

ATOLL RESEARCH BULLETIN

No. 155

SOME MARINE BENTHIC ALGAE FROM TRUK AND KUOP, CAROLINE ISLANDS

by Roy T. Tsuda

Issued by

THE SMITHSONIAN INSTITUTION

Washington, D. C., U. S. A.

December 31, 1972

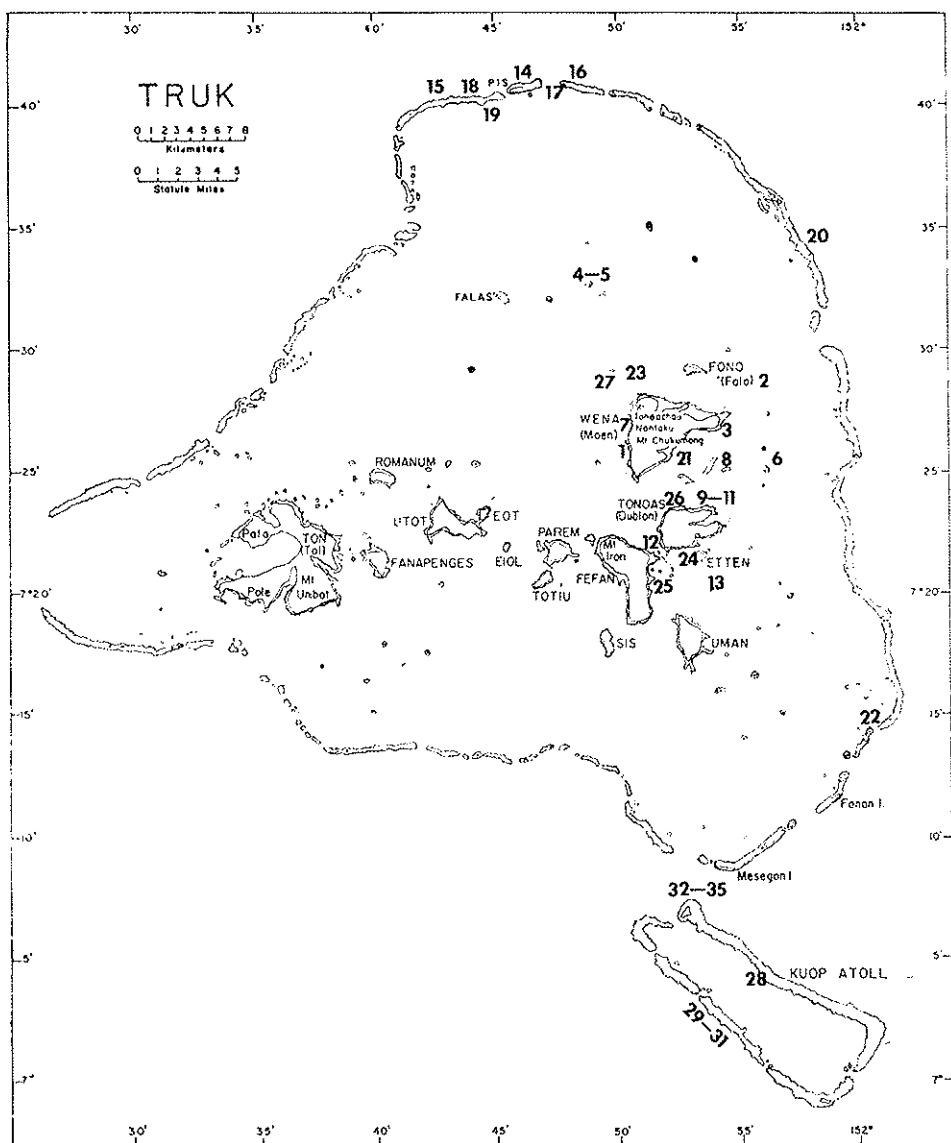


Figure 1. Map of Truk and Kuop showing collecting sites (map taken from Gressitt, 1954).

SOME MARINE BENTHIC ALGAE FROM TRUK AND KUOP, CAROLINE ISLANDS¹

by Roy T. Tsuda²

INTRODUCTION

Truk (Fig. 1) consists of a lagoon, with about 40 volcanic islands and several reef patches, encircled by a barrier reef. The lagoon is from 45 to 65 kilometers in diameter and ranges in depth to 75 meters. Fringing reefs prevail along the coast of the larger lagoon islands. Wave-washed benches, which are present along the windward coast of non-lagoon volcanic islands, are absent. The barrier reef with its numerous passages is about 225 km in circumference and has approximately 50 small coral islets. Most of the barrier reef is awash during low tides. Kuop Atoll lies only three km south of the southernmost terminus of the Truk barrier reef and for the purpose of algal distribution is merely a southern extension of Truk.

