



Revision of the coral genus *Acropora* (Scleractinia: Astrocoeniina: Acroporidae) in Indonesia

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The coral genus *Acropora* is reviewed from Indonesia for the first time, following detailed collections made at 131 sites and additional material collected from approximately 40 sites throughout the archipelago during the period 1993–6. Eighty-three species are recorded, four of these (*Acropora halmaherae*, *A. awi*, *A. plumosa* and *A. simplex*) new to science, six first described in 1994 and six in 1997. Records are compared with specimen-based records from localities worldwide. The species of *Acropora* occurring in Indonesian waters include five recorded only from the Indian Ocean and Indonesia, seven recorded only from the Pacific Ocean, South China Sea and Indonesia, and a further 10 species apparently endemic to Indonesia, as well as widespread Indo-Pacific species. Two species (*A. jacquelineae* Wallace, 1994 and *A. batunai* Wallace, 1996) are recorded only from north central Indonesia and Papua New Guinea, and two species (*A. russelli* Wallace, 1994 and *A. turaki* Wallace, 1994) only from north central Indonesia and north western Australia. The findings contribute to a new view of the corals of the Indo-Pacific ‘centre of diversity’ as a composite fauna with origins in a number of events in space and time.

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ADDITIONAL KEY WORDS:—systematics – biodiversity – biogeography – coral reefs – Indo-Pacific – corals – centres of diversity.

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INTRODUCTION

Despite its reputation as the centre of marine biodiversity for the Indo-Pacific, and the location of the world's greatest coral diversity (Stehli & Wells, 1971; Potts, 1984, 1985; Rosen, 1984, 1988; McManus, 1985; Best *et al.*, 1989), the Indonesian archipelago has rarely been the subject of taxonomic review for corals. Notable exceptions are the monograph of Fungiidae (Hoeksema, 1989) and Best's (1974, 1976) detailed review of the Faviidae. Much information exists in regional surveys, expedition reports and catalogues that document assemblages and some of the taxa occurring in parts of the archipelago (e.g. Studer, 1878; Brook, 1891, 1893; Verrill, 1902; Bedot, 1907; Umbgrove, 1930, 1939, 1940, 1947; Theil, 1933; Boschma, 1923; Best, 1977; McManus & Wenno, 1981; Best, Moll & Boekschoten, 1985; Brown, Sya'rani & le Tissier, 1985; Best & Hoeksema, 1987; Best *et al.*, 1989; Boekschoten *et al.*, 1989; Best & Suharsono, 1991; Hoeksema & Best, 1991).

The genus *Acropora* in Indonesia has received even less attention than many other genera, as there was anticipation for many years of the monograph of Verwey, based on his research in the area now known as Seribu Islands, Jakarta Bay, during the 1930s (e.g. as noted by Umbgrove, 1939 for Indonesia, and Wells, 1954 for Indo-Pacific *Acropora*). Dr Verwey's manuscript, completed just before his death in 1981, is not yet published.

This revision of *Acropora* in Indonesia is based on profiles of 131 sites throughout the archipelago, in each of which a systematic sample of all *Acropora* species present was taken (total approximately 3800 specimens). In addition to this, approximately

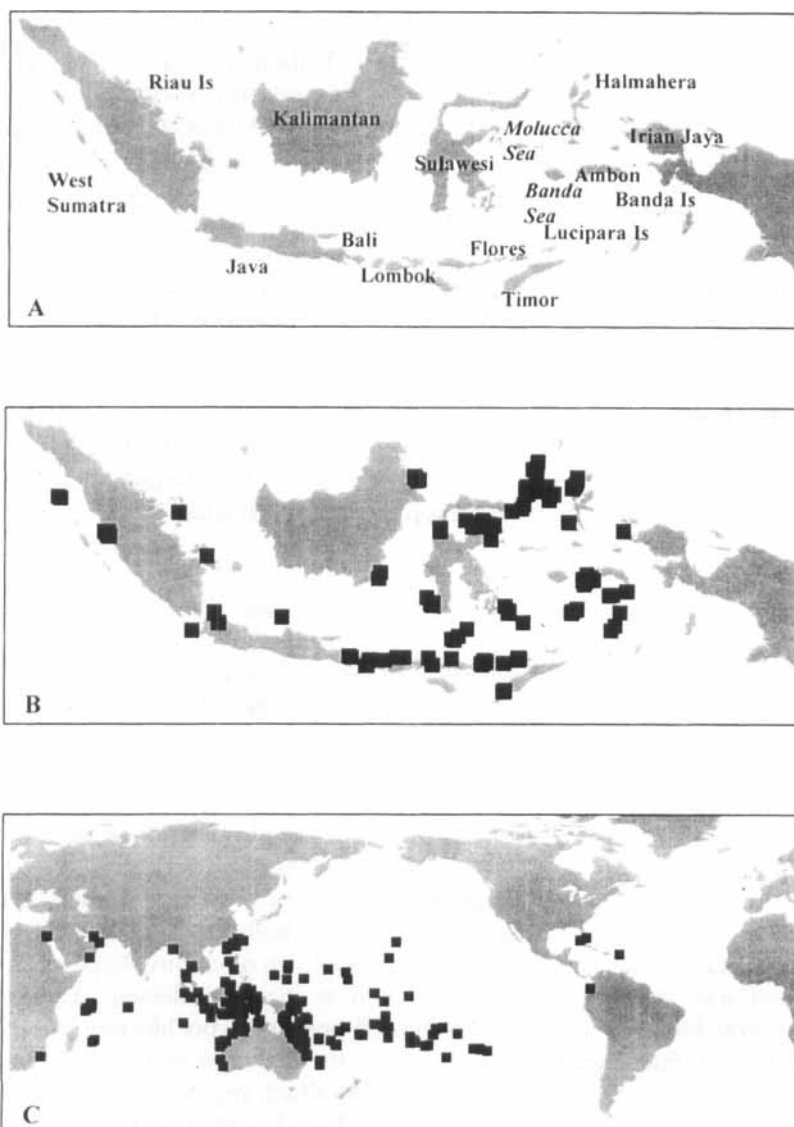


Figure 1. Maps indicating: general features of Indonesia (A); all sites in Indonesia from which specimens are recorded (B); all sites represented by specimens in the world-wide *Acropora* collection and database at Museum of Tropical Queensland (C). The sites indicated in map (B) include the fully documented sites listed in Appendix 1 and sites from which additional specimens were obtained.

300 samples were provided from approximately 40 other locations by colleagues working in Indonesia (see 'Methods').

METHODS

Locations

Detailed site data are given in the Appendix and location of collecting sites is indicated in Figure 1. Between October 1993 and June 1995, 109 sites were sampled

in detail by the authors in S. Sumatra, E. Kalimantan, N. Java, Bali, N.W. Lombok, N.W. Sulawesi, Central Sulawesi, S. Sulawesi, Ambon, Banda Sea, N. Flores, Alor Islands and W. Timor. A further 22 sites in Central and N. Sulawesi, Halmahera and Bali were sampled in detail in June 1996, but only new species and significant new records from these sites are included in this revision. Latitude and longitude of each site is accurate to the nearest minute from Admiralty charts.

Additional samples were received from: Nias, W. Sumatra (M. Christensen); Riau/Lingga Archipelago, E. Sumatra (J. Thorogood, I. Neuss); Seribu Islands, Java (LIPI staff, C. Wilkinson, T. Tomascik, J.M. Dauget, Suharsono); Karimunjawa Islands, N. Central Java (E. Edinger); Lombok (Suharsono); Bali (S. Romano, A. Heyward); N.E. Kalimantan (M. Aw); S. Kalimantan (J. Simmons, R. Moss, G. Adams); Bunaken National Park, N. Sulawesi (L. Lalamentik, I. Neuss); S.W. Sulawesi (B. Hoeksema, E. Edinger, M. Aw); Taka'bonerate, S. Sulawesi (J. Alder, M. Aw); Ambon (E. Edinger, S. Romano); Banda Islands (T. Tomascik, R. Van Woesik); Moyo, Flores and Alor, Nusa Tenggara (M. Aw); Islands of W. Irian Jaya and the Moluccas (D. Itano) (total of approximately 40 sites).

Sampling and database protocol

Sampling by the authors followed a standard protocol at each site, using Scuba (occasionally snorkelling or reef-walking on shallow sites). Collection and recording of *Acropora* species began from the greatest depth at which they could be located (usually 25–28 m) and then continued upwards to shallow water, over a horizontal distance of 100 to 400 m. Habitat features and dominant benthic groups were noted for each site. For each species encountered, a sample portion of the colony was taken; more colonies were sampled when unusual forms or undescribed species were encountered. Most specimens were photographed *in situ* before collection. A tentative identification, colour of the colony, and depth at which it occurred, were recorded, along with other relevant features such as unusual size or colony shape. A numbered plastic label was attached to each specimen as it was collected. After the dive, specimens were bleached in household bleach (sodium hypochlorite), rinsed in fresh water, and dried. Specimens were returned to the Museum of Tropical Queensland in Australia, where they were re-examined, identified, registered into the specimen-based database (using an RBASE system) labelled and stored in the Museum's permanent collection.

Duplicate specimens, representing all species collected, were provided for the Indonesian Institute of Sciences (LIPI), and deposited in: LIPI Research and Development Centre for Oceanology (PPPO) at Ancol, Java (N. and Central Sulawesi collection); LIPI PPPO at Ambon, Moluku Province (Banda Sea collection); and Department of Marine Science, Bung Hatta University Padang, Sumatra (S. Sumatra collection).

Mapping of species distributions

The full set of sites available for species distribution records within Indonesia is given in the Appendix and Figure 1. For individual species, the range of localities occupied and number of specimens available for study are indicated in 'Material

examined' under the species heading. The specimen-based database was used to prepare a distribution list for each species in ASCII format, including site coordinates with each specimen record. These lists were used to plot the distribution records for each species in Indonesia, using a MAPINFO GIS package for WINDOWS. In order to indicate the broad geographic spread of the species outside Indonesia, a small inset map is included with the Indonesian distribution map for each species. This inset map is plotted from records within the specimen-based database, which at the time of preparation included some 15 000 records from some 800 sites worldwide (indicated in Fig. 1); in addition to these specimen-based records, the type locality for each species and its synonyms is indicated by a star symbol on the map. A detailed outline of the sites and records worldwide used for the preparation of this inset map will be available in Wallace (in press).

Citation of localities for specimens examined

For brevity, specimens examined for this review are cited by registration number and by an abbreviated locality. For each region (e.g. N. Sulawesi), specimen numbers from within that region are listed, followed by the abbreviated site (e.g. Bunaken N.P. for the islands in the Bunaken National Park). An exception to this is the citation of type specimens of new species: collection data for these specimens are cited in full. A full catalogue of the Indonesian specimens in the Museum of Tropical Queensland is available in hard copy or on disk on request.

Geographical terms have been translated into English. An exception is the Indonesian term 'tanjung' (abbreviated as Tg), referring to a cape or point, which is retained.

Characters

Although genetic and breeding experiments indicate that morphological boundaries may not differentiate fully amongst *Acropora* species (Wallace & Willis, 1994), morphological characters combined with field appearance remain, for the present, the only characters available across the full range of species and thus the only indicators of species boundaries. Discriminant function analysis of morphological characters over a subset of species confirmed morphologically-defined species boundaries (Wallace *et al.*, 1991) and reinstated finer species boundaries indicated by breeding experiments between morphs of another species (Willis *et al.*, 1997). Thus traditional morphological characters are used in the descriptions in this review.

For detailed skeletal measurements, three specimens of each species from Indonesia were examined using a Wild M8 microscope with eyepiece graticule, lit by fibre-optic lighting. Measurements and qualitative characters were taken for five branches, five axial corallites and five radial corallites. This information was added to already-documented information for each species (Wallace, 1978, 1994, 1997a; Veron & Wallace, 1984; Wallace & Dai, 1997 and type descriptions) as well as field notes regarding colony shape and size of all specimens taken, to give the final diagnosis for each species. If the Indonesian specimens diverge from characteristics of a species elsewhere, this is noted in 'Remarks'.

For illustration, electron micrographs were taken using the Phillips XL20 or the

JEOL scanning electron microscope at James Cook University, Townsville, Australia. Photographs of skeletons were taken by Photography Section, Queensland Museum, Brisbane and by Z. Florian, Townsville. Photographic plates comprise these photographs and field photographs taken *in situ* mainly by C. Wallace and sometimes by M. Aw or R. Aiello.

Field characteristics, including colony shape, colour, habitat distributions and other relevant field information describe the species within Indonesian waters. Any major divergence from these characteristics as recorded elsewhere in the world is noted in 'Remarks'.

RESULTS AND DISCUSSION

Eighty-three species are recorded in this study.

Reef types and habitats of Indonesia

Because of its complex tectonic history, active geology, multiplicity of coastlines, hydrological characteristics and depth contours, the Indonesian archipelago has a great variety of antecedent structures and reef types. In most regions, several different kinds of reefs are found in close proximity. Because of adjacent islands and reefs, strong currents occur in many locations (up to 5 knots encountered in this survey). Depth of water immediately offshore from reefs varies from around 100 m on continental shelf reefs (e.g. in the Java Sea and Spumonde Archipelago) to around 2000 m (e.g. in the Banda Sea reefs), as can be seen from charts of the region.

Temperatures encountered were usually in the range 27–30°C, but much lower temperatures were occasionally encountered in areas of upwelling (e.g. 16°C at 10 m depth at site 69, Alor Islands) or in waters apparently affected by high algal content and/or long-term cloud cover (e.g. 24°C at 10 m on reefs off Padang, W. Sumatra). Higher temperatures (up to 32°C at 10 m) were encountered in the vicinity of volcanic activity (e.g. in parts of Gunung Api reef, Banda islands) or on shallow volcanic ash slopes (e.g. Tulumben wreck, E. Bali).

The following is our summary of reef types encountered in the survey: these reef types are allocated to the sampling sites in the Appendix:

- basaltic flow slopes below recent volcanoes
- volcanic rock slopes
- volcanic ash slopes
- rocky slopes
- fringing reefs
- dense coral slopes
- sandy slopes
- vertical walls and associated reef flats
- rubble banks
- underwater volcanoes
- reefs with emergent tops
- submerged reefs
- atoll reefs
- sheltered inlets and lagoons within reefs
- cay-bearing reefs on continental shelves

The dominant benthic organism encountered at each site is also recorded in the Appendix. While an *Acropora* assemblage is sometimes a dominant feature of Indonesian reefs (e.g. on many submerged reefs and gentle sandy slopes), this is not always the case. In particular vertical walls (a very common reef type) are not dominated by *Acropora*, although the species number may be high. In general reef flats associated with vertical walls and fringing reefs are narrow in Indonesia and do not have large assemblages of *Acropora*.

Biogeography of Acropora in Indonesia

The species composition of Indonesian *Acropora* includes 10 species (*Acropora sukarnoi*, *A. derawanensis*, *A. halmaherae* sp. nov., *A. indonesia*, *A. awi* sp. nov., *A. desalwii*, *A. suharsonoi*, *A. simplex* sp. nov., *A. plumosa* sp. nov. and *A. togianensis*) which are to date recorded as endemic to Indonesia. Ranges of the species *A. jacquelineae* (type locality E. New Guinea) and *A. russelli* and *A. turaki* (type locality W. Australia) are extended into Indonesia. Five species (*A. turaki*, *A. indiana*, *A. rudis*, *A. russelli* and *A. kosurini*) are recorded from the Indian Ocean as well as Indonesia, but not from the Pacific Ocean. Seven species (*A. cuneata*, *A. crateriformis*, *A. jacquelineae*, *A. batunai*, *A. sarmentosa*, *A. nana*, *A. speciosa*) are recorded on the database from the Pacific Ocean (and sometimes also South China Sea and Philippines) as well as Indonesia, but not from the Indian Ocean. Of the remaining 61 species, most have widespread Indo-Pacific distribution, although a few (*A. solitaryensis*, *A. brueggemanni*, *A. glauca* and *A. abrolhosensis*) are limited to the central Indo-Pacific. Thus the 83 species recorded in this revision are not distributed evenly throughout the archipelago; nor do they occur concentrically in a pattern that could be considered to indicate a 'centre of origin' (Stehli & Wells, 1971). Although the species composition is dominated by wide-ranging Indo-Pacific species, a dual pattern is discernible, in which Indian Ocean and Pacific Ocean distributions overlap into the south-western and north-eastern parts of the archipelago respectively.

While the ranges of species apparently endemic to Indonesia probably will be extended outside the archipelago, some species distributions are clearly restricted regionally, e.g.: *Acropora suharsonoi* and *A. sukarnoi* to the island chains of Nusa Tenggara and Sumatra-Java; *A. desalwii* to the Banda Sea and neighbouring waters, *A. halmaherae* to the Molucca Sea and *A. derawanensis* to the Celebes Sea.

Most distinctive amongst the localities sampled in Indonesia was the Togian Islands, lying within the waters of the Bay of Tomini in central Sulawesi. Umbgrove (1940) noted that these islands are protected from prevailing winds and occupy a position between two major monsoonal influences; he did not, however, record any unusual species, probably because his investigation was limited to shallow water. Our studies of only 13 sites within these islands (see Appendix) revealed a composite fauna comprising endemic species, rare species (such as *A. caroliniana* and *A. multiacuta*), and the species mentioned above with disjunct distributions. Most unusually, all of these species occur abundantly, making this the most unusual *Acropora* fauna we have ever seen. A 'Tethyan-relictual' origin was proposed to explain the unusual coral assemblages of these islands (Wallace, 1997b). The hypothesis is that contained within the fauna of the islands is a relictual element of the earlier coral fauna of the Tethys Sea, which was gradually closed by movement and docking of terranes from its borders during the Miocene period.

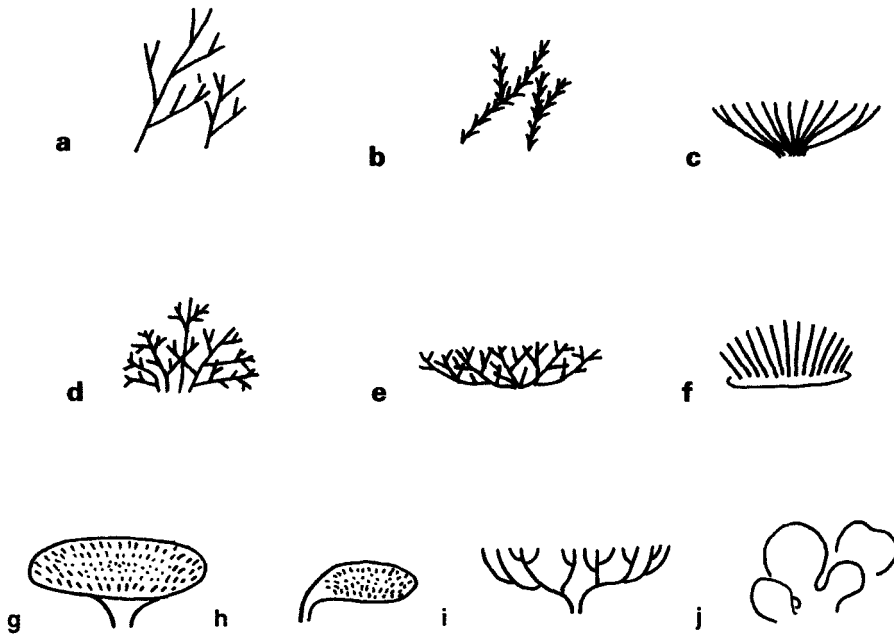


Figure 2. Diagrammatic representation of colony shape categories used in text. a: arborescent; b: hispidose; c: corymbose; d: caespitose; e: caespito-corymbose; f: digitate; g: table; h: plate; i: arborescent table; j: cuneiform.

The three major patterns of distribution of *Acropora* species discussed above are identified by Wallace (1997b) as 'duality', 'endemicity' and 'Tethyan-relictual', and it is concluded that the *Acropora* species composition of Indonesia is a composite with origins in a number of events in space and time.

Terminology

The genus *Acropora* has the characters of the family Acroporidae (synapticulotheca, simple septa and no columella or dissepiments) and is defined by its mode of growth, in which a central or *axial* corallite extends and buds off subsidiary or *radial* corallites (Oken, 1815; Wells, 1956; Wallace, 1978).

Growth form. The mode of growth leads to a variety of growth form options, so that characteristic growth forms of species are often difficult to define clearly. The colony shape definitions used in the species descriptions describe the usual shape of the colonies in the field (see Fig. 2).

Axial corallites. Axial corallite diameter is expressed as the range for outer diameter and inner (calice) diameter. In general, minimum diameters for Indonesian species are less than those previously recorded for the species.

Radial corallites. The shape of radial corallites provides a major defining character for *Acropora* species and species groups. Several terms are used to describe the main

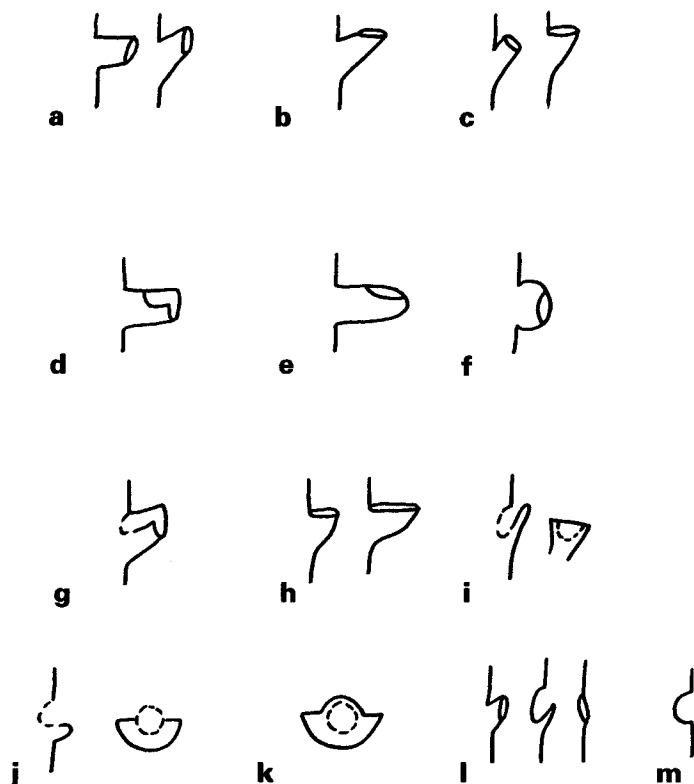


Figure 3. Diagrammatic representation of corallite shape categories used in text. a: tubular, round opening; b: tubular, oblique opening; c: tubular appressed; d: tubular, dimidiate opening; e: tubular, nariform opening; f: rounded tubular; g: dimidiate; h: nariform; i: labellate scaly lip; j: labellate flaring lip; k: cochleariform; l: sub-immersed; m: immersed.

shapes seen and these are illustrated in Figure 3. The descriptions of the radial corallites for each species include an indication of whether the radial corallites are all of similar size and/or shape and whether or not the radial corallites are crowded on the branches. These conditions, while showing some overlap, are relevant to the definition of species groups.

Septal measurements. Septal details are included for completeness of description, but do not constitute the major distinguishing characters for the species. For both axial and radial corallites the maximum extent of septa into the centre of the corallite (expressed as a proportion of R , the radius) is indicated. In general, septal development is less in Indonesian species than for the species occurring elsewhere, so that specimens encountered are likely to have less than the maximum septal extent.

Coenosteum. In usual coral terminology, 'coenosteum' refers to the skeletal material between the corallites. Because of the budding mode of *Acropora*, where a central axial corallite extends and buds off radial corallites from its sides, the material between the radial corallites is also the wall of the axial corallite. The entire skeleton of an *Acropora* colony (other than the epitheca) can be said to be formed by synapticular development, with infilling (Wells, 1956; Wallace, 1978; Gladfelter,

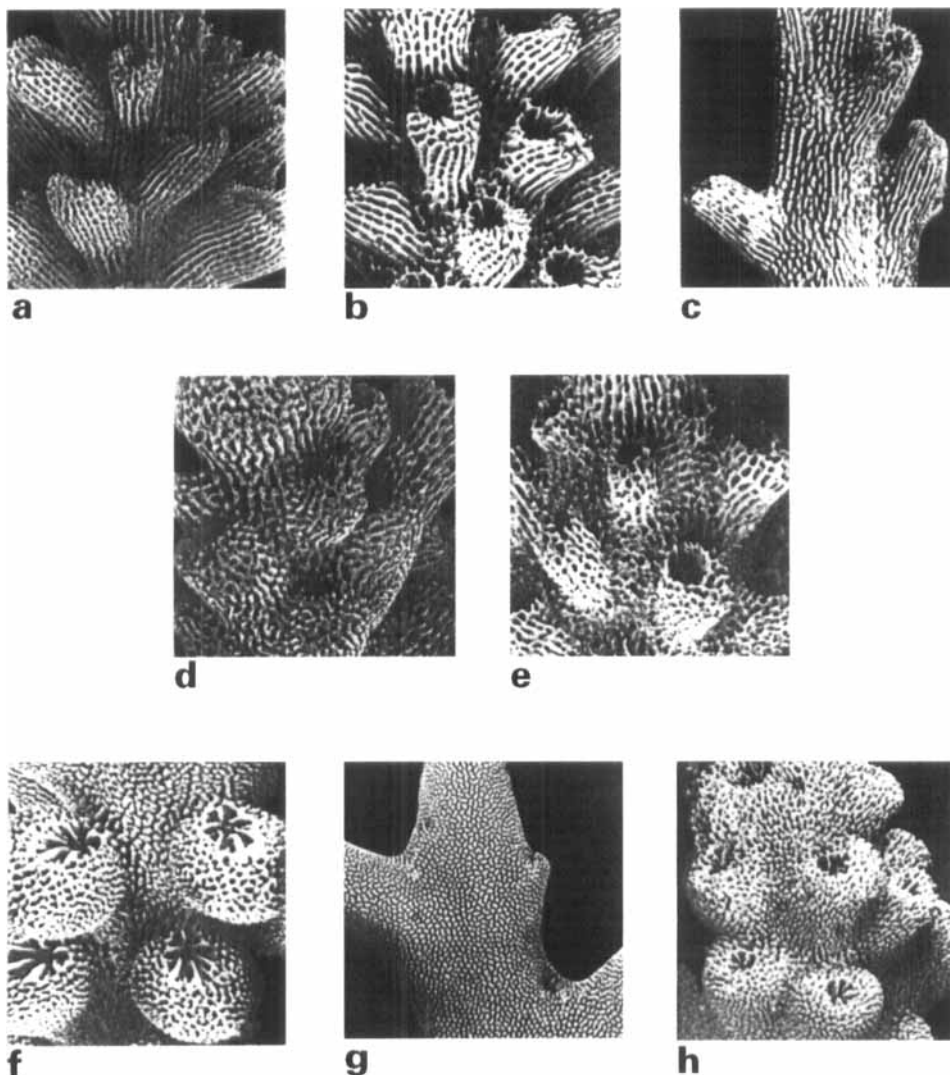


Figure 4. Some coenosteum types used in text. a: costate; b: costate on radial corallites, reticulate between; c: costate or lines of simple spinules; d: reticulate; e: reticulate with simple spinules; f: evenly distributed spinules; g: a dense arrangement of spinules; h: a dense arrangement of elaborate spinules.

1982). By convention, the term 'coenosteum' is used to describe the fine structure of the walls of the radial corallites as well that of as the material between them. The structure of the coenosteum may be similar for the radial corallite walls and the intercorallite areas, or may differ between them. For the terminology used to describe the coenosteum, see Figure 4.

Synonymies

The form of synonymy used by Veron and Wallace (1984) is followed, with the following exceptions: only the original description of each synonym is cited, except

for cases when the original author expanded that description in a second publication (e.g. Brook, 1893; Verrill, 1901); synonyms derived from only part of syntype series are not cited, pending lectotypification of those series; questioned synonyms are not included; new species described since that revision are added; full page and figure references are given for citations. Few changes to synonymies are made in this review, but there are exceptions, e.g. reinstatement of *Acropora intermedia*, splitting of *A. granulosa*.

Some relatively obscure species named from Indonesia are not resolved in this work, but they are predicted to be junior synonyms, as follows: *Acropora quelchi* (Brook, 1893) (named for a specimen from Ambon identified by Quelch (1886) as *Madrepora effusa* Dana, 1846), possibly a synonym of *A. secale*; *A. dactylophora* (Brook, 1893) (named for a specimen from Salawatti identified by Studer (1878) as *A. digitifera*), possibly a synonym of *A. digitifera*; *A. mirabilis* (Quelch, 1886) from Banda, possibly a synonym of *A. florida*; *A. bandensis* Verrill, 1902 (named from specimens from Banda identified by Quelch (1886) as *Madrepora tubigera* Horn, 1861), possibly a synonym of *A. tenuis*; and *A. cruciseptata* Theil, 1932 from 'Mille Islands', possibly a synonym of *A. intermedia*.

Systematic arrangement of species
Family Acroporidae Verrill
Genus *Acropora* Oken, 1815

Acropora Oken, 1815 p. 66

TYPE SPECIES *Millepora muricata* Linnaeus, 1758

Genus name and type species officially validated in 1963 (Boschma, 1961; China, 1963). "Acroporidae which are ramose, rarely massive or encrusting, branching with an axial or leading corallite (or corallites) larger than the more numerous radial corallites budded from it (or them); united by light, reticulate, spinose or pseudocostate or costate coenosteum. Columella and dissepiments absent". (Description taken from Wallace, 1978: 277, modified from Wells, 1956: F374).

Subgenus *Acropora* Oken, 1815

Single axial corallite forms axis of branch. Radial corallites and coenosteum various.

Species groups

Groupings of species as used in Veron and Wallace (1984) and additionally from Wallace (1994) are used here. Some of these groups have a unique character and are thought to be monophyletic, but some do not have a unique character and are not clearly monophyletic. One new species grouping (the *Acropora rudis* group) is designated.

The *Acropora humilis* group

Radial corallites short tubular with dimidiate opening; coenosteum reticulate with laterally flattened elaborate spinules; colony corymbose or digitate.

Acropora (Acropora) humilis (Dana, 1846)
(Figs 5, 6)

Madrepora humilis Dana, 1846 p.483 pl.31 fig.4 pl.41 fig.4

Madrepora fruticosa Brook, 1892 p.457; 1893 p.138 pl.18 fig.A

Madrepora guppyi Brook, 1892 p.458; 1893 p.158 pl.23 fig.D

Madrepora spectabilis Brook, 1892 p.462; 1893 p.141 pl.16 fig.B

Madrepora obscura Brook, 1893 p.129 pl.32 fig.A

Material examined

W. SUMATRA: G47160, G47167 Nias I.; G48590–5, G48625 Padang; JAVA: G32836, G49096 Seribu Is.; G50819 Karimunjawa I.; KALIMANTAN: G39796 Pulau Laut; G49100, G49109–11 N.E. Kalimantan; N. SULAWESI: G49102–3 Tg Dodepo; G34169–72, G35408–9, G47328–30 Bunaken N.P.; G47327 Tg Torowitang; G47326 Tg Pulisan; G47320–5 Sangihe Is.; C. SULAWESI: G49104–8 Togian Is.; S. SULAWESI: G47318–9, G47331 Spumonde Arch.; G50895 Taka'bonerate; NUSA TENGGARA: G49101, G49112–4 Bali; G47458 Lombok; G48596–602, G48626 Flores; G48603–4, G48627 W. Timor; G48605–6, G48628 Alor Is.; BANDA SEA: G35966 Bacan I.; G47042 Lucipara Is.; G36179, G36211, G47038, G50820–1 Ambon I.; G47039, G47043 Nusa Laut; G47040–1 Banda Is.

Skeletal characteristics

Corallum. Digitate or corymbose, with central or side attachment; branches up to 30 mm basal diameter and tapering.

Corallites. Axial corallites outer diameter 3.0–8.0 mm, inner diameter 1.0–1.8 mm, primary septa present up to 3/4R, secondary septa up to 2/3R; radial corallites evenly distributed, short tubular with dimidiate openings and thickened walls; proximally on branches radial corallites may be in two sizes, with smaller, sub-immersed corallites interspersed amongst the dimidiate tubular corallites; primary septa to 1/3R, secondary septa incomplete, to 1/4R.

Coenosteum. Dense arrangement of laterally flattened elaborated spinules, sometimes arranged into dense irregular costae, throughout.

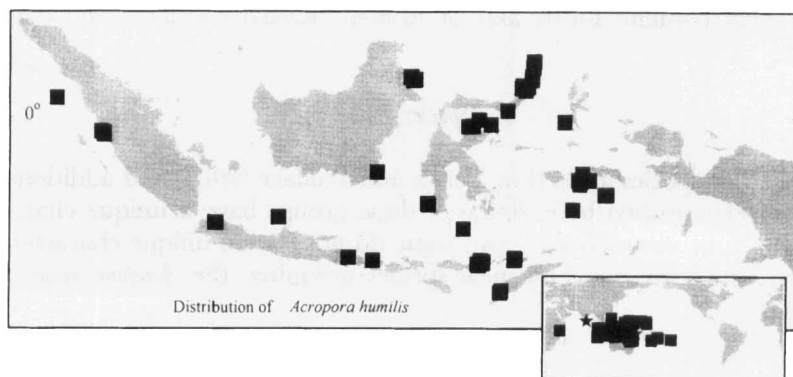


Figure 5. Distribution of *Acropora humilis* in Indonesia (main map) and worldwide (inset), taken from specimen-based records on MTQ database (star indicates type locality not represented on MTQ database).

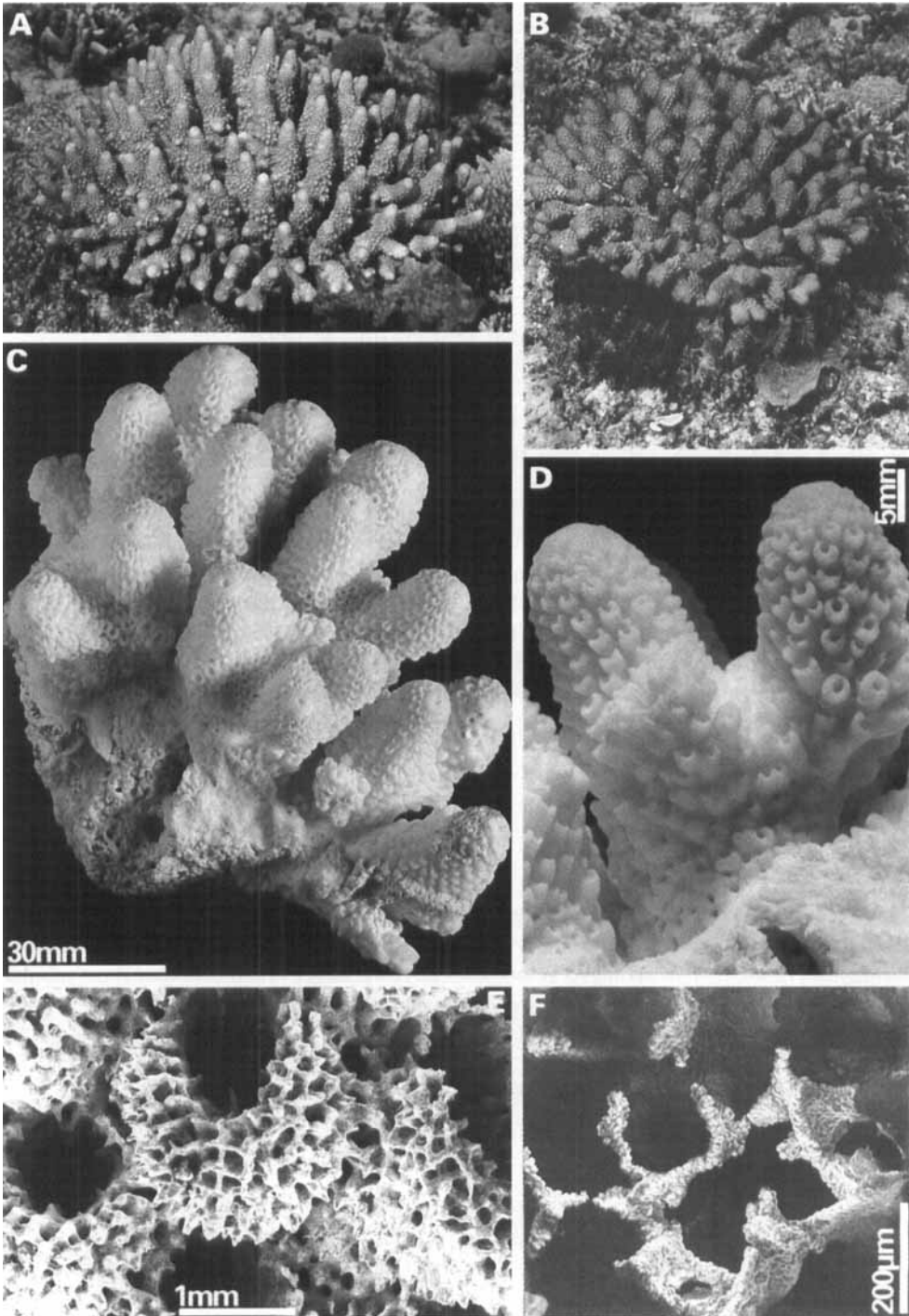


Figure 6. *Acropora humilis* (A) at Kudingareng I., Spumonde Archipelago, S.W. Sulawesi (B) at Pulisan, N. Sulawesi; (C–F) G36179: (C) portion of colony (D) portion of branches (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Field characteristics. Sturdy, digitate to corymbose colonies with large obvious axial corallites and mostly evenly sized radial corallites; known colours cream, brown, blue, purple, cream with blue tips, yellow-green; occurs intertidally and just subtidally on reef tops, upper slopes to about 5 m and submerged reefs.

Remarks

This species, and also *A. gemmifera* and *A. monticulosa*, are not as abundant on Indonesian reefs as they are on most of the Pacific reefs. This may be influenced by the relative paucity of shallow, solid, reef flat habitats on Indonesian reefs.

Acropora (Acropora) gemmifera (Brook, 1892)
(Figs 7, 8)

Madrepora gemmifera Brook, 1892 p.457; 1893 p.142 pl.21

Madrepora australis Brook, 1892 p.453; 1893 p.155 pl.23 fig.C

Material examined

W. SUMATRA: G47175–6 Nias I.; G48607–9, G50390 Padang; KALIMANTAN: G49031–6, G49877–8 N.E. Kalimantan; N. SULAWESI: G49028–9 Tg Dodepo; G49027 Tg Flesko; G47265–6 Tg Pisok; G47255–64, G47972, G49030 Sangihe Is; C. SULAWESI: G50533 Togian Is; S. SULAWESI: G47267 Spumonde Arch.; NUSA TENGGARA: G49879 Bali; G47485 Lombok; G50893–4 Sangeang I.; G48610–2, G48616, G49634 Flores; G48613–5 Alor Is; BANDA SEA: G35968 Bacan I.; G47047 Lucipara Is; G47033, G47049, G50831–2 Ambon I.; G36225 Pombo I.; G47045 Nusa Laut; G47046 Banda Is; G47048 Manuk I.

Skeletal characteristics

Corallum. Digitate or corymbose, with central or side attachment; branches up to 25 mm basal diameter and tapering.

Corallites. Axial corallites outer diameter 2.8–4.2 mm, inner diameter 1.0–1.6 mm, primary septa present up to 3/4R, secondary septa up to 2/3R; two sizes of radial corallites throughout branch, often arranged in longitudinal rows; larger radial corallites short tubular, with dimidiate openings and thickened walls; smaller radial corallites sub-immersed, primary

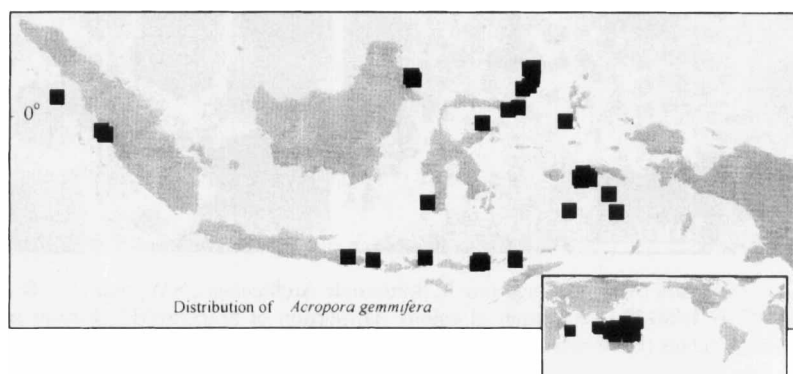


Figure 7. Distribution of *Acropora gemmifera* in Indonesia (main map) and worldwide (inset).

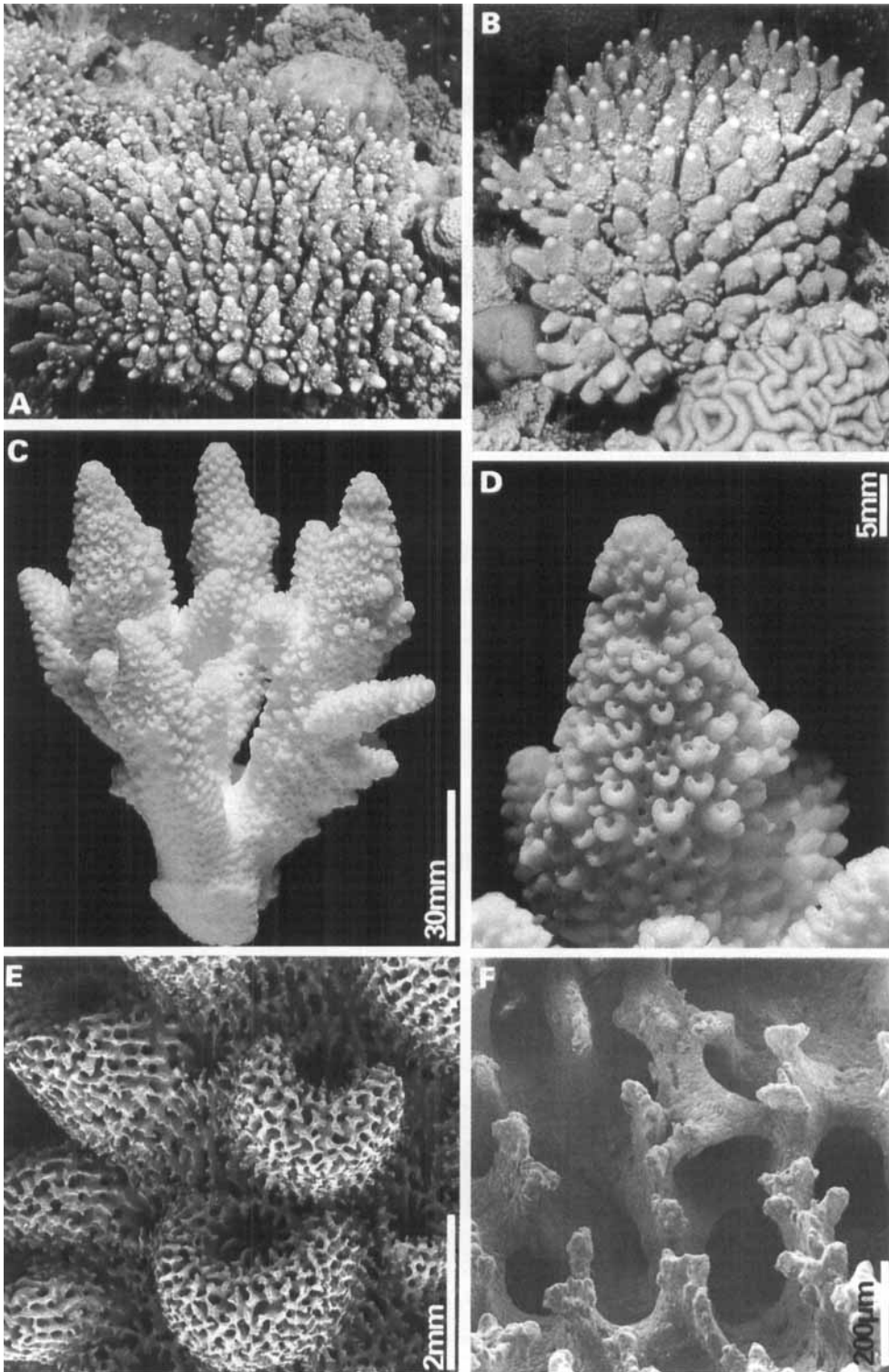


Figure 8. *Acropora gemmifera* (A) at Bunaken I., N. Sulawesi (B) at Tg Dodepo, N. Sulawesi; (C–F) G47176: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

septa of the larger corallites present up to 3/4R, secondary septa absent or a few visible up to 1/4R.

Coenosteum. Dense arrangement of laterally flattened elaborated spinules, sometimes arranged into dense irregular costae, throughout.

Field characteristics

Sturdy, digitate to corymbose colonies; large axial corallites and two distinct sizes of radial corallites are obvious; known colours cream, brown, blue, purple, cream with blue tips; occurs intertidally and subtidally on reef tops, upper slopes and submerged reefs.

Remarks

It is often difficult to distinguish between the two species *Acropora humilis* and *A. gemmifera* (see remarks in Wells, 1954; Wallace, 1978 and Veron & Wallace, 1984). Currently the species are distinguished by the consistent presence of immersed radial corallites throughout a branch in *A. gemmifera*. For both of these species, taxonomic resolution, including decisions about synonyms, is incomplete, pending more detailed field and laboratory studies.

Acropora (Acropora) monticulosa (Brüggemann, 1879)
(Figs 9, 10)

Madrepora monticulosa Brüggemann, 1879 p.576

Material examined

N. SULAWESI: G34173, G47316 Bunaken N.P.; G49010 Batong I.; G47315 Tg Pulisan; G47308–14 Sangihe Is.

Skeletal characteristics

Corallum. Digitate from a broad base; branches up to 50mm basal diameter and strongly tapered.

Corallites. Axial corallites outer diameter 1.4–3.8 mm, inner diameter 0.6–1.2 mm, primary septa present up to 3/4R, secondary septa absent or a few just visible to 1/4R; radial

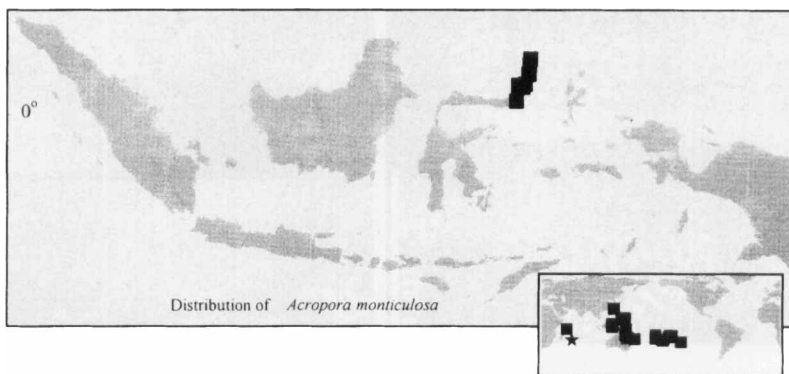


Figure 9. Distribution of *Acropora monticulosa* in Indonesia (main map) and worldwide (inset).

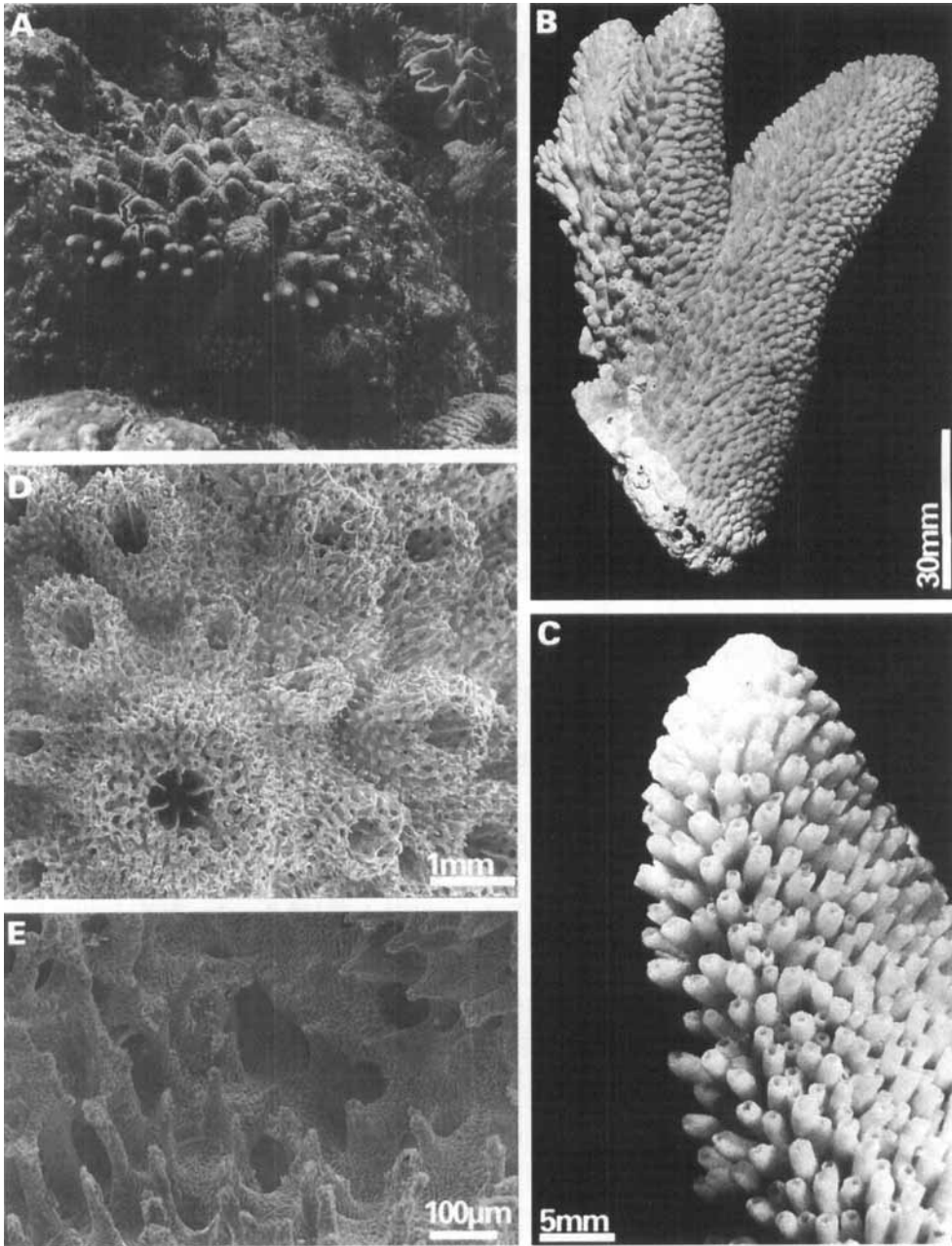


Figure 10. *Acropora monticulosa* (A) at Batong I., N. Sulawesi; (B, C) G47309; (D, E) G47308: (B) portion of colony (C) portion of branch (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

corallites evenly sized and distributed, short tubular with rounded and only very slightly digitate openings, primary septa present up to 1/2R, secondary septa absent or a few just visible as points.

Coenosteum. On radial corallites, a dense arrangement of laterally flattened elaborated spinules, sometimes arranged into dense irregular costae; reticulate with less densely arranged spinules in intercorallite areas.

Field characteristics

Digitate with broad, low conical branches, sometimes appearing hexagonal at their bases; radial corallites can be seen to be smaller and more uniform in size than those of *A. humilis* and *A. gemmifera*; axial calices similar in size to those of radial corallites; known colours cream, brown, lavender-brown; occurs around low tide mark and just subtidally on rocky, waveswept, shallow reefs.

Remarks

The type locality for this species is Rodriguez in the W. Indian Ocean: however, it is most frequently recorded in the Pacific Ocean and in our sampling of Indonesian reefs, was only found on reefs near the Pacific Ocean.

Acropora (Acropora) samoensis (Brook, 1891)
(Figs 11, 12)

Madrepora samoensis Brook, 1891 p.468; 1893 p.143 pl.31 fig.A pl.6 fig.C

Material examined

W. SUMATRA: G47168–9 Nias I.; G48658–68, G48672–3 Padang; E. SUMATRA: G49831–5 Riau/Lingga Is; JAVA: G51204–7 Seribu Is; KALIMANTAN: G49128–31, G50890–2 N.E. Kalimantan; N. SULAWESI: G34179, G35412 Bunaken N.P.; G49127 Tg Flesko; C. SULAWESI: G49117–26, G49332, G50537–8 Togian Is; S. SULAWESI: G51063–5 Taka'bonerate; NUSA TENGGARA: G49115, G49132 Bali; G49116, G50536 Nusa Lembongan; G47564 Lombok; G51062 Komodo; G48669, G50535 Flores; G48670–1 Alor Is; BANDA SEA: G35979 Bacan I.; G47044 Nusa Laut.

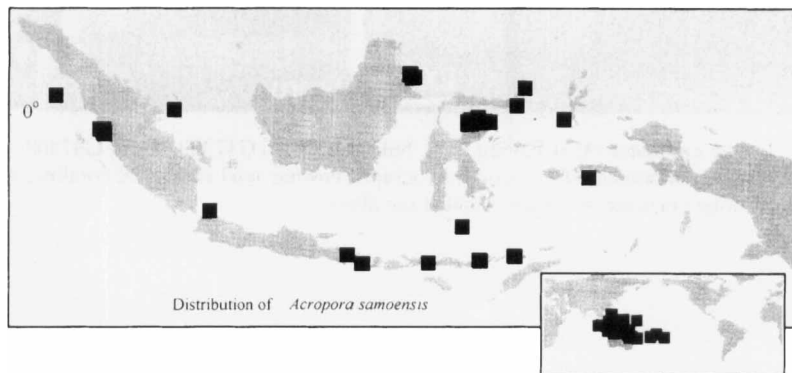


Figure 11. Distribution of *Acropora samoensis* in Indonesia (main map) and worldwide (inset).

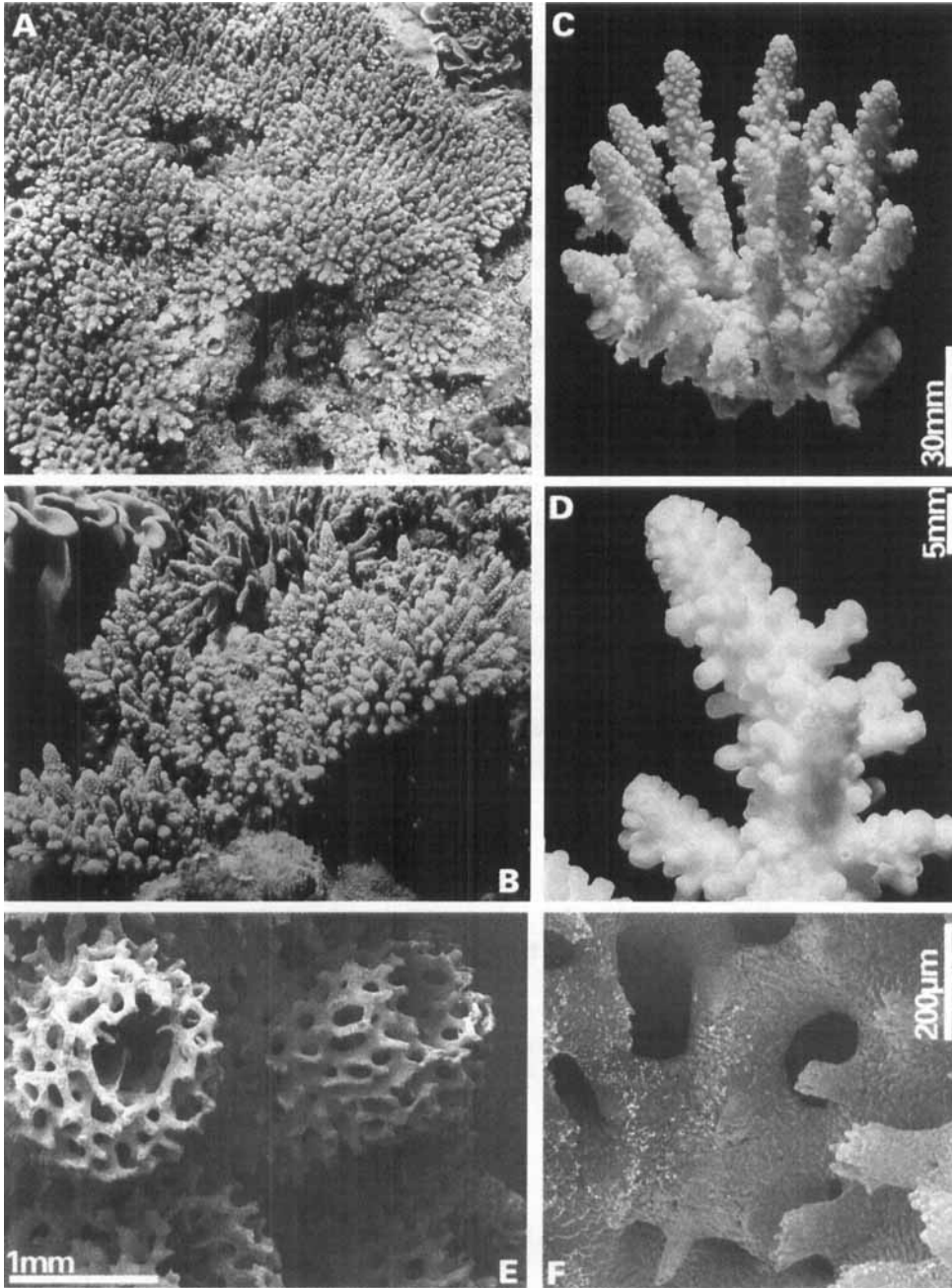


Figure 12. *Acropora samoensis* (A) at Lembongan I, S.E. Bali (B) at Bunaken I, N. Sulawesi; (C–F) G35979: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Caespitose to caespitose-corymbose, with central to side attachment; branches terete or only slightly tapering, up to 15 mm diameter.

Corallites. Axial corallites outer diameter 2.7–4.5 mm, inner diameter 0.8–1.8 mm, primary septa present up to 3/4R, secondary septa to 2/3R; radial corallites mostly not touching on branches, tubular with round to oblique or dimidiate openings, may be interspersed with immersed corallites, primary septa present up to 1/4R, secondary septa absent or a few just visible as points.

Coenosteum. Dense arrangement of laterally flattened elaborated spinules throughout; may appear costate on radial corallites.

Field characteristics

Colony caespitose-corymbose with frequent branching, branches terete (same thickness throughout) and not sturdy; radial corallites separate, not touching; known colours cream or pale brown; found subtidally on most reef locations to approximately 15 m depth.

Remarks

Unlike other members of the species group, the species is encountered on most reefs throughout Indonesia. It occurs in a broader depth range than all other species in the group.

Acropora (Acropora) digitifera (Dana, 1846)
(Figs 13, 14)

Madrepora digitifera Dana, 1846 p.454

Madrepora leptocyathus Brook, 1891 p.463; 1893 p.159 pl.16 fig.C

Madrepora brevicollis Brook, 1892 p.454; 1893 p.159 pl.27 figs A, B

Madrepora baedactyla Brook, 1892 p.453; 1893 p.158 pl.13 figs A, B

Acropora wardii Verrill, 1902 p.248 pl.36 fig.13 pl.36B fig.4 pl.36F fig.4

Material examined

W. SUMATRA: G48629–30 Padang; E. SUMATRA: G49803–13 Riau/Lingga Is;
KALIMANTAN: G39805, G39813–6 Pulau Laut; G50096, G50394, G50547–50 N.E.

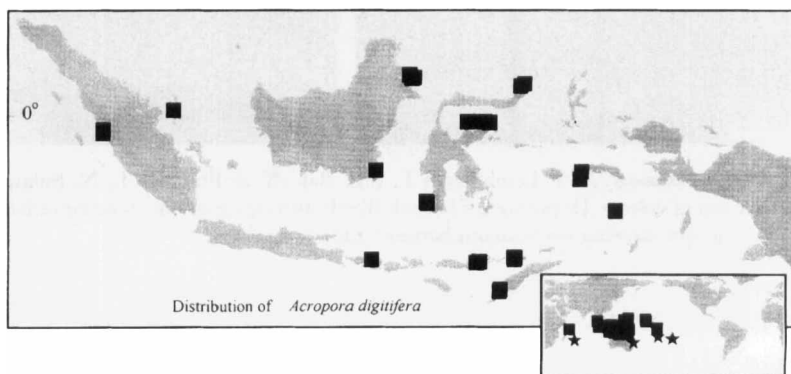


Figure 13. Distribution of *Acropora digitifera* in Indonesia (main map) and worldwide (inset).

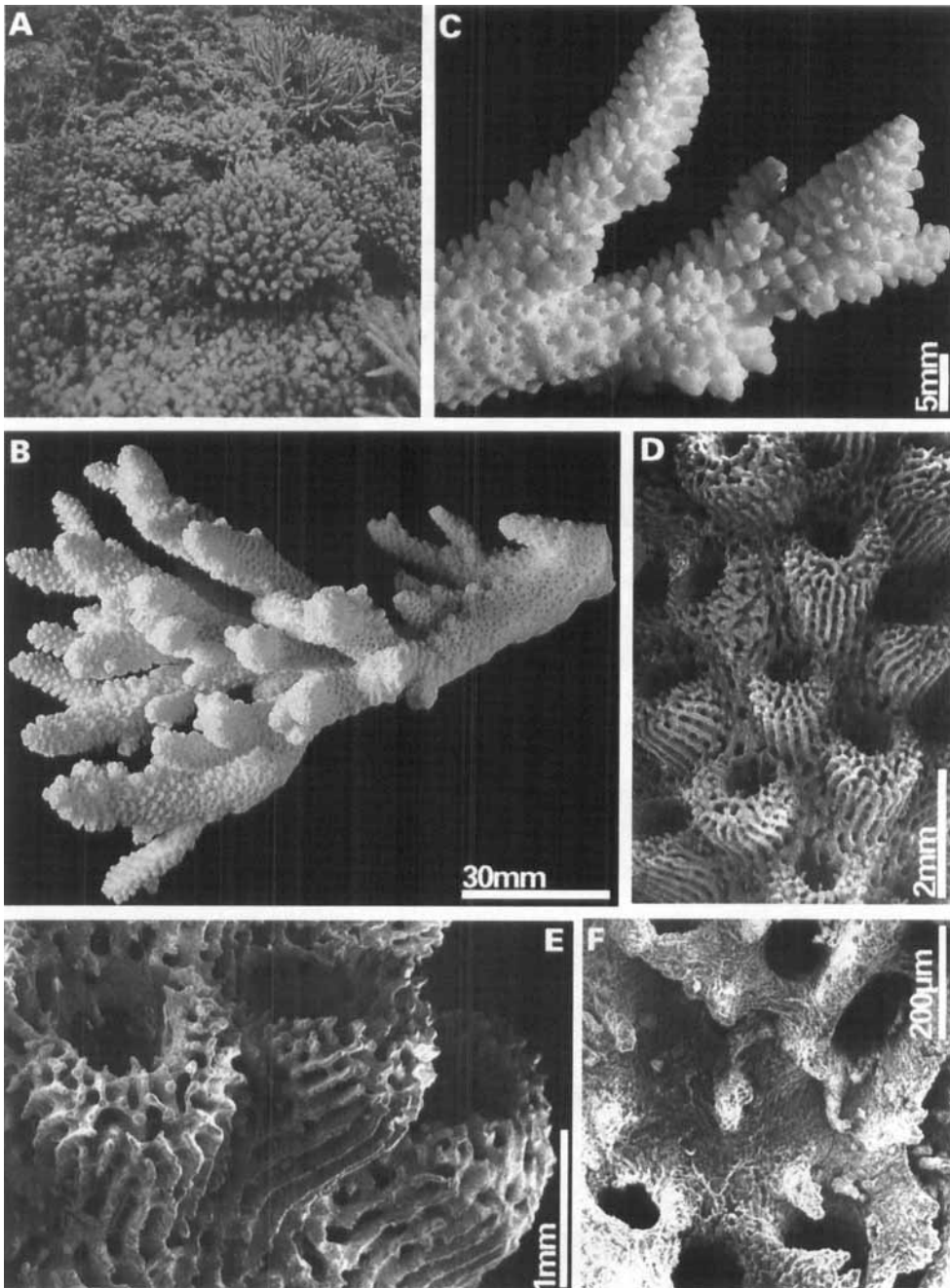


Figure 14. *Acropora digitifera* (A) at Bira Reef, Jakarta Bay, Java; (B–F) G39815: (B) portion of colony (C) portion of branches (D, E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Kalimantan; N. SULAWESI: G47541 Bunaken N.P.; G47540 Tg Torowitang; C. SULAWESI: G50542-6 Togian Is; S. SULAWESI: G47542-3 Spumonde Arch.; NUSA TENGGARA: G47544 Lombok; G48631-2, G50393 Flores; G48618, G48633-4 Kupang; G48635-7, G48619 Alor Is; BANDA SEA: G47035, G50810 Ambon I.; G48638 Manuk I.

Skeletal characteristics

Corallum. Digitate or corymbose; branches moderately tapering, up to 15 mm basal diameter.

Corallites. Axial corallites outer diameter 2.2-3.8 mm, inner diameter 0.6-1.6 mm, primary septa present up to 2/3R, secondary septa some to all present up to 1/4R; radial corallites dimidiate, evenly arranged close together, with thickened walls and little or no inner wall, so that lower wall looks like a lip, primary septa present up to 1/3R, secondary septa present up to 1/4R.

Coenosteum. On radial corallites a dense arrangement of laterally flattened elaborated spinules, sometimes in lines; dense reticulate with elaborate spinules in intercorallite areas.

Field characteristics

Colonies digitate to corymbose; branches thin relative to those of other members of group; radial corallites closely arranged on branches; known colours white, cream or pale brown, usually with blue tips; occurs intertidally on reef flats.

Remarks

This species often co-occurs with *Acropora pulchra* and sometimes *A. aspera* as a shallow-water assemblage on rubble flats close to coral cays or low islands. It is almost exclusively an intertidal species. Specimens from Indonesia differ from those in the Pacific in having radial corallites more distantly spaced (not touching) and the lip-like outer wall more accentuated.

Acropora (Acropora) multiacuta Nemenzo, 1967
(Figs 15, 16)

Acropora multiacuta Nemenzo, 1967 p.133 pl.39 figs 1-3

Material examined

C. SULAWESI: G48843-52, G50534 Togian Is; NUSA TENGGARA: G48387-9 Flores.

Skeletal characteristics

Corallum. Irregular caespito-corymbose colonies from a central to lateral base, with axial

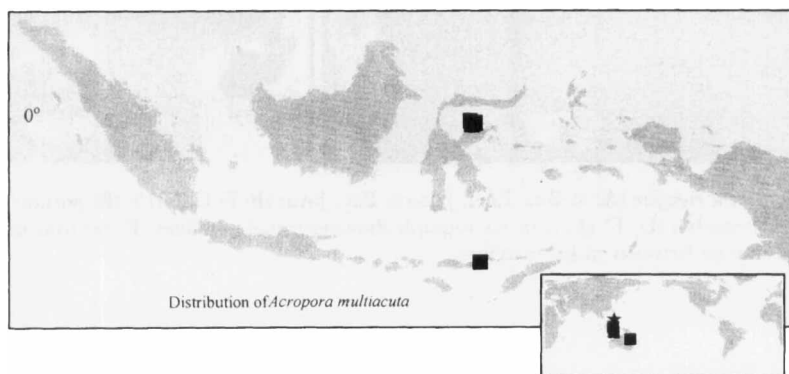


Figure 15. Distribution of *Acropora multiacuta* in Indonesia (main map) and worldwide (inset).

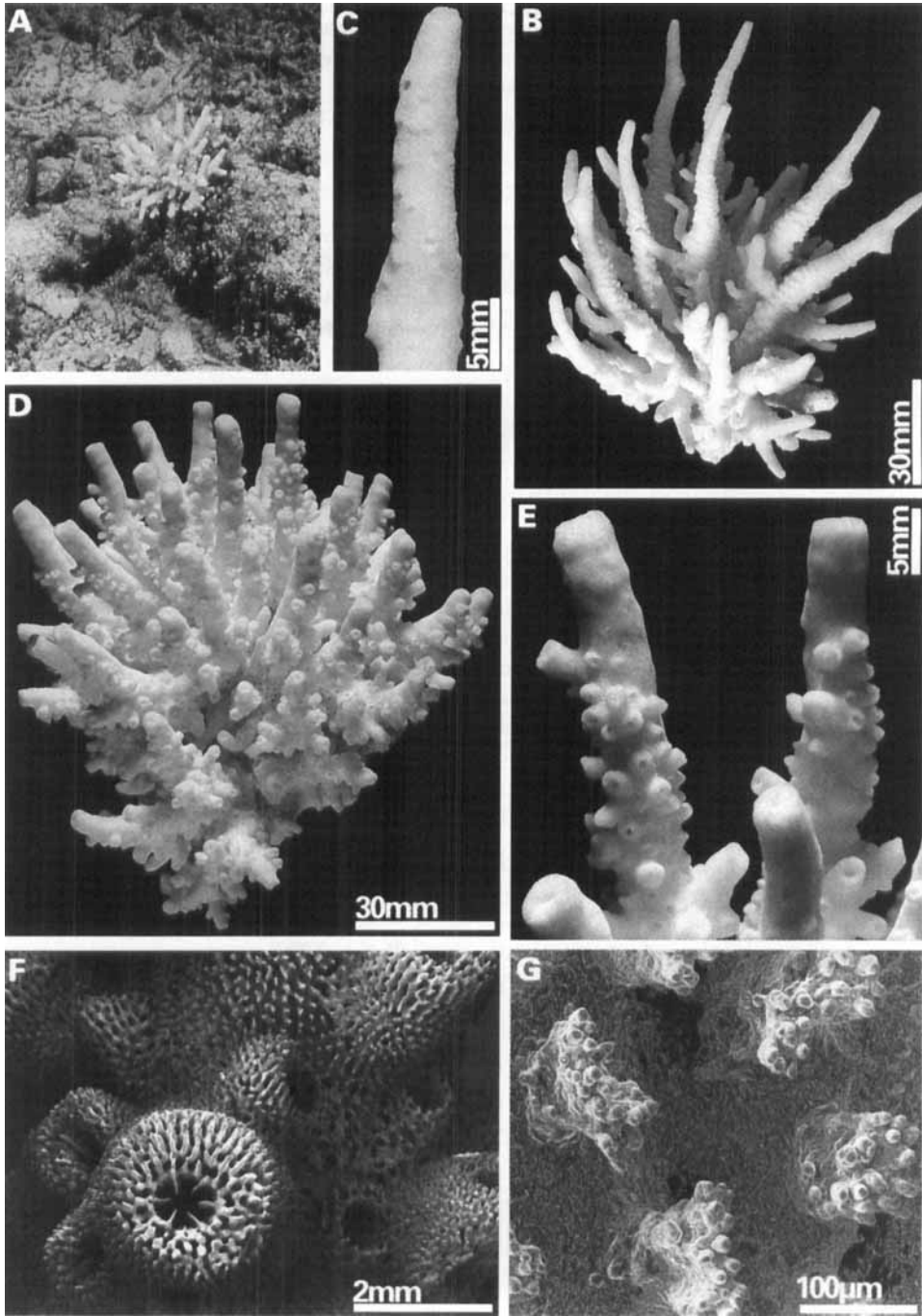


Figure 16. *Acropora multiacuta* (A) at Kojadoi Reef, Maumere Bay, Flores; (B, C, G) G48849; (D–F) G48389: (B, D) whole colony (C, E) portion of branches (F) electron micrograph showing axial and radial corallites (G) electron micrograph showing coenosteum between radial corallites.

corallites sturdy and prominent, sometimes to the extent that the entire branch or one side of a branch does not bear radial corallites; main branches up to 100 mm in length and 15 mm diameter at base (10 mm in Indonesian specimens); secondary branches or incipient branches without radial corallites may be clustered around the base of the primary branches.

Corallites. Axial corallites outer diameter 2.4–6.5 mm, inner diameter 0.6–2.0 mm, primary septa present up to 3/4R, secondary septa absent or some to all present up to 1/3R; radial corallites scattered, nariform, tubo-nariform or partly appressed tubular, often oriented with opening down or across branch, primary septa just visible as points, up to 1/4R, secondary septa absent or a few just visible as points.

Coenosteum. A dense arrangement of elaborated spinules, sometimes arranged in lines, throughout.

Field characteristics

Small colonies which appear digitate because of the large size of the primary branches relative to the secondary branches; known colours pale blue, pink, or whitish brown; occurs subtidally on submerged reef tops, ledges in walls and rocky slopes; often found in indentations or crevices in the reef surface.

Remarks

This species is extremely rare, being apparently absent on most Indonesian reefs. When it does occur, groups of colonies can be found, suggesting that some localised form of recruitment is involved. The Togian Islands specimens have more elongate and tapering branches than the Flores specimens, which in turn are generally thinner and more tapering than those recorded from the Great Barrier Reef (Wallace, 1978: 301; Veron & Wallace, 1984: 184).

The *Acropora loelli* group

Radial corallites evenly sized and shaped, appressed rounded tubular with large round openings. Coenosteum reticulate with simple spinules, sometimes arranged in rows or costae.

Acropora (Acropora) glauca (Brook, 1893)
(Figs 17, 18)

Acropora glauca Brook, 1893 p.164 pl.34 fig.D

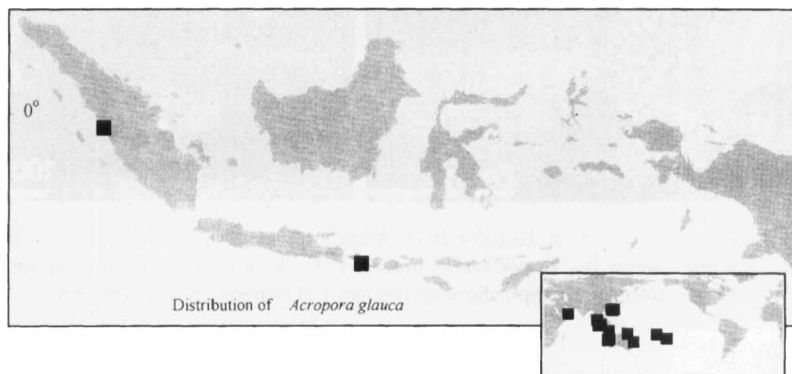


Figure 17. Distribution of *Acropora glauca* in Indonesia (main map) and worldwide (inset).

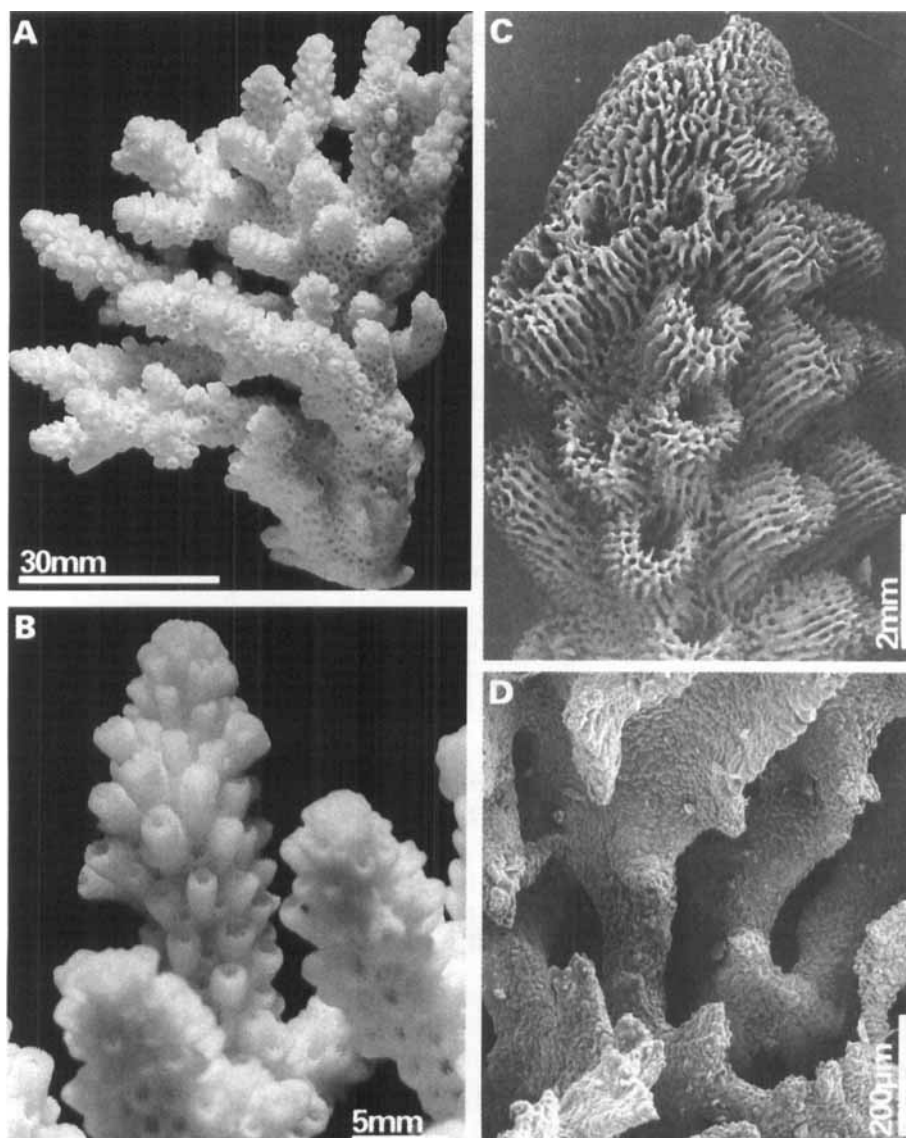


Figure 18. *Acropora glauca* (A–D) G46700: (A) portion of colony (B) portion of branches (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G49876 Padang; NUSA TENGGARA: G46700–1 Nusa Lembongan.

