

ROY T. TSUDA* and WILLIAM J. TOBIAS**: Marine Benthic
Algae from the Northern Mariana Islands, Chlorophyta and Phaeophyta

Introduction

This report represents the first account of the marine benthic algae from the nine northern Mariana Islands. The algae were collected during seven expeditions: July 1970 (J. Villagomez aboard the Trust Territory field trip vessel), February 1971 (R. H. Randall aboard the "USS Grasp"), April 1971 (H. K. Larson aboard the "Wanderer"), June 1971 and July 1972 (M. V. C. Falanruw aboard the "Wanderer"), January 1975 (W. J. Tobias aboard the "New World"), and July 1975 (R. Rechebei and L. G. Eldredge aboard the "New World"). All of the specimens listed in this paper are deposited in the Herbarium of the University of Guam Marine Laboratory.

The nine islands of the northern Marianas, located between 16°22' N and 20°32' N latitude, and 144°54' E and 145°51' E longitude, extend north-south approximately 483 km and form a convex ridge midway between Honshu and New Guinea. All of the northern Mariana Islands are volcanic in origin with a combined area of less than one-fifth that of the southern chain.

Collecting Stations

Anatahan (16°22' N, 145°40' E)—Southeast side, 0-30 m deep, II-14-71, R. H. Randall (RT 4808-4846, RT 4884-4887); west coast near "Observation Spot", intertidal zone along beach boulders, lava barricade, and landward tidepools, I-8-75, W. J. Tobias (WJT 1-27).

Sarigan (16°42' N, 145°47' E)—VI-25-71, M. V. C. Falanruw (MVCF 1978).

Guguan (17°19' N, 145°51' E)—West bay anchorage, 15 m deep, black sand and large boulders covered with black silt to coral ledge, I-10-75, W. J. Tobias (WJT 28-49, WJT 87-88); western shore at lava flow, sloping boulder bottom with vertical wall extending from shore to 20 m drop-off, I-11-75, W. J.

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- Tobias (WJT 50-86); drop-off at 20 m, and shelf at 6-9 m, VII-12-75, R. Rechebei (RT 5028-5043); sandy area, 6 m deep, VII-12-75, R. Rechebei (RT 5044-5064).
- Alamagan (17°36' N, 145°50' E)—Southwest bay anchorage, submerged reef flat platform sloping from shore boulder zone to 20 m terrace, I-12-75, W. J. Tobias (WJT 93-118).
- Pagan (18°07' N, 145°46' E)—Tarague Beach, VII-29-70, J. Villagomez (RT 4888-4891); Degusa Beach, in small tidepools, IV-8-71, H. K. Larson (RT 4892-4927); Degusa Beach anchorage, intertidal zone, raised limestone buttress system with consolidated sand, I-14-75, W. J. Tobias (WJT 119-142); Degusa Beach anchorage, gradually sloping sand bottom interspersed with coral mounds from exposed buttress system to 15 m deep, I-16-75, W. J. Tobias (WJT 143-174); Pagan Harbor, 6-16 m deep, slope on southern side, VII-6-75, R. Rechebei (RT 4949-4961); reef bench and tidepools, VII-6-75, R. Rechebei (RT 4962-4978).
- Agrihan (18°46' N, 145°40' E)—West side, 0-20 m deep, II-12-71, R. H. Randall (RT 4781-4807); west coast lava flow north of anchorage, large mounds and crevices, 20 m deep, I-17-75, W. J. Tobias (WJT 176-205).
- Asuncion (19°40' N, 145°24' E)—Southwest bay anchorage, large boulders covered with fine black sediment, 15 m deep, I-18-75, W. J. Tobias (WJT 206-224); rich coral zone, 5-14 m deep, VII-7-75, R. Rechebei (RT 4979-4986).
- Maug (20°01' N, 145°13' E)—Inner lagoon, 2-30 m deep, II-10-71, R. H. Randall (RT 4847-4883); 4 m deep, VII-5-72, M. V. C. Falanruw (RT 4931-4948); west end of North Island, large boulders covered with fine black sediment near shore to 20 m drop-off, I-19-75, W. J. Tobias (WJT 225-278); inner side of West Island, lush coral growth, VII-9-75, R. Rechebei (RT 4987-4988); inner side of West Island, 3-24 m deep, VII-9-75, R. Rechebei (RT 4989-5013); western side of East Island, sandy bottom, 9-13 m deep, VII-9-75, R. Rechebei (RT 5017-5027); northeast side of East Island, tidepools, VII-9-75, L. G. Eldredge (RT 5014-5016).
- Uracas (20°32' N, 144°54' E)—Anchorage at south coast, volcanic finger extending from shore to 25 m deep, I-20-75, W. J. Tobias (WJT 279-289, WJT 291-301); intertidal zone on wave eroded lava, I-20-75, W. J. Tobias (WJT 290).

