Udotea polychotomis, a New Species of Chlorophyta from the Caroline Islands[1]

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Abstract

A new species, *Udotea polychotomis*, is described and tentatively assigned under genus *Udotea* of the green algal family Codiaceae (Siphonales). Some of the more interesting diagnostic features are: presence of trichotomous filaments in the apical portion of the frond; tendency to 'branch' or stipes of usually two fronds fused from the base down; and, occurrence of bilaminate forms, smaller fronds super-imposed over the presumably 'older' or mother frond. The Type is deposited in the Herbarium, University of Guam Marine Laboratory.

INTRODUCTION

The alga described here was collected by Mr. E.G. Menez in 1960 while a member of the Miami University Collegiate Rebel Expedition to Micronesia. The materials studied were reported by Trono (1968) as *Udotea indica* A. & E. S. Gepp, in his floristic account of the algal vegetation of the Caroline Islands. Further studies and findings, however, seem to dictate that the specimens comprise a new species and possibly new genus of the Siphonales in the Chlorophyta.

TAXONOMIC TREATMENT

Udotea polychotomis n. sp.

Figs. 1–14

As *U. indica* A. & E. S. Gepp, in Trono 1968:187, pl. 19, fig. 3.

Frons ad 6 cm alta et ca 4.5 cm lata, erecta, stipitata, expansa, irregulariter flabelliformibus, simpliciter marginalibus ad crenulato-lobata, inconspicuo-zonata; cuneata ad basim, ex polysiphoniis stipitibus et monostromatica composita, adfixa basalibus ad intricatis intexto-fibrae, reticulato-rhizoidibus composita; stipite 1.5–2.0 cm longo et 2.0 mm (—4.0 mm) lato; filamentis 26–52 μ in diau. (—78 μ, ad marginibus ex stipito radiato-orientibus, polychotomis (fere 3–2 chotomis) divisis, inaequali-constrictis polychotomis ad apicem subparalletos, cylindricis, acutis, unicellularibus; cum rotundis vel oblongis chromatophoribus; filamentis apicibus dominationis trichotomis, raro dichotomis, levis, ad leviter undulato-unilateralibus; filamentis in parte media cum brevis, pedicellatis, rustice conicis, unilaterali-appendicis ornatis; filamentis in parte basali cum truncatis ad digitatis saepe affixis, bilateralibus pedicellato-appendicis ornatis; calce incrussatus; colore virido et incano in sicco; reproductione non observata.

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Thallus calcified, green to dirty white upon drying, to 6 cm tall, erect, stipitate, expanded; frond to 4.5 cm broad, irregularly flabelliform, simple or occasionally 'branched' and/or bilaminate, unconspicuously zoned; margin simple to crenulato-lobulate; base cuneate; stipe from 1.5 to 2.0 cm long, to 2.0 mm (—4.0 mm) broad, polysiphonous, monostromatic; basal attachment of fusiform mass of intricately woven fibers forming a rhizoidal network.

Filaments 26–52 μ in diameter (—78 μ), radiating from stipe to margin polychotomous (usually 3–2 chotomous), unevenly constricted above polychotomies and elsewhere, subparallel, cylindric, acute, unicellular with chromatophores; chromatophore roundish or oblong; apical frond filament predominantly trichotomous, rarely dichotomous, smooth to slightly undulate unilaterally; mid-frond filaments with unilateral appendages becoming pronounced, short, pedicellate, bluntish to conical; basal filaments with bilateral pedicellate appendages, truncate to digitate oftentimes fitted together; reproduction not seen.

HOLOTYPE: MSD (Maxwell S. Doty) 21342–III, collected by E. G. Menez, June 29, 1960. Deposited in the Herbarium, University of Guam Marine Laboratory.