Skeletal characteristics

Corallum. Corymbose; branches short and terete up to 15 mm basal diameter.

Corallites. Axial corallites outer diameter 3.1–4.1 mm, inner diameter 1.0–1.3 mm, primary septa to 3/4R, secondary septa present up to 2/3R, occasionally a third cycle is partially

developed; radial corallites evenly distributed, equal shapes and sizes, appressed rounded tubular with large round openings, primary septa to $3/4R$, secondary septa to $1/2R$.

Coenosteum. Reticulate or finely costate throughout.

Field characteristics

Colonies corymbose to anastomosed corymbose plates; radial corallites very evenly shaped and arranged and just touching; known colour pale cream, brown or dark green; occurs subtidally on reef tops and upper slopes.

Remarks

This seems to be a species whose habitat preference is for rocky shores. It has not been located on coral cays, sandy reefs or reef walls.

The *Acropora robusta* group

Radial corallites dimorphic: long tubular corallites with dimidiate openings are interspersed with sub-immersed radial corallites; coenosteal structure dimorphic: costate on radials, reticulate in intercorallite areas.

Acropora (Acropora) robusta (Dana, 1846)
(Figs 19, 20)

Madrepora robusta Dana, 1846 p.475 pl.39 figs 3,3a pl.31 fig.3a-c

Madrepora conigera Dana, 1846 p.440 pl.32 figs 1,1a

Madrepora pacifica Brook, 1891 p.465; 1893 p.39 pl.30 fig.B

Madrepora ambigua Brook, 1892 p.451; 1893 p.70 pl.8 fig.C

Madrepora decipiens Brook, 1892 p.456; 1893 p.51 pl.14 figs B-D

Madrepora smithi Brook, 1893 p.34 pl.26 fig.B

Madrepora brooki Bernard, 1900 p.120

Acropora ponderosa Nemenzo, 1967 p.57 pl.20 figs 3,4

Material examined

W. SUMATRA: G47161 Nias I.; G48463-4, G48683 Padang; JAVA: G50749-50 Seribu Is; KALIMANTAN: G49337-41, G49720 N.E. Kalimantan; N. SULAWESI: G47550

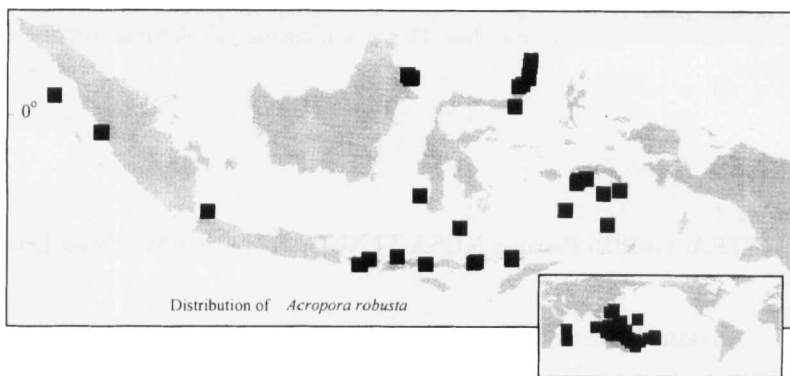


Figure 19. Distribution of *Acropora robusta* in Indonesia (main map) and worldwide (inset).

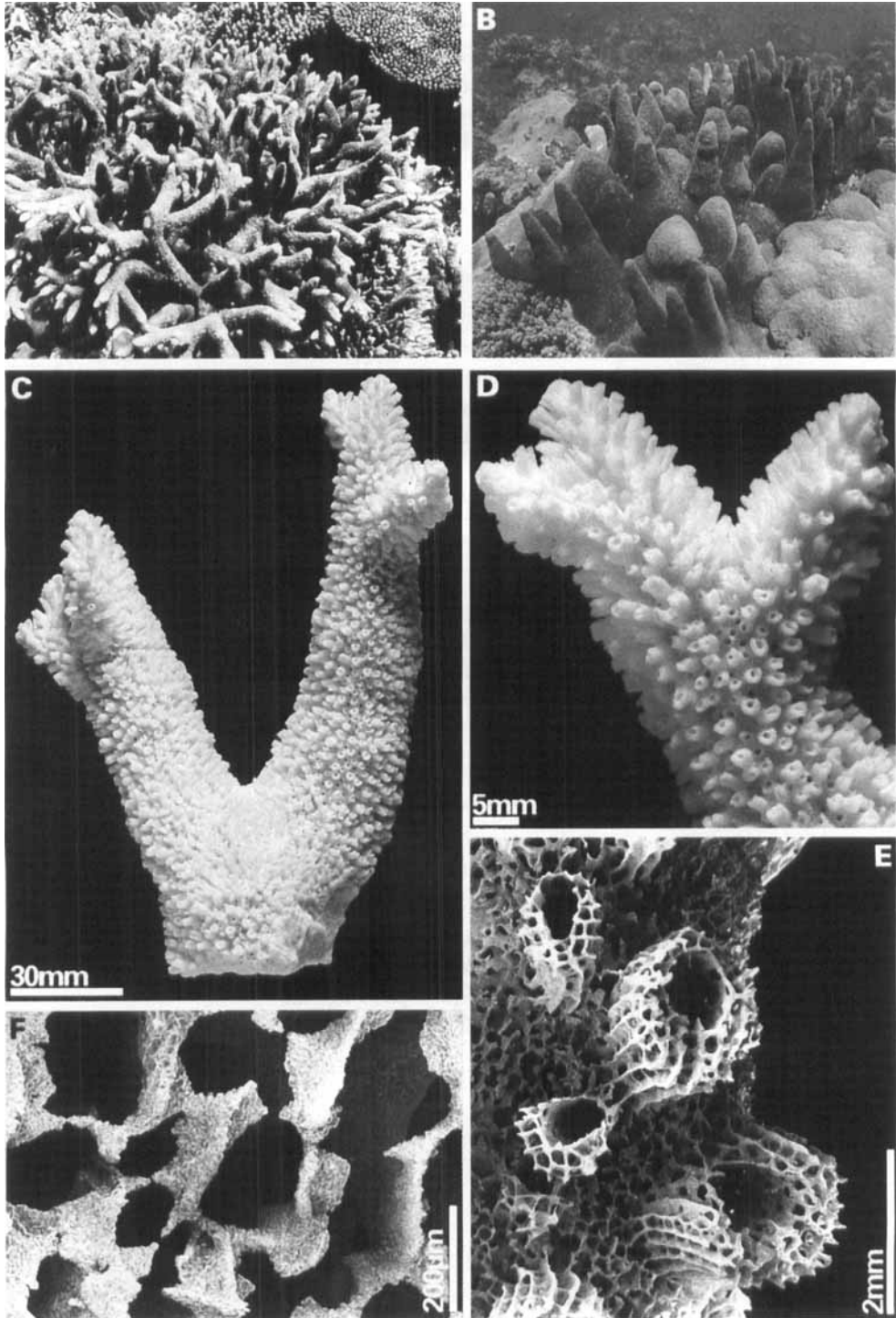


Figure 20. *Acropora robusta* (A) at Sangalalaki I., N.E. Kalimantan (B) at Sahaong I., Sangihe Is, N. Sulawesi; (C–F) G46997: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Bunaken N.P.; G49336 Tg Flesko; G47549 Tg Torowitang; G47545–8 Sangihe Is; S. SULAWESI: G50823 Spumonde Arch.; G50906 Taka'bonerate; NUSA TENGGARA: G49333–4 Nusa Penida; G49335 Nusa Lembongan; G47551 Lombok; G50907 Moyo; G50904–5 Komodo; G48465, G48684 Flores; G48466–8, G48682 Alor Is; BANDA SEA: G47000 Lucipara Is; G36177, G36215, G47036 Ambon I.; G46995 Nusa Laut; G46996 Suanggi I.; G46997–8 Banda Is; G46999 Serua I.

Skeletal characteristics

Corallum. Subarborescent, the branches broad (up to 40 mm basal diameter); peripheral branches elongate, up to 250 mm long; central branches may be conical and even appear digitate.

Corallites. Axial corallites outer diameter 2.1–4.0 mm, inner diameter 0.5–1.5 mm (Indonesian specimens with smaller calice diameter than Pacific specimens), primary septa present up to 3/4R, secondary septa to 1/3R; radial corallites dimorphic: long tubular corallites with dimidiate openings are interspersed with sub-immersed forms: dimorphism not obvious on digitate central branches, but distinctive towards branch tips, primary septa of large radials present to 1/2R, secondary septa just visible as points in Indonesian specimens.

Coenosteum. Costate on radial corallites; reticulate with occasional simple spinules in intercorallite areas.

Field characteristics

Sturdy low subarborescent colonies with digitate central branches and curving peripheral branches; known colours green with pink branch tips or pale brown; occurs intertidally or just subtidally on shallow reef tops and edges.

Remarks

This is a common Indo-Pacific coral which does not vary greatly throughout its range. It is restricted to shallow, mostly intertidal habitats.

Acropora (Acropora) danai (Edwards & Haime, 1860)

(Figs 21, 22)

Madrepora deformis Dana, 1846 (non Michelin) p.484 pl.43 fig.1

Madrepora danai Edwards & Haime, 1860 p.560

Madrepora irregularis Brook, 1892 p.458; 1893 p.50 pl.14 figs E,F

Madrepora rotumana Gardiner, 1898 p.258 pl.23 fig.2

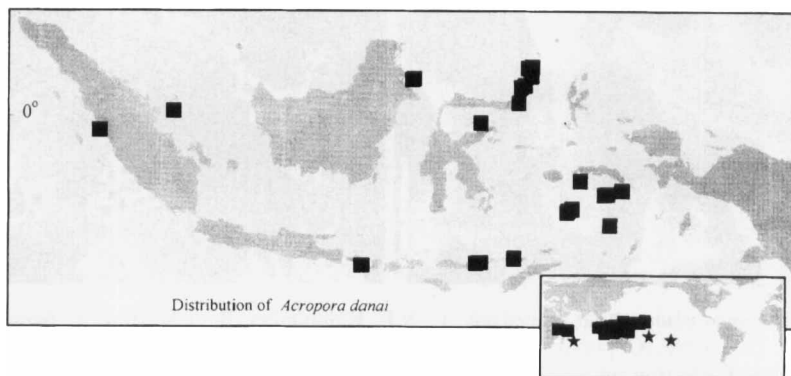


Figure 21. Distribution of *Acropora danai* in Indonesia (main map) and worldwide (inset).

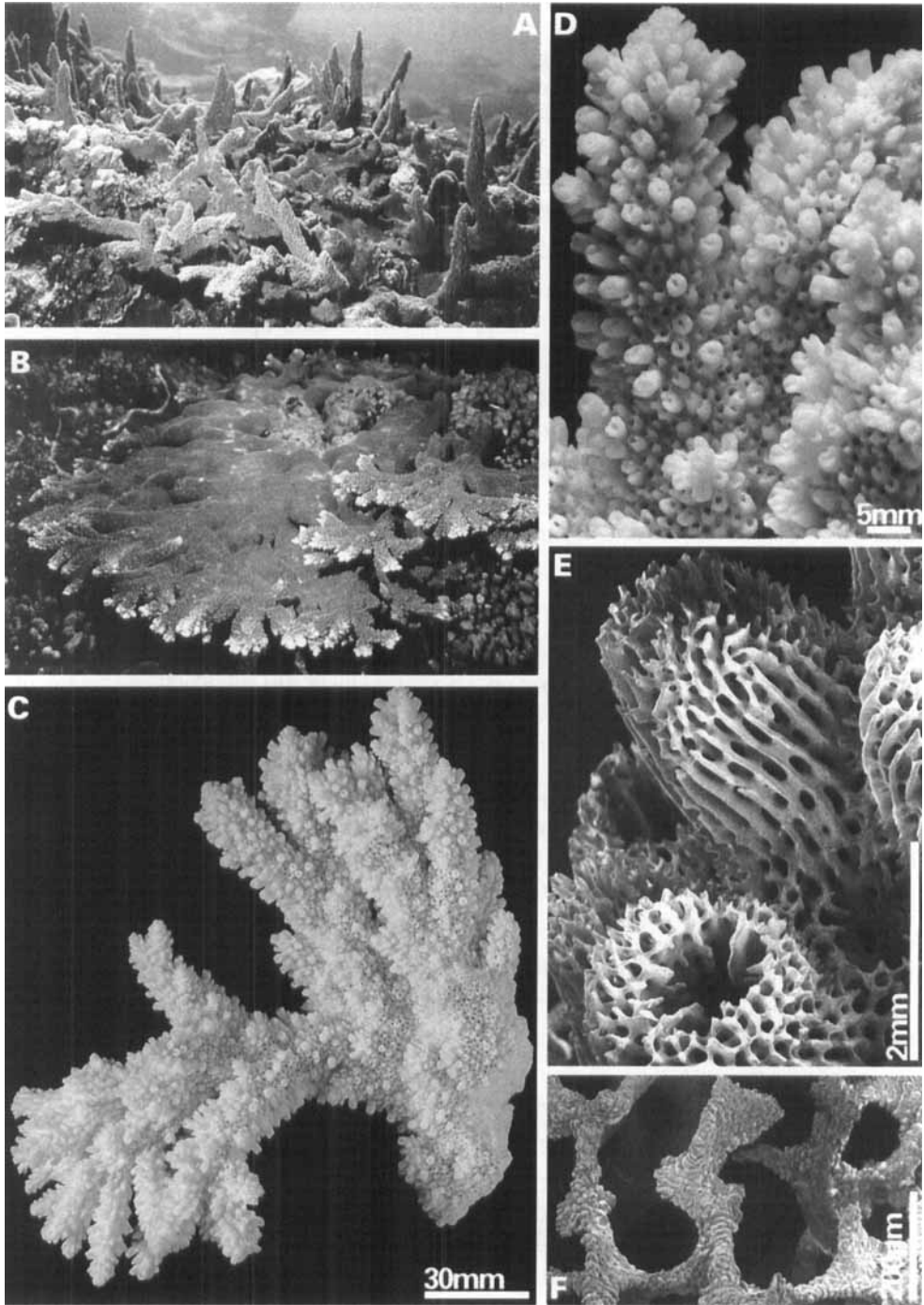


Figure 22. *Acropora danai* (A, B) at Siau I., Sangihe Is, N. Sulawesi; (C-F) G46694: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G48470 Padang; E. SUMATRA: G49871 Riau/Lingga Is; KALIMANTAN: G49350–1 N.E. Kalimantan; N. SULAWESI: G47457 Bunaken N.P.; G49352 Batong I.; G47456 Tg Torowitang; G47451–5 Sangihe Is; C. SULAWESI: G50373 Togian Is; NUSA TENGGARA: G49353 Nusa Penida; G46694 Nusa Lembongan; G48469, G48471–2 Flores; G48473–5 Alor Is; BANDA SEA: G46977 Sekaro I.; G46978–82 Lucipara Is; G46983 Ambon I.; G46974 Suanggi I.; G46975, G47450 Banda Is; G46976 Serua I.

Skeletal characteristics

Corallum. Low arborescent with broad branches up to 40 mm diameter, which extend mostly horizontally and proliferate into small, fused branchlets at their tips.

Corallites. Axial corallites outer diameter 2.0–2.5 mm, inner diameter 0.7–1.2 mm, primary septa to 2/3R, secondary septa to 1/4R; radial corallites dimorphic: long tubular corallites with dimidiate openings are interspersed with sub-immersed forms, dimorphism most obvious towards edge of colony, primary septa to 1/3R, secondary septal cycle incomplete to 1/4R or absent.

Coenosteum. Costate on radial corallites; reticulate with occasional spinules in intercorallite areas.

Field characteristics

Colonies consist of thick main branching units which proliferate distally as short branchlets; known colours brown or pinkish-brown; occurs intertidally or just subtidally on shallow reef tops and edges.

Remarks

This species co-occurs with *A. robusta*: the two species are very similar in all characters except the proliferation of small branches at the branch tips in *A. danai*, and *A. danai* never has the green/pink colouration. On Indonesian reefs, *Acropora danai* is the more common species, although neither species occurs as commonly as on Pacific reefs.

Acropora (Acropora) palmerae Wells, 1954

(Figs 23, 24)

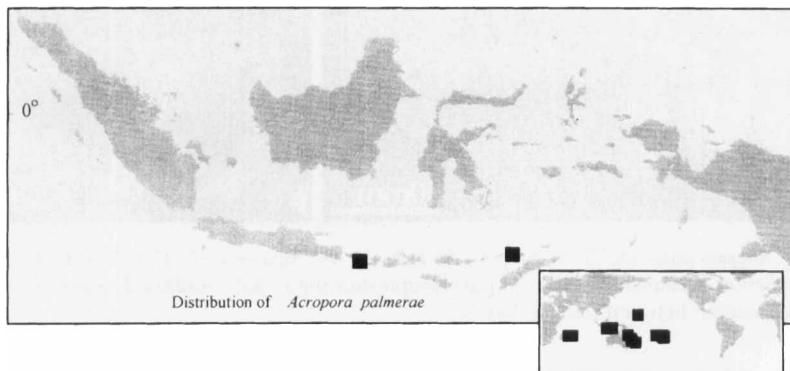
Acropora palmerae Wells, 1954 p.410 pl.113 figs 1–3

Figure 23. Distribution of *Acropora palmerae* in Indonesia (main map) and worldwide (inset).

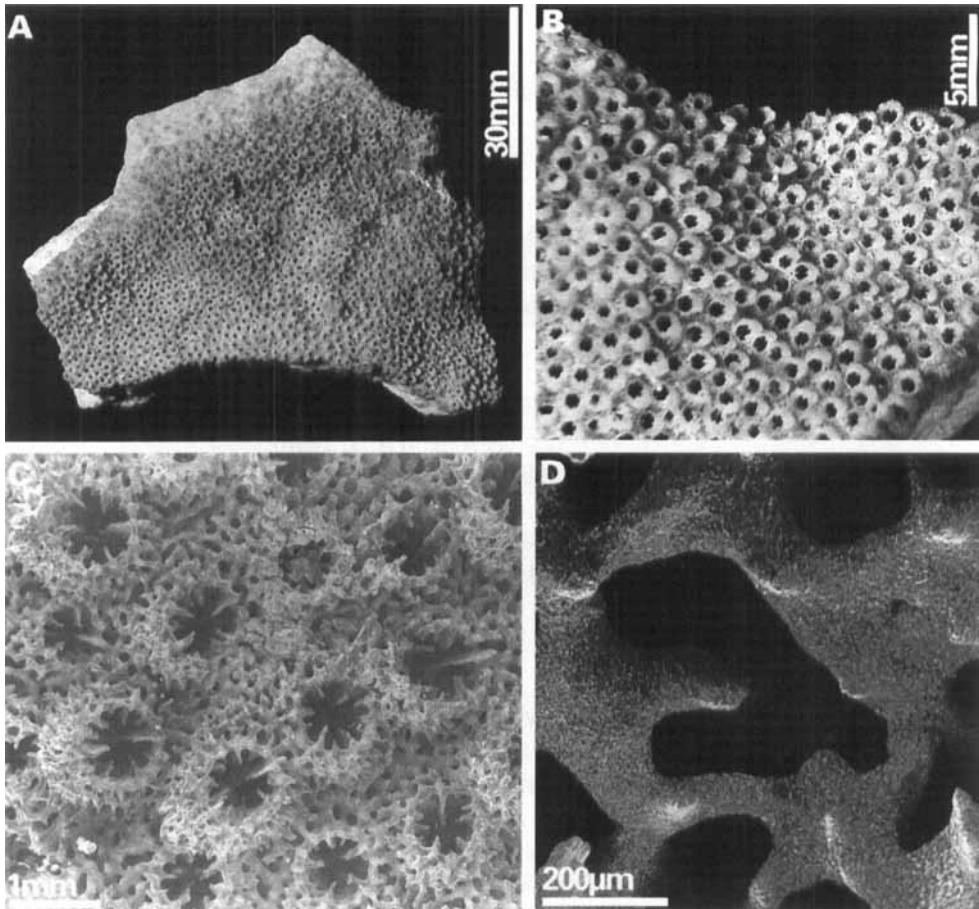


Figure 24. *Acropora palmerae* (A, B) G49359; (C, D) G49361: (A) portion of colony (B) close-up of colony (C) electron micrograph showing radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Material examined

NUSA TENGGARA: G49361 Nusa Lembongan; G49359–60 Alor Is.

Skeletal characteristics

Corallum. Encrusting, with an occasional short branch developed in some colonies.

Corallites. Axial corallites if present outer diameter 2.1–2.8 mm, inner diameter 0.9–1.3 mm, primary septa present up to $1/2R$, secondary septa to $1/4R$ (not observed in Indonesian specimens); radial corallites showing the dimorphic character in some parts of colony, but mostly sub-immersed with nariform or just discernible dimidiate openings; primary septa of large radial corallites present up to $1/2R$, secondary septa just visible as points in Indonesian specimens.

Coenosteum. Costate on radial corallites; reticulate with occasional simple spinules in inter-corallite areas.

Field characteristics

Sturdy encrusting colonies, up to 2 m diameter; known colours bright green or brown; occurs intertidally or subtidally on shallow reef tops and edges, especially in regions of strong current.

Remarks

There remains some doubt as to whether this is a separate species or simply a strong-water form of *Acropora robusta*. All specimens examined occurred in habitats experiencing strong currents, where this species was abundant, co-occurring with an encrusting form of *A. palifera*.

Acropora (Acropora) intermedia (Dana, 1846)
(Figs 25, 26)

Madrepora intermedia Brook, 1891 p.463; 1893 p.31 pl.1 fig.C

Acropora vanderhorsti Hoffmeister, 1925 p.70 pl.18 fig.2

Material examined

W. SUMATRA: G48568–9, G48685–6, G49149–53 Padang; E. SUMATRA: G49815–8 Riau/Lingga Is; JAVA: G32839, G32844, G50721–7 Seribu Is; KALIMANTAN: G49161–3, G49294, G49349, G50910 N.E. Kalimantan; N. SULAWESI: G35519–21, G35813–4, G47429–30, G48161 Bunaken N.P.; G47428 Tg Torowitang; G47426 Tg Pulisan; G47419–25, G47427, G48157 Sangihe Is; C. SULAWESI: G49158–60 Togian Is; S. SULAWESI: G47418, G47431, G50808–9 Spumonde Arch.; G43816 Taka'bonerate; NUSA TENGGARA: G49164 Bali; G49156 Nusa Penida; G46702, G49157 Nusa Lembongan; G47432–3, G47842 Lombok; G50909 Moyo; G48570–3, G48687, G48688, G49154 Flores; G48574, G48689 W. Timor; G48575–81, G48690–1, G49155 Alor Is; BANDA SEA: G47027 Sekaro I.; G47028 Ambon I.; G47026 Suanggi Is; G47001, G47131, G47417 Banda Is; IRIAN JAYA: G36043 Batanta I.

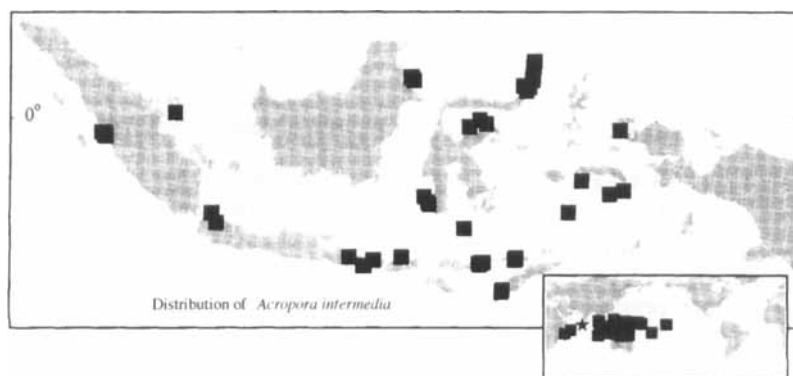
Skeletal characteristics

Figure 25. Distribution of *Acropora intermedia* in Indonesia (main map) and worldwide (inset).

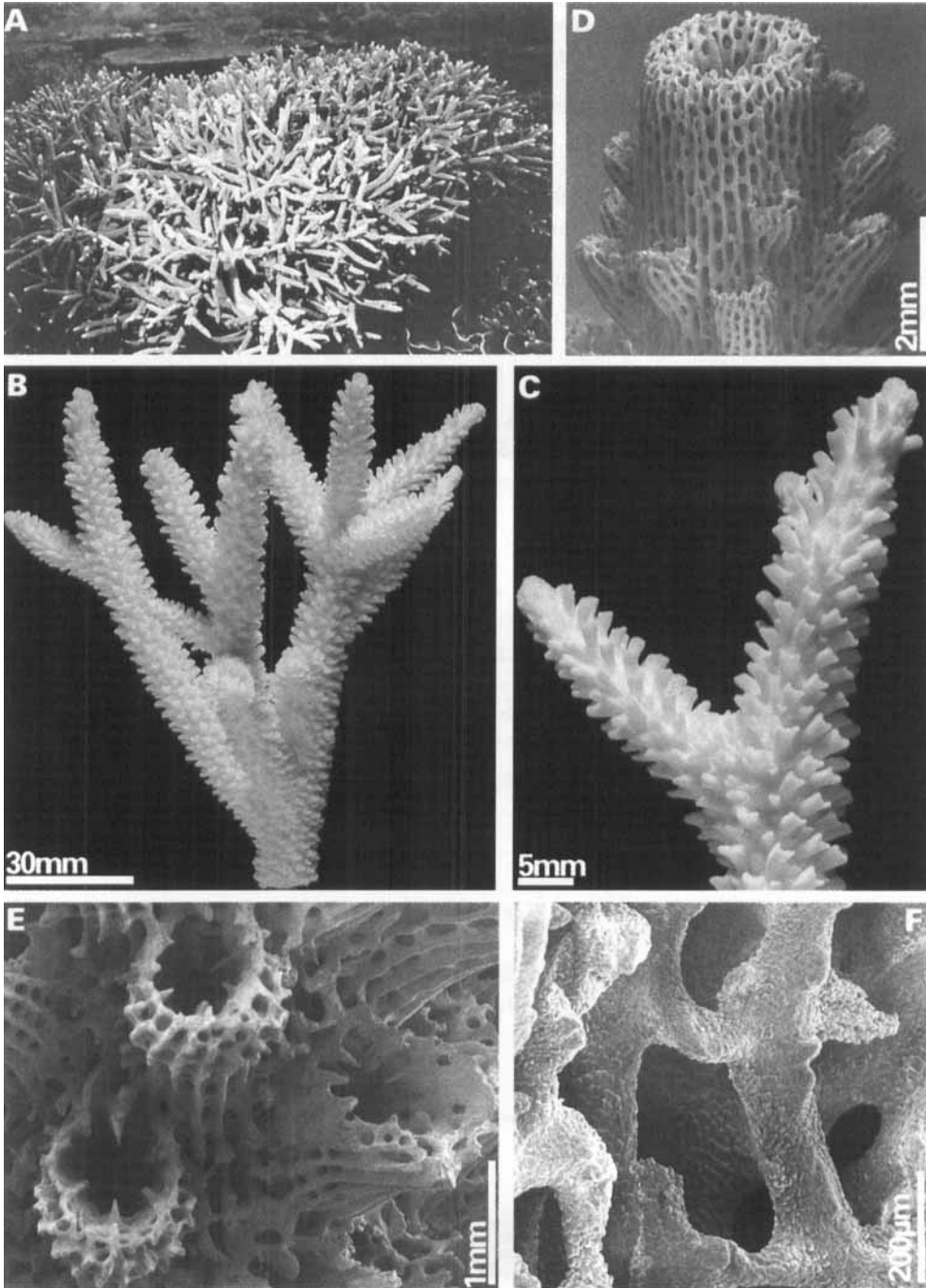


Figure 26. *Acropora intermedia* (A) at Siau I., Sangihe Is, N. Sulawesi; (B–F) G47423: (B) portion of colony (C) portion of branches (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Corallum. Arborescent, with branches given off at wide angles (45° to 90°); branches with basal diameters up to 25 mm and tapering gradually.

Corallites. Axial corallites outer diameter 2.5–4.0 mm, inner diameter 0.8–1.5 mm, primary septa present up to $3/4R$, secondary septa from absent to $1/4R$; radial corallites dimorphic: long tubular radial corallites with dimidiate or oblique openings, primary septa to $2/3R$, secondary septa to $1/4R$ (less well developed in Indonesian specimens); between these are immersed corallites in which septa are hardly visible.

Coenosteum. Smooth costate on radial corallites; reticulate with occasional simple spinules in intercorallite areas.

Field characteristics

Arborescent, forming compact colonies or large thickets; radial corallite dimorphism and the dimidiate openings of large radials clearly visible under water; known colours cream, brown, pale green or blue; occurs subtidally in most reef locations to around 18 m deep.

Remarks

This species was recorded as *Acropora nobilis* (Dana, 1846) by Veron & Wallace (1984: 214) and as *A. intermedia* in Wallace (1978: 280). Reasons for re-instating the use of *A. intermedia* are given in Wallace & Dai (1997: 298). *Acropora nobilis* (Dana, 1846) is not a synonym. The Indonesian specimens of this species are generally less heavily calcified, with septa less well developed, than the Pacific specimens. Although commonly encountered, this species is not as strong a reef-builder on Indonesian reefs as it is on Pacific reefs, often being replaced by *A. austera* or *A. brueggemanni* as an abundant thicket-former.

Acropora (Acropora) polystoma (Brook, 1891) (Figs 27, 28)

Madrepora polystoma Brook, 1891 p.466; 1893 p.112 pl.19 fig.A
Acropora massawensis von Marenzeller, 1907 p.54, pl.17 figs 49,50

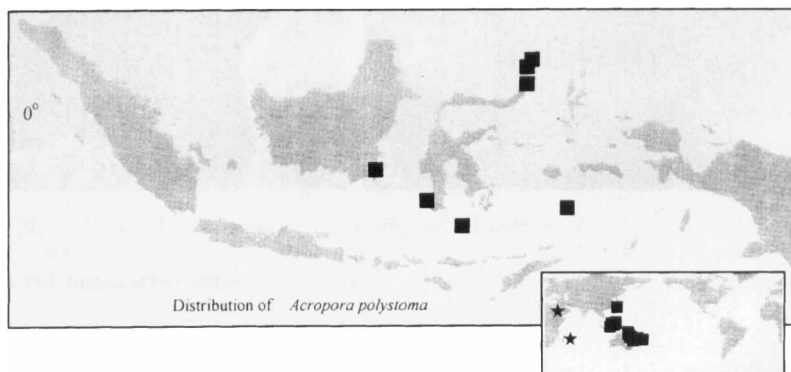


Figure 27. Distribution of *Acropora polystoma* in Indonesia (main map) and worldwide (inset).

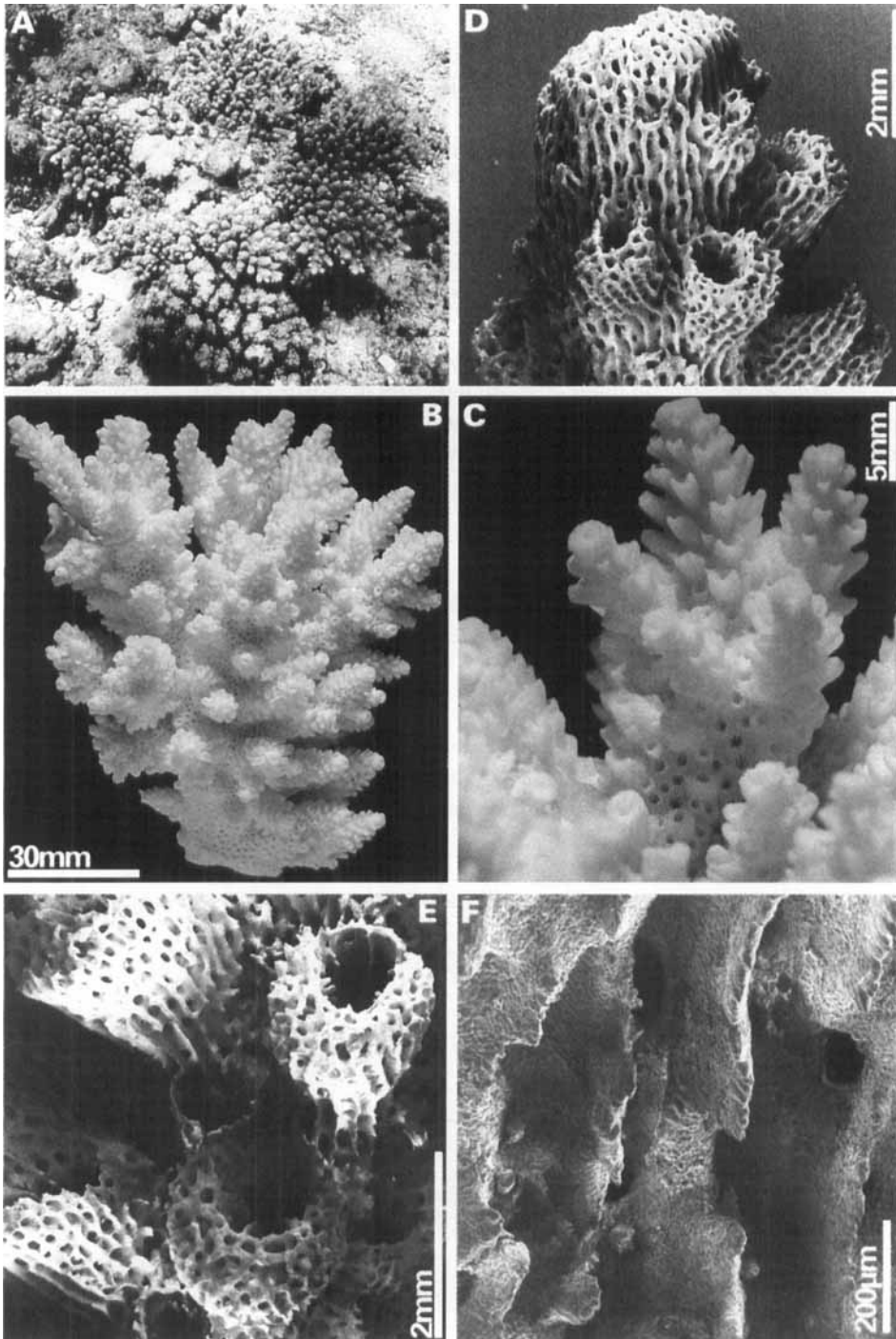


Figure 28. *Acropora polystoma* (A) at Tg Torowitang, N. Sulawesi; (B–F) G39817: (B) portion of colony (C) portion of branches (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

KALIMANTAN: G39817 Pulau Laut; G50385–6, G50889 N.E. Kalimantan; N. SULAWESI: G50382 Bunaken N.P.; G50384 Tg Torowitang; G47552–3, G47555, G49348 Sangihe Is; G47556 Tg Pisok; G47554 Tg Pulisan; C. SULAWESI: G50383, G50540 Togian Is; S. SULAWESI: G47253 Spumonde Arch.; G43812–4 Taka'bonerate; NUSA TENGGARA: G50541 Bali; G50539 Nusa Penida; BANDA SEA: G46843 Lucipara Is.

Skeletal characteristics

Corallum. Tabulate or side-attached corymbose; short, thick branchlets up to 15 mm in basal diameter given off from basal stem or horizontal branches.

Corallites. Axial corallites outer diameter 2.5–4.0 mm, inner diameter 0.8–1.5 mm, primary septa present up to 3/4R, secondary septa absent or some to all present up to 1/3R; radial corallites dimorphic: long tubular radial corallites with dimidiate or oblique openings, primary septa to 1/4R, secondary septa absent to just visible as points; between these are sub-immersed radials in which septa are hardly visible.

Coenosteum. Costate on radial corallites; reticulate with occasional simple spinules in intercorallite areas.

Field characteristics

Colonies are small to medium sized (maximum 800 mm diameter) with an irregular tabletop; known colours lavender or brown; occurs intertidally or just subtidally on shallow reef tops and edges.

Remarks

This species appears to be confined to reef-edge habitats with good water circulation. Because it is uncommon, it is not easily identified to species in the field: its radial corallites can be seen to be of the *A. robusta* group type when viewed under the microscope.

Acropora (Acropora) listeri (Brook, 1893)
(Figs 29, 30)

Madrepora listeri Brook, 1893 p.53 pl.30 figs C,D

Material examined

N. SULAWESI: G35527 Bunaken N.P.; C. SULAWESI: G49345–6 Togian Is; BANDA SEA: G47003 Banda Is.

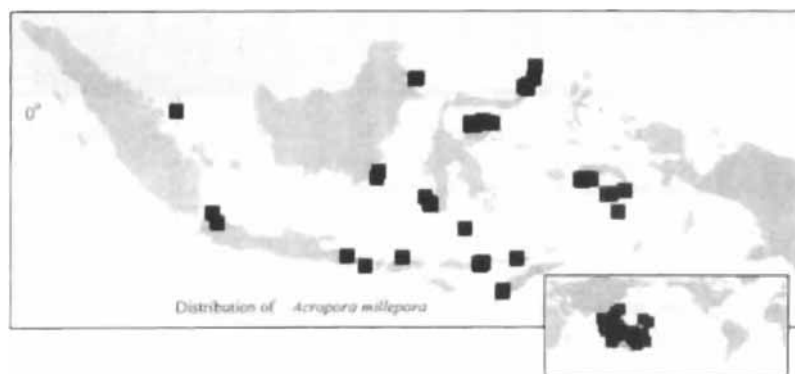


Figure 29. Distribution of *Acropora listeri* in Indonesia (main map) and worldwide (inset).

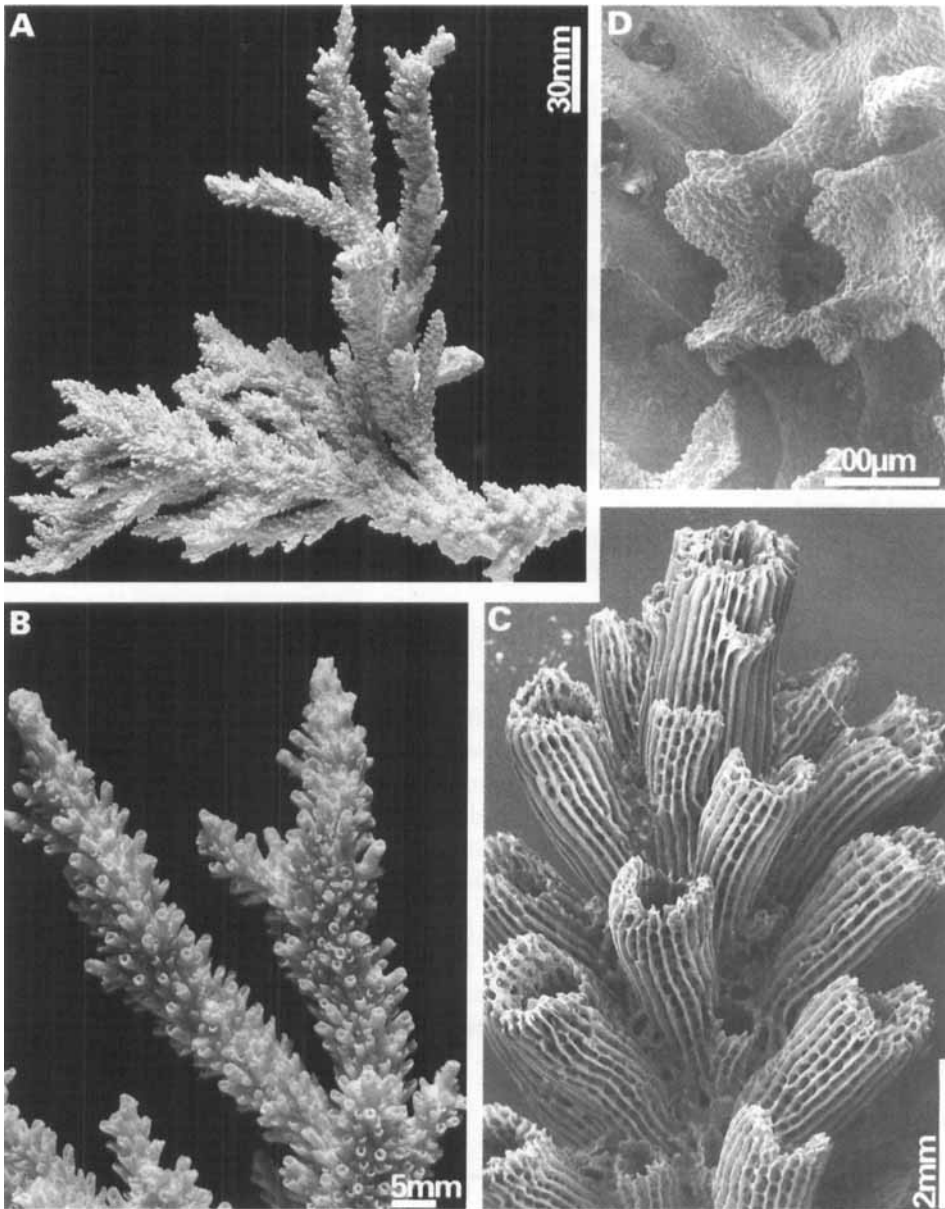


Figure 30. *Acropora listeri* (A–D) G47003: (A) portion of colony (B) portion of branch (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Irregular sub-arborescent to corymbose; branches irregular in length and diameter and may have incipient branchlets developed around them.

Corallites. Axial corallites outer diameter 1.3–4.0 mm, inner diameter 0.6–1.0 mm; radial corallites dimorphic: long tubular radial corallites with mostly upwardly extended oblique or dimidiate openings, primary septa to $2/3R$, secondary septa to $1/4R$.

Coenosteum. Costate on radial corallites; reticulate with occasional spinules in intercorallite areas.

Field characteristics

Low, sturdy irregular colonies up to 500 mm in diameter; known colours cream or brown; occurs just subtidally on shallow reef edges.

Remarks

Like *Acropora polystoma*, this species is not easily identified in the field and it appears to be uncommon in Indonesia, being restricted to reef edge situations.

Acropora (Acropora) sukarnoi Wallace, 1997
(Figs 31, 32)

Acropora sukarnoi Wallace, 1997 p.30 fig.3

Material examined

W. SUMATRA: G49283–4 Padang; NUSA TENGGARA: G50903 Komodo; G48827–31, G48832 (HOLOTYPE) Nusa Lembongan; G48493–502, G48559, G48833, G49285–6, G50103, G50528 Alor Is.

Skeletal characteristics

Corallum. Plate or table with laterally flattened branches extending mostly horizontally or sub-horizontally; sometimes cylindrical, proliferating branches extend vertically, usually at the centre of the table; branch diameter up to 30 mm within the table, narrower than this towards the circumference of the table. From the branches, small branchlets or incipient branchlets (one axial corallite with a few radial corallites surrounding it) are given off at regular intervals so that the branching pattern is hispidose, but not obviously so, because the branchlets are so short and narrow in relation to the branches.

Corallites. Axial corallites outer diameter 2.3–3.0 mm, inner diameter 0.7–1.5 mm, primary septal cycle present up to 2/3R, secondary septa to 1/3R; radial corallites tubular with dimidiate openings, in a range of sizes from fully exsert to immersed, with thickened lower wall: primary septa present up to 2/3R, secondary septa present up to 1/4R, or just visible as points.

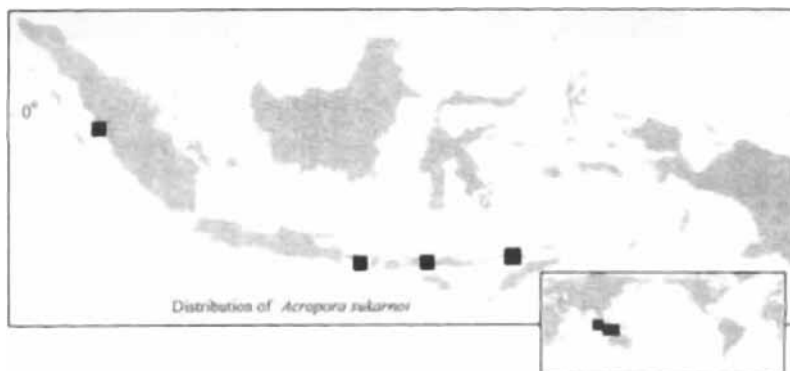


Figure 31. Distribution of *Acropora sukarnoi* in Indonesia (main map) and worldwide (inset).

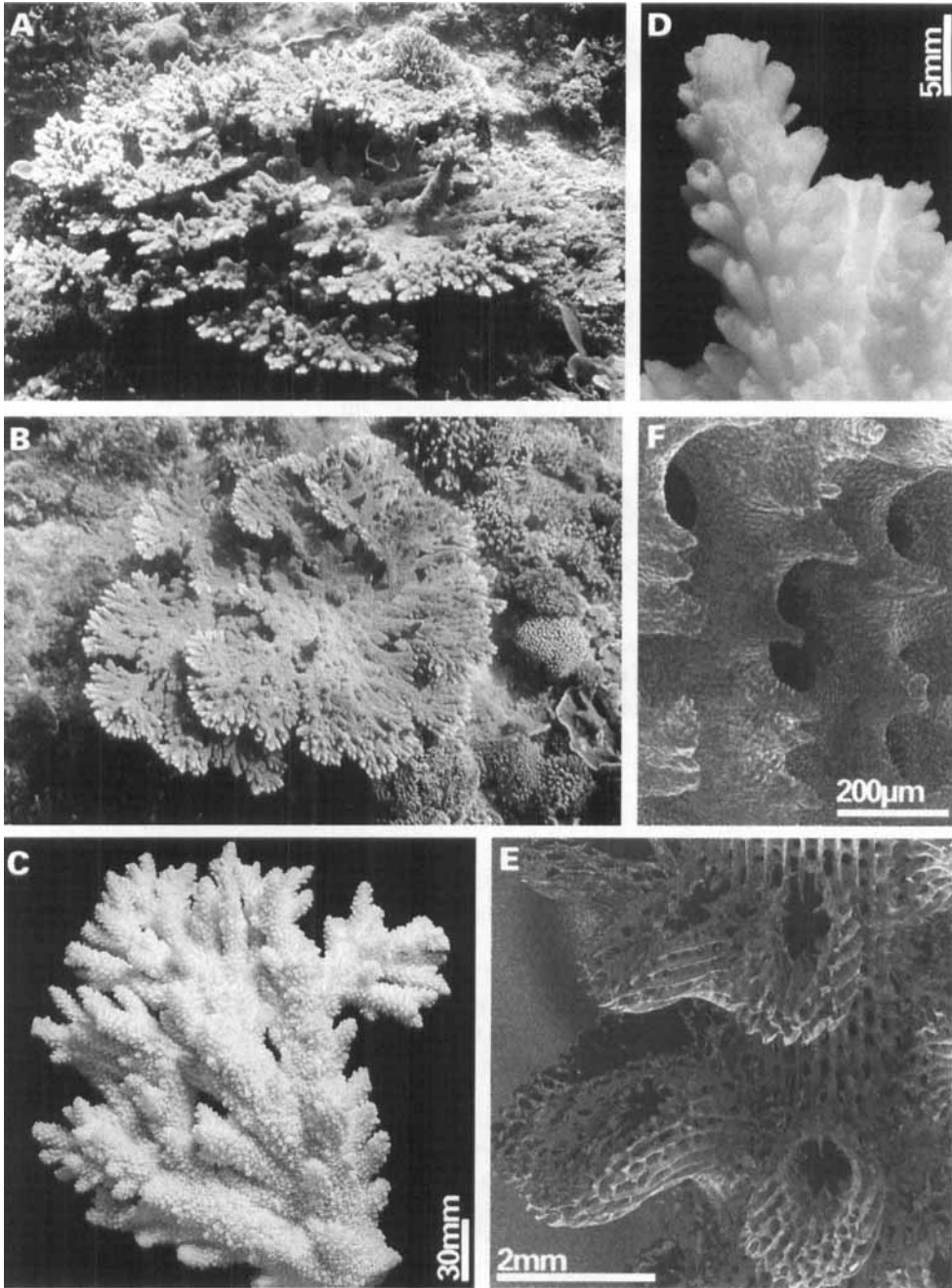


Figure 32. *Acropora sukarnoi* (A, B) at Lembongan I, S.E. Bali; (C, D) holotype G48832; (E, F) paratype G48497: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Coenosteum. Costate or lines of simple spinules on radial corallites; reticulate with simple spinules in intercorallite areas.

Field characteristics

Colonies occur as stalked tables or side-attached plates, up to approximately 1.5 m in diameter; known colours lavender-blue, blue, cream with blue tips, pink, pinkish brown, brown or green; occurs subtidally on submerged reefs.

Remarks

From skeletons, *Acropora sukarnoi* is most like *A. danai*, from which it is most clearly distinguished by the presence of regularly distributed branchlets. The two species appear distinctly different in the field.

The *Acropora formosa* group

Open arborescent branching mode, corallites tubular (no other distinctive features: this is probably not a monophyletic group).

Acropora (Acropora) formosa (Dana, 1846)
(Figs 33, 34)

Madrepora formosa Dana, 1846 p.473 pl.38 fig.4 pl.31 figs 2a,b

Madrepora arbuscula Dana, 1846 p.474 pl.40 fig.2

Madrepora virgata Dana, 1846 p.471 pl.39 fig.1

Madrepora repens Rehberg, 1892 p.36 pl.4 fig.8

Madrepora stellulata Verrill, 1902 p.238 pl.36C fig.3 pl.36F fig.10

Material examined

W. SUMATRA: G47159 Nias I.; G49176-9, G49427-8 Padang; JAVA: G32851 Jakarta; G50705-20 Seribu Is; KALIMANTAN: G49197-204, G49275, G49440-4, G50912-5 N.E. Kalimantan; N. SULAWESI: G49191 Tg Dodepo; G48207-14, G49170, G49426 Bunaken N.P.; G48206 Tg Torowitang; G48201-2, G48204 Tg Pulisan; G48195-200, G48203, G48205, G49168-9, G49422-5 Sangihe Is; C. SULAWESI: G49192-6, G49433-9 Togian Is; S. SULAWESI: G48215-8, G49171, G49175, G49206, G50824-9 Spumonde Arch.; G43811 Taka'bonerate; NUSA TENGGARA: G49205, G50222 Bali; G48219-20, G49172-4 Lombok; G50916 Moyo; G49180-4, G49429, G50917 Flores; G49185-8,

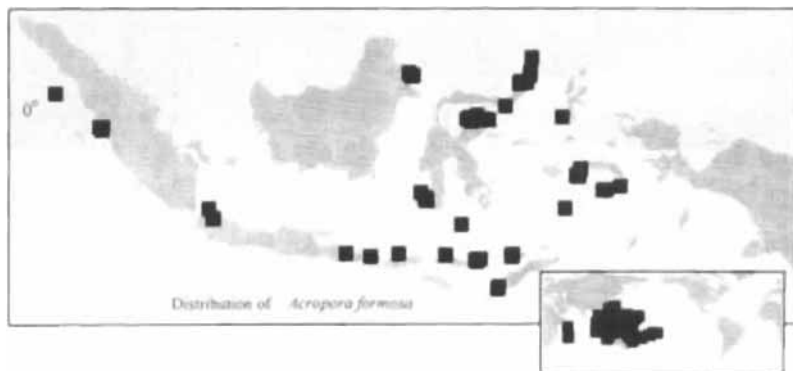


Figure 33. Distribution of *Acropora formosa* in Indonesia (main map) and worldwide (inset).

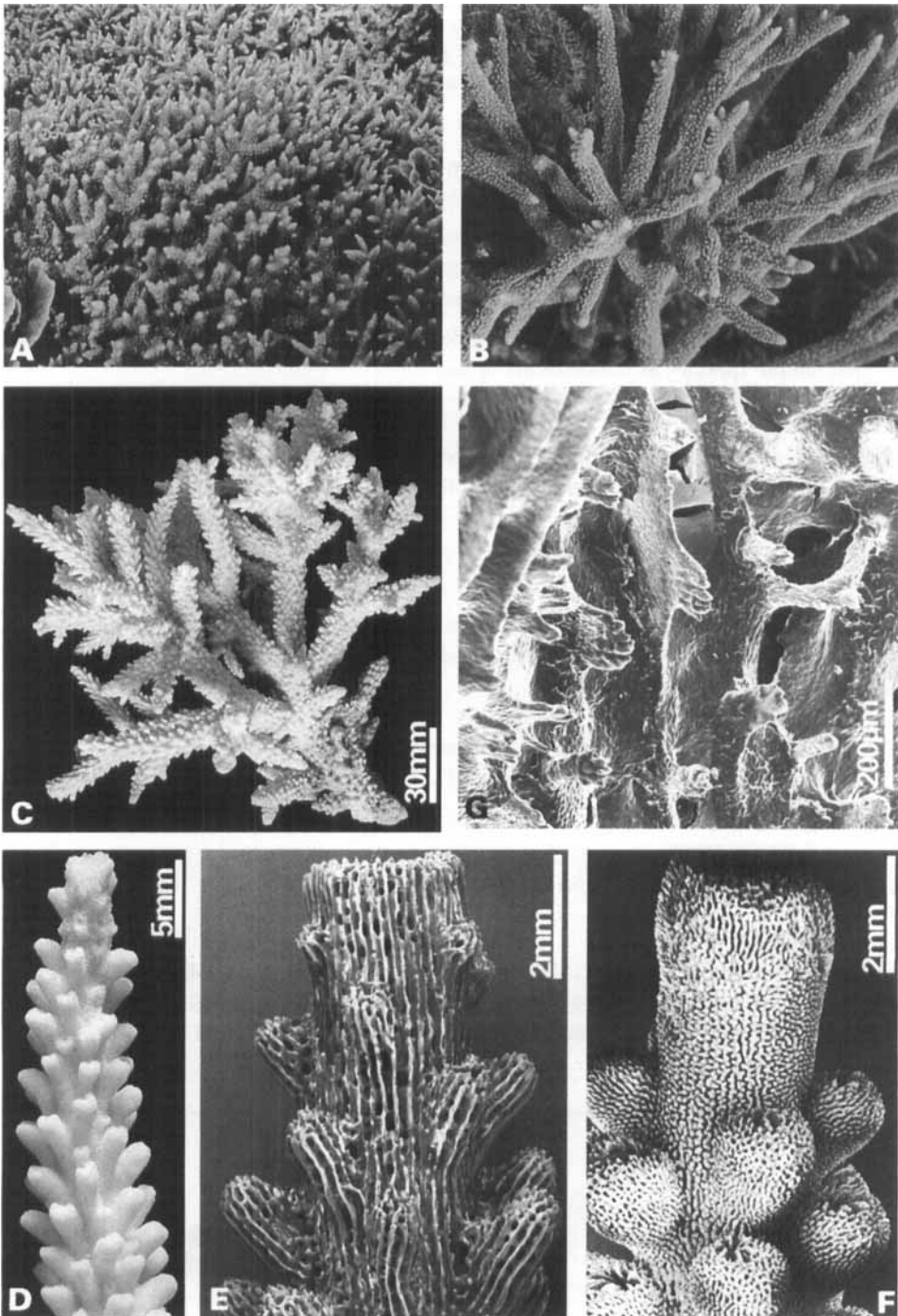


Figure 34. *Acropora formosa* (A) at Bunaken I., N. Sulawesi (B) at Nain I., N. Sulawesi; (C–E, G) G47123; (F) G48202: (C) portion of colony (D) portion of branch (E, F) electron micrograph showing axial and radial corallites—note variation in coenosteal development in this species (G) electron micrograph showing coenosteum between radial corallites.

G49302, G49430-2 W. Timor; G49189-90 Alor Is; BANDA SEA: G35761, G35974, G35976 Bacan I.; G47126 Sekaro I.; G47127, G50830, G50834 Ambon I.; G47123 Suangi I.; G47124-5, G48194, G49165-7, G49421 Banda Is.

Skeletal characteristics

Corallum. Arborescent, branches up to 20 mm diameter and tapering.

Corallites. Axial corallites outer diameter 1.5-3.0 mm, inner diameter 0.8-1.2 mm, primary septa present up to 1/2R, secondary septa present up to 1/3R; radial corallites evenly sized or slightly variable, tubular to tubular appressed with round to oblique openings, primary septa present up to 1/2R, secondary septa just visible as points.

Coenosteum. Costate or neatly arranged simple spinules on radial corallites; reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Arborescent thickets with slender to moderately thick branches; radial corallites close together and narrow tubular, giving a smooth appearance to the branch surface; known colours brown or cream, sometimes with blue tips; occurs subtidally in most reef habitats.

Remarks

This is one of the commonest Indo-Pacific *Acropora* species, and it forms large thickets on many Indo-Pacific reefs. In Indonesia, however, it should not be assumed that extensive arborescent thickets are composed of this species: more often they are of *Acropora austera*, *A. brueggemanni* or *A. horrida*.

Acropora (Acropora) grandis (Brook, 1892)
(Figs 35, 36)

Madrepora grandis Brook, 1892 p.457; 1893 p.42 pl.1 figs A,B

Acropora vanderhorsti Hoffmeister, 1925 p.70 pl.18 fig.2

Acropora dispar Nemenzo, 1967 p.55 pl.19 figs 3,4

Material examined

N. SULAWESI: G47445-8, G47857, G49385 Bunaken N.P.; C. SULAWESI: G49386 Togian Is; S. SULAWESI: G49382-3, G50811-2 Spumonde Arch.; G50896-7 Taka'bonerate; NUSA TENGGARA: G49384 W. Timor; BANDA SEA: G35984 Bacan I.; G46846-7 Sekaro I.; G51178 Ambon I.

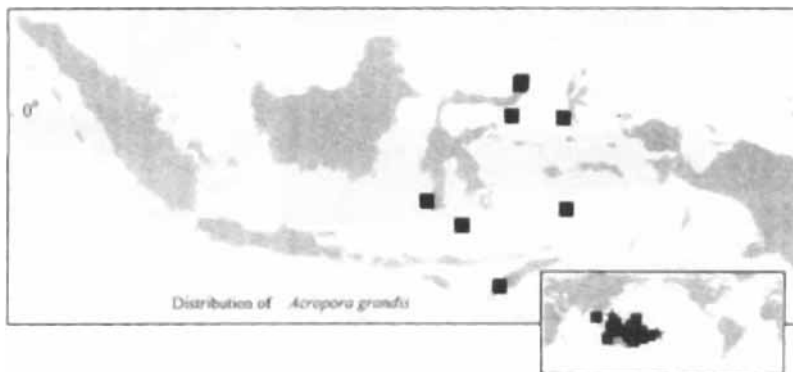


Figure 35. Distribution of *Acropora grandis* in Indonesia (main map) and worldwide (inset).

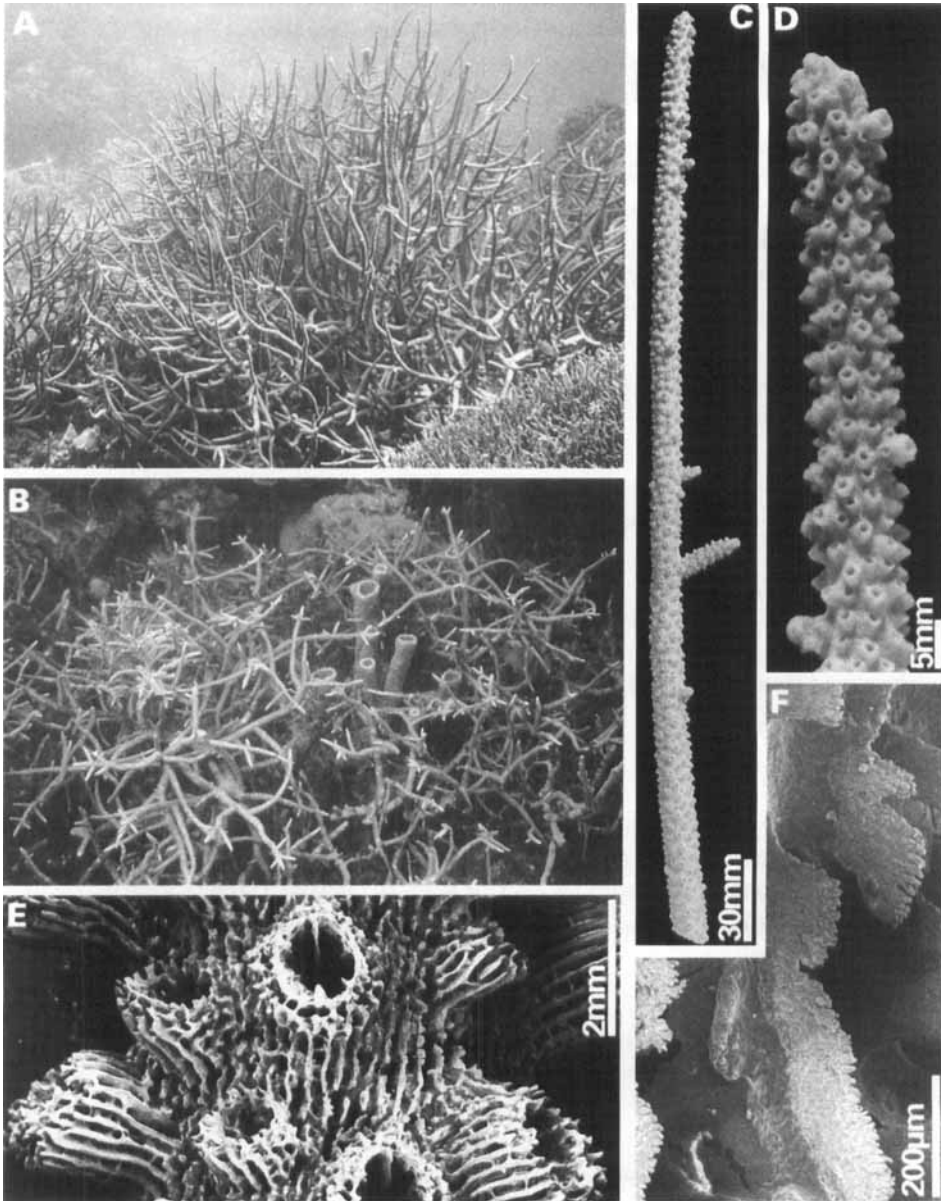


Figure 36. *Acropora grandis* (A) at Nain I., N. Sulawesi (B) at Kudingareng I., Spumonde Archipelago, S.W. Sulawesi; (C–F) G47448: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Open arborescent; branches up to 15 mm thick and up to 500 mm long.

Corallites. Axial corallites outer diameter 1.5–3.0 mm, inner diameter 0.8–1.7 mm, primary septa present up to $3/4R$, secondary septa absent or just visible, up to $1/4R$; radial corallites variable in size, tubular, extending directly outwards from branch, with round to oblique openings, primary septa just visible up to $1/4R$, secondary septa absent.

Coenosteum. Lightly structured costate or reticulate on radial corallites; reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Open arborescent colonies may be several metres in height and diameter, but are usually around 2 m high by 2 m diameter; branches have a crumbly texture due to the very light structure of the radial corallite walls; known colours brown, brown with blue tips or blue; occurs only subtidally, usually in protected waters.

Remarks

In Indonesia this species is most commonly encountered in enclosed lagoons or sheltered slopes with sandy bases.

Acropora (Acropora) acuminata (Verrill, 1864)
(Figs 37, 38)

Madrepora acuminata Verrill, 1864 p.40

Madrepora diffusa Verrill, 1864 p.41

Madrepora nigra Brook, 1892 p.459; 1893 p.45 pl.27 fig.C

Material examined

JAVA: G32848 Seribu Is; KALIMANTAN: G49379–80 N.E. Kalimantan; N. SULAWESI: G35812, G47886–90 Bunaken N.P.; G49373 Tg Pisok; G49378, G49533 Tg Torowitang; G47881–5, G49372 Sangihe Is; S. SULAWESI: G50919 Taka'bonerate; NUSA TENGGARA: G49381 Bali; G49377 Nusa Lembongan; G48480, G49374, G49727, G50918, G51072 Flores; G49375–6 Alor Is; BANDA SEA: G47129 Ambon I.; G47130 Banda Is.

Skeletal characteristics

Corallum. Centra- to side-attached arborescent table colonies; slender, upwardly curving branches up to 10 mm in diameter and 100 mm in length.

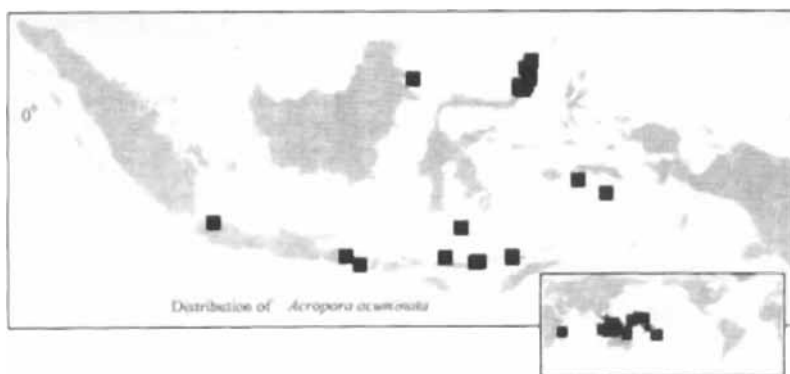


Figure 37. Distribution of *Acropora acuminata* in Indonesia (main map) and worldwide (inset).

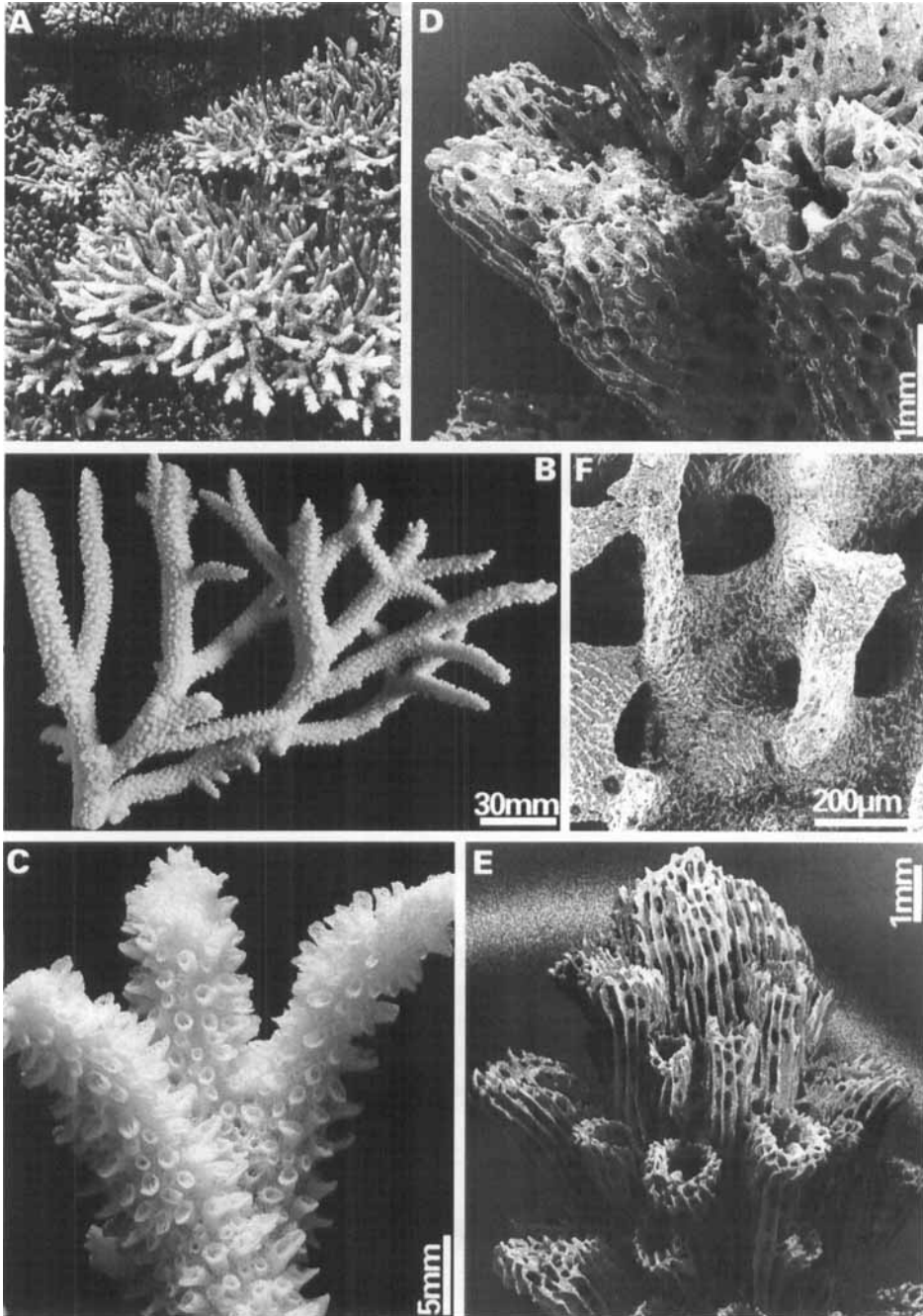


Figure 38. *Acropora acuminata* (A) at Bunaken I., N. Sulawesi; (B) G48480; (C, E, F) G47883; (D) G47882: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.6–2.9 mm, inner diameter 0.6–1.2 mm, primary septa to 3/4R, secondary septa to 1/2R; radial corallites tubular with oval to nariform openings; some radial corallites longer than average, with openings curving outwards; primary septa present up to 1/2R, a few secondary septa present up to 1/4R.

Coenosteum. Costate on radial corallites, with spinules on costae; reticulate with occasional simple spinules in intercorallite areas.

Field characteristics

The open branching of this species gives the appearance of a small arborescent table (up to 1 m diameter); branches appear prickly because of the occasional protruding radial corallites; known colours brown or blue; occurs subtidally on reef slopes.

Remarks

Dying specimens of this species turn black, a characteristic noted by Wells (1954) and useful for identification.

Acropora (Acropora) valenciennesi (Edwards & Haime, 1860)
(Figs 39, 40)

Madrepora valenciennesi Edwards & Haime, 1860 p.137

Acropora splendida Nemenzo, 1967 p.51 pl.17 fig.2

Material examined

W. SUMATRA: G48967–9, G48995 Padang; KALIMANTAN: G48976–7, G48980, G50900 N.E. Kalimantan; N. SULAWESI: G35529, G47852–4 Bunaken N.P.; G47851 Tg Pisok; G47850 Tg Torowitang; G47849 Tg Pulisan; G47847–8 Sangihe Is; C. SULAWESI: G48973–5, G48998–9, G49354 Togian Is; S. SULAWESI: G47855, G50815 Spumonde Arch.; G50898–9 Taka'bonerate; G50901 Kayuadi I.; NUSA TENGGARA: G48978 Bali; G47856 Lombok; G50902 Komodo; G48979, G48996 Flores; G48970–1 W. Timor; G48972, G48997 Alor Is; BANDA SEA: G35763, G35980 Bacan I.; G50816–7 Ambon I; G47846 Nusa Laut; G47845 Suanggi I.; G47843–4 Banda Is.

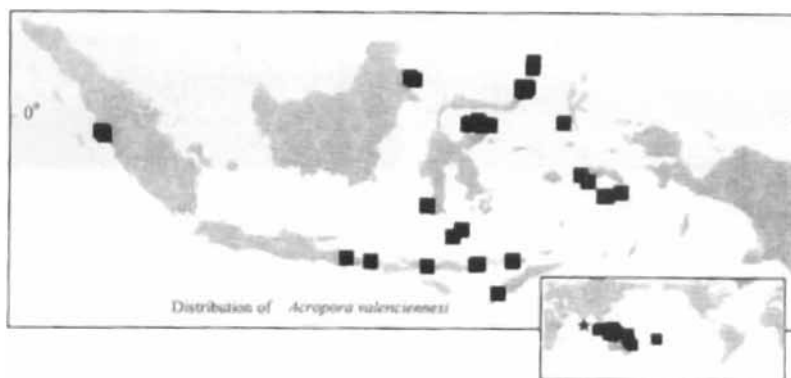


Figure 39. Distribution of *Acropora valenciennesi* in Indonesia (main map) and worldwide (inset).

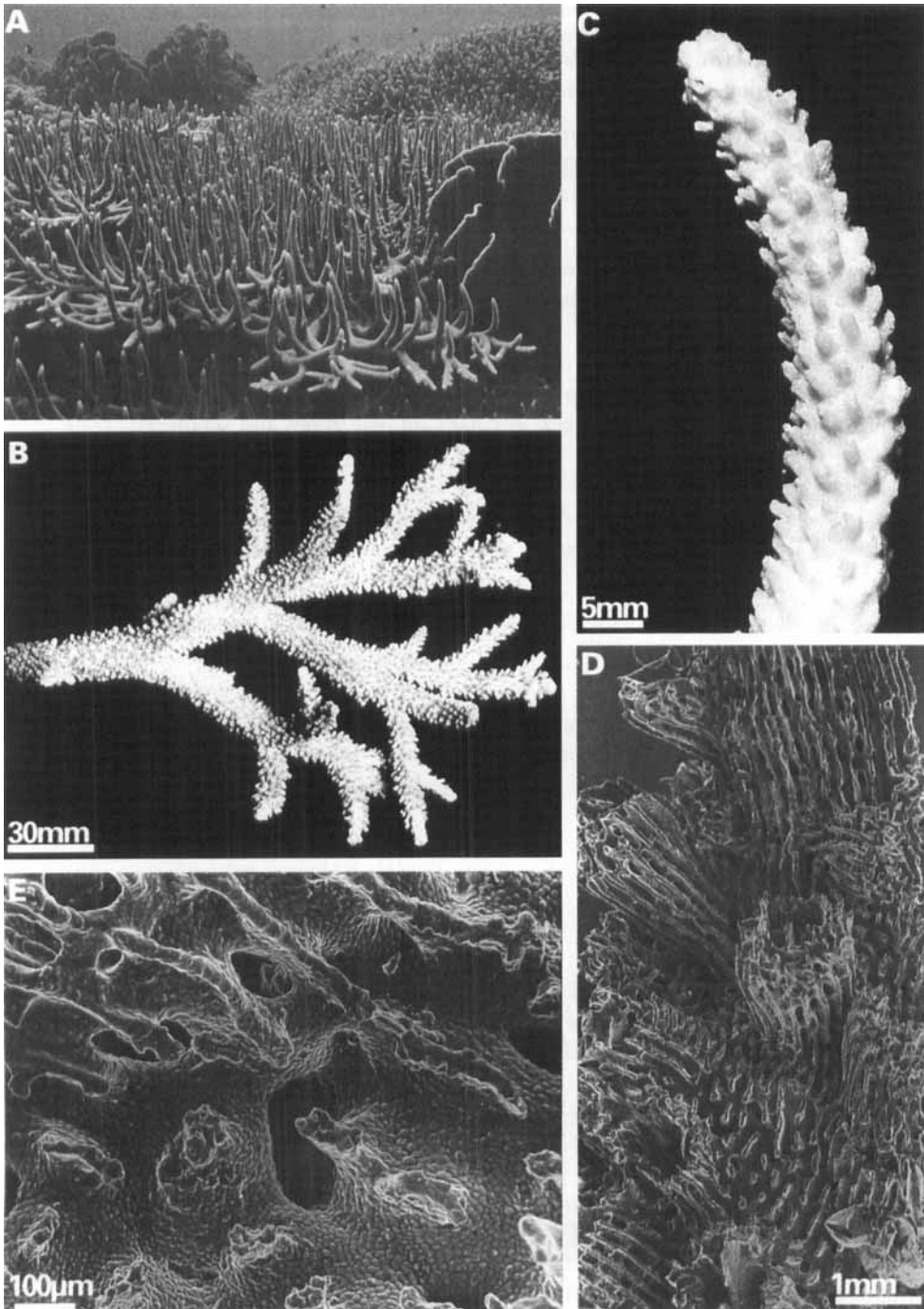


Figure 40. *Acropora valenciennesis* (A) at Mahangetang I., N. Sulawesi; (B) G47844; (C-E) G47847: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Arborescent table with widely spaced tapering branches which curve upwards; basal branch diameter up to 20 mm.

Corallites. Axial corallites outer diameter 2.0–3.5 mm, inner diameter 0.6–1.5 mm, primary septa present up to 1/2R, secondary septa absent or some to all present up to 1/4R; radial corallites evenly sized and distributed, tubular with oval to nariform or dimidiate openings, primary septa present up to 1/3R, secondary septa absent to all present to 1/4R.

Coenosteum. Costate with synapticular connections obvious on radial corallites; open reticulate with very few, simple spinules in intercorallite areas.

Field characteristics

Large open arborescent table, up to 4 m in diameter; known colours brown, brown with blue tips, green with paler tips; occurs subtidally on reef slopes and submerged reefs.

Remarks

This species can be confused in the field with *Acropora hoeksemai*, but the latter is sturdier, with shorter branches, and has corallites and coenosteum similar to those of other members of the *A. divaricata* species group.

The *Acropora horrida* group

Colonies of all species have phenotypically plastic growth forms, ranging from open arborescent through hispidose to irregular caespitose (sometimes within a single colony); radial corallites simple tubular with round openings; coenosteum with simple to moderately elaborated spinules.

