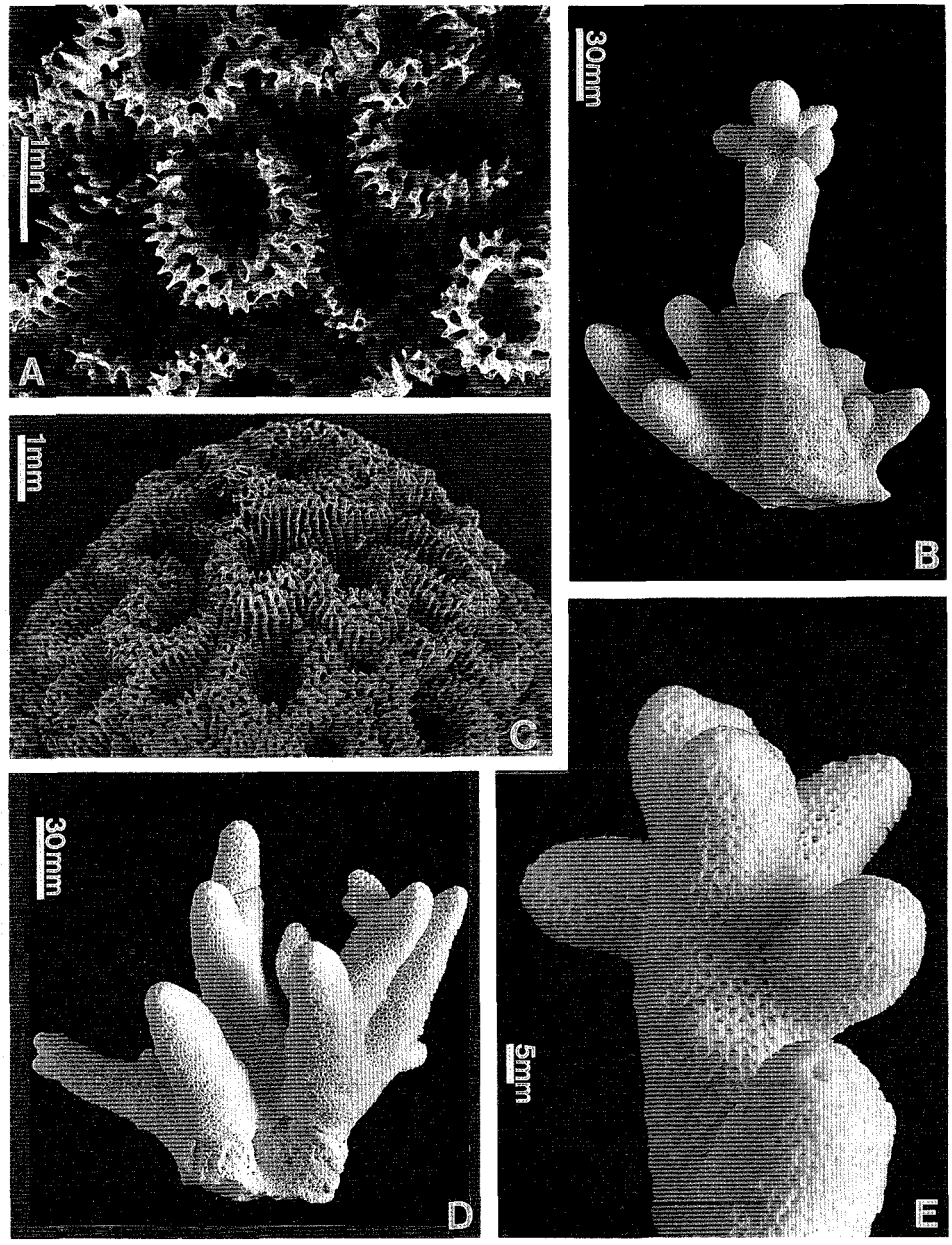


Fig. 4. *Acropora indiana*, sp. nov., *A*, *B*, *C*, *E*, holotype G46445: *D*, paratype G40792: *A*, SEM of radial corallites; *B*, *D*, whole corallum; *C*, SEM of branch tip; *E*, detail of branches showing radial corallites.

Skeletal Characteristics

Corallum. Open arborescent, branches up to 11 cm long and 12 mm diameter, most branches incurved.

Corallites. Axial corallites outer diameter 2·3–2·8 mm, inner diameter 1·2–1·6 mm; primary septa present up to R, secondary septa complete, up to $^1/_3$ R. Radial corallites scattered along branch, not touching; shape lipped and sometimes cochleariform; septal development poor in most radials: primary septa present to $^1/_4$ R, but sometimes directives obvious and meeting deep in the corallite, secondary septa absent to just visible.

Coenosteum. Costate or broken costate throughout.

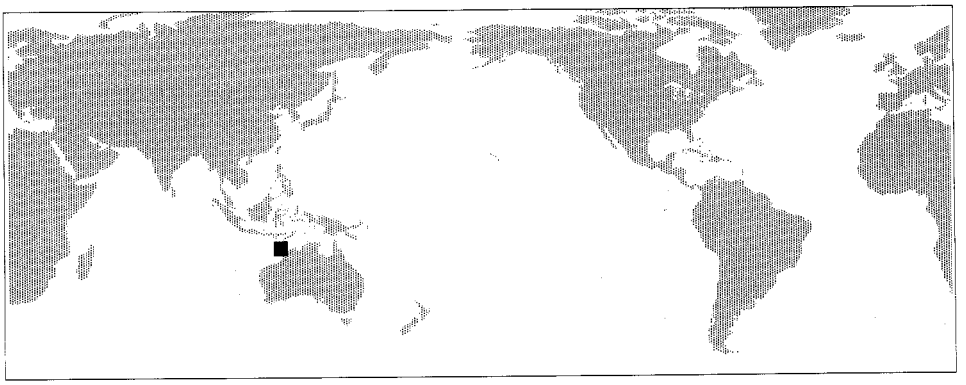


Fig. 5. *Acropora loisetteae*, sp. nov.: distribution from MTQ database.

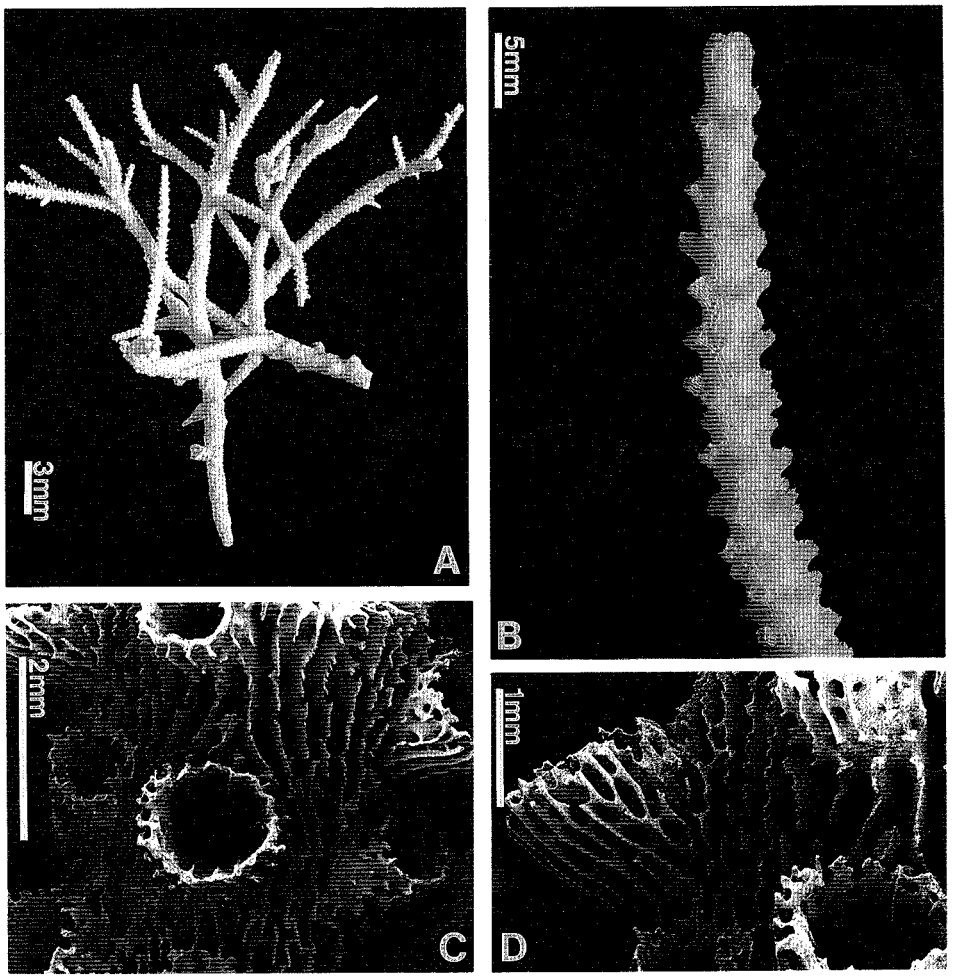


Fig. 6. *Acropora loisetteae*, sp. nov., holotype G46442: *A*, whole corallum; *B*, detail of branch showing radial corallites; *C, D*, SEM showing radial corallites and coenosteum.

Field Characteristics

Occurs as small, open arborescent colonies in lagoonal situations with other arborescent *Acropora* species and as more compact arborescent colonies in shallower situations; colour pale greenish blue, with darker coloration on corallite lips; polyps extended during day are pale pink.

Remarks

Because of its radial corallites, which appear to have a reduced form of the cochleariform shape, and because of a similarity in coenosteal microstructure, this species is grouped within the *Acropora selago* species-group.

Etymology

Named for Loisette Marsh, Curator of Marine Invertebrates at Western Australian Museum 1970 to 1993, instigator of much of the research on Western Australian reefs.

The *Acropora echinata* Group

Species with hispidose ('bottlebrush') branching form due to the presence of evenly distributed, secondary branchlets, each consisting of an axial corallite with just a few radial corallites developed on it.