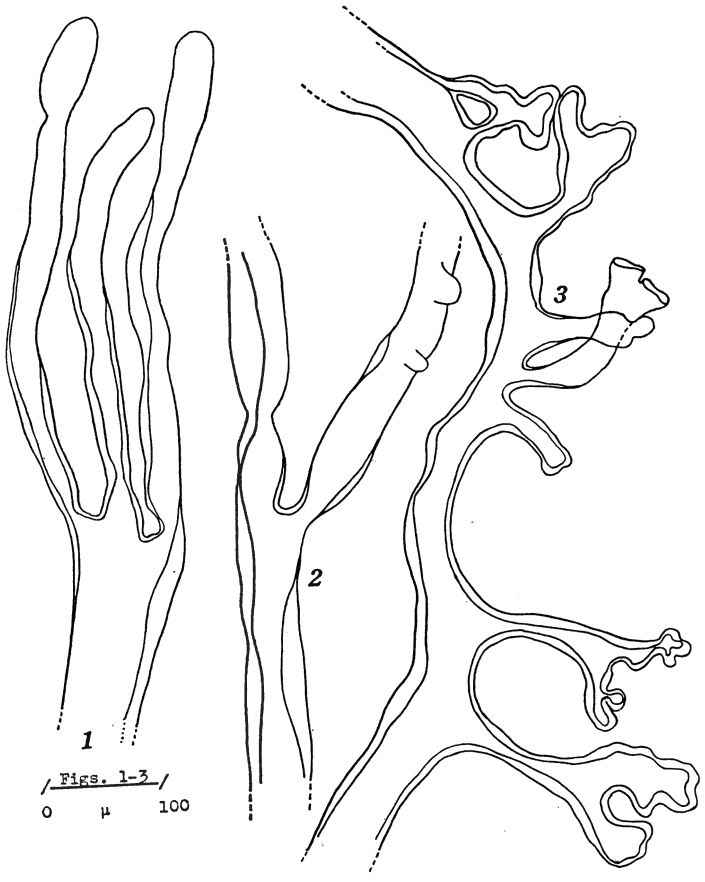
TYPE LOCALITY: From W. seaward reef flat with sandy substratum with hard bottom with coral heads and limestone rocks at Urak Island, Mokil Group, Caroline Islands.

ADDITIONAL MATERIALS EXAMINED: MSD 21342–I, IV; MSD 21381–I to V, all from the general locality as the type; and, MSD 15913–I to IV, collected on reef, Quoi Island, Truk, Caroline Islands, August 2, 1960, all collections of E. G. Menez. Deposited in the Herbarium, University of Guam Marine Laboratory.

DISCUSSION

This Micronesian plant as a member of the Order Siphonales, agrees best with the genus *Udotea* based on its external morphology, flabelliform and calcified frond to cite some, but differs markedly in the trichotomous feature (Figs. 1, 4, 8, 12) of some apical filaments as well as in other characters mentioned above. Furthermore, it answers the generic descriptions of Kützing (1849), Harvey (1857), A, & E. S. Gepp (1911), Okamura (1912, 1936), Boergesen (1913), Taylor (1928), etc. Likewise, in close accord with the specific limitations for *U. indica* set aside by the Gepps and Taylor (1950) as well, except for the peculiar trichotomies observed in MSD 21342–II and III and MSD 21381–I, which has never been previously reported. The Gepps, though, noticed the filaments of the stipe of *U. palmetta* as, "...bearing lateral appendages 2–4 times dichotomous....," a rather common occurrence in genus *Udotea* (Figs. 3 and 11).

Boergesen (1913) found this trichotomous character in his Dutch West Indies specimen *Cladocephalus luteofuscus* (Crouan) Boergesen, another codiaceous plant. The present plant, however, differs from that of Boergesen's by not having distinctly zonate, not transversely orbicular, and generally here and there constricted to mention



