

EXPERIMENTAL INVESTIGATIONS IN *PITHOPHORA OEDOGENIA* WITTRÖCK

G. PURNA CHANDER and VIDYAVATI

Hydrobiology Laboratory, Department of Botany, Kakatiya University, Warangal 506 009, (A.P.), India.

Experiments were carried out on *Pithophora oedogonia* Wittrock in order to determine suitable medium, temperature and illumination conditions for the optimum growth. Among various media employed, Soil-extract+Godward medium was found to be more suitable (with pH 7.5-8.0 receiving 16/8 h L/D cycle and temperature 18-22°C) for the optimum growth of the species, under investigation.

Keywords : Growth; Culture conditions; *Pithophora oedogonia*.

Introduction

There is not much information available regarding the favourable culture methods and conditions for the growth of *Pithophora oedogonia*. It is a less known member of the order Cladophorales with vegetative cells similar to those of *Cladophora* sp. Many workers successfully maintained various members of Cladophorales under different culture conditions.¹⁻³ In order to get the maximum growth for the species under investigation, it was thought desirable to find out suitable medium, temperature and illumination conditions.

Material and Methods

Pithophora oedogonia was collected from the fresh water pond cistern of Bhadrakali temple in Warangal district of Andhra Pradesh and its clonal cultures were maintained.

During the present investigation, the following media were employed Chu⁴, Godward⁵, Waris⁶, Knop⁷ and George⁸. Apart from these, Godward and Chu 10

media separately supplemented with 10% garden soil extract (1:1).

With accessible variations in temperature and illumination, the following conditions were tried for experimental studies:

1. Cabinet provided with day light at 27-30°C.
2. Cabinet with alternate light and dark periods (16:8 h) at 18- 22°C.
3. Cabinet with alternate light and dark periods (16:8 h) at 27- 30°C.
4. Cabinet with continuous illumination at 27-30°C.
5. A cabinet with complete darkness and a temperature at 27-30°C.

In all the above stated conditions, each flask with 50 ml of different media were taken and autoclaved. After inoculation of the materials the flasks were kept for observations and gently shaken twice a day in order to avoid clumping of the cells. For the determination of growth, the percentage of survival represents the percentage of healthy or unaffected cells out of total number of cells observed at

random on the last day of the week for a period of four weeks. Along with these chlorophyll contents (on Ist and IV week) were also recorded. Approximately 20 mg of the algal filaments were weighed and the chlorophyll pigments were extracted in 8 ml of 80% acetone by grinding with the help of mortar and pestle, and centrifuged at 7500 rpm for 10 min. The clear green extract was decanted and optical density was scanned at 645 nm and 663 nm with the help of ELICO Spectrophotometer. A tube containing 80% aqueous acetone was used to set as a blank. The estimations for total chlorophyll, chlorophyll 'a' and 'b' were done separately.

Results and Discussion

From the observations presented in Figs. 1 & 2, it became clear that *Pithophora oedogonia* showed optimum growth in Godwards medium supplemented with 10% (1:1) soil-extract inorganic culture medium with a pH 7.5-8.0, at a temperature of 18-22°C, receiving alternately, 16/8 h light/dark illumination with 6500°K light intensity. The present results confirm the results of previous findings^{1-3,9}.

The data further showed that for the optimum growth of the species, pH also plays an important role. In the present study, nine media (Chu 10, pH 7.0-7.5; Godward, pH 6.5-7.5; George, pH 8.5; Waris, pH 6.0-6.5; Knop, pH 5.3; Czurda, pH 6.4-7.0; Soil-extract, pH 7.5-8.0; Soil-extract+Chu 10, pH 7.5-8.0; Soil extract + Godward, pH 7.5-8.0) were employed. The best growth was obtained in medium having pH 7.5-8.0

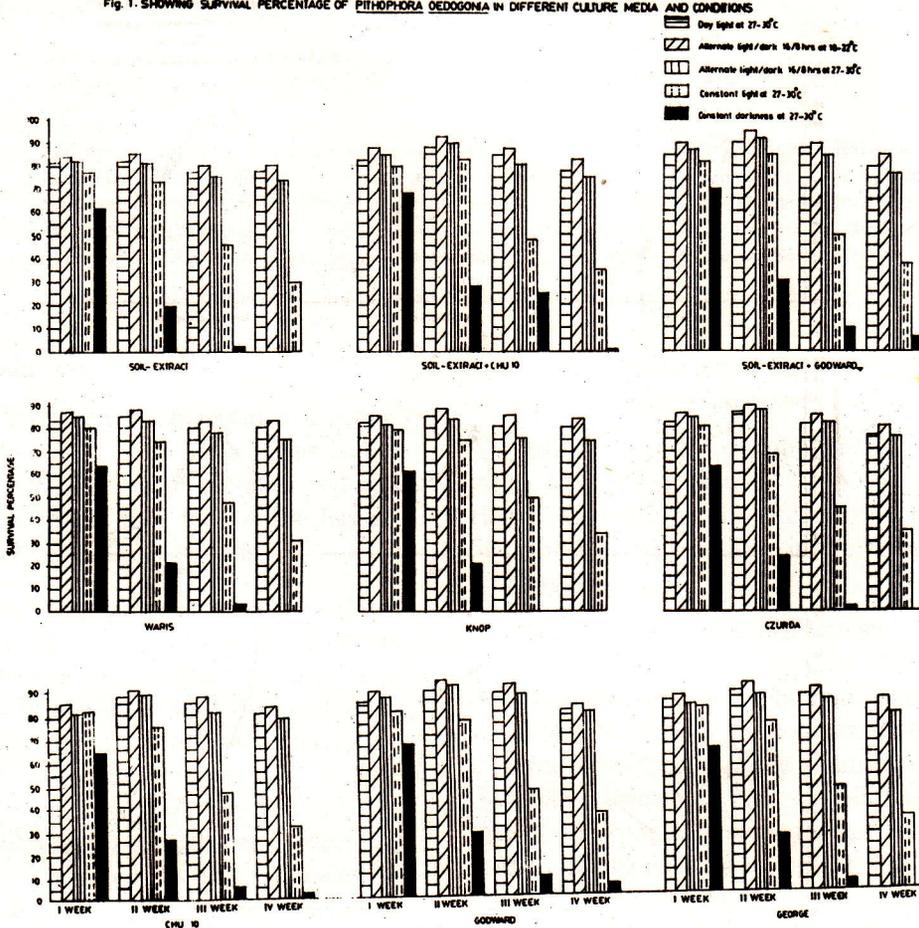
which correspond more or less with that of the habitats from where the species were originally collected. The favourable growth was not obtained even when the pH was maintained corresponding to those of natural habitats⁹. This shows that although the pH may be one of the important factors for growth, it might be operating along with micronutrients, temperature, illumination and other factors¹⁰.

