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MARINE ALGAE KNOWN FROM THE MALDIVE ISLANDS

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by H. E. Hackett¹

Introduction

At the opening of the International Indian Ocean Expedition in 1964, 17 red algae, 5 green algae, and 2 brown algae were known from the Maldivé Islands. These had been collected during the J. Stanley Gardiner Expedition (Barton 1903; Foslie 1903, 1907; Weber van Bosse and Foslie 1904) and the John Murray Expedition (Newton 1953). The coralline algae are in the Foslie Herbarium, others are in the British Museum.

During the Cambridge Expedition to Addu Atoll in the summer of 1964, Sigee (1966) collected algae from the southern part of the atoll and published ecological notes. Specimens were identified by Tsuda and Newhouse (1966). They added 7 bluegreens, 20 reds, 25 greens, and 7 browns to the list of known algae. Specimens are at the University of Hawaii. The Expedition reports (Stoddart 1966) provide extensive references on the natural features of the Maldives.

During the U. S. Navy Biological Expedition to the Chagos in August 1967, C. Rhyne collected at Addu. The species are reported in this paper, and vouchers are at the U. S. National Museum. As part of the International Indian Ocean Expedition, Cruise B of the R/V TE VEGA went to the Maldivé Islands in 1964. Extensive algal collections were made at nine atolls.²

An area was usually sampled by removing algae from a square meter plot or by line transect. On occasion SCUBA, a two foot wire dredge or a six foot beam trawl were used. Some specimens were collected by other members of the scientific party.

The collections bring the total of known Maldivé algae to 21 bluegreens, 163 reds, (about 30 additional entities from dredge hauls are too fragmentary for analysis), 83 greens, and 18 browns.

Hackett (1969b) compared the Maldivé algae to those of the Marshall Islands, contrasted floristic differences between northern and southern atolls, and gave indicator genera for the Maldivé ecosystem. Aregood

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and Hackett (1971) reported a new species of Dictyurus from the Maldives.

This paper reports habitat descriptions from Cruise B and a list of known Maldivian algae. The list is based in part upon an unpublished PhD dissertation at Duke University (Hackett, 1969a). Specimens are at Duke University, Durham, N. C. and at the U. S. National Museum.

Maldivian reef features

The Maldives form a double row of atolls on the Chagos-Laccadive Bank. They extend northward from the equator along the 73°E meridian for more than 600 miles, and include more than 2,000 islands. The islands are for the most part transient, building and eroding rapidly. Large populated islands have completely disappeared within the memory of living natives (Hasen Didi, 1964 personal communication). Probably because of this transient quality, the Maldivian language, Divehi, emphasizes reef types rather than islands. These terms are pertinent and should be accepted as part of contemporary atoll terminology.

Tracey, Cloud and Emery (1955) have standardized terms for atoll reef features. Their classification, while applicable to most Pacific atolls, is not adequate for many Maldivian atolls. The Maldives have a more complex atoll structure than is typical in the Pacific. Most of the larger atolls are best described as atolls within atolls or composite atolls. In addition, because of the alternating monsoon wind pattern, the Maldives do not have typical windward and leeward sides. The terminology of Tracey, Cloud and Emery is followed where appropriate, but some new terms apply only to Maldivian reef features.

Faru means a reef, part of which is above water at low tide. The faru may have an island, and it may be a part of the atoll rim or a formation in the lagoon.

Farus in the lagoon probably developed on coral-algal knolls. Such farus are frequently so well developed that each has a central lagoon and, thus, becomes a microatoll. A shallow lagoon of this type is called a falu. A deeper lagoon is called a velu (vilu), although the distinction between them is not always clear.¹

Farus on the atoll rim may enclose a falu or velu. These are usually present when massive reef corals grow on the edge of the lagoon reef flat.

Atoll or atolu is the only Maldivian word placed into the English language. Yet, atolu in Divehi does not mean a circle of reef and islands enclosing a lagoon. Atolu refers only to a political division.

¹ Spelling is based on recent interpretations from Divehi. These were prepared by N. T. Hasen Didi, during Cruise B. The Admiralty Chart name appears in parentheses after the corrected name.

The political unit usually corresponds to the English language concept of an atoll. However, the largest emergent atoll in the world is in the Maldives and is made up of two political units. The northern half is called Tiladummati Atoll and the southern half Miladummadulu Atoll.

Both Agassiz (1903) and Gardiner (1903) made extensive comments on the structure of Maldivian atolls, and Hass in 1962 proposed a new theory of atoll formation based on his expedition to the Maldives. Plates I and II show in cross section the conspicuous features of a typical Maldivian atoll.

Environmental features

The only extensive records of air temperature are kept by the R. A. F. Meteorological Office at Gan, Addu Atoll. But some air and sea temperature records are available from expedition reports and Maldivian sources.

From the Addu records of 1959 to 1964 the lowest air temperature was a Jan. reading of 20.6°C, and the highest in April 32.8°C (Scorer, Mar. 1964 personal communication).

It is likely that surface water temperatures are similar throughout the year. Water temperatures of above 31°C were recorded in March and October from *Cymodocea* beds and lagoon reef flats. Lowest water temperatures are 27.2°C for lagoon surface readings in January. Agassiz (1903) showed that there is probably no appreciable temperature change from the top to the bottom of the lagoon.

Rainfall data from the northern islands are scant. Figures from the Maldivian Ministry indicate that the northern islands have a rainfall that is nearly equal to that of Addu, which is the southern most atoll. But the rain of the northern monsoon atolls is seasonal with a peak during May at the beginning of the Southwest Monsoon. In contrast the continuously unsettled weather of Addu results in more even monthly rainfall.

The prevailing monsoon wind regulates the seasonally reversing currents. At least in the northern Maldives the cross bank currents move westward from December to April, during the Northeast Monsoon; and they move more or less eastward from May through August, during the Southwest Monsoon.

Tidal data are scant, but the U. S. Naval Oceanographic Office (1951) states that the mean high water interval for Malcolm or Mukundu Atoll in the northern Maldives is 10 hours, 20 minutes. Spring tide range is 2.7 feet. Mean tide range is 2.1 feet. Tidal streams are irregular and much variation occurs.

The best salinity records are those for Addu Atoll kept by Stoddart (1966).

Habitat descriptions

Algal ridge

The algal ridge, or windward atoll margin, is a sporadic feature in the Maldives. A supposed prerequisite for its development is a continuous onshore wind that provides the water agitation needed for massive coral growth. Where corals reach the surface a pavement of calcareous red algae develops in the surf.

Algal ridges are seen in the atolls of the eastern side of the archipelago on their eastern and northeastern rims and in the western atolls on their western and southwestern rims. These are the sites that face the open sea and the alternating monsoon winds.

The habitat was studied on Himmafuri Faru in the northeastern sector of Male Atoll. There were no surge channels and the pavement was of *Porolithon* and *Lithophyllum*. Crevices continuously flushed with water contained a richly developed algal turf, dominated by small creeping species of *Chondria*, *Laurencia*, *Hypnea*, and *Polysiphonia*. Occasional are *Amphiroa*, *Anadyomene*, *Caulerpa peltata*, *Dasya*, *Dictyosphaeria*, *Halimeda*, *Jania*, *Oscillatoria*, *Peyssonelia*, *Pocockiella*, *Rhipidiphyllon*, a tiny *Sargassum*, *Schizothrix*, *Valonia*, and *Valoniopsis*. *Heteroderma* is a common epiphyte.

Leeward atoll margin

Although there are no true leeward reef margins in the Maldives, comparable situations are common where the atoll rim does not face the open sea. The habitat was studied on the eastern side of North Malosmadulu, facing the interatoll flat. Surf is negligible and the reef corals do not reach the surface, but slope gradually to deep water. *Lithophyllum* dominates. Confined to crevices are turfs of *Chondria*, *Herposiphonia*, *Hypnea* and *Tolypiocladia*. Occasional are *Codium*, *Boodlea*, *Gelidium*, *Halimeda*, *Jania*, *Turbinaria*, and *Vidalia*. Epiphytes are *Acrochaetium*, *Enteromorpha*, and *Jania*.

Seaward reef flat

The seaward flat is usually behind an algal ridge. If there is no ridge the seaward reef flat slopes gradually into deep water and is probably not distinguishable from the leeward atoll margin in the Maldives. The community at Himmafuri Faru, behind the algal ridge, is in less than a meter of water, and in places very broad and flat with high water temperatures. The sponge symbioses, stinging corals, blue corals, and true corals are abundant. *Tridacna* is occasional.