Acropora (Acropora) horrida (Dana, 1846)
(Figs 41, 42)

Madrepora horrida Dana, 1846 p.472 pl.39 figs 2,2a

Madrepora arabica Edwards & Haime, 1860 p.145

Madrepora microcyathus Klunzinger, 1879 p.22 pl.3 fig.4 pl.4 fig.19 pl.9 fig.17

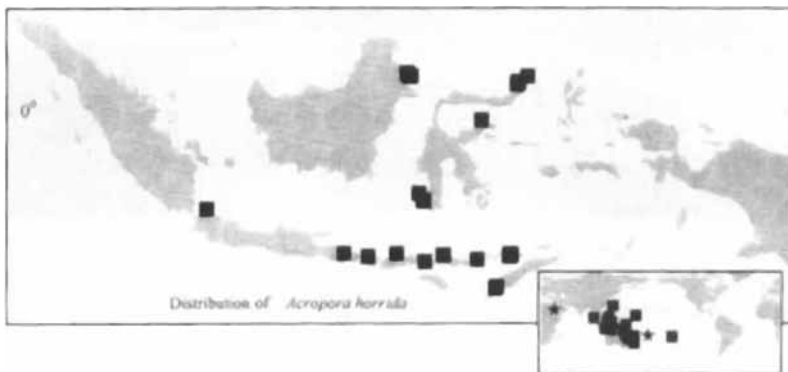


Figure 41. Distribution of *Acropora horrida* in Indonesia (main map) and worldwide (inset).

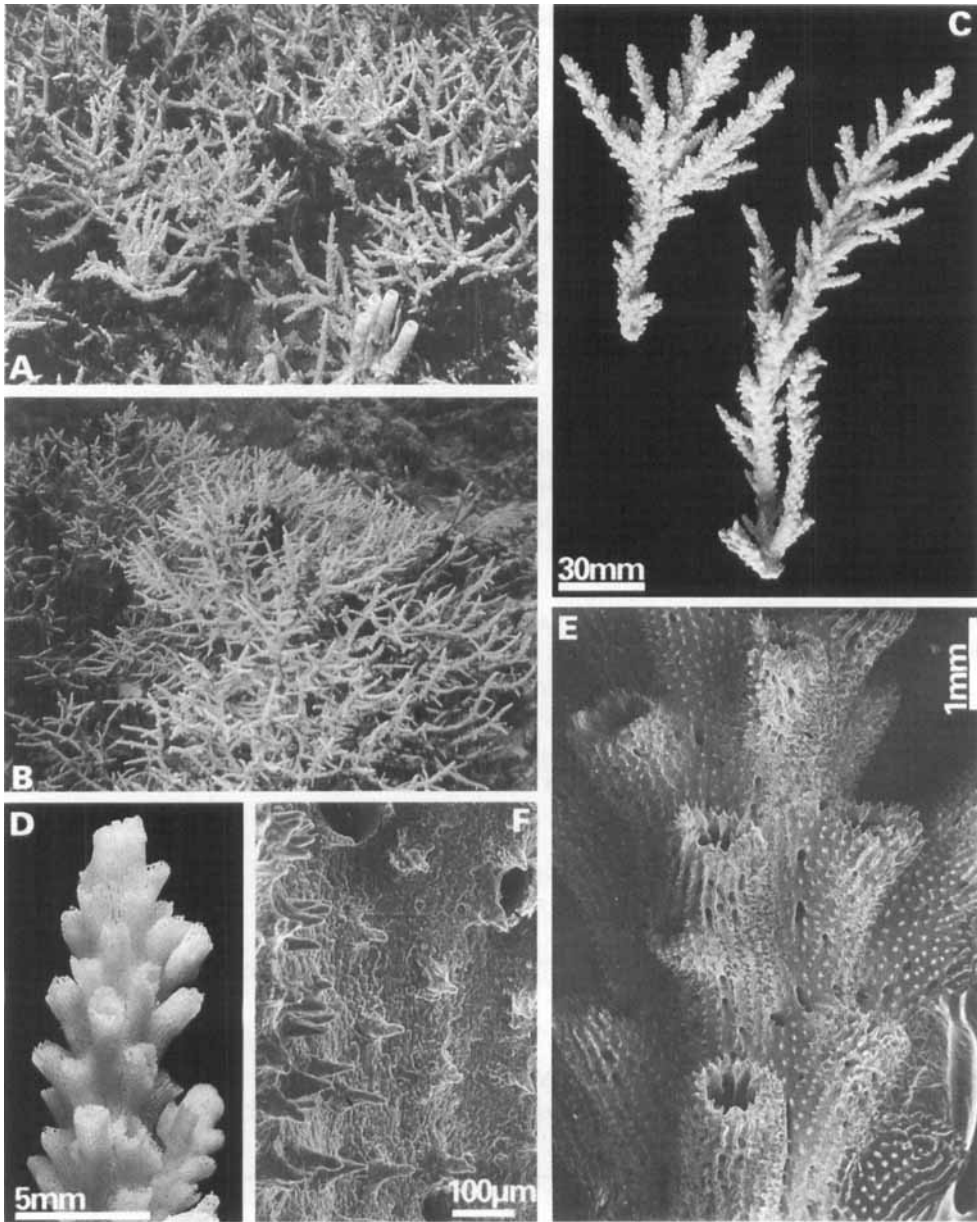


Figure 42. *Acropora horrida* (A) at Kudingareng I., Spumonde Archipelago, S.W. Sulawesi (B) at Badi I., Spumonde Archipelago, S.W. Sulawesi; (C–F) G48166: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

JAVA: G50739 Seribu Is; KALIMANTAN: G48964, G49522–6 N.E. Kalimantan; N. SULAWESI: G48168–71, G49520 Bunaken N.P.; G48166–7 Sangihe Is; C. SULAWESI: G49521 Togian Is; S. SULAWESI: G48172–5, G50818 Spumonde Arch.; NUSA TENGGARA: G49527 Bali; G48176–8 Lombok; G50973 Moyo; G50974 Komodo; G49509, G50972 Flores; G49510–1 W. Timor; G49512–9 Alor Is.

Skeletal characteristics

Corallum. Irregular arborescent or hispidose-arborescent; branches narrow, up to 8 mm diameter.

Corallites. Axial corallites outer diameter 1.4–2.4 mm, inner diameter 0.6–1.5 mm, primary septa present up to 2/3R, secondary septa absent or a few just visible as points; radial corallites irregularly distributed, not touching, tubular or sub-immersed with round calices, walls thin and very fragile around the opening, primary septa present up to 1/2R, secondary septa absent, or a few just visible as points.

Coenosteum. Open reticulate with scattered simple spinules throughout: patches of fused reticulum in places.

Field characteristics

Occurs as irregular low patches, or rounded arborescent colonies up to 2 m in diameter, or extensive thickets; known colours pale blue, grey, lemon yellow and grey-green; occurs subtidally on protected deepwater flats, lagoons and sandy slopes.

Remarks

This is a distinctive species which can usually be recognised by its irregular, slender branches and by the fact that the polyps are usually extended during daylight hours as well as at night. In the Alor Islands, this species forms almost mono-specific banks on some of the sandy reef slopes: colours are a mixture of the blue and grey-green forms. Here, however, the polyps are not extended during the day, and the specimens have some other characteristics which suggest a variation on the usual *A. horrida* form.

Acropora (Acropora) vaughani Wells, 1954
(Figs 43, 44)

Acropora vaughani Wells, 1954 p.416 pl.105 fig.1 pl.106 figs 1–8 pl.107 figs 2–6

Material examined

JAVA: G32852 Seribu Is; N. SULAWESI: G48344 Bunaken N.P.; S. SULAWESI: G50822 Barang Lompo; G50937 Panjang I.; BANDA SEA: G47052 Banda Is.

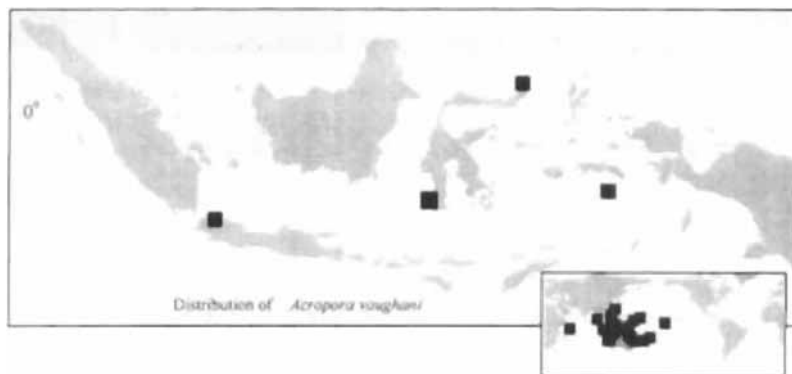


Figure 43. Distribution of *Acropora vaughani* in Indonesia (main map) and worldwide (inset).

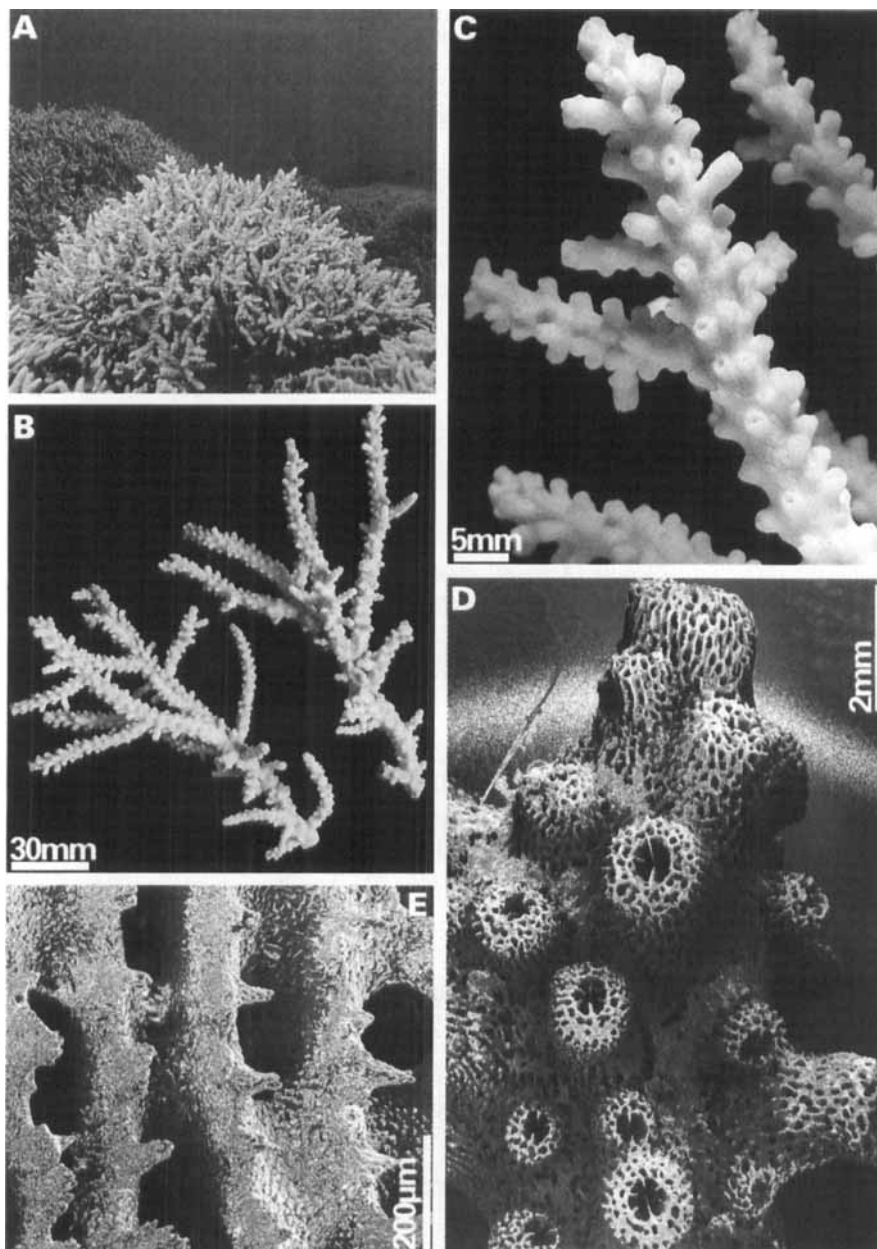


Figure 44. *Acropora vaughani* (A) at Nain I., N. Sulawesi; (B, C, E) G48344; (D) G40752: (B) portion of colony (C) portion of branches (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Irregular arborescent to hispidose-arborescent; branches up to 10 mm diameter.

Corallites. Axial corallites outer diameter 1.5–2.5 mm, inner diameter 0.5–1.1 mm, primary septa present up to $2/3R$, secondary septa absent or present up to $1/4R$; radial corallites

scattered and not touching, rounded tubular with round openings, primary septa present to $1/3R$ as points.

Coenosteum. Dense arrangement of slightly elaborated spinules throughout; in lightly calcified specimens, the spinules may be simple.

Field characteristics

Irregular, sprawling colonies, appearing arborescent to caespitose; known colours cream, brown, brown with blue tips or blue; occurs only in protected subtidal habitats such as contained lagoons and sandy slopes.

Remarks

This species resembles a sturdy form of *A. horrida*. It is less common than *A. horrida* and does not occur in monospecific stands. Its polyps are not usually extended during the day.

Acropora (Acropora) abrolhosensis Veron, 1985
(Figs 45, 46)

Acropora abrolhosensis Veron, 1985 p.147 figs 3,4

Material examined

JAVA: G50389 Seribu Is; N. SULAWESI: G47477–81, G49368–9, G50487 Bunaken N.P.; C. SULAWESI: G49370, G50388 Togian Is; S. SULAWESI: G47482, G47702–3, G50488 Spumonde Arch.; BANDA SEA: G46859–60 Sekaro I.; NUSA TENGGARA: G49246–7, G49371 Bali; G49367 Flores; G50387 W. Timor.

Skeletal characteristics

Corallum. Irregular arborescent to hispidose-arborescent; branches up to 10 mm diameter, with obvious, protruding, radial corallites.

Corallites. Axial corallites outer diameter 2.5–3.5 mm, inner diameter 0.9–1.5 mm, primary septa present up to $1/2R$, secondary septa up to $1/3R$; radial corallites well spaced on

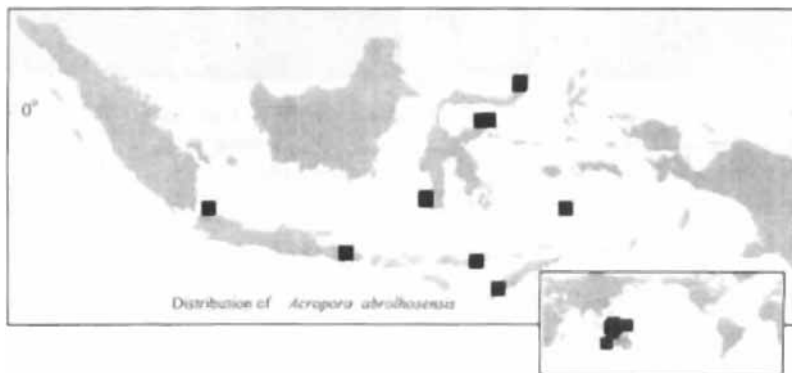


Figure 45. Distribution of *Acropora abrolhosensis* in Indonesia (main map) and worldwide (inset)

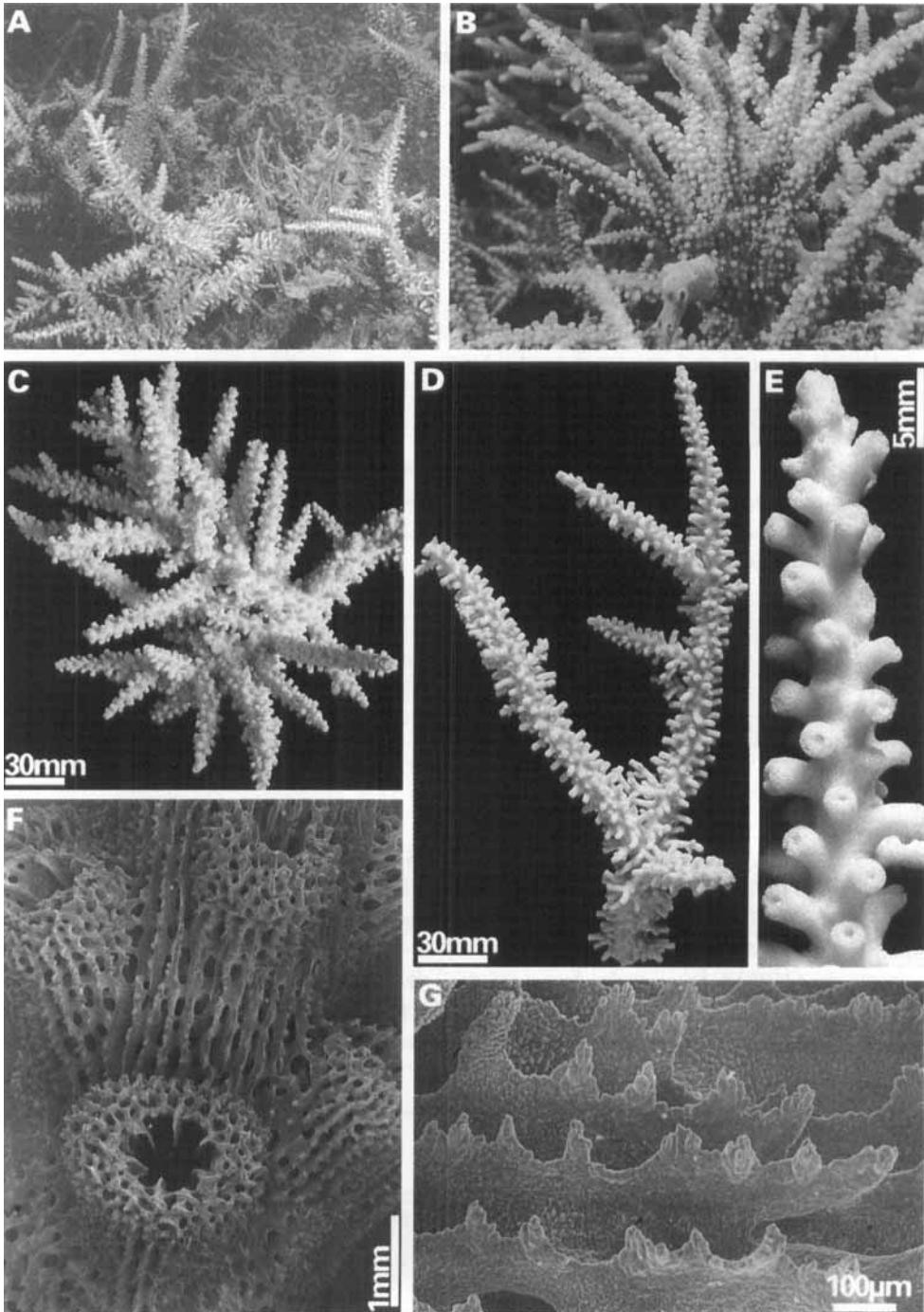


Figure 46. *Acropora abrolhosensis* (A, B) at Nain I, N. Sulawesi; (C, F, G) G46860; (D, E) G47477: (C, D) portion of colony (E) portion of branch (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

branches and not touching, tubular, extending up to 14 mm in length at 90° to branches, with rounded openings and slightly swollen ends, primary septa present up to 1/4R, secondary septa absent or a few just visible as points.

Coenosteum. On radial corallites, reticulate with evenly distributed, slightly elaborated spinules, sometimes arranged in lines; in intercorallite areas, more openly reticulate with evenly distributed spinules arranged in lines.

Field characteristics

Arborescent colonies up to 3 m in diameter, sometimes larger as thickets, with obvious protruding tubular radial corallites; known colours bright blue, pale blue or white; occurring subtidally in lagoons and protected sandy slopes.

Remarks

This species is restricted to enclosed lagoons and protected reef slope habitats and thus may be missed on many reefs. The large protruding tubular radial corallites are unusual and resemble what would be called incipient axial corallites in other species. It does not closely resemble any other species.

Acropora (Acropora) microphthalma (Verrill, 1869)
(Figs 47, 48)

Madrepora microphthalma Verrill, 1869 p.83

Material examined

W. SUMATRA: G50485 Padang; JAVA: G50741 Seribu Is; KALIMANTAN: G49268–71, G49534, G50911 N.E. Kalimantan; N. SULAWESI: G49258–60 Tg Dodepo; G35522–5, G48226, G49257 Bunaken N.P.; G48225 Tg Torowitang; G48224 Tg Pulisan; G48223 Sangihe Is; C. SULAWESI: G49261–7, G49364–6, G50486 Togian Is; S. SULAWESI: G48227–8, G50813 Spumonde Arch; G50813 Barang Lompo; G43818 Taka'bonerate; NUSA TENGGARA: G49272–4 Bali; G49248–55, G49363 Flores; G49256 Alor Is; BANDA SEA: G35762 Bacan I.; G47050–1, G49362 Banda Is.

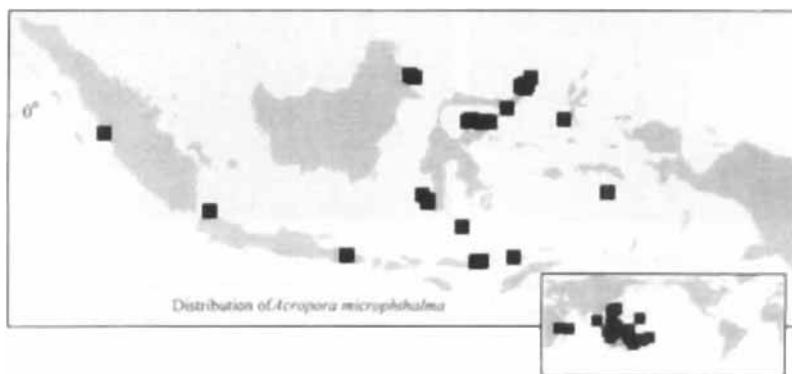


Figure 47. Distribution of *Acropora microphthalma* in Indonesia (main map) and worldwide (inset).

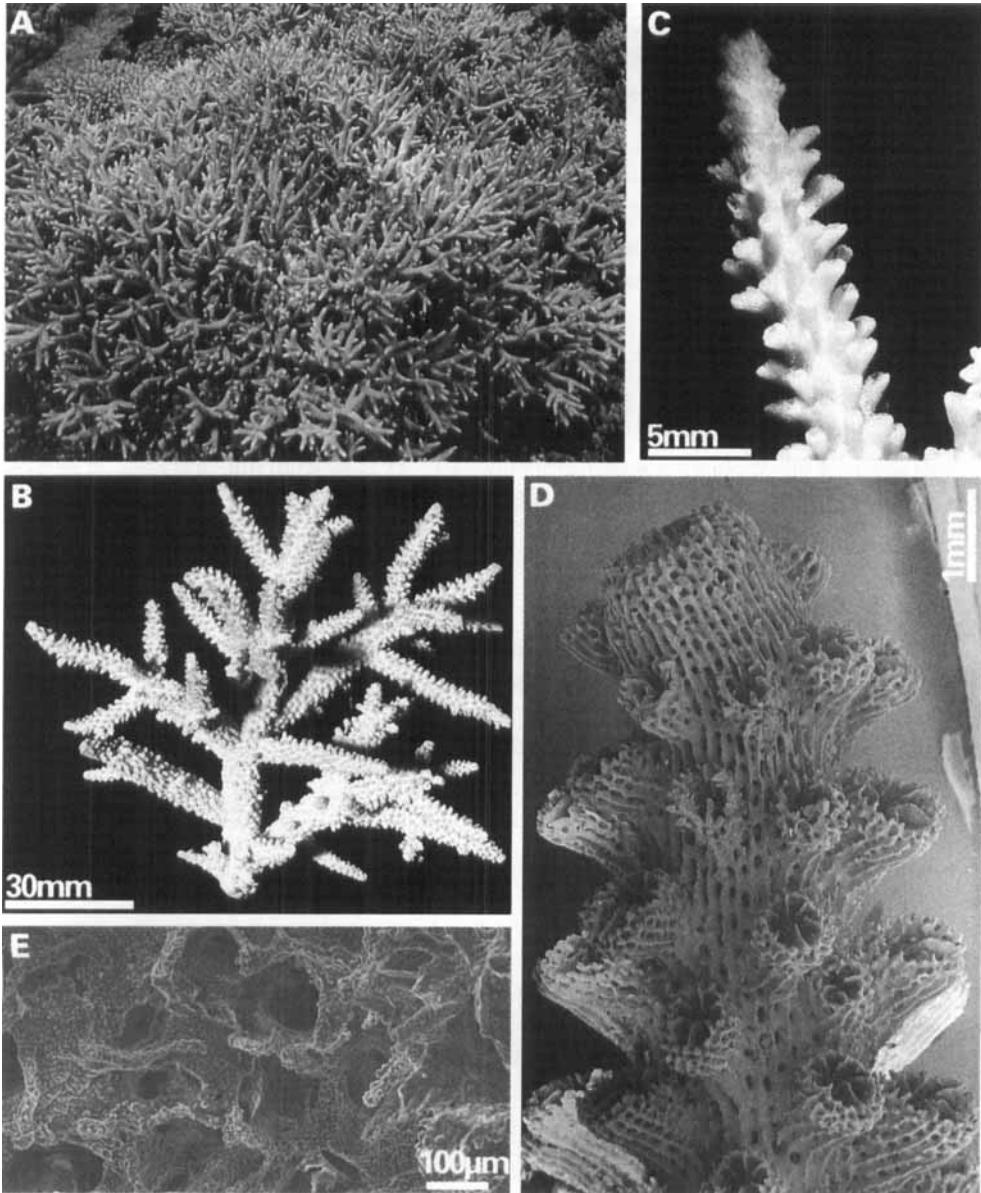


Figure 48. *Acropora microphthalmalma* (A) at Bira Reef, Jakarta Bay, Java; (B–D) G49248; (E) G47051: (B) portion of colony (C) portion of branch (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Arborescent, branching at 45° to 90°; branches up to 14 mm diameter.

Corallites. Axial corallites outer diameter 1.8–2.7 mm, inner diameter 0.6–1.0 mm, primary septa present up to 3/4R, secondary septa absent or some present to 1/4R; radial corallites tubular with round to oblique openings, crowded on branches, primary septa present up to 2/3R, secondary septa absent or a few just visible as points.

Coenosteum. When spinules are well developed, they have elaborated tips and are distributed throughout; lightly calcified coralla have simple pointed spinules, densely arranged throughout, sometimes in lines on the radial corallites.

Field characteristics

Fine-branching dense arborescent clumps or thickets, with smooth branches; known colours cream or white, occasionally pale blue; found in subtidal habitats such as slopes and submerged reefs.

Remarks

Specimens of this species are sometimes difficult to separate from fine-branched *A. formosa*. The usually whitish colouration of *A. microphthalmus* is distinctive in the field.

Acropora (Acropora) kirstyae Veron & Wallace, 1984
(Figs 49, 50)

Acropora kirstyae Veron & Wallace, 1984 p.247 figs 593,596,597

Material examined

C. SULAWESI: G48956–7 Togian Is.

Skeletal characteristics

Corallum. Arborescent to irregular hispidose; thin branches up to 8 mm in diameter.



Figure 49. Distribution of *Acropora kirstyae* in Indonesia (main map) and worldwide (inset).

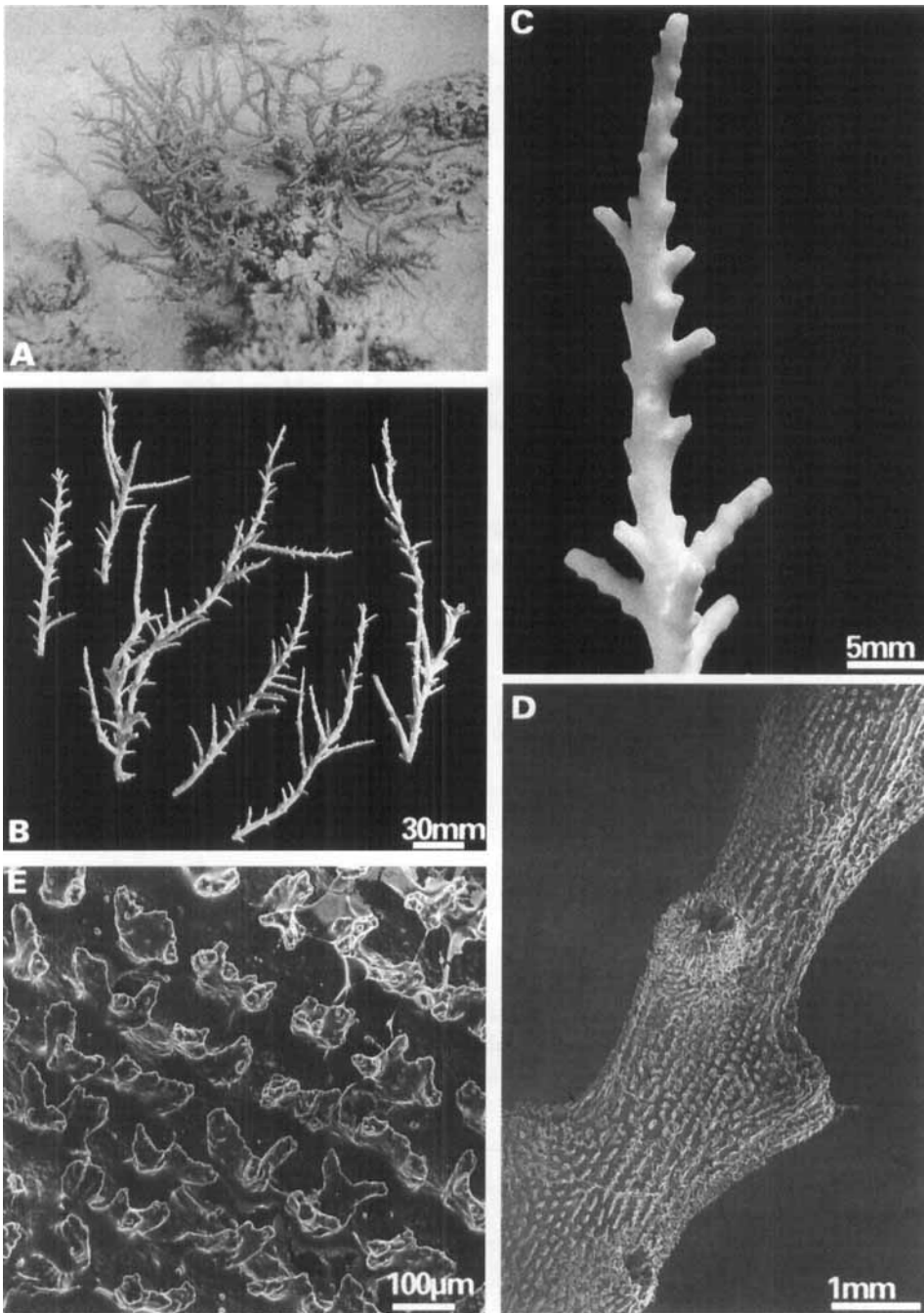


Figure 50. *Acropora kirstyae* (A) at Talatakoh I., Togian Is, Central Sulawesi; (B–E) G48957: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 0.9–1.4 mm, inner diameter 0.2–0.8 mm; radial corallites scattered, tubular, with round openings, primary septa present up to 1/3R, secondary septa absent or a few just visible as points.

Coenosteum. Densely arranged, irregularly elaborated spinules throughout.

Field characteristics

Irregular, fine-branched colonies, known colours pale brown; occurs only in protected subtidal lagoons.

Remarks

This species was only encountered in the unusual assemblages of the Togian Islands. *Acropora derawanensis* is a similar, but far more lightly structured, species.

Acropora (Acropora) derawanensis Wallace, 1997
(Figs 51, 52)

Acropora derawanensis Wallace, 1997 p.33 fig.5

Material examined

KALIMANTAN: G48958–62, G48963 (*holotype*), G48965, G50317, G50967–70 N.E. Kalimantan.

Skeletal characteristics

Corallum. Arborescent with slender simple to hispidose branches up to 4 mm diameter; branchlets given off at regular intervals, but branchlet lengths may be mostly similar or variable; branchlets carry up to 10 radial corallites, which are tubular appressed with round openings.

Corallites. Axial corallites outer diameter 1.1–1.4 mm, inner diameter 0.5–1.0 mm, primary septa present up to 3/4R, secondary cycle absent to all present, up to 1/4R; radial corallites scattered on branches, not touching, tubular with round openings, primary septa present up to 1/4 R, secondary cycle absent or a few septa just visible as fine points.

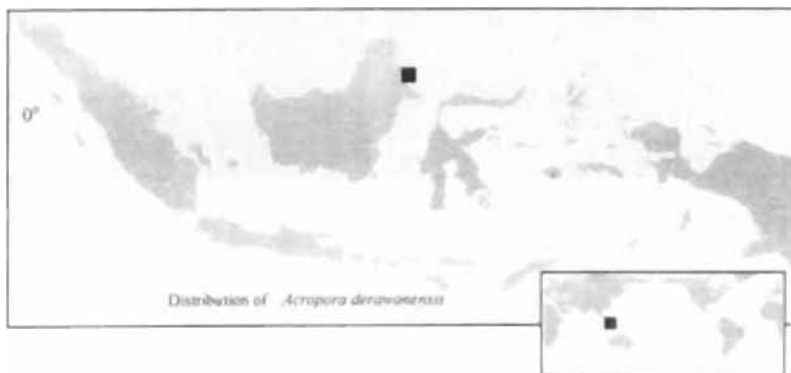


Figure 51. Distribution of *Acropora derawanensis* in Indonesia (main map) and worldwide (inset).

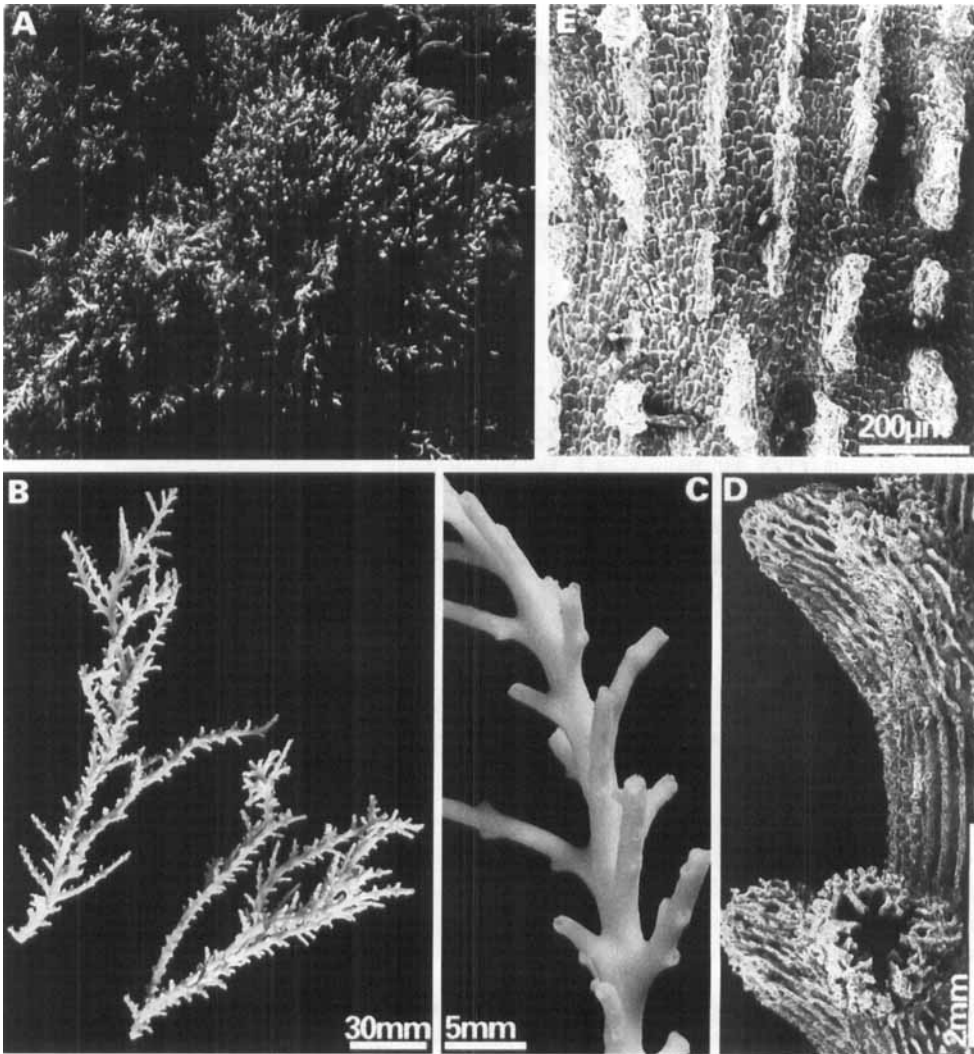


Figure 52. *Acropora derawanensis* (A) at Tababinga Reef, Derawan I., E. Kalimantan; (B–E) holotype G48963: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Coenosteum. A moderately dense arrangement of fine spinules, mostly arranged in lines and occasionally joining as costae, throughout.

Field characteristics

Colonies arborescent to irregular hispidose, up to about 1 m in diameter, upright to prostrate, very slender-branching and fragile; known colours brown, blue or brown with blue tips; occurs subtidally on protected deep sandy slopes.

Remarks

In general appearance this species resembles *A. kirstyae* and *A. halmaherae* (see below); however, its branch thickness is less than half that of *A. kirstyae*, and coenosteum and radial

corallite characteristics are distinctive. Its combination of extremely delicate and slender branches with an upright branching mode makes it the most fragile of *Acropora* species yet encountered.

***Acropora (Acropora) halmaherae* sp. nov.**

(Figs 53, 54)

Material examined

Holotype

G51513 Halmahera, S. Loloda Is, Sidanga I., 1°39'N, 127°29'E, depth 15 m, 3. VI. 1996 coll. C.C. Wallace and J. Wolstenholme.

Paratypes G51509 Halmahera, S. Loloda Is, Sidanga I., 1°39'N, 127°29'E, depth 14 m, 3. VI. 1996 coll. C.C. Wallace and J. Wolstenholme; G51510–1 same data except depth 18 m; G51512 same data except depth 15 m.

Skeletal characteristics

Corallum. Fine-branching open irregular arborescent; branches up to 6 mm in diameter and tapering; occasional short branchlets given off from the main branchlets giving a semi-hispidose appearance in some parts of a colony.

Corallites. Axial corallites outer diameter 1.3–2.2 mm, inner diameter 0.6–0.9 mm, primary septa present up to 2/3R, secondary septa some to all present up to 1/4R; radial corallites irregularly dispersed on branches, not touching, extending at about 80° to branch, tubular exsert with oval to nariform openings, primary septa present up to 2/3R, secondary septa absent, or some to all present up to 1/4R.

Coenosteum. Reticulate with evenly arranged elaborated spinules, sometimes arranged into costae with elaborated spinules along their edges, throughout.

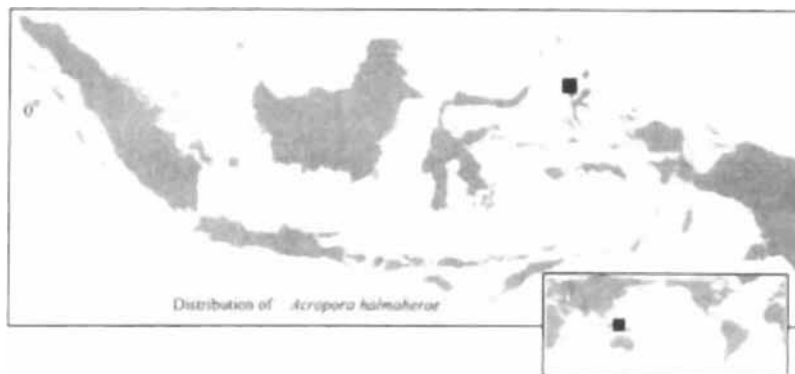


Figure 53. Distribution of *Acropora halmaherae* sp. nov. in Indonesia (main map) and worldwide (inset).

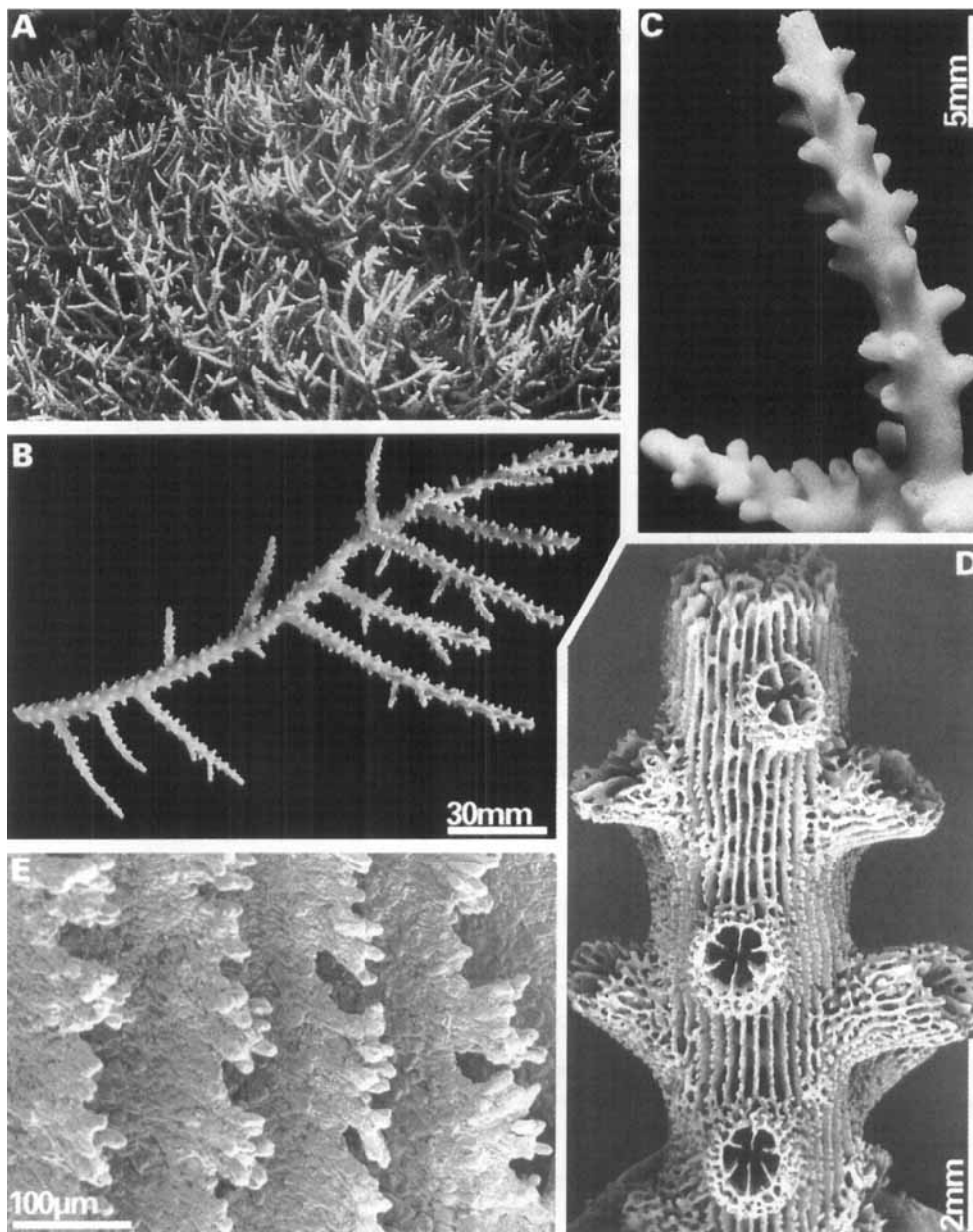


Figure 54. *Acropora halmaherae* sp. nov. (A) at Sidanga I., S. Loloda Is, N. Halmahera; (B–E) holotype G51513: (B) portion of holotype specimen (C) portion of branch (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Field characteristics

Occurs in sprawling arborescent patches or thickets; known colour pink-grey, with white tips; occurs on protected sandy slopes.

Remarks

This species is only known from the type locality, where it was abundant amongst an assemblage of mainly hispidose species. It is most similar to *A. derawanensis*, but it is not as fragile as that species.

Etymology

Named for the type locality.

The *Acropora rudis* group

Colonies are irregularly branching arborescent to hispidose, with rounded tubular radial corallites; coenosteum includes elaborated spinules.

Acropora (Acropora) rudis (Rehberg, 1892)
(Figs 55, 56)

Madrepora rudis Rehberg 1892 p.6 pl.4 fig.9

Material examined

W. SUMATRA: G47165–6 Nias I.

Skeletal characteristics

Corallum. Irregularly arborescent with sturdy branches up to 28 mm diameter; sometimes incipient axial corallites are common, adding to the irregular branching pattern.

Corallites. Axial corallites outer diameter 2.6–3.4 mm, inner diameter 0.6–0.9 mm; primary septa present up to 3/4R, secondary septa to 1/2R; radial corallites evenly sized, touching

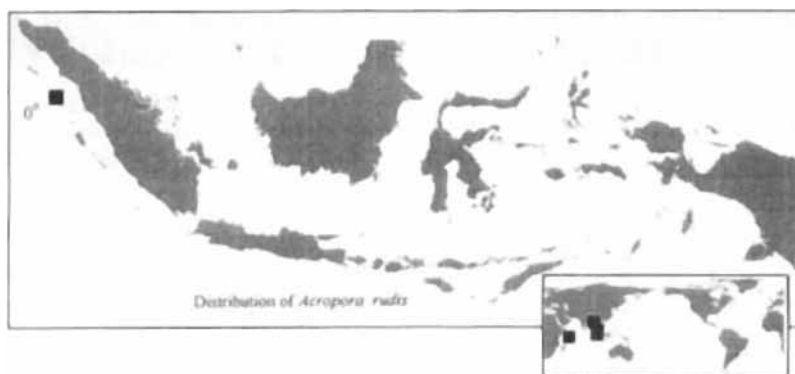


Figure 55. Distribution of *Acropora rudis* in Indonesia (main map) and worldwide (inset).

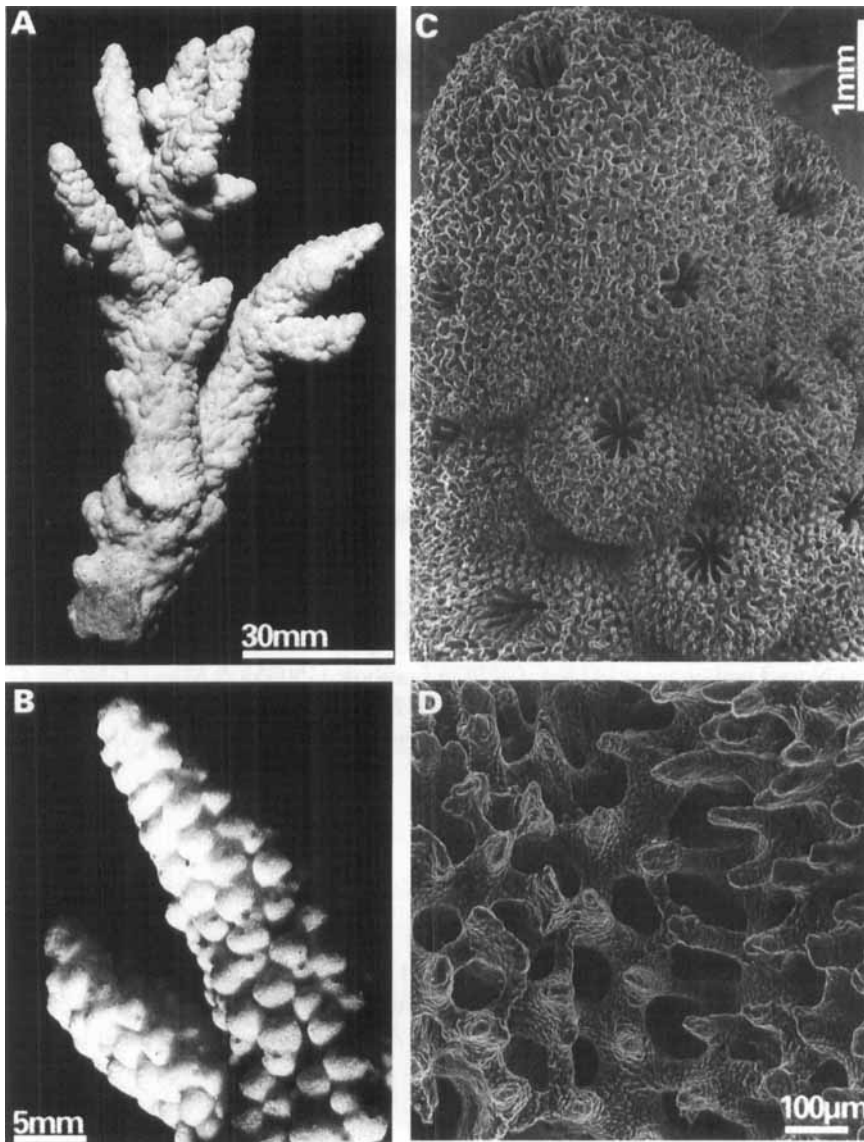


Figure 56. *Acropora rudis* (A–D) G47165: (A) portion of colony (B) portion of branch (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing coenosteum between radial corallites.

on branches, rounded tubular with round calices, primary septa present up to $1/2R$, secondary septa some to all present up to $1/3R$.

Coenosteum. A dense arrangement of elaborated spinules throughout.

Field characteristics

The very large corallite size and rounded appearance of radial corallites of this species, as well as the sturdy branches are distinctive; known colours dark green or brown; occurs in shallow reef edge and submerged reef top habitats.

Remarks

This species is apparently restricted to the Indian Ocean, specimens having been found in Sri Lanka (type locality), Bangladesh, W. Thailand (where it is common), and Seychelles. In Indonesia, it has to date only been found on the Indian Ocean reefs of the outer islands of W. Sumatra.

Acropora (Acropora) austera (Dana, 1846)
(Figs 57, 58)

Madrepora austera Dana, 1846 p.478

Acropora multiramosa Nemenzo, 1967 p.73 pl.24 figs 1,2

Material examined

W. SUMATRA: G50297–8, G50374 Padang; JAVA: G32853, G50754–8 Seribu Is; KALIMANTAN: G50313–6, G50380–1 N.E. Kalimantan; N. SULAWESI: G47876–8 Bunaken N.P.; G50312 Batong I.; G47859 Tg Pisok; G47860, G47875 Tg Torowitang; G47858, G47861 Tg Pulisan; G47862, G47868–74 Sangihe Is; C. SULAWESI: G50310–1, G50376–9 Togian Is; S. SULAWESI: G50762 Spumonde Arch.; NUSA TENGGARA: G50309 Nusa Lembongan; G47864, G47879 Lombok; G50955–9 Moyo; G50299, G50306 Flores; G50301–2 W. Timor; G50303–8, G50375 Alor Is; BANDA SEA: G47121 Sekaro I.; G47867 Lucipara Is; G47122, G47863 Suanggi I.; G47118–9, G47865, G47880 Banda Is; G47120, G47866 Manuk I.

Skeletal characteristics

Corallum. Caespitose to irregular hispidose, hispidose-arborescent, or irregular arborescent; branch diameter very variable up to 35 mm.

Corallites. Axial corallites outer diameter 2.2–3.8 mm, inner diameter 0.6–1.5 mm, primary septa present to 3/4R, secondary septa present to 2/3R; radial corallites rounded tubular, with round to square calices, primary septa to 1/3R, secondary cycle absent to incomplete up to 1/4R.

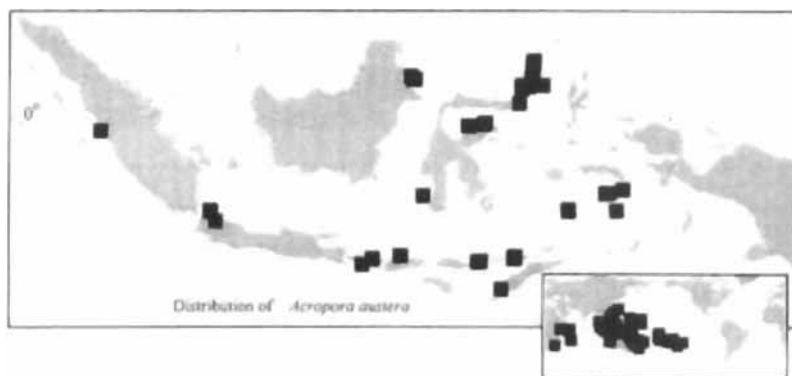


Figure 57. Distribution of *Acropora austera* in Indonesia (main map) and worldwide (inset).

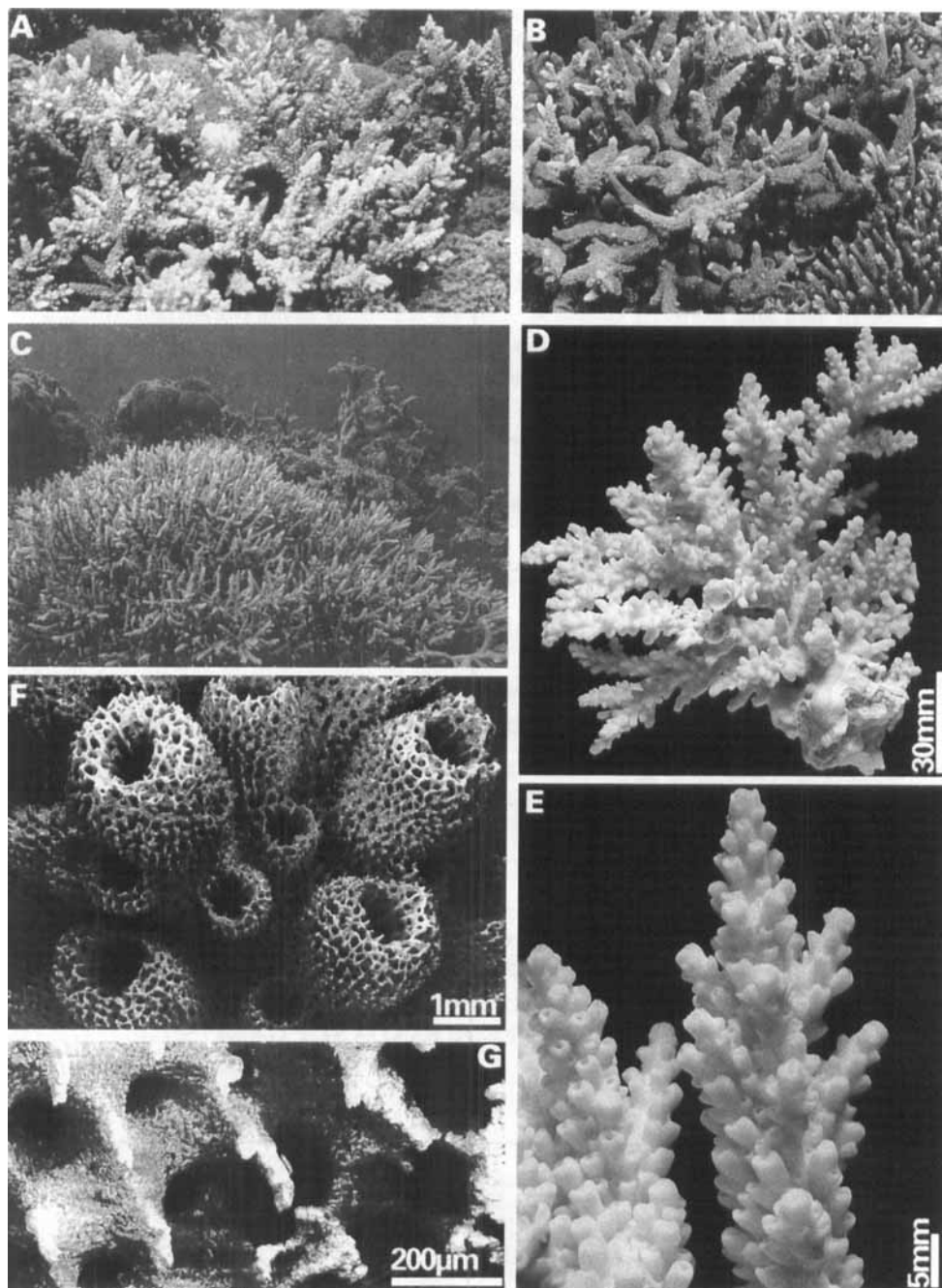


Figure 58. *Acropora austera* (A) at Kera I., W. Timor (B) at Bunaken I., N. Sulawesi (C) at Nain I., N. Sulawesi; (D) G47121; (E-G) G47870: (D) portion of colony (E) portion of branches (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

Coenosteum. Dense reticulate with scattered elaborated spinules throughout; sometimes slightly costate on radial corallites.

Field characteristics

Hispidose to arborescent; corallites large and obvious; known colours pale yellow-brown, green-brown, pale brown, pale brown with yellow radial corallites and purple axial corallites, and lavender; occurs subtidally in almost all reef locations.

Remarks

This is a common and abundant species in Indonesia. In some areas, e.g. some reef slopes in southern Bali and northern Sulawesi, *A.austera* occurs as slender-branched arborescent thickets, forming almost monospecific banks. A thick-branched arborescent form (e.g. Fig.58B) is sometimes encountered, and could possibly be a separate species. Because its radial corallites are more like those of *A.rudis* than those of the *A.horrída* group, the species grouping is changed from that proposed by Veron & Wallace (1984: 262).

The *Acropora aspera* group

All species possess labellate radial corallites, the upper part of the corallite wall being absent and the lower part being developed into a flaring lip. Coenosteum open and simple, with few, simple spinules and differing structures on and between radial corallites.

Acropora (Acropora) aspera (Dana, 1846)
(Figs 59, 60)

Madrepora aspera Dana, 1846 p.468 pl.38 figs 1,1a,b

Madrepora hebes Dana, 1846 p.468 pl.35 fig.5

Madrepora cribrifera Dana, 1846 p.470 pl.31 figs 1,1a-c

Madrepora manni Quelch, 1886 p.150 pl.85 figs 6,7

Material examined

KALIMANTAN: G35582, G39793-4, G39804, G39806, G39808 Pulau Laut; G49282 N.E. Kalimantan; N. SULAWESI: G49278-9 Bunaken N.P.; G47538 Tg Torowitang; C. SULAWESI: G49280-1 Togian Is; S. SULAWESI: G47242-3 Spumonde Arch.; NUSA TENGGARA: G47490 Lombok; G48560 Flores; BANDA SEA: G46845 Sekaro I.; G36178, G36213, G36216 Ambon I.

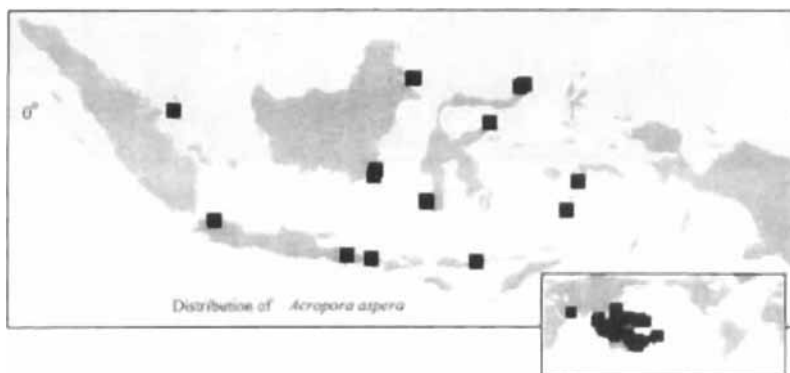


Figure 59. Distribution of *Acropora aspera* in Indonesia (main map) and worldwide (inset).

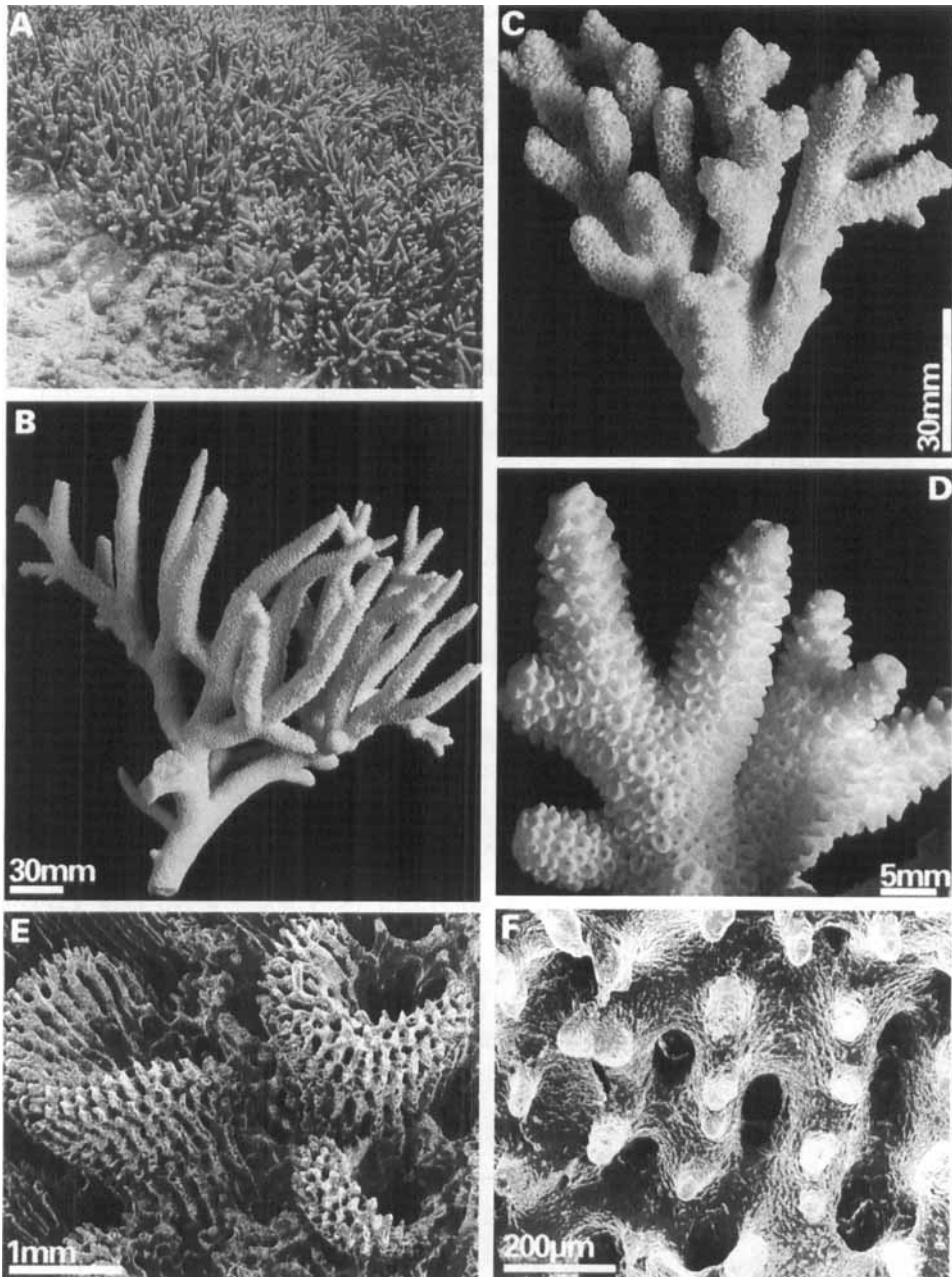


Figure 60. *Acropora aspera* (A) at Kudingareng I., Spumonde Archipelago, S.W. Sulawesi; (B) G39794; (C, E, F) G36212; (D) G39793: (B, C) portion of colony (D) portion of branches (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Arborescent to apparently corymbose; when appearing corymbose, the upper growth limit of branches is determined by tidal height; branches up to 15 mm in diameter and tapering.

Corallites. Axial corallites outer diameter 3.5–4.5 mm, inner diameter 1.0–1.8 mm, primary septa present up to $2/3R$, secondary septa present up to $1/3R$, occasionally a tertiary cycle is also partially represented; radial corallites a mixture of two sizes: larger, more numerous radials with upper wall undeveloped, and lower wall short and thickened or extended horizontally as a rounded lip, and smaller sub-immersed or immersed radials, primary septa present up to $1/3R$, secondary septa absent to some just visible up to $1/4R$.

Coenosteum. Costate on radial corallites; open reticulate with scattered laterally flattened spinules in intercorallite areas.

Field characteristics

Low, sprawling colonies, sometimes appearing corymbose because of the even height of the branches; known colours pale blue-grey, green-grey, or cream; occurs intertidally on reef flats; sometimes taller arborescent colonies may occur in shallow protected habitats, such as inter-reefal lagoons.

Remarks

Where zoning can be detected on reef flats, this species tends to occur between the ranges of *A. millepora* (outer flat) and *A. pulchra* (inner flat) and overlapping with each species at the edges of its range. It can sometimes be confused with either species, but especially with *A. pulchra*, with which it can occur in dense stands.

Acropora (Acropora) pulchra (Brook, 1891)
(Figs 61, 62)

Madrepora pulchra Brook, 1891 p.452; 1893 p.44 pl.28 figs A–C

Material examined

JAVA: G32849, G50742–4 Seribu Is; KALIMANTAN: G39807 Pulau Laut; G49299, G49300 N.E. Kalimantan; N. SULAWESI: G35810, G47250–1, G49296 Bunaken N.P.; G47539 Tg Torowitang; C. SULAWESI: G49297–8 Togian Is; S. SULAWESI: G47252 Spumonde Arch.; G50984–5 Tanahjanpea; NUSA TENGGARA: G46703, G50531 Nusa Lembongan; G47487 Lombok; G48624 Flores; G49295 Alor Is; BANDA SEA: G46844 Sekaro I.; G50774 Ambon I.

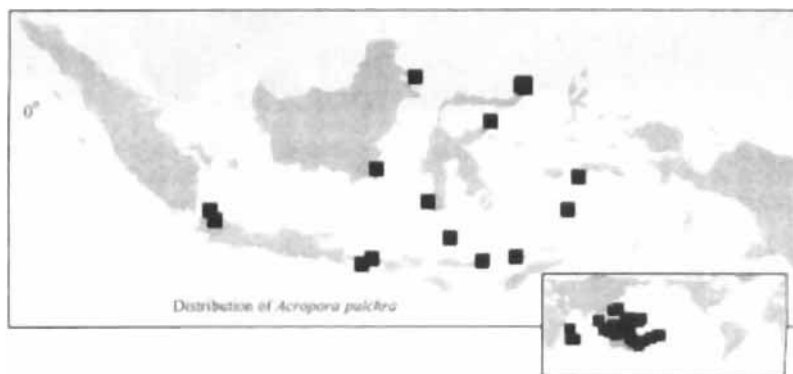


Figure 61. Distribution of *Acropora pulchra* in Indonesia (main map) and worldwide (inset).

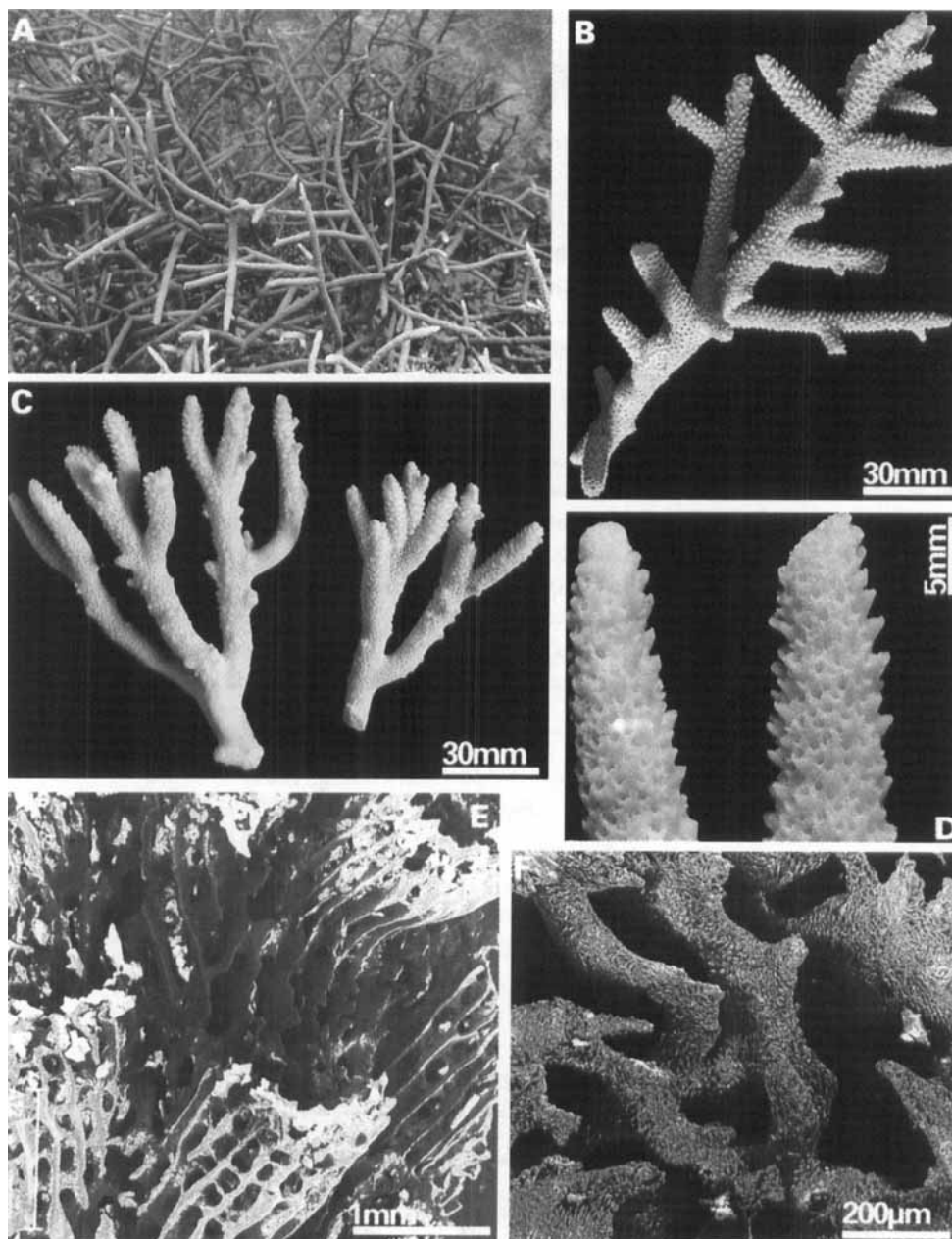


Figure 62. *Acropora pulchra* (A) at Nain I., N. Sulawesi; (B, E) G46844; (C, D, F) G46703: (B, C) portion of colony (D) portion of branches (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Arborescent, sometimes appearing corymbose, the upper growth limit of branches determined by tidal height; branches up to 12 mm in diameter and terete.

Corallites. Axial corallites outer diameter 1.8–3.5 mm, inner diameter 0.6–1.2 mm, primary septa present up to 2/3R, secondary cycle absent or some present to 1/4R; radial corallites

scattered on branches and mostly not touching, a mixture of large and small, larger corallites labellate with 'pointed' lip, smaller corallites sub-immersed with a reduced lip, primary septa to 2/3R, secondary septa absent or a few just visible as points.

Coenosteum. Costate on radial corallites; open reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Open arborescent, thicket-like colonies, usually low, sprawling and less than 50 mm in height because of tidal limits, may appear corymbose when occurring at low tide mark, but can also form tall arborescent thickets, e.g. in sheltered inlets; radial corallites scattered and not very obvious; known colours brown, brown with blue tips; occurs in reef flat and shallow habitats or inter-reefal lagoons.

Remarks

This is usually the only species of *Acropora* encountered on the innermost parts of reef flats in Indonesia, where there is often a zone of rubble and macroalgae. (On the Great Barrier Reef, another species, *A. (Isopora) cuneata* also occurs in this habitat, but this species appears to be rare on Indonesian reefs). At the outermost edge of its range in this habitat, it occurs with *A. aspera*, from which it can be distinguished by its smaller, more pointed and more scattered radial corallites. Because it has been interbred in the laboratory with both morphs of *A. millepora*, and because of the narrow genetic distances detected between the species, this species is the subject of debate about species boundaries in *Acropora* (see Wallace & Willis, 1994).

Acropora (Acropora) millepora (Ehrenberg, 1834)
(Figs 63, 64)

Heteropora millepora Ehrenberg, 1834 p.109

Madrepora spathulata Brook, 1891 p.469; 1893 p.121 pl.32 fig.B

Madrepora squamosa Brook, 1892 p.463; 1893 p.120 pl.20 fig.B

Acropora singularis Nemenzo, 1967 p.91 pl.26 fig.5

Acropora librata Nemenzo, 1967 p.121 pl.34 figs 1,2

Material examined

E. SUMATRA: G49796–802 Riau/Lingga Is; JAVA: G32838, G32845, G50759 Seribu Is; KALIMANTAN: G35583, G39795, G39809–11, G39821 Pulau Laut; G50011, G50019

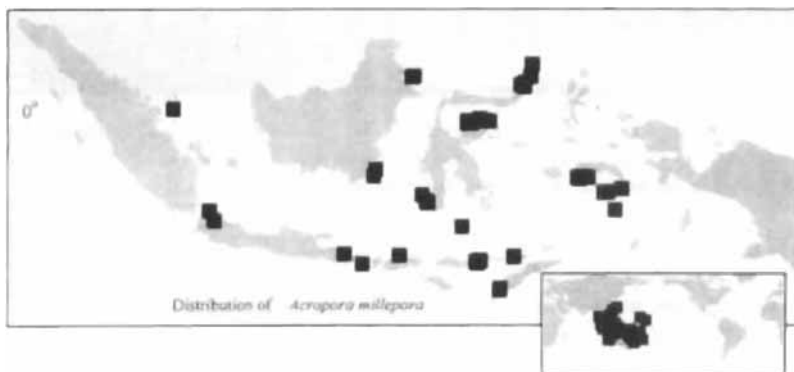


Figure 63. Distribution of *Acropora millepora* in Indonesia (main map) and worldwide (inset).

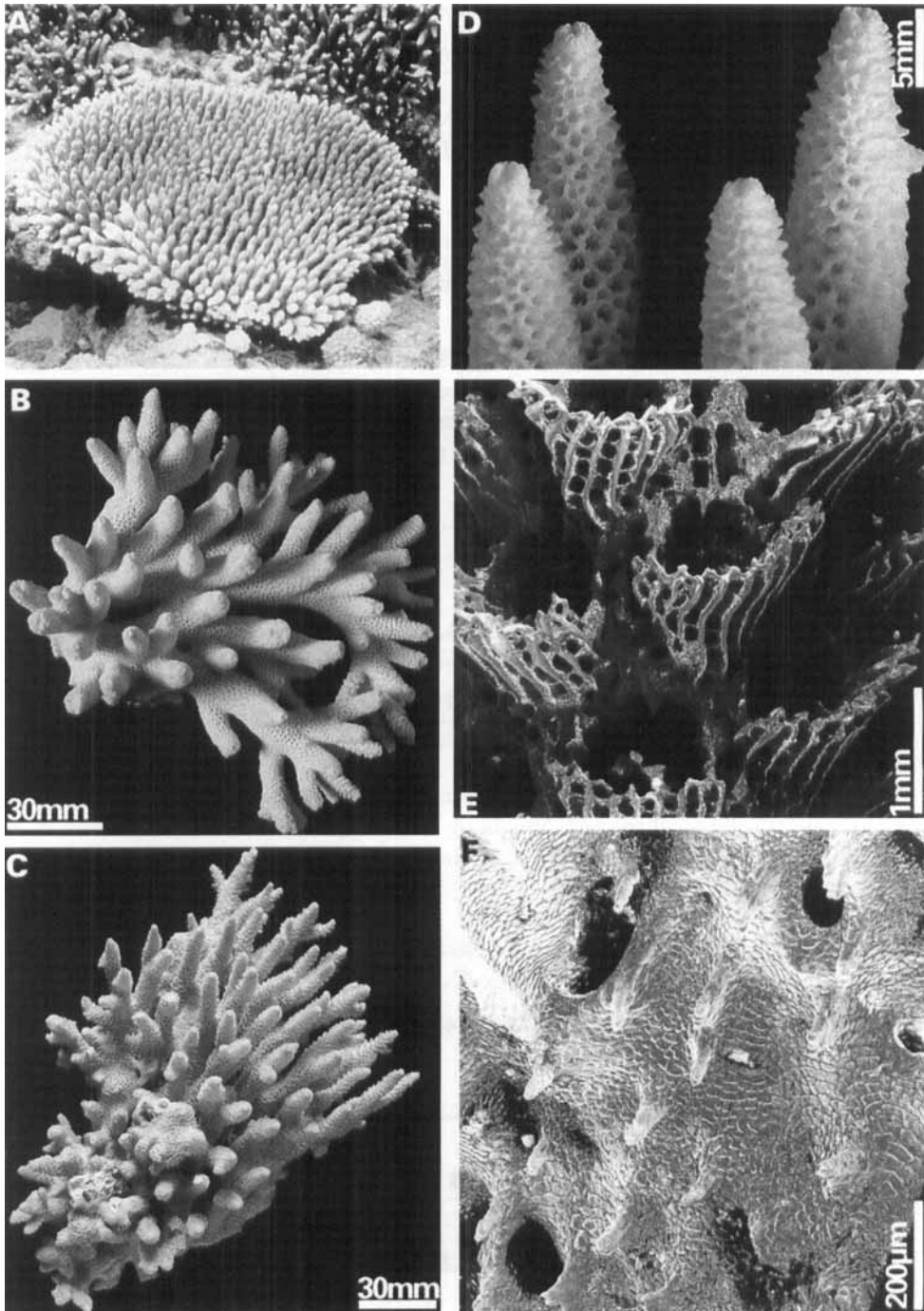


Figure 64. *Acropora millepora* (A) at Wailiti Reef, Maumere Bay, Flores; (B) G39821; (C–F) G46973: (B, C) portion of colony (D) portion of branches (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

N.E. Kalimantan; N. SULAWESI: G35413, G48046 Bunaken N.P.; G48045 Tg Torowitang; G48043–4 Sangihe Is; C. SULAWESI: G50007–10, G50018, G50089–90 Togian Is; S. SULAWESI: G48047–8, G50777–8 Spumonde Arch.; G50949 Taka'bonerate; NUSA TENGGARA: G46987 Bali; G50006 Nusa Penida; G50950–1 Moyo; G49999–G50002, G50015, G50091 Flores; G50003, G50016 W. Timor; G50004–5, G50017 Alor Is; BANDA SEA: G47030, G50776, G50835 Ambon I.; G46969 Nusa Laut; G46970 Suanggi I.; G46971–2 Banda Is; G46973 Manuk I.