To the species exposed to alternate light and dark periods, the most favourable range of temperature was 18-22°C, whereas the temperatures below and above this range lowered the rate of the cell growth (Figs. 1 & 2). Present findings were more or less in conformity with that of the earlier findings in experimental and periodic collection studies^{11,12}.

Regarding the illumination, the culture flasks were kept in a cabinet fitted with 40 watts day light fluorescent tubes of 6500°K with a 15 cm distance from the source. A good growth was attained under artificial illumination, where the light intensity was twice as much as the day light. Of all the five various illumination conditions tried, it was established that 16 h light period alternated by 8 h dark period proved most suitable for the optimum growth of *Pithophora oedogonia*.

Pithophora oedogonia showed maximum survival percentage (Fig.1) in Godward+soil-extract and Godwards media, which also agrees with the chlorophyll content values (Fig.2). Growth decreased

Fig. 1. SHOWING SURVIVAL PERCENTAGE OF *PITHOPHORA OEDOGONIA* IN DIFFERENT CULTURE MEDIA

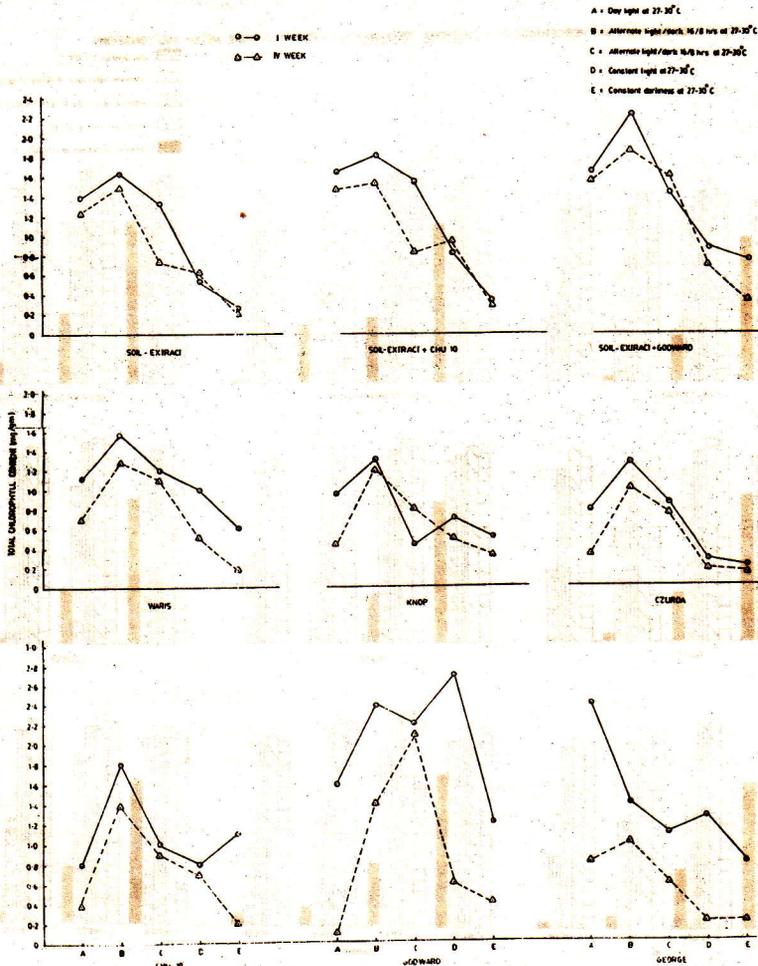


in Chu 10 and Waris and Czurda media. Sudden drop in the number of healthy cells was recorded in the cultures of *Pithophora oedogonia* subjected to constant darkness and the entire culture turned pale-yellow after 15 days. In con-

stant light, growth rate was maximum as compared to constant darkness.

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Fig. 2. SHOWING TOTAL CHLOROPHYLL CONTENT (mg/gm) OF *PHILOPHORA GEDDONGIA* IN VARIOUS CULTURE MEDIA AND CONDITIONS

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