Most of the algae are small and confined to crevices. Occasional are *Actinotrichia*, *Amphiroa*, *Caulerpa serrulata*, *Caulerpa racemosa*, *Dictyota*, *Goniolithon*, *Halimeda*, *Halymenia* (rare), *Jania*, *Padina*, *Peyssonelia*, *Pocockiella* and *Turbinaria*. Turf formers are *Boodlea*, *Chondria*, *Champia*, *Cladophora*, *Herposiphonia*, *Hypnea*, *Microdictyon*, *Polysiphonia*, and *Tolypiocladia*. *Acrochaetium*, *Erythrocladia*,

Fosliella, *Heteroderma*, *Schizothrix*, and *Sphacelaria* are epiphytic.

The turf algae are mostly infertile, partially developed, and of divergent growth forms. This habit is apparently due in great part to the feeding of various reef herbivores. In areas of greater protection, as interisland flats, occasional large clumps of *Ceramium* may develop. In areas of considerable water flow *Calothrix* turfs may be extensive.

Calcareous debris, beach rock, and pavements

Distinct zonation was observed only once. The supralittoral black zone of *Entophysalis* and some *Calothrix* develops where the calcareous debris is stable. Below this is a supralittoral lighter band of the same genera. Its origin is unknown. The upper limits of the littoral are marked by a heavy growth of *Entophysalis* and *Calothrix*. The color given to the substrate by these algae gradually decreases down to low tide. This would appear to be related to the thickness of the brown sheath of *Calothrix*. The sheath is not so thick on those trichomes from the lower littoral. In the sublittoral, most debris is covered with *Entophysalis* and penetrated by *Gomontia* and *Ostreobium* filaments.

Beach rock is usually covered with *Entophysalis*, which has considerable endolithic development. There are several other bluegreen and green endolithic filaments.

In the northern atolls shallow depressions in beach rock and littoral pavements near low tide may have minute algal turfs of *Boodlea*, *Calothrix*, *Ceramium*, *Cladophora*, *Dictyosphaeria*, *Erythrotrichia*, *Microcoleus*, *Oscillatoria*, *Polysiphonia*, *Schizothrix*, *Spirulina* and hydroids.

At Addu, beach rock has well developed turfs. Crevices contain *Anacystis*, *Caulerpa racemosa*, *C. serrulata*, *C. taxifolia*, *Ceramium*, *Centroceras*, *Chondria*, *Cladophora*, *Dictyurus*, *Ectocarpus*, *Enteromorpha*, *Hormothamnion*, *Jania*, *Microcoleus*, *Oscillatoria*, *Padina*, *Polysiphonia*, *Schizothrix*, *Sphacelaria*, and *Wrangelia*. Thick turfs entirely of *Calothrix* were collected on debris throughout the littoral and sublittoral.

Mangrove

Rhizophora mucronata is occasional in protected sites along lagoon beaches. Where the prop roots of this mangrove extend into the sublittoral, an algal turf of *Gelidium*, *Jania*, and *Caulerpa racemosa* develops.

Cymodocea-Thalassia flat

Flats of *Cymodocea* and *Thalassia* are rare and turf development is usually sparse. They occur mostly on seaward reefs or adjacent to channels crossing the atoll rim, although small tufts of *Thalassia* may be in most any protected area. In the northern atolls, flats are composed of *Cymodocea rotundata* with some *Thalassia hemprichii*. The

latter is usually poorly developed and heavily epiphytized. The flat at Addu has *Thalassidondron ciliatum* in addition to *Cymodocea* and *Thalassia*.

Flats contain many algae that are not seen elsewhere. Near Himmafuri Village, Male Atoll, poorly developed specimens of *Acanthophora*, *Chondria*, *Gracilaria*, *Hypnea*, and *Leveillea* were collected along with a single *Acetabularia*. Dominant are large clumps of *Jania* and *Goniolithon*, the latter often overgrown with *Peyssonelia*. Occasional are *Boergesenia*, *Bryopsis*, *Caulerpa*, *Chaetomorpha*, *Champia*, *Cladophora*, *Dictyosphaeria*, *Halimeda*, *Padina*, *Sphacelaria*, and *Tolypiocladia*. *Acrochaetium*, *Entocladia*, *Entophysalis*, *Erythrotrichia*, *Fremyella*, *Hormothamnion*, *Microcoleus*, *Oscillatoria*, and *Schizothrix* are epiphytic on larger algae. *Thalassia* is commonly epiphytized by *Ceramium*, *Cladophora*, *Enteromorpha*, *Fosliella*, *Jania*, *Ulvela*, and many bluegreens.

The algal composition of the flat at Addu Atoll varied. In May the site had considerable silting with poor water visibility. Occasional are *Brachytrichia*, *Caulerpa*, *Centroceras*, *Ceramium*, *Champia*, *Chondria*, *Cladophora*, *Dictyosphaeria*, *Dictyota*, *Ectocarpus*, *Enteromorpha*, *Fosliella*, *Herposiphonia*, *Jania*, *Mastigocoleus*, *Microcoleus*, *Pocockiella*, *Turbinaria*, and *Udotea javensis*. Subsequent summer collections found *Boergesenia*, *Boodlea*, *Hydroclathrus*, *Rosenvingea*, *Spyridia*, *Tolypiocladia*, and *Udotea orientalis*.

Lagoon reef flat

In the northern atolls, if reef building corals occur on the lagoon periphery of the flat, masses of *Porolithon craspedium* and *P. gardineri* occur among them. In either case *Actinotrichia*, *Bryopsis*, *Cladophora*, *Dictyopteris*, *Gelidium*, *Goniolithon*, *Halimeda*, *Hypnea*, *Jania*, *Microdictyon*, *Peyssonelia*, *Pocockiella*, *Tydemanina* (rare), *Valonia*, and *Vidalia* occur in crevices. *Acanthophora*, *Amphiroa*, *Boodlea*, *Caulerpa racemosa*, *C. serrulata*, *C. taxifolia*, *Centroceras*, *Champia*, *Cladophoropsis*, *Derbesia*, *Ectocarpus*, *Enteromorpha*, *Hypnea*, and *Sphacelaria* grow on the lower parts of corals. Epiphytes are *Acrochaetium*, *Asterocystis*, *Microcoleus*, *Schizothrix* and *Spirulina*.

At Addu Atoll both algal diversity and development is much greater. In crevices are *Acrochaetium*, *Amphiroa*, *Asterocystis*, *Boodlea*, *Botryocladia*, *Bryopsis*, *Caulerpa*, *Ceramium*, *Chaetomorpha*, *Champia*, *Chondria*, *Cladophora*, *Cladophoropsis*, *Codium*, *Derbesia*, *Dictyopteris*, *Dictyota*, *Dictyurus*, *Ectocarpus*, *Enteromorpha*, *Erythrotrichia*, *Galaxaura*, *Gelidium*, *Halimeda*, *Herposiphonia*, *Hypnea*, *Jania*, *Laurencia*, *Martensia*, *Microcoleus*, *Oscillatoria*, *Pocockiella*, *Polysiphonia*, *Schizothrix*, germinating *Sphacelaria propagulae*, *Spongomorpha*, *Struvea*, *Taenioma*, *Tolypiocladia*, and *Turbinaria*.

Velu

The only small lagoon or velu studied was on Himmafuri Faru. It is on the lagoon reef flat and separates the massive lagoon reef structure from the island. The velu has little water circulation and

the bottom at three to four meters is of bare calcareous sand with occasional clumps of *Acropora formosa*. Algae occurring as a turf on the lower parts of the coral are *Caulerpa*, *Dasya*, *Gelidiella*, *Herposiphonia*, *Jania*, and *Spyridia*.

Lagoon floor

The lagoon floor in northern atolls is rich in algae. Over 20% of all Maldivian algal species were collected there only. Undoubtedly many were overlooked and several are too fragmentary for analysis. Dredge hauls were dominated by *Microdictyon* and *Pocockiella*. Other genera are *Anadyomene*, *Antithamnion*, *Botryocladia*, *Bryopsis*, *Callithamnion*, *Caulerpa*, *Ceramium*, *Chaetomorpha*, *Champia*, *Chondria*, *Chrysomenia*, *Dasya*, *Dictyopteris*, *Dictyota*, *Dictyurus*, *Enteromorpha*, *Entocladia*, *Entophysalis*, *Erythrotrichia*, *Fauchea*, *Gracilaria*, *Halimeda*, *Haloplegma*, *Heteroderma*, *Herposiphonia*, *Hypoglossum*, *Laurencia*, *Lophocladia*, *Martensia*, *Neomeris*, *Oscillatoria*, *Padina*, *Polysiphonia*, *Schizothrix*, *Sphacelaria*, *Spongomorpha*, *Struvea*, the flabellate form of *Tydemanina*, *Udotea*, and *Valonia*.

Melobesioid algae were common only in a dredge haul in a channel crossing the atoll rim.