Past records of marine benthic algae from Truk can be found in seven publications, while marine algae from Kuop Atoll have not been reported to date. The first paper to list marine algae from Truk was published by Okamura (1916) who cites 27 species. In a systematic compilation of 484 species of marine algae from the Pacific Ocean, Schmidt (1928) includes all the species reported by Okamura and four additional species from Truk.

During the summer of 1960, Mr. Ernani Menez, presently with the Smithsonian Oceanographic Sorting Center, made a rather extensive collection of marine benthic algae from several islands in the Caroline Islands while a member of the Miami University-Collegiate Rebel Expedition to Micronesia. The collections were stored in the Department of Botany of the University of Hawaii until 1964 when Dr. Gavino Trono, Jr., presently with the University of the Philippines, undertook the task of identifying the specimens as part of his Ph.D. dissertation under the direction of Dr. Maxwell S. Doty. In the same year, Dr. George J. Hollenberg of the University of Redlands arrived at the University of Hawaii to resume his studies on the red algal genera *Polysiphonia* and *Herposiphonia*, and incorporated those specimens that he had examined from the Caroline Islands into his papers (Hollenberg, 1968a, 1968b, 1968c). These publications include four species of *Polysiphonia* and four species of *Herposiphonia* from Truk. The results of Dr. Trono's study on the marine benthic algae from the Caroline Islands were published in two parts. Part I (Trono, 1968) lists 42 species of blue-green and green algae from Truk, while Part II (Trono, 1969) includes 48 species of brown and red algae from Truk and also incorporates the eight species reported by Dr. Hollenberg. Altogether, in the above mentioned papers, 102 species of marine benthic algae have been reported from Truk.

Recently, opportunities to make additional collections of marine algae on Truk and Kuop have arisen in conjunction with the "crown-of-thorns" starfish, *Acanthaster planci*, studies in Micronesia. Mr. Richard H. Randall of the University of Guam took the initiative to make a

¹Contribution No. 12, Micronesian Institute for the Natural Sciences, University of Guam.

²The Marine Laboratory, University of Guam, Agana, Guam 96910.

(Manuscript received Nov. 1970--Eds.)

moderate collection of marine algae from Truk and Kuop during the Westinghouse *Acanthaster* survey in the summer of 1969. The following summer, the author was able to make additional collections of algae when he participated as member of the University of Guam's *Acanthaster* monitoring team.

The purpose of this paper is to provide a checklist of the species collected by Mr. Randall and the author. Seven additional specimens collected by Mr. Asterio Takesy, formerly a student at the University of Guam, are also incorporated in this paper.

ACKNOWLEDGEMENT

The author is grateful to Mr. Wyman X. Zachary, Director of Resources and Development, and to Mr. Peter T. Wilson, Fisheries Management Biologist, both of the Trust Territory of the Pacific Islands, for their financial and logistic support during the author's stay on Truk. The author acknowledges the help of Dr. Robert S. Jones, Director of the University of Guam's Marine Laboratory, Mr. M. Rodney Struck, staff member of the University of Guam's Marine Laboratory, and Mr. Milton McDonald, Starfish Control Specialist for Trust Territory, who served as diving companions and at times contributed specimens to the overall collections.

STATION DESCRIPTIONS

The following is a listing of the 35 algal collecting stations which can be located on Fig. 1. The stations for Truk and Kuop are numbered consecutively but are separated merely for convenience. Information for each station includes 1) the specific island from which the collection was made, 2) a brief description of the habitat, i.e., zone and depth, 3) name of collector, 4) date of collection and 5) the collection number(s) assigned to the algae at each station.