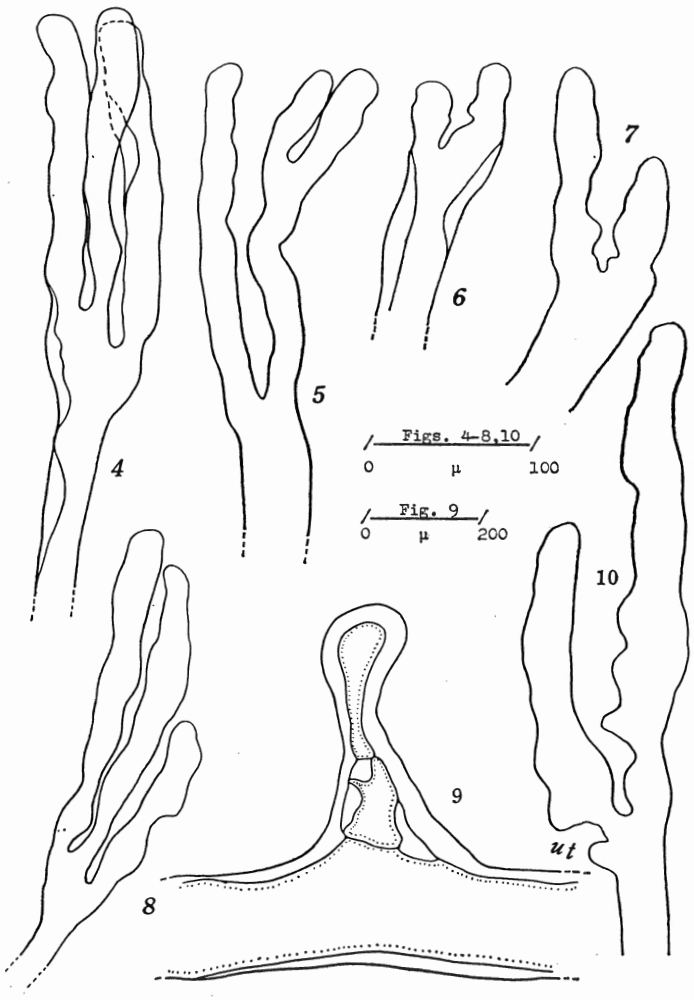
Udotea polychotomis CORDERO

Fig. 1. Trichotomous filament near apical portion of frond (MSD 21342-III)
Fig. 2. Mid-frond filament with lateral proliferous growth (MSD 21342-III).
Fig. 3. Filament near base of frond (MSD 21342-III)

the more prominent differences. Taylor (1928), named his material from the Dry Tortugas, Florida, as *C. luteofuscus* but said, "filaments repeatedly dichotomously branching forming the cortex . . ."

One of the more intriguing gross morphological characters seen is its tendency to branch (Fig. 14). The stipes of 'paired' fronds are fused a few millimeters below the base, becoming inseparable downward. This is not a simple case of two plants having been cemented somewhere due to pressing as was initially construed by me.

Another feature present is the bilaminate structure of the frond, one or more smaller fronds super-imposed over the older one observed in MSD 21381–I to IV. This same feature was noted, though in part, by Boergesen (1930) based on some Ceylonese materials. He said, ". . . in older specimens flabellum is often longitudinally folded and numerous proliferations are growing out from the edge of the flabellum . . . ." Egerod (1952), in her presentation of *U. javensis* from Hawaii, had this



Udotea polychotomis CORDERO

Fig. 4. Unequal polychotomous branching (MSD 21381–V).

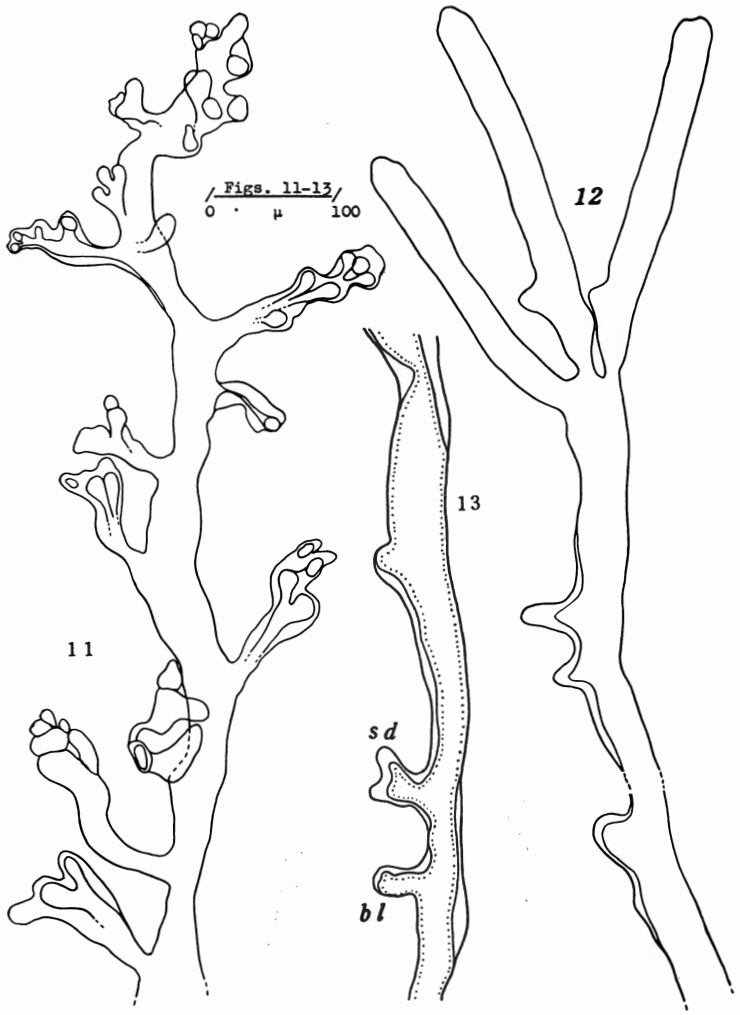
Figs. 5–7. Succesion of branching (MSD 21381–V).

