

What is the Diversity Importance of Nocturnal Arthropods?



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Introduction

- Nocturnal Insects do the majority of pollination, even affecting diurnal pollinators (Knop et al., 2017).
- With the populations of pollinators decreasing, the diversity of plants, including crops, is decreasing tremendously (Knop et al., 2017).
- Seeing as how there are many variations of pollinators, DNA Barcoding is essential in order to distinguish them.
- A lot of insects are currently decreasing in numbers because of the alarming increase in light pollution and use of artificial lights at night (Eccard et al., 2018).
- We plan to collect nocturnal pollinators in order to better identify species in our area.
- **Research Question:** What is the diversity importance of nocturnal arthropods?
- **Hypothesis:** The organisms captured using a black light will have a greater variation compared to the organisms captured with white light. This is because insects are generally more attracted to the blacklight, so we hypothesize that the blacklight would attract a greater variety of nocturnal insects.



Figure 1:
Picture of
pollinator



Figure 2: Side
by side
comparison of
pollinator with
ruler

Methods

We planned to collect nocturnal pollinators with a simple light trap, which consisted of a funnel attached to a glass jar with parafilm along with a light hanging above. The lights we used were: blacklights, white lights, and LED black lights. We placed the trap near the grass or in it. The jar and funnel sat on the ground while the light attracted nocturnal insects, which they went toward and fell into the funnel then into the jar. It is highly probable that we collected more insects when the light is higher up and when the jar was placed in grass.

We performed DNA barcoding, which included DNA extraction, PCR in which we used polymerase and primers to make copies of the CO1 gene, then gel electrophoresis to separate DNA bands and see if we got results.



Figure 3: General
setup of the trap that
was used for
collection

Results and Conclusions

Electrophoresis Results

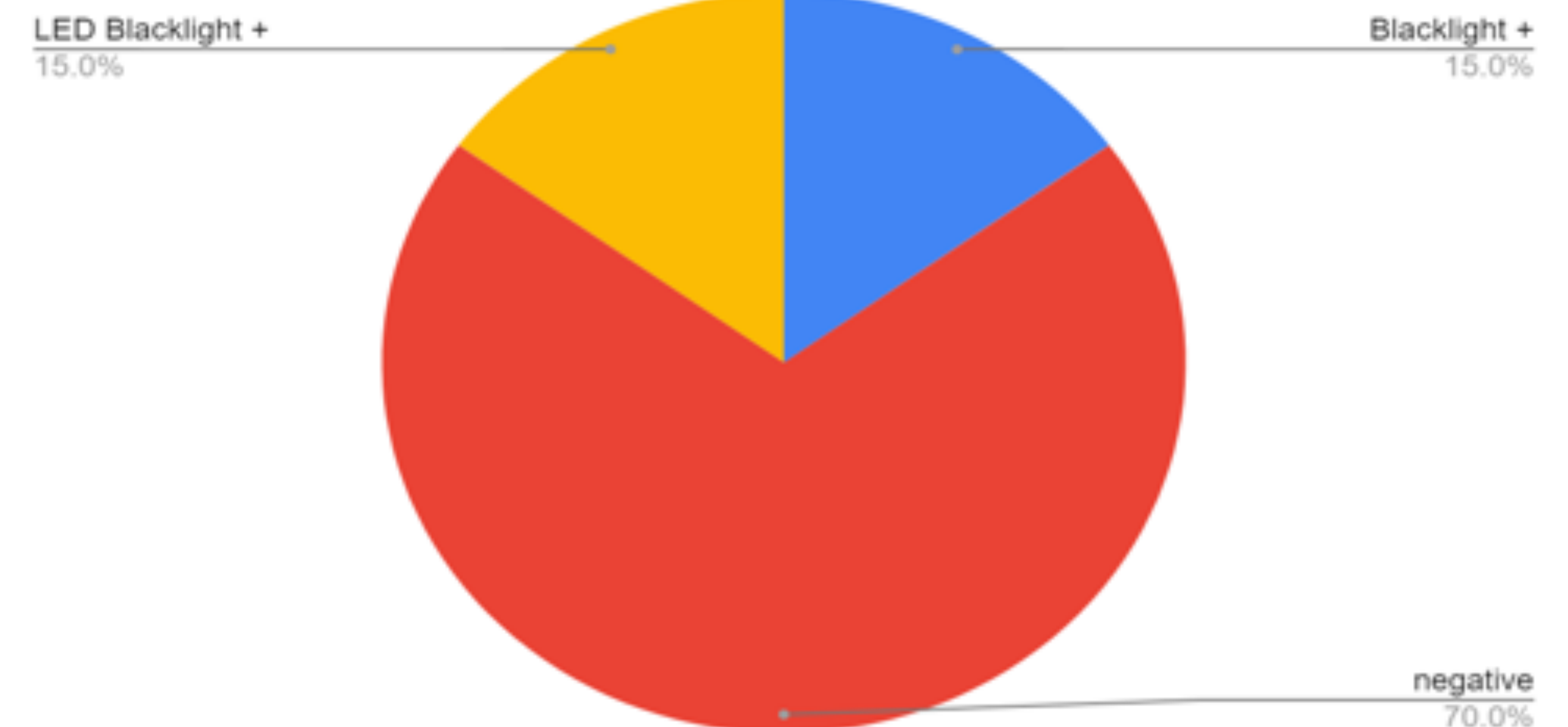


Figure 4: This figure shows that we had the best results for DNA barcoding with the LED blacklight and regular blacklight samples (3 of each) while the rest of the results were negative, the DNA extraction was not successful in 14 samples.

Future Research

In the future, we plan to research further about the biodiversity of nocturnal epigeal arthropods and how they are affected by light sources. In our plan for the future, we hope to use more of a wide range of different types of lights, for example, incandescent bulbs, fluorescent bulbs, and halogen bulbs. We also plan to expand our research to diurnal insects such as bees and air-dwelling nocturnal insects such as moths.

References

- Eccard, J. A., Scheffler, I., Franke, S., & Hoffmann, J. (2018). Off-grid: solar powered LED illumination impacts epigeal arthropods. *Insect Conservation and Diversity*, 11(6), 600-607.
- Knop, E., Zoller, L., Ryser, R., Gerpe, C., Hörler, M., & Fontaine, C. (2017). Artificial light at night as a new threat to pollination. *Nature*, 548(7666), 206-209L.
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