Skeletal characteristics

Corallum. Corymbose from a central or side-attached base; branches terete, up to 10 mm in diameter.

Corallites. Axial corallites outer diameter 1.2–3.9 mm, inner diameter 0.4–1.6 mm, primary septa present up to 1/2R, secondary septa absent or just visible to 1/4 R; radial corallites crowded on branches and touching, equally sized labellate, with no upper wall and lower wall developed into a flaring lip, primary septa present to 2/3R, secondary septa present to 1/4R.

Coenosteum. Costate on radial corallites; reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Corymbose colonies; radial corallites scale-like, very evenly distributed and sized; known colours green with orange branch tips, orange-brown, pink or blue (most commonly pink on Indonesian reefs); occurs mostly intertidally on reef flats, or in shallow subtidal areas (3 m or less).

Remarks

As noted by Wallace & Willis (1994), the synonymy given above is probably too broad, encompassing 'thick-branched' and 'thin-branched' morphs which do not interbreed. In Indonesia, however, only the 'thin-branched' morph has been found, and this is identified with the senior synonym *A. millepora*.

Acropora (Acropora) spicifera (Dana, 1846)
(Figs 65, 66)

Madrepora spicifera Dana, 1846 p.442 pl.33 figs 4,4a,4b,5

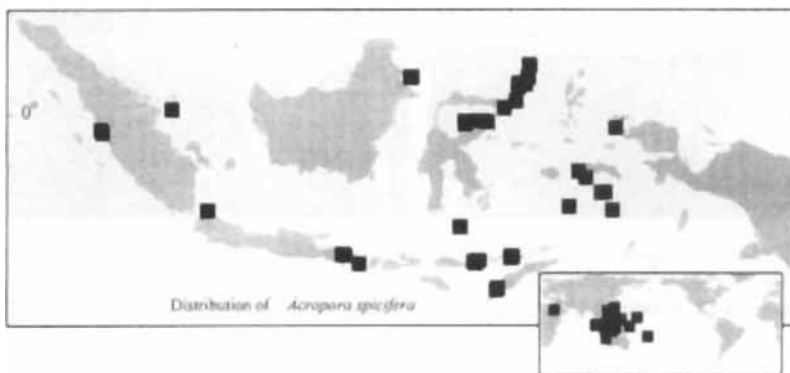


Figure 65. Distribution of *Acropora spicifera* in Indonesia (main map) and worldwide (inset).

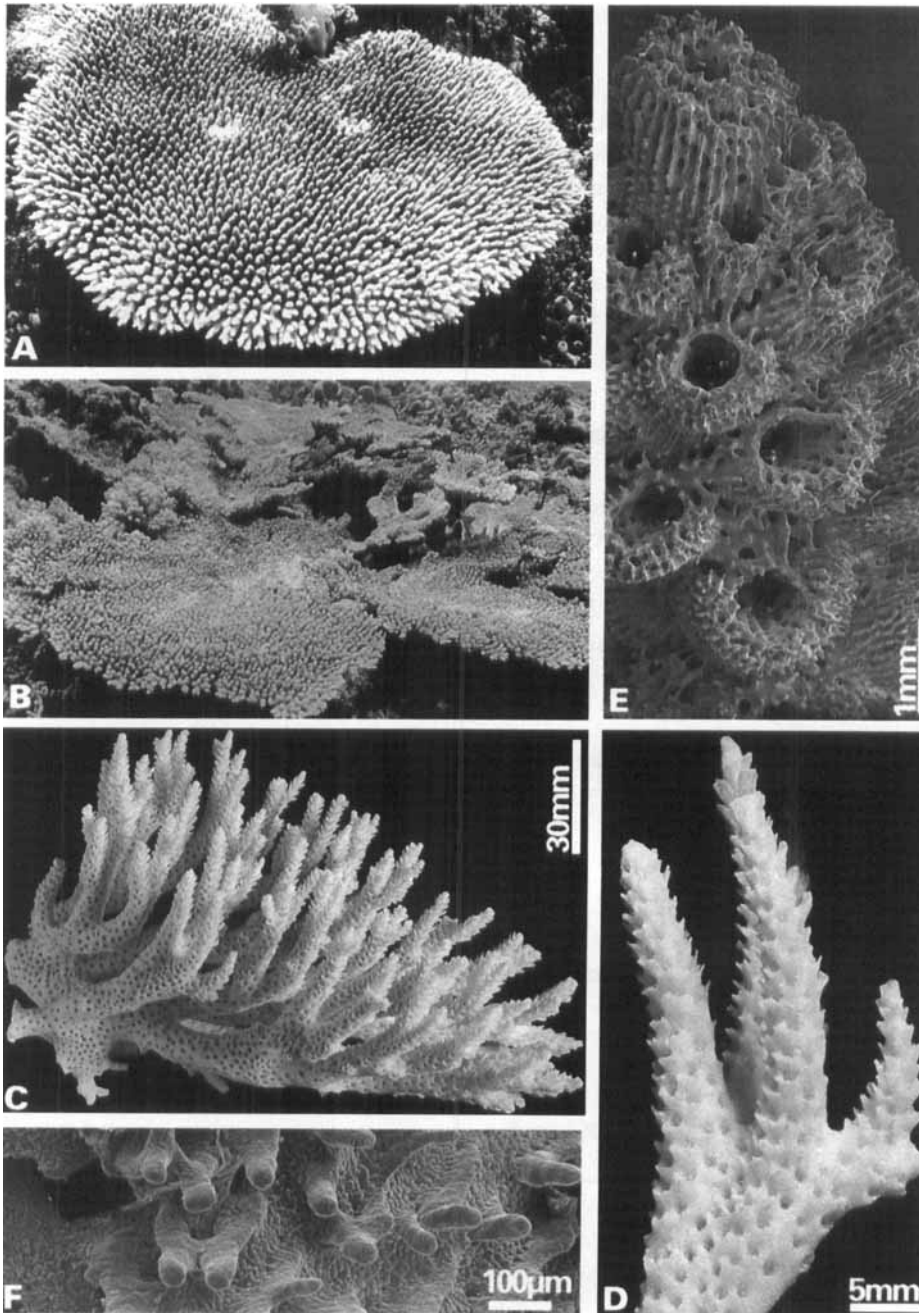


Figure 66. *Acropora spicifera* (A) at Reta I., Alor Is., E. Nusa Tenggara (B) at Walea Lighthouse, Togian Is., Central Sulawesi; (C, D) G46944; (E, F) G50152: (C) portion of colony (D) portion of branches (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G50152, G50616 Padang; E. SUMATRA: G49827–8 Riau/Lingga Is; JAVA: G50732–3 Seribu Is; KALIMANTAN: G50179–80 N.E. Kalimantan; N. SULAWESI: G50169 Tg Dodepo; G48075, G50615 Bunaken N.P.; G50177 Batong I.; G50614 Tg Pisok; G50178, G50612–3 Tg Torowitang; G50610–1 Tg Pulisan; G50608–9 Sangihe Is; C. SULAWESI: G50170–6 Togian Is; S. SULAWESI: G43820–3 Taka'bonerate; NUSA TENGGARA: G46988–94, G50181–3 Bali; G50617 Nusa Lembongan; G50153–6 Flores; G50157–9 W. Timor; G50160–8 Alor Is; BANDA SEA: G50607 Lucipara Is; G50780 Ambon I.; G50151 Nusa Laut; G46943–5 Banda Is; G50606 Manuk I.; IRIAN JAYA: G36042 Batanta I.

Skeletal characteristics

Corallum. Corymbose from a central or side-attached base; branches terete, up to 10 mm in diameter.

Corallites. Axial corallites outer diameter 0.9–1.9 mm, inner diameter 0.5–0.9 mm, primary septa present to 1/3R, secondary septa absent; radial corallites crowded on branches and touching, equally sized labellate, with no upper wall and lower wall developed as an upwardly directed flat scale, primary septa present up to 1/3R, secondary septa absent.

Coenosteum. Costate on radial corallites; reticulate with scattered simple spinules or lines of spinules in intercorallite areas.

Field characteristics

Flattened corymbose or tabular colonies; radial corallites reduced scale-like, touching, very evenly distributed and sized; known colours pink or pale brown; occurs mostly intertidally on reef flats.

Remarks

This species is very similar to *A. millepora*, from which it is distinguished by its generally narrower and shorter branchlets (forming tables and plates rather than the thicker corymbose colonies) and by its less developed radial corallite lips.

Acropora (Acropora) indiana Wallace, 1994
(Figs 67, 68)

Acropora indiana Wallace, 1994 p.963 fig.4

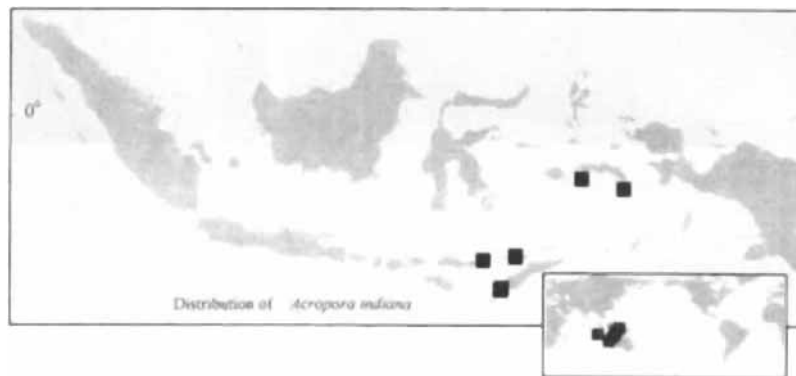


Figure 67. Distribution of *Acropora indiana* in Indonesia (main map) and worldwide (inset).

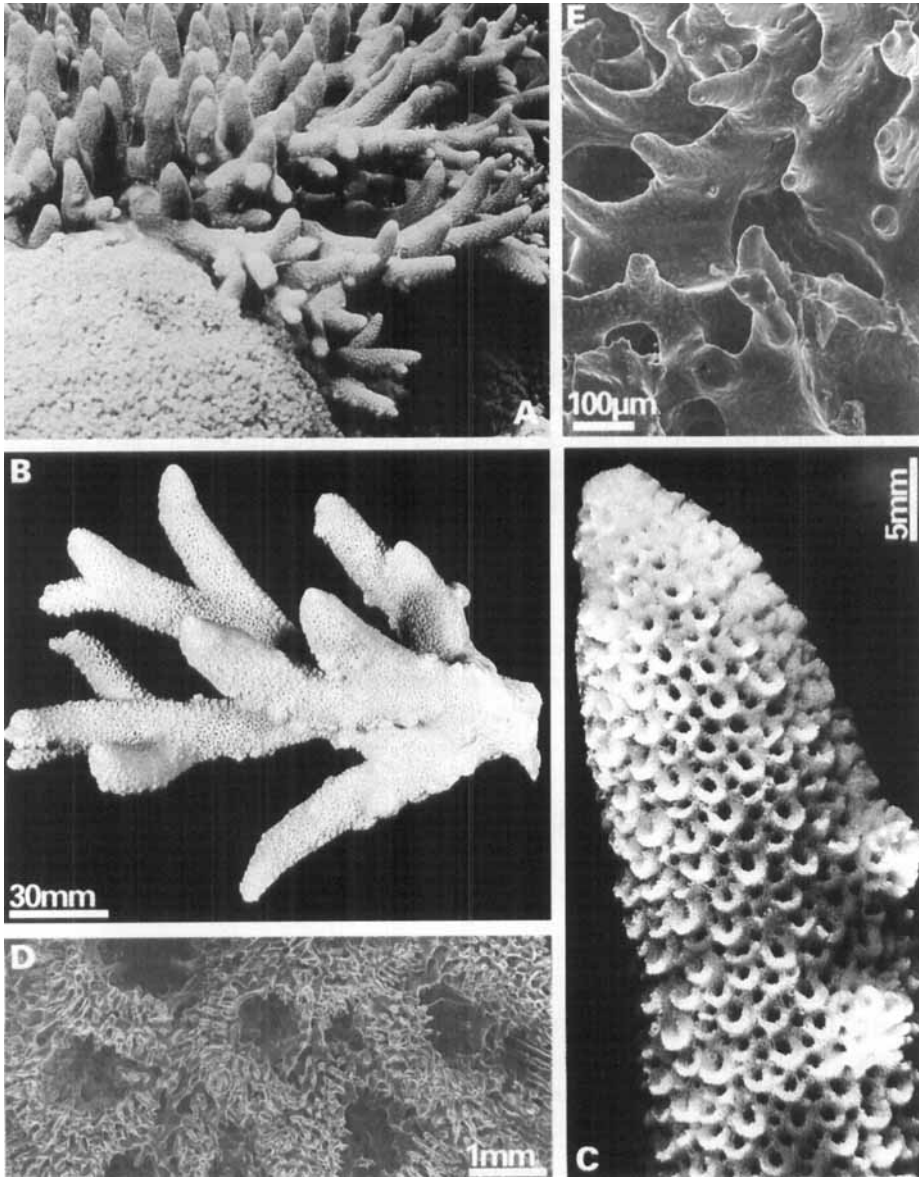


Figure 68. *Acropora indiana* (A) at Kera I., W. Timor; (B–E) G48563: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Material examined

NUSA TENGGARA: G48561–2 Flores; G48563–5, G48620–1 Kupang; G48566–7 Alor Is; BANDA SEA: G47037 Ambon I. (*paratype*); G46415–8 Suanggi I. (*paratypes*).

Skeletal characteristics

Corallum. Sub-arborescent: from a central to side attachment, thick branches radiate horizontally and then extend vertically as thick cones; basal branch diameter up to 3.0 cm.

Corallites. Axial corallites outer diameter 2.7–3.4 mm, inner diameter 0.8–1.6 mm; primary septa present up to 1/3R, secondary septa to 1/4R; radial corallites crowded on branches, mostly similar in size, with strong lower lip, occasional small immersed corallites between these; distal radial corallites have primary septa to 1/3R and secondaries to 1/4R; in radials towards bases of branches the primary septa reach the centre of the corallites.

Coenosteum. Costate on radial corallite lips; reticulate in intercorallite areas.

Field characteristics

Limited-branching colonies with digitate or sub-arborescent growth; known colours bright green or greenish-cream; occurs on intertidal reef flats.

Remarks

The radial corallite shapes in 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 robust and limited in branching than the potentially arborescent shape of *A. aspera*, distinguish it. Its general colony shape as well as its green colouration make it superficially similar to *A. robusta*, but the differences in radial corallite type are discernible even in the field.

The *Acropora selago* group

Radial corallites have 'cochleariform' shape: upper wall is short and weakly developed, lower wall forms a flaring lip. Species differ in the degree of development of this lip and in colony shape. Coenosteum is costate on radial corallites, reticulate with simple spinules in intercorallite areas.

Acropora (Acropora) selago (Studer, 1878)
(Figs 69, 70)

Madrepora selago Studer, 1878 p.530

Madrepora delicatula Brook, 1891 p.461; 1893 p.109, p.128 figs D,E

Material examined

W. SUMATRA: G50189; KALIMANTAN: G50210–7, G50221, G50930 N.E. Kalimantan; N. SULAWESI: G34180, G48067–70, G50198 Bunaken N.P.; G48066 Tg Torowitang; G48064–5, G50186 Sangihe Is; C. SULAWESI: G50199–209 Togian Is; S.

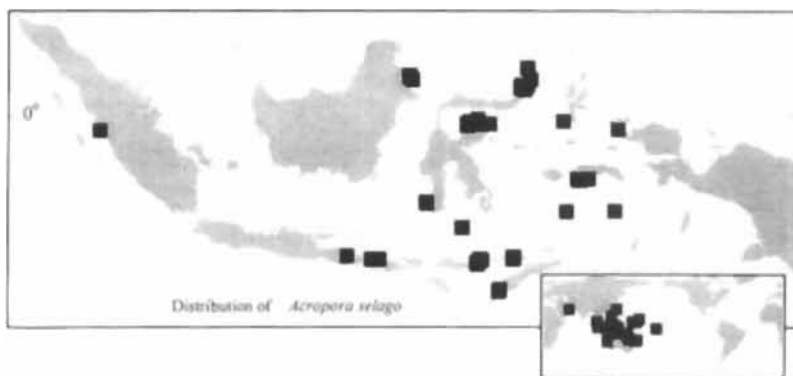


Figure 69. Distribution of *Acropora selago* in Indonesia (main map) and worldwide (inset).

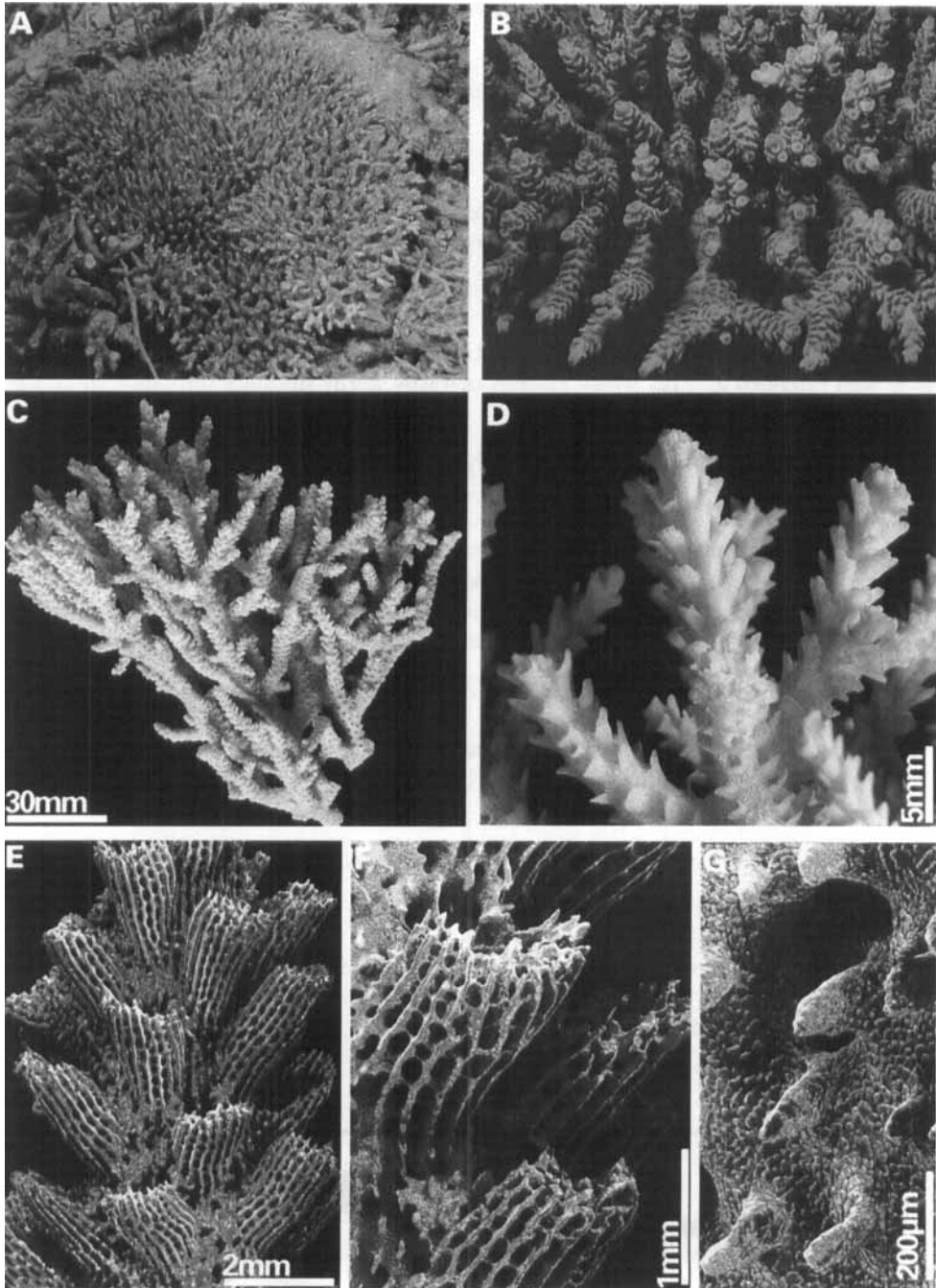


Figure 70. *Acropora selago* (A) at Nain I., N. Sulawesi (B) at Tg Torowitang, N. Sulawesi; (C, D) G46941; (E–G) G48065: (C) portion of colony (D) portion of branches (E, F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

SULAWESI: G48071, G50187–8 Spumonde Arch.; G50931–3, G51071 Taka'bonerate;
 NUSA TENGGARA: G50218–20 Bali; G48072–3, G50526 Lombok; G48674–5, G50191,

G50193, G50625 Flores; G48676–7, G50192 Timor; G48678–9, G50194–7, G50626–7 Alor Is; BANDA SEA: G35964, G35975 Bacan I.; G46941–2, G48062, G50185 Sekaro I.; G47034, G50775 Ambon I.; G47483 Nusa Laut; G48063 Manuk I.; IRIAN JAYA: G36037 Batanta I.

Skeletal characteristics

Corallum. Corymbose to caespito-corymbose; very slender terete branches up to 5 mm diameter, in which most of the branch diameter is provided by the radial corallites.

Corallites. Axial corallites outer diameter 1.1–2.4 mm, inner diameter 0.5–0.9 mm, primary septa present up to 1/2R, secondary septa absent or a few present up to 1/3R; radial corallites evenly sized, scale-like in appearance, cochleariform with no upper wall and with lower wall extended as a lip, which extends upwards, partly shielding the calice and giving a scaly appearance to the branch.

Coenosteum. Costate or lines of simple laterally flattened spinules throughout.

Field characteristics

Corymbose to caespito-corymbose colonies, usually side-attached, with short, slender, 'scaly' branches; the withdrawn radial polyps can usually be seen as darker brown tissue inside each radial corallite; known colours pale brown, pink-brown, blue or blue-brown: occurs subtidally on protected reef slopes and patch reefs and in lagoons.

Remarks

This species reaches its greatest size and is usually common in lagoonal habitats in Indonesia, although it is also encountered on gentle reef slopes and other protected habitats.

Acropora (Acropora) tenuis (Dana, 1846)

(Figs 71, 72)

Madrepora tenuis Dana, 1846 p.451

Madrepora macrostoma Brook, 1891 p. 464; 1893 p.105 pl.19 fig.B

Madrepora bifaria Brook, 1892 p.453; 1893 p.110 pl.30 fig.A

Madrepora kenti Brook, 1892 p.458; 1893 p.110 pl.11 fig.B

Acropora plana Nemenzo, 1967 p.93 pl.27 fig.3

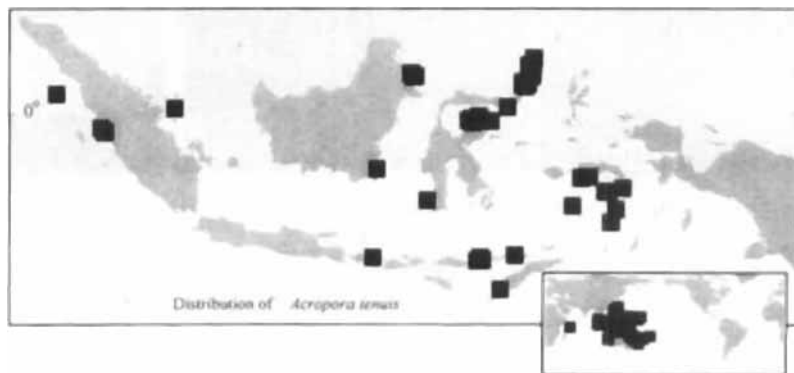


Figure 71. Distribution of *Acropora tenuis* in Indonesia (main map) and worldwide (inset).

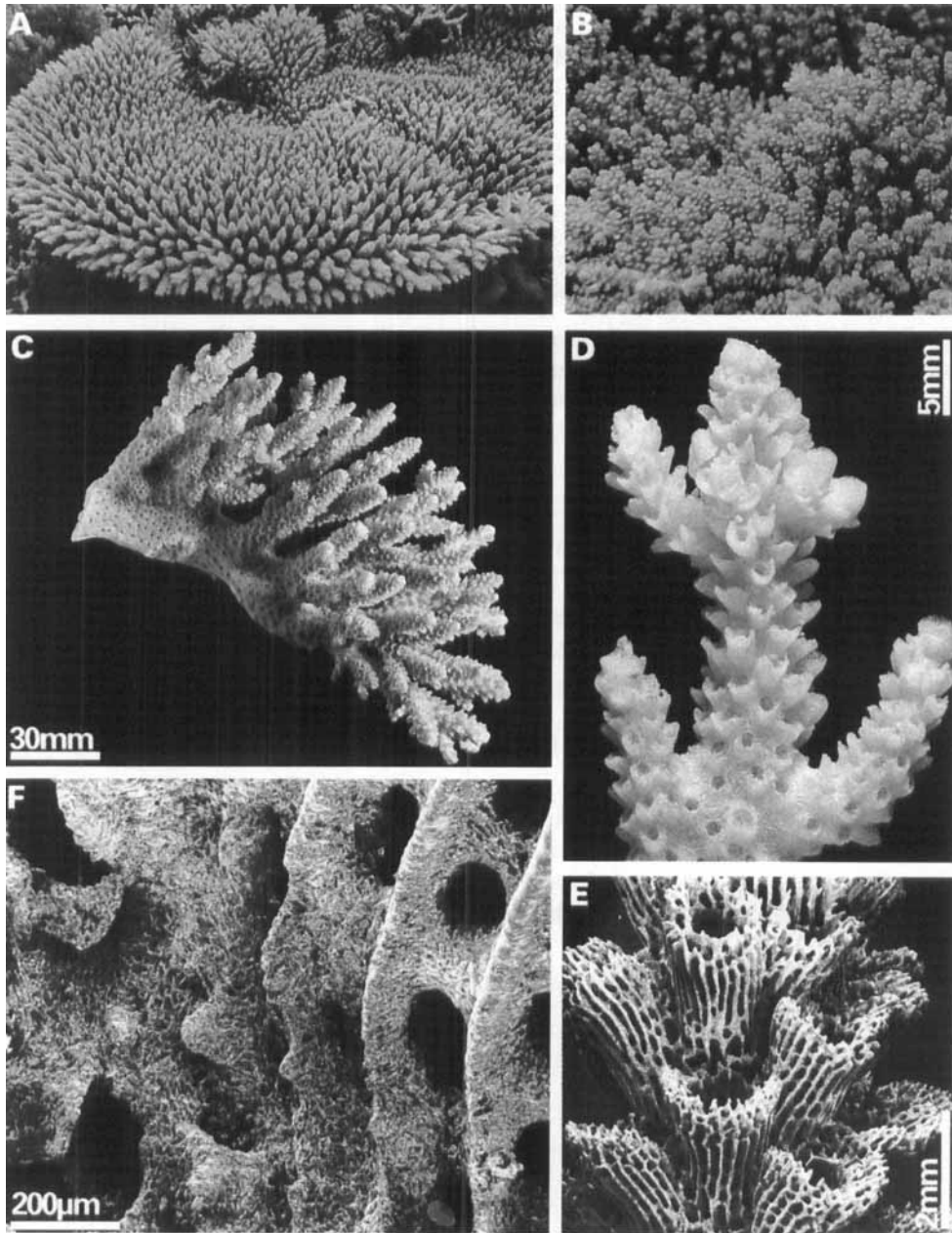


Figure 72. *Acropora tenuis* (A) at Walea Lighthouse, Togian Is, Central Sulawesi (B) at Nain I., N. Sulawesi; (C, D) G46865; (E, F) G47463: (C) portion of colony (D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G47164 Nias I.; G48639–43 Padang; E. SUMATRA: G49821 Riau/Lingga Is; JAVA: G50752–3 Seribu Is; G50772–3 Karimunjawa I.; KALIMANTAN: G39825 Pulau Laut; G50119–24 N.E. Kalimantan; N. SULAWESI: G50112 Tg Dodepo;

G34175, G47473–4 Bunaken N.P.; G47472 Tg Pisok; G47471 Tg Torowitang; G47469 Tg Pulisan; G47462–8, G47470 Sangihe Is; C. SULAWESI: G50105, G50113–8 Togian Is; S. SULAWESI: G47475 Spumonde Arch.; NUSA TENGGARA: G47476 Lombok; G50954 Moyo; G48644–9 Flores; G48650 W. Timor; G48651–2 Alor Is; BANDA SEA: G46865 Lucipara Is; G47029 Ambon I.; G36219 Haruku I.; G46861 Nusa Laut; G46862 Suanggi I.; G46866, G46966 Banda Is; G46864 Serua I.; G46863 Manuk I.

Skeletal characteristics

Corallum. Corymbose to caespito-corymbose; closely arranged terete branches up to 10 mm in diameter and up to 90 mm in length.

Corallites. Axial corallites outer diameter 1.8–3.4 mm, inner diameter 0.8–1.2 mm, primary and secondary septal cycles both present up to 1/3R; radial corallites cochleariform, the lip rounded, flaring broadly on radials towards the base of branches and extended upwards on distal radials, primary septa present to 2/3R, with directives well developed, secondary septa absent or some present to 1/4R.

Coenosteum. Costate or rows of simple spinules on radial corallites; reticulate with scattered simple laterally flattened spinules in intercorallite areas.

Field characteristics

Colonies corymbose to caespito-corymbose with narrow branches, most of the branch diameter formed by the radial corallites which are closely and neatly arranged and evenly sized with obvious, flaring lips; known colours pale grey, pink grey, cream (sometimes with bright orange axial polyps and purple radial polyps), pale brown or blue; occurs in shallow subtidal habitats, including outer reef flats and upper slopes.

Remarks

This species is encountered on most reefs in Indonesia, where its compact, mostly pale grey, colonies make it one of the easiest *Acropora* to identify. Other species in the group, especially *A. yongei* and *A. striata*, have very similar radial corallites, and the species are separated by their distinctive colony shapes.

Acropora (Acropora) striata (Verrill, 1866)
(Figs 73, 74)

Madrepora striata Verrill, 1866 p.24; 1901 p.251 pl.36 figs 4,4a pl.36A figs 4,4a pl.36F fig.7

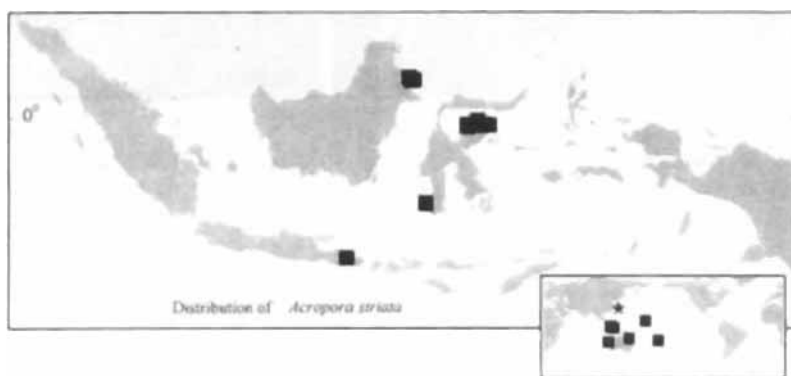


Figure 73. Distribution of *Acropora striata* in Indonesia (main map) and worldwide (inset).

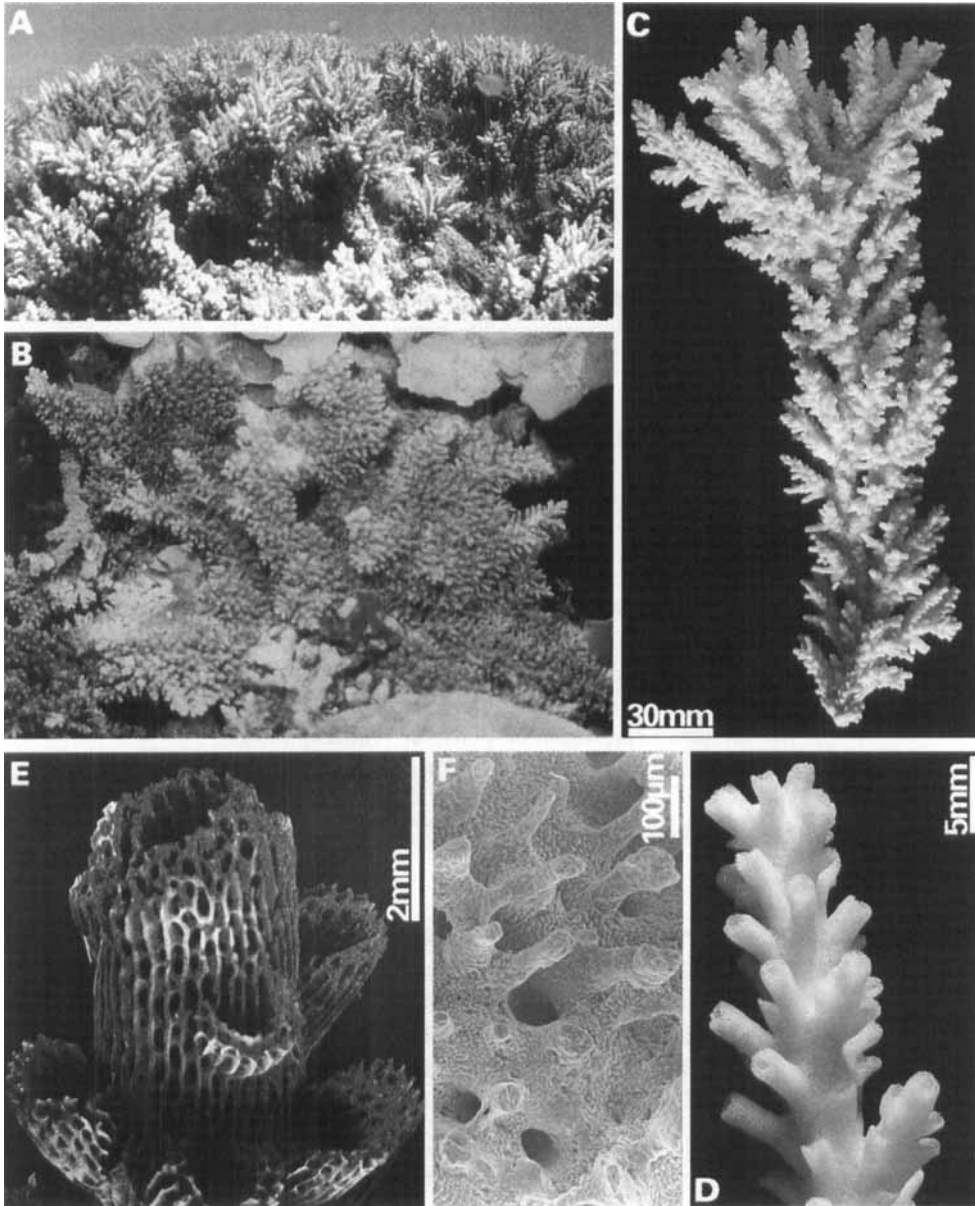


Figure 74. *Acropora striata* (A) at Sendiri I., Togian Is, Central Sulawesi (B) at Makailu I., Banggai Is, Central Sulawesi; (C, D) G48946; (E, F) G48954: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

KALIMANTAN: G48953–4, G50490 N.E. Kalimantan; C. SULAWESI: G48946–52, G50104, G50318 Togian Is; S. SULAWESI: G48945, G50489 Spumonde Arch.; NUSA TENGGARA: G50106–7 Bali.

Skeletal characteristics

Corallum. Irregular hispidose, typically with upright hispidose branches, up to 15 mm in diameter, from which several uppermost branchlets fan out further than those below.

Corallites. Axial corallites outer diameter 1.6–2.4 mm, inner diameter 0.8–1.1 mm, primary septa present up to 1/2R, secondary septa some to all present up to 1/3R; radial corallites mostly touching, tubular with cochleariform or lipped openings, primary septa present up to 1/3R, secondary septa some to all present up to 1/4R.

Coenosteum. Costate or rows of simple spinules on radial corallites; reticulate with scattered simple laterally flattened spinules in intercorallite areas.

Field characteristics

Typically occurs as clumps of upright hispidose branches in which the uppermost branchlets are longer; known colours bright blue or lavender, cream, or cream with bright blue tips; occurs just subtidally on sheltered reef tops and the edges of enclosed lagoons.

Remarks

This is not a common species and some colonies intergrade in characters with *A. tenuis*; however, many are distinctive.

Acropora (Acropora) donei Veron & Wallace, 1984
(Figs 75, 76)

Acropora donei Veron & Wallace, 1984 p.287 figs 698,702,708

Material examined

W. SUMATRA: G50320 Padang; KALIMANTAN: G50324–5 N.E. Kalimantan; N. SULAWESI: G47507–10 Bunaken N.P.; G47506 Tg Pisok; G47505 Tg Torowitang; G47501–4 Tg Pulisan; G47492–500, G47514 Sangihe Is; C. SULAWESI: G50323 Togian Is; NUSA TENGGARA: G50326–7 Bali; G47511–2 Lombok; G50321 Flores; G48656 W. Timor; G48657, G50322 Alor Is; BANDA SEA: G48041 Sekaro I.; G50319 Lucipara Is; G47513 Ambon I.; G47491 Banda Is.

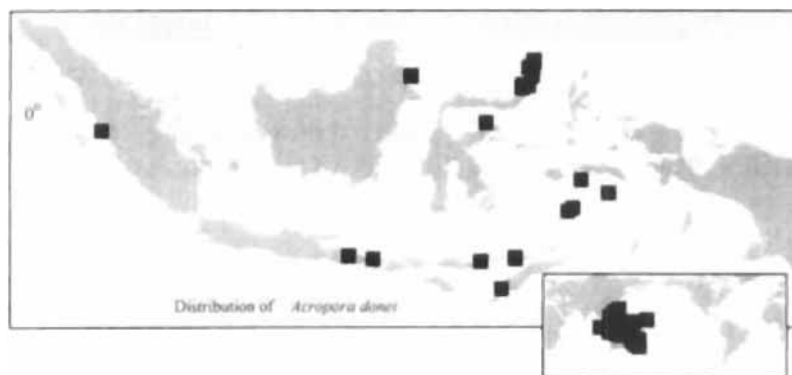


Figure 75. Distribution of *Acropora donei* in Indonesia (main map) and worldwide (inset).

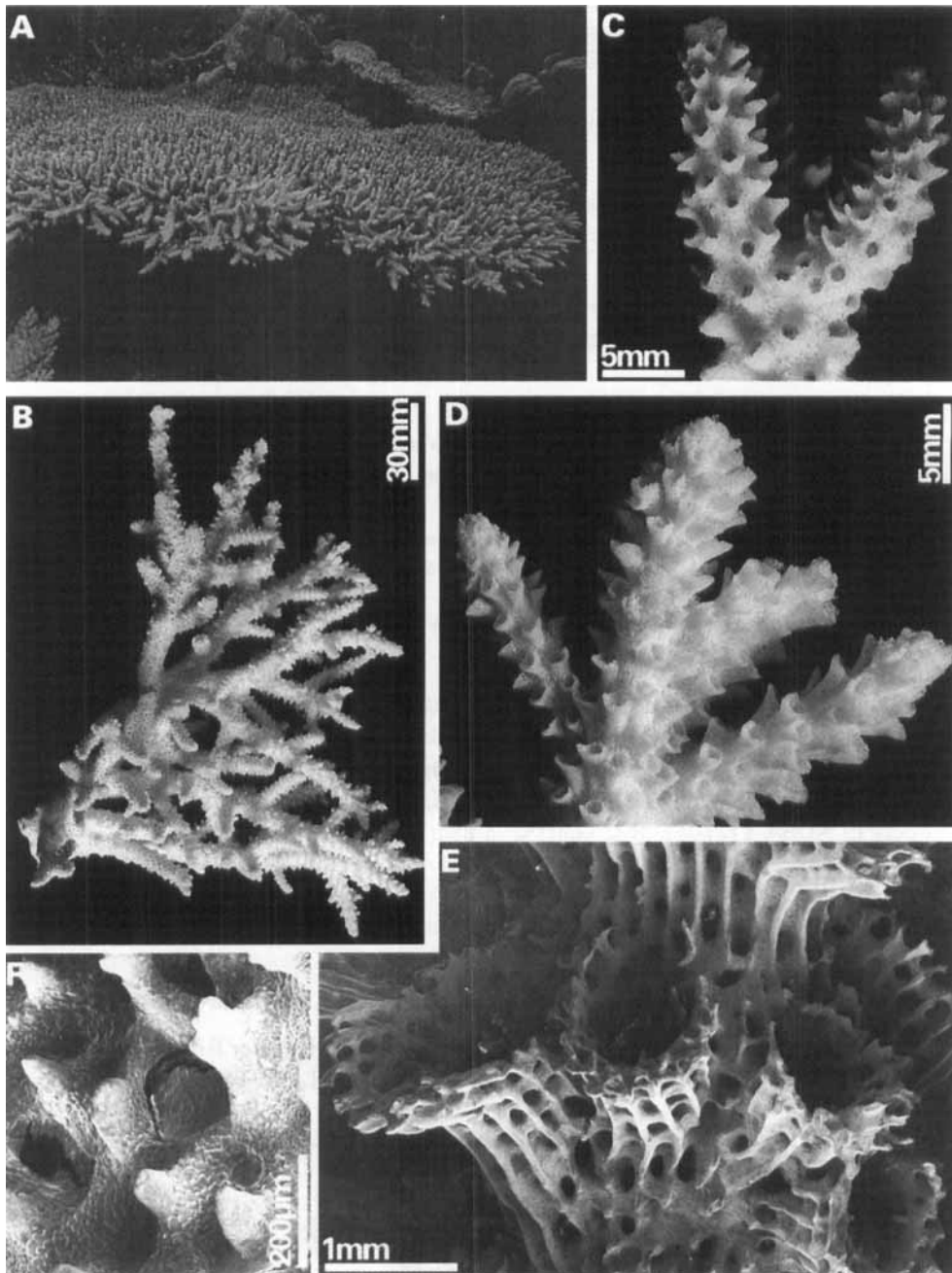


Figure 76. *Acropora donei* (A) at Nain I., N. Sulawesi; (B, C, E) G47492; (D, F) G47491: (B) portion of colony (C, D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Corymbose or caespito-corymbose or arborescent tables; branches up to 5 mm in diameter and well spaced, main branches extend horizontally and secondary branches extend upwards, often curving, from these.

Corallites. Axial corallites outer diameter 2.0–4.2 mm, inner diameter 0.8–1.4 mm, primary septa present up to 2/3R, secondary septa to 1/3R; radial corallites evenly sized and distributed on branches, not touching, cochleariform but with lip reduced and extending outwards from branch, primary septa present to 1/2R, secondary septa absent or a few just visible to 1/3R.

Coenosteum. Costate or lines of simple spinules on radial corallites; reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Colonies large tables or side-attached plates, up to 3 m in diameter; known colours cream, white or white with bright blue tips; found subtidally on upper reef slopes or submerged reefs.

Remarks

This is a common species on Indonesian reefs and reefs of the South China Sea and Japan. It can sometimes be confused with flattened colonies of *A. tenuis*.

Acropora (Acropora) yongei Veron & Wallace, 1984
(Figs 77, 78)

Acropora yongei Veron & Wallace, 1984 p.294 figs 719,723

Material examined

JAVA: G50745 Seribu Is; KALIMANTAN: G50238–41, G50250–1 N.E. Kalimantan; N. SULAWESI: G50233 Tg Dodepo; G34188, G47531 Bunaken N.P.; G47530 Tg Torowitang; G47528 Tg Pulisan; G47522–7, G47529 Sangihe Is; C. SULAWESI: G50234–7, G50248–9 Togian Is; S. SULAWESI: G47533–4, G47536, G50766–8 Spumonde Arch.; G50938 Panjang I.; NUSA TENGGARA: G50252–3 Bali; G50232 Nusa Penida; G47532, G47535 Lombok; G50939 Sangeang I.; G50940 Komodo; G50224–6, G50941 Flores; G50242–3 W. Timor; G50227–31, G50244–7 Alor Is; BANDA SEA: G36224 Pombo I.; G47521 Nusa Laut; G47484, G47520 Suangi I.; G47516–9 Banda Is; G47515, G48160 Manuk I.

Skeletal characteristics

Corallum. Arborescent, frequently branching; branches up to 15 mm in diameter.

Corallites. Axial corallites outer diameter 1.8–3.5 mm, inner diameter 0.8–1.2 mm, primary septa present up to 2/3R, secondary septa present up to 1/3R; radial corallites closely

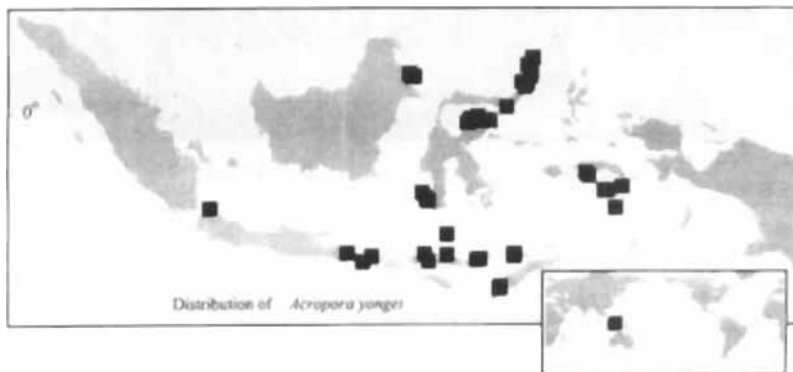


Figure 77. Distribution of *Acropora yongei* in Indonesia (main map) and worldwide (inset).

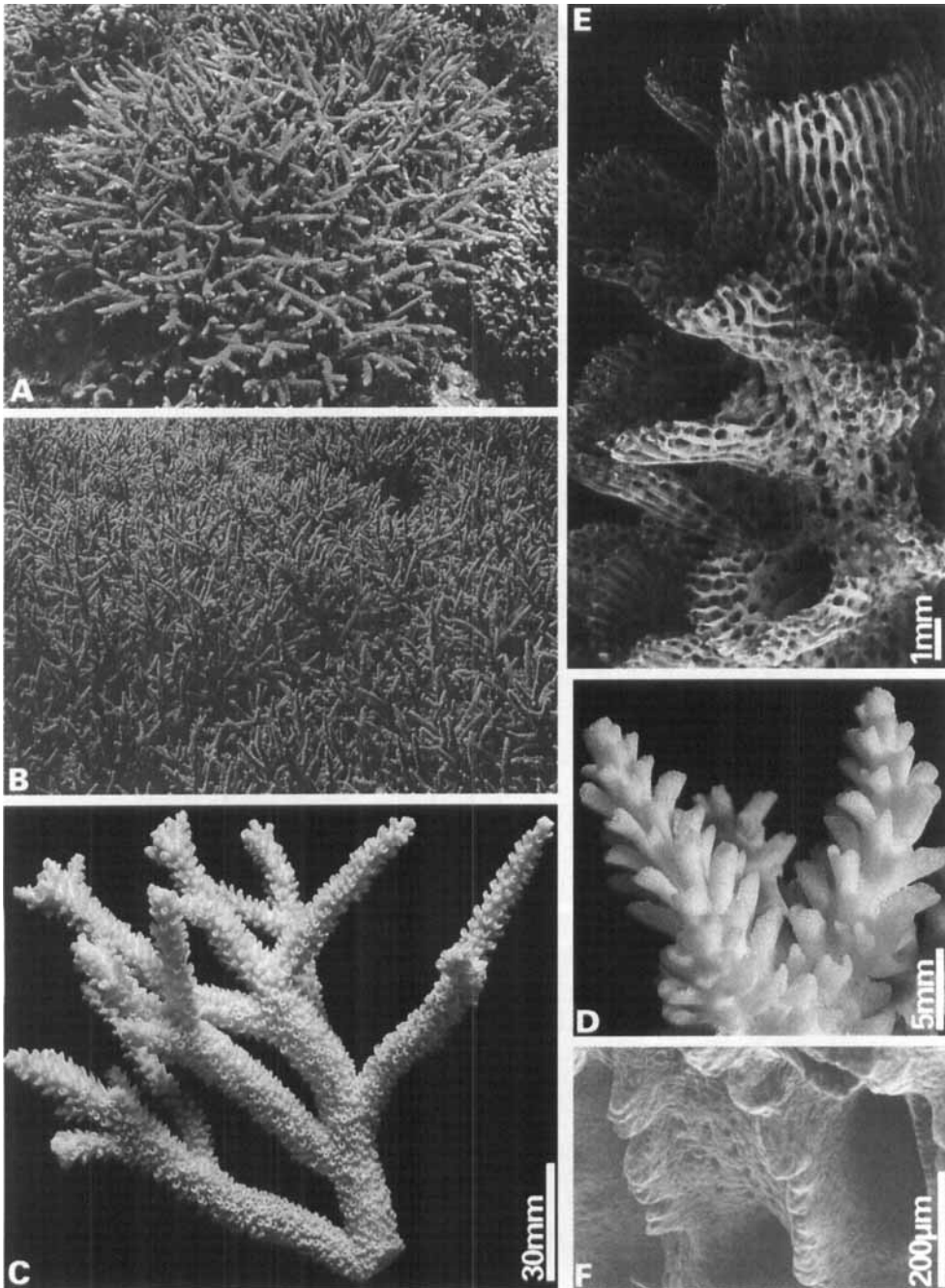


Figure 78. *Acropora yongei* (A) at Pulisan, N. Sulawesi (B) at Trawangan I., Lombok; (C, E, F) G47522; (D) G47484: (C) portion of colony (D) portion of branches (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

arranged on branches but not touching, cochleariform, with flaring rounded lip, primary septa present up to 1/2R, secondary septa absent or some to all present to 1/4R.

Coenosteum. Costate or lines of simple spinules on radial corallites; lines of simple spinules on intercorallite areas.

Field characteristics

Colonies open arborescent, sometimes forming thickets, sometimes small clumps; known colours pale brown, yellow-brown, pink-brown or cream; occurs subtidally on reef slopes or submerged reef tops.

Remarks

This common species can form a major component of arborescent stands. It is easily distinguished from other arborescent species by the large, open radial corallites with flaring lips: most other arborescents have some variation of tubular corallites. As noted by Wallace *et al.*, 1991, this species may be a synonym of *Acropora haimeii*.

The *Acropora hyacinthus* group

Colonies table or plate form with central to side attachment via a thickened stalk; radial corallites with no upper wall development, the lower wall developed into a lip; coenosteum costate on radial corallites and reticulate with simple spinules between radial corallites.

Acropora (Acropora) hyacinthus (Dana, 1846)
(Figs 79, 80)

Madrepora hyacinthus Dana, 1846 p.444 pl.32 fig.2

Madrepora patella Studer, 1878 p.526 pl.1 fig.1

Madrepora conferta Quelch, 1886 p.164 pl.10 fig.3

Madrepora pectinata Brook, 1892 p.460; 1893 p.95 pl.27 figs D,E

Madrepora recumbens Brook, 1892 p.461; 1893 p.106 pl.27 fig.F

Madrepora sinensis Brook, 1893 p.114 pl.33 fig.C

Material examined

W. SUMATRA: G41545–50 Nias I.; G48508–14, G50027 Padang; E. SUMATRA: G49836–49 Riau/Lingga Is; JAVA: G50062, G50085 Seribu Is; KALIMANTAN: G50044–56, G50994, G51166 N.E. Kalimantan; N. SULAWESI: G50035 Tg Dodepo; G35501–5

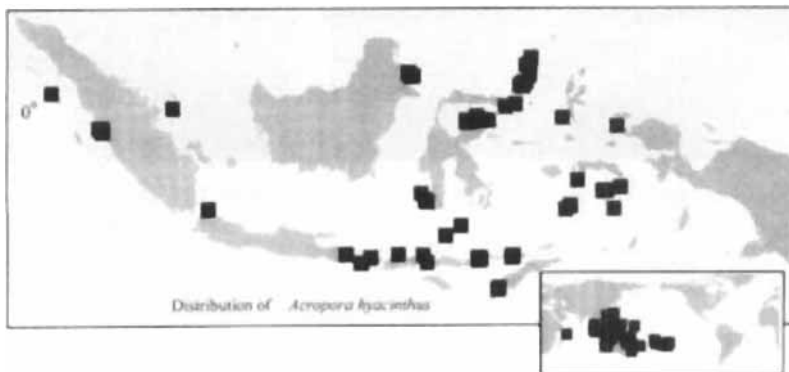


Figure 79. Distribution of *Acropora hyacinthus* in Indonesia (main map) and worldwide (inset).

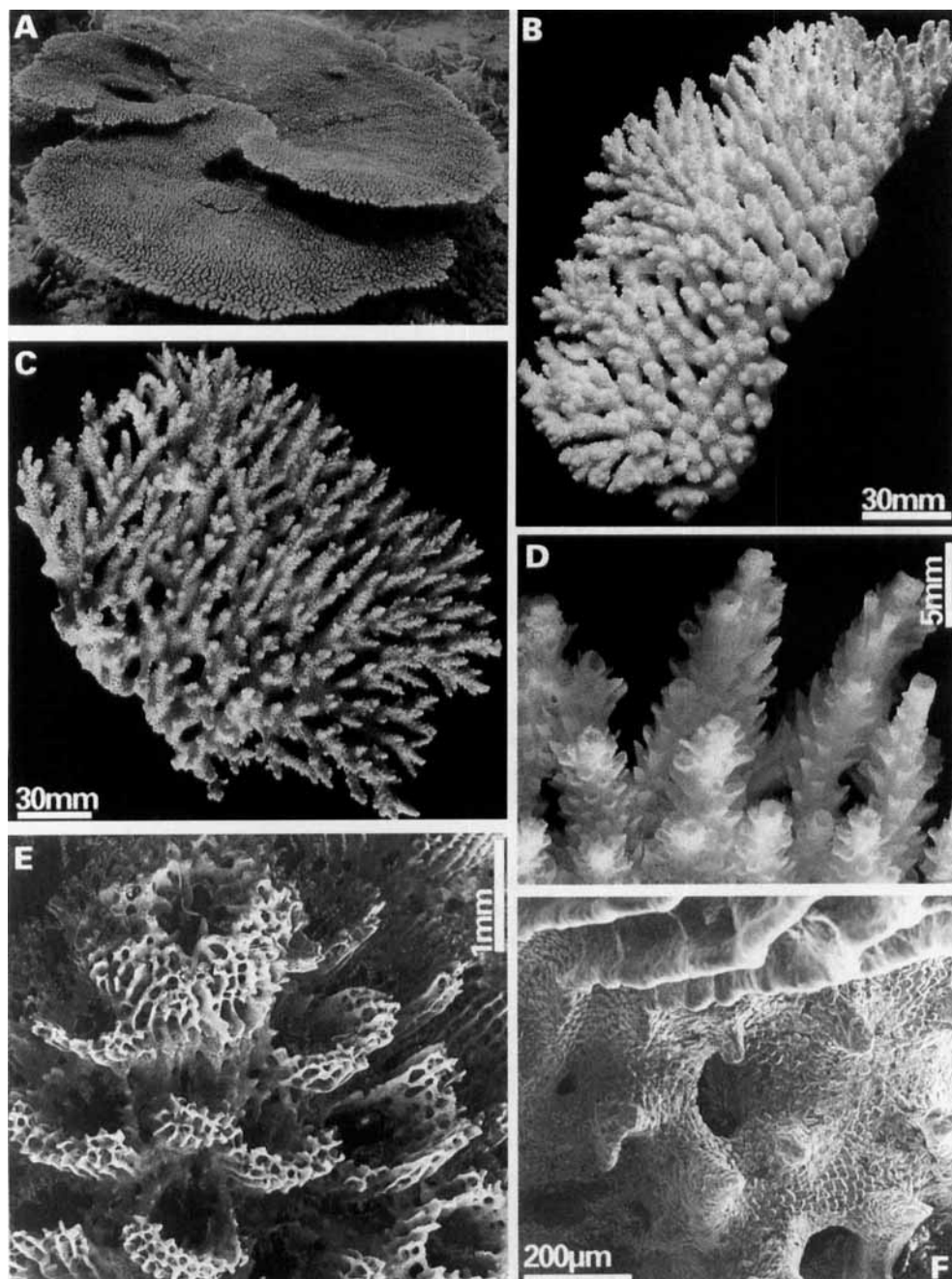


Figure 80. *Acropora hyacinthus* (A) at Bira Reef, Jakarta Bay, Java; (B, D–F) G47300; (C) G46907: (B, C) portion of colony (D) portion of plate (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Bunaken N.P.; G50034 Tg Flesko; G47306 Tg Pisok; G47305 Tg Torowitang; G47297–304, G50026, G50618 Sangihe Is; C. SULAWESI: G50036–43, G50086 Togian Is; S. SULAWESI: G47307, G47973, G50763–5 Spumonde Arch.; G50993 Taka'bonerate; G50992

Panjang I.; NUSA TENGGARA: G50057–60 Bali; G50031–3 Nusa Penida; G46695–7 Nusa Lembongan; G47449, G48042, G48122–3, G48158 Lombok; G50988–91 Moyo; G50995–7 Sangeang I.; G50998–1002 Komodo; G48515–9, G50028 Flores; G48520–2 W. Timor; G48523–30, G50029–30, G50552, G50619 Alor Is; BANDA SEA: G35971 Bacan I.; G47296 Sekaro I.; G46909, G46911 Lucipara Is; G36214 Ambon I.; G46906 Suanggi I.; G46907–8, G46912–3 Banda Is; G46910 Manuk I.; IRIAN JAYA: G36036 Batanta I.

Skeletal characteristics

Corallum. Tabular to plate-like colonies to over 3 m diameter, the table-top consisting of horizontal branches from which extend single vertical branchlets up to 3 mm in diameter and 20 mm in length.

Corallites. Axial corallites outer diameter 1.0–2.0 mm, inner diameter 0.4–1.1 mm, primary septa present up to 3/4R with obvious directives, secondary septa absent or some present to 1/4R; radial corallites labellate, the upper wall undeveloped and the lower wall developed as a rounded or square lip which extends outward from the branch; looking down on the branch, the radial corallites can be seen to be arranged in a neat rosette around the axial corallite; primary septa present to 1/2R with directives obvious, secondary septa absent or some present to 1/4R.

Coenosteum. Costate on radial corallites; reticulate with scattered laterally-flattened spinules in intercorallite areas.

Field characteristics

Colonies occur as large tables or plates with a flat top on which the short, regular, rosette-like branchlets can be seen; a sturdy stalk may be developed; known colours brown, brown with blue or pink edges or blue; occurs intertidally on reef flats and subtidally on reef edges, slopes and submerged reefs.

Remarks

This is one of the most common *Acropora* species throughout Indo-Pacific reefs. It is sometimes difficult to distinguish from *A. cytherea*, but the latter has branchlets arranged in groups and elongate, pointed radial corallite lips.

Acropora (Acropora) anthocercis (Brook, 1893)
(Figs 81, 82)

Madrepora anthocercis Brook, 1893 p.106 pl.13 fig.C

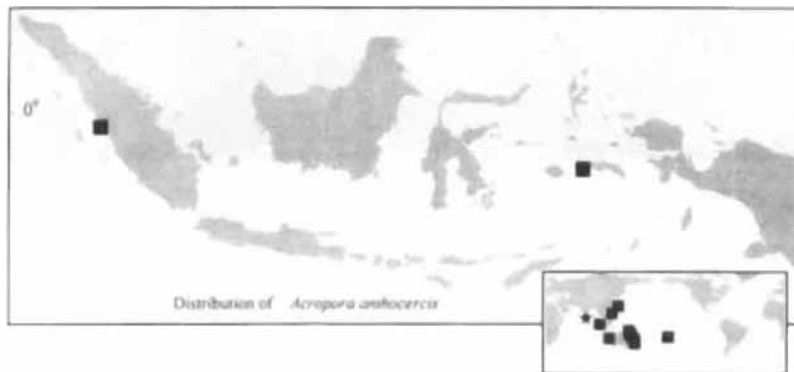


Figure 81. Distribution of *Acropora anthocercis* in Indonesia (main map) and worldwide (inset).

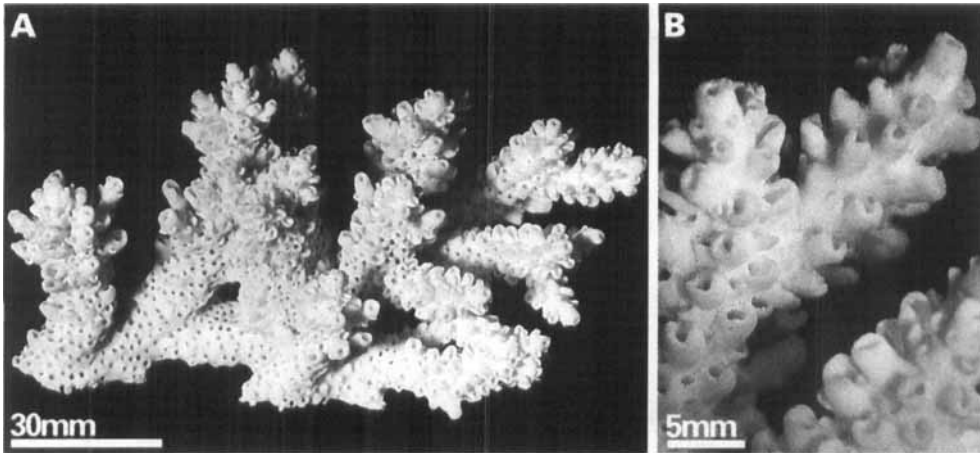


Figure 82. *Acropora anthocercis* (A–B) G50592: (A) portion of colony (B) portion of branches.

Material examined

W. SUMATRA: G50592 Padang; BANDA SEA: G50833 Ambon I.

Skeletal characteristics

Corallum. Low corymbose to plate-like colonies up to 0.5 m diameter, branchlet diameter up to 5 mm.

Corallites. Axial corallites outer diameter 1.9–2.8 mm, inner diameter 0.8–1.3 mm, primary septa present up to 2/3R, secondary septa present up to 1/4R; radial corallites just touching, evenly sized, labellate with thick outer wall and lip extended upwards, primary septa present up to 2/3R, secondary septa present up to 1/3R.

Coenosteum. Costate or lines of spinules on radial corallites; reticulate with scattered simple spinules in intercorallite areas.

Field characteristics

Forms low corymbose plates with irregular-looking branchlets due to the presence of incipient axial corallites; known colours pale blue, or a mixture of pink, blue and brown; occurs intertidally on exposed outer reef flats.

Remarks

Acropora anthocercis is a rare species on Indonesian reefs, possibly because of an absence of its preferred habitat, shallow water biotopes exposed to strong wave action (Veron & Wallace, 1984).

Acropora (Acropora) cytherea (Dana, 1846)
(Figs 83, 84)

Madrepora cytherea Dana, 1846 p.441 pl.32 figs 3a,b

Madrepora efflorescens Dana, 1846 p.441 pl.33 fig.6

Madrepora arcuata Brook, 1892 p.452; 1893 p.102 pl.12

Madrepora armata Brook, 1892 p.461; 1893 p.68 pl.4 figs A,B

Madrepora reticulata Brook, 1892 p.461; 1893 p.68 pl.4 figs A,B

Acropora cytherella Verrill, 1902 p.253, pl.36 fig.7 pl.36A fig.7 pl.36F fig.1

Material examined

W. SUMATRA: G47170 Nias I.; G48531–6, G48541–3 Padang; JAVA: G32850 Seribu Is; KALIMANTAN: G50639–41 N.E.Kalimantan; N. SULAWESI: G35815, G47275–7 Bunaken N.P.; G50633 Tg Torowitang; G47273 Tg Pulisan; G47270–2, G47274, G50630–2, G50638 Sangihe Is; C. SULAWESI: G50634–37 Togian Is; NUSA TENGGARA: G50642–3 Bali; G48537–8, G50971 Flores; G48537 W. Timor; G48539 Alor Is; BANDA SEA: G46903 Sekaro I.; G46904, G50628 Lucipara Is; G48540 Nusa Laut; G46905, G47268–9 Banda Is.

Skeletal characteristics

Corallum. Tabular to plate-like colonies to over 3 m diameter, the table-top consisting of horizontal branches from which extend groups of vertical branchlets (or single branchlets with multiple axial corallites) up to 2 mm in diameter and 15 mm in length.

Corallites. Axial corallites in groups of two or three, outer diameter 1.3–2.5 mm, inner diameter 0.7–1.0 mm, primary septa to 2/3R, secondary septa absent to incomplete; radial corallites with elongate upwardly pointing lips, primary septa absent or a few just visible; secondary septa absent.

Coenosteum. Costate on radial corallites; reticulate with scattered laterally-flattened spinules in intercorallite areas; coenosteum may also bear calcite deposits (see Fig. 84F), giving the cleaned skeleton a yellowed appearance.

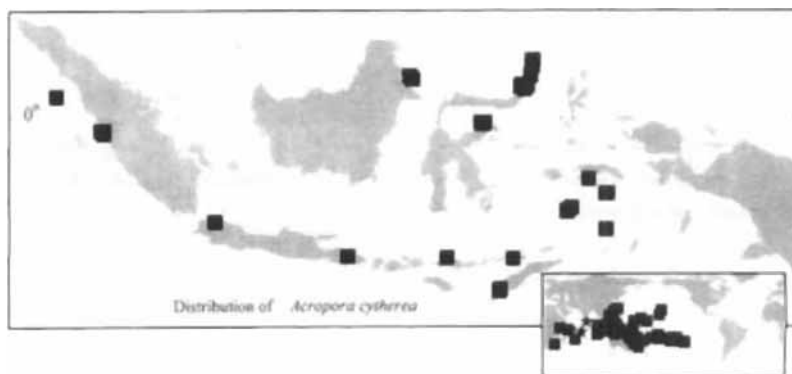


Figure 83. Distribution of *Acropora cytherea* in Indonesia (main map) and worldwide (inset).

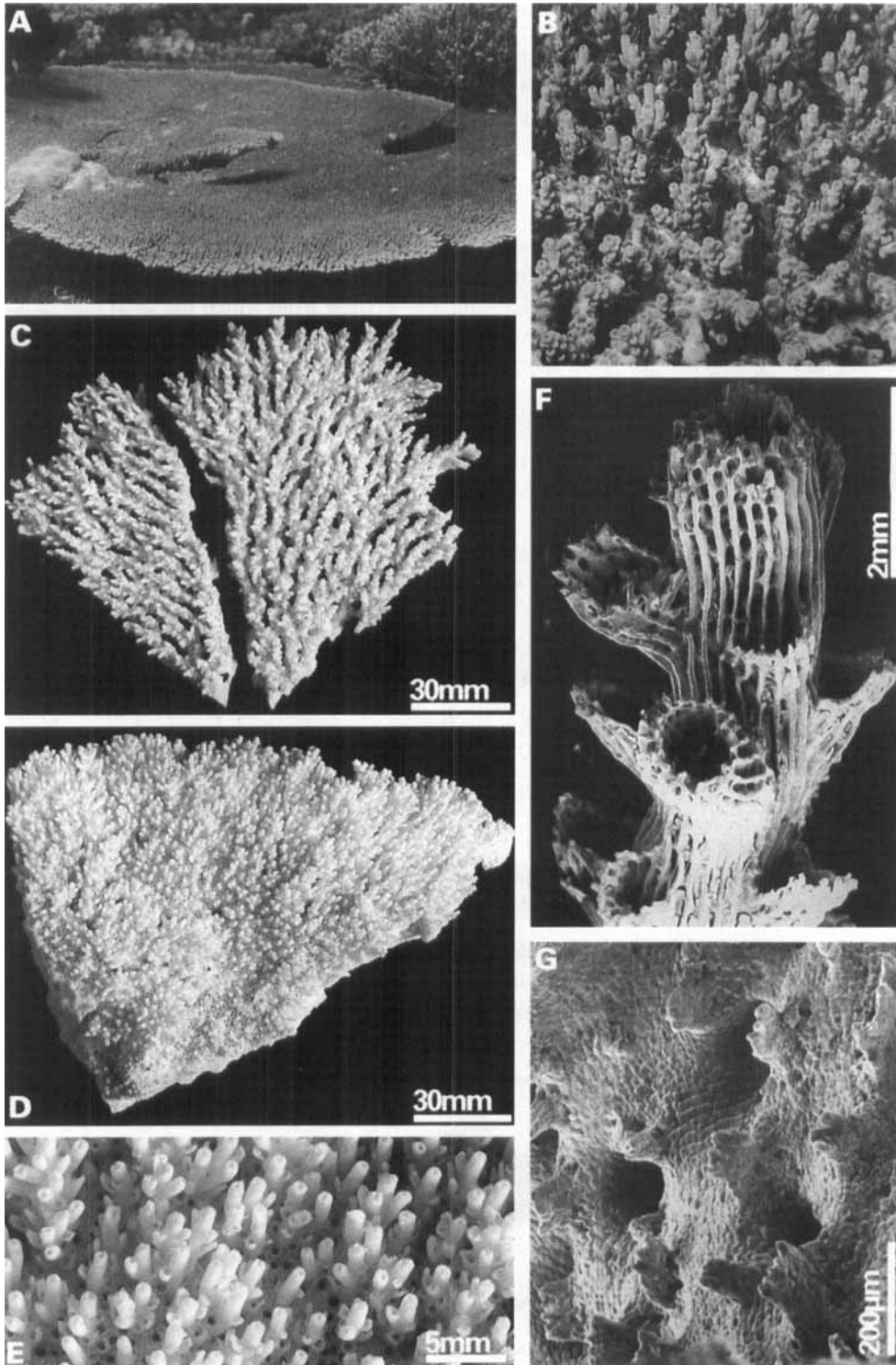


Figure 84. *Acropora cytherea* (A) at Nain I., N. Sulawesi (B) at Tg Torowitang, N. Sulawesi; (C, G) G48531; (D, E) G48534; (F) G47268: (C, D) portion of colony (E) portion of table-top (F) electron micrograph showing radial corallites and calcite deposits within coenosteum (G) electron micrograph showing coenosteum between radial corallites.

Field characteristics

Forms large flat tables in which the multiple axial corallites can be detected; the corallum has a crumbly texture; known colours pale brown, less commonly cream, pink-, yellow-, green- or blue-brown or brown-grey; occurs subtidally on reef slopes and submerged reefs, not usually found intertidally.

Remarks

Although a widespread species, *Acropora cytherea* is not usually abundant on Indonesian reefs. In the region of Padang, W. Sumatra, this species occurs (apparently exclusively) as a variant with anastomosed branchlets, forming a solid plate from which the axial and radial corallites protrude (see Fig. 84D). This form is also seen in some specimens from the Great Barrier Reef. Differences between this species and *A. hyacinthus* are noted above.

Acropora (Acropora) microclados (Ehrenberg, 1834)
(Figs 85, 86)

Heteropora microclados Ehrenberg, 1834 p.109

Madrepora assimilis Brook, 1892 p.452; 1893 p.85 pl.20 fig.A

Material examined

JAVA: G50728 Seribu Is; KALIMANTAN: G50929 N.E. Kalimantan; N. SULAWESI: G50603 Tg Torowitang; C. SULAWESI: G50601-2 Togian Is; NUSA TENGGARA: G51073 Flores; G50600 Alor Is; BANDA SEA: G50598 Lucipara Is; G36221 Haruku I.; G50599 Nusa Laut.

Skeletal characteristics

Corallum. Corymbose, forming thick plates or sometimes stalked to form a table; branches up to 80 mm in length and 5 mm in diameter.

Corallites. Axial corallites outer diameter 1.0–2.9 mm, inner diameter 0.6–1.2 mm, primary septa present up to 2/3R, secondary cycle absent or incomplete to 1/4R; radial corallites nariform or tubular with nariform openings, the outer part of the wall being extended and

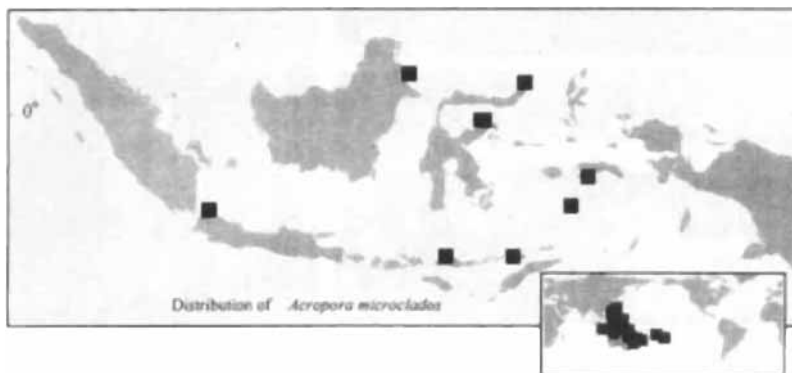


Figure 85. Distribution of *Acropora microclados* in Indonesia (main map) and worldwide (inset).

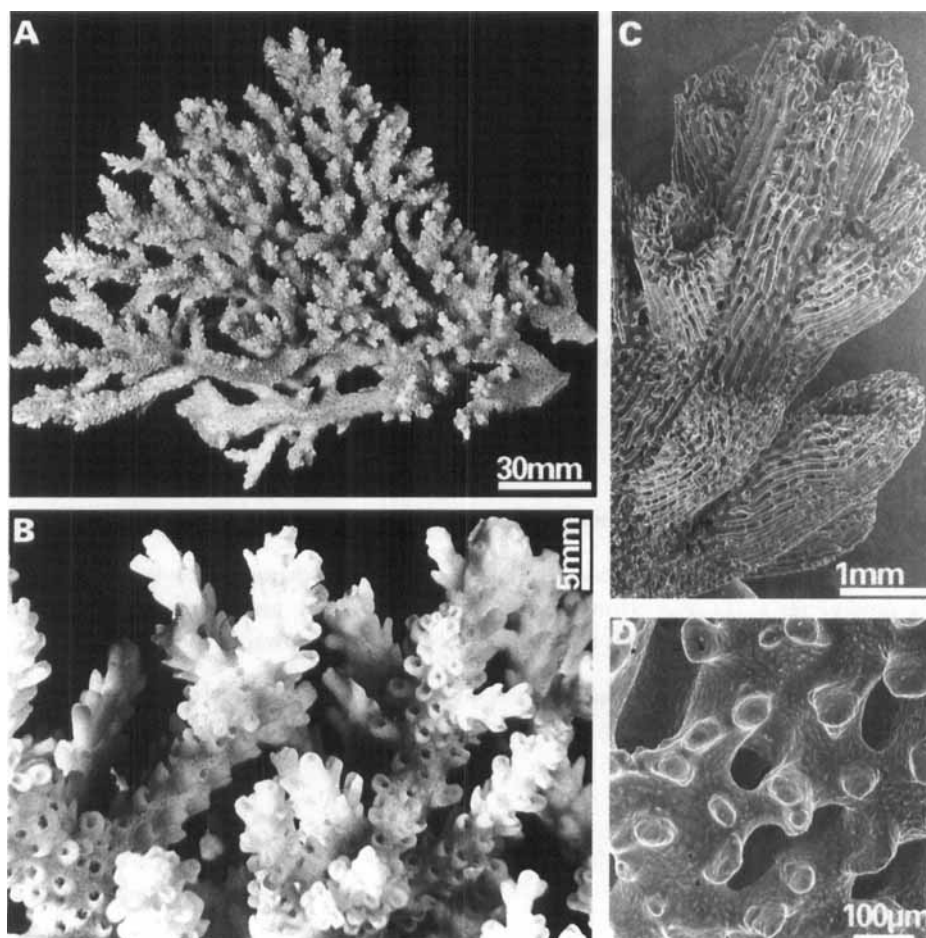


Figure 86. *Acropora microclados* (A–D) G50599: (A) portion of colony (B) portion of branches (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing coenosteum between radial corallites.

sometimes appearing labellate, primary septa to $1/3R$, secondary septa absent or incomplete to $1/4R$.

Coenosteum. Costate on radial corallites; reticulate with scattered simple spinules or lines of spinules in intercorallite areas.

Field characteristics

Colonies form small tables (up to 150 mm diameter) or thick plates; known colour pink; occurs just subtidally at reef edges.

Remarks

This species is difficult to identify in the field, often being confused with *A. cerealis* or slender branching forms of *A. nasuta*.

Acropora (Acropora) paniculata Verrill, 1902
(Figs 87, 88)

Acropora paniculata Verrill, 1902 p.259 pl.36D figs 7,10,10A pl.36E fig.5

Material examined

KALIMANTAN: G50677–8 N.E. Kalimantan; N. SULAWESI: G50657–9 Sangihe Is; C. SULAWESI: G50671–6 Togian Is; S. SULAWESI: G50935 Taka'bonerate; G50936 Panjang I.; NUSA TENGGARA: G50679 Bali; G50670 Nusa Lembongan; G50660–1 Lombok; G50662–9 Alor Is; BANDA SEA: G50654–5 Lucipara Is; G48681, G50656 Banda Is.

Skeletal characteristics

Corallum. Corymbose as plates or sometimes short tables; slender branches to 3 mm diameter.

Corallites. Axial corallites outer diameter 1.2–1.9 mm, inner diameter 0.4–0.8 mm, primary septa present up to 1/2R, secondary septa absent or a few just visible as points; radial corallites scattered, not touching, nariform or labellate with upwardly pointing lips.