Truk ($7^{\circ}28'N$, $151^{\circ}52'E$)

- STATION 1: Moen I., Mwaan Village, reef flat, 1 m deep, legit A. Takesy, May, 1969 (RT 2856-2861).
- 2: Osakura I., lagoon slope, 7 m deep on dead coral rubble, legit R.H. Randall, July 6, 1969 (RHR 359).
- 3: Moen I., east end, lagoon slope, 3-7 m deep on dead coral rubble, legit Randall, July 7, 1969 (RHR 369).
- 4: Fanuet I., reef margin, nearly awash, legit Randall, July 10, 1969 (RHR 371).
- 5: Fanuet I., lagoon slope, 3 m deep attached to dead *Acropora*, legit Randall, July 10, 1969 (RHR 372).
- 6: Herit I., reef flat and lagoon slope, .3-3 m deep, legit Randall, July 18, 1969 (RHR 368).
- 7: Moen I., Government Dock outside of Fisheries Office, .5 m deep on cement wall, legit R.T. Tsuda, June 13, 1970 (RT 3367-3368).
- 8: Yanagi I., west lagoon slope, 10-17 m deep on dead *Acropora* and coral rubble, legit Tsuda, June 13, 1970 (RT 3370-3387).
- 9: Dublon I., north reef flat, .3 m deep on dead coral and sand, legit Tsuda, June 13, 1970 (RT 3388-3402).

- STATION 10: Dublon I., north lagoon slope, 3-7 m deep in live *Acropora* bed, legit Tsuda, June 13, 1970 (RT 3405-3408).
- 11: Dublon I., north lagoon floor, 17 m deep on coral rubble and sand, legit R.S. Jones, June 13, 1970 (RT 3413-3415).
- 12: Reef patch, .5 km SW of Dublon I., 2 m deep, legit Tsuda, June 14, 1970 (RT 3416-3417).
- 13: Sunken Japanese Ship, ca. 4 km SE of Etten I., 20-30 m deep, legit Tsuda, June 14, 1970 (RT 3419-3434).
- 14: Pis I., seaward side, intertidal zone, legit Tsuda, June 15, 1970 (RT 3437-3441).
- 15: Pis I., west of channel, seaward reef margin (exposed) and seaward reef front (1 m deep), legit Tsuda, June 16, 1970 (RT 3442-3449).
- 16: Pis I., east of channel, seaward slope, 15-35 m deep, legit Tsuda, June 16, 1970 (RT 3451-3461).
- 17: North Pass, channel slope, 10-30 m deep, legit Tsuda, June 17, 1970 (RT 3462-3463).
- 18: Pis I., west of channel, seaward slope, 45 m deep on dead coral, legit Tsuda, June 17, 1970 (RT 3465-3466).
- 19: Pis I., boat harbor, 1 m deep near shore, legit Tsuda, June 17, 1970 (RT 3467).
- 20: Liball I., reef flat, .3-1 m deep, legit Tsuda, June 17, 1970 (RT 3469-3487).
- 21: Moen I., Wiicap, mangrove area, reef flat and reef front, .3-2 m deep, legit Tsuda, June 18, 1970 (RT 3488-3505).
- 22: Salat I., east coast, lagoon slope, 5 m deep, legit Tsuda, June 19, 1970 (RT 3508-3514).
- 23: Drift, north of Moen I., legit Tsuda, June 19, 1970 (RT 3515).
- 24: Etten I., reef flat, .5-1 m deep, legit Tsuda, June 20, 1970 (RT 3518-3519).
- 25: Sunken Japanese Destroyer, east coast of Fefan I., 10-30 m deep, legit Tsuda, June 20, 1970 (RT 3520-3535).
- 26: Sunken Japanese Tanker, northwest coast of Dublon I., 10-30 m deep, legit Tsuda, June 20, 1970 (RT 3536-3546).
- 27: Scheiben I., lagoon slope, 7 m deep, legit Tsuda, June 23, 1970 (RT 3558-3561).

Kuop (6°59' N, 151°59' E)

- 28: Lagoon reef, 1-2 m deep on sand and coral, legit Randall, July 12, 1969 (RHR 360).
- 29: Southwest side of atoll, seaward reef front, 7 m deep, legit Randall, July 13, 1969 (RHR 364).

- STATION 30: Southwest side of atoll, seaward reef margin, awash, legit Randall, July 13, 1969 (RHR 365a).
- 31: Southwest side of atoll, seaward reef front, 7 m deep, legit Randall, July 13, 1969 (RHR 365b-d).
- 32: Northwest side of atoll, seaward submarine cliff, 16-40 m deep, legit Randall, July 13, 1969 (RHR 366).
- 33: Northwest side of atoll, seaward submarine cliff, 3-16 m deep, legit Randall, July 13, 1969 (RHR 367).
- 34: Northwest side of atoll, seaward reef flat and margin, exposed to .3 m deep, legit Tsuda, June 21, 1970 (RT 3547-3550).
- 35: Northwest side of atoll, seaward submarine cliff, 10-30 m deep, legit Tsuda, June 21, 1970 (RT 3552-3557).

