



A Comparative Study on the Effects of Varying Photoperiod and Types of Light on the Growth of *Asclepias tuberosa*

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Introduction

General information

- *Asclepias tuberosa*, commonly referred to as 'Butterfly weed' is a perennial wildflower native throughout North America
- This plant is known as an attractant for beneficial pollinators, including bumblebees, honeybees, and monarchs (USDA NRCS, n.d)
- The purpose of this experiment is to compare the growth of *Asclepias tuberosa* stem cuttings exposed to different photoperiods and light types

Problem

- *A. tuberosa* populations have been declining in recent years due to urbanization, agriculture
- Native plants are not widely cultivated and produced, so little research is conducted on their production

Hypothesis

- I hypothesize that *A. tuberosa* cuttings will have the highest growth under LED long day photoperiods.
- According to a previous study, the plants grow best under photoperiods of 14 hours or longer (Whitman & Runkle, 2017).

Experimental Design

- *A. tuberosa* stem cuttings will be grown under different photoperiod and lighting conditions.
- By utilizing LED, incandescent, and natural sunlight, cuttings will be exposed to long-day or short-day settings
- 6 replicates will be tested for each lighting condition:
LED – Long day (16/8), Short day (8/16)
Incandescent – Long day (16/8). Short day (8/16)
Controls – sunlight and natural photoperiods, darkness (0/24), and constant light [one under an LED light and one under an incandescent light] (24/0)
- Stem cuttings will be under these conditions for 2 weeks and the vertical growth and root growth will be measured afterward

Results and Photos

Condition	Root length	Shoot length	New leaves
LED Short Day (8/16)			
LED Long Day (16/8)			
LED All Day (24/0)			
Incand Short Day (8/16)			
Incand Long Day (16/8)			
Incand All Day (24/0)			
Sunlight			
Dark (0/24)			



A. tuberosa stock plants



Inside the lighting chamber



Cuttings before placed in lighting chambers

Data Analysis

- Cutting and root lengths were measured after 2 weeks in the growth chambers and data was collected. The initial cuttings were all approximately 7.5cm when planted, had 4 leaves, and no roots.

Conclusion

The anticipated results are for the LED long day plants to have the optimized growth. This is because LED lights emit less heat than Incandescent lights and because *A. tuberosa* is know to do well under extended daylight periods.

Discussion

- This research is pioneering the way to understanding native plant production
- There is so much we do not know about native plants, and more research needs to be conducted before they can effectively be produced commercially.

Future Research

- I would like to test more photoperiods and test other forms of vegetative propagation
- I would also like to test the effects of rooting hormones on the growth vegetative cuttings

Acknowledgements

I would like to thank Erin Alvarez, Brian Owens, and Cody Banner for their assistance with this project. Without them, this project would not have been possible

Literature Cited

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- Whitman, C., & Runkle, E. (2017). *Asclepias tuberosa* Butterfly Weed. Retrieved from <https://gpnmag.com/article/asclepias-tuberosa-butterfly-weed/>