Coenosteum. Costate on radial corallites; costate or reticulate with lines of simple spinules in intercorallite areas.

Field characteristics

Occurs as small plates or tables (to about 150 mm in diameter) which are open and delicate in appearance because of the light coenosteum; known colours pale brown and blue-brown; occurs just subtidally on reef edges and upper slopes.

Remarks

This species is not often encountered on Indonesian reefs.

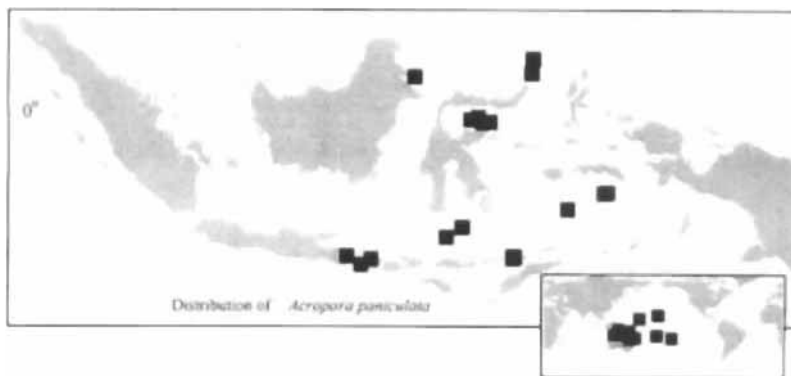


Figure 87. Distribution of *Acropora paniculata* in Indonesia (main map) and worldwide (inset).

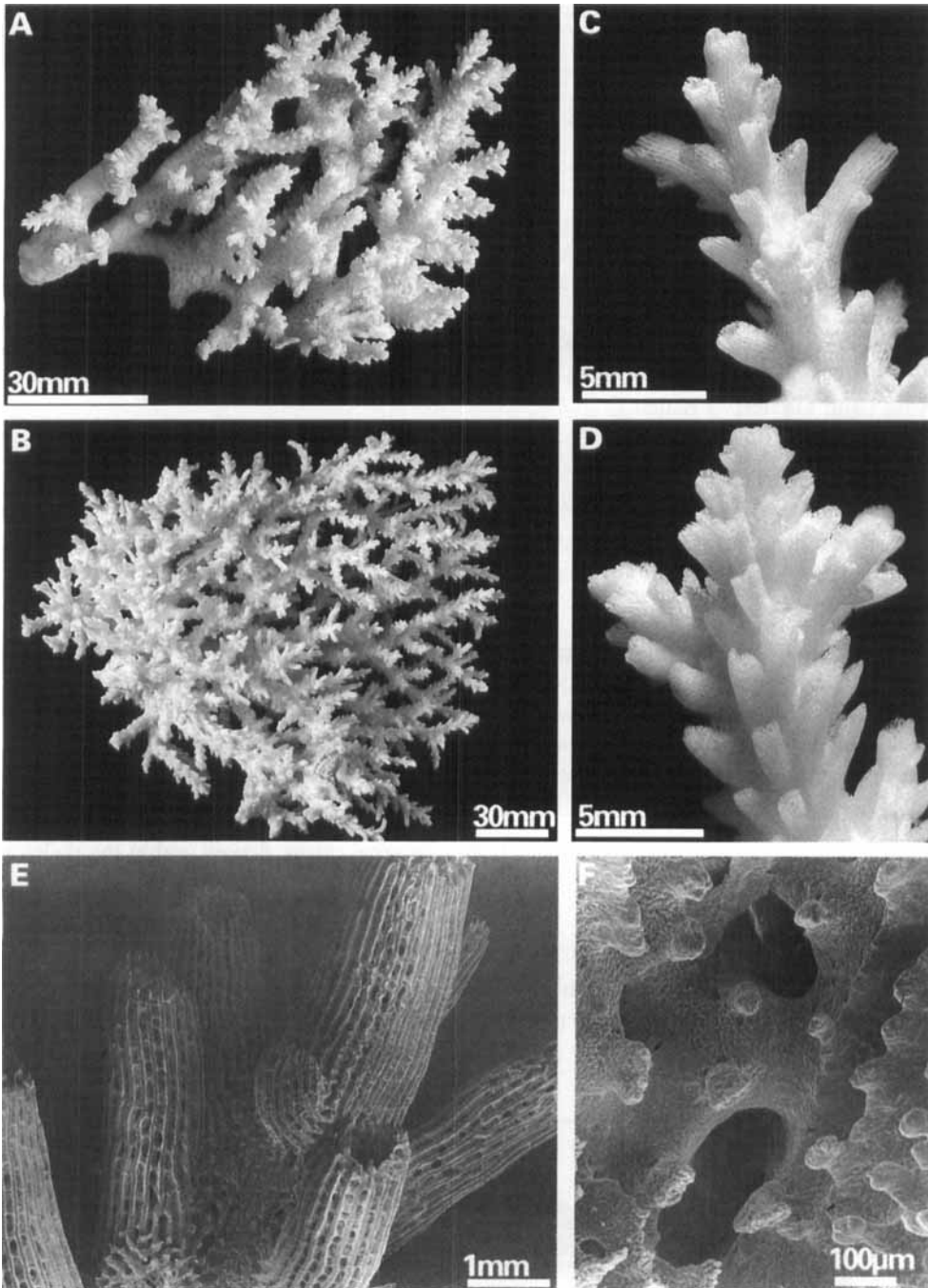


Figure 88. *Acropora paniculata* (A, D) G50674; (B, C, E, F) G50676: (A, B) portion of colony (C, D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Acropora (Acropora) indonesia Wallace, 1997
(Figs 89, 90)

Acropora indonesia Wallace, 1997 p.35 fig.7

Material examined

W. SUMATRA: G48694 Padang; JAVA: G49011 Seribu Is; KALIMANTAN: G48940–1, G48944 N.E. Kalimantan; N. SULAWESI: G47903–5, G48942–3, G50014 Bunaken N.P.; G47902 Tg Torowitang; G47898–900, G48692 Tg Pulisan; G47894–7, G48545 Sangihe Is; G47901 (*holotype*) Bangka I.; C. SULAWESI: G48939, G49012–4, G49535, G50493 Togian Is; S. SULAWESI: G47906–7 Spumonde Arch.; NUSA TENGGARA: G49633 Bali; G48695–7 W. Timor; G48698–9 Alor Is; BANDA SEA: G48693 Ambon I.; G48544 Nusa Laut; G47891–3 Banda I.

Skeletal characteristics

Corallum. Arborescent table in which slender, upwardly curving branches form a table-top up to 100 mm thick; branches interlocking and some lower branches anastomosing, final branches up to 80 mm long but usually around 50 mm long and up to 8mm diameter and tapering.

Corallites. Axial corallites outer diameter 1.5–2.2 mm, inner diameter 0.6–1.0 mm, primary septal cycle complete, septa to 3/4R or R, secondary septal cycle absent to all septa present, up to 1/3R; radial corallites generally not touching, nariform, only outer wall developed and extended upwards to a greater or lesser extent, sometimes to a fine point, primary septa just visible up to 1/4R, secondary septa absent to a few just visible.

Coenosteum. Open costate on radial corallites; reticulate and flaky, with very few spinules, between radial corallites; most specimens have a mineral calcite deposit within the skeleton (see Wallace, 1994, fig. 7D).

Field characteristics

Occurs as flat tables, ranging from about 1 m to several metres in diameter; often a colony consists of many such tables in tiers or layers; known colours cream, pale brown, or pinkish

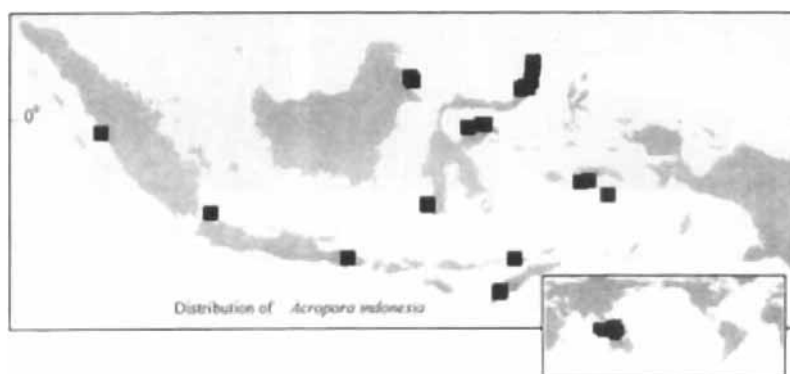


Figure 89. Distribution of *Acropora indonesia* in Indonesia (main map) and worldwide (inset).

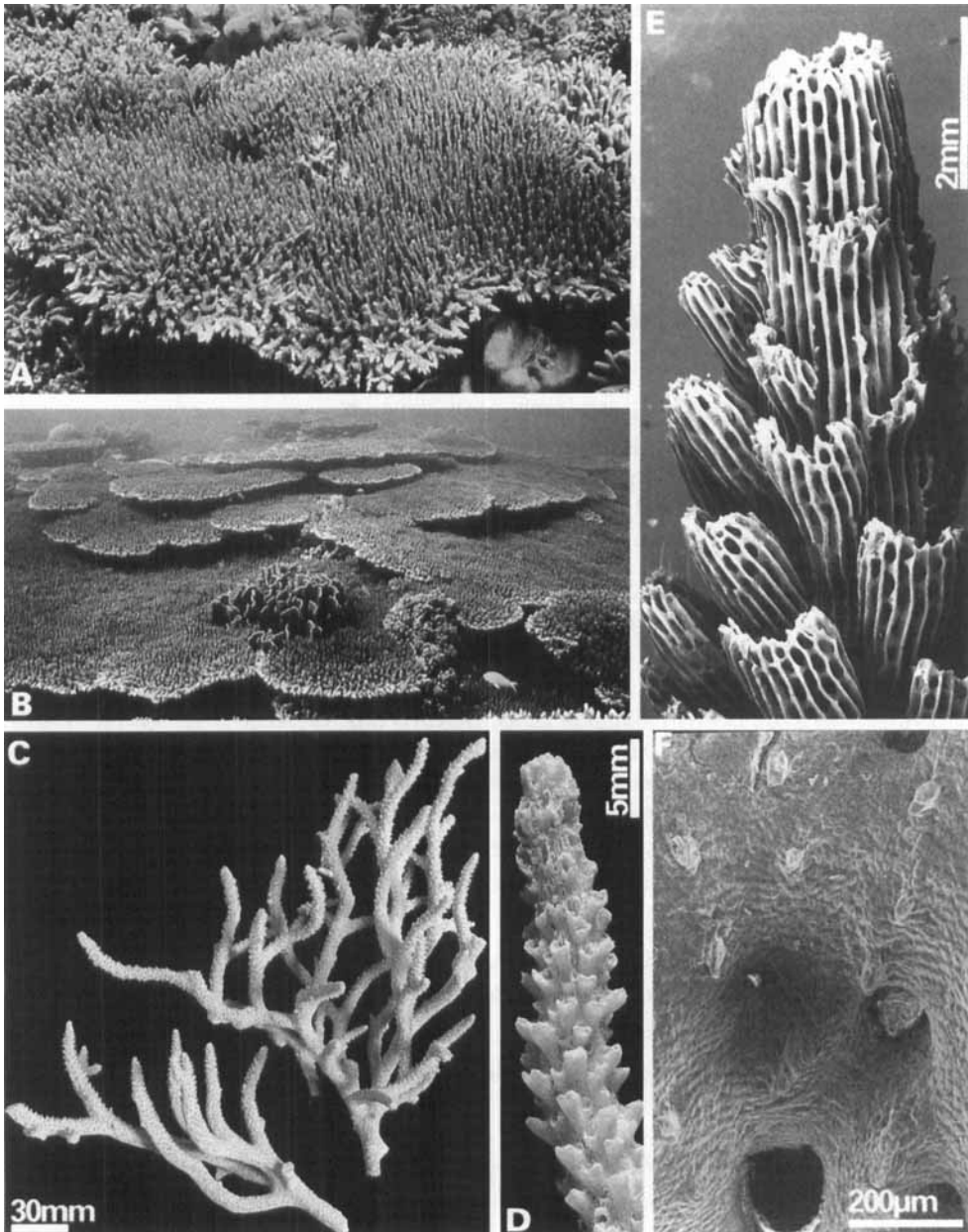


Figure 90. *Acropora indonesia* (A) at Bunaken I., N. Sulawesi (B) at Pemuteran, N.W. Bali; (C, D, F) paratype G48939; (E) G47907: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

brown; occurs subtidally on horizontal surfaces such as submerged reef flats or ledges, or on very gentle slopes.

Remarks

This species, although having the same general colony form as *A. valenciennesi* and *A. hoeksemai*, does not closely resemble these or any other species. Because of the loosely

interlocking branch structure, specimens broken from tables usually fall into several pieces, and the light coenosteal structure means that specimens are generally very fragile. The radial corallite structure and the presence of the calcite deposit are reminiscent of *A. cytherea*.

The *Acropora latistella* group

Colonies corymbose with slender branches (around 5 mm diameter); radial corallites appressed tubular with round openings; coenosteum of well-spaced, simple spinules.

Acropora (Acropora) latistella (Brook, 1892) (Figs 91, 92)

Madrepora latistella Brook, 1892 p.459; 1893 p.112 pl.9 fig.B

Madrepora patula Brook, 1892 p.460; 1893 p.111 pl.9 fig.E

Acropora loricata Nemenzo, 1967 p.113 pl.32 figs 1,2

Acropora imperfecta Nemenzo, 1971 p.153 pl.4 fig.3

Material examined

W. SUMATRA: G50139 Padang; E. SUMATRA: G49819–20 Riau/Lingga Is; JAVA: G50735–7 Seribu Is; G50771 Karimunjawa I.; KALIMANTAN: G49905–8, G50147–8, G50604 N.E. Kalimantan; N. SULAWESI: G49910, G50145 Tg Dodepo; G34189, G35514, G48151, G49882 Bunaken N.P.; G48149–50 Tg Torowitang; G47974, G48148 Tg Pulisan; G48143–7, G49881, G50137 Sangihe Is; C. SULAWESI: G49899–904, G50146 Togian Is; S. SULAWESI: G49883, G50769 Spumonde Arch.; G43815, G50943–4 Taka'bonerate; NUSA TENGGARA: G49909 Bali; G48039, G48152, G50138 Lombok; G49884–90, G50140–1, G50942 Flores; G49891–2, G50142–3 W. Timor; G49893–8, G49959, G50144, G50605 Alor Is; BANDA SEA: G48140 Sekaro I.; G48139 Lucipara Is; G36217, G48142, G50770 Ambon I.; G48141, G49880 Suanggi I.; IRIAN JAYA: G36038 Batanta I.

Skeletal characteristics

Corallum. Corymbose, forming thick plates with side attachment; branches compactly arranged, slender and terete, up to 40 mm in length and 5 mm in diameter.

Corallites. Axial corallites outer diameter 1.4–3.0 mm, inner diameter 0.6–0.9 mm, primary septa present to 3/4R, secondary septa absent, or some to all present to 1/2R; radial

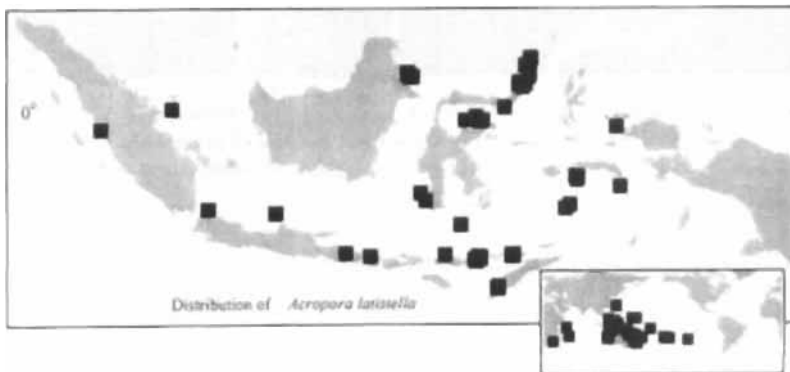


Figure 91. Distribution of *Acropora latistella* in Indonesia (main map) and worldwide (inset).

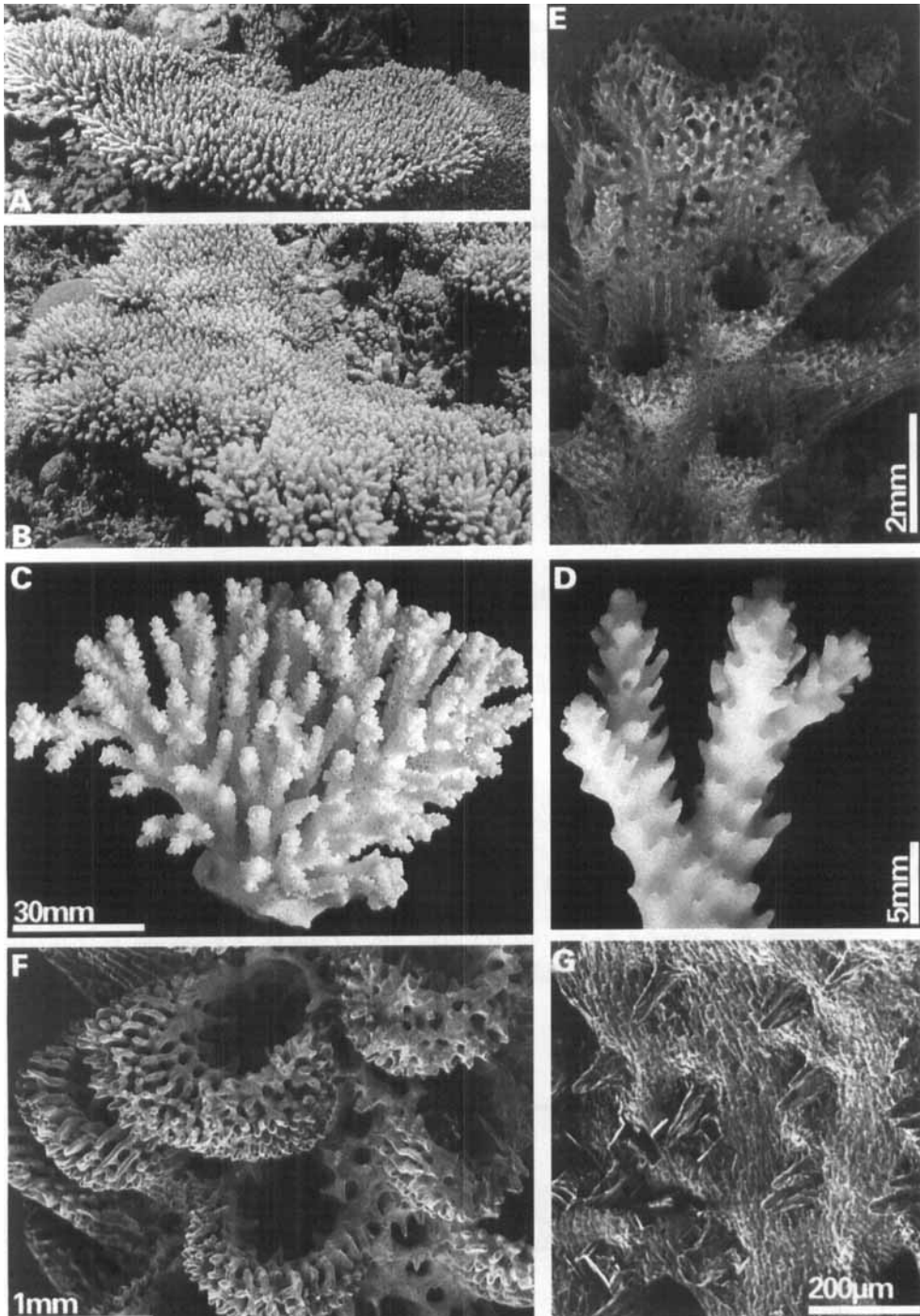


Figure 92. *Acropora latistella* (A) at Nain I., N. Sulawesi (B) at Walea Lighthouse, Togian Is, Central Sulawesi; (C–E, G) G48144; (F) G48141: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing radial corallites (G) electron micrograph showing coneosteum between radial corallites.

corallites appressed tubular with round to slightly oval or slightly dimidiate openings, sometimes the outer wall extended upwards, primary septa present up to 2/3R, secondary septa absent or some to all present to 1/4R.

Coenosteum. Lines of spinules throughout.

Field characteristics

Low corymbose colonies or thick plates with slender branches; known colours pale brown, yellow, yellow-grey, blue or blue-brown; occurs subtidally on reef slopes, walls and submerged reefs.

Remarks

This species occupies a wide range of habitats, from just below the low tide mark to about 20 m depth, and is encountered at most sites; it is also recorded from submerged reefs with a high level of siltation. It is most easily confused with *A. aculeus*, and sometimes the two species can only be distinguished in the laboratory.

Acropora (Acropora) subulata (Dana, 1846)
(Figs 93, 94)

Madrepora subulata Dana, 1846 p.448 pl.32 fig.3

Madrepora frondosa Brook, 1893 p.114 pl.34 fig.E

Material examined

JAVA: G50061, G50729 Seribu Is; KALIMANTAN: G49987–91 N.E. Kalimantan; N. SULAWESI: G35513, G35518, G35820, G48155, G50022 Bunaken N.P.; G49983 Tg Flesko; G48153–4, G49968, G50021–2, G50094 Sangihe Is; C. SULAWESI: G49984–6 Togian Is; S. SULAWESI: G49969 Spumonde Arch.; G50945 Taka'bonerate; NUSA TENGGARA: G49982 Nusa Penida; G48156 Lombok; G49970–3 Flores; G49974–5 W. Timor; G49976–81, G50024–5 Alor Is; BANDA SEA: G49966–7 Lucipara Is; G50779 Ambon I.; G50020 Suangi I.; G49963–5 Banda Is.

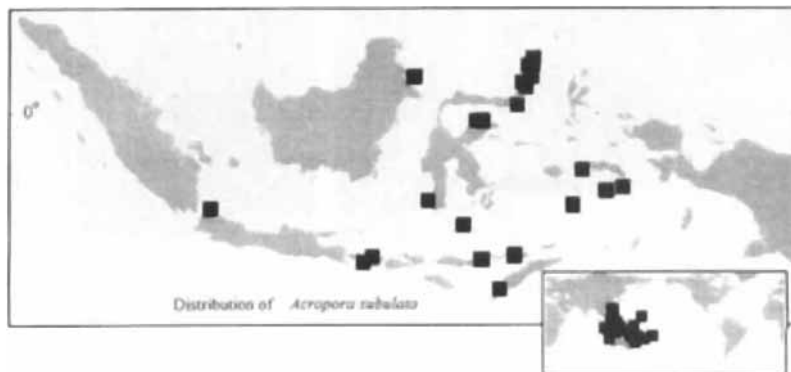


Figure 93. Distribution of *Acropora subulata* in Indonesia (main map) and worldwide (inset).

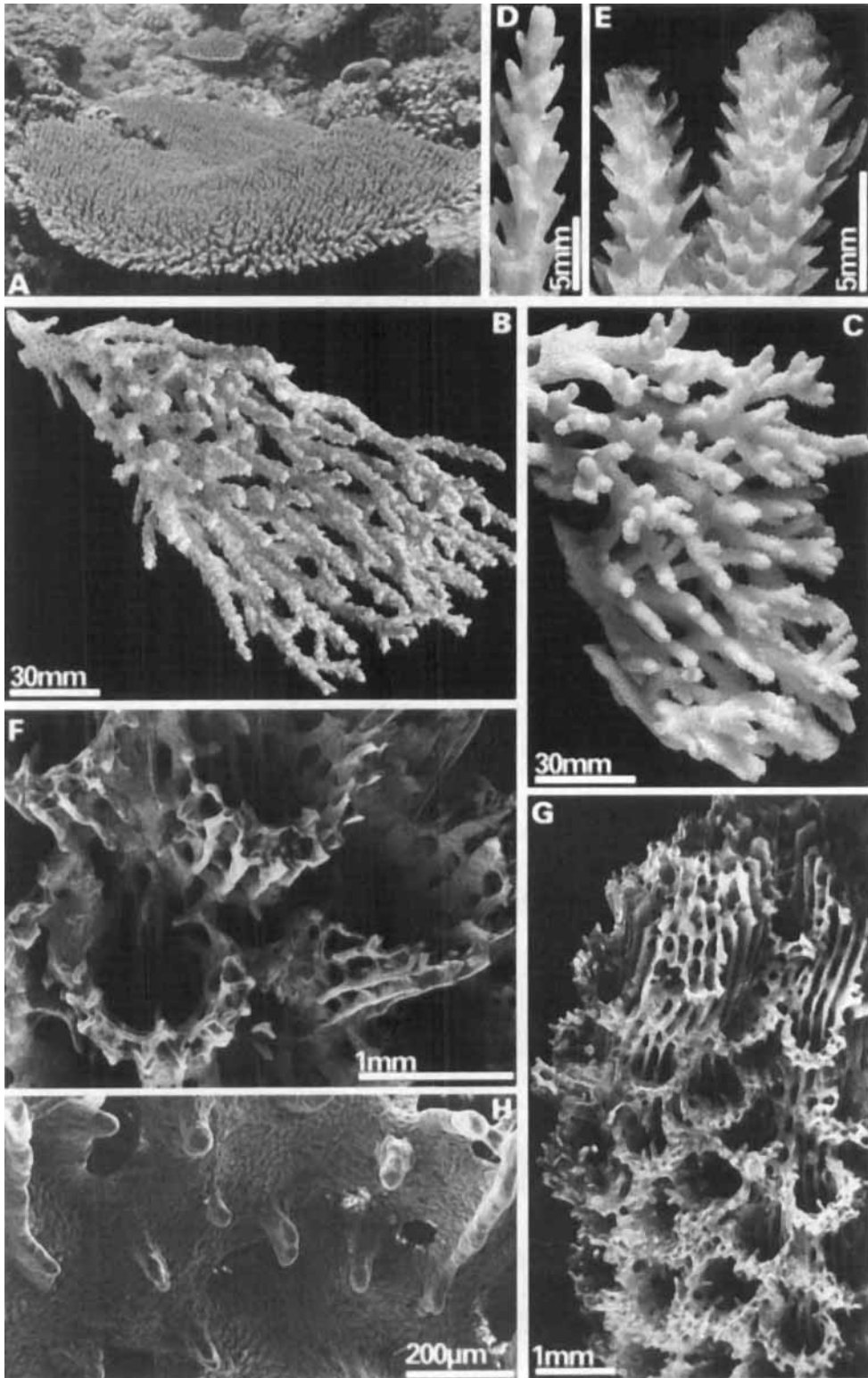


Figure 94. *Acropora subulata* (A) at Makalehi I., Sangihe Is, N. Sulawesi; (B, D) G48155; (C, E–H) G35518: (B, C) portion of colony (D, E) portion of branch (F) electron micrograph showing radial corallites (G) electron micrograph showing axial and radial corallites (H) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Tabular: branchlets of around 4 mm diameter and up to 40 mm in length extend vertically from a network of horizontal anastomosing branches with a central stalk, ending in a single plane.

Corallites. Axial corallites outer diameter 1.2–1.9 mm, inner diameter 0.8–1.2 mm, primary septa present up to 3/4R, secondary septa absent in Indonesian specimens; radial corallites evenly sized and arranged, mostly not touching, appressed tubular with oval openings, the upper wall barely developed, or missing, giving a corallite that is effectively labellate, primary septal cycle usually incomplete, may be present up to 1/3R, but in Indonesian specimens a few septa just visible as points and secondary septa absent.

Coenosteum. Costate or lines of simple spinules on radial corallites; reticulate with scattered spinules or lines of spinules in intercorallite areas.

Field characteristics

Large stalked tables (up to 3 m in diameter) with regular and well-spaced upright branches and crumbly texture; known colour brown; found subtidally on submerged reefs and gentle reef slopes.

Remarks

This species can sometimes appear similar to *Acropora cytherea*, but is distinguished by its longer, well-spaced and single branchlets.

Acropora (Acropora) nana (Studer, 1878)
(Figs 95, 96)

Madrepora nana Studer, 1878 p.533 pl.2 fig.6

Material examined

N. SULAWESI: G47572–3, G49913 Sangihe Is; S. SULAWESI: G51070 Taka'bonerate; NUSA TENGGARA: G50513 Nusa Lembongan; G49914 Alor Is; BANDA SEA: G47566 Sekaro I.; G47568, G47574 Lucipara Is; G47571 Ambon I.; G47569–70 Suangi I.; G47567 Banda Is; G47565 Manuk I.

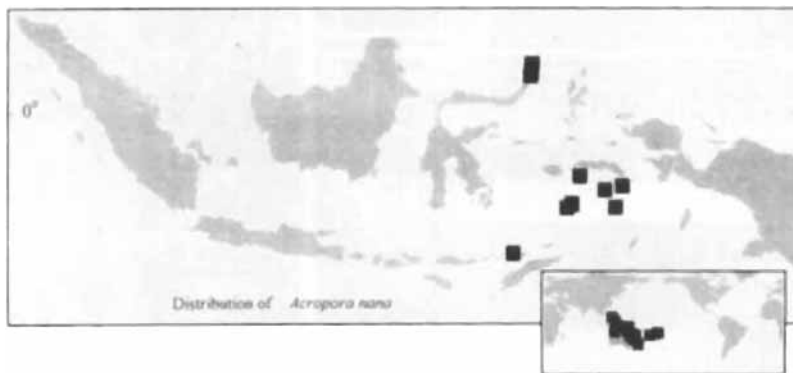


Figure 95. Distribution of *Acropora nana* in Indonesia (main map) and worldwide (inset).

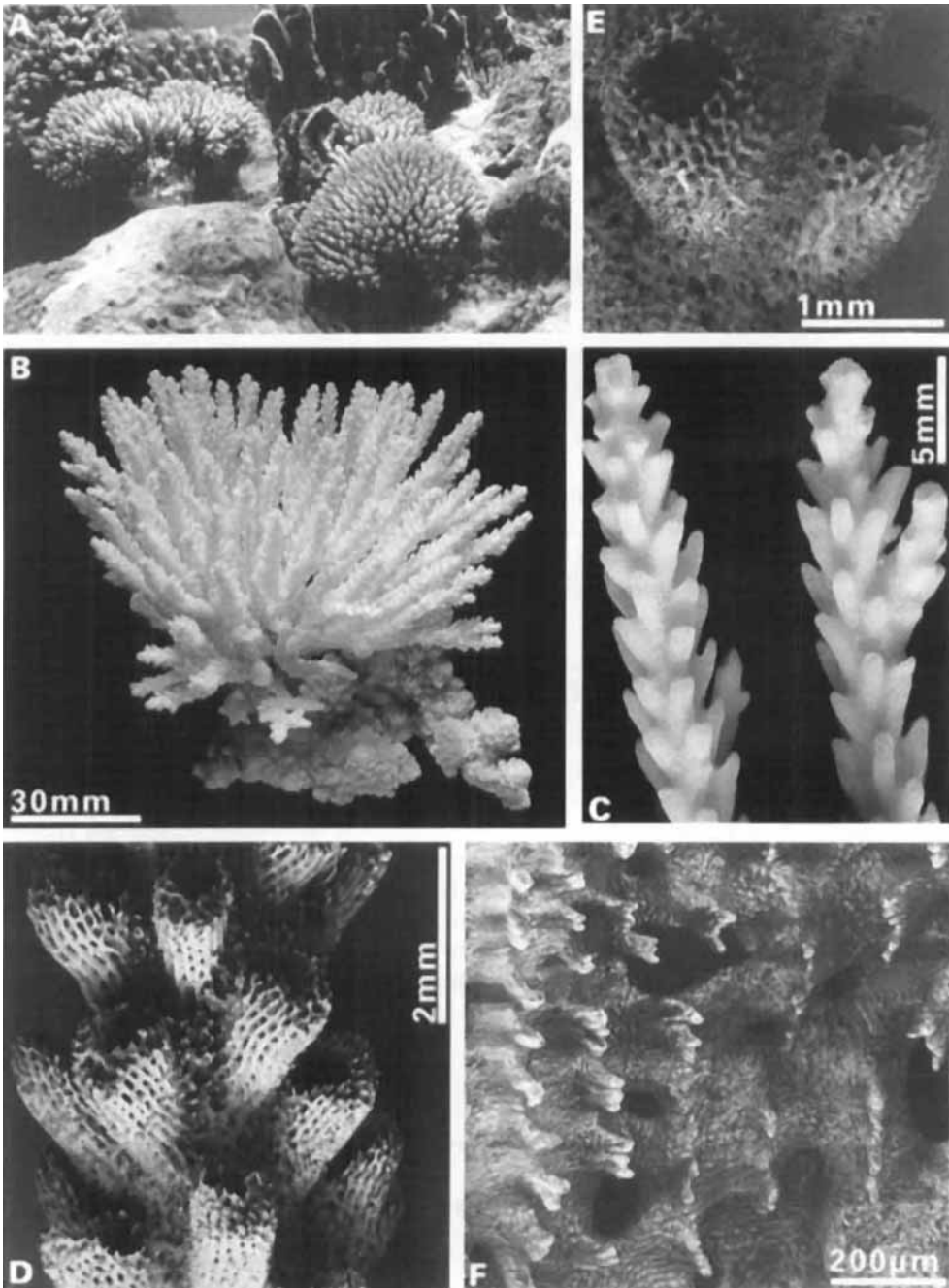


Figure 96. *Acropora nana* (A) at Nalahia Bay, N.W. Nusalaut I., Banda Sea; (B–D, F) G47573; (E) G47572: (B) portion of colony (C) portion of branches (D, E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Corymbose; slender terete branches 4–10 mm in diameter and up to 18 mm long, arising vertically from a solid base or short stalk.

Corallites. Axial corallites outer diameter 1.3–2.0 mm, inner diameter 0.5–1.0 mm, primary septa present up to R, secondary septa absent in Indonesian specimens but present up to 3/4R in specimens from elsewhere; radial corallites regular in size, regularly arranged and just touching, appressed tubular with round to oval openings and the outer wall extended upwards, sometimes giving a nariform appearance, primary septa present up to 1/2R with obvious directives, secondary septa absent in Indonesian specimens, present up to 1/4R in specimens from elsewhere.

Coenosteum. Dense reticulate or lines of simple spinules throughout.

Field characteristics

Small rounded corymbose colonies (maximum colony diameter around 150 mm), with slender branches; known colours brown, blue or purple; found just subtidally, at reef edge and top of slope.

Remarks

This species is common in the Pacific Ocean and South China Sea: it appears to be restricted to northern and eastern parts of Indonesia.

Acropora (Acropora) aculeus (Dana, 1846)
(Figs 97, 98)

Madrepora aculeus Dana, 1846 p.450 pl.32 fig.6

Material examined

W. SUMATRA: G49922 Padang; JAVA: G51203 Seribu Is; KALIMANTAN: G49936, G49939–41, G49947–51, G50012 N.E. Kalimantan; N. SULAWESI: G49920 Bunaken N.P.; G48188 Tg Pisok; G48187 Tg Torowitang; G48184–86 Sangihe Is; C. SULAWESI: G49930–5, G49937–8, G49945–6, G50623 Togian Is; S. SULAWESI: G48189–90, G50790 Spumonde Arch.; G50928 Kayuadi I.; NUSA TENGGARA: G49952, G49952–3, G50624 Bali; G49929 Nusa Penida; G48191–3, G49921 Lombok; G49923–5, G49942–3, G50621, G50927 Flores; G49926 W. Timor; G49927–8, G49944, G50622 Alor Is; BANDA SEA: G48180 Sekaro I.; G48179 Lucipara Is; G46899–900 Suanggi I.; G46901, G48181–3 Banda Is.

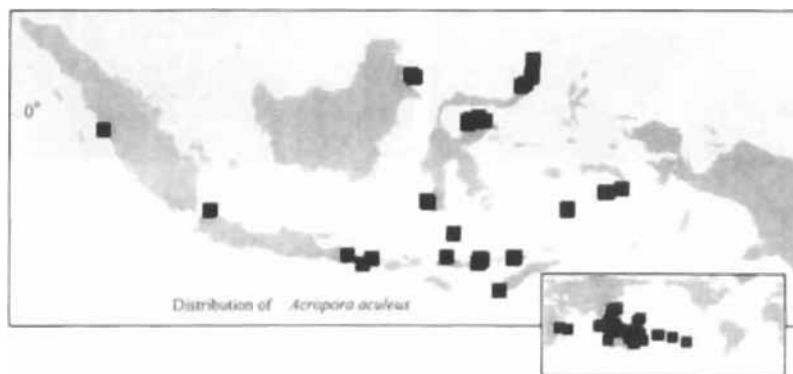


Figure 97. Distribution of *Acropora aculeus* in Indonesia (main map) and worldwide (inset).

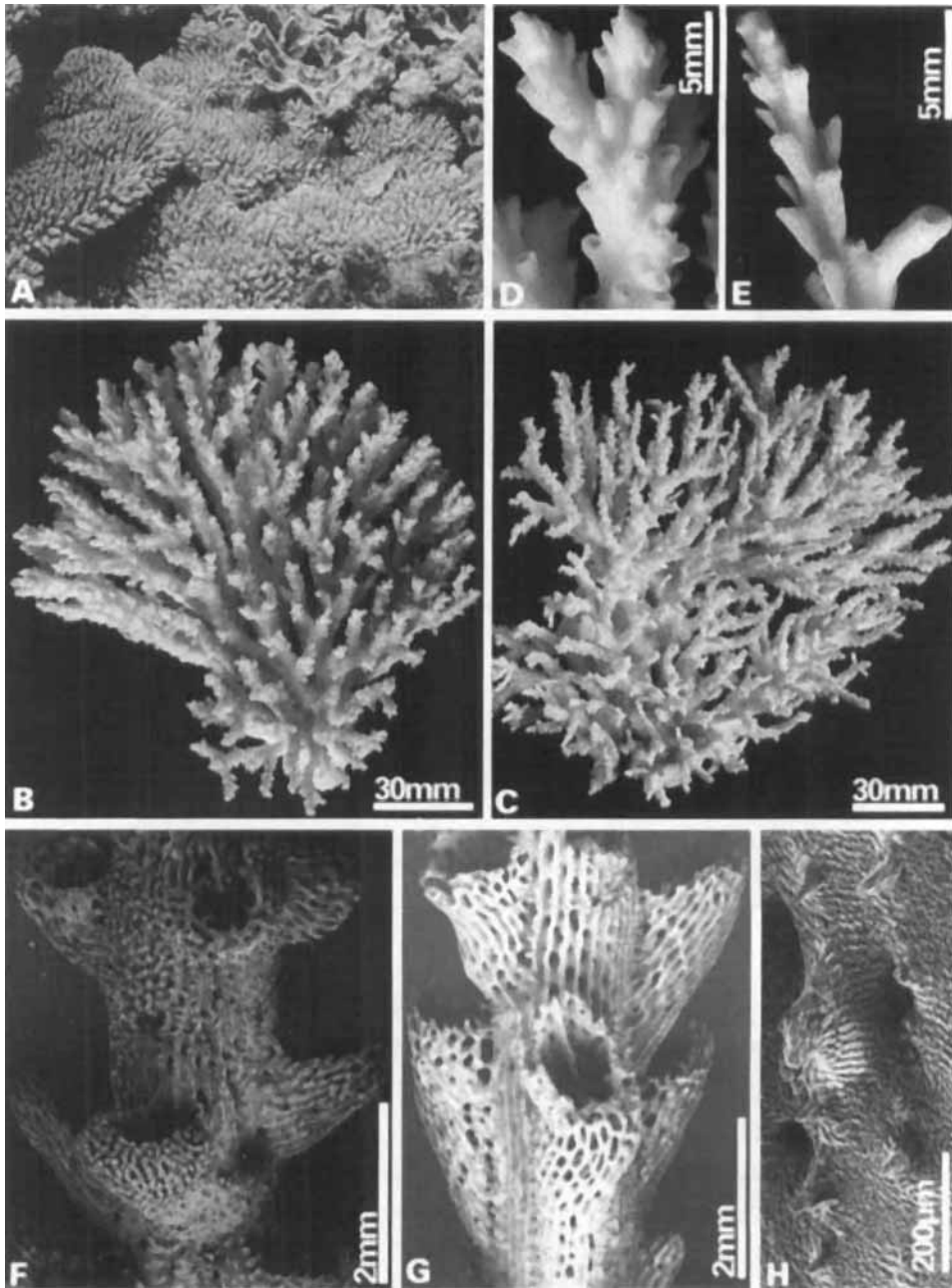


Figure 98. *Acropora aculeus* (A) at Manukang (Suanggi) I., Banda Sea; (B, E, G, H) G46900; (C, D, F) G48180: (B, C) portion of colony (D, E) portion of branch (F, G) electron micrograph showing radial corallites (H) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Corymbose or corymbose plates, formed by horizontal branches from which are given off short slender vertical branchlets, up to about 50 mm in length and 4 mm in diameter.

Corallites. Axial corallites outer diameter 1.6–2.4 mm, inner diameter 0.8–1.0 mm, primary septa to 2/3R, secondary septa absent or some present to 1/3R; radial corallites regularly sized and distributed on branchlets, not touching, appressed tubular with round openings, primary septa present to 1/3R, secondary septa absent or a few just visible as points.

Coenosteum. Dense reticulate or lines of simple spinules throughout.

Field characteristics

Flattened, corymbose colonies to about 40 cm diameter, with very slender branches; known colours bright blue, bright yellow-green, brown or blue-grey; found subtidally on reef slopes and walls.

Remarks

Like *Acropora latistella*, this species occurs through a broad depth range, often being found to 20 m on slopes and walls; sometimes the species can only be distinguished in the laboratory.

The *Acropora nasuta* group

All species have corymbose colonies with branches around 8–10 mm diameter; radial corallites are mostly nariform or tubo-nariform; coenosteum is developed from a reticulate structure with simple spinules, in some species the spinules being arranged in rows or coalesced into costae.

Acropora (Acropora) nasuta (Dana, 1846)
(Figs 99, 100)

Madrepora nasuta Dana, 1846 p.453 pl.34 fig.2

Madrepora canaliculata Klunzinger, 1879 p.12 pl.1 fig.3 pl.4 fig.10

Madrepora cymbicyathus Brook, 1893 p.86

Acropora diomedae Vaughan, 1906 p.69 pl.7 figs 1,1a pl.8 figs 2,3

Material examined

W. SUMATRA: G47177, G47190–2 Nias I.; G49552–6, G49718, G50131 Padang; E. SUMATRA: G49861–8 Riau/Lingga Is; JAVA: G32835, G32840, G50730–1 Seribu Is;

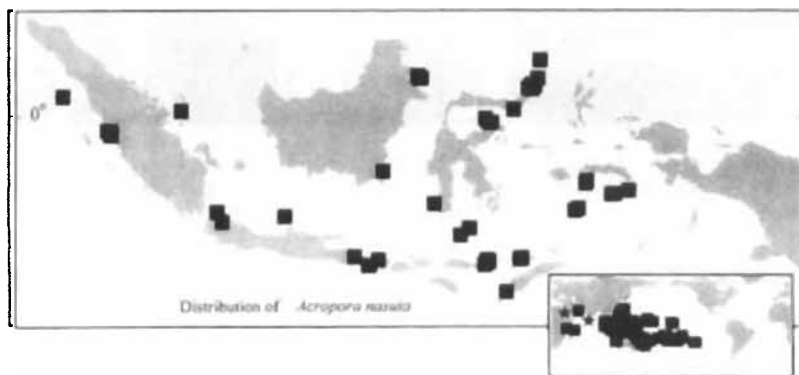


Figure 99. Distribution of *Acropora nasuta* in Indonesia (main map) and worldwide (inset).

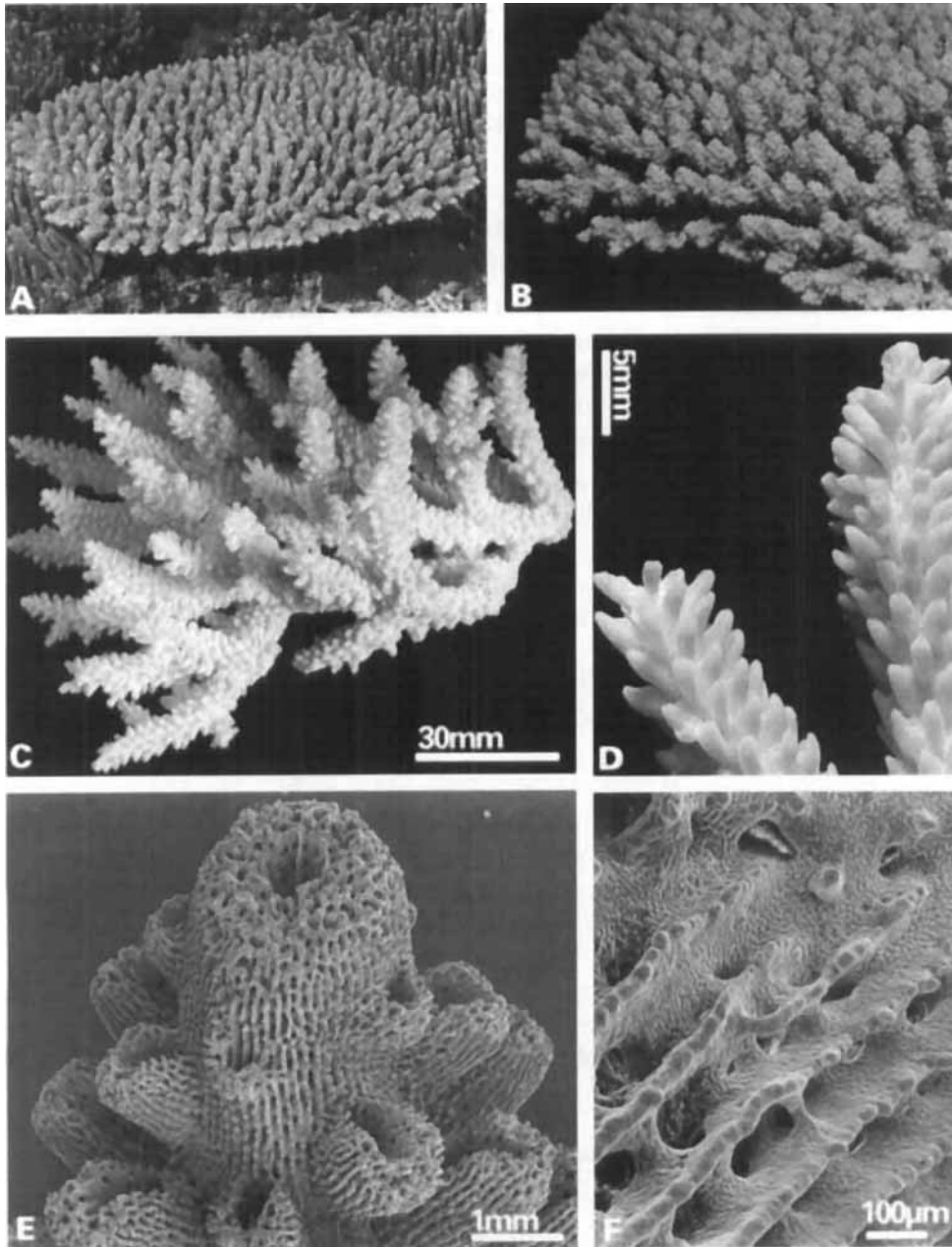


Figure 100. *Acropora nasuta* (A) at Pulisan, N. Sulawesi (B) in N. Sulawesi; (C, D, F) G48015; (E) G48022: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

G50791 Karimunjawa I.; KALIMANTAN: G39812 Pulau Laut; G49573–4, G50597 N.E. Kalimantan; N. SULAWESI: G49571 Tg Dodepo; G34174, G35506–9, G35819 Bunaken N.P.; G48018 Tg Pisok; G48017 Tg Torowitang; G48016 Tg Pulisan; G48015, G50129–30 Sangihe Is; C. SULAWESI: G49572, G50135–6 Togian Is; S. SULAWESI: G48019

Spumonde Arch.; G43817, G50946–7 Taka'bonerate; G50948 Kayuadi I.; NUSA TENGGARA: G49575–6 Bali; G50132–4 Nusa Penida; G49570 Nusa Lembongan; G48020 Lombok; G49557–62 Flores; G49563 W. Timor; G49564–9, G50454 Alor Is; BANDA SEA: G48008–9, G50125 Lucipara Is; G36210, G48014, G50128 Ambon I.; G48012–3, G50126–7 Suangi I.; G48010–1 Banda Is.

Skeletal characteristics

Corallum. Corymbose, or forming small tables (up to 800 mm diameter), branches up to 12 mm in diameter arising from a central to side attachment.

Corallites. Axial corallites outer diameter 1.4–3.0 mm, inner diameter 0.5–1.1 mm, primary septa present to 3/4R (less in Indonesian specimens), secondary septa to 1/4R (absent in Indonesian specimens); radial corallites evenly sized and arranged and touching on branches, nariform with rounded to slightly dimidiate openings, primary septa present up to 2/3R, secondary septa absent or a few just visible as points up to 1/4R.

Coenosteum. Densely costate or lines of laterally flattened spinules on radial corallites, reticulate with scattered spinules in intercorallite areas.

Field characteristics

Stalked to side-attached corymbose colonies; known colours pale brown with blue tips, blue, purple, or green; found subtidally on reef edge, slope and submerged reefs.

Remarks

This species can be confused with *Acropora cerealis* in the field (see below).

Acropora (Acropora) cerealis (Dana, 1846)

(Figs 101, 102)

Madrepora cerealis Dana, 1846 p.460 pl.35 fig.2

Madrepora hystrix Dana, 1846 p.476 pl.31 fig.5 pl.40 fig.1

Madrepora tizardi Brook, 1892 p.464; 1893 p.89 pl.11 figs C,D

Material examined

W. SUMATRA: G47163 Nias I.; G49391–2, G49539–40, G49730 Padang; JAVA: G50751 Seribu Is; KALIMANTAN: G49415–8 N.E. Kalimantan; N. SULAWESI: G49731, G50284 Tg Dodepo; G48032, G48034–5, G49538 Bunaken N.P.; G50282–3 Tg Flesko;

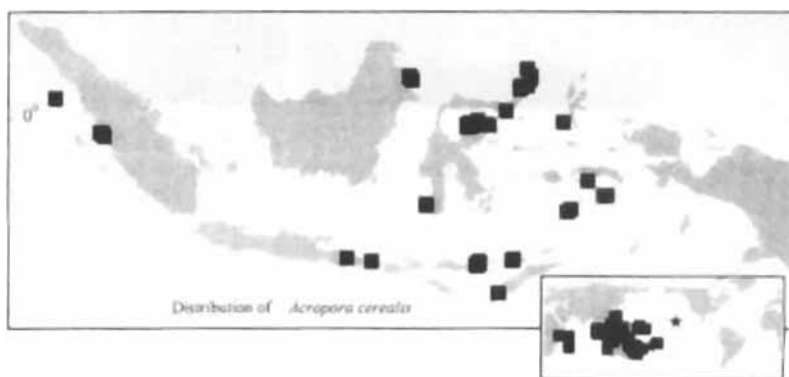


Figure 101. Distribution of *Acropora cerealis* in Indonesia (main map) and worldwide (inset).

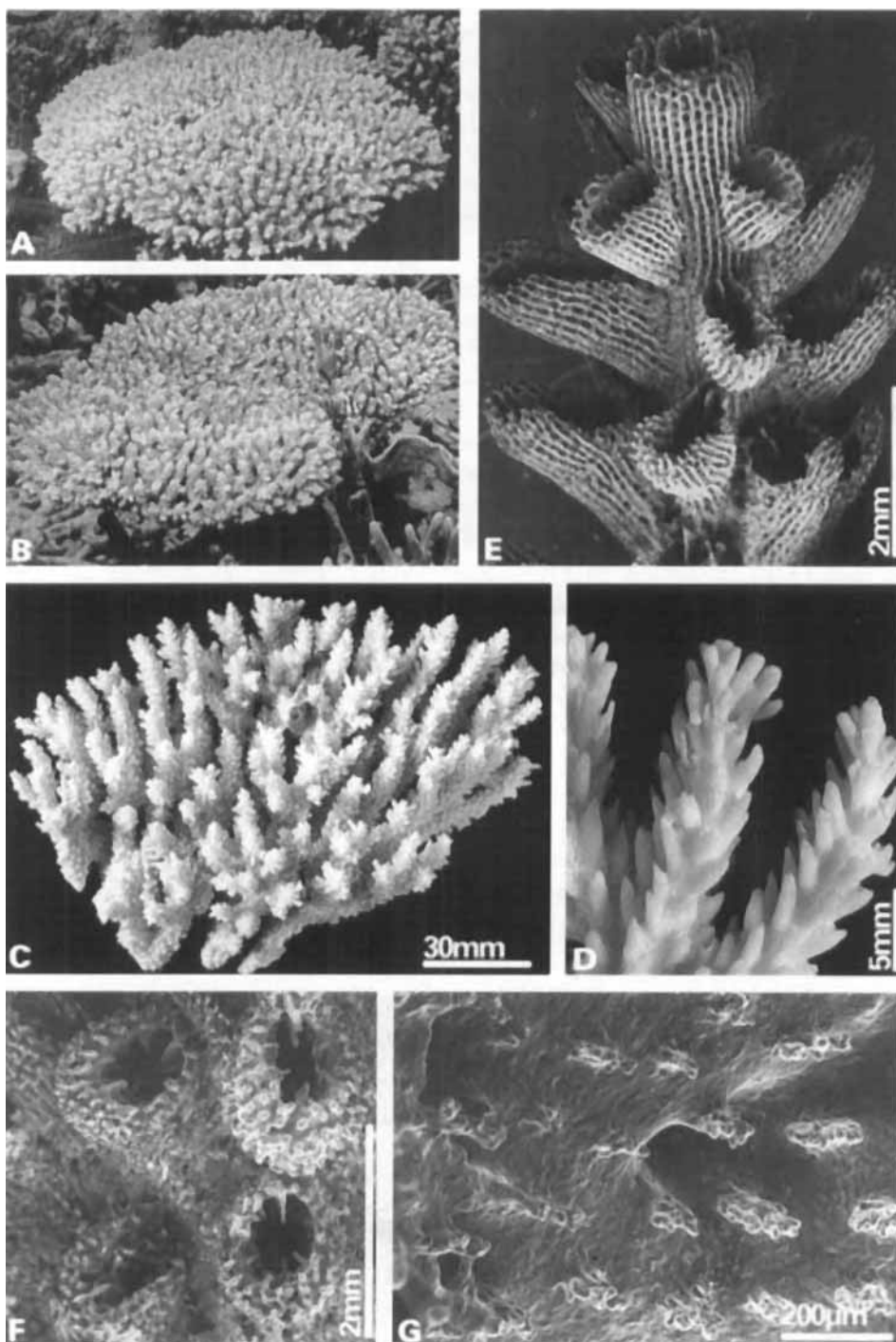


Figure 102. *Acropora cerealis* (A, B) at Nain I, N. Sulawesi; (C, D) G48027; (E) G48028; (F, G) G49730: (C) portion of colony (D) portion of branches (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

G48033 Tg Pisok; G50291 Tg Torowitang; G50278 Tg Pulisan; G48030-1, G48121, G49389, G49536-7, G50587-8 Sangihe Is; C. SULAWESI: G49404-14, G49544-8, G49732 Togian Is; S. SULAWESI: G48036-7 Spumonde Arch.; NUSA TENGGARA: G49419-20, G49549-51 Bali; G48038, G49390 Lombok; G49393-4, G49541-3, G50589 Flores; G49395-7 W. Timor; G49398-403, G50590 Alor Is; BANDA SEA: G35963, G35982 Bacan I.; G48026, G49387 Lucipara Is; G50273, G50781-4, G50792 Ambon I.; G48029 Nusa Laut; G48025, G48027-8, G48268, G49388, G49728-9 Banda Is.

Skeletal characteristics

Corallum. Corymbose, from a central to side attachment, branches up to 10 mm in diameter (most of branch width provided by the extended radial corallites).

Corallites. Axial corallites outer diameter 1.0-2.2 mm, inner diameter 0.3-0.8 mm, primary septa present up to 2/3R, secondary septa up to 1/4R (absent in Indonesian specimens); radial corallites evenly sized and distributed, neatly arranged and just touching on branches, nariform with elongate openings, outer wall extended outwards to a greater or lesser extent, sometimes hooked upwards, primary septa present up to 1/3R (mostly absent in Indonesian specimens), secondary septa absent or a few just visible as points.

Coenosteum. Densely arranged lines of laterally flattened spinules or costate throughout.

Field characteristics

Corymbose as side-attached thick plates or small tables to about 500 mm in diameter, the branches covered neatly and evenly with nariform corallites with elongated openings; known colours pale brown or cream, usually with blue tips, green- or yellow-brown; occurs subtidally on outer reef flats, reef slopes, walls and submerged reefs.

Remarks

As noted in Wallace (1978: 297), corallite shapes within a colony are very similar, but the range of corallite shapes that can occur in different colonies of the species led to the description of a number of species, now synonymized. This makes the species a little difficult to identify in the field. This species can be confused with *Acropora nasuta* and is distinguished by having thinner branches and a 'spiny' appearance due to the extended outer radial corallite walls.

Acropora (Acropora) valida (Dana, 1846)

(Figs 103, 104)

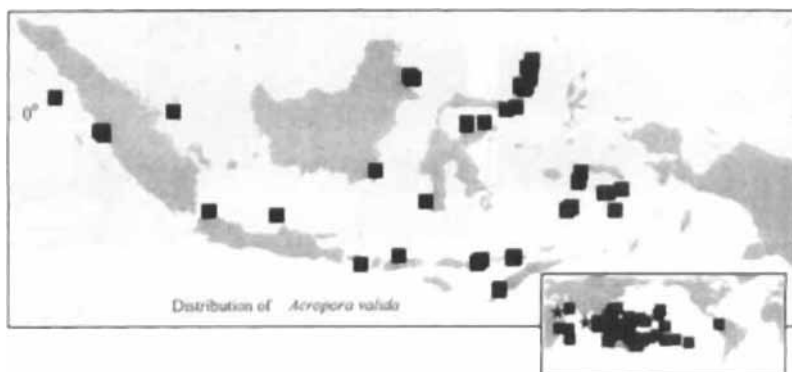


Figure 103. Distribution of *Acropora valida* in Indonesia (main map) and worldwide (inset).

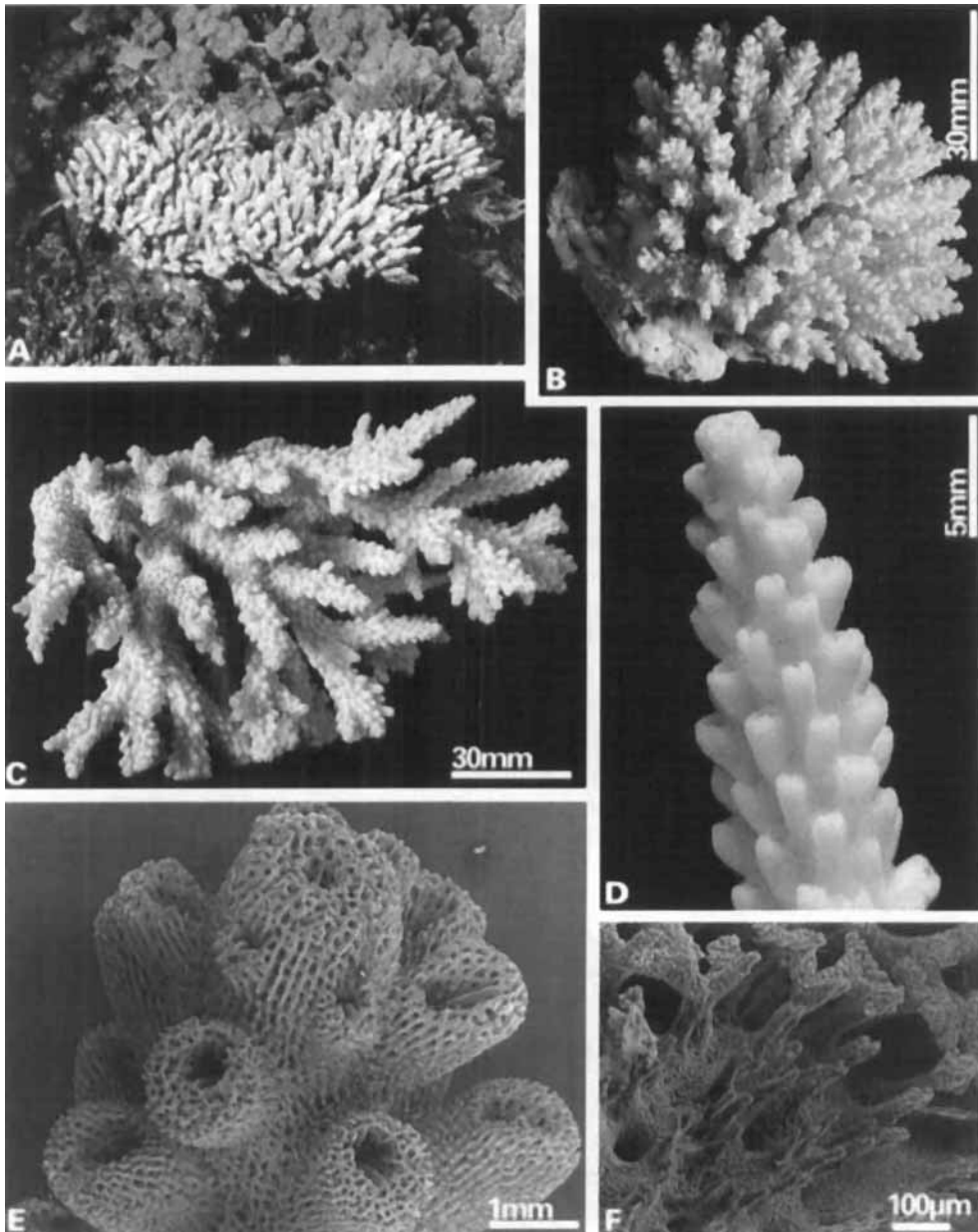


Figure 104. *Acropora valida* (A) at Biaro I., Sangihe Is, N. Sulawesi; (B, E, F) G47980; (C, D) G47985: (B, C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Madrepora valida Dana, 1846 p.461 pl.35 fig.1

Madrepora variabilis Klunzinger, 1879 p.17 pl.1 fig.10 pl.2 figs 1,5 pl.5 figs 1,3 pl.9 fig.14

Madrepora coalescens Ortmann, 1889 p.509 pl.13 fig.5

Acropora dissimilis Verrill, 1902 p.226 pl.34 fig.9

Material examined

W. SUMATRA: G47172–4 Nias I.; G49580, G49715–7, G49723 Padang; E. SUMATRA: G49850–60 Riau/Lingga Is; JAVA: G50740 Seribu Is; G50878 Karimunjawa I.; KALIMANTAN: G39819–20 Pulau Laut; G49600–4, G50596 N.E. Kalimantan; N. SULAWESI: G49595 Tg Dodepo; G35515–7, G48006–7 Bunaken N.P.; G49599, G50108 Tg Flesko; G48005, G50110 Tg Torowitang; G48004 Tg Pulisan; G47993–8003, G49911, G49919 Sangihe Is; C. SULAWESI: G49596–8, G49912, G50455 Togian Is; S. SULAWESI: G49579 Spumonde Arch.; NUSA TENGGARA: G49593–4 Nusa Lembongan; G50952–3 Moyo; G49581–4 Flores; G49585–6 W. Timor; G49587–92, G50109, G50483 Alor Is; BANDA SEA: G47984, G49577 Sekaro I.; G47976–83, G47986–7, G50111 Lucipara Is; G36209, G47990–2, G49635–6, G50785–6 Ambon I.; G47988–9 Suanggi I.; G49578, G49722 Banda Is; G47985 Manuk I.

Skeletal characteristics

Corallum. Corymbose to caespitico-corymbose or caespitose, with branches from 7 to 20 mm in diameter.

Corallites. Axial corallites outer diameter 1.6–2.8 mm, inner diameter 0.5–0.9 mm, primary septa present up to 1/2R, secondary septa absent to all present to 1/3R; radial corallites similar sizes or a mixture of sizes, touching on branches, appressed tubular or tubo-nariform, with rounded to slightly elongate openings, primary septa present up to 2/3R, secondary septa present to 1/4R (absent in Indonesian specimens).

Coenosteum. Reticulate with densely and evenly arranged spinules throughout, sometimes costate on radial corallites (in lightly calcified specimens).

Field characteristics

Small rounded corymbose colonies or thick tables; known colours purple with yellow corallite tips or brown or green; found intertidally on the outer reef flat and subtidally on the reef edge and tops of submerged reefs.

Remarks

The distinctive purple and yellow coloration is also seen in some colonies of *Acropora secale*, hence the two species are sometimes difficult to distinguish. *A. valida* generally has more slender branches and lacks the prominent tubular radial corallites of *A. secale*.

Acropora (Acropora) secale (Studer, 1878)
(Figs 105, 106)

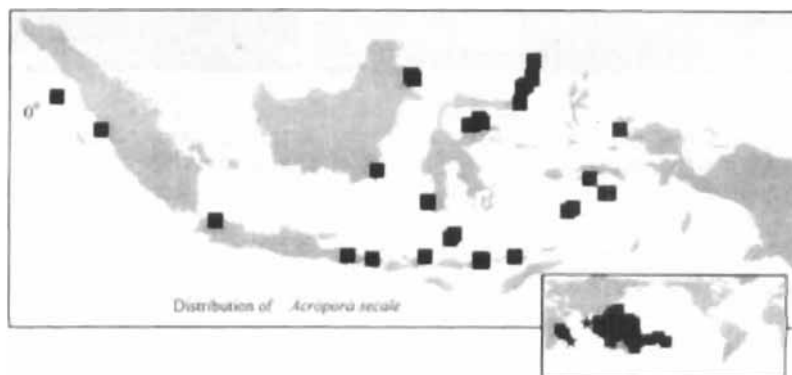


Figure 105. Distribution of *Acropora secale* in Indonesia (main map) and worldwide (inset).

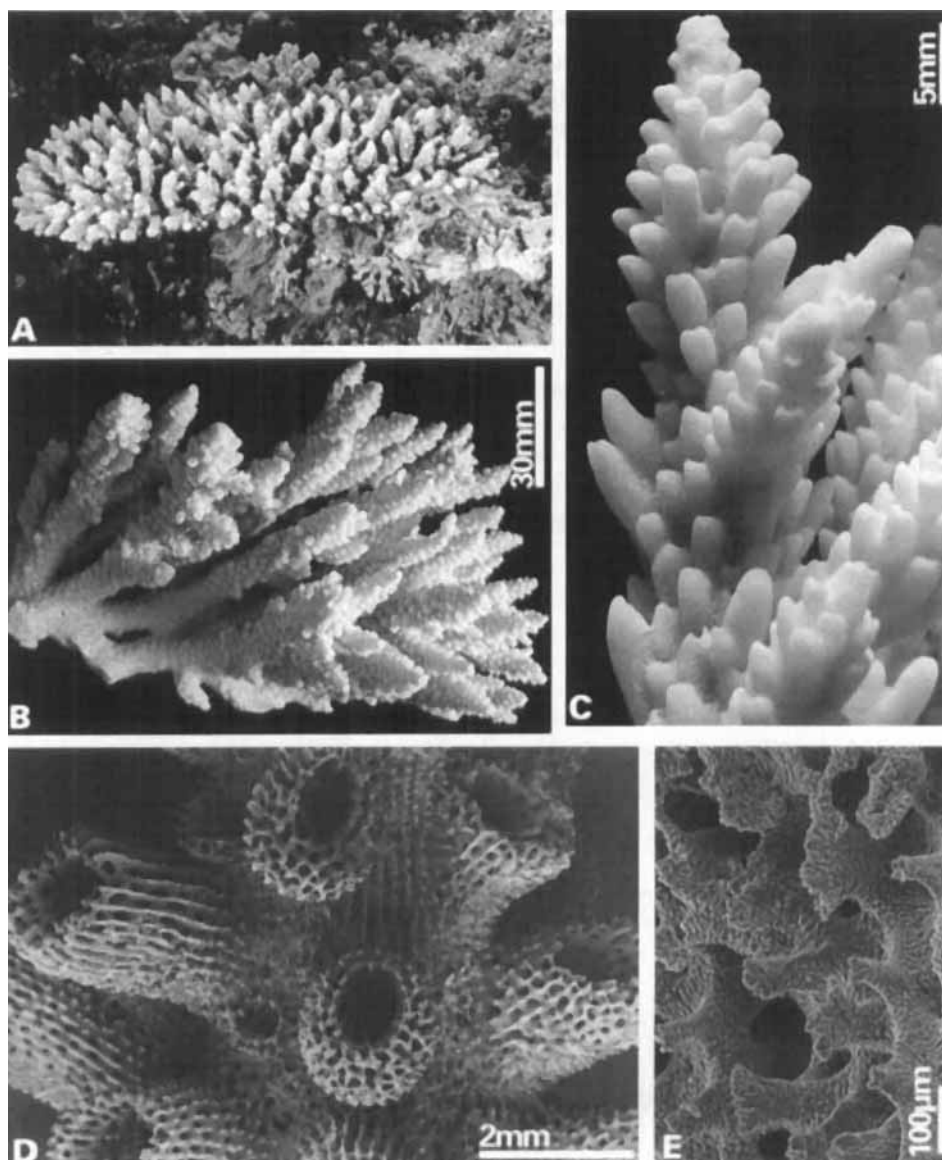


Figure 106. *Acropora secale* (A) at Biaro I., Sangihe Is, N. Sulawesi; (B, C) G39823; (D) G39822; (E) G49607: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Madrepora secale Studer, 1878 p.530

Madrepora concinna Brook, 1891 p.460; 1893 p.165 pl.17

Madrepora diversa Brook, 1891 p.461; 1893 p.424 pl.117 figs 3-6

Madrepora quelchi Brook, 1893 p.90 pl.32 fig.D

Acropora otteri Crossland, 1952 p.229 pl.43 figs 1,2 pl.44 figs 1,2

Material examined

W. SUMATRA: G47171, G47186-7 Nias I.; G49637, G49724 Padang; JAVA: G32841, G32846 Seribu Is; KALIMANTAN: G39822-3 Pulau Laut; G49625-8 N.E. Kalimantan;

N. SULAWESI: G48053, G49611–2, G49632 Bunaken N.P.; G49624, G49639 Batong I.; G48052 Tg Torowitang; G48050–1, G49609–10 Sangihe Is; C. SULAWESI: G49621–3, G50095 Togian Is; S. SULAWESI: G48054–5, G49605 Spumonde Arch.; G50983 Tanahjanpea; G50982 Kayuadi I.; NUSA TENGGARA: G49629–31, G49640, G50458 Bali; G48056, G49613–4 Lombok; G50981 Sangeang I.; G49615–8, G49638, G50456–7 Flores; G49619–20 Alor Is; BANDA SEA: G49606–7 Sekaro I.; G48040 Lucipara Is; G48061 Nusa Laut; G48057–60, G49608 Banda Is; IRIAN JAYA: G35766 Batanta I.

Skeletal characteristics

Corallum. Corymbose or caespito-corymbose from a side to central attachment, branches 7–20 mm in diameter and 20–70 mm in length.

Corallites. Axial corallites outer diameter 1.4–3.3 mm, inner diameter 0.3–1.2 mm, primary septa present up to 3/4R, secondary septa to 1/3R (absent or just visible as points in Indonesian specimens); radial corallites just touching, a mixture of long tubular with round to nariform openings and shorter nariform, the two types often arranged in separate rows along the branches, primary septa present up to 1/3R, secondary septa absent or some present up to 1/4R.

Coenosteum. A dense arrangement of spinules on radial corallites, reticulate with evenly distributed spinules in intercorallite areas.

Field characteristics

Corymbose, with side attachment or stalk; mixture of long tubular and short nariform corallites obvious; known colours purple with yellow corallite tips, brown, brown with blue branch tips or green; found subtidally on outer reef flat, reef edge, slopes and walls to around 5 m.

Remarks

This species can be confused with *Acropora valida* (see above) and with *A. lutkeni*, which is distinguished by sturdier branches, an irregular branching pattern and (in the laboratory) by the round openings of the radial corallites.

Acropora (Acropora) lutkeni Crossland, 1952
(Figs 107, 108)

Acropora lutkeni Crossland, 1952 p.229 pl.41 fig.1 pl.46 fig.2

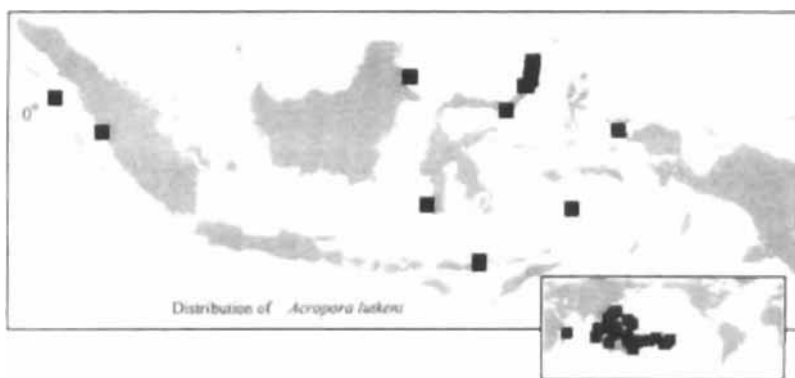


Figure 107. Distribution of *Acropora lutkeni* in Indonesia (main map) and worldwide (inset).

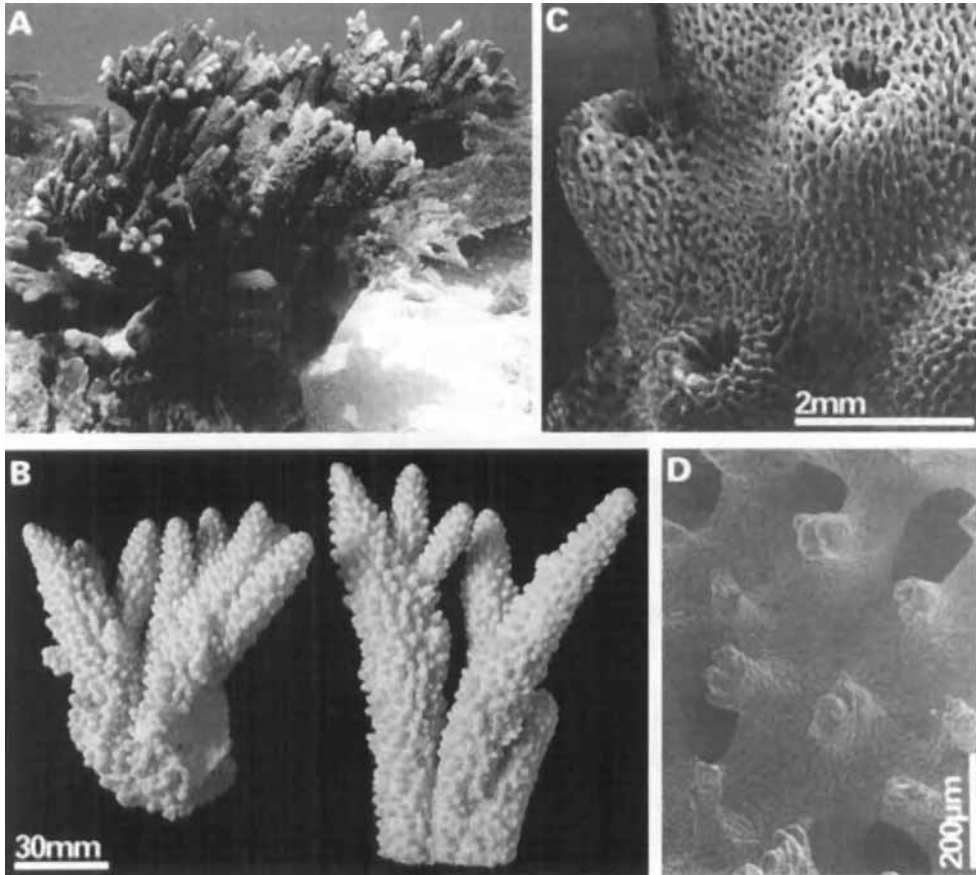


Figure 108. *Acropora lutkeni* (A) at Derawan I., E. Kalimantan; (B–D) G47254: (B) portions of colony (C) electron micrograph showing radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G47184–5 Nias I.; G49641 Padang; KALIMANTAN: G49647–8 N.E. Kalimantan; N. SULAWESI: G49644–5 Tg Dodepo; G47444 Tg Torowitang; G47254, G47438–43, G49646 Sangihe Is; S. SULAWESI: G47437 Spumonde Arch.; NUSA TENGGARA: G49642–3 Flores; BANDA SEA: G47436 Lucipara Is; IRIAN JAYA: G36033 Batanta I.

Skeletal characteristics

Corallum. Irregular with sturdy branches up to 45 mm in diameter, arising from a central to side-attached base but all ending at different heights; sometimes all branches may extend to more or less the same plane to give a corymbose appearance.

Corallites. Axial corallites outer diameter 1.9–4.3 mm, inner diameter 0.6–1.2 mm, primary septa present up to $2/3R$, secondary septa present to $1/2R$; radial corallites in mixed sizes up to 5 mm long, touching or just separated on branches, tubular with mostly rounded or slightly nariform openings, primary septa present up to $1/3R$, secondary septa mostly present, up to $1/2R$.

Coenosteum. A dense arrangement of laterally flattened spinules on radial corallites, reticulate with flaky spinules in intercorallite areas.

Field characteristics

Corymbose to irregular caespitose colonies with sturdy branches in which can be seen the mixture of corallite lengths; known colours brown, purple or blue; occurs subtidally on reef edge or upper slopes to about 5 m depth and submerged reefs.