In contrast to northern atolls the lagoon floor at Addu Atoll seems to have a sparse algal community. *Caulerpa verticillata*, *Chaetomorpha*, *Cladophora*, *Heteroderma*, *Mastigocoleus*, *Schizothrix*, and *Udotea* occur.

Knoll reef flat and slope

Coral knolls are farus in the atoll lagoon. The three sites observed are Duniidu in Male Lagoon, Walla in South Nilandu Lagoon, and Madugali in Ari Lagoon. All have flats about 25 meters in width that slope away from emergent islands to a depth of 4 meters before dropping sharply to the lagoon floor. Duniidu is a disturbed site. The island is the British Administrative residence. Walla and Madugali are uninhabited.

Conspicuous at Duniidu is *Tydemanina*. It is the only alga growing profusely above the surface of the corals. *Caulerpa*, *Chaetomorpha*, *Champia*, *Enteromorpha*, *Halimeda*, *Herposiphonia*, *Hypnea*, *Struvea*, and *Tolypiocladia* are in crevices. Most dead corals were covered with mixtures of *Entophysalis*, *Hormothamnion*, *Microcoleus*, *Schizothrix*, and the arcuate tufts of *Oscillatoria*.

At Walla coral crevices contained *Acrochaetium*, *Amphiroa*, *Caulerpa*, *Ceramium*, *Chlorodesmis*, *Cladophora*, *Coelarthrum*, *Codium*, *Derbesia*, *Dictyurus*, *Dictyota*, *Asparagopsis* (tetraspotophytes), *Griffithsia*, *Halimeda*, *Herposiphonia*, *Heteroderma*, *Hormothamnion*, *Hypoglossum*, *Pocockiella*, *Porphyrosiphon*, *Schizothrix*, *Sphacelaria*, *Spirulina*, *Struvea*, *Turbinaria*, *Udotea*, and *Vidalia*.

At Madugali *Halimeda* is dominant but confined to crevices along with *Acrochaetium*, *Caulerpa racemosa*, *Ceramium*, *Chondria*, *Hypoglossum*,

Jania, and *Wrangelia*.

The rubble pool at Filadu, Tiladummati Atoll

Near a channel crossing the reef flat, a circular mass of calcareous debris enclosed a pool about 20 meters in diameter and a meter in depth. The wall, which served as a tern rookery, allowed algae to grow free from wave activity and grazing by herbivorous fishes.

Although large clumps of *Halimeda* occurred, the pool was dominated by entangled and partially free floating mats of the Cnidarian *Zoanthus* mixed with *Caulerpa racemosa* var. *microphysa* and *C. sertularioides*. The *Caulerpa* was the most profusely developed of any shallow water alga in the Maldives.

Stations of Cruise B of the R.V. Te Vega 1964

Male Atoll

2. Mar. 17. Duniu Faru. (73°30'15"E, 4°11'30"N). Littoral beach rock and smooth calcareous pavement on the east side of the coral knoll island.
3. As above. Reef flat, reef margin, reef front, 1-2 meters of water on the north side.
4. Mar. 19. Himmafuri Faru. (73°34'E, 4°18'30"N). *Cymodocea* bed just below low tide on the north side of the island near the village.
5. Mar. 21. As above but on the south side of the island.
 - 5a. Seaward reef flat, 1 meter or less of water.
 - 5b. Algal ridge.
 - 5c. Velu, 3-4 meters of water.
6. Mar. 22. South of Kagi Faru. (73°34'E, 4°32-35'N). Lagoon floor in 60-66 meters, beam trawl.
7. Mar. 22. Kagi Faru. (73°29'45"E, 4°40'N). Seaward reef flat on the north side of the Faru, 2-6 meters of water.

Fadiffolu Atoll

8. Mar. 23. Between Mako (Maro) and Mafilafuri (Mafilefuri). (73°25'24"E, 5°21'30"N). Inter-island flat of calcareous debris, less than 1 meter of water with current.
9. Mar 24. As above but nearer the lagoon side, sheltered water at the point of low tide.
 - 9a. *Rhizophora* roots.
 - 9b. Coral debris especially *Acropora*.
 - 9c. Sparse *Thalassia* bed.

10. Mar. 25. East of Lohi and Lasalafuri. (73°29'E, 5°20'N).
Lagoon floor in 50-70 meters, beam trawl.

11. Mar. 25. Near Maduvvari. (73°29'E, 5°18'N). Channel across
the atoll reef in 50-70 meters, beam trawl.

Miladummadulu Atoll

12. Mar. 27. Kendikolu. (73°2'E, 5°57'N). Lagoon reef flat, 3
meters of water.

13. Mar. 27. Just west of Kendikolu. Lagoon floor in 50 meters,
wire dredge.

14. Mar. 28. Kendikolu. Patch reef adjacent to the lagoon beach,
less than 1 meter of water.

15. Mar. 29. Near Bomasdu. (73°19'E, 5°58'N). Lagoon floor in
72 meters, beam trawl.

Tiladummati Atoll

16. Mar. 31. Filadu. (73°10'E, 6°55'N). Enclosed rubble pool on
the reef flat.

17. As above. Lagoon reef flat outside the pool, 5 meters of water.

Male Atoll

18. Apr. 19. Dunidu Faru. See station 2. Littoral pools on
pavement and the pavement at the point of low tide.

19. Apr. 19. As station 3.

North Malosmadulu Atoll

20. Apr. 21. Ugu Faru (Ongu). (73°0'E, 4°40'N). Site similar to a
leeward reef flat, 1-3 meters of water.

21. Apr. 21. Near Ugu Faru. (73°0'E, 4°41'N). Lagoon floor in 44
meters, wire dredge.

Ari Atoll

22. Apr. 22. Madugali. (72°45'E, 4°6'N). Beach rock and the reef
flat of a coral knoll island, to 2 meters of water.

South Nilandu Atoll

23. Apr. 23. Kuda Huvadu. (72°55'E, 2°42'N). Floating algal mat
from the lagoon beach.

24. Apr. 24. Walla Faru (Wala). (72°55'E, 2°42'N). Reef flat of a coral knoll island.

Addu Atoll

25. Apr. 28. Gan Island. (73°9'E, 0°41'S). Littoral beach rock from the lagoon beach near the inter-island flat.

26. Apr. 30. Wilingili. (73°11'E, 0°41'S). Lagoon reef flat, less than 1 meter of water.

27. May 4. As station 25. Coral rubble surrounding the pier on the lagoon beach, 1 meter of water.

28. May 5. North of the Gan-Fedu gap. (73°9'E, 0°41'S). Lagoon floor in 40-50 meters, wire dredge.

29. May 8. As station 25. Small rubble island on the inter-island flat between Gan and Fedu. *Cymodocea-Thalassia* beds and littoral calcareous debris.

30. May 10. Busby Island. (73°10'E, 0°40'S). Lagoon reef flat on the western side of the island, coral rubble and shells in 1 meter of water.

Stations of other expeditions

Barton. Algae collected during the J. Stanley Gardiner Expedition to the Maldives were listed by Barton (1903). All the Maldivian plants were dredged in water 25-45 fathoms. The locations are given in the systematic list.

Foslie. Coralline algae collected during the Gardiner Expedition were listed by Foslie (1903, 1907) and Weber Van Bosse and Foslie (1904). The locations are given in the systematic list.

DS. Algae collected by D. Sigee during the Cambridge to Addu Atoll were listed by Tsuda and Newhouse (1966). For locations consult that paper.

Rhyne. Algae were collected at Addu Atoll in August 1967 by C. Rhyne during the U.S. Navy Biological Expedition to Diego Garcia. All were found on the shallow inter-island flat between Gan and Fedu.

Systematic list

Cyanophyceae

Anacystis aeruginosa (Zanardini) Drouet and Daily

Stations: 23, 25; on *Enteromorpha* and *Schizothrix* or interstitial.

Brachytrichia maculans Gomont

Stations: 29; on calcareous debris with *Calothrix* in *Cymodocea* beds.

Calothrix crustacea Schousboe and Thuret

Stations: 4, 18, 22, 29; on coral debris, beach rock and on *Cymodocea*.

Calothrix pilosa Harvey

Stations: 8, 16, 29; DS 120: forming a turf on coral rubble in *Cymodocea* beds or blackening supralittoral debris in undisturbed areas.

Coccochloris elabens (Brebisson) Drouet and Daily

Stations: 15; Several irregular and often medianly constricted cells of this tentatively identified alga (Drouet, 1967 personal communication) are within many of the blade cells of the monostramatic specimens of *Dictyopteris*.

Entophysalis conferta Drouet and Daily

Stations: 3, 5a, 5b, 5c, 15, 18; on *Microcoleus*, *Schizothrix*, *Polysiphonia*, and *Valoniopsis*.