Acropora turaki, sp. nov.
(Figs 7, 8)

Material Examined

Holotype. G46446, Western Australia, Rowley Shoals, Clerke Reef, 17°22'S,119°20'E, coll. E. Turak, 7.ix.1993.

Paratypes. G46447, Western Australia, Rowley Shoals, Clerke Reef, 17°22'S,119°20'E, coll. E. Turak, 8.ix.1993; WAM–9–94 (portion of G46447) (WAM).

Skeletal Characteristics

Corallum. Hispidose, consisting of arborescently branching main branches from which arise shorter secondary branches bearing a small number of radial corallites (less than 10) and several incipient branches (axial corallites not bearing radial corallites). In the first

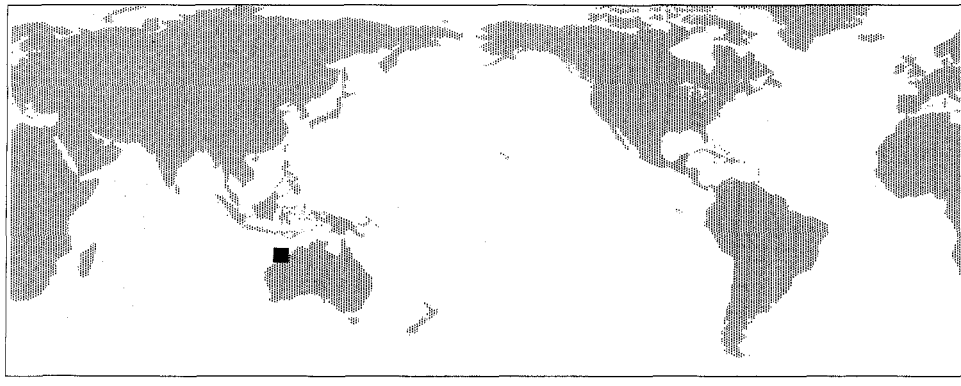


Fig. 7. *Acropora turaki*, sp. nov.: distribution from MTQ database.

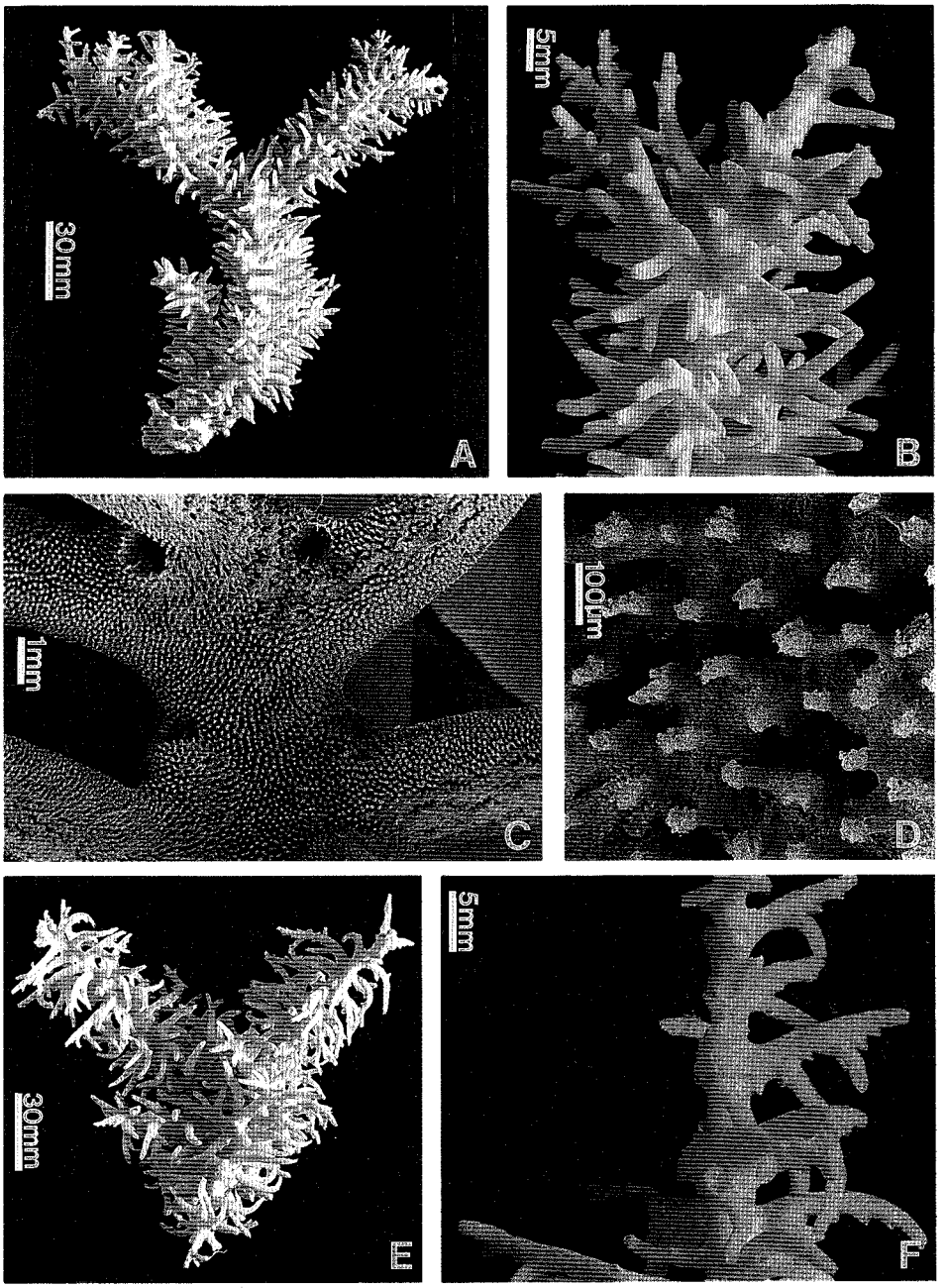


Fig. 8. *Acropora turaki*, sp., nov., *A, B, C, D*, holotype G46446; *E, F*, paratype G46447: *A, E*, whole corallum; *B, F*, detail of branch and secondary branchlets, showing axial and radial corallites; *C*, SEM showing radial corallites and axial corallites (in part); *D*, SEM showing coenosteum.

paratype the secondary branches and incipient branches are recurved. Main branches up to 100 mm long; secondary branchlets up to 20 mm long.

Corallites. Axial corallites outer diameter 1·5–2·0 mm, inner diameter 0·4–0·8 mm; primary septal cycle complete, septa to $\frac{1}{3}$ R, secondary septa not visible. Radial corallites scattered, appressed, with round calices, only directive septa visible or other primary septa just visible as fine points.

Coenosteum. Evenly distributed elaborated spinules throughout.

Field Characteristics

Small hispidose colonies occurring in lagoonal situations on unconsolidated base; colour iridescent white.

Remarks

This species is superficially similar to *A. subglabra*, which has more diminutive dimensions, and *A. longicyathus*, which has more and larger radial corallites.

Etymology

Named for Emre Turak.

The *Acropora loripes* Group

Species with coenosteum of densely arranged elaborate spinules all over the corallum; radial corallites rounded appressed tubular with openings nariform to dimidiate; tendency for reduced radial corallite numbers, either throughout the colony or on upper sides of branches.

Acropora jacquelineae, sp. nov.
(Figs 9, 10)

Material Examined

Holotype. G35631, Papua New Guinea, Huon Gulf, Sheila's Reef, 7°00'S,147°00'E, 25 m depth, 11.i.1990, coll. Jacqueline Wolstenholme.

Paratype. G39734, Papua New Guinea, West New Britain, Arawe I., 6°10'S,148°55'E, 6 m depth, 22.x.1991, coll. Paul Lokani.

Skeletal Characteristics

Corallum. Extremely delicate, side-attached plate up to 20 mm thick predominated by branches with few to no radial corallites, overall diameter unknown. Primary branching pattern is horizontal, and branches up to 5 mm in diameter curve upwards to end in a horizontal plane. Other branches up to 2 mm in diameter given off from these end in the same plan. Branch tips taper strongly.

Corallites. Axial corallites outer diameter 0·7–1·2 mm, inner diameter 0·1–0·5 mm; usually only directive primary septa visible to $^1/_2$ R, other primary septa sometimes visible deep within the corallite as fine points; no secondary septa. In the holotype most branches bear no radial corallites, but occasionally a branch has 1 or 2 appressed tubular or nariform radial corallites and these have rudimentary primary septa just visible. The paratype has more radial corallites, most terminal branches bearing one radial corallite.

Coenosteum. Parallel lines of laterally flattened fine spinules throughout, except towards branch tips where these become costae.

Field Characteristics

Occurs as side-attached plate on reef walls; colour pale brown.

Remarks

In general appearance this species resembles an extemely diminutive *Acropora caroliniana* Nemenzo, 1967.

Etymology

Named for Jacqueline Wolstenholme.

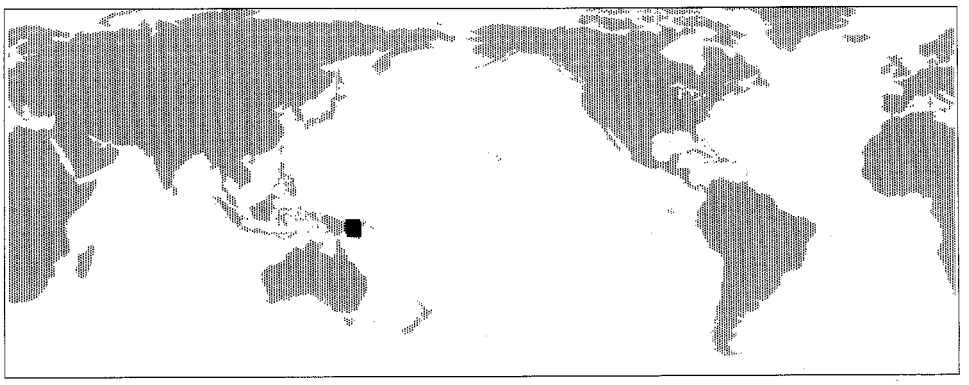


Fig. 9. *Acropora jacquelineae*, sp. nov.: distribution from MTQ database.