Remarks

Because of the irregular mode of growth, no two colonies of *Acropora lutkeni* are exactly alike, which makes it a difficult species to identify in the field. 'Pseudo-corymbose' colonies can be confused with *A. secale* (see above).

The *Acropora divaricata* group

Radial corallites open nariform with thickened outer walls; coenosteum reticulate with forked or simple spinules throughout.

Acropora (Acropora) divaricata (Dana, 1846)
(Figs 109, 110)

Madrepora divaricata Dana, 1846 p.477 pl.41 fig.2,2a

Madrepora tenuispicata Studer, 1880 p.20 figs 1a,b

Madrepora scabrosa Quelch, 1886 p.152 pl.10 fig.2

Material examined

W. SUMATRA: G49774–82 Padang; JAVA: G50738 Scribu Is; KALIMANTAN: G48981 N.E. Kalimantan; N. SULAWESI: G35528 Bunaken N.P.; G49793 Tg Flesko; G49971–2 Sangehe Is; S. SULAWESI: G49773 Spumonde Arch.; G50920–2, G51066–7 Taka'bonerate; NUSA TENGGARA: G49794–5 Bali; G49792 Nusa Penida; G50923–4, G51067–8 Moyo; G49783–6 Flores; G49787–8 W. Timor; G49789–91 Alor Is; BANDA SEA: G49767 Lucipara Is; G51179–82 Ambon I.; G49769–70 Suanggi I.; G49768 Manuk I.

Skeletal characteristics

Corallum. Branching pattern open caespito-corymbose with branches up to 15 mm diameter curving and anastomosing to form a network within the colony.

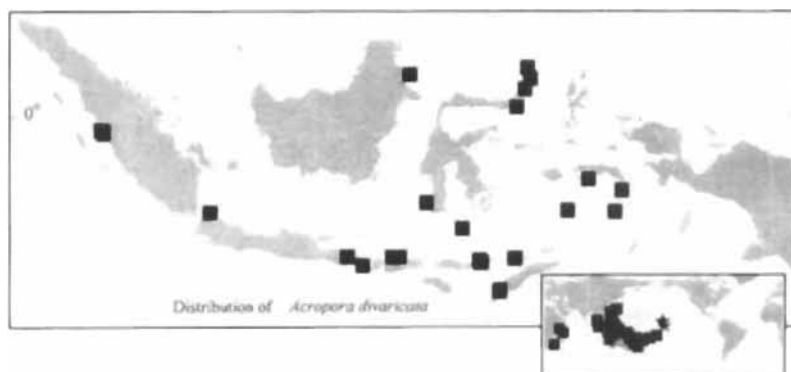


Figure 109. Distribution of *Acropora divaricata* in Indonesia (main map) and worldwide (inset).

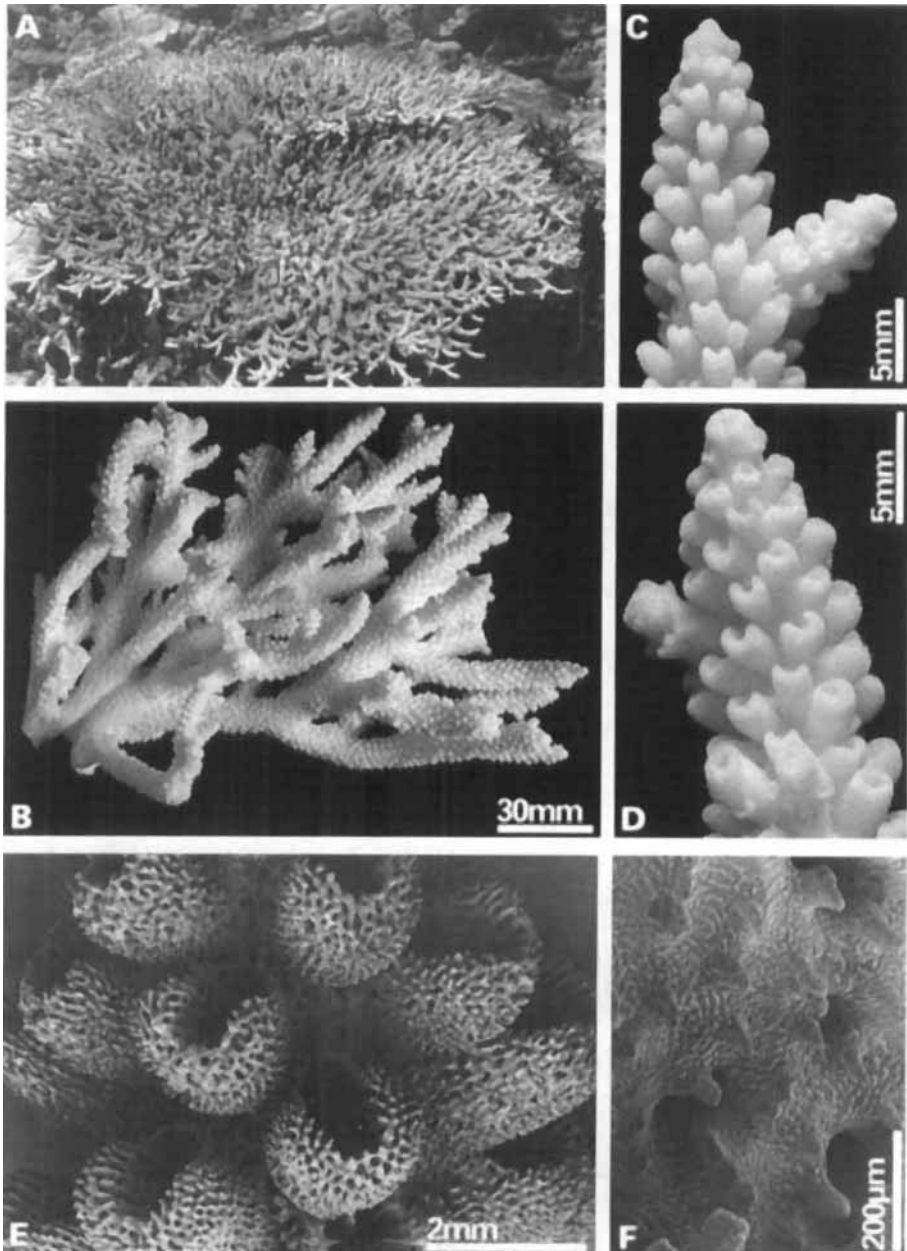


Figure 110. *Acropora divaricata* (A) at Bone Tambung, Spumonde Archipelago, S.W. Sulawesi; (B-F) G49781: (B) portion of colony (C, D) portion of branch (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.8–3.0 mm, inner diameter 0.7–1.0 mm, primary septa present up to 1/2R, secondary septa absent or some to all present to 1/4R; radial corallites evenly sized and spaced on branches, just touching, nariform, with large, open calices, distally radial corallites are tubo-nariform and towards the base of branches they may be appressed tubular, sometimes radial corallite walls extended outwards by a rostrate

development, primary septa present up to 1/2R with obvious directives, secondary septa present up to 1/4R.

Coenosteum. Reticulate with dense arrangement or rows of laterally flattened or forked spinules on radial corallites; reticulate with spinules less densely arranged in intercorallite areas.

Field characteristics

Colonies have a distinctive divergent branching pattern within a bracket or rounded arborescent table shape; known colours brown or greenish brown, usually with blue branch tips; found subtidally on reef slopes and submerged reefs.

Remarks

This species is very similar to *Acropora solitariaensis*, the two species being distinguished by growth form. It is not common in Indonesia, and some of the specimens may be immature colonies of *A. solitariaensis*.

Acropora (Acropora) solitariaensis Veron & Wallace, 1984
(Figs 111, 112)

Acropora solitariaensis Veron & Wallace, 1984 p.371 figs 916,922,928

Material examined

W. SUMATRA: G47189 Nias I.; G49654–7, G49708–9 Padang; E. SUMATRA: G49829–30 Riau/Lingga Is; KALIMANTAN: G49693–704, G49714, G50098, G51023–4 N.E. Kalimantan; N. SULAWESI: G49685 Tg Dodepo; G48091, G49653 Bunaken N.P.; G49686, G49713, G49741 Tg Flesko; G48100, G49652 Tg Pisok; G48098–9, G49651 Tg Pulisan; G48090 Tg Torowitang; G48083–9, G48094–7, G49650, G49739, G49742 Sangihe Is; C. SULAWESI: G49687–92 Togian Is; NUSA TENGGARA: G49705–7 Bali; G49684 Nusa Penida; G46698–9, G46984, G49712, G50097 Nusa Lembongan; G48092 Lombok; G51031–6 Sangeang I.; G51025–30 Komodo; G49658–60, G49740 Flores; G49661–5 W. Timor; G49666–83, G49710–1, G50099–102, G50591 Alor Is; BANDA SEA: G48080, G48653 Sekaro I.; G48078–9, G48082, G49649 Lucipara Is; G36180 Ambon I.; G49738 Suangi I.; G48076–7, G48081, G48093 Banda Is.

Skeletal characteristics

Corallum. Tabulate, table tops up to 3 m in diameter being formed by anastomosing and upwardly curving branches, up to 15 mm in diameter.

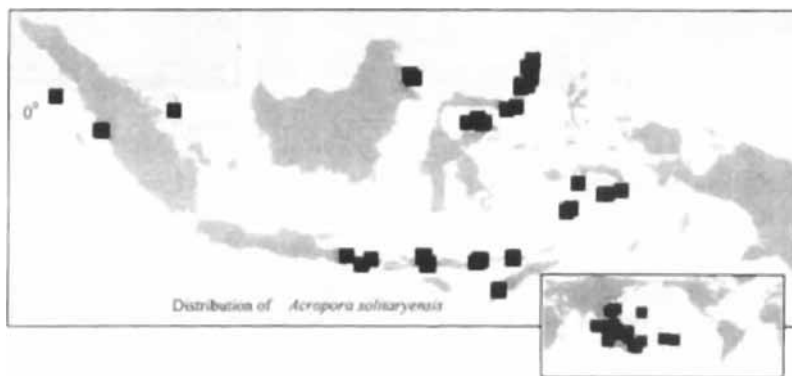


Figure 111. Distribution of *Acropora solitariaensis* in Indonesia (main map) and worldwide (inset).

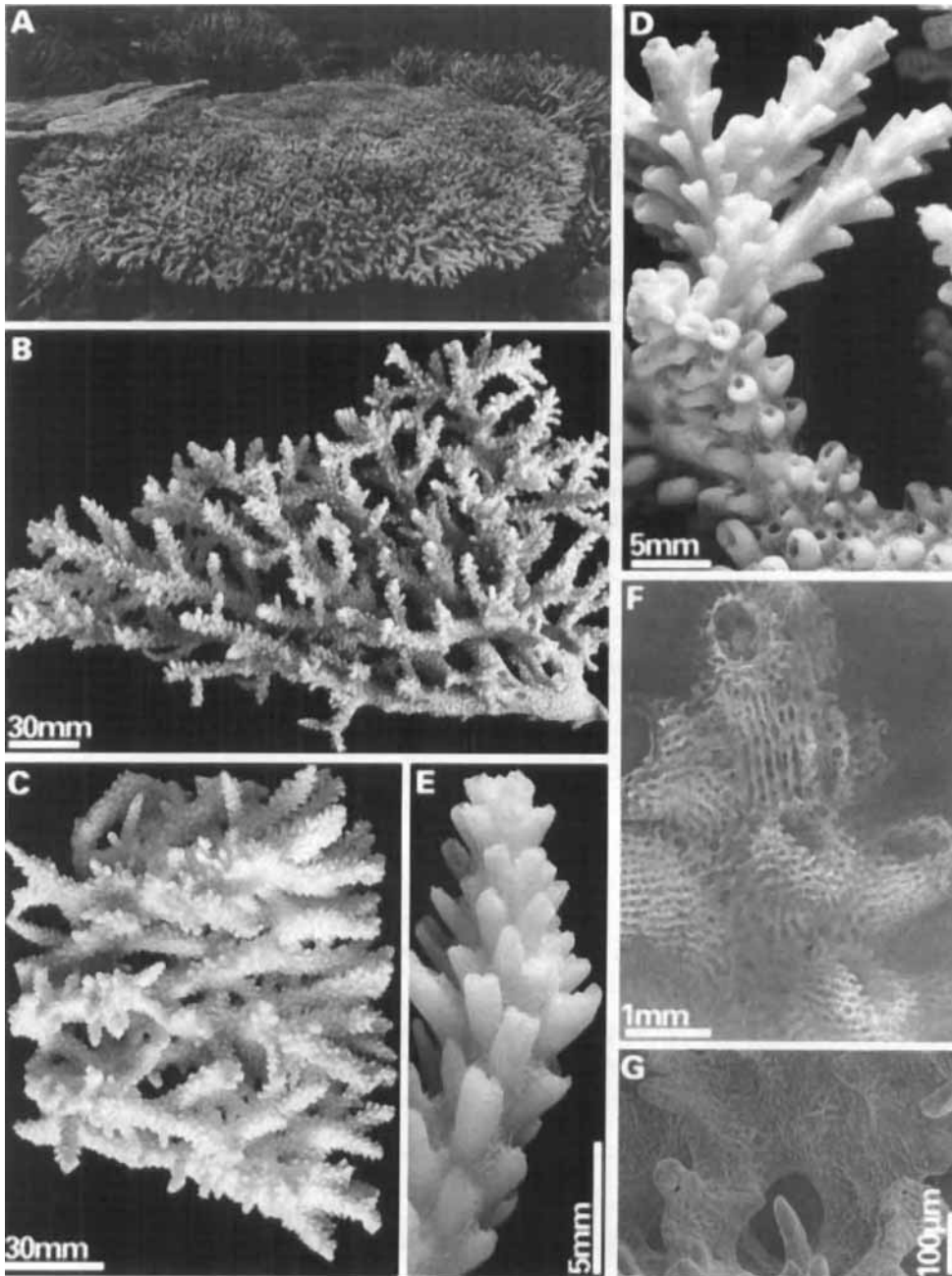


Figure 112. *Acropora solitaryensis* (A) at Nain I., N. Sulawesi; (B, D) G48076; (C, E-G) G48086: (B, C) portion of colony (D, E) portion of branch (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.6–3.4 mm, inner diameter 0.5–1.1 mm, primary septa present up to $1/2R$, secondary septa absent to a few just visible, up to $1/4R$; radial corallites evenly sized and arranged, large nariform or tubo-nariform, with large, open calices, distally radial corallites are tubo-nariform and towards the base of branches they

may be appressed tubular, sometimes radial corallite walls extended outwards by a rostrate development, primary septa present up to $1/3R$, secondary septa absent or a few just visible, up to $1/4R$.

Coenosteum. Reticulate with dense arrangement or rows of laterally flattened or forked spinules on radial corallites; reticulate with spinules less densely arranged in intercorallite areas.

Field characteristics

Occurs as stalked tables up to 3 m in diameter with widely spaced and anastomosing branchlets and large, obvious, radial corallites; known colours brown or greenish brown, usually with blue edge; occurs subtidally on reef slopes and walls and submerged reefs.

Remarks

This species looks like a flattened version of *A. divaricata*, with branches so much anastomosed that they sometimes form a solid plate. The degree of thickening of branches can vary greatly, so that specimens may appear quite delicate or very sturdy. It is a very common species on Indonesian reefs and also reefs of the South China Sea and Taiwan. This distribution is surprising, given the southern latitude distribution and absence from the Great Barrier Reef proper reported in Veron & Wallace (1984: 373).

Acropora (Acropora) kosurini Wallace, 1994
(Figs 113, 114)

Acropora kosurini Wallace, 1994 p.984 fig.27

Material examined

W. SUMATRA: G49725–6 Padang.

Skeletal characteristics

Corallum. Corymbose, from a central to side-attached growing point, with widely spaced and upwardly arching branches to 12 mm in diameter and 100 mm in length, tapering strongly to approximately 2 mm at their tips.

Corallites. Axial corallites outer diameter 2.3–2.7 mm, inner diameter 0.6–0.8 mm, primary septa present up to $1/3R$, secondary septa present up to $1/3R$; radial corallites densely

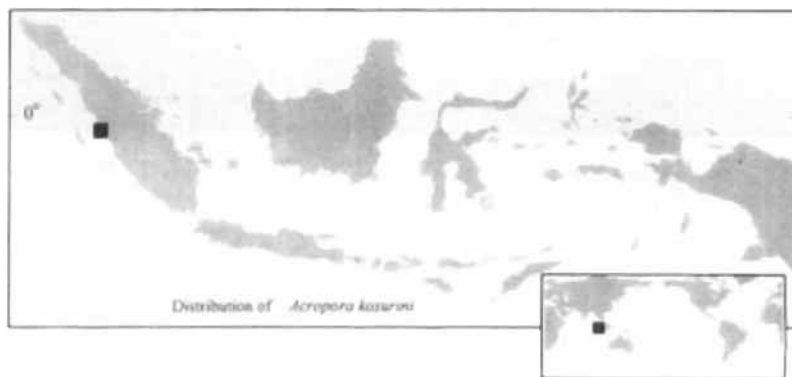


Figure 113. Distribution of *Acropora kosurini* in Indonesia (main map) and worldwide (inset).

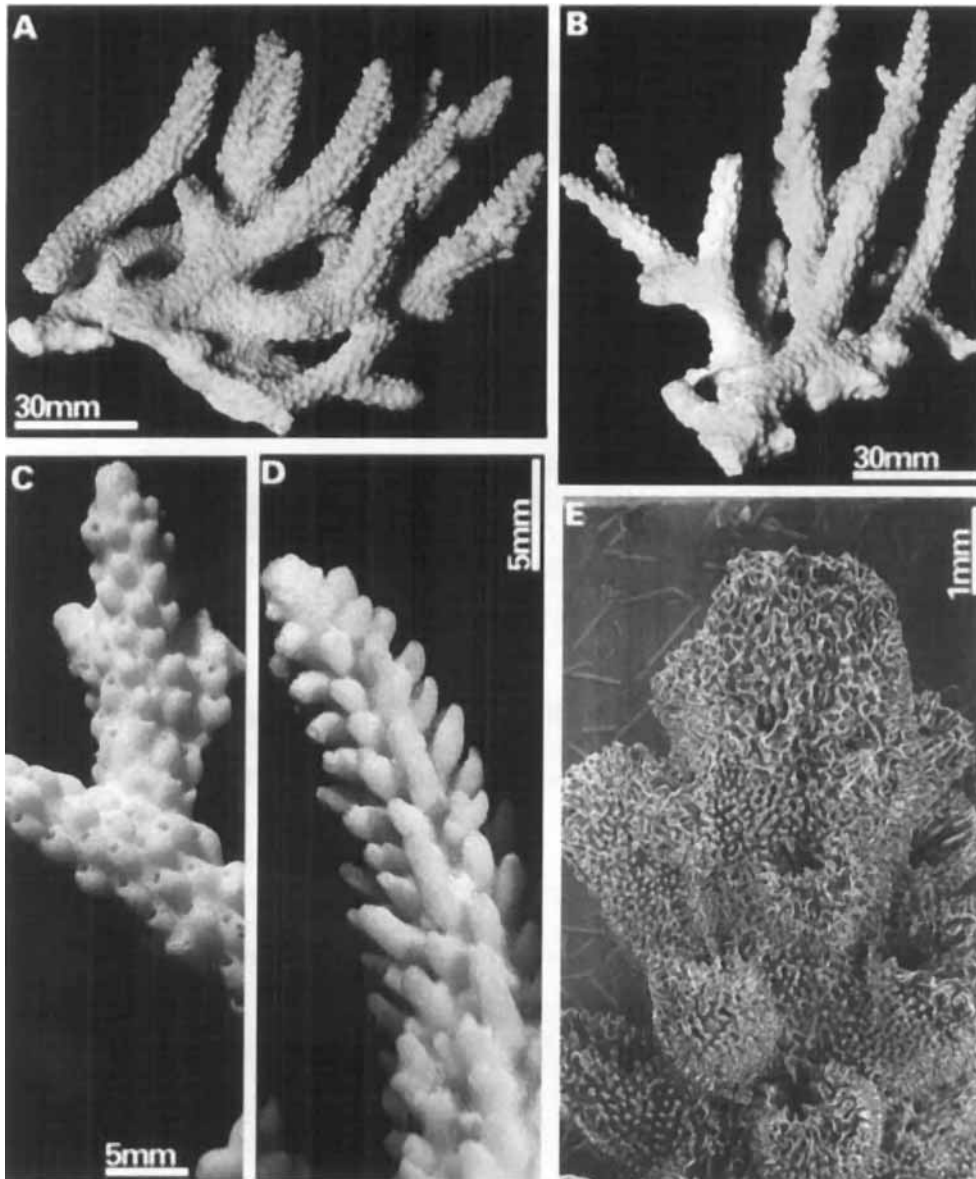


Figure 114. *Acropora kosurini* (A, D, E) G49725; (B, C) G49726: (A, B) portion of colony (C, D) portion of branch (E) electron micrograph showing axial and radial corallites.

arranged on branches, evenly sized and shaped, nariform with thickened and extended outer wall, primary septa present up to $2/3R$, secondary septa present up to $1/2 R$.

Coenosteum. Evenly arranged, elaborate spinules throughout.

Field characteristics

Occurs as an obvious bowl or bracket shape, which is distinctive because of its evenly arranged, long tapering branches; colour pale brown; occurs subtidally on outer reefs, upper slopes or walls and submerged reefs.

Remarks

This species has only previously been reported from western Thailand, and its presence in only the western part of Indonesia suggests that it is endemic to the central Indian Ocean. It is most similar to *Acropora hoeksemai*. Radial corallites are similar to those of other species in the group, but smaller and more even in size and shape.

Acropora (Acropora) hoeksemai Wallace, 1997

(Figs 115, 116)

Acropora hoeksemai Wallace, 1997 p.40 fig.11*Material examined*

KALIMANTAN: G48985–90, G48994 N.E. Kalimantan; N. SULAWESI: G48983, G48984 (*holotype*), G49719 Bunaken N.P.; C. SULAWESI: G48993 Togian Is; NUSA TENGGARA: G50976–80 Sangeang I.; G50975 Komodo; G48476–9, G48991 Flores; G48481–2 W. Timor; G48483–6, G48992 Alor Is; BANDA SEA: G35967 Bacan I.; G49721 Lucipara Is; G48982 Banda Is.

Skeletal characteristics

Corallum. Arborescent table; branches up to 15 mm diameter, tapering and broadly separated, horizontal branches at the base of the table anastomosing to a greater or lesser degree, central branches the sturdiest, peripheral branches may be half the thickness of central branches.

Corallites. Axial corallites outer diameter 2.0–2.6 mm, inner diameter 0.6–1.1 mm, primary septa present up to 3/4R, secondary septal cycle absent, or a few just visible; radial corallites evenly sized and distributed, not touching on the branches, tubular with a nariform outline but dimidiate openings, primary septa present up to 1/3R, secondary septa absent or a few just visible.

Coenosteum. Costate or lines of simple spinules on radial corallites, reticulate with simple spinules in intercorallite areas.

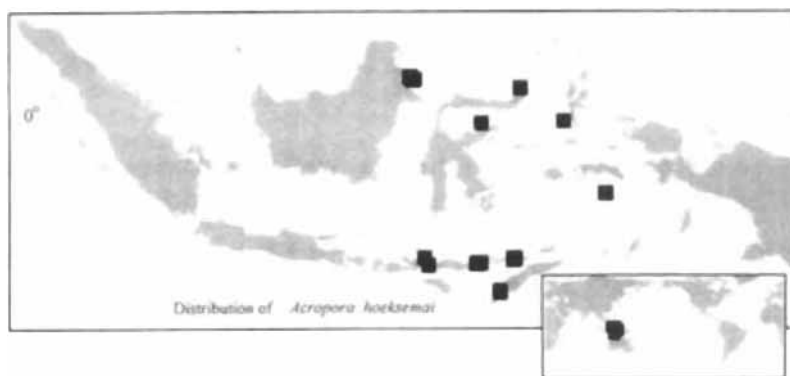


Figure 115. Distribution of *Acropora hoeksemai* in Indonesia (main map) and worldwide (inset).

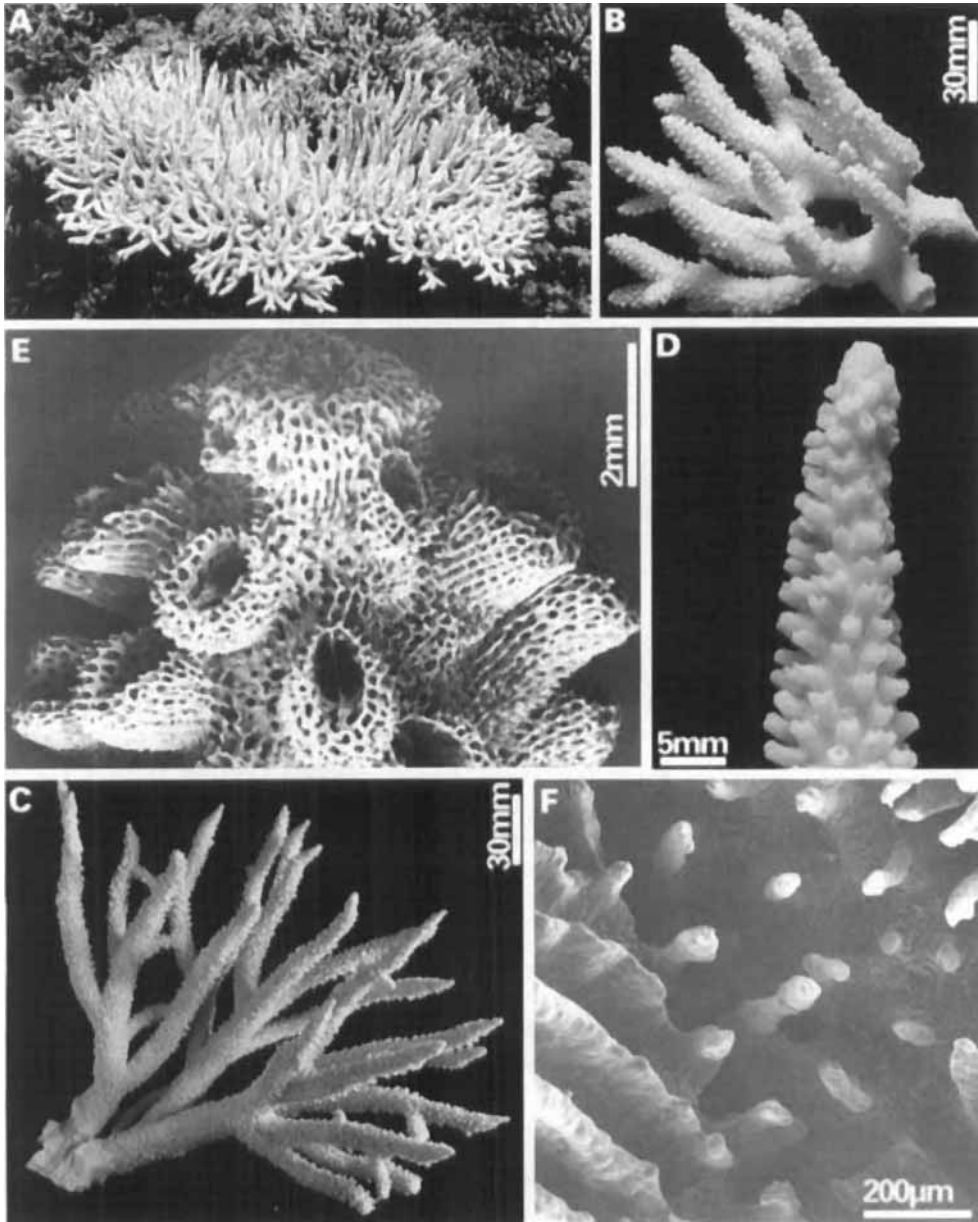


Figure 116. *Acropora hoeksemai* (A) at Walea Lighthouse, Togian Is, Central Sulawesi; (B, E) paratype G48476; (C, F) paratype G48982; (D) holotype G48984: (B, C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Field characteristics

Arborescent tables may be more or less stalked and are usually around 1–2 m diameter, although much larger tables, up to 4 m across, can occur; branches on the inside of the table sturdier than those towards the outside; known colours cream, white or pale brown; occurs subtidally on outer reefs, reef slopes or ledges on walls, and submerged reefs.

Remarks

This species superficially resembles, and can be confused with, *Acropora valenciennesi*. Sometimes specimens can only be separated in the laboratory. In general, however, the two can be separated by the more open, longer branching and finer skeletal structure of *A. valenciennesi*. *Acropora hoeksemai* also has corallites and coenosteum similar to those of the *A. divaricata* group, with a denser coenosteum than that of *A. valenciennesi*.

Acropora (Acropora) clathrata (Brook, 1891)
(Figs 117, 118)

Madrepora clathrata Brook, 1891 p.459; 1893 p.49 pl.5 pl.6 figs A,B

Madrepora complanata Brook, 1891 p.459; 1893 p.70 pl.8 fig.C

Madrepora orbicularis Brook, 1892 p.460; 1893 p.37 pl.2

Madrepora vasiformis Brook, 1893 p.37 pl.26 fig.A

Material examined

W. SUMATRA: G47188 Nias I.; G48801–2 Padang; KALIMANTAN: G49761–5 N.E. Kalimantan; N. SULAWESI: G49751 Tg Dodepo; G47720–1 Bunaken N.P.; G49750 Tg Flesko; G47219 Tg Pisok; G47211–8, G49760 Sangihe Is; C. SULAWESI: G49752–9 Togian Is; S. SULAWESI: G47210 Spumonde Arch.; NUSA TENGGARA: G49766 Bali; G49749 Nusa Penida; G47486 Lombok; G50925 Moyo; G48803, G49748, G50926 Flores; G48804–6 W. Timor; G48807–9 Alor Is; BANDA SEA: G46854 Sekaro I.; G46851, G46855 Lucipara Is; G47031–2 Ambon I.; G36218 Haruku I.; G46848 Nusa Laut; G46849 Suangi I.; G46850, G46852 Banda Is; G46853 Serua I.; IRIAN JAYA: G35767, G36035, G36041 Batanta I.

Skeletal characteristics

Corallum. Tabulate or plate-like, all branching beyond the stalk being horizontal or almost so, giving a completely flat table-top; branches flattened, diameter 6–10 mm.

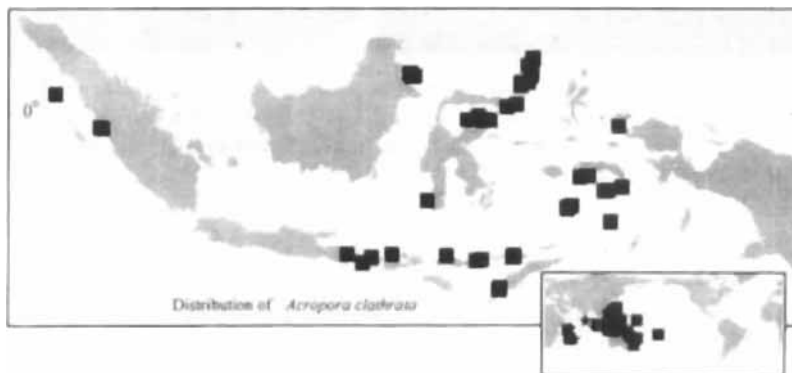


Figure 117. Distribution of *Acropora clathrata* in Indonesia (main map) and worldwide (inset).

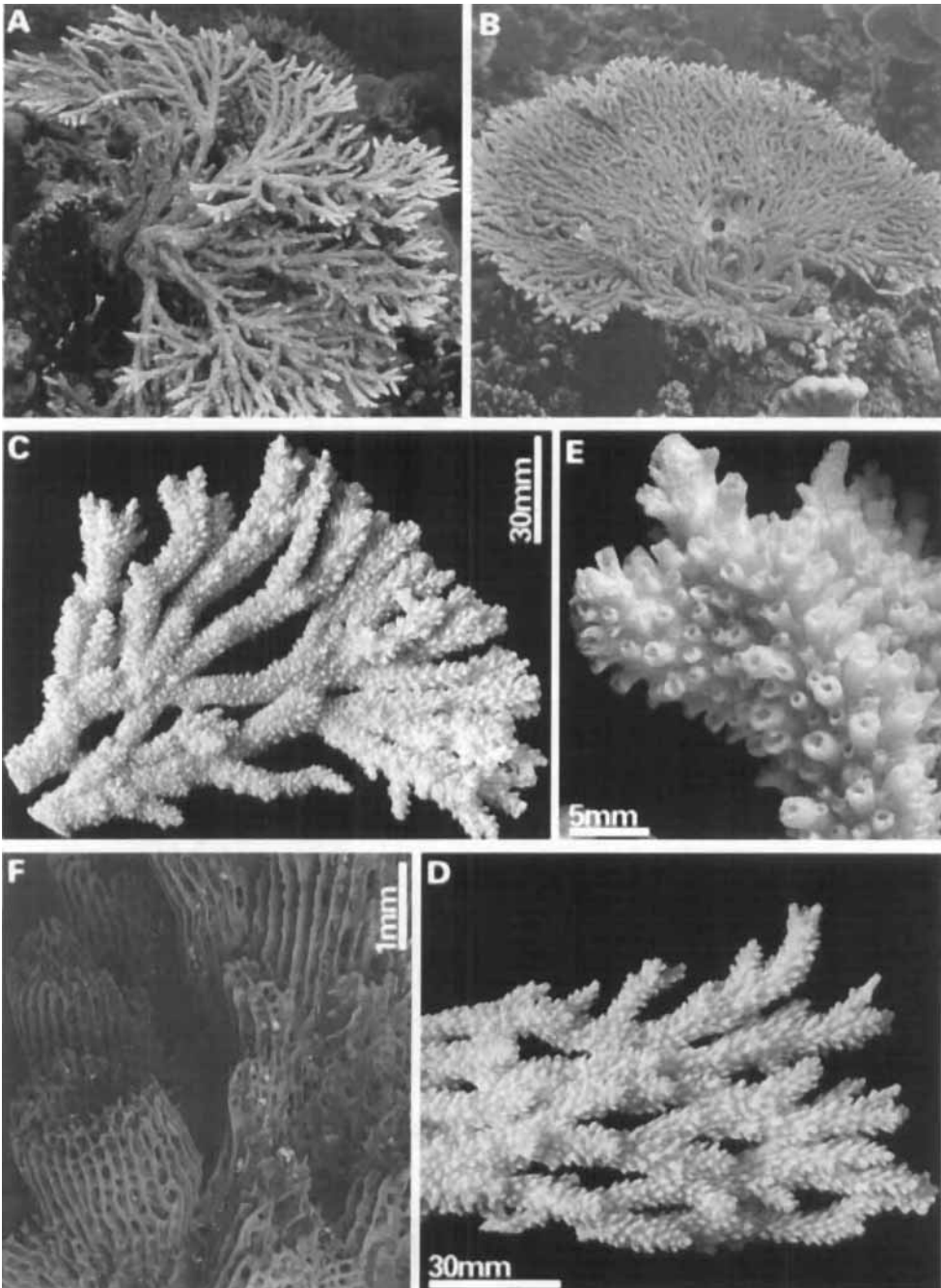


Figure 118. *Acropora clathrata* (A) at Kudingaren I., Spumonde Archipelago, S.W. Sulawesi (B) at Gunung Api, Banda Is, Banda Sea; (C, E, F) G46854; (D) G47211: (C, D) portion of colony (E) portion of branch (F) electron micrograph showing radial corallites.

Corallites. Axial corallites outer diameter 1.6–3.0 mm, inner diameter 0.5–0.9 mm, primary septa absent or some to all present up to 1/3R, secondary septa absent or a few just visible as points; radial corallites evenly sized or mixed sizes, closely arranged on branches, nariform or appressed tubo-nariform, sometimes with rostrate developments in the form of single or double extensions to the outer corallite wall (see detailed description in Wallace, 1978), primary septa absent or a few just visible as points, directives obvious, secondary septa absent.

Coenosteum. Costate or lines of densely arranged laterally flattened or forked spinules on radial corallites, reticulate with scattered spinules in intercorallite areas.

Field characteristics

Occurs as large tables or side attached plates with a very flat surface; known colours brown, blue, lavender or green; found subtidally on reef tops, slopes and walls, to about 15 m depth.

Remarks

This common species is found in most reef habitats of Indonesia, and does not strongly resemble any other species. Colonies vary greatly in terms of the degree of anastomosis of branches, and the degree of calcification of the skeleton and radial corallite developments (discussed in Wallace, 1978: 303).

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; coenosteum costate or lines of spinules throughout.

Acropora (Acropora) echinata (Dana, 1846)
(Figs 119, 120)

Madrepora echinata Dana, 1846 p.464 pl.36 figs.1,1a

Madrepora durvillei Edwards & Haime, 1860 p.148

Madrepora procumbens Brook, 1891 p.467; 1893 p.188 pl.29 fig.D

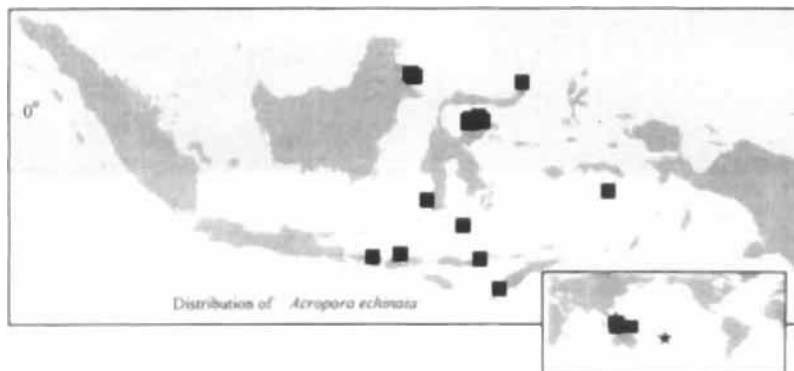


Figure 119. Distribution of *Acropora echinata* in Indonesia (main map) and worldwide (inset).

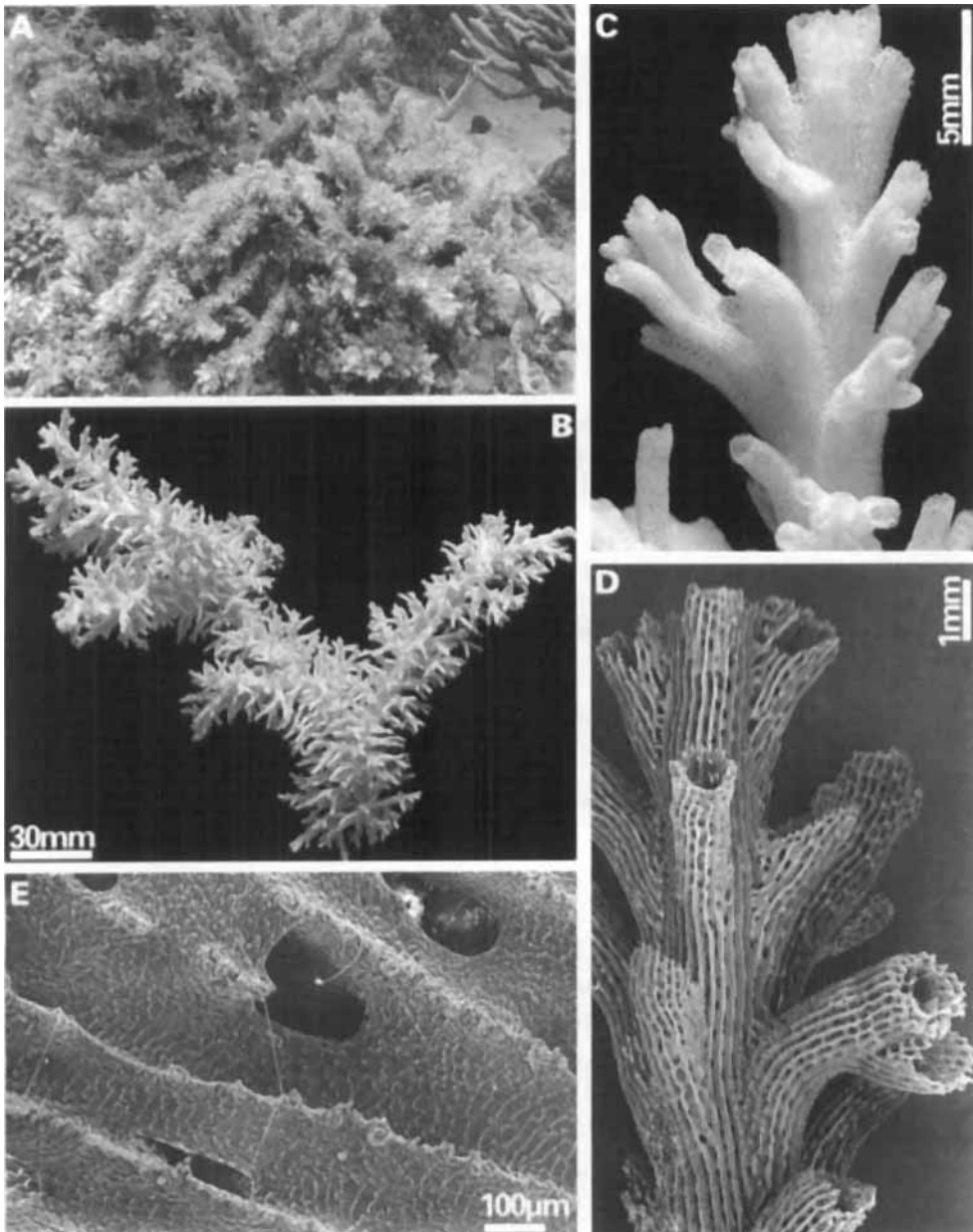


Figure 120. *Acropora echinata* (A) at Talatakoh I., Togian Is, Central Sulawesi; (B, C) G47704; (D, E) G50331: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Material examined

KALIMANTAN: G50336–45 N.E. Kalimantan; N. SULAWESI: G47706 Bunaken I.; C. SULAWESI: G49955–8, G50330–5 Togian Is; S. SULAWESI: G47707 Spumonde Arch.; G43810, G50962–3 Taka'bonerate; NUSA TENGGARA: G47708–9 Lombok; G50961 Moyo; G50328 Flores; G50329 W. Timor; BANDA SEA: G47704–5 Banda Is.

Skeletal characteristics

Corallum. Hispidose, consisting of irregularly branching main branches from which short branchlets are given off at regular intervals; branchlets composed of an axial corallite, bearing incipient axial corallites and a few radial corallites.

Corallites. Axial corallites outer diameter 0.8–1.8 mm, inner diameter 0.5–1.0 mm, primary septa present up to 2/3R, secondary septa absent or a few just visible; radial corallites scattered on branches, not touching, on branchlets appressed tubular with broad round, oval or nariform openings, on main branches immersed, primary septa present up to 1/4R, secondary septa absent or a few just visible as points.

Coenosteum. Light, perforate, costate or lines of spinules throughout.

Field characteristics

Occurs as sprawling, fragile hispidose colonies usually no larger than 1.5 m in diameter; known colours bright blue, white with bright blue or lavender tips to branchlets, or pale brown; found subtidally on protected sandy slopes and lagoon floors.

Remarks

This species is most similar to *Acropora subglabra*, from which it differs by having a lighter structured coenosteum and open, non-contracted axial and radial corallite calices. It frequently co-occurs with other species in the group, and the distinctions amongst the species can be noted in the field.

Acropora (Acropora) batunai Wallace, 1997
(Figs 121, 122)

Acropora batunai Wallace, 1997 p.38 fig.9

Material examined

C. SULAWESI: G48834 (*holotype*), G48835–42 Togian Is.

Skeletal characteristics

Corallum. Tabulate, the table top formed by horizontal branches from which further branchlets project sub-horizontally to vertically; these distal branchlets are surrounded by short branchlets in a hispidose pattern.

Corallites. Axial corallites outer diameter 0.6–1.0 mm, inner diameter 0.2–0.5 mm, primary septa present up to 1/4R, secondary septa absent; radial corallites arranged in rows down

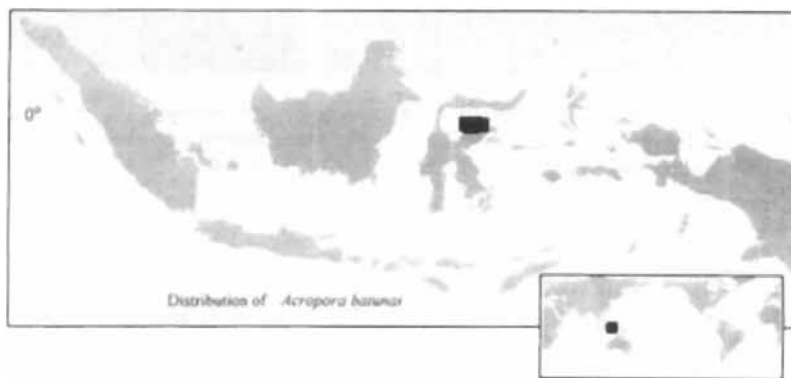


Figure 121. Distribution of *Acropora batunai* in Indonesia (main map) and worldwide (inset).

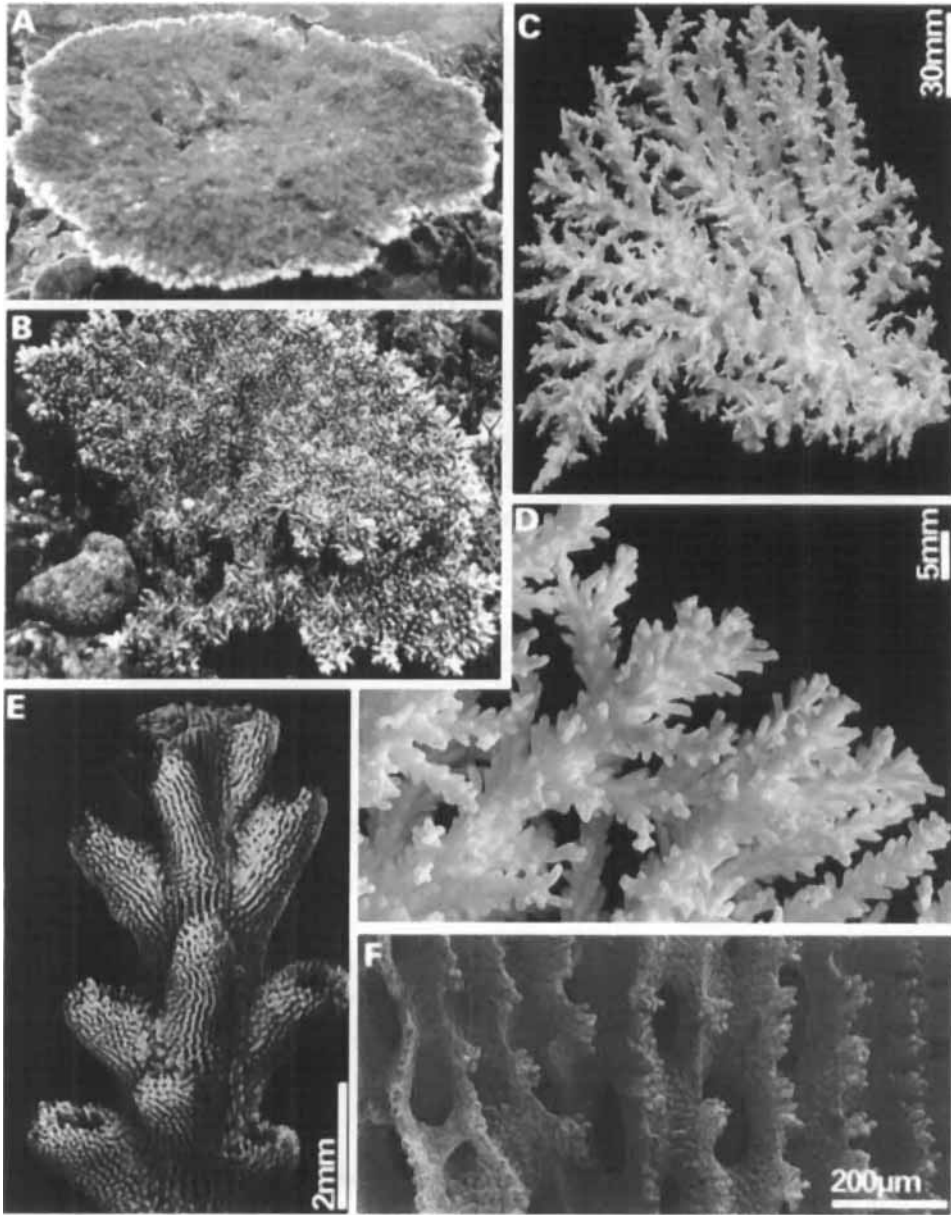


Figure 122. *Acropora batunai* (A, B) at Talatakoh I., Togian Is, Central Sulawesi; (C, F) paratype G48835; (D, E) holotype G48834: (C) portion of colony (D) portion of branches (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

the branchlets, tubular with nariform openings, curving away from the branchlet, and often in transition into axial corallites, bearing a few partially formed radial corallites; primary septa just visible or up to $1/3R$, secondary septa absent.

Coenosteum. Spinules evenly arranged in lines both on and between radial corallites.

Field characteristics

Colony a stalked table with table-top around 35 mm thick (with some branchlets projecting above this) and up to 1.25 m in diameter; throughout this table top, delicate hispidose branchlets can be seen; known colours brown, or brown with a white edge; occurs subtidally on slopes and ledges on walls.

Remarks

This species is included in the species group because of its hispidose branchlets, but it is the only species in the group which has a tabular growth form. Its tables reach diameters similar to those of *Acropora jacquelineae*, with which it occurs in the Togian Islands, and from which it can be distinguished by the hispidose branching and by its coloration (*A. jacquelineae* is usually pink). It was thought to be endemic to the Togian Islands (Wallace, 1997), but a specimen has since been collected in Kimbe Bay, New Britain, by U. Kaly.

Acropora (Acropora) subglabra (Brook, 1891)
(Figs 123, 124)

Madrepora subglabra Brook, 1891 p.470; 1893 p.186 pl.29 fig.C
Acropora spiniformis Eguchi and Shirai, 1977 p.493

Material examined

KALIMANTAN: G50363–70, G51052–61 N.E. Kalimantan; N. SULAWESI: G35512, G47722–5 Bunaken N.P.; C. SULAWESI: G50360–2 Togian Is; S. SULAWESI: G47726–7, G50353–4 Spumonde Arch.; G51049–51 Taka'bonerate; NUSA TENGGARA: G50371–2 Bali; G51044–8 Moyo; G50511 Flores; G50355–9, G50512 W. Timor; BANDA SEA: G47713–21 Banda Is.

Skeletal characteristics

Corallum. Hispidose, consisting of irregularly branching main branches from which short branchlets are given off at regular intervals.

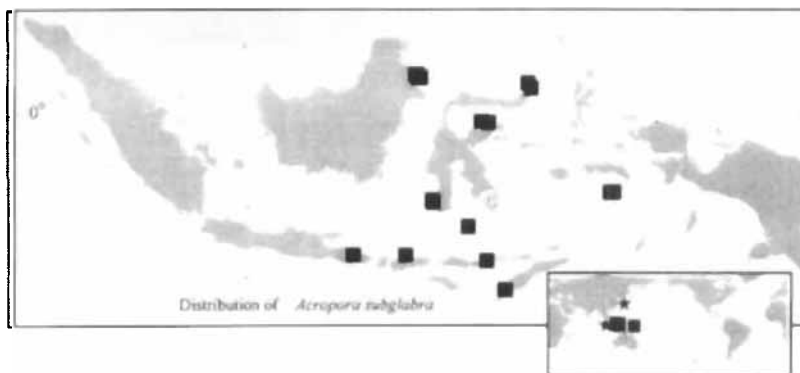


Figure 123. Distribution of *Acropora subglabra* in Indonesia (main map) and worldwide (inset).

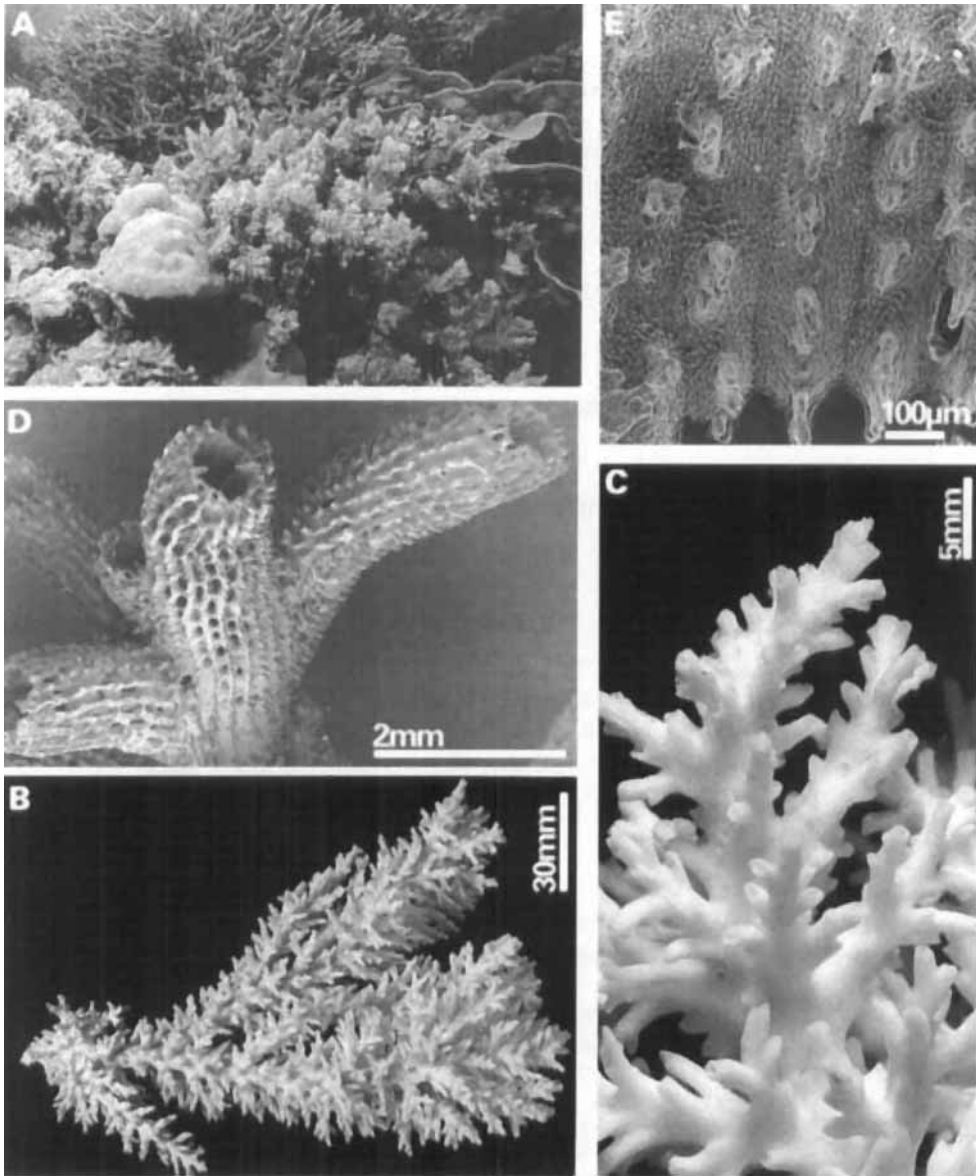


Figure 124. *Acropora subglabra* (A) at Nain I., N. Sulawesi; (B, C, E) G47724; (D) G47715: (B) portion of colony (C) portion of branch (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 0.8–1.5 mm, inner diameter 0.3–0.8 mm, primary septa present up to 2/3R, secondary septa absent or a few just visible as points; radial corallites scattered on branches, not touching, appressed tubular with round to oval, sometimes slightly nariform openings, primary septa present up to 2/3R, secondary septa absent.

Coenosteum. Lines of spinules, or costae bearing spinules, throughout.

Field characteristics

Occurs as sprawling hispidose colonies, sometimes (e.g. on the coral cays of the Spumonde Archipelago) forming thickets covering large areas of reef slope; known colours cream or pale brown, often with yellow branch tips; occurs subtidally on protected sandy slopes and lagoon floors.

Remarks

In degree of calcification this species is intermediate to *Acropora echinata* and *A. carduus*.

Acropora (Acropora) carduus (Dana, 1846)
(Figs 125, 126)

Madrepora carduus Dana, 1846 p.464 pl.36 fig.2

Madrepora proluxa Verrill, 1866 p.22

Material examined

KALIMANTAN: G50491 N.E. Kalimantan; N. SULAWESI: G47711, G48266 Bunaken N.P.; C. SULAWESI: G50349–50, G50492 Togian Is; S. SULAWESI: G50346 Spumonde Arch.; G50964 Taka'bonerate; NUSA TENGGARA: G47712 Lombok; G50965–6 Komodo; G50347 Flores; G50348 W. Timor; BANDA SEA: G35977, G35981 Bacan I.; G47710 Banda Is.

Skeletal characteristics

Corallum. Hispidose, consisting of irregularly branching main branches from which short branchlets are given off at regular intervals.

Corallites. Axial corallites outer diameter 1.0–2.0 mm, inner diameter 0.5–0.9 mm, primary septa present up to 1/4R, secondary septa absent or a few visible up to 1/4R; radial

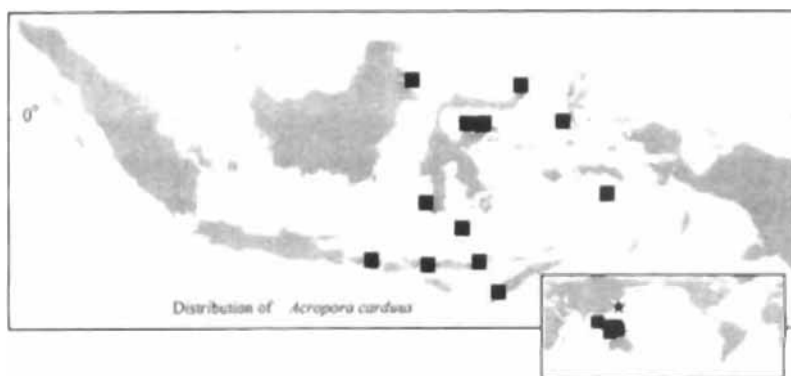


Figure 125. Distribution of *Acropora carduus* in Indonesia (main map) and worldwide (inset).

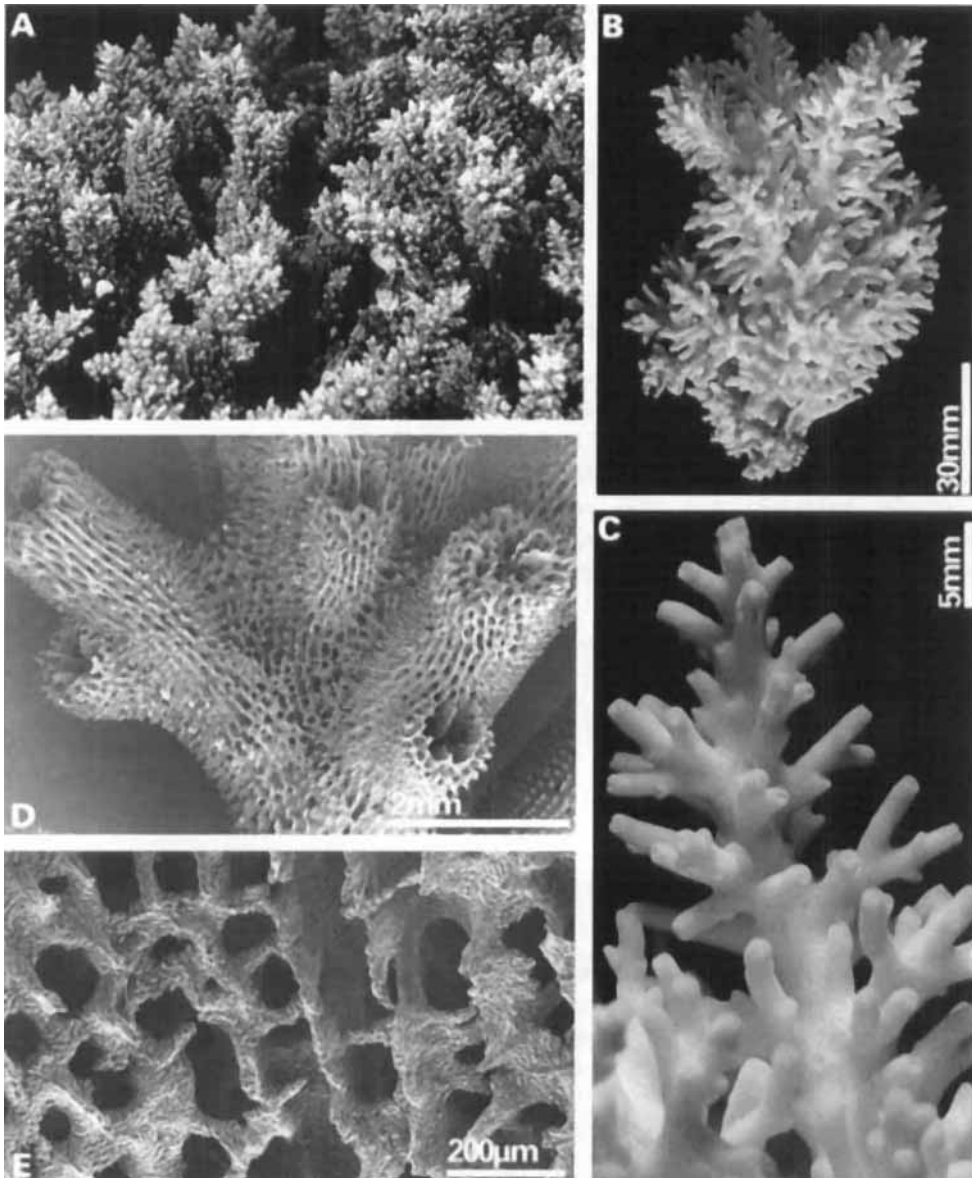


Figure 126. *Acropora carduus* (A) at Nain I., N. Sulawesi; (B–E) G50347: (B) portion of colony (C) portion of branch (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

corallites scattered on branches, not touching, appressed tubular with round, oval or nariform openings, primary septa present up to $1/2R$, secondary septa absent.

Coenosteum. Lines or broken lines of elaborated spinules throughout.

Field characteristics

Occurs as sprawling hispidose colonies, sometimes (e.g. on the coral cays of the Spumonde Archipelago) forming thickets covering large areas of reef slope; known colours cream or brown; occurs subtidally on protected sandy slopes and lagoon floors.

Remarks

Along with *Acropora subglabra*, this is a very common species in protected sandy habitats in Indonesia.

***Acropora (Acropora) awi* sp. nov.**

(Figs 127, 128)

Material examined

Holotype: G50646 C. Sulawesi, Togian Is, Bangu I., 00°30'S, 122°30'E, depth 9 m, 10.V.1995, coll. C.C. Wallace and J. Wolstenholme.

Paratypes: G50647 C. Sulawesi, Togian Is, Walebahi I., 00°12'S, 122°14'E, depth 8 m, 10.V.1995, coll. C.C. Wallace and J. Wolstenholme; G50648 E. Kalimantan, Sangalaki I., 02°15'N, 118°24'E, depth 8 m, 24.V.1995, coll. C.C. Wallace and J. Wolstenholme; G50649 same data except depth 13 m; G50650 E. Kalimantan, Karang Tababinga, 02°16'N, 118°14'E, depth 6 m, 25.V.1995, coll. C.C. Wallace and J. Wolstenholme; G50651 E. Kalimantan, Karang Tababinga, 02°16'N, 118°14'E, depth 6 m, 26.V.1995, coll. C.C. Wallace and J. Wolstenholme; G50652 same data except depth 3 m; G50653 same data except depth 5 m.

Other specimens: N. SULAWESI: G47730–1 Bunaken N.P.; S. SULAWESI: G47732–5 Spumonde Arch.; C. SULAWESI: G51730 Donggala Beach; HALMAHERA: G51731–4 N. Loloda Is; G51735–8 S. Loloda Is; NUSA TENGGARA: G47736 Lombok; G50644–5 W. Timor.

Skeletal characteristics

Corallum. Hispidose branching, with main branches up to 12 mm diameter and short secondary branchlets up to 8 mm in length and 3mm in diameter distributed evenly along branches; some short branchlets also bear incipient axial corallites.

Corallites. Axial corallites outer diameter 1.6–2.5 mm, inner diameter 0.7–1.0 mm, primary septa present up to 3/4R, secondary septa absent or some present up to 1/4R; radial corallites appressed or partly appressed tubular with oval openings, primary septa present up to 1/4R, secondary septa absent or a few just visible as points.

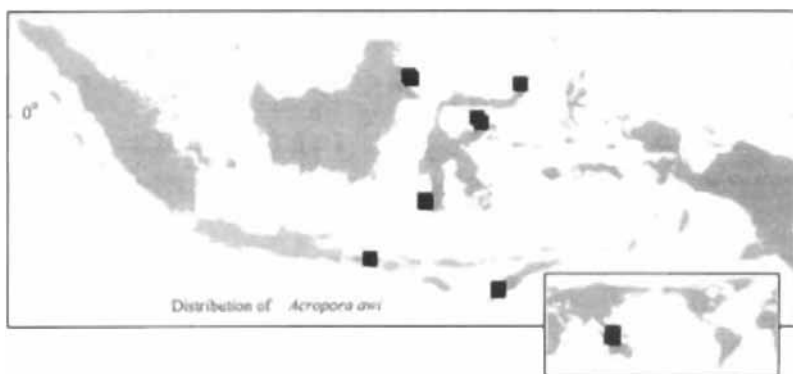


Figure 127. Distribution of *Acropora awi* sp. nov. in Indonesia (main map) and worldwide (inset).

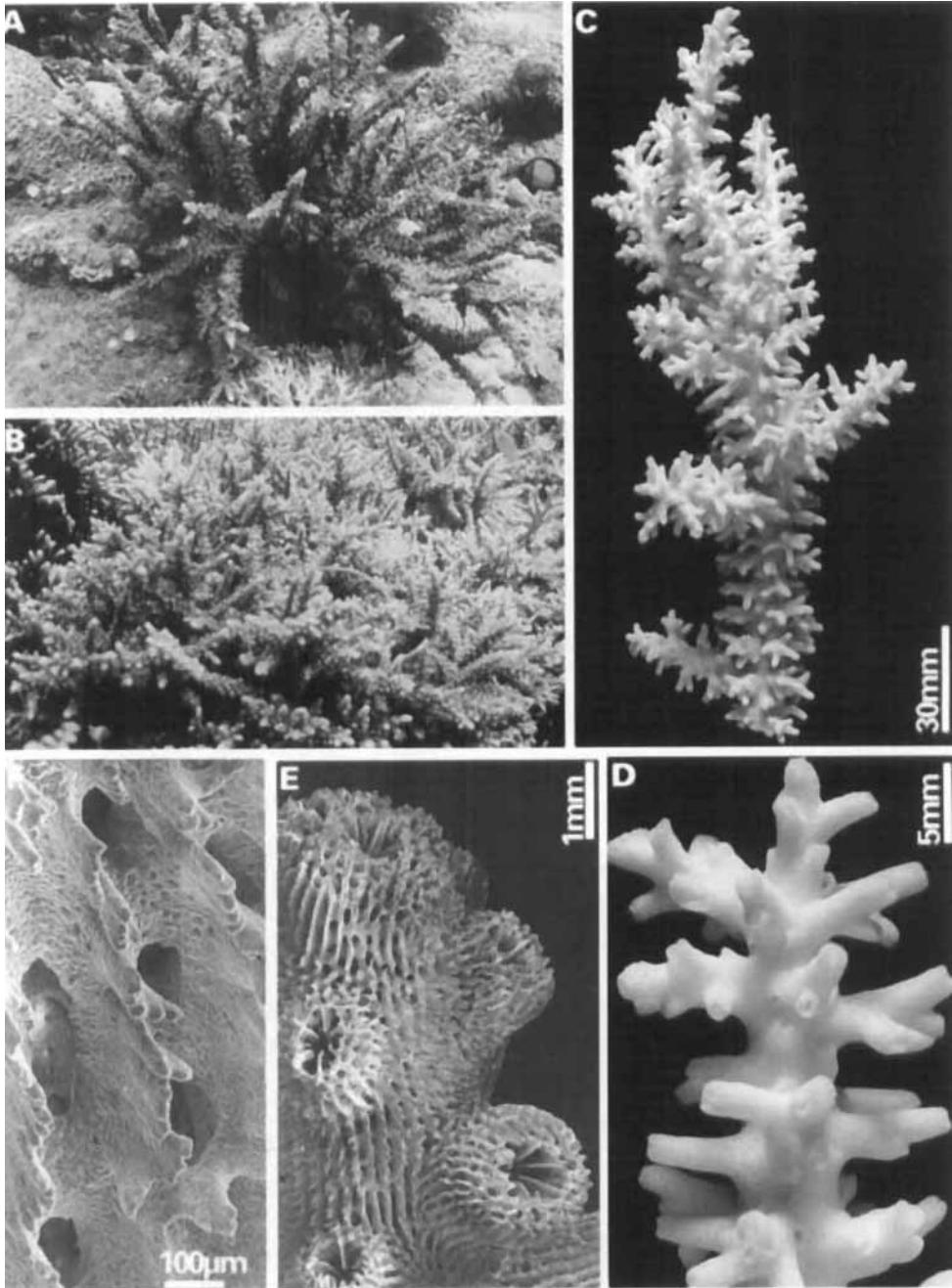


Figure 128. *Acropora awi* sp. nov. (A, B) at Tababinga Reef, Derawan I., E. Kalimantan; (C, D) holotype G50646; (E, F) paratype G50652: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Coenosteum. Dense lines of elaborate spinules or costae bearing elaborate spinules throughout; intercorallite areas sometimes reticulate with elaborate spinules.

Field characteristics

Occurs as upright branching hispidose colonies, up to 1.5 m in diameter; known colours pink, pink-brown or pale brown; occurs on protected sandy slopes and submerged reefs.

Remarks

In its general branch and corallite dimensions this species comes between *Acropora carduus* and *A. longicyathus*. It is usually more upright in its branching mode than the other hispidose species (except *A. turaki*). At Karang Tababinga (near Derawan I., N.E. Kalimantan) colonies of this species occurred around the top of the reef slope, shallower than the other hispidose species (such as *A. carduus*, *A. subglabra* and *A. echinata*), occurring in a zone about 4m in extent beginning at top of the slope and extending down the slope. Colonies from the Loloda Islands (Halmahera), have shorter branchlets and are sometimes reminiscent of *A. abrolhosensis* (but dimensions are less sturdy).

Etymology

Named for Michael Aw, underwater photographer, naturalist and friend of Indonesia's reefs.

Acropora (Acropora) elseyi (Brook, 1892)
(Figs 129, 130)

Madrepora elseyi Brook, 1892 p.456; 1893 p.172 pl.11 figs E,F

Madrepora exilis Brook, 1892 p.457; 1893 p.172 pl.10 figs C,D

Material examined

KALIMANTAN: G50506–10 N.E. Kalimantan; N. SULAWESI: G35511, G50501 Bunaken N.P.; G47835–6 Sangihe Is; C. SULAWESI: G50505 Togian Is; NUSA TENGGARA:

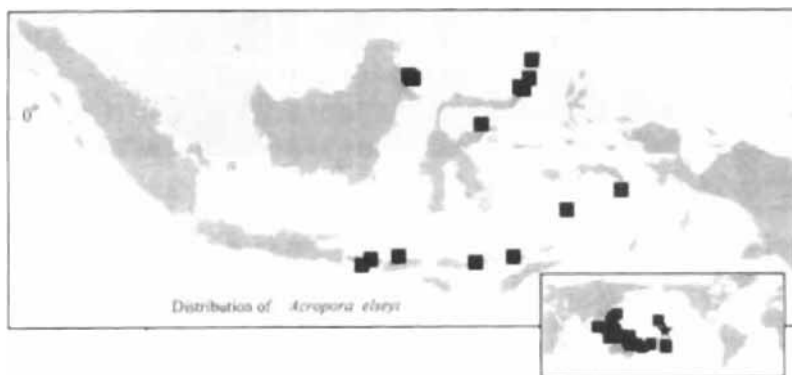


Figure 129. Distribution of *Acropora elseyi* in Indonesia (main map) and worldwide (inset).

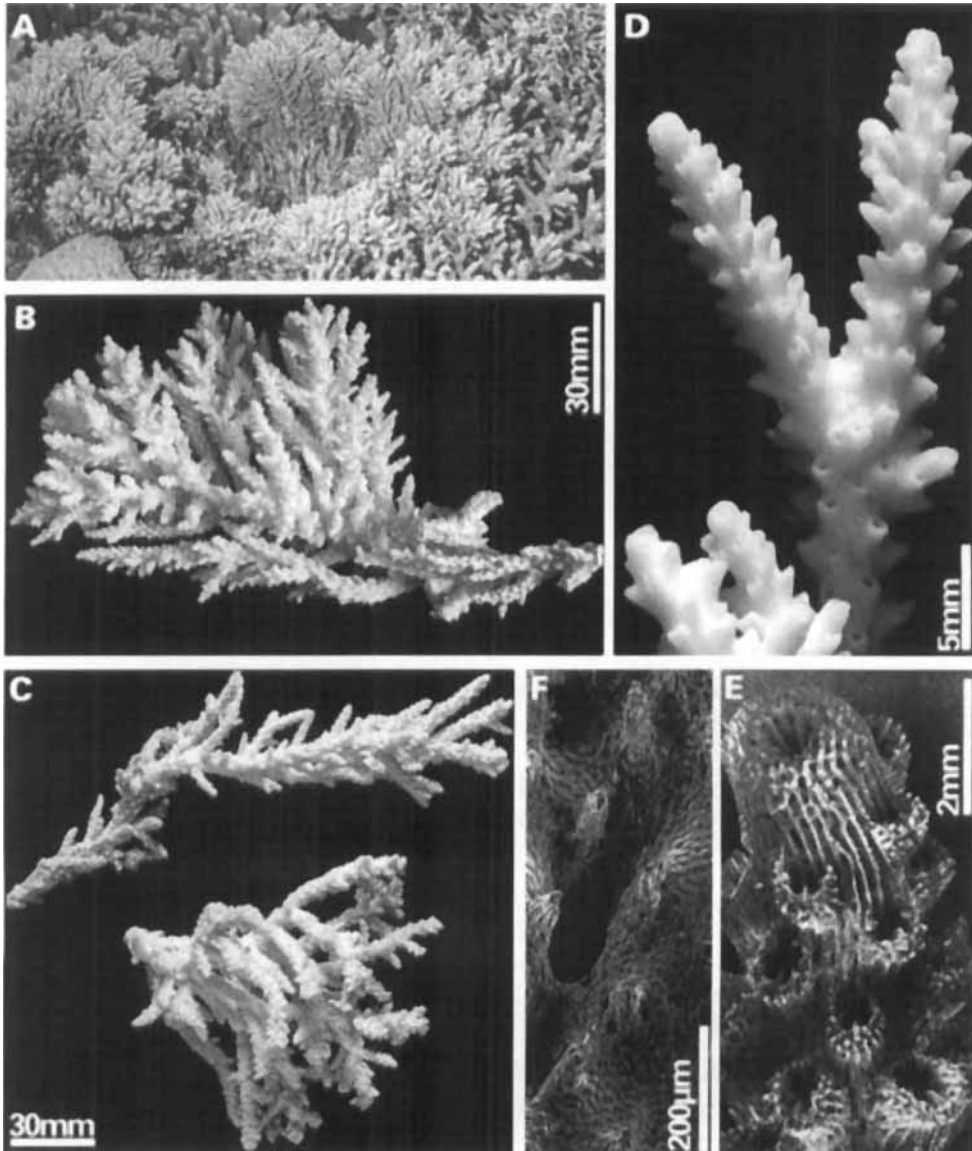


Figure 130. *Acropora elseyi* (A) at Mahangetang I., N. Sulawesi; (B, F) G47835; (C–E) G48163: (B, C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

G50504 Nusa Penida; G47837 Lombok; G50986–7 Moyo; G50594 Flores; G50502–3 Alor Is; BANDA SEA: G47833, G48165 Lucipara Is; G47834, G48162–4 Suanggi I.

Skeletal characteristics

Corallum. Irregular hispidose shape ranging from compact hispidose branches to caespitose and low arborescent forms, due to variability in the length and placement of secondary branchlets; main branches up to 15 mm diameter, secondary branchlets up to 7 mm diameter.

Corallites. Axial corallites outer diameter 0.9–2.3 mm, inner diameter 0.6–0.9 mm, primary septa present up to 2/3R, secondary septa absent or a few just visible as points; radial corallites crowded on branch, rounded tubular to appressed tubular with oblique openings and slightly thickened outer wall, primary septa present to 1/4R, secondary septa absent or a few just visible.

Coenosteum. Lines of elaborate spinules on radial corallites, similar or reticulate with scattered elaborate spinules in intercorallite areas.

Field characteristics

Found as scattered small caespitose colonies, usually less than 500 mm in diameter, or sprawling hispidose colonies, sometimes forming low thickets; known colours white, brown with white branch tips, brown or bright yellow; found around low tide mark and shallow subtidal habitats.

Remarks

This species is not closely similar to the other species in the group, and it occurs in more shallow habitats.

Acropora (Acropora) longicyathus (Edwards & Haime, 1860)
(Figs 131, 132)

Madrepora longicyathus Edwards & Haime, 1860 p.148

Madrepora syringodes Brook, 1892 p.463; 1893 p.177 pl.33 fig.E

Material examined

JAVA: G51208–9 Seribu Is; N. SULAWESI: G47691–3, G47728, G47728–9 Bunaken N.P.; S. SULAWESI: G47694–6, G50789 Spumonde Arch.; BANDA SEA: G50788 Ambon I.