SPECIES LISTING

The following list includes specimens collected by A. Takesy (May 1969), R.H. Randall (July 1969) and the author (June 1970). All specimens are catalogued in the University of Guam Herbarium. Species preceded by an asterisk represent new records from Truk.

DIVISION CYANOPHYTA (blue-green algae)

Order Oscillatoriales

**Calothrix confervicola* (Roth) Ag.

TRUK: Sta. 15 (RT 3443).

**Hormothamnion solutum* Bornet & Flahault

TRUK: Sta. 21 (RT 3488).

Microcoleus lyngbyaceus (Kütz.) Crouan

TRUK: Sta. 6 (RHR 368e), Sta. 8 (RT 3370, RT 3382), Sta. 9 (RT 3399), Sta. 13 (RT 3430), Sta. 22 (RT 3510), Sta. 25 (RT 3523).

The specimens vary from 13 to 40 μ in diameter.

Schizothrix calcicola Gomont

TRUK: Sta. 8 (RT 3371).

The specimen appears as a gelatinous ball with individual filaments 1 to 1.5 μ in diameter.

**Schizothrix mexicana* Gomont

TRUK: Sta. 4 (RHR 371a), Sta. 8 (RT 3383), Sta. 15 (RT 3445), Sta. 22 (RT 3511).

**Spirulina subsalsa* Gomont

TRUK: Sta. 9 (RT 3399, intermixed with *Microcoleus lyngbyaceus*).

DIVISION CHLOROPHYTA (green algae)

Order Ulotrichales

**Enteromorpha clathrata* (Roth) Ag.

TRUK: Sta. 14 (RT 3441).

The specimen consists of an immature branched thallus about 5 mm high.

Order Cladophorales

Rhizoclonium samoense Setchell

TRUK: Sta. 14 (RT 3439).

Order Siphonales

Bryopsis pennata Lamx.

TRUK: Sta. 20 (RT 3470), Sta. 25 (RT 3528).

**Caulerpa ambigua* Okamura

TRUK: Sta. 13 (RT 3433b).

Caulerpa brachypus Harvey

TRUK: Sta. 8 (RT 3372), Sta. 13 (RT 3426), Sta. 25 (RT 3529), Sta. 26 (RT 3541).

The latter three specimens collected from sunken ships possess thin delicate elongated blades.

Caulerpa cupressoides (West) C. Ag.

TRUK: Sta. 9 (RT 3396).

**Caulerpa filicoides* Yamada

TRUK: Sta. 13 (RT 3425), Sta. 26 (RT 3546).

This species was one of the most dominant algae found on the sunken ships.

Caulerpa lentillifera J. Ag.

TRUK: Sta. 11 (RT 3413), Sta. 13 (RT 3429), Sta. 26 (RT 3544).

Caulerpa racemosa (Forskål) J. Ag.

TRUK: Sta. 6 (RHR 368b), Sta. 8 (RT 3373), Sta. 9 (RT 3392), Sta. 18 (RT 3465), Sta. 20 (RT 3473), Sta. 21 (RT 3492), Sta. 25 (RT 3525, RT 3533).

KUOP: Sta. 35 (RT 3555).

Caulerpa serrulata (Forskål) J. Ag.

TRUK: Sta. 19 (RT 3467), Sta. 22 (RT 3513).

KUOP: Sta. 35 (RT 3554).

Caulerpa sertularioides (Gmel.) Howe

TRUK: Sta. 9 (RT 3390), Sta. 21 (RT 3495), Sta. 26 (RT 3540).

Caulerpa taxifolia (Vahl) C. Ag.

TRUK: Sta. 20 (RT 3481).

Caulerpa urvilliana Montagne

TRUK: Sta. 20 (RT 3476).

KUOP: Sta. 28 (RHR 360b).

**Caulerpa verticillata* J. Ag.

TRUK: Sta. 21 (RT 3496).

Chlorodesmis fastigiata (C. Ag.) Ducker

TRUK: Sta. 16 (RT 3460).

KUOP: Sta. 34 (RT 3549).

Chlorodesmis hildebrandtii A. & E.S. Gepp

TRUK: Sta. 16 (RT 3491, epiphytic on *Halimeda*).