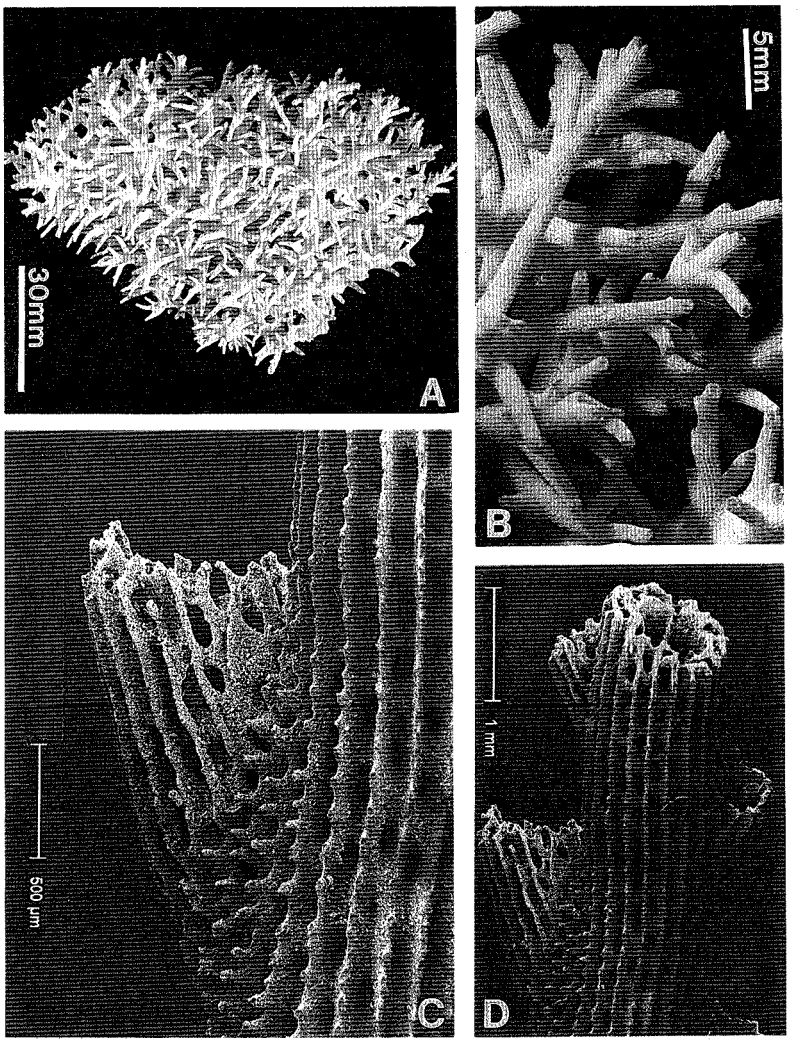


Fig. 10. *Acropora jacquelineae,* sp. nov., holotype G35631: *A*, whole corallum; *B*, detail of branches showing most without radial corallites; *C*, SEM of radial corallite and coenosteum; *D*, SEM of branch tip.

Acropora desalwii, sp. nov.
(Figs 11, 12)

Material Examined

Holotype. G46450, Indonesia, Banda Sea, Banda Is, Gunung Api, 04°31′S,129°52′E, depth 5–12 m, coll. C. C. Wallace, J. Wolstenholme, 16.x..1993.

Paratypes. G46448, G46449, G46902, Indonesia, same data as holotype; G46451, Indonesia, Banda Sea, Banda Is, Run I., 04°33′S,129°40′E, depth 20 m, coll. C. C. Wallace, J. Wolstenholme, 17.x.1993; G46452, Indonesia, Banda Sea, Sekaro Is., 05°35′S,127°28′E, depth 20 m, coll. C. C. Wallace, J. Wolstenholme, 20.x.1993; portion of G46902 (LIPI).

Skeletal Characteristics

Corallum. Side-attached plate or bracket up to 30 cm diameter and 7 cm in thickness, with crowded branches arising vertically and ending in a single plane; branches give off numerous secondary branchlets, especially distally. Branches up to 6 cm long and 7 mm wide.

Corallites. Axial corallites outer diameter 1·0–1·2 mm, inner diameter 0·6–0·8 mm; some to all primary septa present, up to 1/4 R, directives obvious and sometimes only directives present; no secondary cycle visible. Radial corallites scattered, appressed tubular with round to oblique openings, sometimes with outer wall extended upwards as a scale-like lip; mostly only directive septa visible, other primary septa may be just visible, no secondary septa visible.

Coenosteum. Costate on branch tips, sometimes lines of slightly elaborated spinules on corallite bases and proximally on branches.

Field characteristics

Occurs as flat plates or brackets projecting from the reef slope, attached to the edges of massive corals or attached to looser reef framework; colour pale brown.

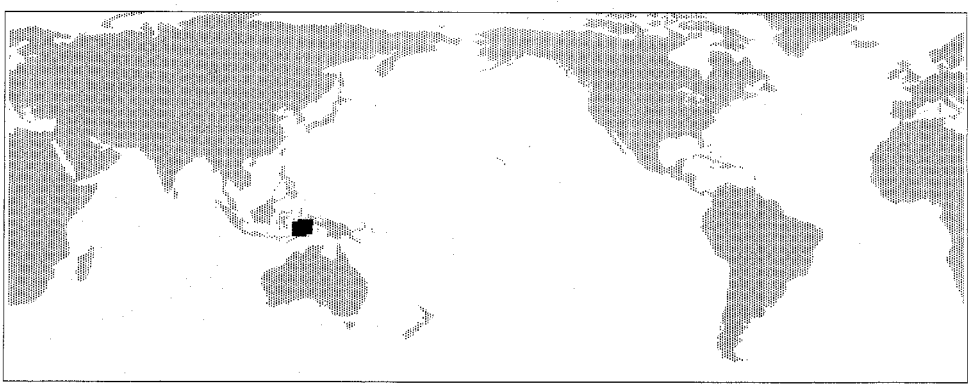


Fig. 11. *Acropora desalwii*, sp. nov.: distribution from MTQ database.

Remarks

In colony shape this species resembles *Acropora granulosa* (Edwards and Haime, 1860) but the dimensions and shape of the corallites as well as the coenosteal structure are most similar to those of *A. echinata*. It co-occurs with *A. granulosa* on reefs of the Banda Sea, where the latter usually has a pale grey coloration. The species is only tentatively allocated to the *A. loripes* species-group, since it does not have hispidose branching (a characteristic of the *A. echinata* group).

Etymology

Named for Mr Des Alwi of the Banda Islands.

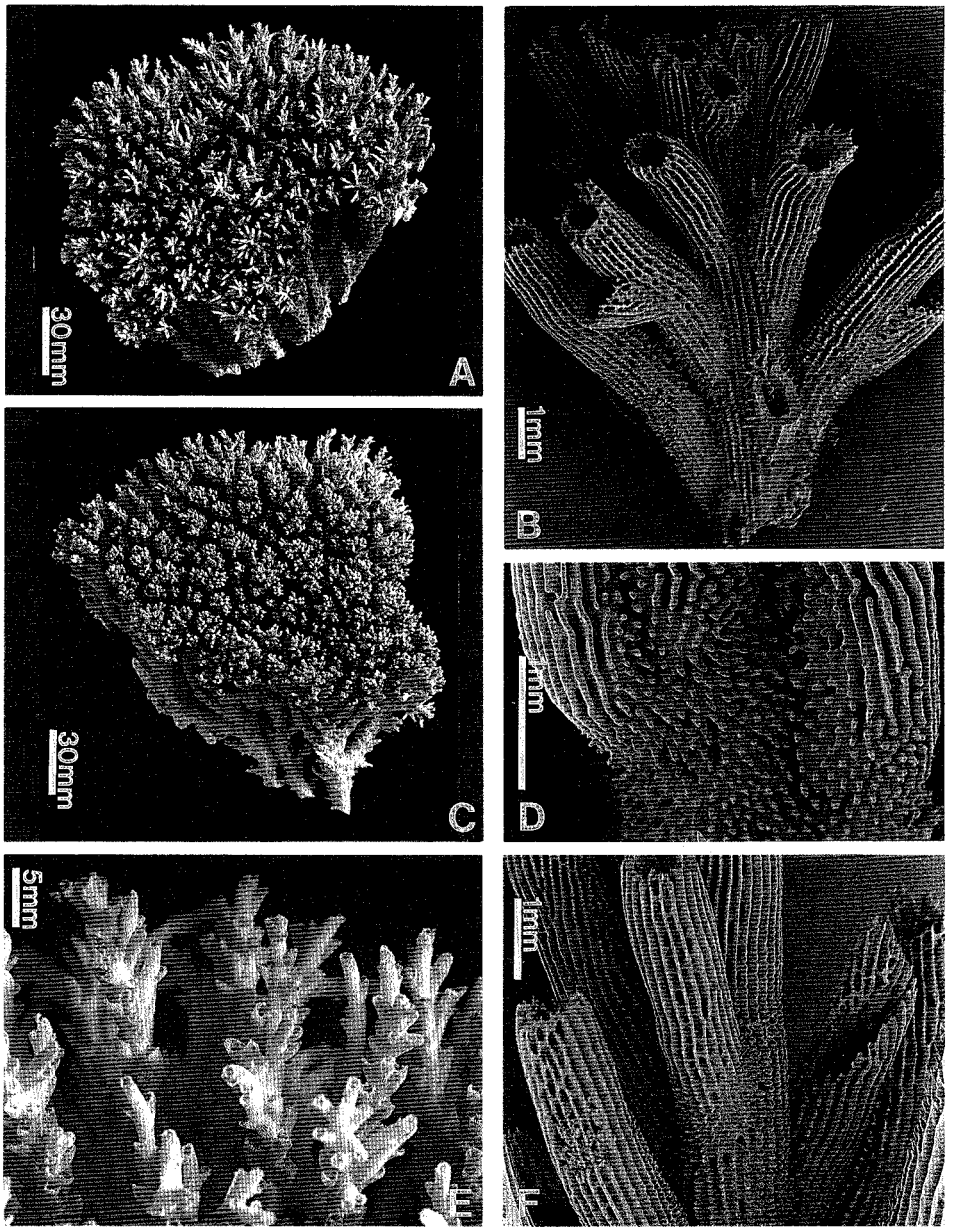


Fig. 12. *Acropora desalwii*, sp. nov., *A, B, D, E, F*, holotype G46450; *C*, paratype G46449: *A, C*, whole corallum; *B*, SEM showing axial corallites and two radial corallites; *D*, SEM showing coenosteum; *E*, detail of branchlets; *F*, SEM showing axial corallites.

