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Soil Algae of Eniwetok Atoll, the Marshall Islands[1]

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The island chain comprising Eniwetok Atoll has been subjected to environmental stress in the form of nuclear weapons testing and human habitation for a number of years. For a detailed description of the history, location, and physical arrangement of the islets in the atoll, see Gilmartin (1958) or Jackson (1969).

Several reports appear in the literature to describe the macrovegetation of the region (Taylor 1950, St. John 1960, Woodbury 1962), the marine algae in surrounding waters (Dawson 1957), and the phytoplankton of the lagoon (Gilmartin 1958), but studies of the soil algal populations are not abundant. In a revision of a major algal taxon, Drouet (1968) listed several blue-green algae as being collected by investigators of the Marshall Islands, noting that some species may exist in brackish waters or in soils. Drouet also suggested that more are available in herbaria, where they await classification (Drouet, personal correspondence).

The following listing of algae is a composite of those cultured from soil collected from Eniwetok Islet, the major islet in the atoll and the only inhabited islet in the region. The soil is a rather coarse coralline sand, and was collected from five random locations over the islet.

METHODS AND MATERIALS

The soil from the top centimeter was collected with a sterile implement and sealed in sterile 2.5 by 15 cm glass test tubes and airmailed to our laboratory in the United States. Three days elapsed between sampling and culture procedures. Sterile filter paper was placed in 9-cm disposable Petri dishes, and approximately 10 g of soil were added. Bristol's solution (Arditti and Dunn 1968) was added as a nutrient. The soil was brought to field capacity and held at that level by repeated irrigation as required. Five cultures of the soil from each of the sampling sites were prepared in this manner. In two of the cultures from each sample, the soil was covered with a second piece of filter paper, which was then saturated with the nutrient. Algal colonies grew through the paper, making isolation into unialgal culture less difficult.

The cultures were placed in an environmental chamber at 15° C, with 100 percent relative humidity and 16 lighted hours per day under 40-watt fluorescent tubes. The cultures were examined periodically under a binocular dissecting microscope and visible colonies were removed for subculture. Small samples of the soil were streaked on Bristol's agar to insure as complete a list of the population as possible. The techniques of Pringsheim (1946) were used to obtain colonies of acceptable purity for identification.

A complete listing of the algae is as follows:

CHLOROPHYTA

Characium sp.
Chlamydomonas typica Deason & Bold
Chlorella vulgaris Beyer.
Chlorococcum sp.
Cylindrocystis Brebissonii Menegh.
Hormidium sp.
Protococcus viridis C. A. Ag.
Spongiochloris excentrica Starr
Stichococcus subtilis (Kuetz.) Klerk.
Zygogonium ericetorum Kuetz.

CYANOPHYTA

Anabaena variabilis Kuetz.
Calothrix braunii Born & Flah.
Calothrix paretina (Naeg.) Thur.
Calothrix sp.
Coccochloris aeruginosa (Naeg.) Dr. & Daily
Cylindrosperumum musicola Kuetz.

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Fischerella ambigua (Naeg.) Gom.
Gleocapsa aeruginosa Kuetz.
Hapalosiphon sp.
Microcoleus lyngbyaceus (Kuetz.) Crouan
Microcoleus tenerrimus Gom.
Nostoc ellipsosporum (Desmaz.) Rabenh.
Nostoc sp.
Oscillatoria Retzii Ag.
Porphyrosiphon Notarissi (Menegh.) Gom.
Rivularia compacta Coll.
Schizothrix arenaria (Berk.) Gom.
Schizothrix calcicola (Ag.) Gom.
Schizothrix Friezii (Ag.) Gom.
Schizothrix rubella Gom.
Schizothrix tennerimus (Gom.) Dr.
Scytonema Hofmanii Ag.

DISCUSSION

Ten species of green algae were identified. Of these, two were filamentous and one was a desmid. The remainder were unicellular forms common to most soils. Twenty-three blue-green algae were cultured, including only two non-filamentous forms, *Coccochloris* and *Gleocapsa*. The most often identified species was *Schizothrix calcicola*, an alga ubiquitous in the world's soils. In fact, other species of *Schizothrix* were common; five of the seven species of this genus were represented in Eniwetok soils. There were no significant differences in lists of species cultured from the five sites. Therefore, the list given above is a composite from all five sites sampled.

The soil algal population of the islet was similar to that of other high-humidity, subtropical, sandy soils. Descriptions of algal flora reveal few qualitative differences in soil algal populations between Eniwetok and Florida soils (Arvik 1971, Smith and Ellis 1943).

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