Fig. 8. Trichotomous (apical portion of frond) with unequal constrictions above (MSD 21342–I).

Fig. 9. Magnified lateral growth (MSD 15913–III).

Fig. 10. Filament near the apical part of frond with undeveloped trichotomy (ut) (MSD 21381–I).

to say: "proliferations of new blades occurring occasionally from injured areas; . . ." She did not elaborate nor cite previous morphological findings to collaborate her observations. Nizamuddin (1963), observed a similar case in his study of the type specimen of *U. indica* from Karachi presently deposited in the British Museum. He said, "the terminal portion of the fertile frond becomes loose . . ." Similarly,



Udotea polychotomis CORDERO

Fig. 11. Basal-stipe filament (MSD 21381–V).

Fig. 12. Trichotomous filament of frond; unilateral growth near mid-section (MSD 21381–I).

Fig. 13. Mid-frond filament showing sub-digitate (sd) and bluntish (bl) proliferations (MSD 21381–I).

Velasquez *et al.* (1971), reported identical findings in their *U. orientalis* specimens from the Philippines. They used the term "branch" instead of proliferate which is more appropriate as shown in Plate 5, fig. 25 of their work. More recently, however, I noticed the same phenomenon in my materials from Batan Island, Northern Philippines, which I later reported (In Press) as a variety of *U. indica.* The materials from Micronesia differ from the Batan plants by having bilateral instead of unilateral appendages in the mid-frond filaments among the more distinguishing features (Fig. 12).

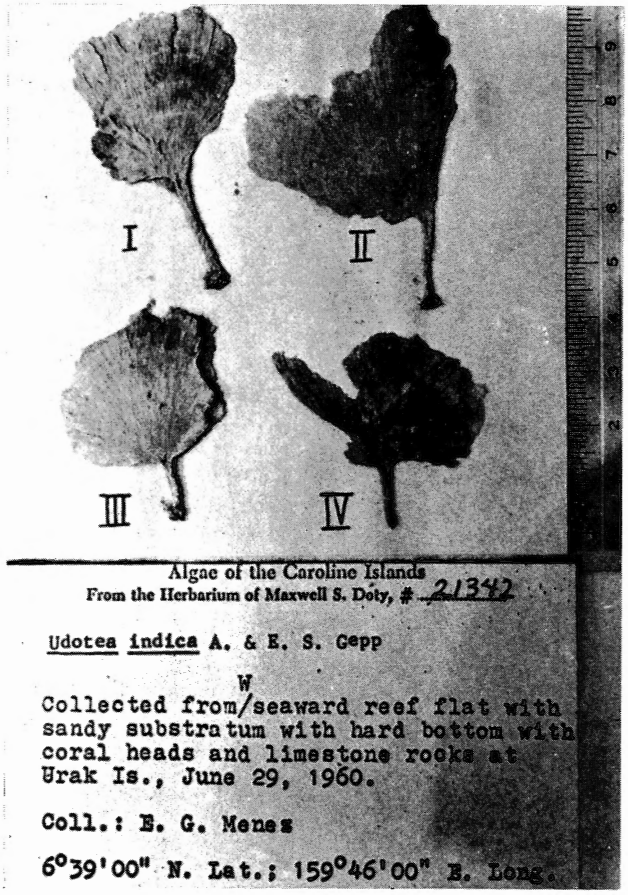


Fig. 14. *Udotea polychotomis* CORDERO, Holotype (MSD 21342).

Therefore, the bare fact that available literature do not mention the findings above, the temptation has been to assume the present plants to be representative of an unknown species. Moreover, the observations obtained may merit a separate generic entity to receive it appropriately.

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