Acropora suharsonoi, sp. nov.

(Figs 13, 14)

Material Examined

Holotype. G47134, Indonesia, Lombok, Gili Trawangan, 08°20′S,116°01′E, 5 m depth, 22.ii.1993, coll. Suharsono.

Paratypes. G47135, Indonesia, Lombok, Gili Meno, 08°20′S,116°03′E, 15 m depth, 31.v.1994, coll. C. C. Wallace and J. Wolstenholme; Indonesia, Lombok, Telak Nare, 15 m depth, Dec. 1992, coll. Suharsono; same data as G47135 except 21 m depth (LIPI).

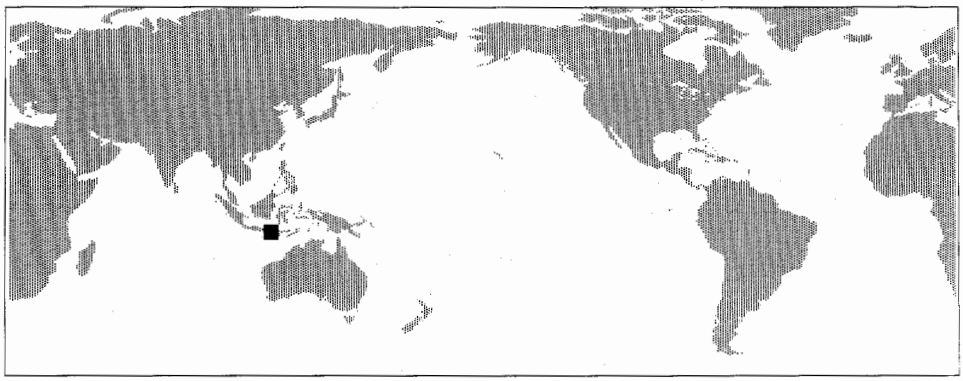


Fig. 13. *Acropora suharsonoi*, sp. nov.: distribution from MTQ database.

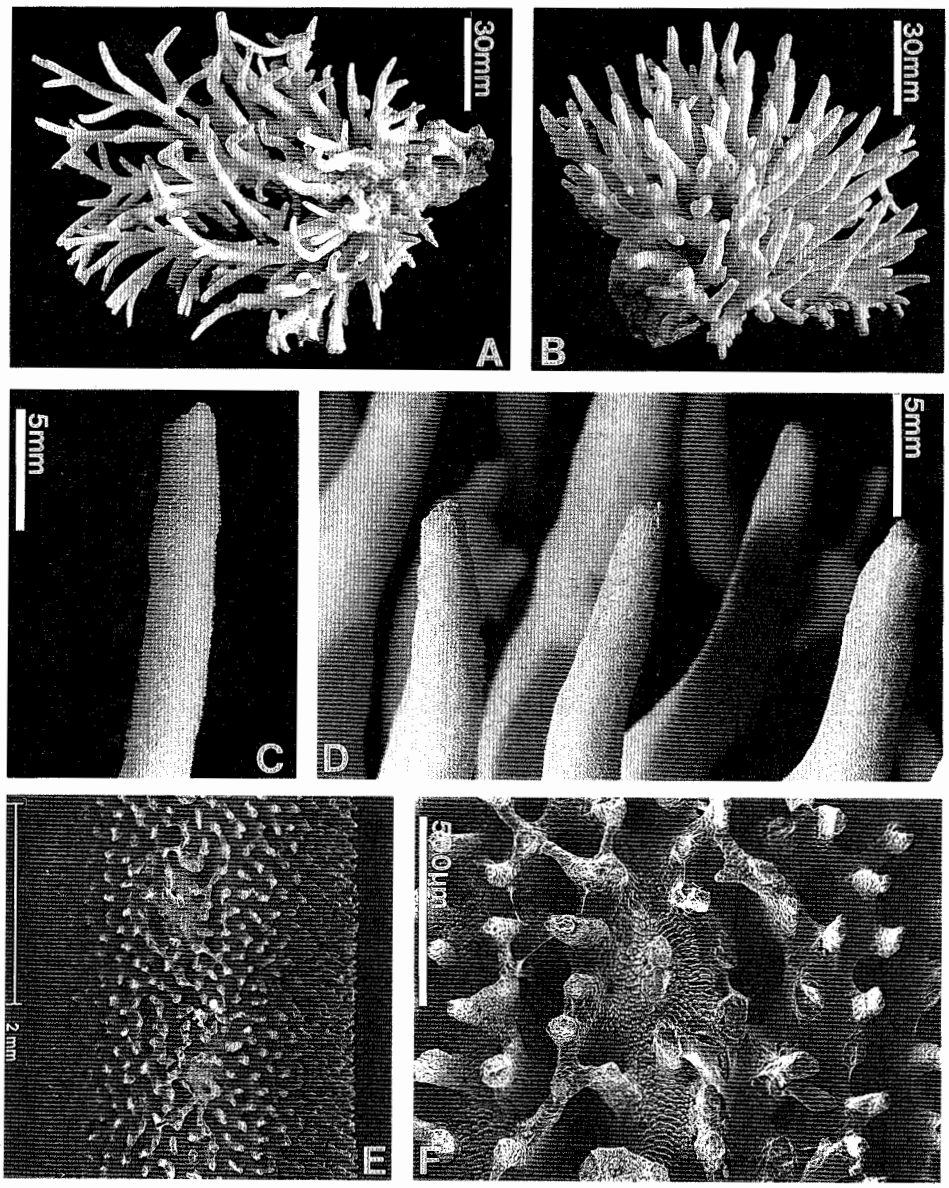


Fig. 14. *Acropora suharsonoi*, sp. nov., *A, C, E, F*, holotype G47134; *B, D*, paratype (LIPI); *A, B*, whole corallum; *C, D*, detail of branches showing lack of radial corallites; *E, F*, SEM of branch coenosteum.

Skeletal Characteristics

Corallum. The mature colony (holotype) is an open bracket 150 mm in greatest diameter: from a central to side attachment, branches curve upwards with little or no secondary branching. Radial corallites absent except towards the base of branches: some terminal branches bear no radial corallites. Maximum branch length 55 mm and diameter 4·5 mm. The paratype at LIPI is a juvenile, 110 mm greatest diameter, just beginning to form the bracket shape.

Corallites. Axial corallites outer diameter 1·6–2·2 mm, inner diameter 0·6–0·8 mm; primary septal cycle developed, usually to $^1/_2$ R but up to R; secondary septa absent Terminal branches bear up to 5 radial corallites towards their base: these are appressed tubular or nariform and may be directed towards or away from the branch tip. Around the base of the corallum, radial corallites are scattered, immersed or subimmersed; primary septa present up to $^2/_3$ R, secondary septa rudimentary or absent.

Coenosteum. A dense arrangement of fine, flattened and elaborated spinules throughout; towards the branch tips these are arranged in lines, becoming distinct costae around the branch tip.

Field Characteristics

Occurs as a side-attached bracket on reef slope; colour white.

Remarks

Because of its naked branches, one juvenile colony (a paratype) has a superficial resemblance to *Acropora multiacuta* Nemenzo, 1967, but all the other material shows *A. suharsonoi* to be a much finer branching species with a different mature growth form.

Etymology

Named for Dr Suharsono of the Indonesian Institute of Sciences (LIPI).

Acropora lokani, sp. nov.
(Figs 15, 16)

Material Examined

Holotype. G39884, Papua New Guinea, West New Britian, Arawe I., 06°10′S,148°55′E, 9 m depth, 22.x.1991, coll. Paul Lokani.

Paratypes. G40018, Malaysia, Sabah, Tunku Abdul Rahmen Nat Pk, 06°01′N,116°01′E, 1–3 m depth, 3.ii.1992, coll. Loisette Marsh; G41129, Malaysia, Sabah, Bodagaya Is (off Semporna), 04°36′N,118°46′E, 1–16 m depth, 14.ii.1992, coll. Loisette Marsh

Skeletal Characteristics

Corallum. Side-attached bracket, overall diameter unknown. Branches first extend horizontally then arch upwards to end in an approximately horizontal plane. Secondary branches are given off from these and may branch again; maximum thickness of final branches 4 mm. Final branches may be void of radial corallites or have up to 3, mostly on lower surface. Radial corallites scattered and rudimentary, except towards the base of main branches.

Corallites. Axial corallites outer diameter 2·2–2·6 mm, inner diameter 0·6–0·9 mm; primary septa present up to $^2/_3$ R, sometimes an obvious directive; secondary septa absent to all visible as short points. Radial corallites rounded appressed with round openings; septa completely absent, or directive primary septa just visible.

