

THE INFLUENCE OF LIGHT ON *IN VITRO* COTTON FIBER DEVELOPMENT

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Abstract

Under field conditions, the ratio of red to far red light received by cotton plants influences boll number, yield, and cotton fiber length (Kasperbauer, 1994; Kasperbauer, 2000). Furthermore, recent evidence suggests that light in the far red range can penetrate through the carpel wall (Kasperbauer, 2000). Therefore, it is unclear whether the response of cotton plants to altered ratios of red and far red light is due to light perception and response by photosynthetic tissues and/or by the developing seeds. Immature cotton ovules can be removed from the parent plant and cultured *in vitro*, producing abundant fiber under controlled laboratory conditions. In this study, we have tested the ability of red and far red light to influence several aspects of fiber growth *in vitro*. Cotton ovule cultures were initiated with field-grown DPL90 ovules harvested on the same day of anthesis. Control cultures were incubated under constant darkness, the standard protocol for ovule cultures. Replicate cultures were exposed to two 30 minute light treatments per day beginning on the day of anthesis, 4 days post-anthesis, or 12 days post-anthesis. The light treatments consisted of fluorescent light with and without a red filter and incandescent light with and without a far red filter. The cultures were harvested at 21 days after culture initiation and photographed. The following measurements were made on the cultures: percentage of ovules with fiber, fresh weight per ovule, fiber dry weight per ovule, and the cellulose content of fiber. None of the measured parameters showed a significant difference attributable to light exposure. This result suggests that light perception and response by photosynthetic tissues is responsible for the observed differences in fiber length in field-grown cotton.