Algal Listing

Division Chlorophyta

- Enteromorpha intestinalis* (L.) Link—Anatahan: WJT 7.
- Avrainvillea lacerata* Gepp—Anatahan: WJT 4.
- Caulerpa ambigua* Okamura—Uracas: WJT 289.
- Caulerpa filicoides* Yamada—Guguan: WJT 56, RT 5039, RT 5049; Alamagan: WJT 103; Asuncion: WJT 208; Maug: WJT 242, RT 4882, RT 4938.
- Caulerpa racemosa* (Forsskal) J. Ag.—Anatahan: RT 4812, RT 4885, WJT 5; Alamagan: WJT 104; Pagan: WJT 122, RT 4976; Agrihan: WJT 184; Maug: RT 4851, RT 4940, WJT 249, RT 5002.
- Caulerpa serrulata* (Forsskal) J. Ag.—Sarigan: MVCF 1978; Guguan: WJT 36, WJT 60, RT 5036, RT 5057; Alamagan: WJT 102; Pagan: RT 4950; Asuncion: RT 4981; Maug: RT 4848, RT 4946, WJT 244, RT 4991, RT 5018.
- Caulerpa sertularioides* (Gmel.) Howe—Uracas: WJT 283.
- Caulerpa taxifolia* (Vahl) C. Ag.—Maug: RT 4947, WJT 246.
- Caulerpa vickersiae* Boerg.—Guguan: WJT 80; Maug: RT 5027.
- Caulerpa webbiana* Montagne—Guguan: WJT 77, RT 5048; Maug: WJT 243; Uracas: WJT 282.
- Derbesia attenuata* Dawson—Alamagan: WJT 106; Pagan: WJT 150.
- Halimeda discoidea* Decaisne—Anatahan: WJT 6; Guguan: RT 5052; Alamagan: WJT 99; Pagan: WJT 155; Agrihan: WJT 185; Maug: RT 4942, WJT 237, RT 5007, RT 5025.
- Halimeda opuntia* (L.) Lamx.—Anatahan: RT 4825; Guguan: RT 5050, RT 5051; Alamagan: WJT 100, WJT 101; Pagan: RT 4951; Asuncion: RT 4985; Maug: RT 4849, RT 4944, WJT 236, RT 5026; Uracas: WJT 285.
- Pseudochlorodesmis furcellata* (Zanard.) Boerg.—Guguan: WJT 47.
- Rhipilia orientalis* A. & E. S. Gepp—Anatahan: RT 4823; Guguan: WJT 34, WJT 57, RT 5042, RT 5055.
- Tydemannia expeditionis* W. v. Bosse—Anatahan: RT 4817 (glomeruli); Guguan: WJT 32 (flabellate), WJT 54 (flabellate and glomeruli), RT 5041 (glomeruli), RT 5047 (glomeruli); Agrihan: RT 4788 (flabellate), WJT 180 (flabellate); Maug: RT 4870 (flabellate), WJT 238 (glomeruli), WJT 250 (flabellate), RT 4987 (glomeruli); Uracas: WJT 287 (flabellate).
- Udotea javensis* (Montagne) A. & E. S. Gepp—Uracas: WJT 288.

- Boergesenia forbesii* (Harv.) Feldmann—Anatahan: WJT 3; Pagan: WJT 126, WJT 154, RT 4965; Maug: RT 4933.
- Boodlea composita* (Harv.) Brand—Guguan: RT 5040; Alamagan: WJT 97; Pagan: WJT 123; Maug: WJT 241, RT 5009.
- Cladophoropsis gracillima* Dawson—Pagan: RT 4977.
- Cladophoropsis membranacea* (Ag.) Boerg.—Maug: RT 4855.
- Dictyosphaeria cavernosa* (Forsskal) Boerg.—Alamagan: WJT 105 (immature); Pagan: WJT 124, RT 4962; Agrihan: WJT 186; Asuncion: WJT 212; Maug: RT 4853, WJT 239, RT 4932.
- Dictyosphaeria versluysii* W. v. Bosse—Agrihan: RT 4785; Uracas: WJT 281.
- Valonia aegagropila* C. Ag.—Maug: RT 4852 (in clumps).
- Valonia utricularis* (Roth) C. Ag.—Maug: WJT 240.
- Valonia ventricosa* J. Ag.—Guguan: WJT 59, RT 5032, RT 5058; Alamagan: WJT 96; Pagan: RT 4892, RT 4954; Agrihan: RT 4782, WJT 183; Asuncion: WJT 210; Maug: RT 4867, RT 4943, WJT 248, RT 5004, RT 5014; Uracas: WJT 286.
- Acetabularia exigua* Solms-Laubach—Maug: RT 4861b.
- Acetabularia moebii* Solms-Laubach—Pagan: RT 4914, WJT 125, RT 4949; Agrihan: RT 4781; Maug: RT 4861a.
- Bornetella oligospora* Solms-Laubach—Maug: WJT 251.
- Bornetella sphaerica* (Zanard.) Solms-Laubach—Anatahan: RT 4887.
- Neomeris annulata* Dickie—Guguan: WJT 35, WJT 58; Alamagan: WJT 98; Pagan: WJT 149; Agrihan: RT 4787, WJT 181; Asuncion: WJT 209, RT 4986; Maug: RT 4871, WJT 253, RT 5022; Uracas: WJT 284.
- Neomeris vanbosseae* Howe—Guguan: RT 5060; Pagan: RT 4907.
- Anadyomene wrightii* Gray—Agrihan: WJT 182.
- Cladophora socialis* Kütz.—Pagan: RT 4967.
- Rhizoclonium implexum* (Dillwyn) Kütz.—Guguan: WJT 87.