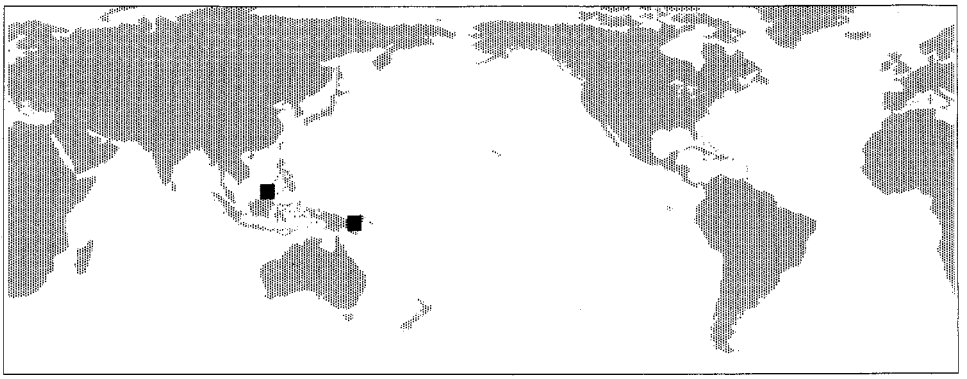


Fig. 15. *Acropora lokani*, sp. nov.: distribution from MTQ database.

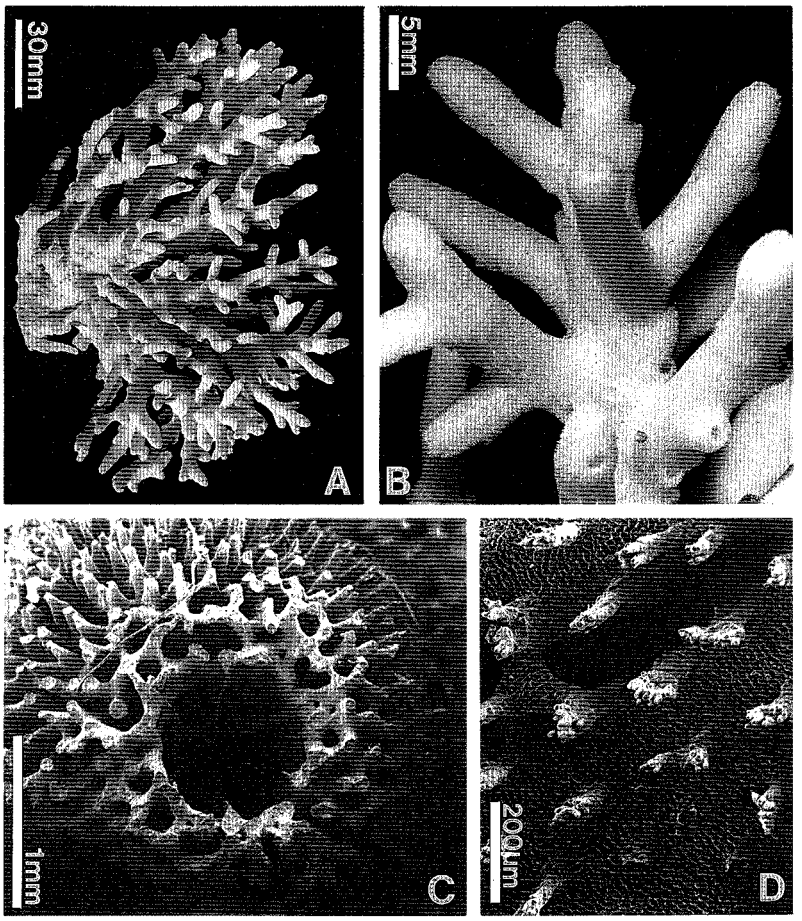


Fig. 16. *Acropora lokani*, sp. nov., holotype G39884: *A*, whole corallum: *B*, detail of branches, showing occasional radial corallites towards bases; *C*, SEM of axial corallite calice; *D*, SEM coenosteum.

Coenosteum. A dense arrangement of moderately elaborate spinules on both radial and axial corallites.

Field Characteristics

Not known.

Remarks

This species is similar to *Acropora caroliniana* Nemenzo, 1976, but is distinguished by a regular dichotomising branching habit, compared with hispidose branching within the bracket shape in *A. caroliniana*.

Etymology

Named for Mr Paul Lokani.

The *Acropora elegans* Group

Species with lightly structured coralla, mostly horizontal branching, and sparsely arranged radial corallites which are tubular or appressed tubular. In some species, radial corallites are borne only laterally on branches. All species occur in relatively deep locations for *Acropora*, i.e. below 20 m.

Acropora elegans (Edwards & Haime, 1860)
(Figs 17, 18, 19)

Madrepora elegans Edwards and Haime, 1860: 163, pl. E1, fig 3.

Material Examined

285b [locality unrecorded] holotype? (PM).
1893.4.7.168, Manila; 1975.8.5.3 [locality uncertain] (BM).
G39799-G39802, Papua New Guinea, Hermit Isles, 01°30′S,145°05′E, Oct. 1977, 22 m depth, coll. T. Done (MTQ).

Skeletal Characteristics

Corallum. Horizontally extending, flattened branches, sometimes anastomosed to give a flat plate (see Fig. 8*C*), bear radial corallites along their sides and scattered radial corallites on the upper surface. The degree of anastomosis of branches varies greatly (compare Figs 18*A* and 19*A*).

Corallites. Axial corallites outer diameter 1·4–2·4 mm, inner diameter 0·5–0·9 mm, primary septa developed up to $^2/_3$ R, all or most secondary septa visible as short points. Tadial corallites tubular to tubular appressed with round openings; septa as for axials.

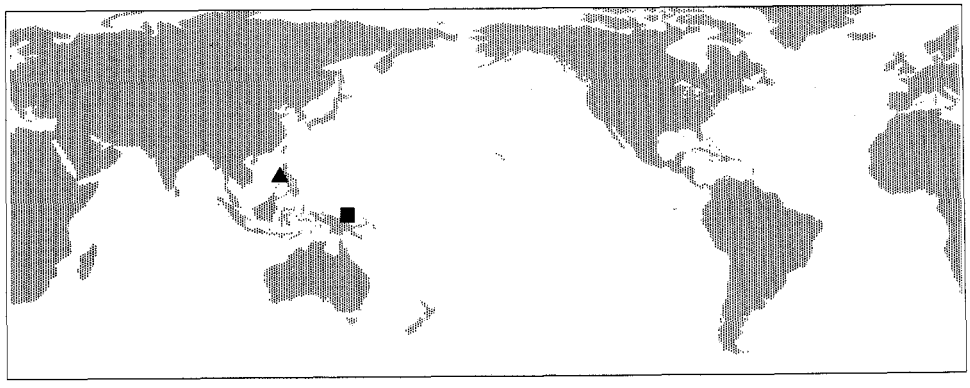


Fig. 17. *Acropora elegans* (Edwards & Haime, 1860) distribution from MTQ database (square) and BM specimen record (triangle). The type locality is unrecorded.

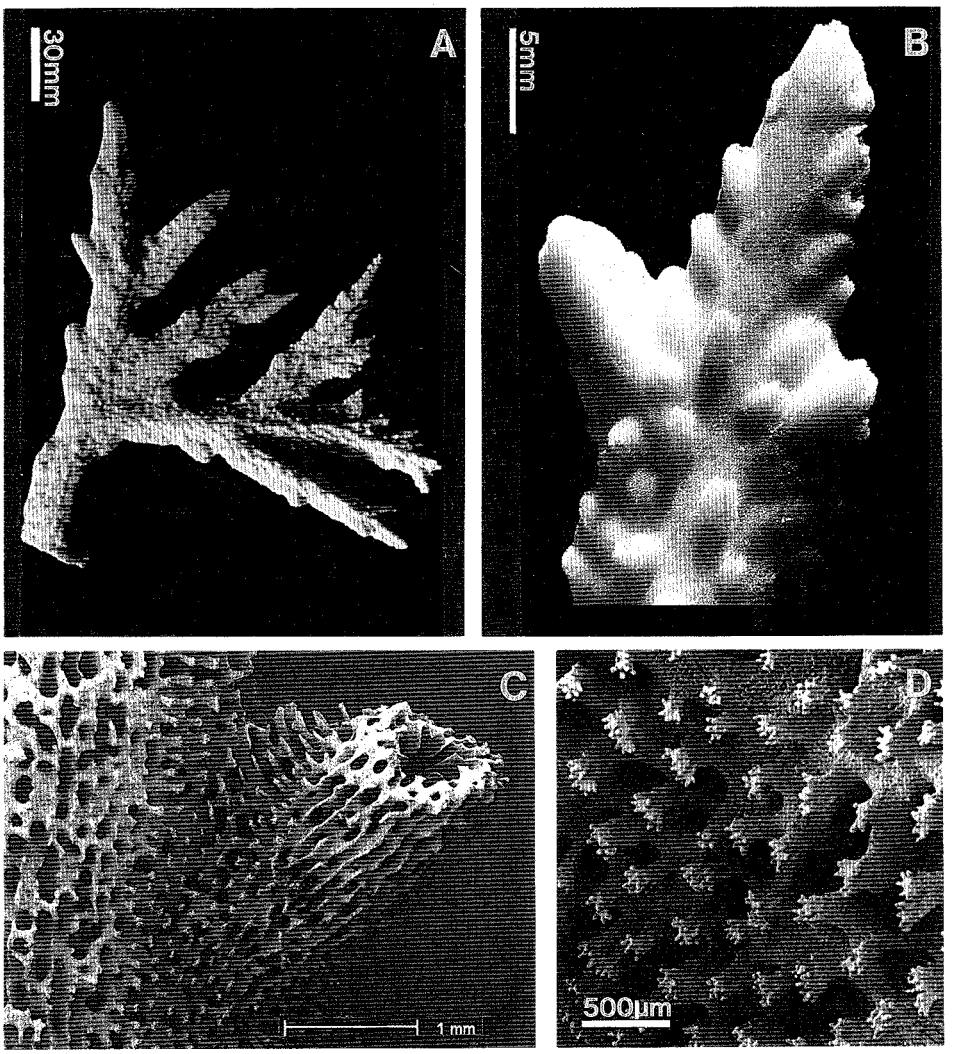


Fig. 18. *Acropora elegans* (Edwards & Haime, 1860) G39800: *A*, whole corallum (non-anastomosing branches); *B*, detail of branches showing radial corallites on sides and scattered on top; *C*, SEM radial corallite and coenosteum; *D*, SEM coenosteum.