Entophysalis deusta Drouet and Daily

Stations: 3, 4, 8, 9, 13, 16, 18, 26; on and in calcareous debris.

Fremyella vitiensis (Askenasy) De Toni

Stations: 4, on various algae in *Cymodocea* beds.

Hormothamnion enteromorphoides Grünow

Stations: 4, 25; on *Børgesenia*, *Thalassia*, and *Cymodocea* or forming a crust on sand in crevices of beach rock.

Hormothamnion solutum Bornet and Grünow

Stations: 9; Rhyne 814a; in the algal turfs on *Rhizophora* roots and on *Thalassia*.

Mastigocoleus testarum Lagerheim

Stations: 9, 28, 29; penetrating beach rock and shell debris.

Microcoleus lyngbyaceus (Kützing) Crouan

Stations: 3, 4, 5a, 5b, 5c, 9, 16, 17, 18, 25, 26, 29, 30; Rhyne 816b; on coral debris, beach rock, in sand or epiphytic, never dredged.

Oscillatoria submembranacea Ardissonne and Strafforello

Stations: 3, 4, 5a, 5c, 9, 10a, 16, 17, 25, 30; Rhyne 825;
forming erect tufts on beach rock or coral debris, or forming spheres,
binding sand, or epiphytic.

Oscillatoria lutea Agardh

Stations: 4, 26; on calcareous debris in *Cymodocea* beds.

Porphyrosiphon notarisii (Meneghini) Gomont

Stations: 15, 24; on a hydroid, on *Microdictyon*.

Rivularia polyotis (J. Agardh) Bornet and Flahault

Stations: 9, on *Thalassia*, on shells.

Schizothrix arenaria (Berkeley) Gomont

Stations: 5a, 5c, 10a, 25; Rhyne 815; in sand.

Schizothrix calcicola (Agardh) Gomont

Stations: 3, 4, 5, 8, 9, 16, 17, 18, 21, 25, 26, 28; DS88;
a common algal epiphyte and often in the tissues of sponges and
Zoanthus.

Schizothrix mexicana Gomont

Stations: 5a, 5b, 5c, 9, 10a, 11b, 15, 17, 20, 24, 26, 28; Rhyne
816a; with other bluegreen algae in turfs especially on the lower
parts of coral, or epiphytic on red algae.

Schizothrix tenerrima (Gomont) Drouet

Stations: 20, on *Gelidium*.

Spirulina subsalsa Oersted

Stations: 9, 16, 17, 18, 20; in turfs with other bluegreen algae
especially *Microcoleus*.

Rhodophyceae

Acanthophora spicifera (Vahl) Børgesen

Stations: 4, 9b; in *Cymodocea* and *Thalassia* beds, rare. Plants
of small stature and heavily epiphytized.

Acrochaetium sargassicola Børgesen

Stations: 20, 30; on *Dictyota*, *Turbinaria*, and coralline algae.

Acrochaetium sp. 1

Stations: 17, 22, 26, 30; on various algae. Plants resemble
A. gracile Børgesen, but with larger dimensions.

Acrochaetium sp. 2

Stations: 4, 24; on *Champia* and *Hypnea* from *Cymodocea* beds, on
Dictyota from the reef flat. Plants 0.2mm - 0.4mm high, sparsely
branched; basal cell 18 μ diam., spherical, at least in young plants,
ultimately forming a filamentous creeping axis or a disk like

structure; lower cells of the upright axis 7-8 μ diam., 10 μ long, ultimate unicellular branchlets usually arising from each of the 2-4 cells of a side branch; plastid band shaped to fragmented.

Actinotrichia fragilis (Forskal) Børgesen

Stations: 7, 17; occasional in crevices.

Amphiroa anastomosans Weber Van Bosse

Stations: 5b, 7, 24, 26; in crevices of the reef flat and in mixed algal turfs of the algal ridge.

Amphiroa fragilissima Lamouroux

Stations: 5b, 9b; in algal turfs.

Amphisbetema indica (J. Agardh) Weber Van Bosse

Stations: DS 112.

Antithamnion breviramosus Dawson

Stations: 7, 10a; on *Valonia* from the reef flat, on dredged *Halimeda*. The axis diameter is smaller than variety *simplex* Dawson (1957) from Eniwetok. Plants are poorly developed, and not all have gland cells.

Antithamnion butleriae Collins

Stations: 10a. Species previously known only from the West Indies.

Antithamnion pseudocorticatum Dawson

Stations: 15, on *Microdictyon*. Plants are better developed than the type. The lower side of the basal cell of the ramuli cuts off a spherical but not densely staining gland-like cell.

Antithamnion sp. 1

Stations: 15, on *Microdictyon* and *Dictyopteris*. Plants are like *A. sublittorale* Setchell and Gardiner, but have di-trizonate gland cells.

Antithamnion sp. 2

Stations: 10a, on calcareous debris. Plants fragmentary, indeterminate axes unbranched, cells 15 μ diam., 50 μ long; determinate ramuli arising near the upper end of the axis cell, opposite, unbranched, to 175 μ long, lower cells 10 μ diam., 17 μ long, terminal cell 5 μ diam., 12 μ long, blunt; flattened gland cells 10 μ long, laterally cut off from lower cells of the ramuli.

Antithamnion sp. 3

Stations: 15, on *Microdictyon*. Plants fragmentary, axis cells 20 μ diam., 70 μ long, each giving rise in a spiral arrangement to two adjacent and thus not opposite, unbranched, determinate ramuli to 180 μ long, one often deciduous in older parts; cells of lower ramuli 8 μ diam., 20 μ long, terminal cell blunt; supposed gland cells not as distinctively dark at maturity as most species, ovoid to spherical 10 μ - 15 μ borne usually on the lower side at a midpoint on the ramuli.

Archaeolithothamnion erythraeum (Rothpletz) Foslie
Stations: Foslie, South Nilandu.

Archaeolithothamnion schmidtii Foslie f. *dissita* Foslie
Stations: Foslie, South Nilandu and Male

Asparagopsis taxiformis (Delile) Collins and Hervey
Stations: 24, 26; tetrasporophytic plants only.

Asterocytis ornata (C. Agardh) Hamel
Stations: 12, 17, 24, 26, 30; on *Sphacelaria*, *Entophysalis*,
Polysiphonia and other turf algae in crevices.

Botryocladia skottsbergii (Børgesen) Levring
Stations: 15, 21, 26; DS 23.

Callithamnion sp.
Stations: 10a, 15: Plants erect to 1cm, axes monosiphonous,
alternate to dichotomously branched, branches spirally arranged
and apparently indeterminate and not differing from the axes, usually
straight; lower cells 37-55-75 μ diam., 212-250 μ long, somewhat
expanded at the ends; upper cells 15 μ diam., 100 μ long; terminal
cells 8 μ diam., 26 μ long, apex wall very thick, blunt; not
reproductive.

Centroceras clavulatum Montagne
Stations: 9b, fragments numerous in algal turfs on dead coral.

Centroceras minutum Yamada
Stations: 9b, 26, 29; in algal turfs on dead coral.

Ceramium fibriatum Setchell and Gardner
Stations: 8, DS 105; on sandy areas of the reef flat, rare.
These plants are the only conspicuous *Ceramium* species found.

Ceramium gracillimum (Griffiths) Harvey var. *byssoideum* (Harvey)
Mazoyer
Stations: 4, 7, 22, 24, 29; Rhyne 804, on *Cymodocea*, *Thalassia*,
Halimeda, *Dictyota*, and *Amphiroa*.

Ceramium mazatlanense Dawson
Stations: 10, 11, 21, 24; on *Codium* and *Dictyota* from the reef flat
and on *Bryozoans*, *Microdictyon*, and *Pocockiella* from the lagoon floor.
Plants are less developed than typical.

Ceramium sp. 1
Stations: 25, 30; on beach rock and debris. Plants have a greater
number of tetrasporangia at a node and a more regular arrangement of
cortical cells than *C. huysmansii* Weber Van Bosse.

Ceramium sp. 2
Stations: 9c, on *Thalassia*. Plants to 3mm high, sparingly and
irregularly branched, apices curved; mature axis cells 85 μ diam.,

150 μ long; mature cortical band 200 μ diam., 100 μ high with some secondary growth, cells 8-24 μ diam., irregular not organized into zones; forming bisporangia, 27 μ diam., 46 μ long, up to 10 at a node, involucrate.

Ceramium sp. 3

Stations: 18, on beach rock. Plants to 2mm high, sparingly and irregularly branched, apices straight, mature axis cells 125 μ diam., 187 μ long; mature cortical band 150 μ diam., 125 μ high with much secondary growth, cells usually round 13 μ , not organized into zones, not reproductive.

