Dictyosphaeria cavernosa

(Forsskål) Børgesen 1932c

***Dictyosphaeria cavernosa*, or "green bubble algae" is an opportunistic green alga which is invasive in overfished, high nutrient reef communities. The large "bubbles" efficiently trap sediments, nutrients and infaunal inside the chambers of the plant.**

Division	Chlorophyta
Class	Ulvophyceae
Order	Cladophorales
Family	Valoniaceae
Genus	*Dictyosphaeria*

Identifying Features

DESCRIPTION

Thallus to 12 cm in diameter, saclike, hollow, spherical when young, becoming convoluted, ruptured, and irregularly lobed when old. Firm, tough texture, consisting of large bubble-shaped cells that are easily seen by eye. Rhizoids are short, branched or unbranched.

Daughter segments are formed as occasional segments become inflated, forming large monostromatic bladders attached to the parent plant. They may remained attached to the thallus or break away and become independent plants.

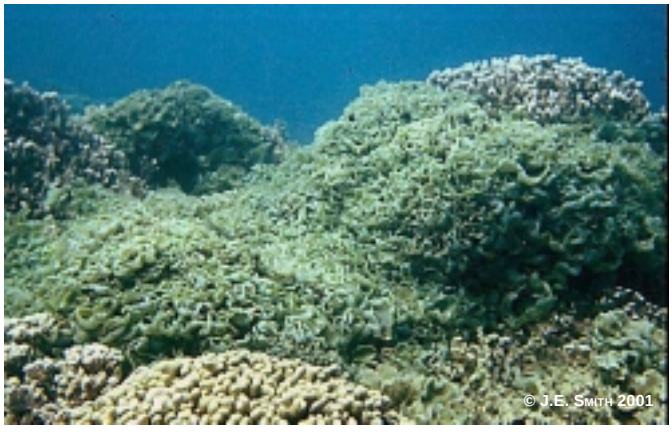
Can be easily confused with *D. versluyii*. *D. versluyii* is smaller, completely solid, and remains rounded.

COLOR

Grass green, but sometimes blueish in color.

Habitat

Dictyosphaeria cavernosa is found attached to rocks or coral rubble on shallow, calm reef flats and in tidepools. Young plants may form small clusters of "bubbles" scattered among turfs on hard substrate. Older plants can form large convoluted mats from 1 to 10 cm thick that may cover large areas subtidally to 59 meters.



Structural

Primary cells 0.1-3.0 mm diam., in monostromatic layer, angular or polyhedral in surface view, appearing honey-comb like, adhering to one another by hapteroid cells at juncture of walls isodiametric, 35 - 45 µm diameter.

Distribution

HAWAI'I

Northwest Hawaiian Islands, O'ahu, Maui, Moloka'i and Lana'i.

WORLDWIDE

Eastern Atlantic, Caribbean, Red Sea, Arabian Sea, Indian and Pacific Oceans.

MECHANISM OF INTRODUCTION

Indigenous to Hawai'i.

Ecology/Impact

Dictyosphaeria cavernosa is a native alga that has shown invasive tendencies in reef communities experiencing nutrient enrichment and overfishing. The thallus' sheet-like morphology enables it to cover large areas of reef and create large hollow chambers where organisms and gases are trapped. Like other invasives, *D. cavernosa* efficiently captures available nutrients, resulting in high growth rates. The morphology of this particular green alga, however, is especially efficient: nutrients trapped in sediments are released to the water column and trapped in the chambers of *D. cavernosa* where they are held for uptake. This special "bubble" morphology has proven successful in areas of long term nutrient loading where the sediments have become a reservoir for additional nutrients.

The solid sheets of *D. cavernosa* can be devasting to coral reefs. Since the 1960's, and possibly earlier, *D. cavernosa* has overgrown and displaced corals on reef slopes and outer reef flats in Kane'ohe Bay, O'ahu, Hawai'i. The alga uses coral and limestone outcrops as an anchorage and proceeds to overgrow them, killing the corals by smothering. In a study of the standing crop of frondose algae at Waikiki as much as 300gm/m^2 wet weight of the biomass was attributed to this species.

Dictyosphaeria species grow by segregative cell division, producing daughter segments that are initiated inside parent segments but grow outwards in the form of a bubble. The species also reproduces sexually by freeing flagellate reproductive cells through pores in the walls of the vegetative cells of the thallus. In conditions of high nutrient loading and overfishing, *Dictyosphaeria* species are fecund and successful competitors.

References

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WEB LINK

Frondose Algae of Waikiki. http://www.botany.hawaii.edu/reefalgae/

Hawaiian Reef Algae. http://www.botany.hawaii.edu/ReefAlgae/