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Zoospore formation in the green alga *Stigeoclonium pascheri*

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Abstract
Green alga *Stigeoclonium pascheri* (Vischer) Cox and Bold formed zoospores abundantly in 7- day old cultures when grown in liquid Bold's basal medium at of temperature of 22 ± 1 ˚C and white light intensity of 40 µmol m^{-2} s^{-1} for 16 h a day in the culture chamber. About 60 per cent vegetative cells of the algal filaments formed zoospores. The vegetative cells protoplast divides successively and formed 2 to 4 zoospores, which are arranged more or less linearly in the cells. The zoospores are released from the cells either through a lateral pore or by rupturing of the lateral cell wall. The released zoospores are settled to the walls and bottom of the culture flask and germinated immediate into unilateral or bilateral germlings.

Introduction

The zoospore formation is a common method of asexual reproduction in green and yellow- green algae. Klebs (1896) first showed that change of illumination acted as a stimulus to zoospore formation in *Hormidium* sp. and *Vaucheria* sp. The change of light intensity also influenced zoospore formation in *Hydrodictyon reticulatum* (Neeb 1952) and *Cladophora* sp. (Mason 1965). The water temperature influenced the zoospore formation in *Vaucheria sessilis* (League and Greulach 1955), *Cladophora* sp. (Mason 1965), *Protosiphon botryoides* (Stewart and O'Kelly 1966) and *Coleochaete scutata* (Graham *et al.* 1986). The present study reports the formation of zoospores in the green alga *Stigeoclonium pascheri* (Vischer) Cox and Bold at the temperature of 22 ± 1 ˚C and white light intensity of 40 µmol m^{-2} s^{-1} in the culture chamber.

Material and Methods

The green alga *Stigeoclonium pascheri* (Vischer) Cox and Bold was isolated from a fresh water pond situated at Sarnath, Varanasi and grown in the laboratory under controlled conditions. The clonal cultures of the alga were raised from germinating zoospores and maintained in Bold's basal medium, BBM, (Cox and Bold 1966). The pH of the medium was adjusted to 7.5 prior to autoclaving. In order to avoid precipitation, phosphates were sterilized separately and added to the medium under sterile conditions. The cultures were grown in a culture chamber at 22 ± 1 ˚C temperature and incident light of 40 µmol m^{-2} s^{-1} provided by cool white fluorescent tube lamps for 16 h a day. The vegetative filaments of the alga were transferred to fresh medium after every 15 days of the inoculation so as to maintain them in actively growing stage.

S. pascheri is a highly branching alga. The filaments of the alga formed rhizoid at the end (Fig 1 A). The rhizoids of the alga had thin, slender, narrow or elongated cells with or without chloroplast. The length and breadth of 7- day old actively growing vegetative filaments cells measured 13. 75 - 22.50 µm, and 3.75 - 5.00 µm, respectively.

Results and Discussion

The 7- day old actively growing cultures of the alga formed zoospores in abundance. About 60 per cent of vegetative cells of the alga formed 2 to 4 zoospores by successive divisions of the protoplast. The zoospores lie inside the cells more or less linearly and were released from the cells either through a lateral pore or by rupturing of the lateral cell wall (Fig 1 B). The released zoospores settled to the walls and bottom of the culture flask and developed into unilateral or bilateral germlings (Fig. 1 C, D). The size and shape

of *S. pascheri* vegetative cells did not change during zoospore formation. In *Rhizoclonium hieroglyphicum* and *Cladophora glomerata*, the breadth of the cells increased up to 1.5 times during zoospore formation, and the cells formed numerous zoospores (Agrawal and Singh 1999). After release the zoospores of *C. glomerata* settled to the walls and bottom of the flask, while those of *R. hieroglyphicum* to the cell wall of the parent filaments cells (Agrawal and Singh 1999). *Chaetophora attenuata* filaments cells also formed zoospores at the temperature of 22 ± 1 ˚C and light intensity of 40 µmol m^{-2} s^{-1} in the culture chamber (Agrawal and Sharma 2005).

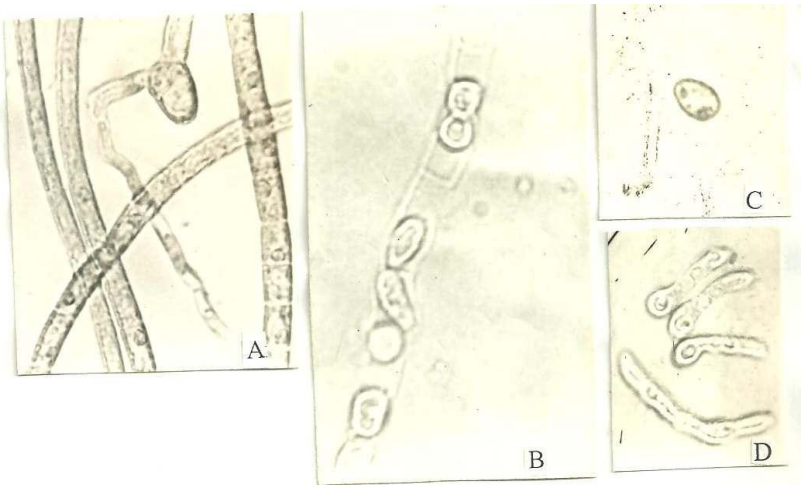

Fig. 1. *Stigeoclonium pascheri.* A. The vegetative filaments, one with a rhizoid; B. Vegetative filament cells showing zoospores. Zoospores are released by the rupture of the lateral cell wall; C. A single zoospore; D. The zoospore germlings. The upper 3 had unilateral germination and the lowermost the bilateral germination.

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