Skeletal characteristics

Corallum. Hispidose; main branches up to 20 mm in diameter, sturdy branchlets up to 5 mm in diameter and 12 mm in length arranged regularly around the main branches.

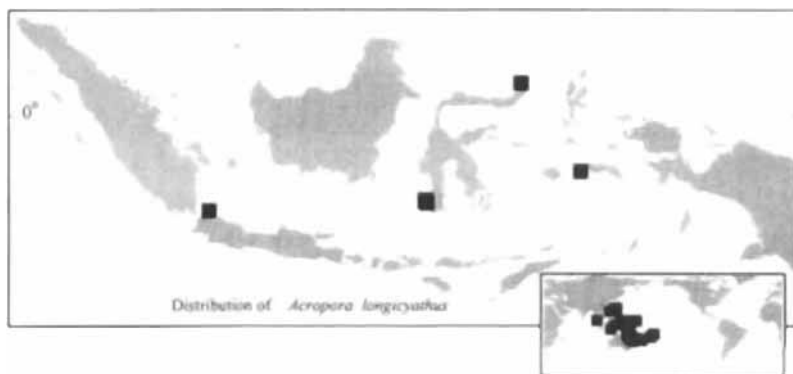


Figure 131. Distribution of *Acropora longicyathus* in Indonesia (main map) and worldwide (inset).

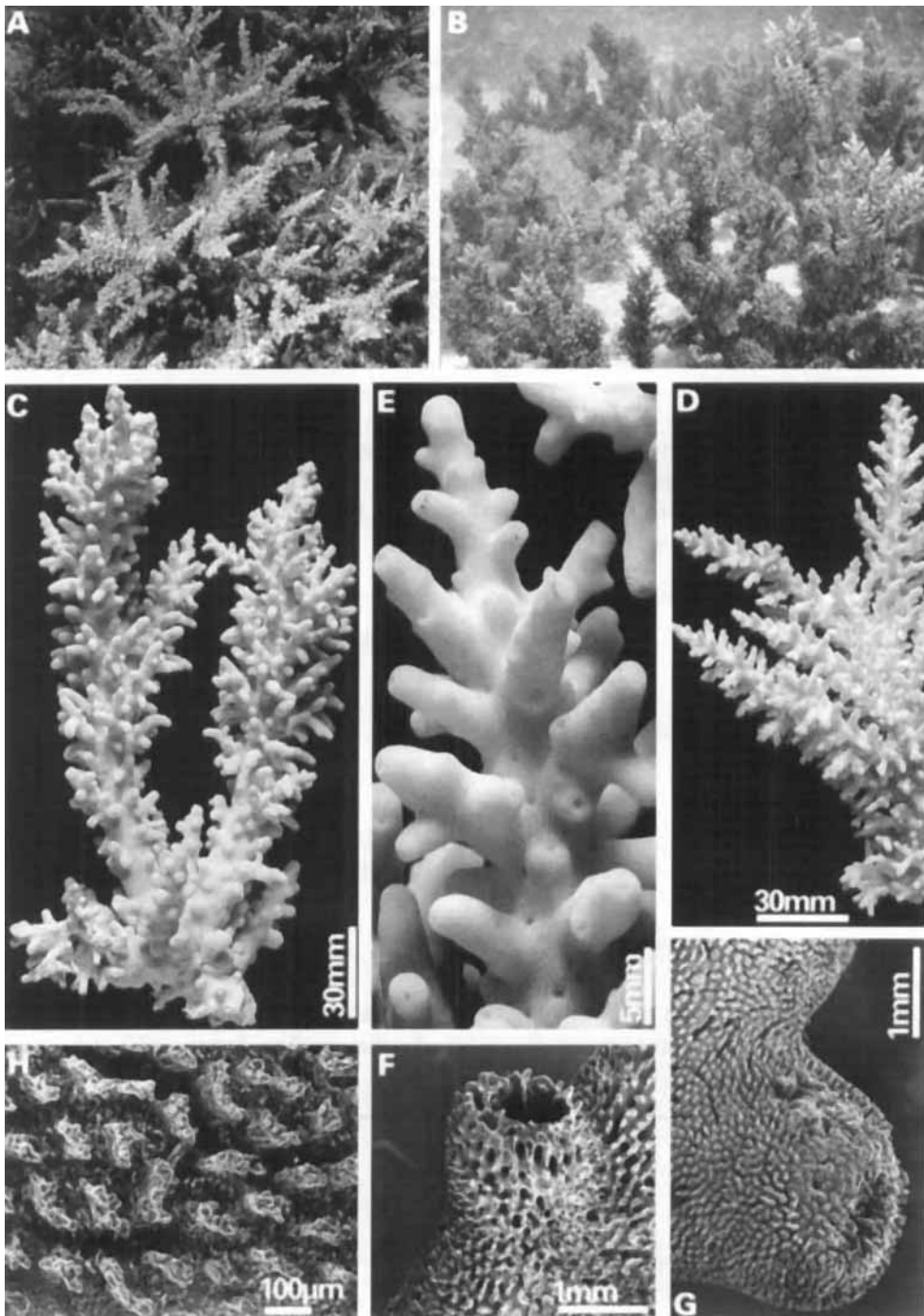


Figure 132. *Acropora longicyathus* (A) at Badi I, Spumonde Archipelago, S.W. Sulawesi (B) at Nain I, N. Sulawesi; (C, E, G, H) G47693; (D, F) G47694: (C, D) portion of colony (E) portion of branch (F, G) electron micrograph showing radial corallite (H) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.5–2.8 mm, inner diameter 0.5–1.3 mm, primary septa present up to 3/4R, secondary septa absent, or a few present up to 1/4R; radial corallites scattered on branches, mostly not touching, appressed or partly appressed tubular with round openings, primary septa present up to 1/4R, secondary septa absent.

Coenosteum. Dense arrangement of elaborated spinules throughout.

Field characteristics

Hispidose branching colonies forming shrubs or thickets; known colours cream, brown, green-brown or (occasionally) blue; occurs subtidally on protected sandy slopes and lagoon floors.

Remarks

In Indonesia, this species is most commonly encountered in mixed hispidose assemblages, occurring with *Acropora carduus*, *A. subglabra* and *A. awi*. It can be distinguished from all the other species by its sturdier appearance, although the Indonesian specimens are generally more slender than those occurring on Pacific reefs.

Acropora (Acropora) turaki Wallace, 1994
(Figs 133, 134)

Acropora turaki Wallace, 1994 p.468 fig.8

Material examined

KALIMANTAN: G49005–6 N.E. Kalimantan; N. SULAWESI: G48680 Bunaken N.P.; C. SULAWESI: G48855–63 Togian Is; S. SULAWESI: G47701 Spumonde Arch.; NUSA TENGGARA: G49007–9 Bali.

Skeletal characteristics

Corallum. Hispidose; main branches up to 10 mm in diameter, shorter secondary branchlets up to 4 mm in diameter bearing a small number of radial corallites (less than 10) and several

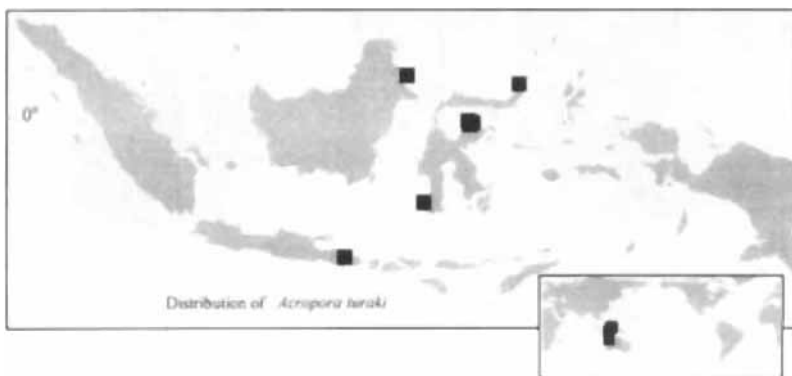


Figure 133. Distribution of *Acropora turaki* in Indonesia (main map) and worldwide (inset).

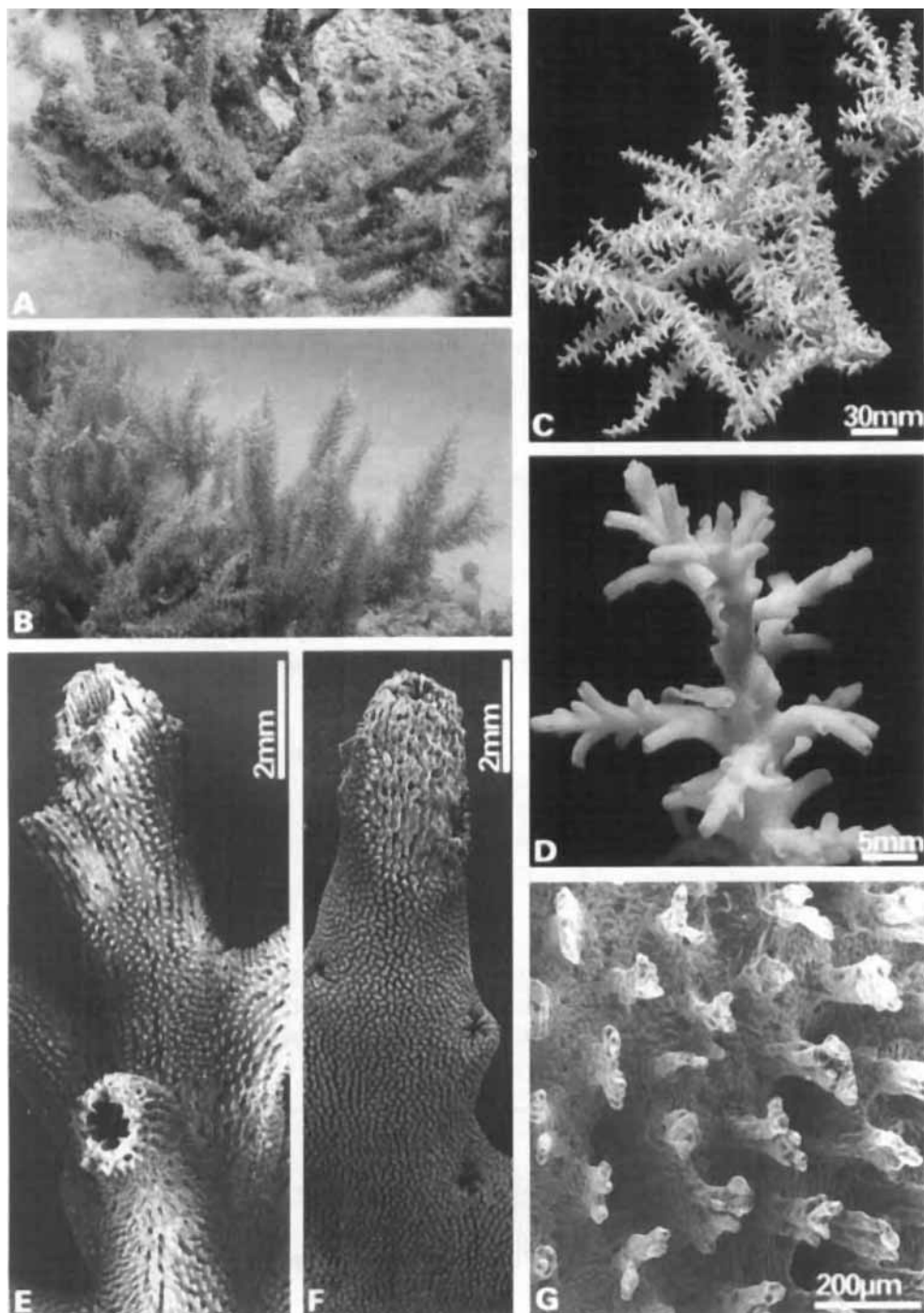


Figure 134. *Acropora turaki* (A, B) at Talatakoh I, Togian Is, Central Sulawesi; (C-E, G) G48857; (F) G48856: (C) portion of colony (D) portion of branch (E, F) electron micrograph showing axial and radial corallites (G) electron micrograph showing coenosteum between radial corallites.

incipient branches (axial corallites not bearing radial corallites); secondary branches and incipient branches may be recurved.

Corallites. Axial corallites outer diameter 1.5–2.0 mm, inner diameter 0.4–0.8 mm, primary septa present up to 1/3R, secondary septa absent; radial corallites scattered, appressed, with round calices, primary septa only directive visible or other primary septa just visible as fine points, secondary septa absent.

Coenosteum. Evenly distributed elaborated spinules throughout.

Field characteristics

Hispidose colonies up to 2 m in diameter; known colours pale blue or white; occurs in protected lagoons or sandy slopes.

Remarks

This species was previously known only from Rowley Shoals, N.W. Australia.

The *Acropora loripes* group

Radial corallites appressed tubular, with absence of radial corallites on parts of the colony; coenosteum based on elaborate spinules and similar on and between radial corallites.

Acropora (Acropora) loripes (Brook, 1892)
(Figs 135, 136)

Madrepora loripes Brook, 1892 p.459; 1893 p.165 pl.8 fig.B

Madrepora murrayensis Vaughan, 1918 p.183 pl. 82 figs 1,1a,b

Material examined

W. SUMATRA: G50459–63 Padang; JAVA: G50734 Seribu Is; KALIMANTAN: G39824 Pulau Laut; G50481, G50499, G50500 N.E. Kalimantan; N. SULAWESI: G50473 Tg Dodepo; G48288 Bunaken N.P.; G50471–2 Tg Flesko; G50482 Batong I.; G48287 Tg

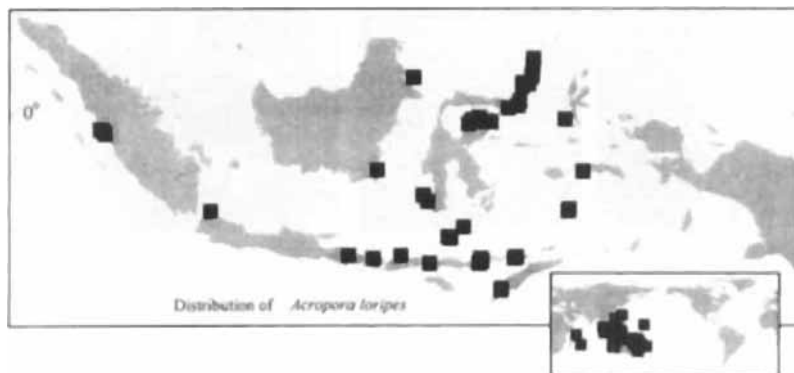


Figure 135. Distribution of *Acropora loripes* in Indonesia (main map) and worldwide (inset).

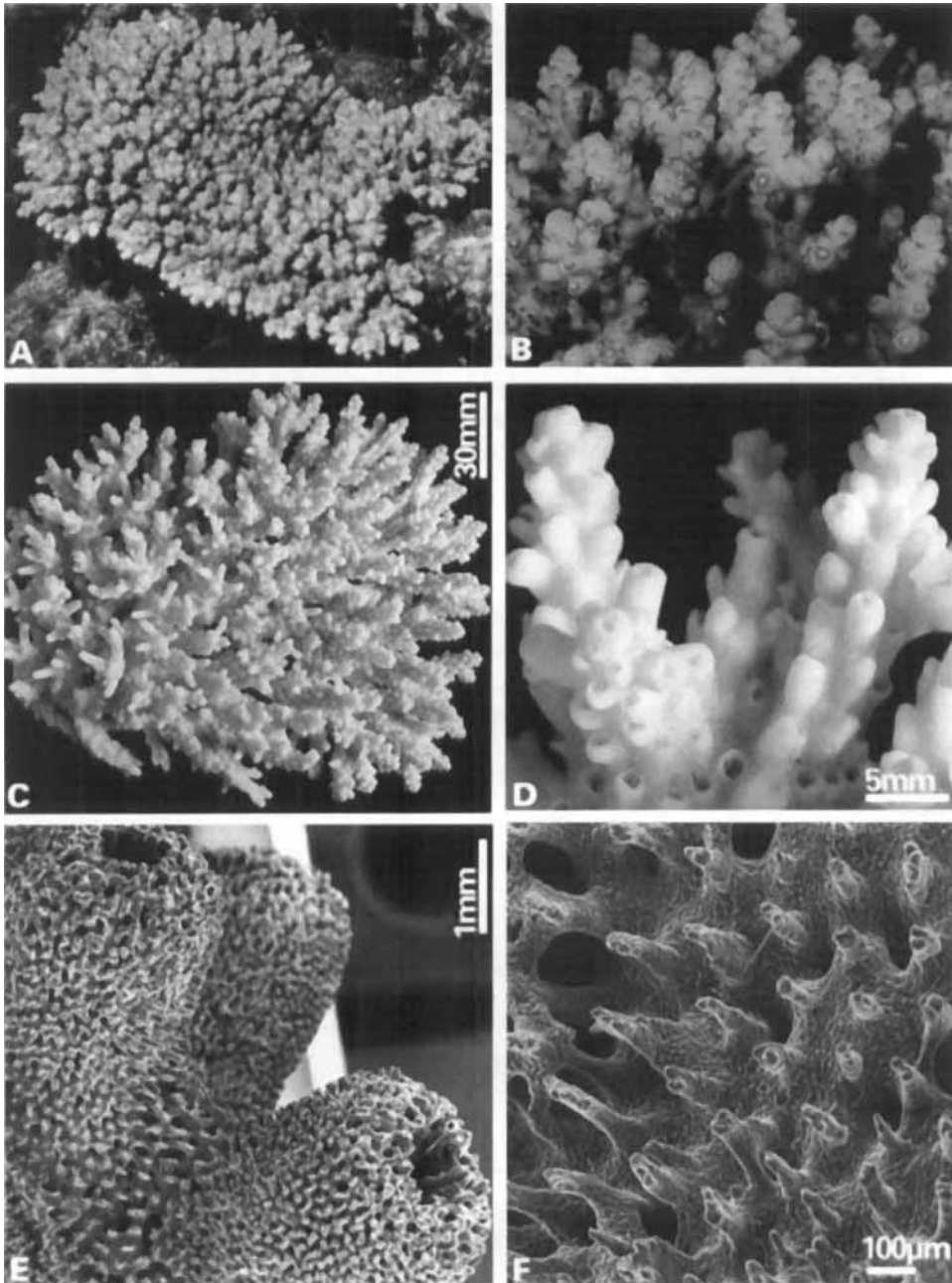


Figure 136. *Acropora loripes* (A) at Loemba Loemba I., Spumonde Archipelago, S.W. Sulawesi (B) at Tg Torowitang, N. Sulawesi; (C–F) G48275: (C) portion of colony (D) portion of branches (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Pisok; G48286 Tg Torowitang; G48282–4 Tg Pulisan; G48277–81, G48285 Sangihe Is; C. SULAWESI: G50474–80, G50496, G50530 Togian Is; S. SULAWESI: G48289, G50802–3 Spumonde Arch.; G51039 Taka'bonerate; G51037 Panjang I.; G51038 Tanahjanpea; NUSA

TENGGARA: G50402–4 Bali; G48290, G48548 Lombok; G51041–3, G51076 Moyo; G51040 Komodo; G50401, G50464–6, G51074–5 Flores; G50467–8, G50595 W. Timor; G50469–70, G50529 Alor Is; BANDA SEA: G35978, G35983 Bacan I.; G48276 Sekaro I.; G48275 Lucipara Is; G50804–5 Ambon I.

Skeletal characteristics

Corallum. Corymbose, caespito-corymbose or plate; short branchlets up to 10 mm in diameter, portion of upper part of branchlet sometimes naked of radial corallites.

Corallites. Axial corallites outer diameter 2.5–3.7 mm (up to 7 mm in Great Barrier Reef specimens: Veron & Wallace, 1984), inner diameter 0.5–1.2 mm, primary septa present up to 2/3R, secondary septa some to all present up to 1/4R; radial corallites mostly touching, appressed tubular with round to slightly nariform openings, primary septa present up to 2/3R, secondary septa absent, or some to all present up to 1/4R.

Coenosteum. A dense arrangement of elaborate spinules throughout.

Field characteristics

Corymbose colonies up to 400 mm diameter, with large and obvious radial corallites and the naked upper branches often obvious; known colours bright blue or pale brown, with a whitish glow behind the general colouration, due to the dense coenosteum; occurs subtidally on reef flats, submerged reefs and upper slopes.

Remarks

Hispidose forms of this species, recorded from the Great Barrier Reef and elsewhere, are not seen in Indonesia.

Acropora (Acropora) granulosa (Edwards & Haime, 1860)
(Figs 137, 138)

Madrepora granulosa Edwards & Haime, 1860 p.156

Madrepora clavigera Brook, 1892 p.455; 1893 p.183 pl.9 figs A,A'

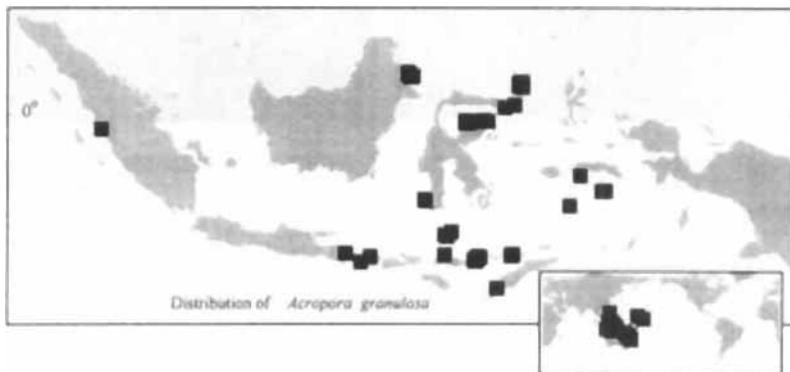


Figure 137. Distribution of *Acropora granulosa* in Indonesia (main map) and worldwide (inset).

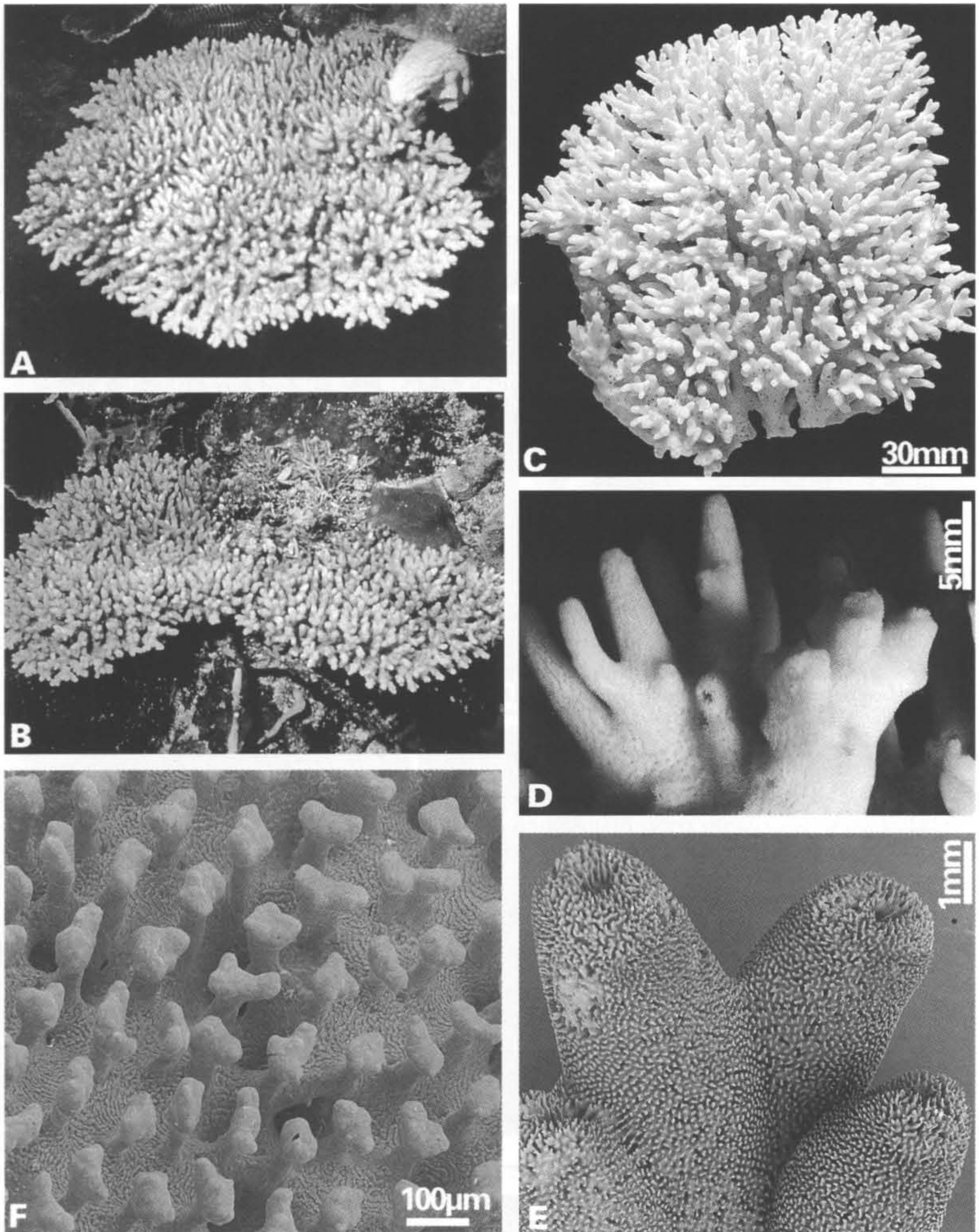


Figure 138. *Acropora granulosa* (A) at Loemba Loemba I., Spumonde Archipelago, S.W. Sulawesi (B) at Bunaken I., N. Sulawesi; (C, D) G48273; (E, F) G48241: (C) portion of colony (D) portion of branch (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G50411 Padang; KALIMANTAN: G50436, G50439-43, G50446-48, G51022, G51197-9 N.E. Kalimantan; N. SULAWESI: G50423-4 Tg Dodepo; G35526, G48242 3 Bunaken N.P.; G50422, G50434 Tg Flesko; G48272-3 Tg Pisok; G48241,

G50435 Tg Torowitang; C. SULAWESI: G50425-9, G50431-3, G51194-6 Togian Is; S. SULAWESI: G48244, G48274 Spumonde Arch.; NUSA TENGGARA: G50450-1, Bali; G48247 Lombok; G50412-3, G50415-6, G51019, G51021, G51191-2 Flores; G50417, G50452, G51193 W. Timor; G50418-20 Alor Is; BANDA SEA: G48269 Lucipara Is; G50794 Ambon I.; G48234-40, G48270-1 Banda Is.

Skeletal characteristics

Corallum. Side-attached thin plate up to 500 mm in diameter, with anastomosing horizontal branches and short vertical branchlets or groups of branchlets, up to 4 mm in basal diameter and terete (non-tapering).

Corallites. Axial corallites outer diameter 1.3-2.8 mm, inner diameter 0.4-0.9 mm, primary septa some to all present up to 3/4R, secondary septa absent or a few visible up to 1/4R; radial corallites scattered on branchlets, not usually touching, appressed tubular with round to slightly oval openings, primary septa some to all present up to 1/2R, secondary septa absent or a few just visible as points.

Coenosteum. A dense arrangement of pointed or slightly elaborated spinules throughout.

Field characteristics

Side-attached plates in which can be seen the groups of short vertical branchlets with rounded axial corallites and few radial corallites; known colours pale blue, pale brown or pale grey; occurs subtidally on walls and steep slopes, usually below 15 m, but occasionally shallower where shaded conditions exist.

Remarks

The species *Acropora granulosa*, *A. speciosa*, *A. clavigera* and *A. rayneri* were synonymized by Wallace (1978: 313), a decision maintained by Veron & Wallace (1984) and others. In this revision, that decision is reversed in that the two similar pairs of species, as noted by Wallace, (1978) (*A. granulosa* = *A. clavigera* and *A. speciosa* = *A. rayneri*) are recognised as separate species. Reasons for this decision are given under *A. speciosa* below.

Acropora (Acropora) speciosa (Quelch, 1886)
(Figs 139, 140)

Madrepora speciosa Quelch, 1886 p.163 pl.10 fig.1

Madrepora rayneri Brook, 1892 p.461; 1893 p.191 pl.8 fig.A

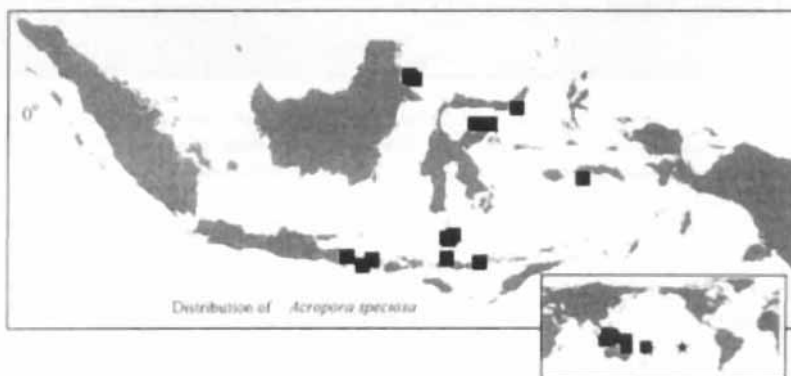


Figure 139. Distribution of *Acropora speciosa* in Indonesia (main map) and worldwide (inset).

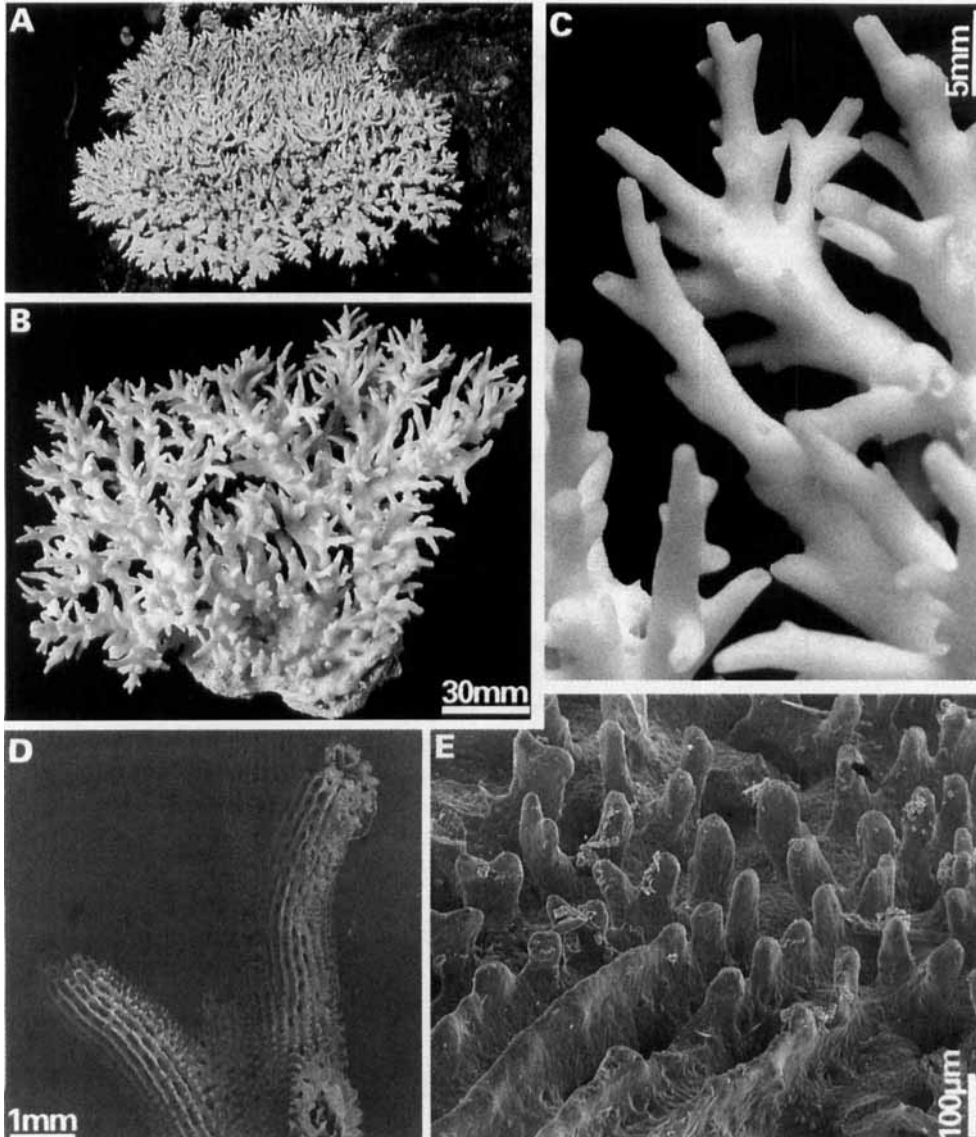


Figure 140. *Acropora speciosa* (A) at Bunaken I., N. Sulawesi; (B–E) G48246: (B) whole colony (C) portion of branches (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing coenosteum between radial corallites.

Material examined

KALIMANTAN: G50437–8, G50444–5 N.E. Kalimantan; N. SULAWESI: G50522, G50527, G51212 Tg Flesko; G50523 Tg Torowitang; G51891 Lembeh Strait; C. SULAWESI: G50430, G50514–21 Togian Is; S. SULAWESI: G51014 Panjang I.; G51017 Kayuadi I.; G51013 Tanahjanpea I.; G51015–6, G51018 Kayuadi I.; NUSA TENGGARA: G50421 Nusa Penida; G50449, G50524, G51200 Bali; G48245–6 Lombok; G50414, G50525, G51020 Flores; BANDA SEA: G50793 Ambon I.

Skeletal characteristics

Corallum. Side-attached thin plate up to 500 mm in diameter, with anastomosing horizontal branches bearing short vertical branchlets or groups of branchlets, up to 3 mm in basal diameter and tapering.

Corallites. Axial corallites outer diameter 0.6–1.5 mm, inner diameter 0.3–0.8 mm, primary septa some to all present up to 1/4R, secondary septa absent; radial corallites only around bases of branchlets, usually less than 5 per branchlet, appressed rounded tubular with round openings, the outer wall sometimes extended upwards, appressed tubular to nariform with round to slightly oval openings, primary septa some to all present up to 1/4R, secondary septa absent.

Coenosteum. A dense arrangement of pointed spinules throughout.

Field characteristics

Side-attached plates in which can be seen the slender vertical branchlets with pointed axial corallites and few radial corallites; known colours pale green or pale grey; occurs subtidally on walls and steep slopes, usually below 15 m, but occasionally shallower where shaded conditions exist.

Remarks

In the field in Indonesia, we have consistently been able to differentiate two morphologies, one (recognised as *Acropora granulosa*) with rounded axial corallites and terete branchlets and the other (herein recognized as *A. speciosa*), with tapering branchlets and narrow axial corallites. The two species apparently have overlapping habitat requirements, and usually both species can be found in this habitat. *Acropora suharsonoi*, within its limited geographic range, shares this habitat. The grouped arrangement of branchlets is similar to that in *A. caroliniana*, so that some specimens of *A. speciosa* may resemble a diminutive *A. caroliniana*.

Acropora (Acropora) suharsonoi Wallace, 1994
(Figs 141, 142)

Acropora suharsonoi Wallace, 1994 p.937 fig.12

Material examined

NUSA TENGGARA: G47134 (*holotype*), G47135–6 Lombok; G48853–4 Bali; G50527 Flores.

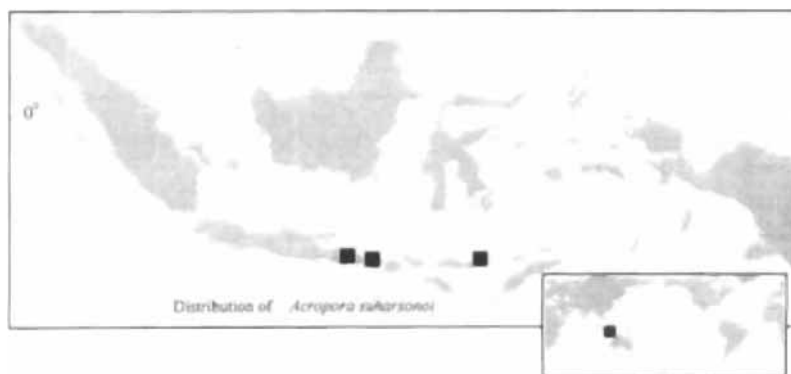


Figure 141. Distribution of *Acropora suharsonoi* in Indonesia (main map) and worldwide (inset).

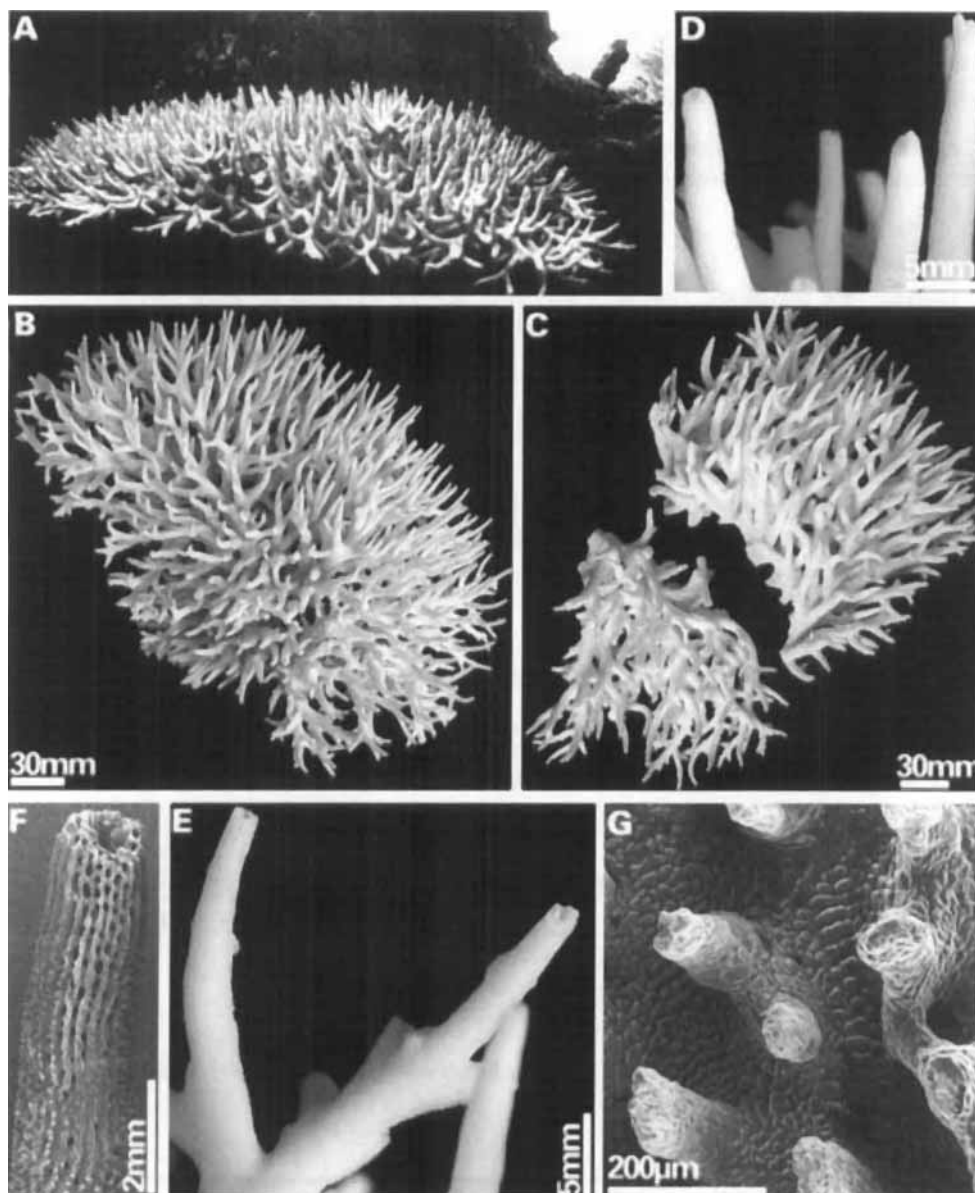


Figure 142. *Acropora suharsonoi* (A) at Pemuteran, N.W. Bali; (B, D, F) G48854; (C, E) G48853; (G) holotype G47134: (B, C) portion of colony (D, E) portion of branch; (F) electron micrograph showing axial corallite (G) electron micrograph showing coenosteum towards base of axial corallite.

Skeletal characteristics

Corallum. The mature colony is an open bracket: from a central to side attachment, branches up to 55 mm long and 5 mm in diameter curve upwards with little or no secondary branching.

Corallites. Axial corallites outer diameter 1.6–2.2 mm, inner diameter 0.6–0.8 mm, primary septa present up to $1/2R$, sometimes to R , secondary septa absent; radial corallites appressed tubular or nariform and may be directed towards or away from the branch tip; branches

bear up to five radial corallites towards their base: around the base of the corallum, radial corallites scattered and immersed or subimmersed, primary septa present to 2/3R, secondary septa rudimentary or absent.

Coenosteum. A dense arrangement of fine, flattened and elaborate spinules throughout: distally on branches these are arranged in lines, becoming distinct costae around the branch tip.

Field characteristics

Colonies are corymbose with bare branches (few to no radial corallites obvious); known colours cream, pale brown or grey; found at 15 to 20 metres depth on reef slopes or submerged reefs.

Remarks

This description extends the original description in that the colonies illustrated in Fig. 142 are much larger than the type specimens. This is a rare and distinctive species, to date only found on the coasts of Bali and Lombok adjacent to Lombok Straits, and in N. Bali. Some colonies were found on the wreck of the 'Liberty' vessel at Talumben beach, E. Bali.

Acropora (Acropora) caroliniana Nemenzo, 1976
(Figs 143, 144)

Acropora caroliniana Nemenzo, 1976 p.152 fig.162

Material examined

KALIMANTAN: G48878, G49026, G50453 N.E. Kalimantan; N. SULAWESI: G48265 Bunaken N.P.; G48876 Tg Torowitang; C. SULAWESI: G48864–74, G50405–10, G51189 Togian Is; NUSA TENGGARA: G51190 Bali; G48877 Flores.

Skeletal characteristics

Corallum. Side-attached thick plates or centrally-attached table up to 500 mm diameter; with

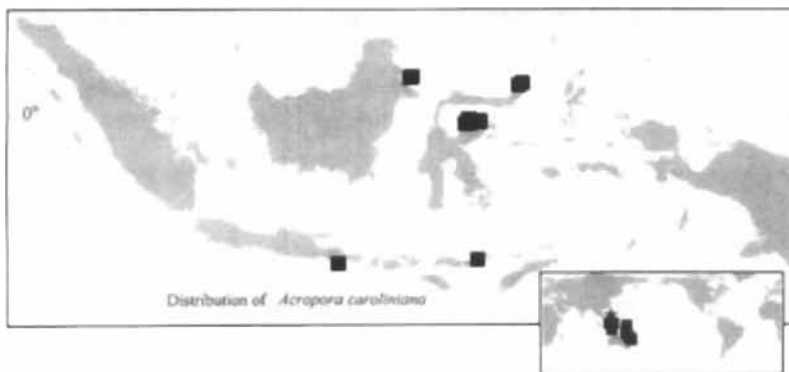


Figure 143. Distribution of *Acropora caroliniana* in Indonesia (main map) and worldwide (inset).

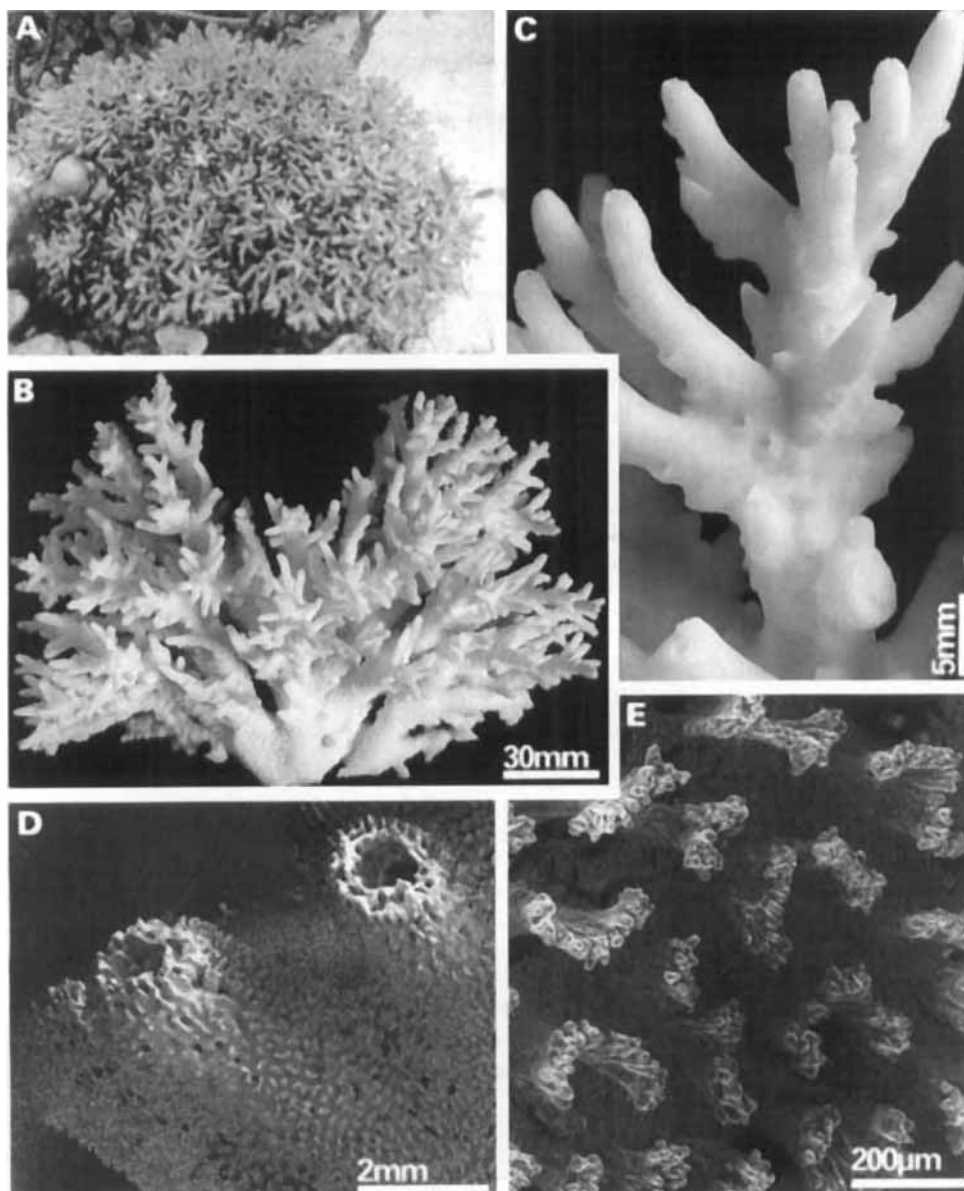


Figure 144. *Acropora caroliniana* (A) at Talatakoh I., Togian Is, Central Sulawesi; (B–E) G48868: (B) portion of colony (C) portion of branch (D) electron micrograph showing radial corallites (E) electron micrograph showing coenosteum between radial corallites.

horizontal, anastomosed branches bearing vertical to oblique branchlets up to 8 mm in diameter; the branchlets, in turn, bear incipient branchlets with few to no radial corallites on them, or radial corallites along lower part of branchlet only.

Corallites. Axial corallites outer diameter 1.7–3.5 mm, inner diameter 0.6–1.0 mm, primary septa present up to $2/3R$, secondary septa absent or some to all present up to $1/3R$; radial corallites scattered on branchlets and mostly not touching, often only on lower part of

branchlets, appressed tubular with round to nariform openings, primary septa present up to 1/4R, secondary septa absent or a few just visible.

Coenosteum. A dense arrangement of elaborated spinules throughout.

Field characteristics

Thick plates or corymbose tables in which can be seen the distinctive branchlet structure, with a whorl of bare incipient branchlets (or long axial corallites); known colours bright blue, light green or brown, sometimes with white patches scattered over the colony; occurs subtidally on slopes, ledges on walls and submerged reefs.

Remarks

This species, described from the Philippines, is generally rare, but is common on some reefs of northern Indonesia, e.g in central and N. Sulawesi and N. Kalimantan. The Indonesian specimens documented here are mostly sturdier than those described from the Great Barrier Reef (Veron & Wallace, 1984: 409) and the holotype (noted by Veron [1993] to be "more finely structured than has been observed in any colony *in situ*"). This is in contrast to the situation for most other species, which tend to be lighter in structure on Indonesian reefs. Colonies sometimes appear very similar to colonies of *Acropora loripes* in the field.

Acropora (Acropora) desalwii Wallace, 1994
(Figs 145, 146)

Acropora desalwii Wallace, 1994 p.972 fig.12

Material examined

N. SULAWESI: G48232-3 Bunaken N.P.; G48230-1 Tg Pisok; G48229 Tg Torowitang;
BANDA SEA: G46452 Sekaro I.; G48159 Nusa Laut; G46448-9, G41450 (*holotype*), G46451,
G46902, G50620 Banda Is.

Skeletal characteristics

Corallum. Side-attached plate or bracket up to 300 mm diameter and 70 mm in thickness; crowded branches up to 60 m long and 7 mm in diameter extending vertically and ending in a single plane; branches give off numerous secondary branchlets, especially distally.

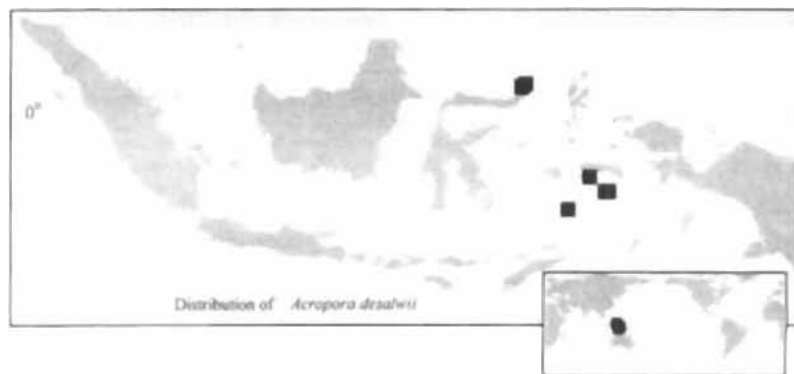


Figure 145. Distribution of *Acropora desalwii* in Indonesia (main map) and worldwide (inset).

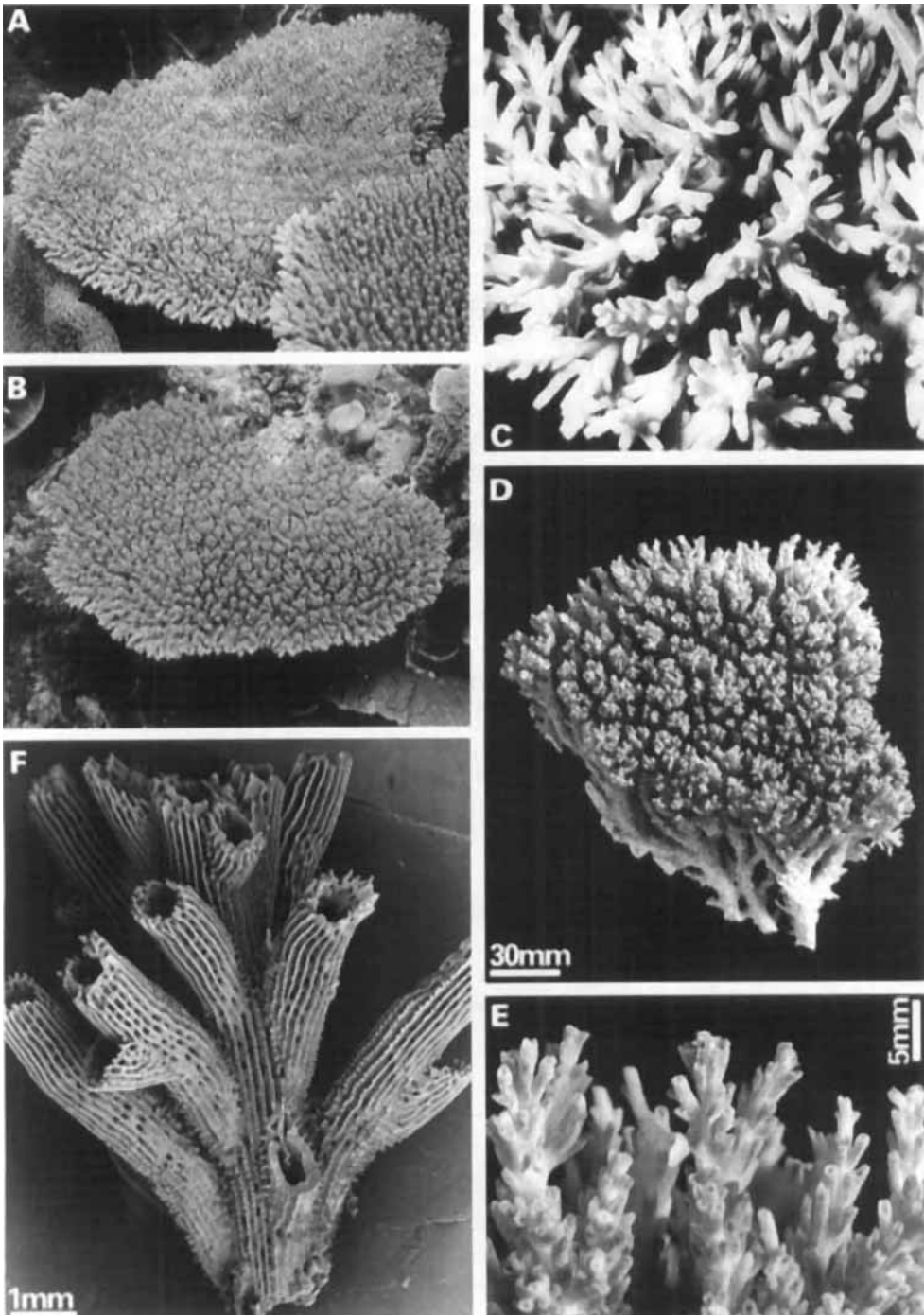


Figure 146. *Acropora desalwii* (A) at Run I., Banda Is, Banda Sea (B) at Tg Pisok, N. Sulawesi (C) at Tg Torowitang, N. Sulawesi; (D, E) paratype G46449; (F) holotype G46450: (D) portion of colony (E) portion of branches (F) electron micrograph showing axial and radial corallites.

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 1/4R, secondary septa absent; 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, secondary septa absent.

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

Field characteristics

Thick side-attached plates project from the reef slope, attached to the edges of massive corals or attached to looser reef framework; known colour pale brown; occurs subtidally on slopes or submerged reefs, mostly below 15 m.

Remarks

As noted in the original description, this species is difficult to place in a species group as it has corallites and coenosteum similar to those of *Acropora echinata*, but does not have the hispidose branching of the *A. echinata* group. It was described from the Banda Sea, where it is common, and has since been seen as a rare occurrence in northern Sulawesi.

Acropora (Acropora) jacquelineae Wallace, 1994
(Figs 147, 148)

Acropora jacquelineae Wallace, 1994 p.970 fig.10

Material examined

C. SULAWESI: G48810–20, G50553–4 Togian Is; HALMAHERA: G51739–41 N. Loloda Is; NUSA TENGGARA: G48488 Flores.

Skeletal characteristics

Corallum. Extremely delicate, side-attached plate or table up to 20 mm thick and up to 800 mm diameter, predominated by branchlets which bear few to no radial corallites; primary branching pattern horizontal, branchlets up to 5 mm in diameter curve upwards to end in a horizontal plane, other branchlets up to 2 mm in diameter given off from these end in the same plane; branch tips taper strongly.

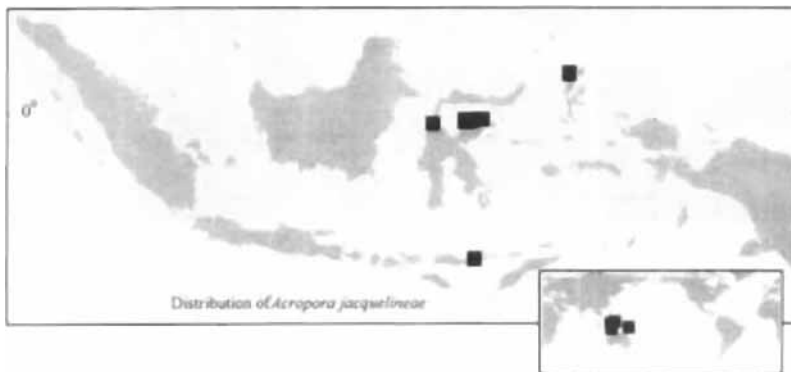


Figure 147. Distribution of *Acropora jacquelineae* in Indonesia (main map) and worldwide (inset).

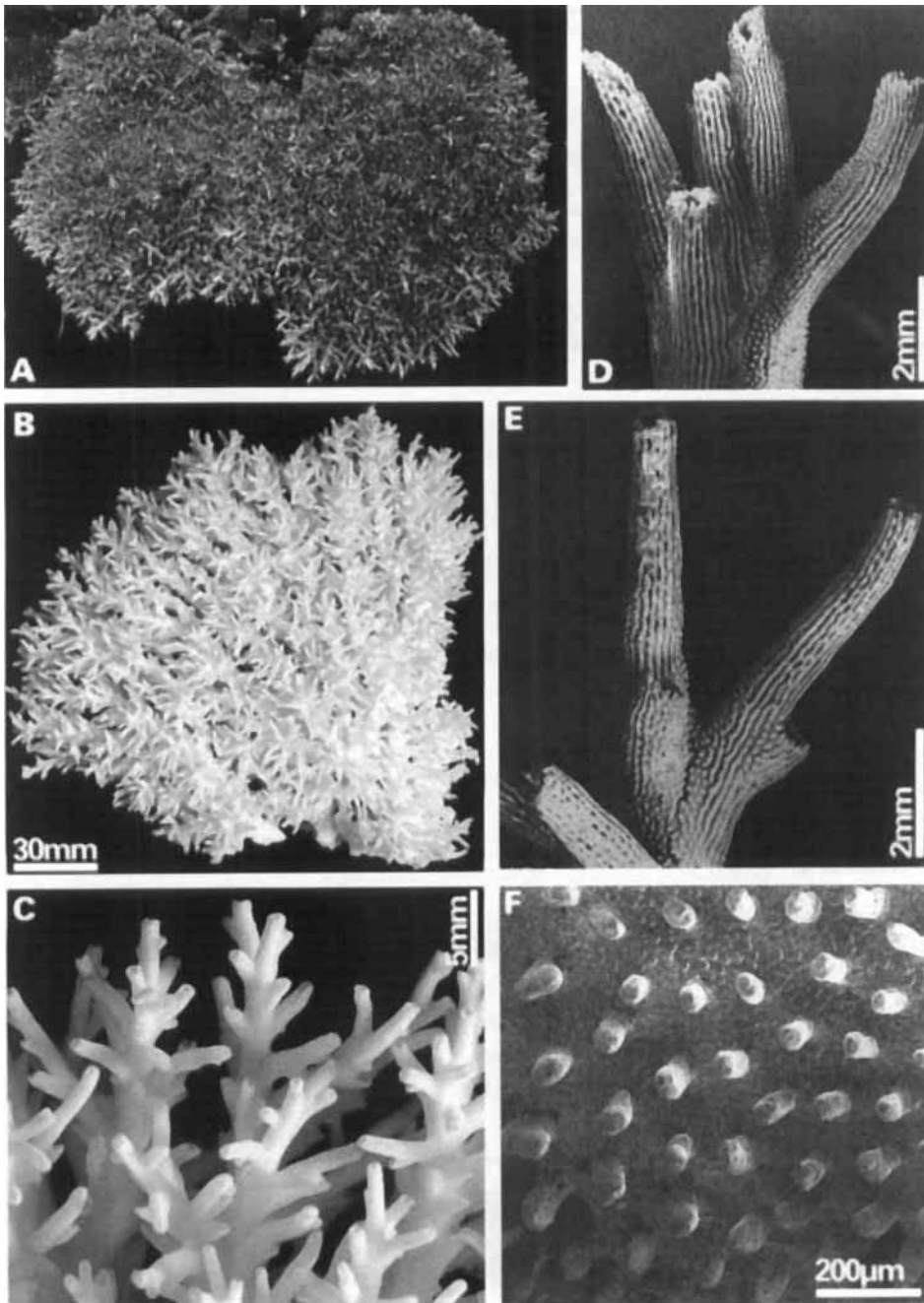


Figure 148. *Acropora jacquelineae* (A) at Talatakoh I., Togian Is, Central Sulawesi; (B, C, E) G48811; (D, F) G48812: (B) portion of colony (C) portion of branches (D, E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 0.7–1.2 mm, inner diameter 0.1–0.5 mm, usually only directive primary septa visible to 1/2R, other primary septa sometimes visible deep within the corallite as fine points, secondary septa absent; most branches bear no radial corallites, but occasionally a branch has one or two appressed tubular or nariform radial corallites and these have rudimentary primary septa just visible.

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

Field characteristics

Side-attached plate or table up to 800 mm diameter, with a spiky appearance due to the rarity of radial corallites; known colours pale pink or pale brown; occurs subtidally on walls and ledges on walls, from around 10 m to 30 m depth.

Remarks

This species was described from E. Papua New Guinea, the only other known locality.

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 [flattened] branches. All species occur in relatively deep locations for *Acropora*, i.e. below 20 m” (Description from Wallace, 1994).

Acropora (Acropora) elegans (Edwards & Haime, 1860)
(Figs 149, 150)

Madrepora elegans Edwards & Haime, 1860 p.163 pl.E1 fig.3

Material examined

S. SULAWESI: G47698–9 Spumonde Arch.

Skeletal characteristics

Corallum. Horizontally extending, flattened branches, up to 20 mm greatest diameter, sometimes anastomosed to give a flat plate, bear radial corallites along their sides and scattered radial corallites on the upper surface.

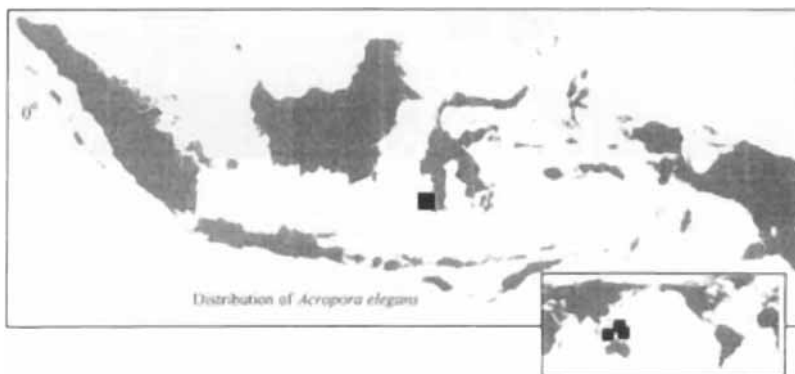


Figure 149. Distribution of *Acropora elegans* in Indonesia (main map) and worldwide (inset).

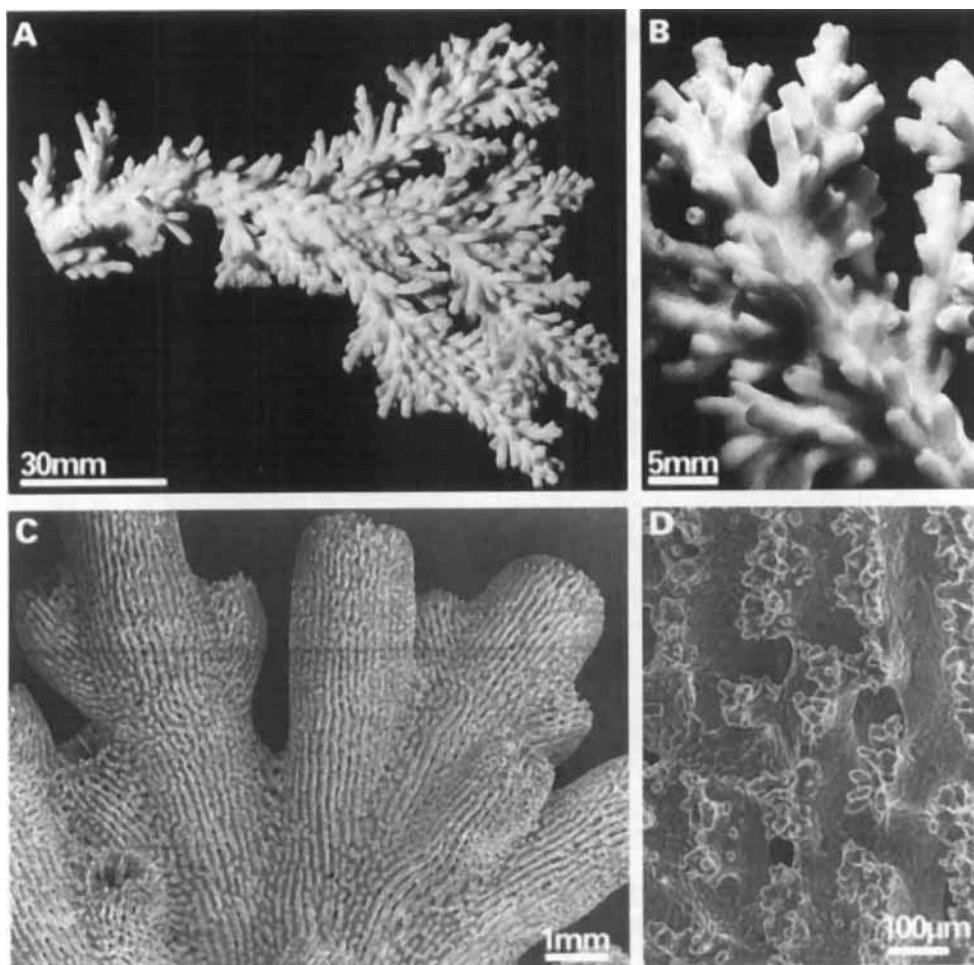


Figure 150. *Acropora elegans* (A–D) G47699: (A) portion of colony (B) portion of branches (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.4–2.4 mm, inner diameter 0.5–0.9 mm, primary septa present up to 2/3R, all or most secondary septa visible as short points; radial corallites tubular to tubular appressed with round openings, primary septa present up to 2/3R, secondary septa absent or a few just visible.

Coenosteum. Elaborated spinules evenly distributed throughout.

Field characteristics

Flat plates with horizontally flattened branches extending outwards from the reef edge; known colours lavender or pale brown; occurs on reef walls below 20 m depth.

Remarks

This species is not often collected by divers because of its depth range (20 m and below). The two specimens in the present collection have unusually crowded radial corallites, which

are longer and more tubular than those of the type and of specimens from Papua New Guinea (see Wallace, 1994: 977) and branchlets extending vertically from the centre of the branches. It may be described as a separate species if further specimens become available. Similarities to *A. tenella* (Brook, 1892) are noted by Brook (1893: 193) and by Wallace (1994: 981).

Acropora (Acropora) russelli Wallace, 1994
(Figs 151, 152)

Acropora russelli Wallace, 1994 p.983 fig.26

Material examined

HALMAHERA: G51486–97 N. Loloda Is.

Skeletal characteristics

Corallum. Colonies free-living (not attached to reef); branches up to 5 mm diameter and horizontal to oblique.

Corallites. Axial corallites outer diameter 1.4–2.0 mm, inner diameter 0.6–1.0 mm, primary septa present up to 3/4R, secondary septa absent, or a few just visible as points; radial corallites distributed at regular intervals along the branches and not touching, extending at 90 or just less from the branch, tubular, with round to oval openings, primary septa present up to 2/3R, secondary septa absent.

Coenosteum. Costate or lines of laterally flattened spinules with elaborated tips throughout.

Field characteristics

Occurs free of any attachment to the substratum, in matted assemblages sometimes entwined with the agariciid coral *Leptoseris* sp.; known colours pale brown or blue-brown; occurs on deep sandy slopes at 15–25 m depth.

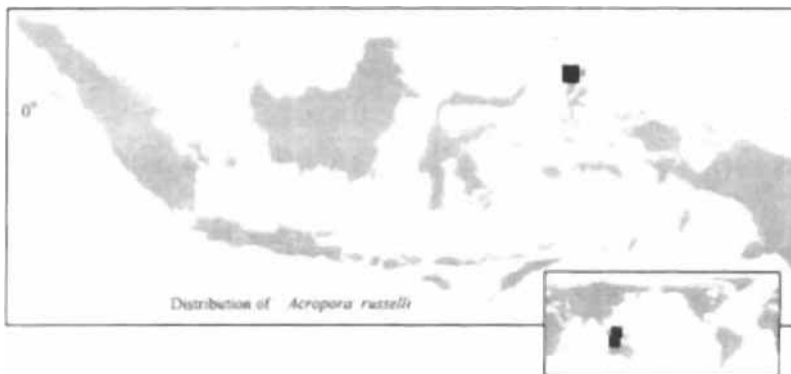


Figure 151. Distribution of *Acropora russelli* in Indonesia (main map) and worldwide (inset).

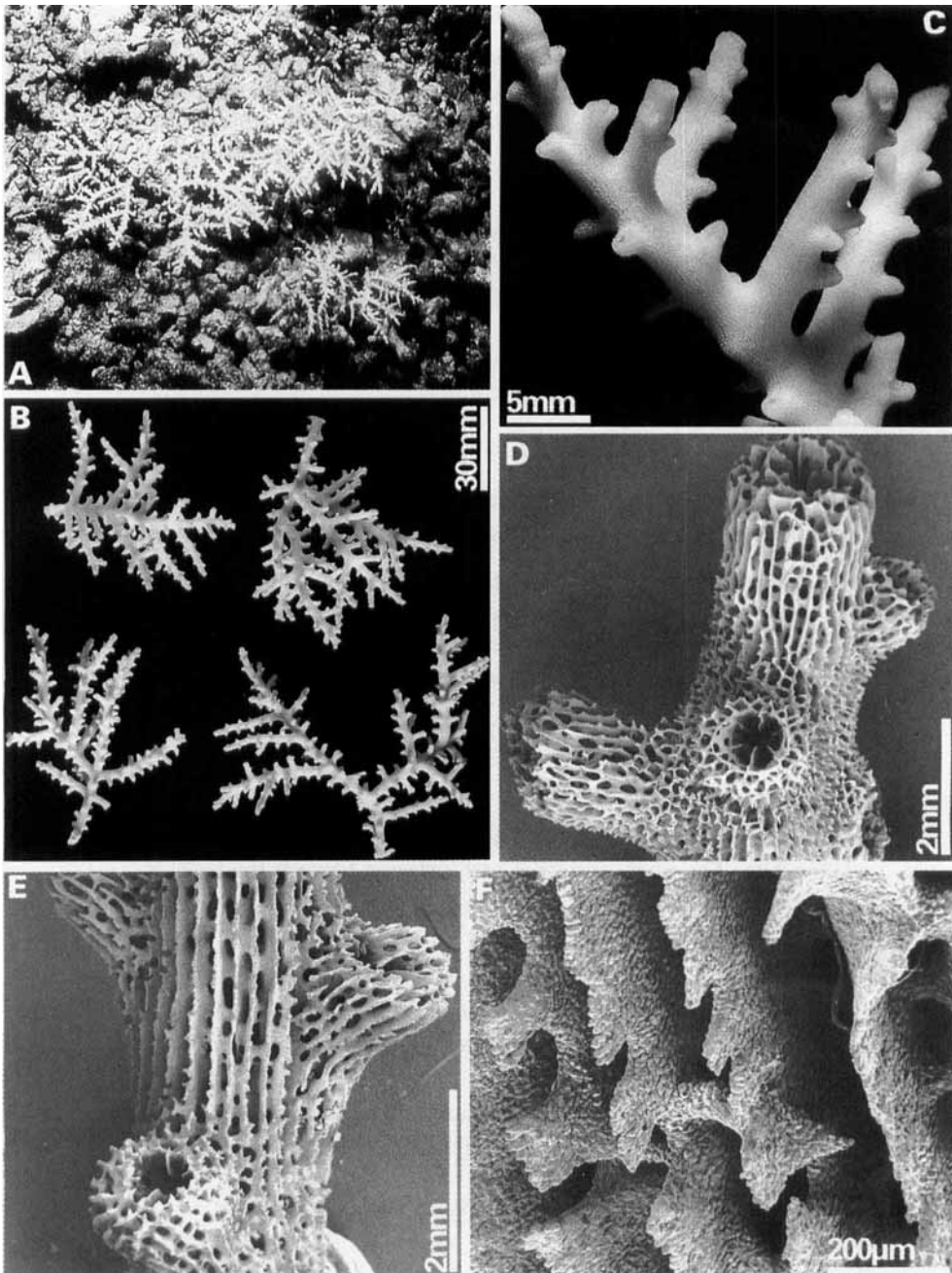


Figure 152. *Acropora russelli* (A) at Doi I., N. Loloda Is, N. Halmahera; (B, C, E, F) G51487; (D) G51493; (B) portion of colony (C) portion of branches (D) electron micrograph showing axial and radial corallites (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Remarks

This species is reported from Indonesia for the first time. It was previously known only from the Timor Sea (Cartier Reef in N.W. Australia). The Halmahera specimens differ from the type series in having more widely separated radial corallites and slightly more slender branches, suggesting they could represent a separate and sister species to *Acropora russelli*.

***Acropora (Acropora) simplex* sp. nov.**

(Figs 153, 154)

Material examined

Holotype: G51188 C. SULAWESI, Togian Is, Pasir Tengah, 00°26'S, 121°37'E, depth 20 m, 12.V.1995, coll. C.C. Wallace and J. Wolstenholme.

Skeletal characteristics

Corallum. A flat plate with horizontally flattened branches; main branches up to 12 mm width, occasional incipient branches arise from the centre of branches and extend vertically.

Corallites. Axial corallites outer diameter 1.4–1.8 mm, inner diameter 0.6–0.8 mm, primary septa present up to 1/3R, secondary septa present up to 1/4R; radial corallites only occurring on central upper part of branches, scattered, appressed tubular with round openings, primary septa present up to 3/4R, secondary septa absent.

Coenosteum. A dense arrangement of laterally flattened elaborated spinules throughout.

Field characteristics

Side-attached very flat plate with branching mostly horizontal and few radial corallites visible; colour white. The single specimen was collected towards the base of a moderately steep sandy slope.

Remarks

We have described a new species based on a single specimen because of its unique characters which do not enable it to be included under any other species. Similar colonies

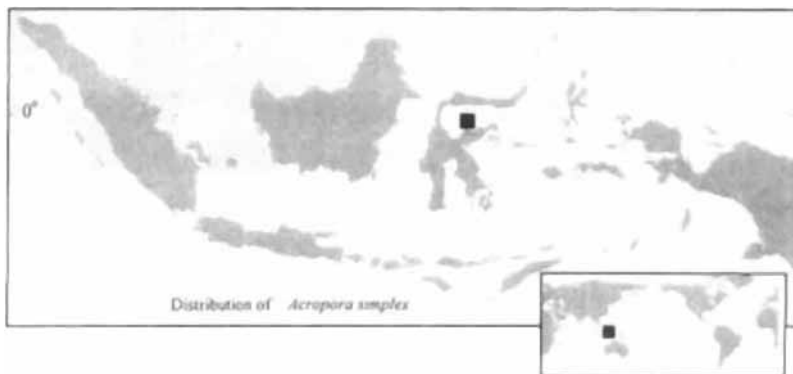


Figure 153. Distribution of *Acropora simplex* sp. nov. in Indonesia (main map) and worldwide (inset).

