The purpose of this project was to develop lab-engineered pesticide resistance in *D. pulex* to acetylcholinesterase inhibitors, specifically malathion, to protect non-target freshwater organisms from the negative effects of pesticide run-off.

- *D. pulex* disappearance causes trophic cascades.
- AChE inhibitors stop the breakdown of ACh.
- Pesticide resistance in *D. pulex* protects the ecosystem by buffering the effects of pesticides and protecting other animals.

### Background

The standard deviations and SEM bars indicate statistical significance due to lack of overlap of the SEM bars. An ANOVA test showed a significant difference between the f value and critical value, which rejects the null hypothesis and shows the statistical significance of the data. The p value further supports the significance of the data.

### Methods

- *D. pulex* was exposed to different concentrations of malathion to determine the LD50.
- LD50 malathion was added to malathion jars every 9 days for 54 days to attempt to develop resistance in *D. pulex*.
- LD75 malathion was added to each malathion and malathion control jar. The mortality rates of all groups were calculated to determine the difference between previously exposed and newly exposed *D. pulex*.

### Data Analysis

In the resistance testing, when compared to the control unexposed *D. pulex*, the previously exposed *D. pulex* had a 3% lower mortality rate and the sensitive *D. pulex* had a 77% higher mortality rate, leading to a difference of 80% between the 2 experimental groups.

### Statistical Significance

The research hypothesis was supported as the previously exposed *D. pulex* had significantly lower mortality rates compared to the sensitive *D. pulex* when exposed to the LD75. Future studies can be completed by exposing other organisms to pesticides with resistant and sensitive *D. pulex*.

### Conclusion


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