Ceramium sp. 4

Stations: 30, on coral debris. Plants creeping to erect, minute, rarely branched, apices straight; mature axis cells 33 μ diam., 90 μ long; mature cortical bands 43 μ diam., 24 μ high; cells irregular 8-13 μ , irregularly arranged into more or less three transverse zones, rhizoids occasional arising from the bands, not reproductive.

Ceramium sp. 5

Stations: 15, on *Microdictyon*. Plants to 3mm high, abundant dichotomous to alternate branching, apices straight; mature axis cells 163 μ wide 188 μ long, bulging; mature cortical bands 160 μ wide, 62 μ high; cells small highly irregular with some gland cells, not reproductive.

Ceratodictyon spongiosum Zanardini

Stations: DS 69.

Champia parvula (C. Agardh) Harvey

Stations: 3, 4, 7, 9b, 9c, 26, 29; DS 122a; Rhyne 810; on *Thalassia*, *Gelidium*, *Dictyosphaeria*, *Padina* and other algae.

Champia salicornoides Harvey

Stations: 21; DS 122b.

Champia sp.

Stations: 13; Plant fragmentary to 3cm high; .5-1mm diam., sparingly branched; not constricted at septa; wall of one layer, cells 34-84 μ long, 28 μ diam., small cells interspersed 10 μ diam., medullary filaments 5 μ diam.

Chondria dasyphylla (Woodward) C. Agardh

Stations: 4, rare. Plants are poorly developed.

Chondria simplicuscular Weber Van Bosse

Stations: 4, 5b, 5c, 7, 20, 25; a common component of turfs.

Chondria spp.

Four additional species of *Chondria* from the reef flat and lagoon floor are being studied.

Chrysymenia sp.

Stations: 11. Plants fragmentary but resemble *C. enteromorpha* Harvey but have cells twice the size.

Coelarthrum boergesenii Weber Van Bosse

Stations: 24, rare, in crevices. Gland cells are not distinctive or numerous.

Crouania minutissima Yamada

Stations: 11.

Cruoriella sp.

Stations: 4, 20; on calcareous debris from the reef flat and on *Conus* from a *Cymodocea* bed.

Cryptonemia crenulata J. Agardh

Stations: 15. Surface cells are slightly smaller than typical West Indian plants.

Dasya spp.

Three species of *Dasya* from the lagoon floor and algal ridge are being studied.

Dasyopsis geppii Weber Van Bosse

Stations: DS 95, 101.

Dictyurus maldivensis Hackett and Aregood

Stations: 13, 15; see Aregood and Hackett (1971).

Dictyurus purpurascens Bory in Belanger and Bory.

Stations: 24, 25, 26; DS 24.

Erythrocladia subintegra Rosenvinge

Stations: 7, 26; on *Valonia* and *Struvea* from crevices.

Erythrotrichia carnea (Dillwyn) J. Agardh

Stations: 4, 10, 25, 26, 30; on *Champia*, *Hypnea*, *Dictyota* and *Thalassia* from the reef flat, on *Pocockiella* from the lagoon floor.

Faucheia peltata Taylor

Stations: 6; DS 64.

Faucheia repens (C. Agardh) Montagne

Stations: 15.

Fosliella farinosa (Lamouroux) Howe

Stations: 4, 7, 9c, 26, 29; on *Cymodocea*, *Thalassia*, and various algae.

Fosliella sp. 1

Stations: 4, on *Padina* and *Dictyosphaeria*. Plants mostly three cell layers thick; cells 15 μ diam., 20 μ long, cap cells lacking; heterocysts 25-32 μ diam., 32-37 μ long, colorless, spherical to ovoid.

Fosliella sp. 2

Stations: 4, 12; on *Cymodocea* and *Valonia*. Plants mostly one cell layer thick; cells variable 10 μ diam., 15 μ long, cutting off cap cells that are prominent on the surfaces of immature conceptacles; heterocysts 12 μ diam., 26 μ long, not particularly distinctive.

Galaxaura filamentosa Chou

Stations: 26, on calcareous debris.

Galaxaura marginata (Ellis and Solander) Lamouroux

Stations: DS 104.

Galaxaura rudis Kjellman

Stations: DS 21.

Gelidiopsis sp.

Stations: 10. Plants fragmentary.

Gelidium crinale (Turner) Lamouroux

Stations: 9a, on roots of *Rhizophora mucronata*.

Gelidium divaricatum Martens

Stations: 20, 26; DS 72; in algal turfs.

Galidium pusillum (Stackhouse) Le Jolis var. *miniscula* Weber Van Bosse

Stations: 26.

Gelidiella sp.

Stations: 5c, 26, in algal turfs on *Acropora*.

Gracilaria corticata J. Agardh

Stations: 4, rare. Plants poorly developed.

Gracilaria sp.

Stations: 4, rare. Plants are poorly developed but resemble *G. verrucosa*. Central cells are smaller than typical and branches do not show the basal attenuation of Ceylon specimens.

Griffithsia rhizophora (Grünow) ex Weber Van Bosse

Stations: 24; DS 80; in algal turfs on *Dictyota*, *Caulerpa*, and *Hypnea*.

Griffithsia tenuis C. Agardh

Stations: 24, on *Halimeda*.

Goniolithon fosliei (Heydrich) Foslie

Stations: Foslie, Male.

Goniolithon frutescens Foslie

Stations: 4, 5a, 9b; DS 98, 113; Rhyne 798c, 828; Foslie, Male and Suvadiva.

- Goniolithon frutescens* Foslie f. *congesta* Foslie
Stations: 9b; Rhyne 820a; Foslie, Male and Suvadiva.
- Goniolithon laccadivicum* Foslie f. *typica* Foslie
Stations: Foslie, Male.
- Goniolithon myriocarpon* Foslie
Stations: Foslie, Male.
- Goniolithon reinboldi* (Weber Van Bosse and Foslie) Foslie
Stations: Foslie, Male.
- Goniolithon* sp.
Stations: 4, on *Goniolithon frutescens*.
- Haloplegma duperrayi* Montagne
Stations: 15.
- Halymenia durvillaei* Bory
Stations: 5a, 5d, 7; DS 121. Plants poorly developed and very rare.
- Herposiphonia crassa* Hollenberg ?
Stations: 9b, on Dictyota from coral rubble.
- Herposiphonia delicatula* Hollenberg
Stations: 9b, 21.
- Herposiphonia dendroidea* Hollenberg var. *minor* Hollenberg
Stations: 30.
- Herposiphonia filifera* Hollenberg
Stations: 15, 26.
- Herposiphonia obscura* Hollenberg
Stations: 11.
- Herposiphonia pacifica* Hollenberg
Stations: 5a, 5c, 9b, 20, 29; on Caulerpa and other algae.
- Herposiphonia parca* Setchell
Stations: 5c, 7, 24, 29; DS 78; in *Cymodocea* beds and on *Acropora*.
- Herposiphonia tenella* (C. Agardh) Schmitz
Stations: 24, on *Pocockiella*.
- Herposiphonia tenella* (C. Agardh) Schmitz f. *secunda* (C. Agardh)
Hollenberg
Stations: 24.
- Heteroderma lejolisii* (Rosanoff) Foslie
Stations: 5b, 7, 21, 24, 26, 28; on *Valonia*, *Chaetomorpha*, *Struvea*, *Valoniopsis*, *Chondria*, *Microcoleus* and other algae.

Heteroderma sp. 1

Stations: 5b, 7; on *Hypnea*, *Pocockiella* and *Valonia*. Plants one cell layer, initial branching dichotomous, cells rectangular; ultimate branching irregular but parallel, cells sigmoid 10 μ diam., 22 μ long. Adjacent branches form a reticulate pattern the lense shaped openings are formed by two sigmoid cells; cap cells but no heterocysts.

Heteroderma sp. 2

Stations: 5b, on *Chondria*. Plants one cell layer, in crusts to 125 μ wide, cells 7-12 μ diam., 10-17 μ long; crusts connected by irregularly branched filaments, cells 12 μ diam., 25-32 μ long; cap cells but no heterocysts.

Heteroderma sp. 3

Stations: 5b, 12; on *Valonia* and *Laurencia*. Plants one cell layer, mostly of fan-like reticulate crusts formed by dichotomous branching some plants with a more filamentous tendency, cells irregular 8-10 μ diam., 10-25 μ long; conceptacles 85 μ high, 50 μ basal diam., conical tapering to a single pore; cap cells but no heterocysts.

Heterosiphonia sp.

Stations: 13, 15. Plants with distinctive acute apices.

Hypnea esperi Bory

Stations: 3, 4, 5b, 7, 9c, 16, 20, 24, 26; DS 12, 18, 93; Rhyne 826.