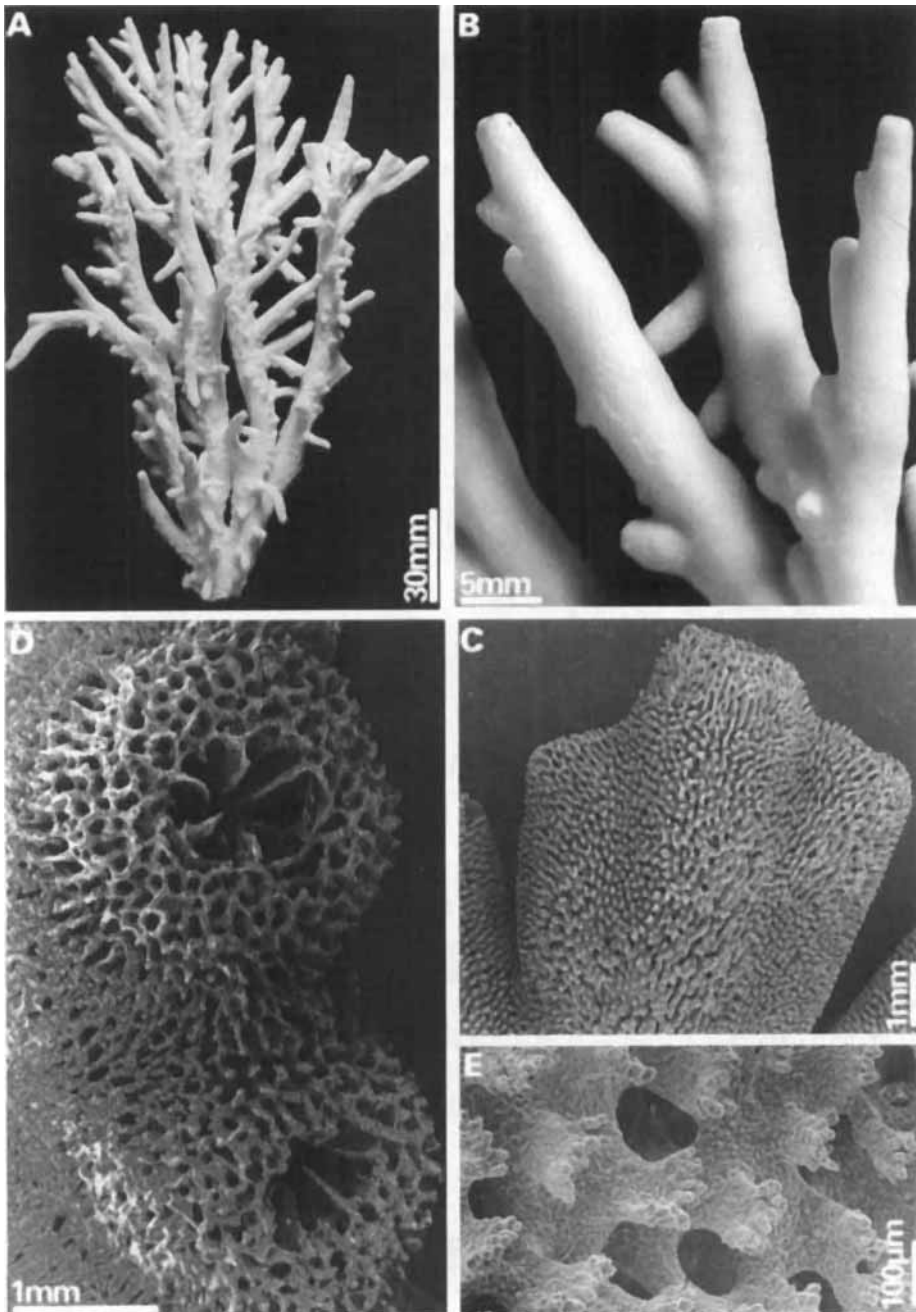


Figure 154. *Acropora simplex* sp. nov. (A–E) G51188: (A) portion of colony (B) portion of branches (C) electron micrograph showing axial and radial corallites (D) electron micrograph showing axial (top) and radial (bottom) corallites (E) electron micrograph showing coenosteum between radial corallites.

have been reported, but not collected by divers working at greater depth, thus it is assumed that this is a deep water species whose depth range begins at 20 m.

Etymology

Named because of the simple structure, with limited branching and limited radial corallite formation.

The *Acropora florida* group

The two species in this group both have sturdy hispidose branches and large rounded corallites which approach a labellate shape.

Acropora (Acropora) florida (Dana, 1846) (Figs 155, 156)

- Madrepora florida* Dana, 1846 p.466 pl.37 fig.1
Madrepora gravida Dana, 1846 p.470
Madrepora compressa Bassett-Smith, 1890 p.452
Madrepora omata Brook, 1891 p.464
Madrepora affinis Brook, 1893 p.60 pl.28 fig.F
Acropora vermiculata Nemenzo, 1967 p.108, pl.31 fig.4

Material examined

W. SUMATRA: g47179–83 Nias I.; G48431–4 Padang; E. SUMATRA: G33357 Bangka I.; G49822–3 Riau/Lingga Is; JAVA: G32842, G50577 Seribu Is; KALIMANTAN: G39792 Laut I., G50262–70, G50399, G51006–7 N.E. Kalimantan; N. SULAWESI: G50257 Tg Dopepo; G34181–7, G47206–7 Bunakan N.P.; G50256 Tg Flesko; G47205 Tg Pisok; G47204 Tg Torowitang; G47202 Tg Pulisan; G47195–201, G47203 Sangihe Is; C. SULAWESI: G50258–61, G50395–8 Togian Is; S. SULAWESI: G47247–8, G47841, G50795–6, G50800 Spumonde Arch.; G51009 Taka'bonerate; G51012 Tanahjanpea I.; G51011 Kayuadi I.; NUSA TENGGARA: G50271–2, G50400 Bali; G50255 Nusa Penida; G47488–9 Lombok;

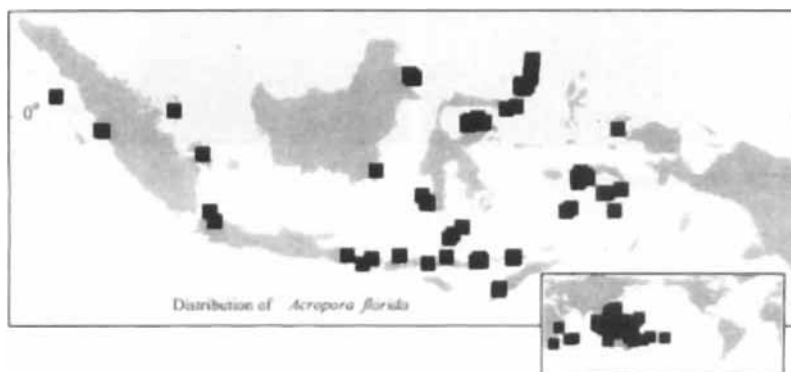


Figure 155. Distribution of *Acropora florida* in Indonesia (main map) and worldwide (inset).

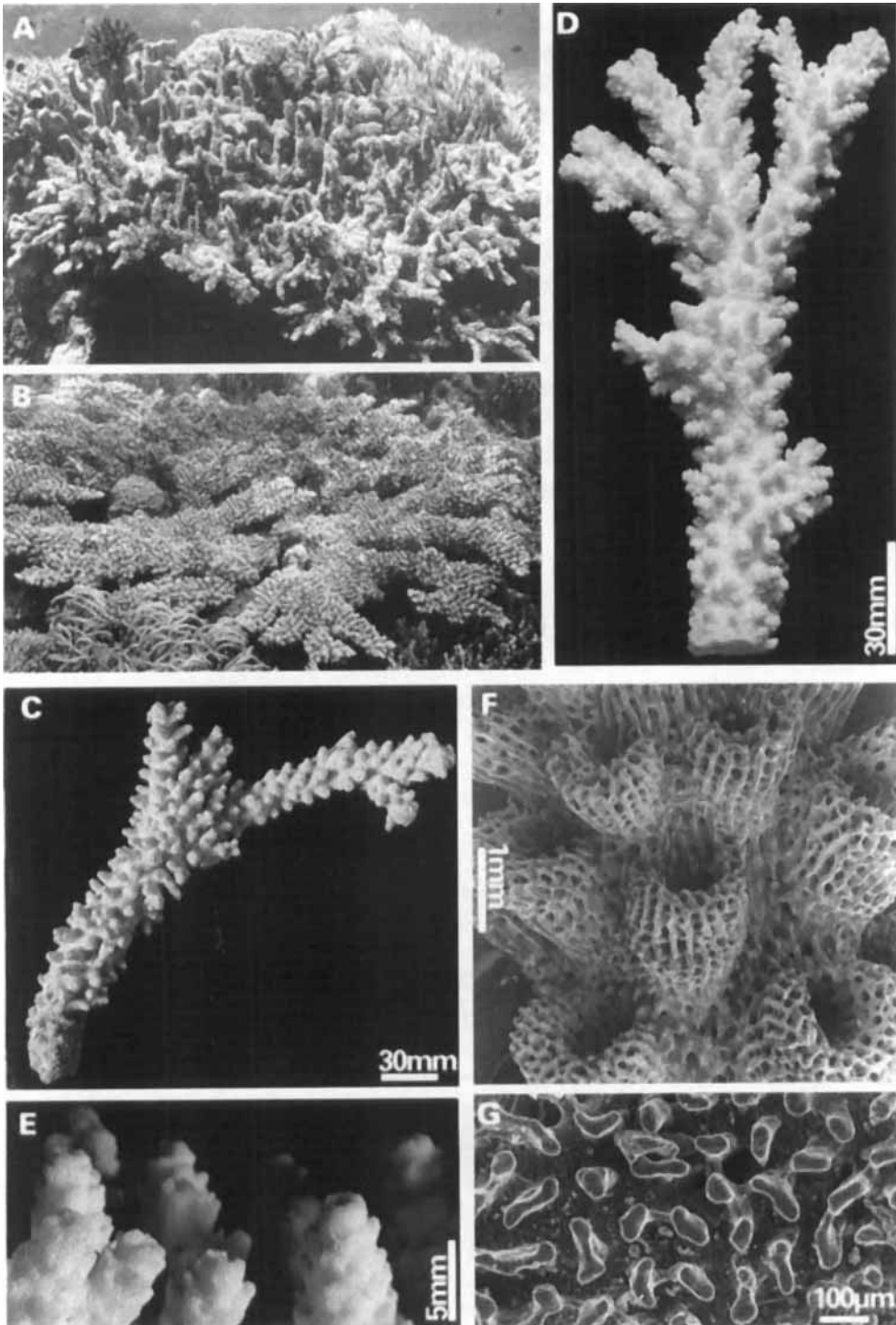


Figure 156. *Acropora florida* (A) at Nain I., N. Sulawesi (B) at Kera I., W. Timor; (C, E, G) G33357; (D) G34186; (F) G50398: (C, D) portion of colony (E) portion of branches (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

G51010 Moyo; G51003–5 Komodo; G48435–9, G50484, G51008 Flores; G48440–1 W. Timor; G48442–53, G50254 Alor Is; BANDA SEA: G46841 Sekaro I.; G46838 Lucipara Is; G36181, G46842, G50797–9, G50801 Ambon I.; G36222 Pombo I.; G46834 Nusa Laut; G46835–6 Suangi I.; G46837, G46839, G47332 Banda Is; G46840 Manuk I.; IRIAN JAYA: G35764–5 Batanta I.

Skeletal characteristics

Corallum. Branches hispidose with evenly distributed short secondary branchlets up to 8 mm in diameter arranged around a broad primary branch up to 40 mm in diameter.

Corallites. Axial corallites outer diameter 2.0–3.0 mm, inner diameter 0.7–1.4 mm, primary septa present up to 2/3R, secondary septa present up to 1/2R; radial corallites crowded on branches, evenly sized and distributed, mostly touching, appressed tubular with round opening, almost labellate in appearance, primary septa present up to 1/2R, some to all secondary septa present up to 1/4R.

Coenosteum. Wall of radial corallites densely costate; intercorallite areas reticulate with evenly distributed simple spinules.

Field characteristics

Colonies have sturdy upright or horizontal hispidose branches; known colours greenish or pinkish brown, yellow or brown; occurs subtidally on reef tops, walls and slopes to 30 m.

Remarks

This species is widespread in Indonesia, occurring in most localities, habitats and depth ranges sampled.

Acropora (Acropora) sarmentosa (Brook, 1892)
(Figs 157, 158)

Madrepora sarmentosa Brook, 1892 p.462; 1893 p.127 pl.22
Acropora vermiculata Nemenzo, 1967 p.108 pl.31 fig.4

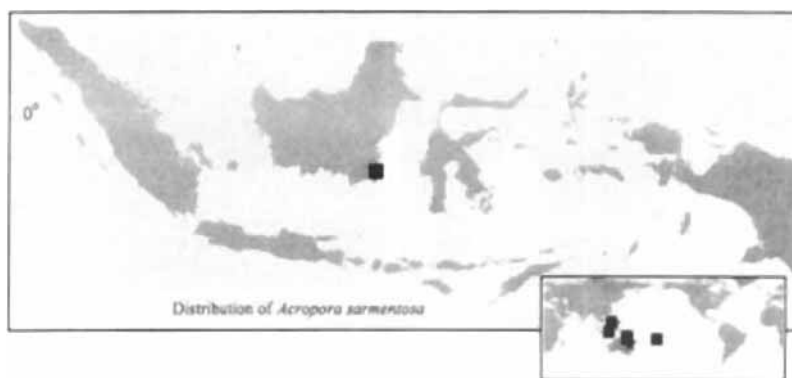


Figure 157. Distribution of *Acropora sarmentosa* in Indonesia (main map) and worldwide (inset).

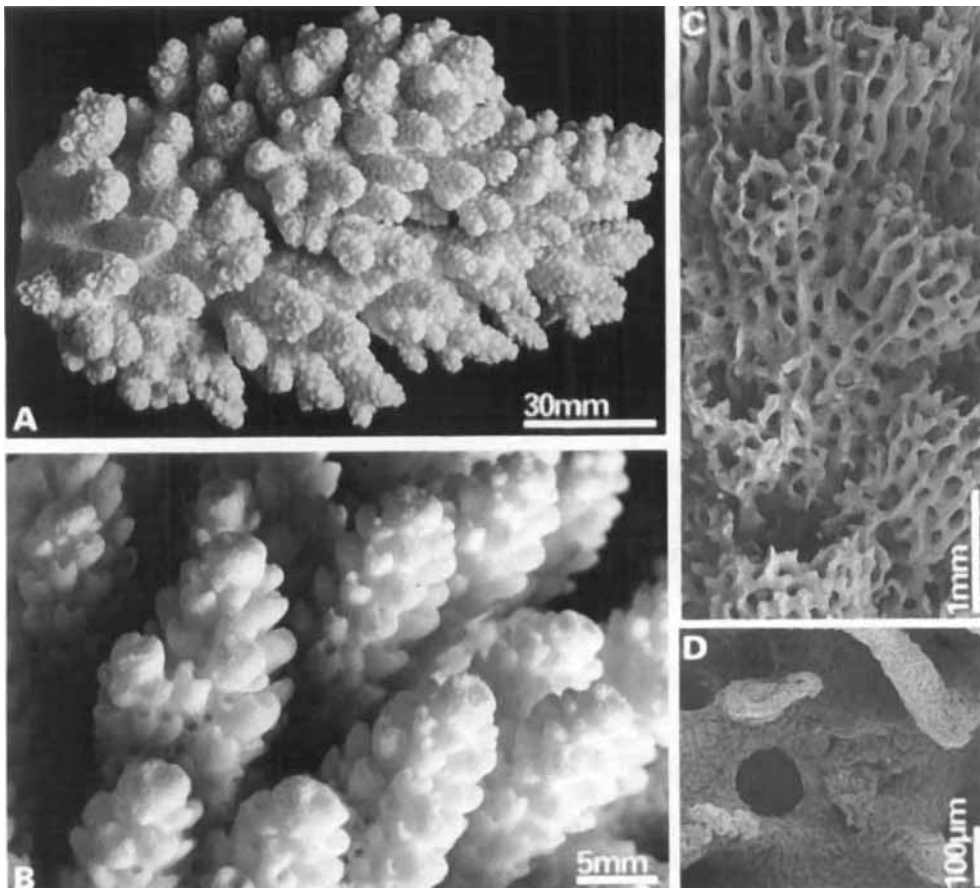


Figure 158. *Acropora sarmentosa* (A–D) G39803: (A) portion of colony (B) portion of branches (C) electron micrograph showing radial corallites (D) electron micrograph showing coenosteum between radial corallites.

Material examined

JAVA: G51175 Karimunjawa I.; KALIMANTAN: G39803 Laut I.

Skeletal characteristics

Corallum. Hispidose, with thick branches up to 30 mm diameter, from which arise short branchlets up to 12 mm diameter at regular intervals; the branches may be horizontally flattened, with branchlets developed only on upper surface (usually in specimens from deeper water) or the branchlet development may be reduced.

Corallites. Axial corallites outer diameter 3.0–4.0 mm, inner diameter 1.0–2.0 mm, primary septa present up to $3/4R$, secondary septa present up to $1/2R$; radial corallites evenly sized and distributed, just touching or slightly separated on branch, appressed rounded tubular, primary septa present up to $2/3R$, secondary septa present up to $1/4R$.

Coenosteum. Coenosteum a dense reticulum with sparsely and evenly distributed, laterally flattened or slightly elaborated spinules throughout.

Field characteristics

Colonies usually have one or two thick, hispidose branching units which extend horizontally; large, rounded radial corallites can be seen in the field; known colours greenish-grey or greenish-brown, with brown or pink branchlet tips; occurs subtidally on reef tops and slopes.

Remarks

We have not seen this species in Indonesian waters (the two recorded specimens being collected by other workers). It is a common western Pacific species and it may be that records from the Indian Ocean are misidentifications of *Acropora florida*.

Unplaced species

These species have not as yet been allocated to species groups.

***Acropora (Acropora) plumosa* sp. nov.**

(Figs 159, 160)

Material examined

Holotype: G49733 C. SULAWESI, Togian Is, Talahtakoh I., 00°28'S, 122°04'E, depth 18 m, 11.V. 1995, coll. C.C. Wallace and J. Wolstenholme.

Paratypes: G49737 KALIMANTAN, N.E. Kalimantan, Karang Tababinga, 02°16'S, 118°14'E, depth 13 m, 25.V.1995, coll. C.C. Wallace and J. Wolstenholme; G49735 C. SULAWESI, Togian Is, Waleabahi I., 00°12'S, 122°14'E, depth 13 m, 13.V.1995, coll. C.C. Wallace and J. Wolstenholme.

Skeletal characteristics

Corallum. An irregular table with branches up to 10 mm in diameter extending horizontally to form a flat table top, and bearing horizontal branchlets up to 4 mm diameter at irregular intervals; some anastomosis.

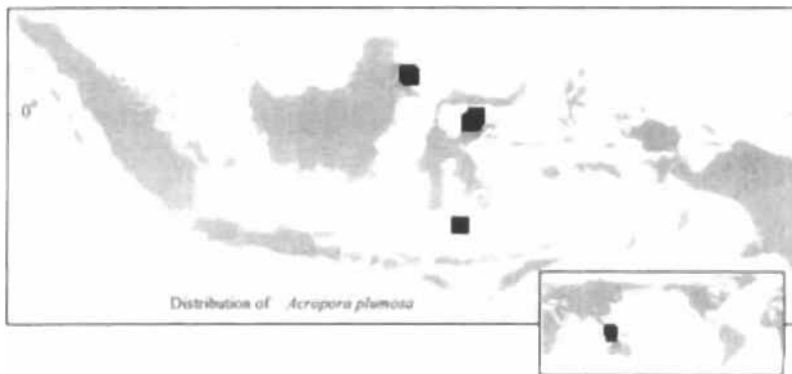


Figure 159. Distribution of *Acropora plumosa* sp. nov. in Indonesia (main map) and worldwide (inset).

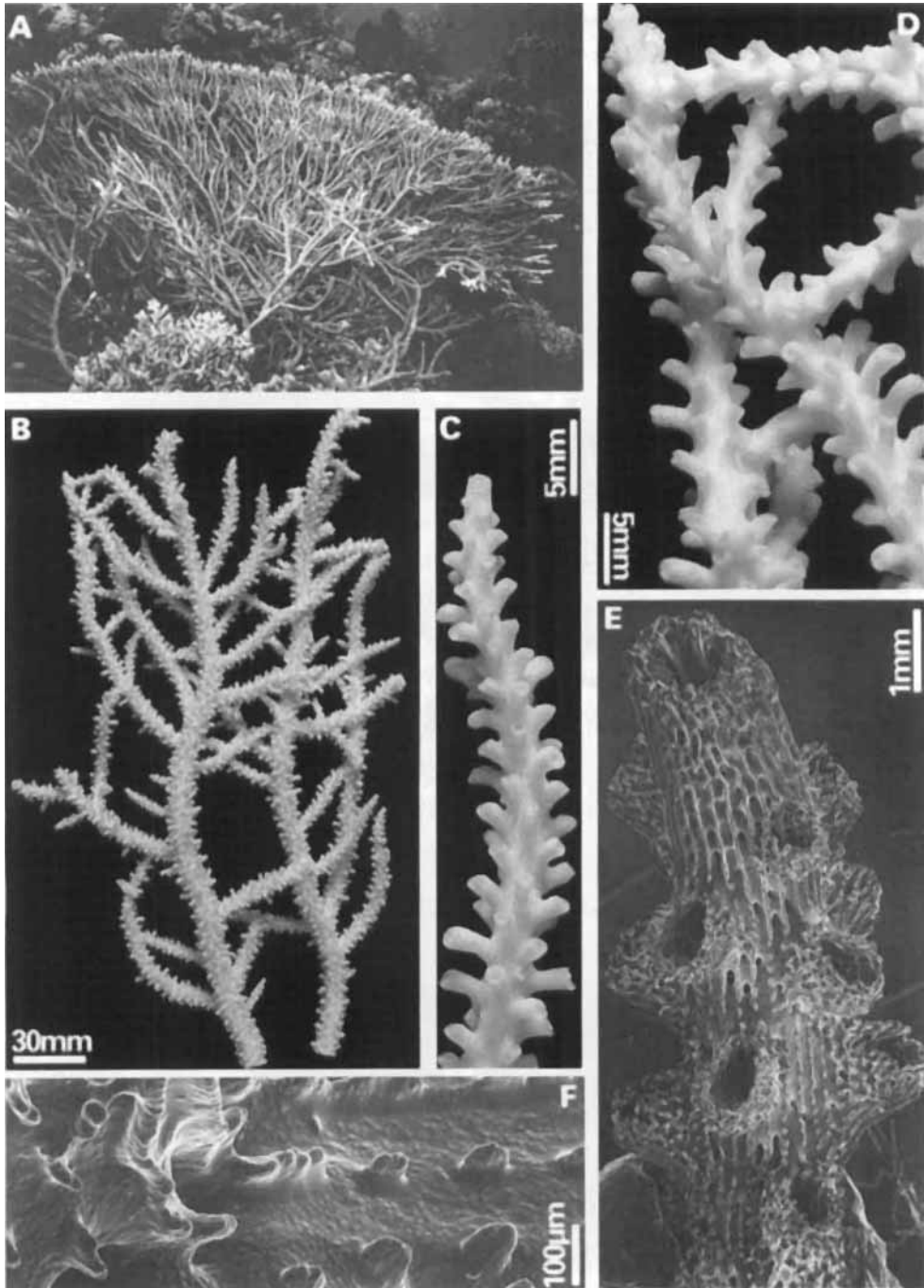


Figure 160. *Acropora plumosa* sp. nov. (A) at Talatakoh I., Togian Is, Central Sulawesi; (B–F) holotype G49733: (B) portion of colony (C) portion of branch (D) portion of branches (E) electron micrograph showing axial and radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Corallites. Axial corallites outer diameter 1.2–2.1 mm, inner diameter 0.6–1.2 mm, primary septa present up to 2/3R, secondary septa absent or a few just visible as points; radial corallites evenly dispersed and not touching, tubular with round, oval or slightly dimidiate openings, primary septa present up to 1/4R, secondary septa absent or a few just visible as points.

Coenosteum. Reticulate with laterally flattened spinules on radial corallites; reticulate with laterally flattened spinules sometimes arranged in rows in intercorallite areas.

Field characteristics

An open table or plate whose slender, widely-spaced horizontal branches and associated small horizontal branchlets are reminiscent of feathers; known colours cream, yellow-brown, yellow-grey or brown; occurs on deep slopes or walls below 12 m.

Remarks

Because of the horizontal branching, colonies of this species have a superficial resemblance to very open-branching colonies of *Acropora clathrata*.

Etymology

Named because of the feather-like appearance of the branches.

Acropora (Acropora?) togianensis Wallace, 1997
(Figs 161, 162)

Acropora togianensis Wallace, 1997 p.43 fig.13

Material examined

C. SULAWESI: G48821–2, G48823 (*holotype*), G48824–6 Togian Is.

Skeletal characteristics

Corallum. Arborescent: branches up to 35 mm diameter and 150 mm in length, cylindrical for most of their length, tapering within the last 20–30 mm.

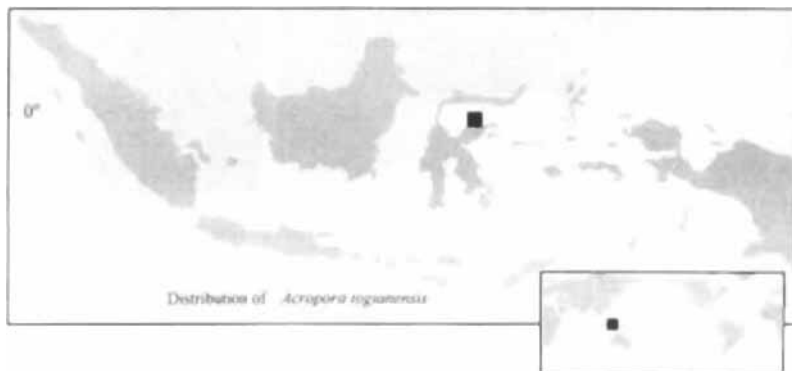


Figure 161. Distribution of *Acropora togianensis* in Indonesia (main map) and worldwide (inset).

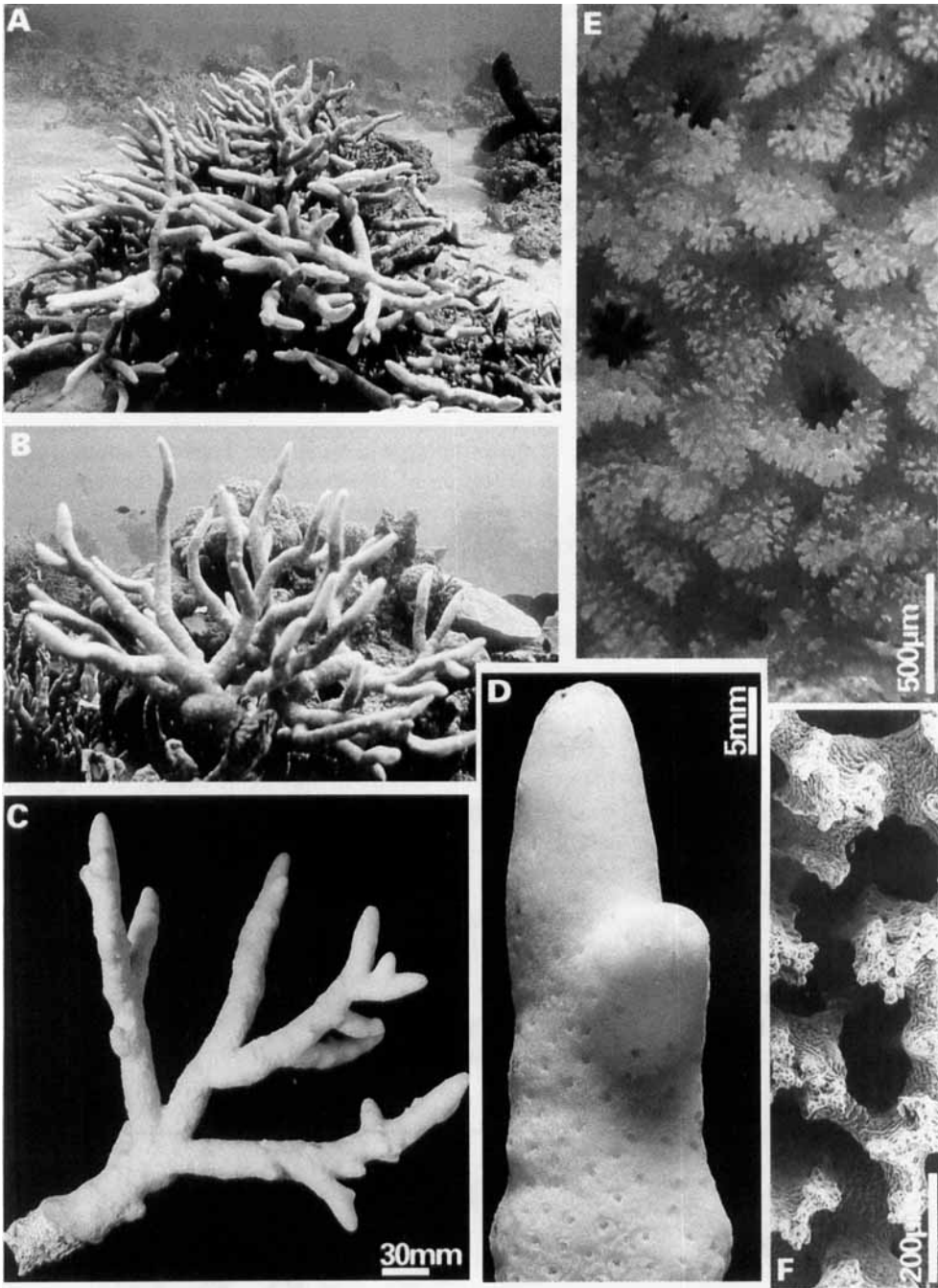


Figure 162. *Acropora togianensis* (A, B) at Talatakoh I., Togian Is, Central Sulawesi; (C–E) holotype G48823; (F) paratype G48822: (C) portion of colony (D) portion of branch (E) close-up of branch showing radial corallites and tuberculae-like structures in coenosteum (F) electron micrograph showing coenosteum between radial corallites.

Corallites. A single axial corallite per branch. Axial corallites outer diameter 5.8–9.1 mm, inner diameter 0.8–1.2 mm, primary septal cycle present up to 2/3R, secondary septa present up to 1/3R; radial corallites immersed or subimmersed with round openings, distantly arranged and not touching, walls consist of a slight development to one side of the corallite resembling a tubercular structure in *Montipora*.

Coenosteum. Elaborated spinules evenly arranged throughout; between radial corallites coenosteum is raised into mounds similar to the tuberculae of *Montipora*.

Field characteristics

Sturdy upright arborescent colonies, reaching approximately 1.5 m colony diameter; surface of branches notable for the lack of protruding radial corallites; known colour dark brown with white branch tips; occurs subtidally on sandy slopes and fringing reefs.

Remarks

This species has not been found outside the type reefs in the Togian Islands, and it remains an enigma because of its unusual feature of *Montipora*-like corallites and coenosteal structures. Because of these features, and pending phylogenetic studies, it is not allocated to a species group, nor even to a subgenus of *Acropora* (Wallace, 1997).

Subgenus *Isopora* Studer, 1878

Isopora Studer, 1878 p.39

Species in this subgenus have a tendency for multiple axial corallites, leading to thickened, wedge-shaped branches: in specimens of some species there may be no branch development at all. Coenosteum consists of a dense arrangement of horizontally elongated, elaborated spinules both on and between corallites, this subgenus having the most elaborated spinules of all *Acropora*.

Acropora (Isopora) palifera (Lamarck, 1816)
(Figs 163, 164)

Astrea palifera Lamarck, 1816 p.262

Madrepora labrosa Dana, 1846 p.486 pl.43 fig.3

Acropora prominens Nemenzo, 1967 p.139 pl.15 fig.2

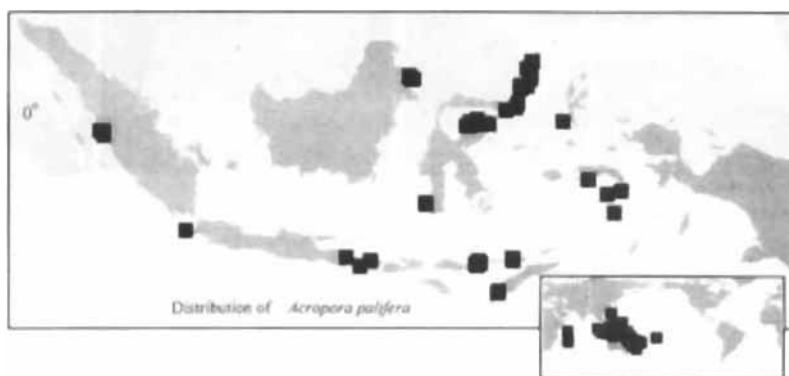


Figure 163. Distribution of *Acropora palifera* in Indonesia (main map) and worldwide (inset).

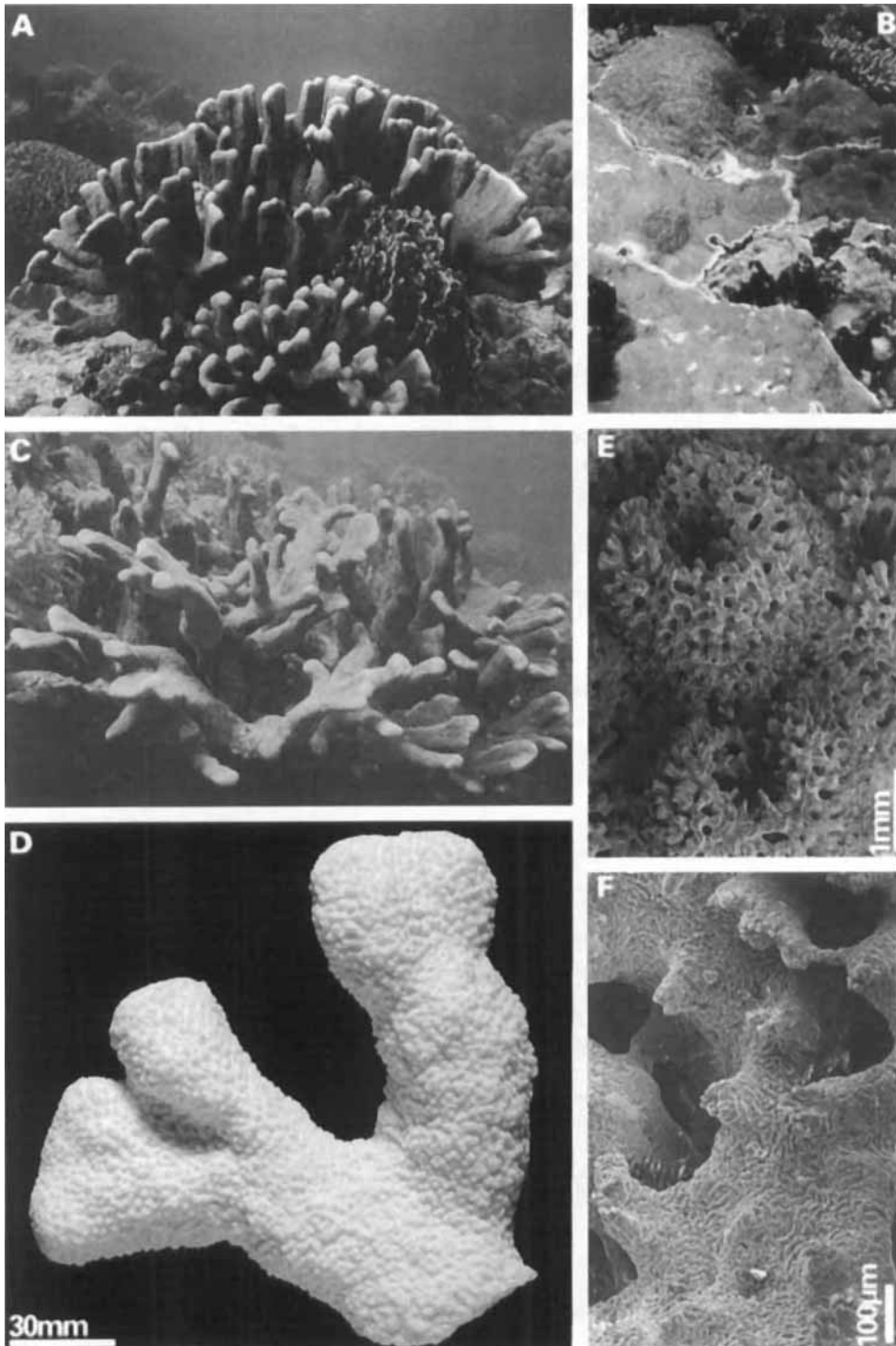


Figure 164. *Acropora palifera* (A) at Biaro I., Sangihe Is., N. Sulawesi (B) at Pantar Strait, Alor Is., E. Nusa Tenggara (C) at Ai I., Banda Is., Banda Sea; (D) G34176; (E, F) G46414: (D) portion of colony (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Material examined

W. SUMATRA: G48401–3, G48423 Padang; JAVA: G32847 Seribu Is; G46624 Panaitan I.; KALIMANTAN: G48894–902 N.E. Kalimantan; N. SULAWESI: G48881 Tg Dodepo; G34176–8, G47157–8 Bunaken N.P.; G48880 Tg Flesko; G48893 Batong I.; G47156 Tg Pisok; G47155 Tg Torowitang; G47153 Tg Pulisan; G47146–52, G47154 Sangihe Is; C. SULAWESI: G48882–92 Togian Is; S. SULAWESI: G47208–9 Spumonde Arch.; NUSA TENGGARA: G48903–4 Bali; G48879 Nusa Lembongan; G47459–60 Lombok; G48404–10 Flores; G48411–3 W. Timor; G48390, G48414–22 Alor Is; BANDA SEA: G35760 Bacan I.; G46410 Nusa Laut; G46411 Suanggi I.; G46412 Banda Is; G46413 Manuk I.; G46233 Sekaro I.; G46234 Lucipara Is.

Skeletal characteristics

Corallum. Branches are thick, wedge-shaped, and very variable in diameter, up to 150 mm, with many axial corallites.

Corallites. Axial corallites outer diameter 2.8–4.2 mm, inner diameter 0.7–1.4 mm, primary septa up to R, secondary septa up to 1/3R; radial corallites large, 1.0–5.0 mm long, appressed tubular with distinct dimidiate openings; primary septa up to R, secondary septa up to 1/3R.

Coenosteum. Coenosteum a dense arrangement of horizontally elongated, elaborated spinules both on and between radial corallites.

Field characteristics

Colonies have thick branches with multiple axial corallites running along the tip of the branch; sometimes colonies are encrusting (on the reef edge or submerged reefs with strong currents); large radial corallites obvious, sometimes their dimidiate openings can be seen; known colours brown or green; found subtidally on deeper parts of reef flat, reef slopes and walls and submerged reefs.

Remarks

This is the commonest *Isopora* species, occurring throughout the Indian and Pacific Oceans as well as the central Indo-Pacific. It is found on almost every reef of Indonesia.

Acropora (Isopora) cuneata (Dana, 1846)
(Figs 165, 166)

Madrepora cuneata Dana 1846 p.487

Madrepora securis Dana, 1846 p.486 pl.43 fig.2

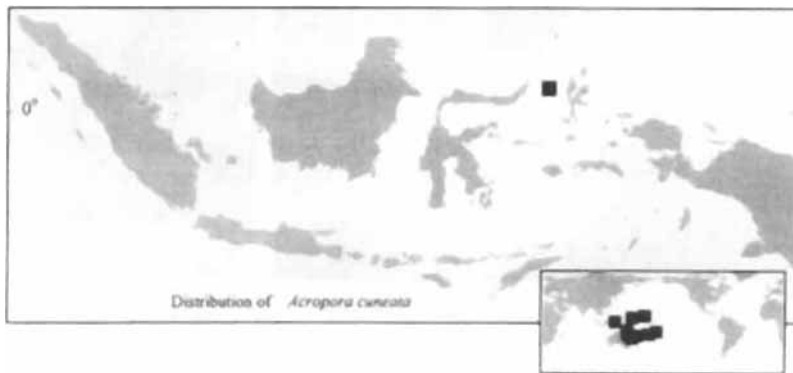


Figure 165. Distribution of *Acropora cuneata* in Indonesia (main map) and worldwide (inset).

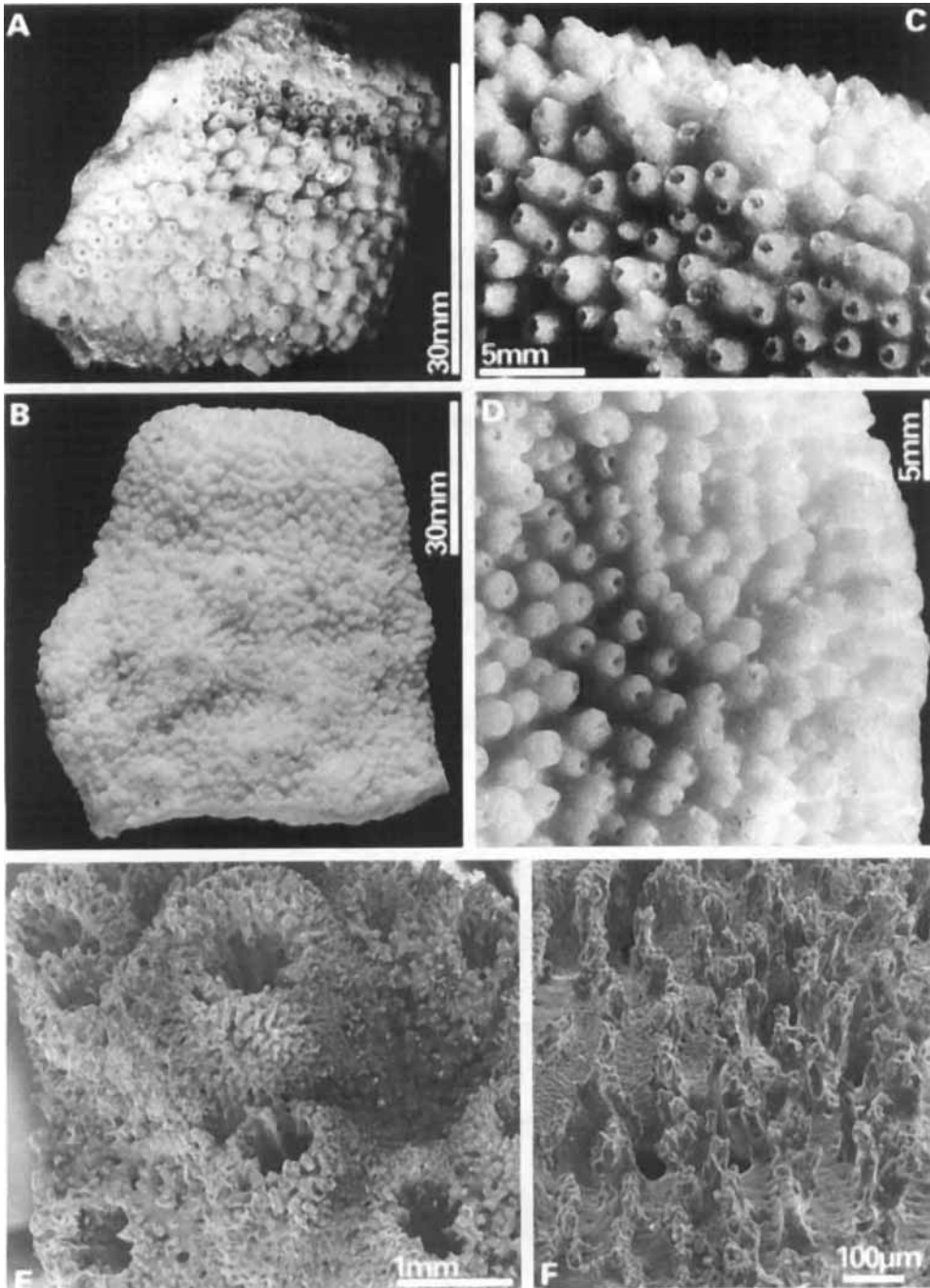


Figure 166. *Acropora cuneata* (A, C) G47137; (B, D-F) G51550: (A, B) portion of colony (C, D) portion of colony showing radial corallites (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Madrepora plicata Brook, 1891 p.465; 1893 p.134 pl.9 fig.D

Madrepora hispida Brook, 1892 p.462; 1893 p.133 pl.9 fig.C

Material examined

N. SULAWESI: G47137 Sangihe Is; C. MOLUCCA SEA: G51549–50 Mayu I.

Skeletal characteristics

Corallum. Cuneiform, with blade-like branches up to 10 mm diameter and sometimes patches of incipient branching on the side of the blades; some colonies mostly encrusting with a small amount of branching.

Corallites. Axial corallites outer diameter 1.5–3.1 mm, inner diameter 0.5–1.0 mm, primary septa present up to 2/3R, secondary septa present up to 1/3R; radial corallites evenly sized, touching or not touching, conical in form, primary septa present up to 1/3R, secondary septa present up to 1/4R.

Coenosteum. Dense arrangement of elaborated spinules throughout.

Field characteristics

Cuneiform-branching or semi-encrusting colonies; known colour brown; occurs intertidally or just subtidally on reef tops or submerged reefs.

Remarks

Based on the rarity of this species in our Indonesian samples (only 2 sites), and its absence from all Indian Ocean samples, we conclude that this is a species of Pacific Ocean origin.

Acropora (Isopora) crateriformis (Gardiner, 1898)
(Figs 167, 168)

Madrepora crateriformis Gardiner, 1898 p.258 pl.23 fig.1

Material examined

MOLUCCA SEA: G51551–3, Mayu I; HALMAHERA: G51554–6 S. Loloda Is; G51557–9 Tg Boro.

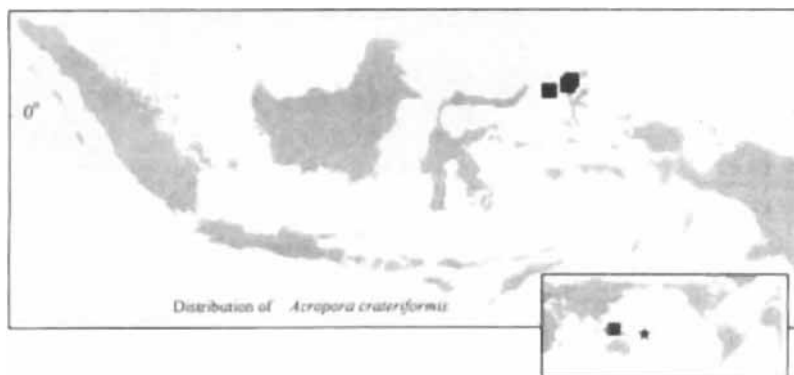


Figure 167. Distribution of *Acropora crateriformis* in Indonesia (main map) and worldwide (inset).

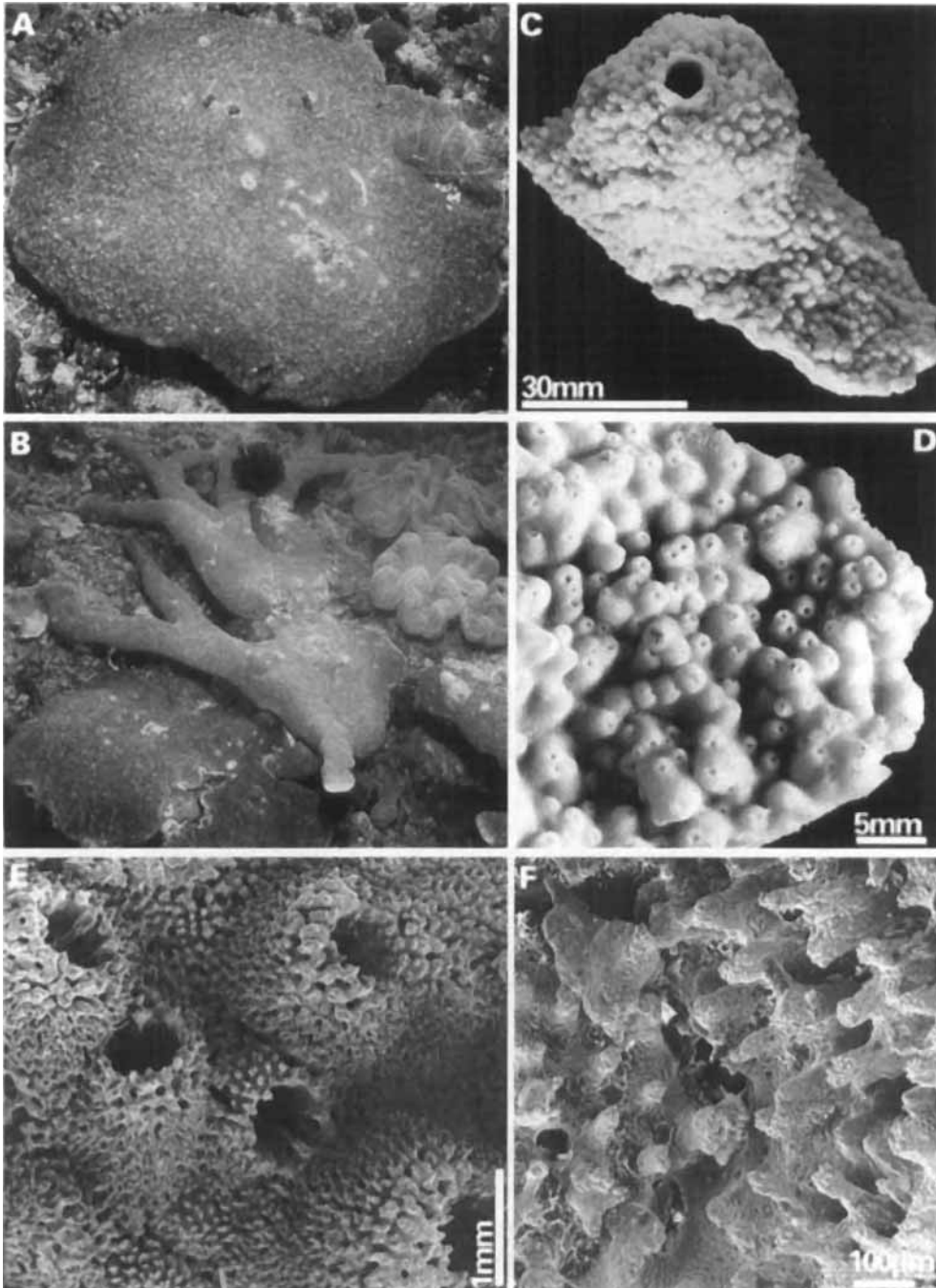


Figure 168. *Acropora crateriformis* (A) at Mayu I., Molucca Sea (B) *A. crateriformis* (lower left) and *A. palifera* (centre) at Mayu I., Molucca Sea; (C, D) G51557; (E, F) G51559: (C) portion of colony (D) portion of colony showing radial corallites (E) electron micrograph showing radial corallites (F) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Encrusting, forming circular colonies to 800 mm in diameter, without axial corallites or with occasional incipient axial corallites.

Corallites. Axial corallites not discernible; radial corallites mostly not touching, conical or appressed conical, primary septa present up to 1/3R, secondary septa some to all present up to 1/4R.

Coenosteum. A dense arrangement of elaborated spinules on radial corallites, slightly less dense arrangement of spinules in intercorallite areas.

Field characteristics

Occurs as circular encrusting colonies, up to 800 mm in diameter; known colour brown; found subtidally on submerged reef tops.

Remarks

This species is close to *Acropora cuneata*, and may be an ecomorphic variant of it. It was very common on the reefs of the Molucca Sea, where it co-occurred with *A. palifera* (see Fig. 168B).

Acropora (Isopora) brueggemanni (Brook, 1893)
(Figs 169, 170)

Madrepora brueggemanni Brook, 1893 p.145 pl.24 p.35 fig.E

Acropora meridiana Nemenzo, 1971 p.146 pl.1 fig.3

Material examined

W. SUMATRA: G48391–2 Padang; E. SUMATRA: G49824–6 Riau/Lingga Is; JAVA: G46622–3 Panaitan I.; G46685, G50746–8 Seribu Is; KALIMANTAN: G48936–8 N.E. Kalimantan; N. SULAWESI: G48927–8 Tg Dodepo; G35410–1, G46422, G46618–21, G47142–3 Bunaken N.P.; G47141 Tg Pisok; G47138–40, G47245 Sangihe Is; C. SULAWESI: G48929–35 Togian Is; S. SULAWESI: G47244, G47246, G50806 Spumonde Arch.; NUSA TENGGARA: G47461 Lombok; G50908 Moyo; G48393–7 Flores; G48398 Alor Is; BANDA SEA: G46231–2 Sekaro I.; G46235–9 Lucipara Is; G50807 Ambon I.; G46230 Banda Is.

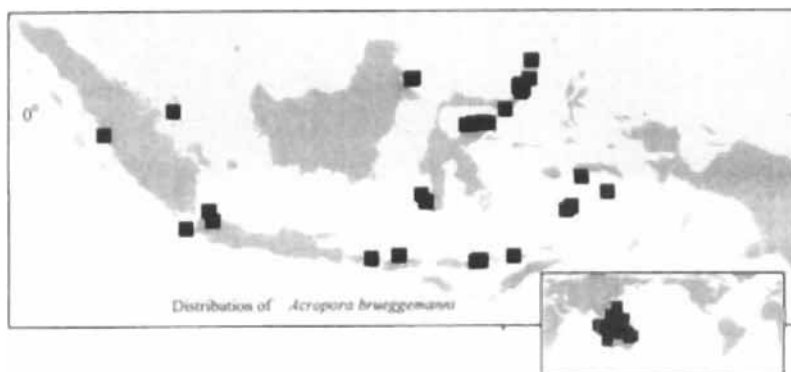


Figure 169. Distribution of *Acropora brueggemanni* in Indonesia (main map) and worldwide (inset).

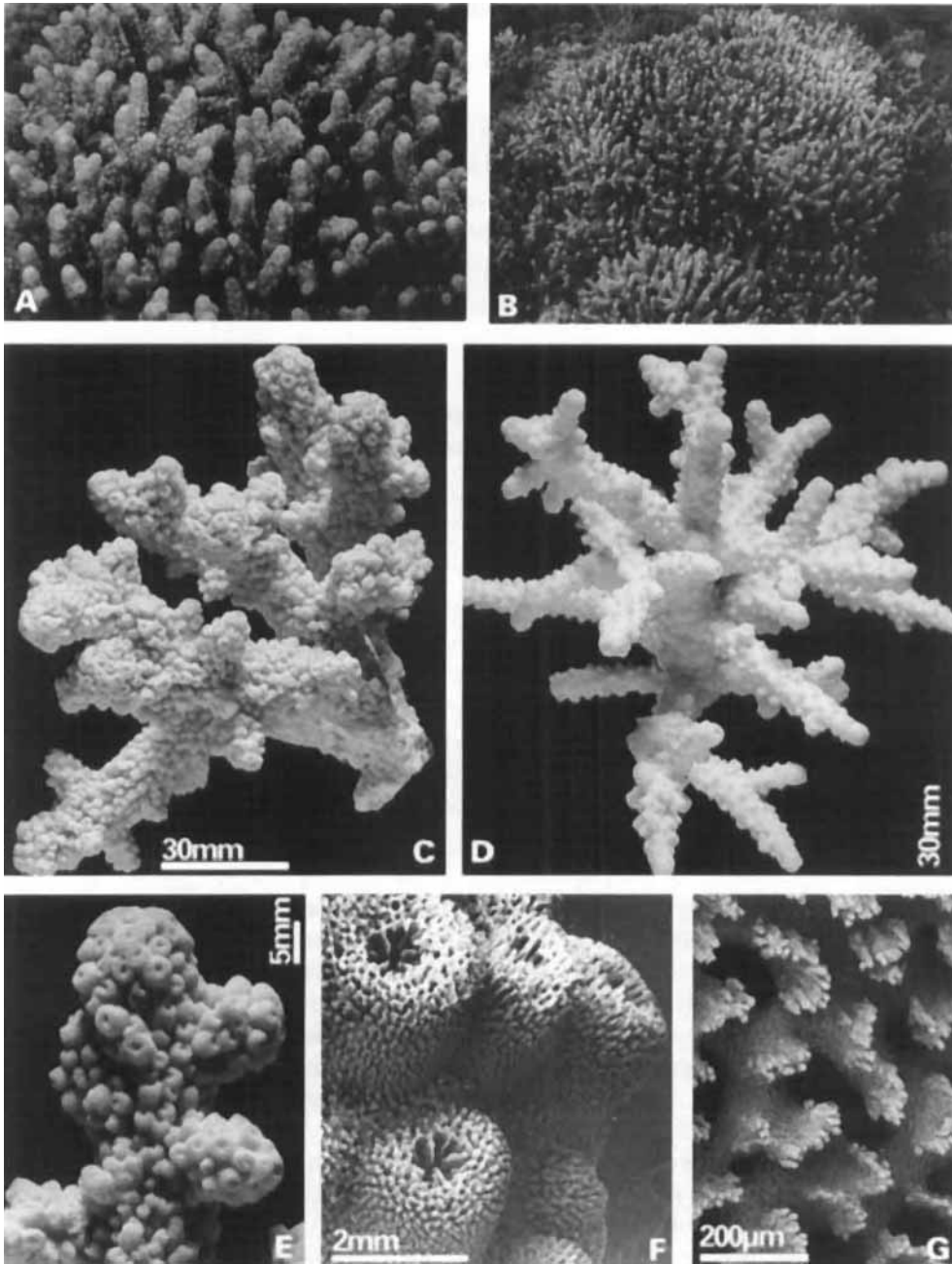


Figure 170. *Acropora brueggemanni* (A) at Nain I., N. Sulawesi (B) at Bunaken I., N. Sulawesi; (C, E, F) G46231; (D, G) G48394: (C, D) portion of colony (E) portion of branch (F) electron micrograph showing radial corallites (G) electron micrograph showing coenosteum between radial corallites.

Skeletal characteristics

Corallum. Arborescent; branches mostly with single axial corallites, but some with two or three axial corallites.

Corallites. Arborescent branches have 1 or 2 axial corallites (sometimes more) with outer diameter 2.9–4.5 mm, inner diameter 1.0–1.6 mm; primary septa present up to 3/4R, secondary septa present up to 1/3R; radial corallites mostly not touching on branches, short conical or tubular appressed with round openings, primary septa present up to 2/3R, secondary septa present up to 1/4R.

Coenosteum. Dense arrangement of horizontally elongated, elaborated spinules throughout.

Field characteristics

Arborescent branching, branches thick, but mostly appearing to have single axial corallites; known colours brown, pale green or white; found on subtidal reef flats, reef edge or upper slope.

Remarks

This species is distributed throughout the central part of the Indo-Pacific, including the northern part of the Great Barrier Reef, but not in other parts of the Pacific. The multiple axial corallites feature of the *Isopora* subgenus is the least developed in this species, its colonies mostly appearing to have cylindrical branches: however, it is included in the subgenus because some branches bear more than one axial corallite and because of its similarity in all other characters to the other species in the subgenus.

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APPENDIX

Details of sites sampled by authors, following standard protocol (see 'Methods'). Site names and co-ordinates taken from Admiralty charts.

Site No.	Location	Region	Lat.	Long.	Date	Site description	Dominant benthos
1	Nalaha Bay, Nusa Laut	Banda Sea	3°40'S	128°45'E	14 x 1993	fringing reef, coral isolates	<i>Aglaophenia</i> (Hydrozoa)
2	Manukang (Suanggi) I.	Banda Sea	4°19'S	130°42'E	15 x 1993	fringing reef, sandy slope	Alcyonacea
3	Manukang (Suanggi) I.	Banda Sea	4°19'S	130°42'E	15 x 1993	sand/mud flat, coral isolates	Alcyonacea
4	Gunung Api, Banda Is	Banda Sea	4°31'S	129°52'E	16 x 1993, 18 x 1993	basaltic flow slope, fringing reef	<i>Acropora</i>
5	Gunung Api, Banda Is	Banda Sea	4°31'S	129°52'E	16 x 1993	basaltic flow slope, fringing reef	<i>Acropora</i>
6	Ai I., Banda Is	Banda Sea	4°31'S	129°46'E	17 x 1993	vertical wall & flat	Alcyonacea
7	Run I., Banda Is	Banda Sea	4°33'S	129°40'E	17 x 1993	vertical wall & flat	Alcyonacea
8	Manuk I.	Banda Sea	5°33'S	130°18'E	19 x 1993	fringing reef	large-polyped Scleractinia
9	Serua I.	Banda Sea	6°19'S	130°01'E	19 x 1993	sand/mud flat, coral isolates	<i>Porites</i>
10	Sekaro I.	Banda Sea	5°35'S	127°28'E	20 x 1993	vertical wall & flat	Alcyonacea
11	Sekaro I.	Banda Sea	5°35'S	127°28'E	20 x 1993	lagoon	<i>Acropora</i>
12	Lucipara Is	Banda Sea	5°28'S	127°31'E	21 x 1993	slope to 6 m then vertical wall	branching <i>Porites</i>
13	Bingkudu I., Lucipara Is	Banda Sea	5°20'S	127°46'E	22 x 1993	vertical wall & flat	branching <i>Porites</i>
14	Ayam I., Lucipara Is	Banda Sea	5°21'S	127°45'E	22 x 1993	vertical wall & flat	<i>Tubastrea</i> /branching <i>Porites</i>
15	Mai I., Lucipara Is	Banda Sea	5°24'S	127°46'E	22 x 1993	vertical wall & flat	<i>Tubastrea</i>
16	Hukurila, Ambon I.	Banda Sea	3°45'S	128°15'E	26 x 1993	fringing reef	<i>Acropora</i> /Alcyonacea
17	Ruang I., Sangihe Is	N. Sulawesi	2°17'N	125°21'E	13 v 1994	volcanic ash slope	Porifera/branching <i>Porites</i>
18	Ruang I., Sangihe Is	N. Sulawesi	2°19'N	125°23'E	13 v 1994	volcanic rock slope	<i>Acropora</i>
19	Makalehi I., Sangihe Is	N. Sulawesi	2°45'N	125°09'E	14 v 1994	gentle slope to 10 m then steep slope	Alcyonacea (Nephtyidae)
20	Siau I., Sangihe Is	N. Sulawesi	2°49'N	125°24'E	14 v 1994	gentle slope to 10 m then steep slope	<i>Acropora</i>
21	Mahangetang I., Sangihe Is	N. Sulawesi	3°09'N	125°26'E	15 v 1994	underwater volcano	<i>Acropora</i>
22	Mahangetang I., Sangihe Is	N. Sulawesi	3°10'N	125°27'E	15 v 1994	submerged reef	<i>Acropora</i>
23	Biaro I., Sangihe Is	N. Sulawesi	2°07'N	125°20'E	16 v 1994	submerged reef	Alcyonacea
24	Biaro I., Sangihe Is	N. Sulawesi	2°06'N	125°20'E	16 v 1994	fringing reef	<i>Montipora</i>
25	Tg Pullisan	N. Sulawesi	1°42'N	125°09'E	17 v 1994	fringing reef	Alcyonacea
26	Bangka I.	N. Sulawesi	1°45'N	125°09'E	17 v 1994	submerged reef flat	Alcyonacea

continued

APPENDIX—continued

Site No.	Location	Region	Lat.	Long.	Date	Site description	Dominant benthos
27	Tg Torowitang	N. Sulawesi	1°45'N	124°59'E	18 v 1994	fringing reef	Alcyonacea
28	Naim I., Bunaken N.P.	N. Sulawesi	1°46'N	124°48'E	18 v 1884	lagoon	<i>Acropora/Anacropora</i>
29	Tg Pisok, Bunaken N.P.	N. Sulawesi	1°34'N	124°47'E	18 v 1994	fringing reef	Alcyonacea
30	Bunaken I., Bunaken N.P.	N. Sulawesi	1°38'N	124°45'E	20 v 1994	vertical wall & flat	<i>Aglaophenia</i> (Hydrozoa)
31	Bunaken I., Bunaken N.P.	N. Sulawesi	1°36'N	124°45'E	20 v 1994	vertical wall & flat	<i>Aglaophenia</i> (Hydrozoa)
32	Naim I., Bunaken N.P.	N. Sulawesi	1°46'N	124°48'E	21 v 1994	dense coral slope	<i>Acropora</i>
33	Kudingareng I., Spumonde Arch.	S. Sulawesi	5°06'S	119°17'E	25 v 1994	cay-bearing reef	<i>Acropora</i>
34	Bone Tambung, Spumonde Arch.	S. Sulawesi	5°01'S	119°13'E	26 v 1994	cay-bearing reef	<i>Acropora</i>
35	Loemba Loemba I., Spumonde Arch.	S. Sulawesi	4°58'S	119°12'E	27 v 1994	cay-bearing reef	<i>Acropora</i>
36	Badi I., Spumonde Arch.	S. Sulawesi	4°58'S	119°17'E	27 v 1994	cay-bearing reef	<i>Acropora</i>
37	Gili Meno, Lombok	Nusa Tenggara	8°20'S	116°03'E	31 v 1994	rubble slope	Alcyonacea
38	Gili Trawangan, Lombok	Nusa Tenggara	8°20'S	116°01'E	31 v 1994	sandy slope	Alcyonacea
39	Gili Trawangan, Lombok	Nusa Tenggara	8°20'S	116°01'E	1 vi 1994	coral slope	massive <i>Porites</i>
40	Parsumpahan I., Padang region	W. Sumatra	1°07'S	100°21'E	18 x 1994	fringing reef	branching <i>Porites</i>
41	Sirandah I., Padang region	W. Sumatra	1°08'S	100°20'E	18 x 1994	sandy slope on cay-bearing reef	
42	Sipakal Reef, Padang region	W. Sumatra	0°56'S	100°14'E	19 x 1994	patch reef with emergent top	<i>Acropora</i>
43	Sauh I., Padang region	W. Sumatra	0°52'S	100°18'E	19 x 1994	sandy slope on cay-bearing reef	<i>Acropora</i>
44	Gedang Reef, Padang region	W. Sumatra	1°03'S	100°15'E	20 x 1994	patch reef with emergent top (damaged reef)	<i>Acropora</i>
45	Singaru I., Padang region	W. Sumatra	1°04'S	100°17'E	20 x 1994	cay-bearing reef	<i>Acropora</i>
46	Pieh I., Padang region	W. Sumatra	0°52'S	100°05'E	22 x 1994	cay-bearing reef	foliose <i>Montipora</i>
47	Pieh I., Padang region	W. Sumatra	0°52'S	100°05'E	22 x 1994	cay-bearing reef	<i>Acropora</i>
48	Pamata Kecil I., Maumere Bay, Flores	Nusa Tenggara	8°20'S	122°21'E	27 x 1994	fringing reef	Alcyonacea
49	Besar I., Maumere Bay, Flores	Nusa Tenggara	8°27'S	122°20'E	27 x 1994	vertical wall & flat	macroalgae (especially <i>Turbinaria</i>)
50	Besar I., Maumere Bay, Flores	Nusa Tenggara	8°29'S	122°21'E	28 x 1994	rubble slope	Porifera
51	Waliti Reef, Maumere Bay, Flores	Nusa Tenggara	8°32'S	122°10'E	28 x 1994	submerged patch reef	Alcyonacea
52	Babi I., Maumere Bay, Flores	Nusa Tenggara	8°24'S	122°30'E	29 x 1994	vertical wall & flat	Alcyonacea

continued

APPENDIX continued

Site No.	Location	Region	Lat.	Long.	Date	Site description	Dominant benthos
53	Pangalatang, Maumere Bay, Flores	Nusa Tenggara	8°29'S	122°28'E	29 x 1994	fringing reef	Alcyonacea
54	Kojadoi Reef, Maumere Bay, Flores	Nusa Tenggara	8°30'S	122°24'E	30 x 1994	fringing reef	Alcyonacea
55	Waipare, Maumere Bay, Flores	Nusa Tenggara	8°37'S	122°14'E	30 x 1994	fringing reef	macroalgae (especially <i>Tubinaria</i>)
56	Kera I., Kupang Bay, W. Timor	Nusa Tenggara	10°05'S	123°34'E	2 xi 1994	cay-bearing reef	Alcyonacea
57	Semau I., W. Timor	Nusa Tenggara	10°12'S	123°28'E	2 xi 1994	fringing reef	Alcyonacea
58	Tenau Harbour, Kupang Bay, W. Timor	Nusa Tenggara	10°12'S	123°31'E	2 xi 1994	fringing reef	Alcyonacea
59	Kebola Bay, Alor, Alor Is	Nusa Tenggara	8°15'S	124°27'E	6 xi 1994	fringing reef	Alcyonacea
60	Pura I., Alor Is	Nusa Tenggara	8°18'S	124°19'E	6 xi 1994	dense coral slope	Alcyonacea
61	Pantar Strait, Alor Is	Nusa Tenggara	8°16'S	124°23'E	7 xi 1994	submerged patch reef	macroalgae
62	Reta I., Alor Is	Nusa Tenggara	8°13'S	124°23'E	7 xi 1994	vertical wall & flat	<i>Halimeda</i>
63	Alor I., Alor Is	Nusa Tenggara	8°15'S	124°24'E	7 xi 1994	fringing reef	Alcyonacea
64	Kumba I., Alor Is	Nusa Tenggara	8°16'S	124°24'E	8 xi 1994	fringing reef	<i>Acropora</i>
65	Pantar I., Alor Is	Nusa Tenggara	8°20'S	124°18'E	8 xi 1994	fringing reef	plating Scleractinia
66	Reta I., Alor Is	Nusa Tenggara	8°13'S	124°21'E	9 xi 1994	overhung wall & flat	Alcyonacea
67	Pantar I., Alor Is	Nusa Tenggara	8°11'S	124°20'E	9 xi 1994	dense coral slope	<i>Acropora</i>
68	Pura I., Alor Is	Nusa Tenggara	8°19'S	124°19'E	9 xi 1994	vertical wall & flat	foliose Scleractinia
69	Pura I., Alor Is	Nusa Tenggara	8°16'S	124°21'E	10 xi 1994	fringing reef	<i>Halimeda</i>
70	Reta I., Alor Is	Nusa Tenggara	8°13'S	124°22'E	10 xi 1994	fringing reef	<i>Halimeda</i>
71	Alor I., Alor Is	Nusa Tenggara	8°20'S	124°23'E	11 xi 1994	fringing reef	Porifera
72	Pura I., Alor Is	Nusa Tenggara	8°17'S	124°22'E	11 xi 1994	fringing reef	<i>Acropora</i>
73	Nusa Penida I., S.W. Bali	Nusa Tenggara	8°40'S	115°30'E	3 v 1995	dense coral slope	<i>Acropora</i>
74	Lembongan Bay, S.W. Bali	Nusa Tenggara	8°40'S	115°25'E	3 v 1995	submerged patch reef	Alcyonacea
75	Bunaken I., Bunaken N.P.	N. Sulawesi	1°37'N	124°44'E	6 v 1995	vertical wall & flat	Porifera
76	Bunaken I., Bunaken N.P.	N. Sulawesi	1°37'N	124°44'E	6 v 1995	lagoon	<i>Acropora</i>
77	Bunaken I., Bunaken N.P.	N. Sulawesi	1°37'N	124°43'E	6 v 1995	vertical wall & flat	Porifera
78	Tg Flesko	N. Sulawesi	0°28'N	124°31'E	8 v 1995, 14 v 1995	rocky slope	Alcyonacea

continued

APPENDIX—continued

Site No.	Location	Region	Lat.	Long.	Date	Site description	Dominant benthos
79	Tg Dodepo	N. Sulawesi	0°20'N	123°55'E	8 v 1995	fringing reef	branching <i>Porites</i>
80	Sendiri I., Togian Is	Central Sulawesi	0°28'S	122°56'E	9 v 1995	cay-bearing reef	<i>Acropora</i>
81	Sendiri I., Togian Is	C. Sulawesi	0°28'S	122°56'E	9 v 1995	lagoon	massive <i>Porites</i>
82	Dondola I., Togian Is	C. Sulawesi	0°25'S	122°38'E	9 v 1995	vertical wall & flat	Alcyonacea
83	Bangu I., Togian Is	C. Sulawesi	0°30'S	122°30'E	10 v 1995	submerged patch reef	<i>Acropora</i>
84	Walea Lighthouse, Togian Is	C. Sulawesi	0°25'S	122°25'E	10 v 1995	patch reef with emergent top	<i>Acropora</i>
85	Talatakoh I., Togian Is	C. Sulawesi	0°28'S	122°04'E	10 v 1995	submerged patch reef	branching <i>Porites</i>
86	Talatakoh I., Togian Is	C. Sulawesi	0°26'S	122°05'E	11 v 1995	fringing reef	<i>Porites</i>
87	Batuigang Bay, Batudaka I., Togian Is	C. Sulawesi	0°33'S	121°53'E	11 v 1995	fringing reef	branching <i>Porites</i>
88	Taupan I., Togian Is	C. Sulawesi	0°35'S	121°37'E	12 v 1995	vertical wall & flat	<i>Pocillopora verrucosa</i>
89	Pasir Tengah, Togian Is	C. Sulawesi	0°26'S	121°37'E	12 v 1995	emergent patch reef	<i>Porites</i>
90	Togian Is	C. Sulawesi	0°20'S	121°49'E	12 v 1995	submerged patch reef	branching <i>Porites</i>
91	Tg Komali, Togian Is	C. Sulawesi	0°12'S	122°14'E	13 v 1995	sandy slope	<i>Acropora</i>
92	Dondola I., Togian Is	C. Sulawesi	0°25'S	122°38'E	13 v 1995	sandy slope	<i>Acropora</i>
93	Batong I.	N. Sulawesi	0°43'N	124°38'E	14 v 1995	rocky slope	Alcyonacea
94	Sahaong I.	N. Sulawesi	1°45'N	125°10'E	15 v 1995	rocky slope	Alcyonacea
95	Tg Torowitang	N. Sulawesi	1°45'N	124°59'E	15 v 1995	fringing reef	Alcyonacea
96	Malinjo I., Jakarta Bay	Java	5°35'S	106°32'E	18 v 1995	cay-bearing reef	<i>Montipora</i>
97	Bira Reef, Jakarta Bay	Java	5°37'S	106°35'E	19 v 1995	cay-bearing reef	<i>Acropora</i>
98	Derawan I.	E. Kalimantan	2°17'N	118°14'E	22 v 1995	cay-bearing reef	<i>Montipora</i>
99	Kakaban I.	E. Kalimantan	2°08'N	118°31'E	22 v 1995	vertical wall & flat	<i>Acropora</i>
100	Kakaban I.	E. Kalimantan	2°08'N	118°30'E	23 v 1995	vertical wall & flat	<i>Acropora</i>
101	Sangkalaki I.	E. Kalimantan	2°06'N	118°24'E	24 v 1995	cay-bearing reef	<i>Acropora</i>
102	Sangkalaki I.	E. Kalimantan	2°05'N	118°24'E	24 v 1995	cay-bearing reef	<i>Pachyseris</i>
103	Masimbung Reef	E. Kalimantan	2°16'N	118°16'E	25 v 1995	cay-bearing reef	<i>Montipora</i>
104	Panjang I.	E. Kalimantan	2°20'N	118°14'E	25 v 1995	sandy slope	<i>Acropora palifera</i>
105	Tababinga Reef	E. Kalimantan	2°16'N	118°14'E	25 v 1995, 27 v 1995	dense coral slope	<i>Acropora</i>

continued

APPENDIX (continued)

Site No.	Location	Region	Lat.	Long.	Date	Site description	Dominant benthos
106	Derawan I.	E. Kalimantan	2°18'N	118°15'E	26 v 1995	submerged patch reef	<i>Acropora</i>
107	Pemuteran, N.W. Bali	Nusa Tenggara	8°09'S	114°36'E	30 v 1995	fringing reef	branching <i>Porites</i>
108	Pemuteran, N.W. Bali	Nusa Tenggara	8°09'S	114°36'E	31 v 1995	submerged patch reef	Alcyonacea
109	Pemuteran, N.W. Bali	Nusa Tenggara	8°09'S	114°36'E	31 v 1995	submerged patch reef	Alcyonacea
110	Tulamben, E. Bali	Nusa Tenggara	8°18'S	115°38'E	16 v 1996	shipwreck on volcanic ash slope	Alcyonacea
111	Donggala	C. Sulawesi	0°40'S	119°45'E	20 v 1996	fringing reef, sandy slope	<i>Acropora</i>
112	Donggala	C. Sulawesi	0°39'S	119°44'E	20 v 1996	fringing reef, sandy slope	Alcyonacea
113	Makaitu I., Banggai Is.	C. Sulawesi	1°19'S	122°44'E	24 v 1996	fringing reef, vertical wall & flat	<i>Montipora</i>
114	Batu Angus, Lembbeh Strait	N. Sulawesi	1°29'N	125°14'E	26 v 1996, 5 vi 1996	basaltic flow slope	foliose Scleractinia
115	N.W. Lembbeh I., Lembbeh Strait	N. Sulawesi	1°31'N	125°16'E	27 v 1996	rocky slope	Alcyonacea
116	Lembbeh Strait	N. Sulawesi	1°28'N	125°14'E	27 v 1996	rocky ash slope	Alcyonacea
117	Mayu I.	Molucca Sea	1°16'N	126°24'E	29 v 1996	rocky slope	Alcyonacea
118	Mayu I.	Molucca Sea	1°20'N	126°25'E	29 v 1996	fringing reef	<i>Acropora/Astropora</i>
119	Sidanga I., S. Loloda Is.	Halmahera	1°39'N	127°28'E	30 v 1996	fringing reef	Alcyonacea
120	Kahatola I., S. Loloda Is.	Halmahera	1°44'N	127°30'E	30 v 1996	rocky slope	Alcyonacea
121	Kahatola I., S. Loloda Is.	Halmahera	1°42'N	127°31'E	30 v 1996	sheltered inlet	Alcyonacea
122	Gorolamo I.	Halmahera	1°48'N	127°36'E	31 v 1996	fringing reef	Gorgonacea (<i>Juncidella</i>)
123	Tg. Boro	Halmahera	1°57'N	127°42'E	31 v 1996	sandy slope	<i>Algaophaenia</i> (Hydrozoa)/ Porifera
124	Salangadeke I., N. Loloda Is.	Halmahera	2°08'N	127°44'E	31 v 1996	submerged reef	<i>Acropora</i>
125	Dagasufi I., N. Loloda Is.	Halmahera	2°10'N	127°45'E	1 vi 1996	submerged patch reef, sandy slope	<i>Acropora</i>
126	Deherete I., N. Loloda Is.	Halmahera	2°16'N	127°44'E	1 vi 1996	rocky slope	Alcyonacea/Gorgonacea (fans)
127	Doi I., N. Loloda Is.	Halmahera	2°15'N	127°45'E	2 vi 1996	fringing reef	<i>Acropora</i>
128	Kahatola I., S. Loloda Is.	Halmahera	1°42'N	127°30'E	3 vi 1996	sandy slope	Alcyonacea
129	Sidanga I., S. Loloda Is.	Halmahera	1°39'N	127°29'E	3 vi 1996	rubble slope	<i>Acropora</i>
130	Tg. Obi Obi, Tifore I.	Molucca Sea	0°58'N	126°07'E	4 vi 1996	rocky slope	Alcyonacea
131	Tifore I.	Molucca Sea	0°57'N	126°08'E	4 vi 1996	submerged patch reef, sheltered inlet	Alcyonacea