

EFFECT OF LIGHT ON GROWTH OF *HEXAGONIA*  
*POLYGRAMMA* MONT. IN CULTURE

BY

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The present investigation has been undertaken in order to collect information on the role of light on growth of *Hexagonia polygramma* Mont. The different spectral ranges of light has been used. It has been observed that the optimum light source for vegetative growth of the test-fungus is alternate light (500—600 m $\mu$ ) and darkness. This is being followed in succession by continuous illumination, complete darkness, blue light, green light, yellow light and red light. Of all these sources red light has maximum inhibitory effect on the growth of the test-fungus.

INTRODUCTION

The role of light in relations to growth of wood-rotting fungi have, however, been reviewed by Banbury (1959), Carlile (1965), and Page (1964). But from the available literature on this subject it reveals that very little work has so far been done on "non-morphogenetic" effect of light on basidiomycetous fungi. Banerjee and Bakshi (1945) have studied the effect of light on vegetative growth of some members of Polyporaceae and concluded that in the presence of light the vegetative hyphae become more compact due to early condensation and more rich in varied colouration than those kept in darkness. Fritz (1923) has opined that complete darkness is the best condition for vegetative growth of some basidiomycetous fungi where as Nandi (1964), Samajpati and Banerjee (1969) and Chakraborti (1970) have reported that alternate light and darkness have yielded the best results.

In the present investigation an attempt has been made to find out the role of light on the growth of *Hexagonia polygramma* Mont. and also the possible impact it has on its pathogenic association with the host tree *Diospyros embryopteris* Pers.

## MATERIAL AND METHODS

The fresh basidiocarps were collected from infected branches of *Diospyros embryopteris* Pers. in the field and brought into the laboratory. Dikaryophasic and monokaryophasic mycelia were obtained from a typical basidiocarp and grown in *potato-dextrose-agar* medium for experimental purposes. Glucose-casein-hydrolysate medium (Lilly and Barnett, 1951) was used as basal synthetic medium. 25 ml. of the medium was taken in each required number of 250 ml. Erlenmeyer flasks, properly plugged, sterilized at 15 pounds pressure for 15 minutes. The pH of the medium was adjusted with N/15 citrate-phosphate buffer. Each flask was inoculated with an inoculum disc in the usual way as stated in the previous work (Chattopadhyay and Samajpati, 1972) and incubated in different spectral range of light and darkness for 15 days at 35°C. . The light chambers used in this experiment were a big projection glass chambers as mentioned in detail by Samajpati and Banerjee (1969). The culture flasks were then accommodated in each treatment box. The chambers had been placed upon the projection chambers and the experimental flasks were illuminated by using different Ilford's standard spectrum light filters (2" x 2"). The intensity of the light in the treatment box had been found to be 2100 Lux. The different types of light were continuous light (500 - 600 m $\mu$ ), alternate light (12 hours) and darkness (12 hours), red light (610 - 750 m $\mu$ ), blue light (435 - 600 m $\mu$ ), green light (500 - 560 m $\mu$ ), yellow light (570 - 600 m $\mu$ ) and complete darkness. Sufficient numbers of flask were inoculated both with the monokaryophasic and the dikaryophasic mycelia of the test-fungus in order to provide three replicates for each treatment for each type of mycelia and incubated (stationary) for 15 days. Every fifth day, three replicates of each treatment of both types of mycelia were harvested. In harvesting, the contents of each flask was filtered through a tared filter paper (Whatman No. 1.) placed on a Buchner funnel. The residual mycelia of the flask were washed separately with distilled water to remove any trace of the medium, and dried at 60°C. in an oven for 24 hours. After drying they were kept in a close vacuum desicator over magnesium perchlorate, cooled and later weighed in a electrically operated chemical balance. The other necessary experimental procedure were, however, remained the same as described in Samajpati and Banerjee (1969).

## RESULTS

The observations so far made during this experiment were given in Tables 1 - 3.

