Materials and Methods

**Setaria viridis** was chosen due to its small size, quick growth, and comparability to C4 grass crops such as corn.

- Plants were grown in a homogenous environment with equal light intensity/quantity/quality, water availability, temperature, soil composition, etc.
- 10 plants were given nitrogen deficient fertilizer (control), 10 were given complete nitrogen fertilizer (N), 10 were given nitrogen deficient fertilizer and gibberellin (G), and 10 were given complete nitrogen fertilizer and gibberellin (NG)
- Plants were allowed to grow for 3 weeks.
- After the first week of growth each plant was given 10 mL of their assigned liquid fertilizer (Gibberellin concentration was 100 ppm).
- Plant height was measured each week after planting.
- Leaf count, shoot biomass, root biomass, stem diameter, and leaf area were measured at the 3 week mark.
- Data was analyzed using PAST
- Leaf surface area was measured using FIJI (steps are shown to the right)

**Results**

- **Mean Leaf Area**
- **Mean Stem Diameter**
- **Mean Shoot Biomass**
- **Mean Plant Height**

**Discussion and Data Analysis**

One of the most striking responses observed was the difference in stem diameter between plants with added gibberellin and those without. As is shown in **Figure 2** plants with gibberellin showed a significantly smaller stem diameter than those without added gibberellin. Overall, the presence of nitrogen significantly increased stem diameter but was not successful in completely negating the effects of the gibberellin. Leaf surface area was greatest for the group given a complete nitrogen fertilizer and no gibberellin as can be seen in **Figure 1**. There was a significant correlation between nitrogen and larger leaf surface area as well as between gibberellin and smaller leaf surface area. In addition to decreasing leaf surface area and stem diameter, added gibberellin correlated with a significant decrease in shoot biomass when compared to the two groups with no gibberellin. As is shown in **Figure 3** nitrogen produced a significant increase in shoot biomass. Although the data was not significant, gibberellin did appear to increase overall plant height as shown in **Figure 4**. The difference in height became more pronounced from week 2 to week 3 although the difference was still statistically insignificant. Overall, plants given gibberellin were taller and thinner as compared to their shorter, stouter nitrogen counterparts. This general difference can be seen in **Figure 5**.

**References**

