FREE SWIMMING ZOOSPORES OF SORASTRUM

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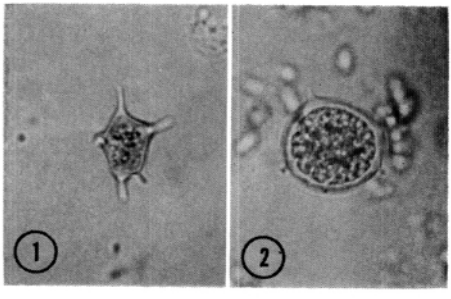
ABSTRACT. — Free swimming zoospores in a *Sorastrum* culture developed into spherical cells with five spines. When transferred to a fresh mineral medium, the spined cells reproduced typical *Sorastrum* colonies.

The colonial green fresh water alga *Sorastrum* had been maintained for three years in a soil water culture. The medium for this culture was prepared in a 250 ml Erlenmeyer flask by covering a small amount of $CaCO_3$ with one inch of sterile garden soil and then adding enough sterile distilled water to cover the soil by one inch. The flask was inoculated with a *Sorastrum* culture (LB785) from the Culture Collection of Algae at Indiana University, and then placed under fluorescent lights of 350 ftC intensity with a 16-8 hr light-dark cycle. Temperature had been maintained at 22-24 C for three years, but was held at 20 C during the fourth year. Sterile distilled water was added as needed to offset evaporation.

During the fourth year the liquid of the culture was carefully poured off, and the soil was allowed to dry somewhat. Three months later sterile distilled water was added so that the original liquid level was restored. Daily examination of the culture for two weeks after the water addition, and thence once weekly for 6 months, revealed many five-spined cells with either thick or thin walls, some free swimming cells, and some typical *Sorastrum* colonies. Since the free swimming and the 5-spined cells have not been reported before for this genus, the author decided to follow their development.

Free swimming cells (zoospores) were completely green except for a clear area from which two anterior flagella of equal length emerged. The zoospores had no cell wall, but were bounded by a thin membrane. The zoospores moved rapidly through the liquid, and at a rate faster than the author could follow with a 45X objective and a mechanical stage. Fast moving zoospores elongated somewhat, but they became spherical when their movement slowed. The zoospores eventually stopped; the length of time they were motile was not determined. After stopping each cell became angular, and five sharp projections appeared on its membrane. During the next 24 hours the cell rounded and secreted a wall; and the projections elongated into 5 spines (FIG. 1). The spines were identical and evenly spaced on the cell. After two weeks each 5-spined spherical cell had enlarged considerably (FIG. 2). When such cells were allowed to remain in the liquid of the soil water flask, they developed thick walls of many layers. Such cells often became yellow to orange, and frequently contained several orange fat droplets. Upon transfer to fresh mineral medium C (Davis 1967) each 5-spined cell divided internally, and released a spherical vesicle containing 8-16 zoospores. After they stopped swimming, each developed into a cell with 4 outwardly-pointing spines and a stipe pointing toward the center of the vesicle.



The stipes of all the cells united, and a typical *Sorastrum* colony resulted.

Discussion

Each cell of a *Sorastrum* colony can reproduce a daughter colony by releasing a vesicle with biflagellate zoospores; each of these becomes a colony cell which produces four outwardly pointing spines and a blunt stipe which points toward the center of the vesicle and fuses with the stipes of the other cells of the same colony (Davis 1966). From their appearance and reproduction, the author believes that the 5-spined cells herein reported originated from zoospores which had escaped from their vesicle. Development of the escaped zoospores in the culture medium and away from the usual confining conditions in the vesicle may account for the five identical spines and the wide spacing of the spines on the single cells.

Literature Cited

Davis, J. S. 1966. Akinetes, reproduction, and colony form in the green alga Sorastrum. Trans. Ill. State Acad. Sci. 59:275-280.

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