Table 1. *Data (mean) showing dry weight of mycelium of Hexagonia polygramma in the presence of various sources and nature of light and at different incubation periods.*

| Nature of light<br>(Flourescent tube) | Mycelium        |               | Light condition<br>Mean |
|---------------------------------------|-----------------|---------------|-------------------------|
|                                       | Monokaryophasic | Dikaryophasic |                         |
| Light                                 | 86.444          | 78.111        | 82.277                  |
| Alternate light and darkness          | 98.222          | 121.888       | 110.055                 |
| Complete darkness                     | 73.555          | 65.000        | 69.277                  |
| Red                                   | 51.555          | 33.111        | 42.333                  |
| Blue                                  | 83.444          | 51.606        | 67.555                  |
| Green                                 | 53.222          | 57.111        | 55.166                  |
| Yellow                                | 56.444          | 48.555        | 52.500                  |
| Mycelium Mean                         | 71.841          | 65.063        |                         |

S.E. for Mycelium =  $\pm .000458$       C.D. for Mycelium at 0.05 of P = .0012  
S.E. for light condition =  $\pm .0086$       C.D. for light condition at 0.05 of P = .0238  
S.E. for Mycelium  $\times$  Light condition =  $\pm .0012$       C.D. for Mycelium  $\times$  light condition at  
0.05 of P = .0053

Table 2. *Data (mean) showing the effect of different incubation periods on the vegetative growth (mg.) of the monokaryophasic and the dikaryophasic mycelia of Hexagonia polygramma under different light condition.*

| Incubation period<br>(Days) | Mycelium        |               | Incubation<br>Mean |
|-----------------------------|-----------------|---------------|--------------------|
|                             | Monokaryophasic | Dikaryophasic |                    |
| 5                           | 50.857          | 39.476        | 45.166             |
| 10                          | 80.428          | 77.952        | 79.238             |
| 15                          | 84.238          | 71.761        | 81.000             |
| Mycelium Mean               | 71.841          | 65.063        |                    |

S.E. for Mycelium =  $\pm .000458$       C.D. for Mycelium at 0.05 of P = .0012  
S.E. for Incubation period =  $\pm .0005$       C.D. for Incubation period at 0.05 of P = .0013  
S.E. for Mycelium  $\times$  Incubation period =  $\pm .0007$       C.D. for Mycelium  $\times$  Incubation period at  
0.05 of P = .000019

Table 3. *Data (mean) showing dry weight of mycelium (mg.) of Hexagonia polygramma in the presence of various sources and nature of light and at different incubation period.*

| Nature of light<br>(Flourescent tube) | Incubation period |         |         | Light condition |
|---------------------------------------|-------------------|---------|---------|-----------------|
|                                       | 5                 | 10      | 15      |                 |
| Light                                 | 41.500            | 107.000 | 98.333  | 82.277          |
| Alternate light and darkness          | 63.166            | 122.833 | 144.166 | 110.050         |
| Darkness                              | 37.000            | 103.500 | 67.333  | 69.227          |
| Red                                   | 49.666            | 40.833  | 36.500  | 42.333          |
| Blue                                  | 47.500            | 71.333  | 83.833  | 67.555          |
| Green                                 | 37.500            | 54.500  | 73.500  | 55.166          |
| Yellow                                | 39.833            | 54.333  | 63.333  | 52.500          |
| Incubation period Mean                | 45.166            | 79.238  | 81.000  |                 |

S.E. for Incubation period  $\times$  Light condition =  $\pm .0014$       C.D. for Incubation period  $\times$  Light  
condition at 0.05 of P = .0041

The data so far recorded clearly indicate that the optimum light source for vegetative growth of the test-fungus is alternate light (500–600 m $\mu$ ) and darkness. This is followed in succession by continuous illumination, complete darkness, blue light, green light, yellow light and red light. Of all the sources, red light has maximum inhibitory effect on the vegetative growth of the test-fungus.

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