Codium edule Silva

TRUK: Sta. 15 (RT 3446).

This specimen consists of only a fragment about 3 cm long.

**Halimeda copiosa* Goreau & Graham

TRUK: Sta. 6 (RHR 368c), Sta. 10 (RT 3406), Sta. 12 (RT 3416), Sta. 13 (RT 3422, RT 3427b), Sta. 16 (RT 3459), Sta. 25 (RT 3532), Sta. 26 (RT 3545).

KUOP: Sta 31 (RHR 365b), Sta. 32 (RHR 366a), Sta. 35 (RT 3553).

Halimeda cylindracea Decaisne

TRUK: Sta 21 (RT 3505), Sta. 22 (RT 3508), Sta 24 (RT 3519), Sta 27 (RT 3560).

Halimeda discoidea Decaisne

TRUK: Sta. 8 (RT 3374), Sta. 9 (RT 3391), Sta. 13 (RT 3427), Sta. 16 (RT 3458), Sta. 20 (RT 3480), Sta. 25 (RT 3521), Sta. 26 (RT 3537).

KUOP: Sta. 29 (RHR 364c)

**Halimeda gigas* Taylor

TRUK: Sta. 8 (RT 3375), Sta. 11 (RT 3415), Sta. 13 (RT 3421), Sta. 21 (RT 3493), Sta. 26 (RT 3543).

**Halimeda gracilis* Harvey

TRUK: Sta. 15 (RT 3447), Sta. 17 (RT 3462).

KUOP: Sta. 29 (RHR 364a).

Halimeda incrassata (Ellis) Lamx.

TRUK: Sta. 7 (RT 3667), Sta. 8 (RT 3377), Sta. 10 (RT 3405), Sta. 16 (RT 3456), Sta. 21 (RT 3501), Sta. 26 (RT 3536), Sta. 27 (RT 3559).

KUOP: Sta 29 (RHR 364b), Sta. 31 (RHR 365c).

Halimeda macroloba Decaisne

TRUK: Sta. 9 (RT 3388), Sta. 21 (RT 3494).

Halimeda macrophysa Askenasy

TRUK: Sta. 10 (RT 3408), Sta. 16 (RT 3457), Sta. 25 (RT 3520), Sta. 27 (RT 3553).

**Halimeda micronesica* Yamada

TRUK: Sta. 20 (RT 3479).

KUOP: Sta. 29 (RHR 364d).

Halimeda opuntia (L.) Lamx.

TRUK: Sta. 4 (RHR 371b), Sta. 8 (RT 3384), Sta. 9 (RT 3397), Sta. 20 (RT 3478).

**Halimeda simulans* Howe

TRUK: Sta. 9 (RT 3389), Sta. 21 (RT 3497).

**Halimeda stuposa* Taylor

TRUK: Sta. 20 (RT 3482).

KUOP: Sta. 28 (RHR 360a).

Rhipilia orientalis A. & E.S. Gepp

TRUK: Sta. 8 (RT 3380), Sta. 25 (RT 3523), Sta. 26 (RT 3542).

**Rhipilia tomentosa* Kutz.

TRUK: Sta. 16 (RT 3455).

Specimen heretofore known only from the Atlantic Ocean represents the first record from the Pacific region.

Tydemania expeditionis Weber van Bosse

TRUK: Sta. 8 (RT 3386), Sta. 13 (RT 3420, RT 3423), Sta. 25 (RT 3524).

Both the flabellate and the glomerulous forms are represented in the collections. The flabellate form was dominant on the sunken Japanese ships.

Udotea argentea Zanardini

TRUK: Sta. 8 (RT 3379), Sta. 25 (RT 3522).

KUOP: Sta. 28 (RHR 360d), Sta. 32 (RHR 366d).

**Udotea geppii* Yamada

TRUK: Sta. 13 (RT 3419), Sta. 25 (RT 3530).

KUOP: Sta. 28 (RHR 360e), Sta. 35 (RT 3552).

**Udotea palmetta* Decaisne

TRUK: Sta. 20 (RT 3475).

KUOP: Sta. 28 (RHR 360f).

Order Siphonocladales

Boergesenia forbesii (Harv.) Feldmann

TRUK: Sta. 22 (RT 3509).

Cladophoropsis membranacea (Ag.) Boerg.

TRUK: Sta. 22 (RT 3512).