Coenosteum. Elaborate spinules evenly distributed both on and between radial corallites.

Field Characteristics

The Papua New Guinea specimens occured as flat plates and branches projecting outwards from the reef slope; colour lavender.

Remarks

Brook (1893: 193) interpreted this species as having an anterior and a posterior surface, and specimen 1975.8.5.3 in the BM had been on display for many years as an upright colony. See also *Acropora tenella* below.

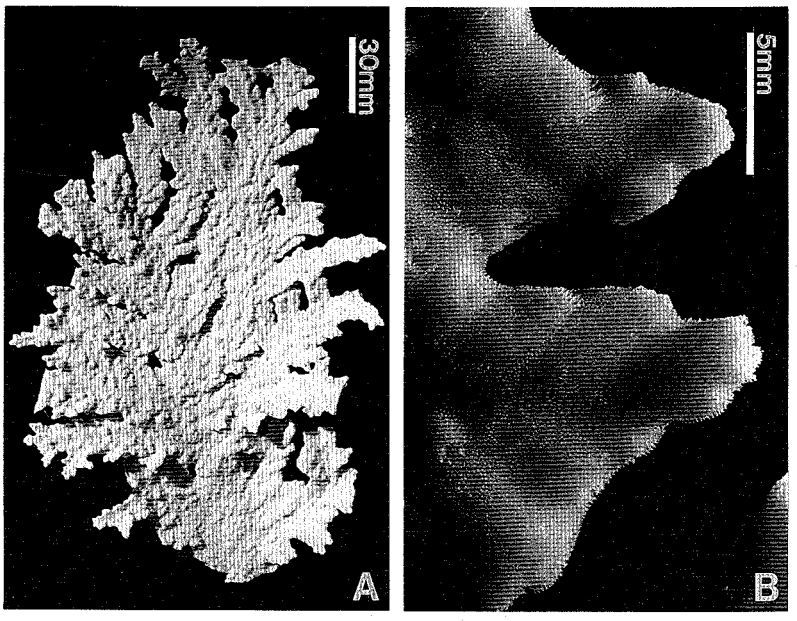


Fig. 19. *Acropora elegans* (Edwards & Haime, 1860) G39799: *A*, whole corallum (anastomosing branches); *B*, detail of branches showing radial corallites.

Acropora tenella (Brook, 1892)
(Figs 20, 21)

Madrepora tenella Brook, 1892: 464. — Brook 1893: 193, pl. 29, fig. E.

Material Examined

G39798, Papua New Guinea, Hermit Isles, 1°30'S,145°05'E, 22 m depth, Oct. 1977, coll. T. Done.

Skeletal Characteristics (MTQ specimen)

Corallum. Branching mainly horizontal, slender flattened branches giving off branches laterally. These branches bear radial corallites along their edges; some additional small branches or axial corallites extend upwards from the centre of the branches.

Corallites. Axial corallites calices sometimes flattened, sometimes round; outer diameter 1·4–1·6 mm, inner diameter 0·5–0·8 mm; primary septa present up to ½ R, secondary septa absent or a few just visible as fine points. Radial corallites appressed tubular, mostly occurring laterally on the flat branches; a few borne down the centre of the branch; calices round, primary septa just visible as fine points, no secondary septa.

Coenosteum. Lines of fine, laterally flattened spinules throughout. Towards the branch tips these form a herringbone pattern (see Fig. 21*C*).

Field Characteristics

The Papua New Guinea specimen occurred as horizontal branches extending from the reef slope; colour lavender.

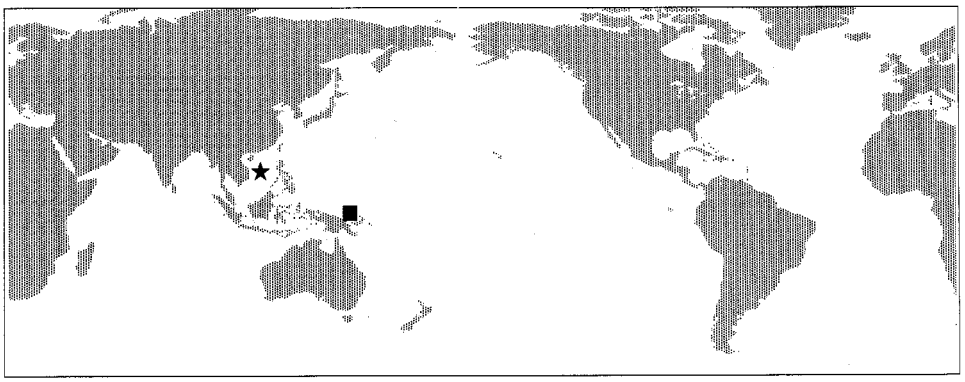


Fig. 20. *Acropora tenella* (Brook, 1892) distribution from MTQ database (square) and type locality (star).

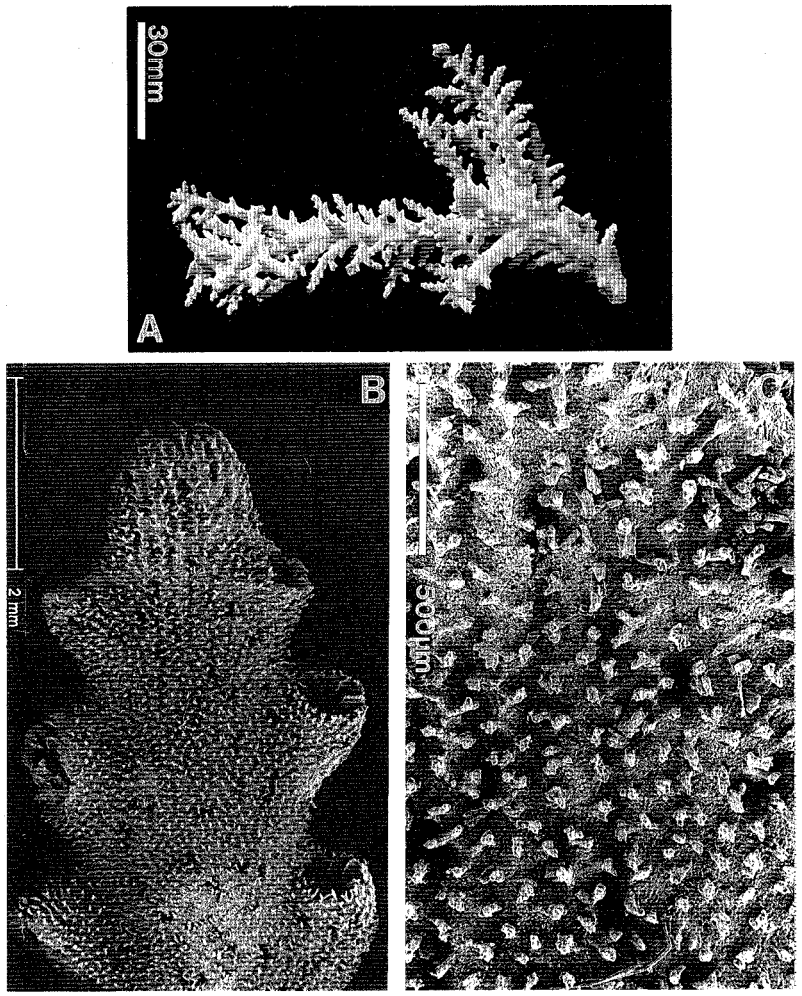


Fig. 21. *Acropora tenella* (Brook, 1892) G39798: *A*, whole corallum; *B*, SEM of branch tip showing laterally arranged radial corallites; *C*, SEM of coenosteum towards branch tip, showing herringbone arrangement of spinules.

Remarks

Brook (1893: 193) suggested a close similarity between this species and *A. elegans*. At the Papua New Guinea site, the two species co-occurred and the collector (T. Done) took them to be a single species. The present skeletal material does not allow sufficient comparison to confirm this, but it is likely that the two species will be combined when further specimens and field observations are obtained. The type specimens of this species were collected at up to 37 fathoms (over 70 M). A further species, *A. parilis* (Quelch, 1886) from Tahiti and the Philippines, may be a (senior) synonym of *A. tenella*; as it was not examined, it is not herein treated.

Acropora cardenae Wells, 1987
(Fig. 22)

Acropora cardenae Wells, 1987: 338–9.

Material Examined

Holotype. 72370, Great Barrier Reef, W of Bowl Reef, *c*. 60 mi NE of Townsville, Qld, dredged, 18°28′S,147°33′E, depth 55 m, coll. J. Veron (USNM).

Paratype. 72372, 8 mi E of Bowl Reef, 130 m, coll. J. Veron (USNM).

Skeletal Characteristics

This species is fully described and illustrated by Wells (1987). Its branch dimensions are the smallest recorded for *Acropora* (1·5–2 mm diameter) and its radial corallites are described as follows: '1 mm in diameter, subimmersed or short tubiform with six weakly developed septa deep in the calice, arranged sympodially in opposite, alternating rows' (Wells 1987).

Field Characteristics

Not known.

Remarks

This species is most similar to the two new species described below. Its diminutive size and the lateral, sympodial arrangement of its radial corallites distinguish it from both species.