Hypnea valentiae (Turner) Montagne

Stations: 4, 9b; DS 91; Rhyne 807.

Hypoglossum minimum Yamada

Stations: 10, 13, 22, 24.

Hypoglossum sp.

Stations: 28, on a tunicate. A single small spermantangial plant.

Jania capillacea Harvey

Stations: 4, 5b, 5c, 7, 9a, 9b, 10, 11, 17, 20, 22, 23, 25, 26, 29, 30; DS 11; Rhyne 809a. Plants are almost always a component of algal turfs, but best developed in *Cymodocea* beds. Two dredged fragments were probably washed from the reef.

Janua ungulata Yendo

Stations: 20, on *Turbinaria*.

Laurencia parvipapillata Tseng

Stations: 5b.

Laurencia spp.

Six additional species of *Laurencia* from the lagoon floor are being studied.

Leveillea jungermannioides (Martens and Hering) Harvey
Stations: 4, rare.

Lithophyllum kotschyannum Unger f. *typica* Foslie
Stations: 5b, 12; DS 92; Foslie, Male.

Lithophyllum kotschyannum Unger f. *madagascarensis* Foslie
Stations: Foslie, Male.

Lithophyllum kotschyannum Unger f. *subplicata* Foslie
Stations: Foslie, Male.

Lithophyllum kaiserii Heydrich f. *subplicata* Foslie
Stations: Foslie, Male.

Lithophyllum spp.
Three additional species of *Lithophyllum* are being studied.

Lithothamnion maldivicum Foslie
Stations: Foslie, Male.

Lithothamnion indicum Foslie f. *typica* Foslie
Stations: Foslie, Male, Addu and South Nilandu.

Lithothamnion fructiculosum (Kützing) Foslie f. *clavulata* Foslie
Stations: Foslie, Male and South Nilandu.

Lithothamnion spp.
Two additional species of *Lithothamnion* including DS 117 are being studied.

Lithoporella melobesioides (Foslie) Foslie
Stations: 4; Foslie, South Nilandu.

Lophocladia lallemandii (Montagne) Schmitz
Stations: 15.

Martensia fragilis Harvey
Stations: 10, 26.

Peyssonelia calcea Heydrich
Stations: 3, on *Acropora*.

Peyssonelia gunniana J. Agardh
Stations: DS 53.

Peyssonelia rubra (Greville) J. Agardh var. *orientalis* Weber Van Bosse
Stations: 12; Barton, Suvadiva.

Peyssonelia spp.
Five additional species of *Peyssonelia* from the reef flat are being studied.

Polysiphonia exilis Harvey

Stations: 24, with *Herposiphonia* on corals.

Polysiphonia ferulacea Suhringer in J. Agardh

Stations: DS 35a.

Polysiphonia flaccidissima Hollenberg

Stations: 21, 30.

Polysiphonia howei Hollenberg

Stations: 18.

Polysiphonia pentamera Hollenberg

Stations: 13.

Polysiphonia poko Hollenberg var. *langii* Hollenberg

Stations: DS 35.

Polysiphonia scopulorum Harvey var. *villum* J. Agardh

Stations: 7; DS 29, 98.

Polysiphonia sphaerocarpa Børgesen

Stations: 26.

Polysiphonia tepida Hollenberg

Stations: 21.

Polysiphonia upolensis (Grunow) Hollenberg

Stations: 30; DS 29c.

Porolithon craspedium (Foslie) Foslie f. *typica* Foslie

Stations: 12; Foslie, Male.

Porolithon craspedium (Foslie) Foslie f. *compressa* Foslie

Stations: Foslie, Male.

Porolithon craspedium (Foslie) Foslie f. *abbreviata* Foslie

Stations: 5b; Foslie, Male.

Porolithon gardineri (Foslie) Foslie f. *typica* Foslie

Stations: 12.

Porolithon onkodes (Heydrich) Foslie

Stations: 5b, 9b; DS 116: Foslie, Male.

Porolithon sp.

Stations: 5b, the prime constituent of the algal ridge. Plants are like *P. craspedium* in part, but are much encrusted and perforated and may be *P. gardineri* or *P. sequinoctale*.

Spermothamnion?

Stations: 5c, 6. Plants not reproductive.

Spyridia filamentosa (Wulfen) Harvey in Hooker
Stations: 5c; DS 97; Rhyne 808a.

Taenioma nanum (Kützing) Papenfuss
Stations: 26 in an algal turf on *Acropora*.

Tolypiocladia glomerulata (C. Agardh) Schmitz
Stations: 3, 4, 7, 20, 26, 30; DS 44; Rhyne 801, 819.

Wrangelia argus Montagne
Stations: 22, 25.

Vidalia serrata (Suhringer) J. Agardh
Stations: 26; DS 19.

Vidalia sp.
Stations: 16, 17, 20, 24; in crevices. Plants erect to 4cm, bushy and compact, axes flat to 1mm broad; cross section .3mm thick near margin, .37mm thick in center; alternately branched and ultimately spinulose; upper apices inrolled; faintly costate on staining; axis cells 100-200 μ long, 75-90 μ diam., pericentrals 5; two layers of cortical cells, outer 5 μ diam., 10 μ long usually in pairs; inner cells 100-125 μ long ovoid; gland cells ovoid 12 μ diam., 22 μ long often reaching the surface; spermatangial clusters near the apices.

Chlorophyceae

Acetabularia sp.
Stations: 4. A single immature specimen.

Anadyomene wrightii Gray
Stations: 5b, 10, on *Valoniopsis* in the algal ridge and lightly attached to sand on the lagoon floor.

Børgesenia forbesii (Harvey) Feldmann
Stations: 4, 30; DS 6; Rhyne 831.

Boodlea composita (Harvey) Brand
Stations: 5c, 18, 26; DS 94; Rhyne 799. Plants from northern atolls are smaller in all aspects than what is usually reported and resemble *B. struveoides* Howe. Addu plants are typical.

Boodlea van-bosseae Reinbold
Stations: 9b, 20, 30, on rubble or in algal turfs.

Boodlea sp.
Stations: DS 63. Plants minute, inner cells 22 μ diam., 58-72 μ long; ultimate cells 22 μ diam., 31 μ long, often curved, some smaller and rhizoidal; hapteral cells various but usually square 22 μ .

Bryopsis pennata Lamouroux

Stations: 26; DS 14, 54.

Bryopsis sp.

Stations: 21, on *Struvea*. Axis .25mm basal diam., .2mm diam. where ramuli diverge; ramuli alternate, 62 μ diam., 1.5mm long, basally constricted to 25 μ , obtuse, mature ramuli often septate at base or with ingrowths of the wall; plastids oval to spindle shaped connected by fine strands.

Caulerpa ambigua Okamura

Stations: 4, 19, 26, 30.

Caulerpa crassifolia (C. Agardh) J. Agardh

Stations: 13, 10, 11, 24.

Caulerpa lentillifera J. Agardh

Stations: DS 8b.

Caulerpa racemosa (Forskål) J. Agardh var. *clavifera* (Turner) Weber

Van Bosse f. *simplicissima* Børgesen

Stations: 9c; Rhyne 802a.

Caulerpa racemosa (Forskål) J. Agardh var. *macrophysa* (Kützing) Taylor

Stations: 7, 8, 9b, 22, 25, 26; DS 8a; Rhyne 811.

Caulerpa racemosa (Forskål) J. Agardh var. *microphysa* (Weber Van Bosse)

Taylor

Stations: 16.

Caulerpa racemosa (Forskål) J. Agardh var. *peltata* (Lamouroux) Eubank

Stations: 5b, 5c, 24, 26, 30; Rhyne 802(2).

Caulerpa serrulata (Forskål) J. Agardh var. *typica* (Weber Van Bosse)

Tseng

Stations: 8, 9b, 25, 30; DS 47; Rhyne 802(1), 812.

Caulerpa sertularioides (Gmelin) Howe

Stations: 16, 17.

Caulerpa taxifolia (Vahl) C. Agardh

Stations: 9c, 9b, 25; DS 10; Rhyne 803.

Caulerpa verticillata J. Agardh

Stations: 28.

Caulerpa sp.

Stations: 21. Plants as *C. serrulata* but with reduced serrations and no twisting.

Chaetomorpha brachygona Harvey

Stations: DS 66.

Chaetomorpha crassa (C. Agardh) Kützing

Stations: 4, 11, 15; DS 106; Rhyne 824.

Chaetomorpha gracilis Kützing

Stations: 10, 11, 13; DS 105.

Chaetomorpha javanica Kützing

Stations: 3, on coral with *Enteromorpha*.

Chaetomorpha linum (Müller) Kützing

Stations: 4, 11, 13, 28.

Chaetomorpha minima Collins and Hervey

Stations: 3, 15, 26, 30.

