Effects of Light Exposure on Seedling Growth

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INTRODUCTION

Bell pepper (*Capsicum annuum*) seedling growth may depend on daily light exposure, which influences photosynthetic carbon gain. Previous studies report plant responses to light availability and photoperiod (Poorter et al. 2019, Wu et al. 2024). It was predicted that seedlings exposed to 12 hours of LED light per day would attain greater height than those exposed to 8 or 6 hours.

RESEARCH PHOTOGRAPH



Figure 1. Bell pepper (*C. annuum*) seedlings growing in individual containers.

MATERIALS AND METHODS

- Study organism: bell pepper (*C. annuum*) seedlings grown in potting soil.
- Independent variable: daily LED grow-light duration (12, 8, or 6 h).
- Dependent variable: tallest observed seedling height in each group at Week 4 (cm).
- Controlled conditions reported: same potting-soil type and 59 mL of water daily per group.
- Seedlings were photographed and the tallest individual in each group was measured; group means were not reported.

RESEARCH PHOTOGRAPHS



Figure 2. Bell pepper (*C. annuum*) seedling development documented during the experiment.



Figure 3. Bell pepper (*C. annuuml*) seedlings in multiple containers during an observation.

RESULTS

Week 4 maximum seedling heights:

- Group A — 12 h/day: 3.56 cm (1.40 in).
- Group B — 8 h/day: 2.54 cm (1.00 in).
- Group C — 6 h/day: 1.91 cm (0.75 in).
- Group A's maximum exceeded Group C's by 1.65 cm.
- Values represent one tallest plant per group, not mean height or growth rate.

WEEK 4 GROWTH

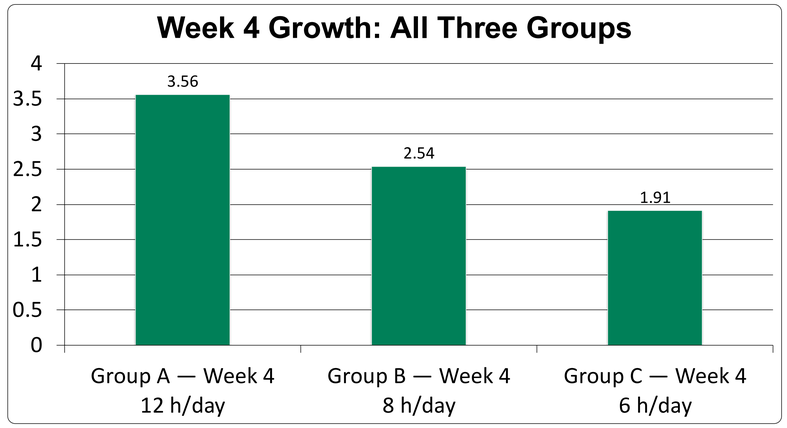


Figure 4. Tallest bell pepper seedling in each light-duration group at Week 4 (cm). These are maximum individual heights, not group means.

DISCUSSION

The Week 4 maximum heights were consistent with the prediction that longer daily LED light exposure would be associated with taller bell pepper seedlings. This observation is broadly consistent with studies linking light conditions to plant performance (Poorter et al., 2019) and photoperiod responses in tomato seedlings (Wu et al., 2024). Because only the tallest plant per group was reported, the results cannot establish differences in average growth or statistical significance; replication and measurements of every seedling would strengthen the evidence. Future trials could also control LED intensity and measure leaf number, biomass, and height over time.

LITERATURE CITED

Poorter, H., Niinemets, Ü., Ntagkas, N., Siebenkäs, A., Mäenpää, M., Matsubara, S., & Pons, T. L. (2019). A meta-analysis of plant responses to light intensity for 70 traits ranging from molecules to whole plant performance. New Phytologist, 223(3), 1073–1105.

Wu, S., Li, R., Bu, C., Zhu, C., Miao, C., Zhang, Y., Cui, J., Jiang, Y., & Ding, X. (2024). Photoperiodic effect on growth, photosynthesis, mineral elements, and metabolome of tomato seedlings in a plant factory. Plants, 13(22), 3119.