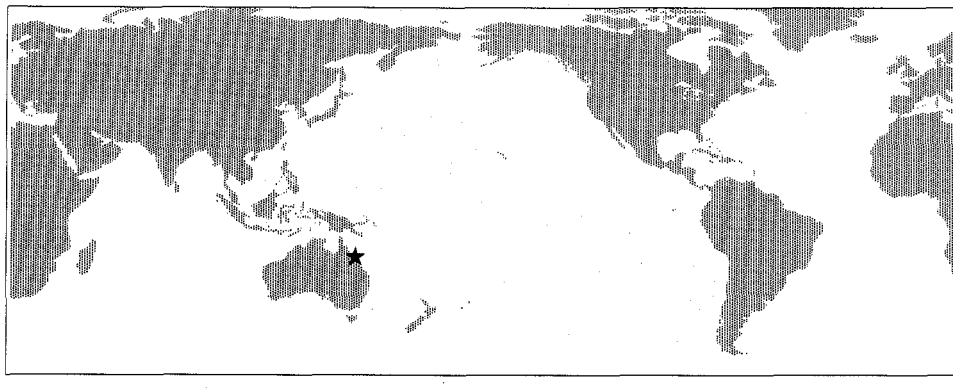


Fig. 22. *Acropora cardenae* Wells, 1987, type locality (star).

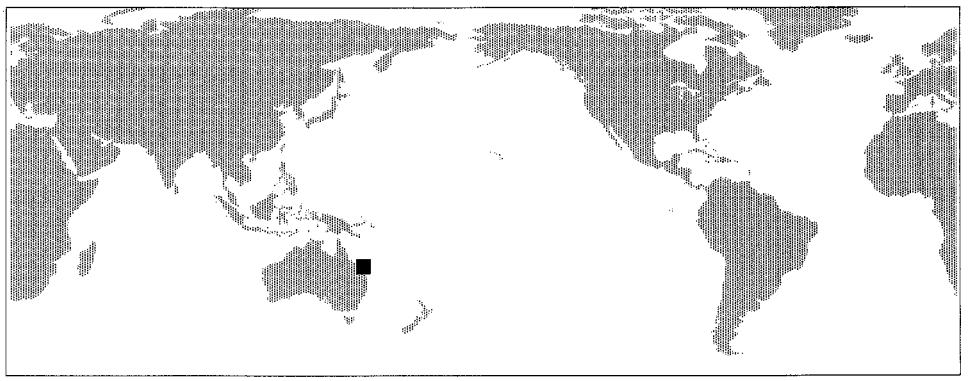


Fig. 23. *Acropora torihalimeda*, sp. nov.: distribution from MTQ database.

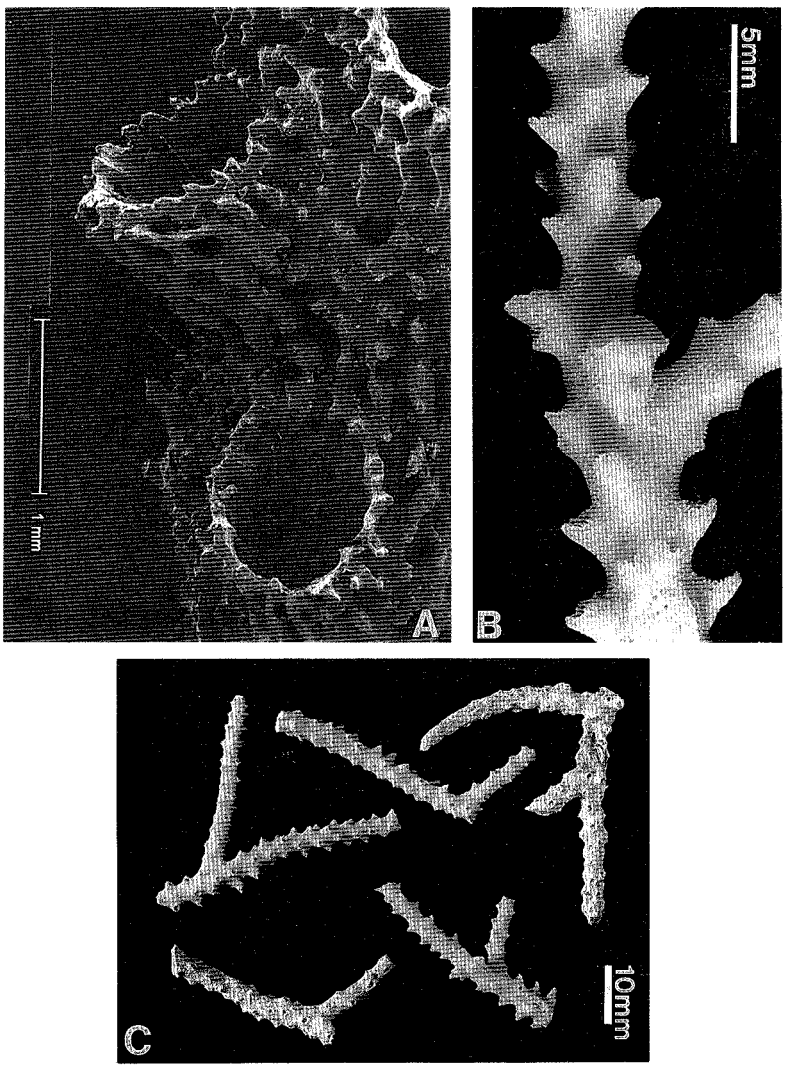


Fig. 24. *Acropora torihalimeda*, sp. nov., holotype G27200: *A*, SEM radial corallites and coenosteum; *B*, detail of branch showing scattered arrangement of radial corallites; *C*, whole corallum.

Acropora torihalimeda, sp. nov.

(Figs 23, 24)

Material Examined

Holotype. G27200, Swains Reefs, eastern Queensland, 26 m depth, dredged material, 9.i.1987, coll. Ed Drew.

Skeletal Characteristics

Corallum. Slender, arborescent branches up to 4 mm diameter. Holotype consists of 5 pieces.

Corallites. Axial corallites outer diameter 1·4 mm, inner diameter 0·8 mm (from only one undamaged corallite); primary septa present to $\frac{1}{2}$ R, secondary septa absent. Radial corallites scattered along branches, tubular appressed to nariform with round to oblique calices; septal cycles absent or very rudimentary primary cycle just visible.

Coenosteum. Both on and between radial corallites the coenosteum is consolidated, with low flat spinules arranged in costal rows.

Field Characteristics

The holotype and only specimen of this species occurred as free-living branches amongst the alga *Halimeda* on submerged banks, where it was recorded by the collector to be common amongst the living algae (viewed using a remotely operated device).

Remarks

This species is closest to *Acropora cardenae* Wells, 1987. In *A. torihalimeda* the branches are rounded and the radial corallites are not arranged in any perceptible pattern, whereas in *A. cardenae* they are 'arranged sympodially in opposite, alternating rows' (Wells 1987). From available material, *A. cardenae* appears to be more slender and two-dimensional than the new species.

Etymology

Named from the *Halimeda*-bank habitat.

Acropora russelli, sp. nov.

(Figs 25, 26)

Material examined

Holotype. G40795, north-west Australia, Timor Sea, Cartier Reef, 12°33′S,123°34′E, 18–25 m depth, 8.v.1992, coll. Russell Kelley.

Paratypes. G40782, G40794, G40796, -7, same data as holotype.

Skeletal Characteristics

Corallum. Colonies are free-living. Branches are slender (up to 5 mm diameter) and horizontal to subhorizontal. Branching is frequent. Radial corallites or incipient axial corallites are distributed at regular intervals along the branches.

Corallites. Axial corallites outer diameter 1·6–2·2 mm, inner diameter 0·5–1·0 mm; Primary septal cycle fully developed to R; secondary cycle undeveloped or rudimentary.

Radial corallites very similar in appearance to axial corallites, tubular with round to oblique calices; primary septa developed to $^2/_3$ R, secondary septa absent or one or two just visible.

Coenosteum. Densely reticulate with irregular laterally flattened spinules throughout.

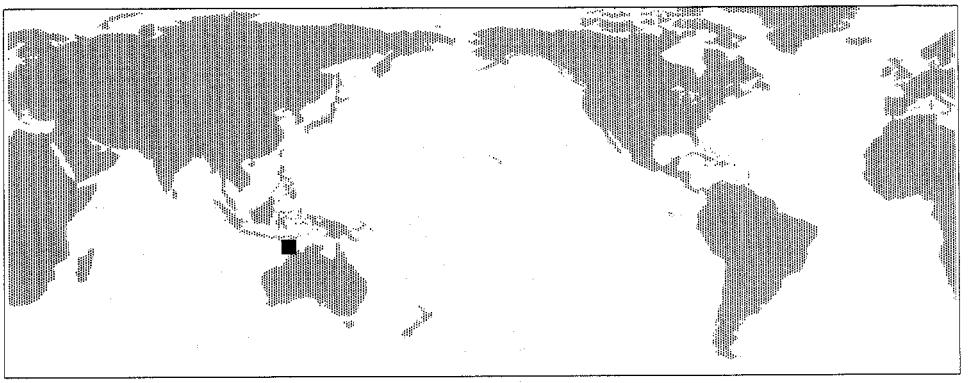


Fig. 25. *Acropora russelli*, sp. nov.: distribution from MTQ database.

Field Characteristics

The type specimens were found on a coarse sandy reef slope at 18 to 25 m depth; colour was pale brown. They occurred in dense matted assemblages, intertwined with an agariciid coral *Leptoseris* sp. (see Fig. 26*C*). Both species appeared to occur mostly free of any attachment to the substratum. Some of the type specimens may belong to a single clone.

Remarks

The closest similarities of this species are with *Acropora torihalimeda*, sp. nov., which is more delicate and does not have the prominent, tubular radial corallites.

Etymology

Named for Russell Kelley.

The *Acropora divaricata* Group

Acropora kosurini, sp. nov.
(Figs 27, 28)

Material Examined

Holotype. G37295, Western Thailand, Mergui Archipelago, Ko Surin, 09°30′N,97°55′E, reef slope 5–7 m depth, 13.ii.1984, coll. C. C. Wallace.

Paratypes. G37301, G37297, same data as holotype; G37294, G37296, G37299, G37300, same locality as holotype, 12.ii.1984, coll. C. C. Wallace.