Chlorodesmis hildebrandtii A. and E. S. Gepp

Stations: 24, a single fragment.

Cladophora patentiramea (Montagne) Kützing?

Stations: 21.

Cladophora crystallina (Roth) Kützing?

Stations: 11, 13, 15, 21.

Cladophora inserta Dickie f. *ungulata* (Brand) Kützing?

Stations: 4, 7, 15, 30; epiphytic on various algae and *Cymodocea*.

Cladophora sp. 1

Stations: 4; DS 55; Rhyne 809, 832. Plants are similar to an undetermined species from Rongelap (Taylor 1950).

Cladophora sp. 2

Stations: 13, 28, on *Dictyota*, a *Pecten* shell and calcareous debris. Plants are microscopic, prostrate with branching only in the plane of the substrate; rhizoids terminating in a bulbous cell that deeply penetrates the substrate or adheres to the surface of other algae.

Cladophora spp.

Three additional species of *Cladophora* are being studied.

Cladophoropsis sp. 1

Stations: 10, 11, 15, 21, on *Struvea* and *Microdictyon*. Plants attached by the expanded to crenulate basal portion on the original coenocyte; in one plant basal portion developing colorless rhizoidal filaments; mature segments generally dichotomously branched, 90 μ diam., to 575 μ long; ultimate segments at least in younger parts moniliform without reference to septa; plastids discoid or associated.

Cladophoropsis sp. 2

Stations: 26, in algal turf. Plants fragmentary but resemble *C. suddanensis* Reinbold.

Cladophoropsis sp. 3

Stations: 26, on *Caulerpa*. Plants fragmentary and poorly developed but resemble *C. gracillima* Dawson.

Cladophoropsis sp. 4

Stations: 9b, 21. Plants creeping to erect, branching irregular to pectinate, often ending in rhizoids; rhizoidal segments 37-45 μ diam., 250-380 μ long, rarely to 2mm long; lower axis segments 100 μ diam., 250-270 μ long, obtuse.

Codium arabicum Kützting

Stations: 20, 26; DS 123.

Codium edule Silva

Stations: 24, 26: DS 22.

Derbesia attenuata Dawson

Stations: 24, 26, in algal turfs.

Derbesia sp. 1

Stations: 26, in algal turfs. Plants have smaller dimensions than *D. marina* (Lyngbye) Kjellman.

Derbesia sp. 2

Stations: 30; DS 73. Plants erect to 5mm not particularly lax irregular creeping axes 25-37 μ diam., erect axes dichotomous to alternate; reproductive axes 75 μ diam. tapering to 28 μ obtuse, rarely with septa; sporangia oval, 90 μ diam., 142 μ long at maturity; pedicle, as limited by septa, 20 μ diam., 12 μ long; plastids discoid, 5 μ diam.

Dictyosphaeria cavernosa (Forskål) Børgesen

Stations: 4, 5b, 18, 30; DS 40 as *D. intermedia* var. *intermedia*; Rhyne 830.

Enteromorpha compressa (L.) Greville

Stations: 3, 9b, 16; DS 68.

Enteromorpha prolifera (Müller) J. Agardh subsp. *prolifera* typus III

Stations: 23, floating in calm water.

Enteromorpha spp.

Five additional species of *Enteromorpha* from the reef flat are being studied.

Entocladia viridis Reinke

Stations: 4, 5c, 15, 30; in the sheath of *Polysiphonia*, *Champia*, *Lurencia*, *Schizothrix* and on hydroids.

Gomontia polyrhiza (Lagerheim) Bornet and Flahault

Stations: 4, 5a, 9b; in corals, shells, and calcareous debris.

Gomontia sp.

Stations: 16, 28; in shells. Axes and branching highly irregular, cells 12-18 μ diam., 20-55 μ long, some empty others with spores, but not otherwise modified as sporangia, spores round 5 μ .

Specimens of *Halimeda* are being studied by Colinvaux but the following have been reported.

Halimeda discoidea Decaisne

Stations: DS 1.

Halimeda copiosa Goreau and Graham

Stations: 15, 21. See Colinvaux (1968), as *H. hederacea*.

Halimeda incrassata (Ellis) Lamouroux

Stations: DS 26, 75, 108; Barton, Addu.

Halimeda opuntia (L.) Lamouroux

Stations: DS 2a, 3, 4; Barton, Addu.

Halimeda tuna (Ellis and Solander) Lamouroux

Stations: Barton, Suvadiva.

Microdictyon pseudohapteron Gepp and Gepp

Stations: 5a, 9b, 11, 13, 15; *M. pseudohapteron* f. *luciparense* Setchell is the only Maldivian alga reported by Newton (1953) for the John Murray Expedition. It was dredged from the lagoon floor of Mulaku (Mulakadu) Atoll.

Microdictyon sp. 1

Stations: 11, 13, 15; several unreported fragments are in the British Museum collection from the lagoons of Addu and Suvadiva. They were dredged during the J. Stanley Gardiner Expedition. Plants resemble *M. agardhianum*.

Microdictyon sp. 2

Stations: 10, 21. Plants belong to the *Eumicrodictyon* section of the genus.

Microdictyon sp. 3

Stations: 21, on *Halimeda*. Plants belong to the *Calodictyon* section of the genus and resemble *M. japonicum*.

Neomeris annulata Dickie

Stations: 21.

Neomeris mucosa Howe

Stations: DS 102.

Ostreobium brabantium Weber Van Bosse

Stations: 4, 17, 28; in *Pecten* and *Tellina* shells, dead corals and in coralline algae.

Ostreobium reineckeii Bornet

Stations: 4, 9b, 28, 16, 17, 19; in *Pecten* and other shells, dead corals and coralline algae.

Pseudochlorodesmis furcellata (Zanardini) Børgesen

Stations: 7, on *Halimeda*.

Rhipidiphyllon?

Stations: 5b, on *Valonia*. Plants as *R. reticulatum* (Askenasy) Heydrich but anastomosing with distal crenulations or fibulae rather than annulations.

Spongomorpha?

Stations: 6, 30; Plants are boodleoid with terminal cells from 1.1 to 2.7mm long.

Struvea anastomosans (Harvey) Piccone et Grunow ex Piccone

Stations: 3, 6, 10, 18, 21, 24, 26.

Tydemania expeditionis Weber Van Bosse

Stations: Glomeruliferous plants 3, 17, DS 32; Flabellate plants 6.

Udotea javensis (Montagne) A. and E. S. Gepp

Stations: 21, 24, 26, 28, 30.

Udotea orientalis A. and E. S. Gepp

Stations: DS 15; . Rhyne 800, 817. Probably a seasonal alga.

Ulvella lens Crouan

Stations: 4, 5b, on *Cymodocea*, *Chaetomorpha* and *Dictyosphaeria*.

Valonia aegagropila C. Agardh

Stations: 5a, 30.

Valonia utricularis (Roth) C. Agardh

Stations: DS 103, 111; Barton, Suvadiva.

Valonia ventricosa J. Agardh

Stations: 6, 7, 10, 11, 12, 15, 21; DS 52.

Valoniopsis pachynema (Martens) Børgesen

Stations: 5; DS 99, 118, as *Cladophoropsis* sp.

Phaeophyceae*Dictyopteris repens* (Okamura) Børgesen

Stations: 11, 12, 13, 15, 26; Barton, Suvadiva, as *Haliseris delicatula*. Some plants are monostromatic and may represent a second entity.

Dictyota patens J. Agardh

Stations: 7, 24, 26, 30; DS 5b, as *Dictyota* sp.

Dictyota bartayresii Lamouroux

Stations: Rhyne 789, 789b, 820; DS 5a, as *D. friabilis*; Barton, Addu.

Dictyota spp.

Two additional species of *Dictyota* including DS 70 [as *D. friabilis* in Tsuda and Newhouse (1966)] are being studied.

Ectocarpus indicus Sonder

Stations: 9b, 25, 26, 30. Plants well developed at Addu only.

Ectocarpus irregularis Kützing

Stations: 12, on *Porolithon*.

Ectocarpus variabilis Vickers

Stations: 25, on *Thalassia*.

Hydroclathrus clathratus (Bory) Howe

Stations: DS 45; Rhyne 890b. Probably a seasonal alga.

Padina commersonii Bory

Stations: 4, 7, 15, 21.

Padina sp.

Stations: 25; DS 17. Plants are thicker than the previous and oogonia are non indusiate.

Pocockiella variegata (Lamouroux) Papenfuss

Stations: 4, 5b, 6, 7, 9b, 10, 11, 12, 15, 21, 24, 26, 29.

Rosenvingea intricata (J. Agardh) Børgesen

Stations: Rhyne 798a on *Thalassia*. Probably a seasonal alga.

Sargassum sp.