Division Phaeophyta

- Ectocarpus breviarticulatus* J. Ag.—Anatahan: WJT 10; Pagan: WJT 133, RT 4910; Maug: RT 4878.
- Feldmannia indica* (Sonder) Womersley & Bailey—Anatahan: WJT 14.
- Sphacelaria furcigera* Kütz.—Pagan: WJT 156 (on dead gorgonian branch).
- Sphacelaria tribuloides* Meneghini—Pagan: RT 4898, WJT 131.

- Dictyopteris repens* (Okamura) Boerg.—Guguan: WJT 45, WJT 61; Maug: RT 4937, RT 5019; Uracas: WJT 295a.
- Dictyota bartayresii* Lamx.—Anatahan: RT 4836, WJT 13; Guguan: WJT 63, RT 5029, RT 5063; Alamagan: WJT 107; Pagan: RT 4893, WJT 132; Agrihan: RT 4784, WJT 187; Asuncion: WJT 214; Maug: RT 4866, RT 4934, WJT 254, RT 4993; Uracas: WJT 295b.
- Dictyota hamifera* Setchell—Asuncion: WJT 213.
- Lobophora variegata* (Lamx.) Womersley—Anatahan: RT 4812, WJT 12; Guguan: WJT 44, WJT 62; Pagan: RT 4891, RT 4911, WJT 157; Agrihan: RT 4798, WJT 192; Asuncion: WJT 215; Maug: RT 4869, RT 4931; Uracas: WJT 294.
- Padina jonesii* Tsuda—Agrihan: RT 4789, WJT 189; Maug: RT 5017.
- Padina minor* Yamada—Anatahan: RT 4884, WJT 9; Pagan: WJT 129, RT 4927, RT 4969.
- Padina tenuis* Bory—Pagan: RT 4923.
- Chnoospora minima* (Hering) Papenfuss—Anatahan: WJT 8; Pagan: WJT 134.
- Hormophysa triquetra* (L.) Kütz.—Pagan: RT 4970.
- Sargassum cristaeifolium* C. Ag.—Anatahan: WJT 11 (sterile); Pagan: RT 4888 (fertile), WJT 128 (sterile), RT 4978 (fertile); Maug: RT 5016 (fertile); Uracas: WJT 291 (tentative identification of immature specimen).
- Sargassum polycystum* C. Ag.—Pagan: RT 4896 (a single branch ca. 3 cm long).
- Turbinaria ornata* (Turn.) J. Ag.—Pagan: RT 4922; Asuncion: RT 4980; Maug: RT 4847, RT 4945, RT 4988.

Discussion

Thirty-five species of Chlorophyta and 16 species of Phaeophyta are reported here from the northern Mariana Islands. The presence of *Dictyota hamifera* on Asuncion and *Hormophysa triquetra* on Pagan represents the first records for the Micronesian region.

The swollen lateral hamate branches borne outside of the dichotomies are distinctive of *D. hamifera* which was first described by Setchell¹⁾ from Tahiti. Womersley and Bailey²⁾ also report this species from the Solomon Islands and cite Taiwan (Formosa) as another area where it occurs. *H. triquetra* has been reported from southern Australia by Womersley³⁾, Solomon Islands by Womersley and Bailey²⁾, Philippines, Malaya and Indonesia by Taylor⁴⁾, and the Indian Ocean by Misra⁵⁾.

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摘 要

R. T. ツダ*・W. J. トビアス**: 北部マリアナ諸島の海藻, 緑藻類と褐藻類

この報告は, 北部マリアナ諸島の9つの島から採集された海藻についての最初のリストで, 緑藻類35種および褐藻類16種を含む。これらのうち, *Dictyota hamifora* と *Hormophysa triquetra* はマイクロネシア海域からの最初の記録である。リストされた標本のすべては, グワム大学臨海研究所に保管されている。(* グワム大学臨海研究所・** テキサス大学海洋生物研究所)