**Dictyosphaeria cavernosa* (Forskål) Boerg.

TRUK: Sta. 13 (RT 3424), Sta. 20 (RT 3484).

KUOP: Sta. 34 (RT 3550).

Microdictyon okamurae Setchell

TRUK: Sta. 2 (RHR 359c), Sta. 20 (RT 3477).

KUOP: Sta. 28 (RHR 360c), Sta. 33 (RHR 367b), Sta. 35 (RT 3556).

Valonia ventricosa J. Ag.

TRUK: Sta. 8 (RT 3381).

Order Dasycladales

**Acetabularia clavata* Yamada

TRUK: Sta. 15 (RT 3444b).

The collection is represented by a single specimen, 1 mm high.

Neomeris vanbosseae Howe

TRUK: Sta. 14 (RT 3440), Sta. 20 (RT 3472), Sta. 21 (RT 3503).

DIVISION PHAEOPHYTA (Brown algae)

Order Dictyotales

Dictyopteris repens (Okamura) Boerg.

TRUK: Sta. 13 (RT 3431), Sta. 15 (RT 3444a), Sta. 16 (RT 3451).

**Dictyota apiculata* J. Ag.

TRUK: Sta. 16 (RT 3452), Sta. 21 (RT 3500b).

**Dictyota bartayresii* Lamx.

TRUK: Sta. 5 (RHR 372b), Sta. 8 (RT 3385), Sta. 11 (RT 3414), Sta. 13 (RT 3434), Sta. 24 (RT 3518), Sta. 26 (RT 3539), Sta. 27 (RT 3561).

**Dictyota patens* J. Ag.

TRUK: Sta. 4 (RHR 371c), Sta. 21 (RT 3500a).

Lobophora variegata (Lamx.) Womersley

TRUK: Sta. 5 (RHR 372c), Sta. 8 (RT 3387), Sta. 13 (RT 3428), Sta. 15 (RT 3449), Sta. 16 (RT 3454), Sta. 18 (RT 3466), Sta. 20 (RT 3471, RT 3483).

Padina boryana Thivy

TRUK: Sta. 7 (RT 3368), Sta. 9 (RT 3398), Sta. 21 (RT 3502).

**Padina* sp.

TRUK: Sta. 8 (RT 3378), Sta. 13 (RT 3432), Sta. 20 (RT 3487, sterile), Sta. 25 (RT 3531).

**Zonaria hawaiiensis* Doty & Newhouse

TRUK: Sta. 8 (RT 3376).

The specimen represents the first collection made outside of Hawaii where it was originally described as a new species.

Order Dictyosiphonales

Hydroclathrus clathratus (Bory) Howe

TRUK: Sta. 9 (RT 3400), Sta. 21 (RT 3499).

Order Fucales

**Sargassum duplicatum* J. Ag.

TRUK: Sta. 23 (RT 3515).

**Sargassum* sp.

TRUK: Sta. 6 (RHR 368c).

This specimen resembles *S. duplicatum* except for a cylindrical stem.

Turbinaria ornata (Turn) J. Ag.

TRUK: Sta. 9 (RT 3393), Sta. 14 (RT 3438), Sta. 15 (RT 3448).

KUOP: Sta. 30 (RHR 365a).

DIVISION RHODOPHYTA (red algae)

Order Nemalionales

Actinotrichia fragilis (Forskål) Boerg.

TRUK: Sta. 2 (RHR 359f), Sta. 21 (RT 3489).

**Galaxaura fasciculata* Kjellman

TRUK: Sta. 12 (RT 3417), Sta. 25 (RT 3535).

**Galaxaura fastigiata* Decaisne

TRUK: Sta. 25 (RT 3527).

**Galaxaura oblongata* (Ellis & Solander) Lamx.

TRUK: Sta. 2 (RHR 359e).

Order Cryptonemiales

Amphiroa foliacea Lamx.

TRUK: Sta. 2 (RHR 359d), Sta. 3 (RHR 369).

Fosliella farinosa (Lamx.) Howe

KUOP: Sta. 32 (RHR 366g, epiphytic on *Lobophora variegata*).

**Halymenia* sp.

TRUK: Sta. 2 (RHR 359a).

**Jania capillacea* Harvey

TRUK: Sta. 15 (RT 3443, epiphytic on *Turbinaria ornata*).