Stations: 5b, on *Lithophyllum*. Plants to 1 cm high.

Spatoglossum sp.

Stations: 15. Plants lack a differentiated epidermal layer but otherwise resemble *S. cornigerum* J. Agardh.

Sphacelaria novae-hollandiae Sonder

Stations: 5a, 12, 25, 26.

Sphacelaria tribuloides Meneghini

Stations: 13, 24, 30. Germinating propagulae are common, but mature plants are rare and poorly developed.

Turbinaria ornata (Turner) J. Agardh var. *ornata* f. *evesiculosa* (Barton) Taylor

Stations: 4, 7, 20, 24, 26, 29, in well protected crevices and *Cymodocea* beds.

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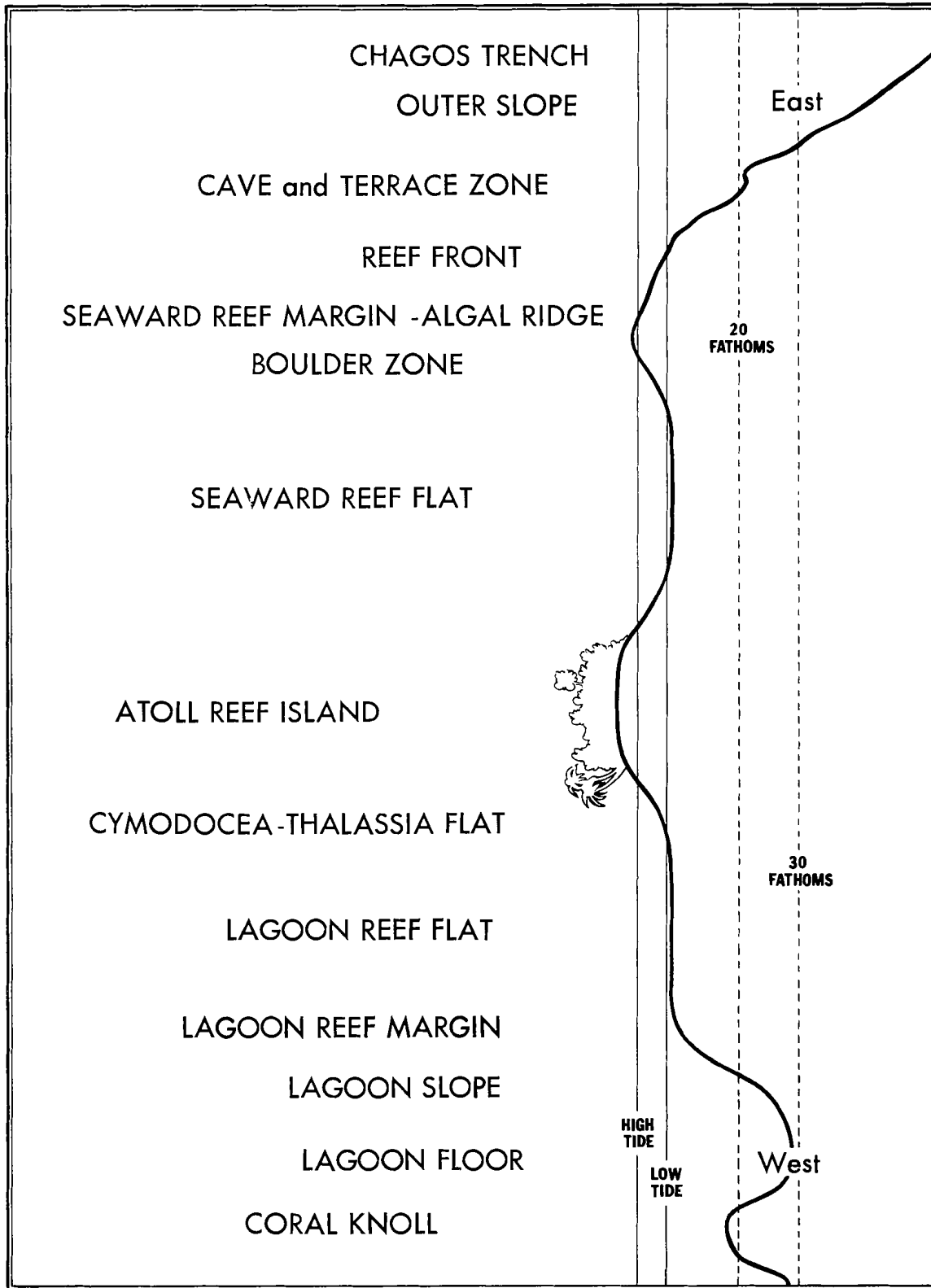


Fig. 1. A composite cross section of the conspicuous features of a large Maldivian Atoll from the eastern side of the archipelago. Eastern half of the atoll.

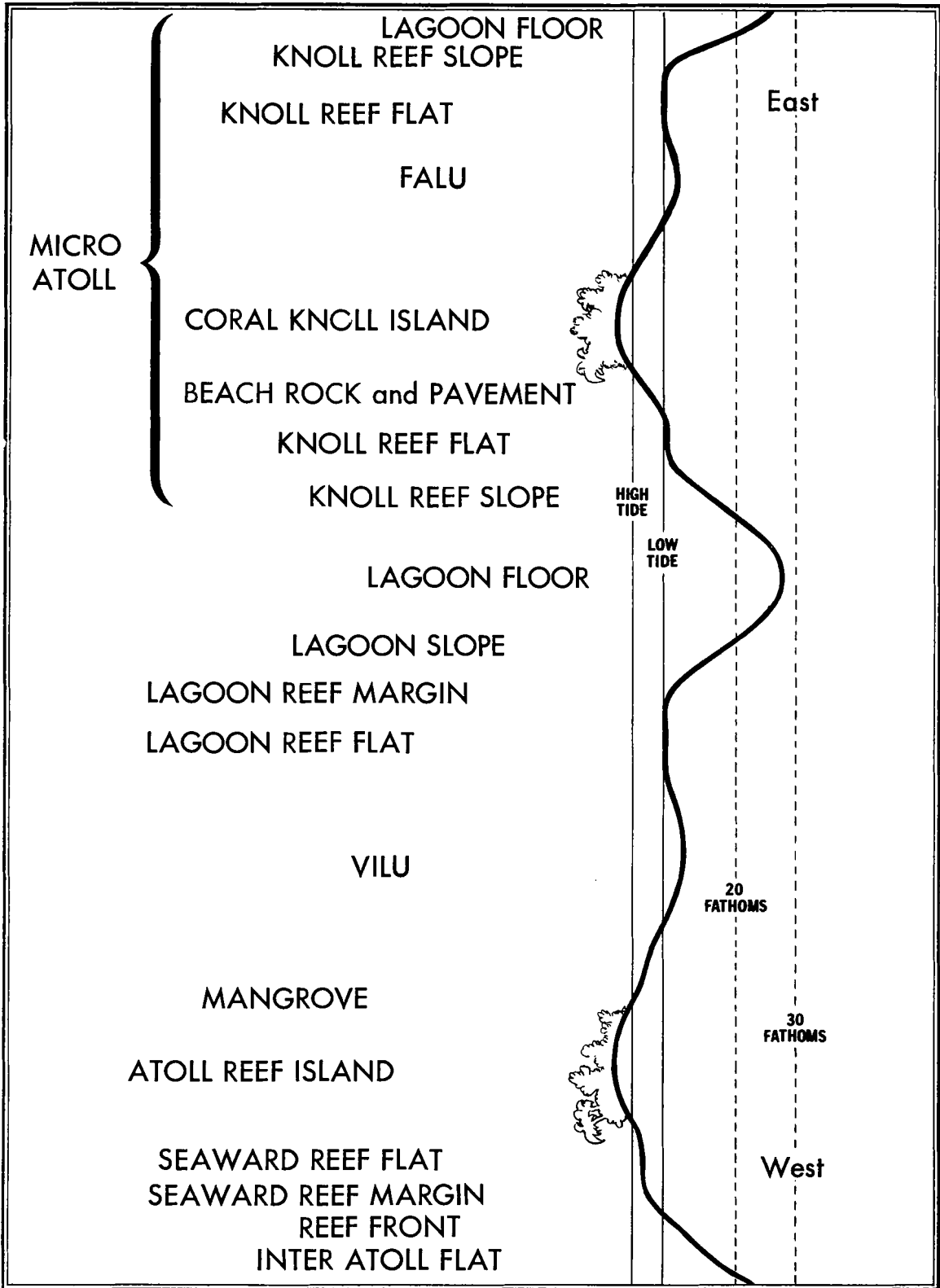


Fig. 2. A composite cross section of the conspicuous features of a large Maldivian Atoll from the eastern side of the archipelago. Western half of the atoll.