Skeletal Characteristics

Corallum. From a central to side-attached growing point, branches arch upwards to end in approximately the same plane, forming an open corymbose shape. There is some secondary branching, with all branches contributing to the overall corymbose shape.

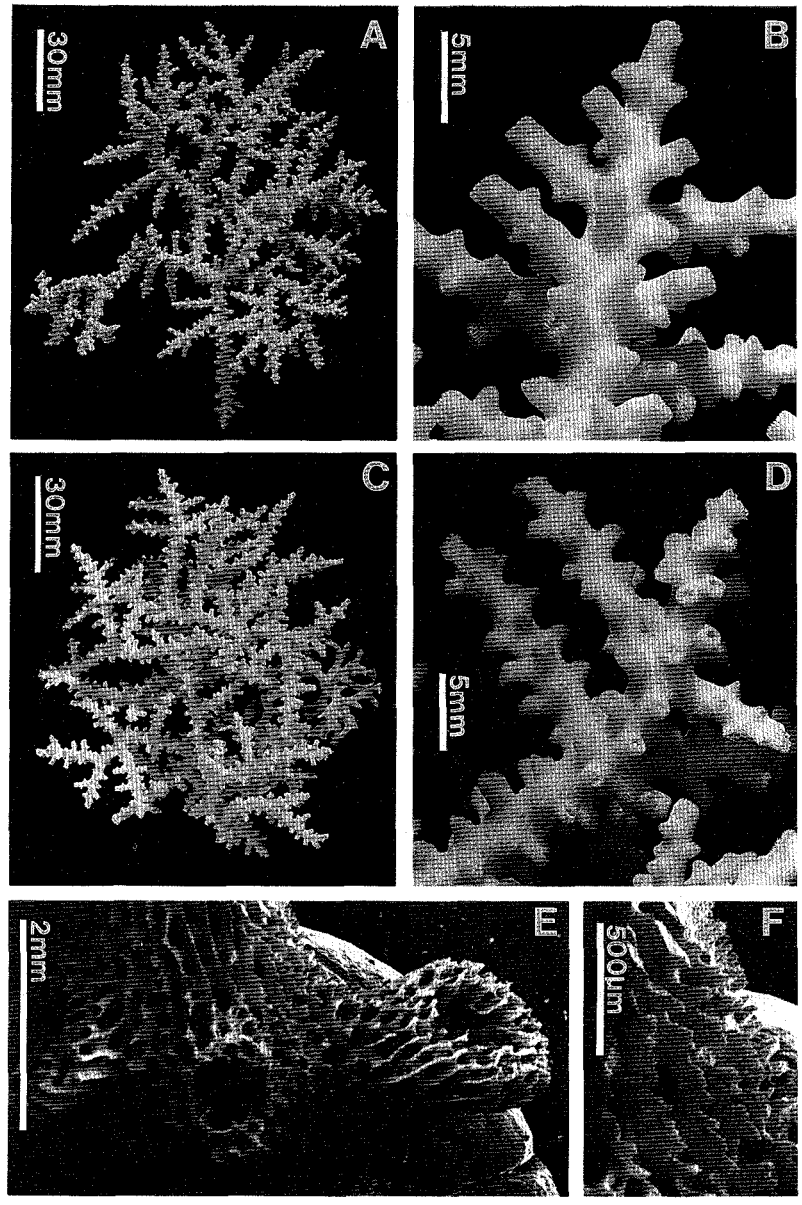


Fig. 26. *Acropora russelli*, sp. nov., *A, B, E, F*, holotype G40795; *C, D*, paratype G40782; *A, C*, whole corallum (*C*, centre right, also showing a specimen of *Leptoseris*, which co-occurs); *B, D*, detail of branches showing evenly distributed, tubular radial corallites; *E*, SEM of radial corallites and coenosteum; *F*, SEM of coenosteum.

Branches are up to 12 mm thick and 100 mm long, and taper strongly to approximately 3 mm at their tips.

Corallites. Axial corallites outer diameter 2·3–2·7 mm, inner diameter 0·6–0·8 mm; primary septa developed up to $^1/_3$ R, with obvious directives; secondary cycle present up to $^1/_3$ R. Radial corallites densely arranged on branches, evenly sized and shaped, nariform with thickened and vertically extended outer wall; primary septa well developed, up to $^2/_3$ R, with prominent directive septa; secondary septa developed up to $^1/_2$ R.

Coenosteum. Evenly arranged, elaborate spinules throughout the corallum.

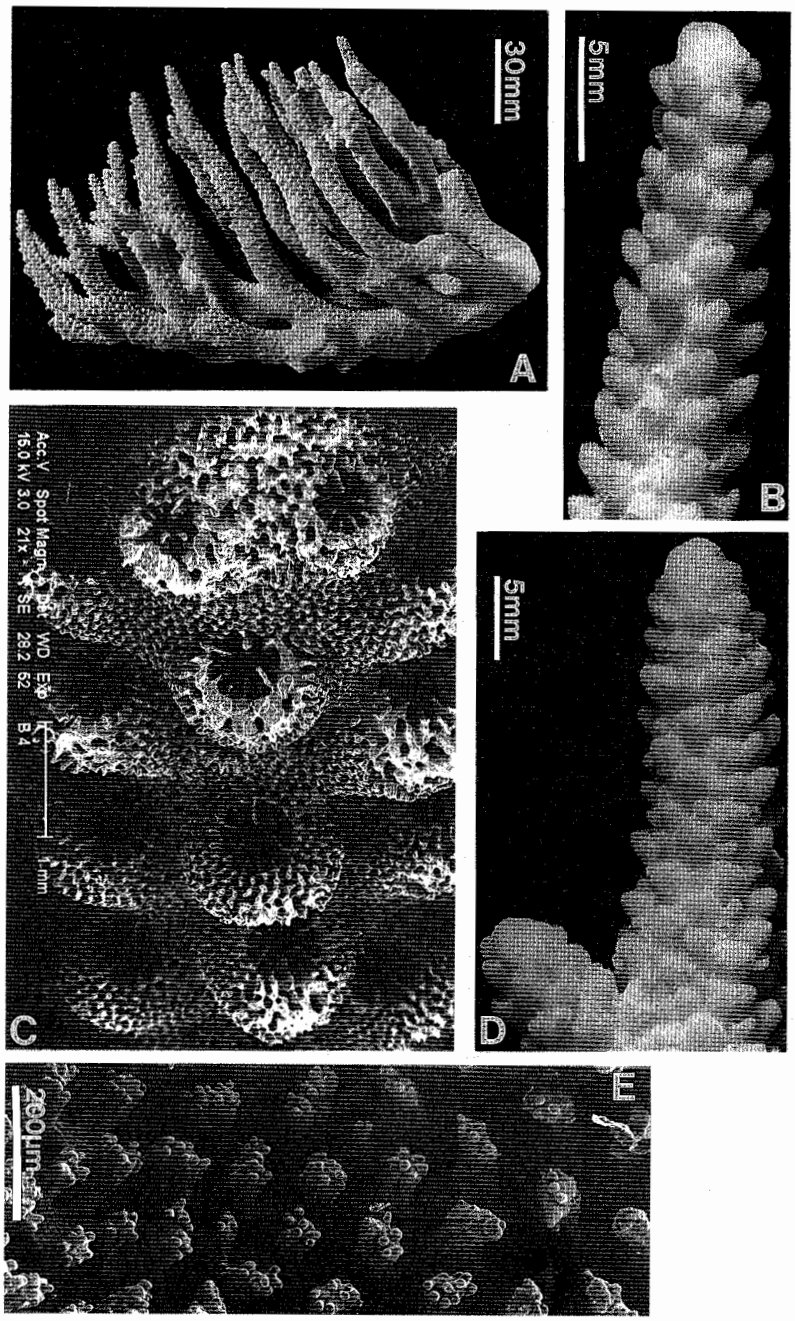


Fig. 27. *Acropora kosurini*, sp. nov., *A, B, C, E*, holotype G 37295; *D*, paratype G37294: *A*, whole corallum; *B, D*, detail of branch showing radial corallites; *C*, SEM of branch tip showing radial corallites; *E*, SEM of coenosteum.

Field Characteristics

Occurs as an obvious bowl or bracket shape, which is distinctive because of its evenly arranged, long tapering branches; colour pale brown.

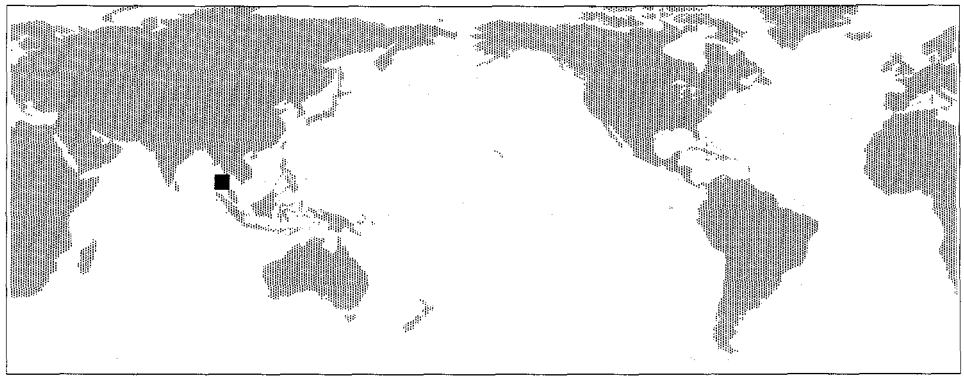


Fig. 28. *Acropora kosurini*, sp. nov.: distribution from MTQ database.

Remarks

This species is quite distinctive and not closely similar to any other described species. It is placed in the *Acropora divaricata* species-group because of a similar coenosteum and radial corallites which are similar to those of *A. divaricata*, but smaller and more even in size and shape.

Etymology

Named for the type locality.

Acknowledgments

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