**Metagoniolithon* sp.

TRUK: Sta. 2 (RHR 359b), Sta. 21 (RT 3504), Sta. 25 (RT 3534).

Further studies are being made on this species which represents the first collection of this genus outside of Australia.

**Peyssonnelia rubra* (Grev.) J. Ag.

TRUK: Sta. 2 (RHR 359a), Sta. 16 (RT 3461).

**Porolithon craspedium* (Foslie) Foslie

KUOP: Sta. 31 (RHR 365d).

Order Gigartinales

Ceratodictyon spongiosum Zanardini

TRUK: Sta. 14 (RT 3437).

Gelidiopsis intricata (Ag.) Vickers

TRUK: Sta. 9 (RT 3401).

Hypnea esperi Bory

KUOP: Sta. 32 (RHR 366e).

Order Rhodymeniales

Champia compressa Harv.

TRUK: Sta. 13 (RT 3433a, epiphytic on *Halimeda*).

Order Ceramiales

**Acanthophora spicifera* (Vahl) Boerg.

KUOP: Sta. 32 (RHR 366c), Sta. 34 (RT 3548a).

**Crouania minutissima* Yamada

TRUK: Sta. 20 (RT 3469).

**Dasyopsis pilosa* Weber van Bosse

KUOP: Sta. 32 (RHR 366f).

Herposiphonia delicatula Hollenberg

KUOP: Sta. 34 (RT 3547).

**Hypoglossum attenuatum* Gardner

TRUK: Sta. 26 (RT 3538).

Laurencia majuscula (Harv.) Lucas
TRUK: Sta. 20 (RT 3485).

**Laurencia parvipapillata* Tseng
KUOP: Sta. 34 (RT 3548b).
This species is represented by a single fragment, 1 cm long.

**Polysiphonia scopulorum* Harvey
TRUK: Sta. 20 (RT 3474).
KUOP: Sta. 28 (RHR 360g).

Tolyptiocladia glomerulata (Ag.) Schmitz & Hauptfleisch
TRUK: Sta. 9 (RT 3395, epiphytic on *Halimeda discoidea*).

**Vanvoorstia* sp.
TRUK: Sta. 16 (RT 3453), Sta. 17 (RT 3463).
Preliminary examination seems to indicate that the specimens may represent a new species.

DISCUSSION

Eighty-five species of marine benthic algae are reported in this paper. Forty-one species or 48 percent of the listed species represent new records for the Truk area. These species consist of 4 Cyanophyta, 15 Chlorophyta, 7 Phaeophyta and 15 Rhodophyta. With the addition of these species, a total of 143 species are presently known from Truk. The author feels that this total represents approximately 75 to 80 percent of the algae actually present on Truk. It is of interest to note that of the 41 species reported as new records, 13 of them were found exclusively in water deeper than 7 meters. The continual use of SCUBA will no doubt increase the number of species known from Pacific islands.

One additional species is present in the collection which is not included in the present listing. This green alga seems to represent a new genus and will be reported on at a later date.

LITERATURE CITED

- Gressitt, J.L. 1954. Insects of Micronesia, Introduction. Vol. I. Honolulu, Bernice P. Bishop Museum, 1-257.
- Hollenberg, G.J. 1968a. An account of the species of *Polysiphonia* of the central and western tropical Pacific Ocean. I. *Oligosiphonia*. Pac. Sci. 22(1): 56-98, 43 figs.
- 1968b. An account of the species of *Polysiphonia* in the central and western tropical Pacific Ocean. II *Polysiphonia*. Pac. Sci. 22(2): 198-207, 3 figs.
- 1968c. An account of the species of the red alga *Herposiphonia* occurring in the central and western tropical Pacific Ocean. Pac. Sci. 22(4): 536-559, 25 figs.
- Okamura, K. 1916. List of marine algae collected in Caroline and Mariana Islands, 1915. Bot. Mag. (Tokyo) 30:1-14, 9 figs., 1 pl.
- Schmidt, V.O.C. 1928. Verzeichnis der Meeresalgen von Neu-Guinea und dem westlichen Oceanien. Hedwigia 68:19-86.
- Trono, G.C. Jr. 1938. The marine benthic algae of the Caroline Islands, I. Introduction, Chlorophyta, and Cyanophyta. Micronesica 4(2): 1-206, 19 pls.
- 1969. The marine benthic algae of the Caroline Islands, II. Phaeophyta and Rhodophyta. Micronesica 5(1):25-119, 11 pls.