**Introduction**

Venus flytraps (*D. muscipula*) belong to several species of plants with once bewildering adaptations: plant carnivory. As a result of nutrient, specifically nitrogen, poor soil in the environments they are native to, these fascinating organisms evolved a completely separate method to obtain the nutrients they lacked from the roots. As a result of continued agricultural pollutant runoff in the Carolinas, we questioned the effects of nitrogenous fertilizer uptake would contribute to slower snap trap mechanism. We believe that the evolutionary trade-offs favor receiving nitrogen via root uptake against spending large amounts of energy to operate the mechanism. As a result of this, the excess nitrogen via root uptake would contribute to slower snap trap closure times as it spends less energy using this mechanism. The purpose of this experiment was to test the effects that nitrogenous fertilizer excess nitrogen uptake and closure speed

**Experimental Groups:**

- Control treatments lacked algal blooms
- Higher concentrations of fertilizer resulted in increased dissolved oxygen
- Control treatments lacked algal blooms
- The increase in dissolved oxygen corresponds to the increase in algal blooms

**Methods**

**Simulated increasing concentrations of nitrogen using MaxSea “Soluble Plant Food Seaweed Powder” (3% total nitrogen) and Miracle-Gro “Water Soluble Acid-loving Plant Food” (30% total nitrogen fertilizers).**

- We created two control groups of distilled water and six diluted fertilizer experimental groups with nitrogen concentrations of: 30 ppm, 15 ppm, 3 ppm, 1.5 ppm, 0.3 ppm, and 0.15 ppm.

**Measuring Trap Closure Speed:**

- Trap closures were induced using a metal probe to stimulate trigger hairs located inside the Venus flytrap leaves.
- 2-3 trap closures were filmed each class and analyzed frame-by-frame using Adobe Photoshop. The time from initial stimulation until full closure was measured in seconds.

**Color Analysis:**

- Used the software ImageJ with the Fiji add-on
- Created a histogram based on the concentration of red color pigment from top-down photos of the fly-trap pots
- Each pixel was turned into a value based on the concentration of red and charted on the histogram against counts of the pigment

**Dissolved Oxygen Measurement:**

- At the end of our treatments, we measured dissolved oxygen levels in each of the controls (which should experience no change in DO levels) and our treatments using a dissolved oxygen probe
- Between each measurement, we rinsed the probe with DI water

**Results & Discussion:**

- We found that the majority of the nitrogenous fertilizer treatments had trap closure speeds that increased slightly over time
- We were unable to discern between higher concentrations of the treatment and trap speed. Our hypothesis that an increase of external nitrogen would cause a decrease in trap closing speed was refuted.
- Our color analysis revealed that with increased nitrogen concentrations, the lobes of *D. muscipula* appear to become a darker shade of red over time, refuting our hypothesis that with excess nitrogen, the red color is not necessary to attract prey
- We found that the dissolved oxygen of the treatment groups actually increased with increasing concentrations of nitrogen from the fertilizer treatments
- We believe that our findings are explained by excess nutrients supplied to the Venus flytraps by the nitrogenous fertilizers, resulting in excess energy to spend on the mobility mechanism, thus increasing the speed of the trap. However, we recognize additional research is necessary to confirm any results.

**Development of Eutrophication in Experimental Groups:**

- By Day 15 plants treated with increasing concentrations of fertilizer had visual differences in the development of algae.
- Higher concentrations of fertilizer resulted in darker algal
- Control treatments lacked algal blooms
- The increase in dissolved oxygen corresponds to the increase in algal blooms

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