

Background

Applying nitrogen fertilizer to corn is necessary in order to produce a good crop, but is expensive for farmers and degrades water quality. The living mulch system is a new crop production system in which corn is planted using no-till methods into a field of established Durana white clover. The clover, a legume, produces nitrogen for the corn to use. This system has the potential to decrease mineral N use and improve water quality in high-yield a corn production system.



Objective

We sought to determine the relationship between corn and Durana white clover by examining how clover height influences clover mass, how corn height influences the amount of light available to the clover (light interception), and how light interception influences clover mass.

Methods

Corn was established using different row widths (30 and 36"), pop. densities (36 and 24K/A), clover band kill (8" and 16"), with 3 replications.

Clover mass was measured using a calibrated rising plate meter (RPM) (calibrated using 1 ft² frame quadrats).

Quantum light was measured above and below the corn canopy with a Licor LI-191 Line Sensor and % light interception calculated

Corn height was measured using a 10 ft stick ruler. All data were measured weekly.

Results

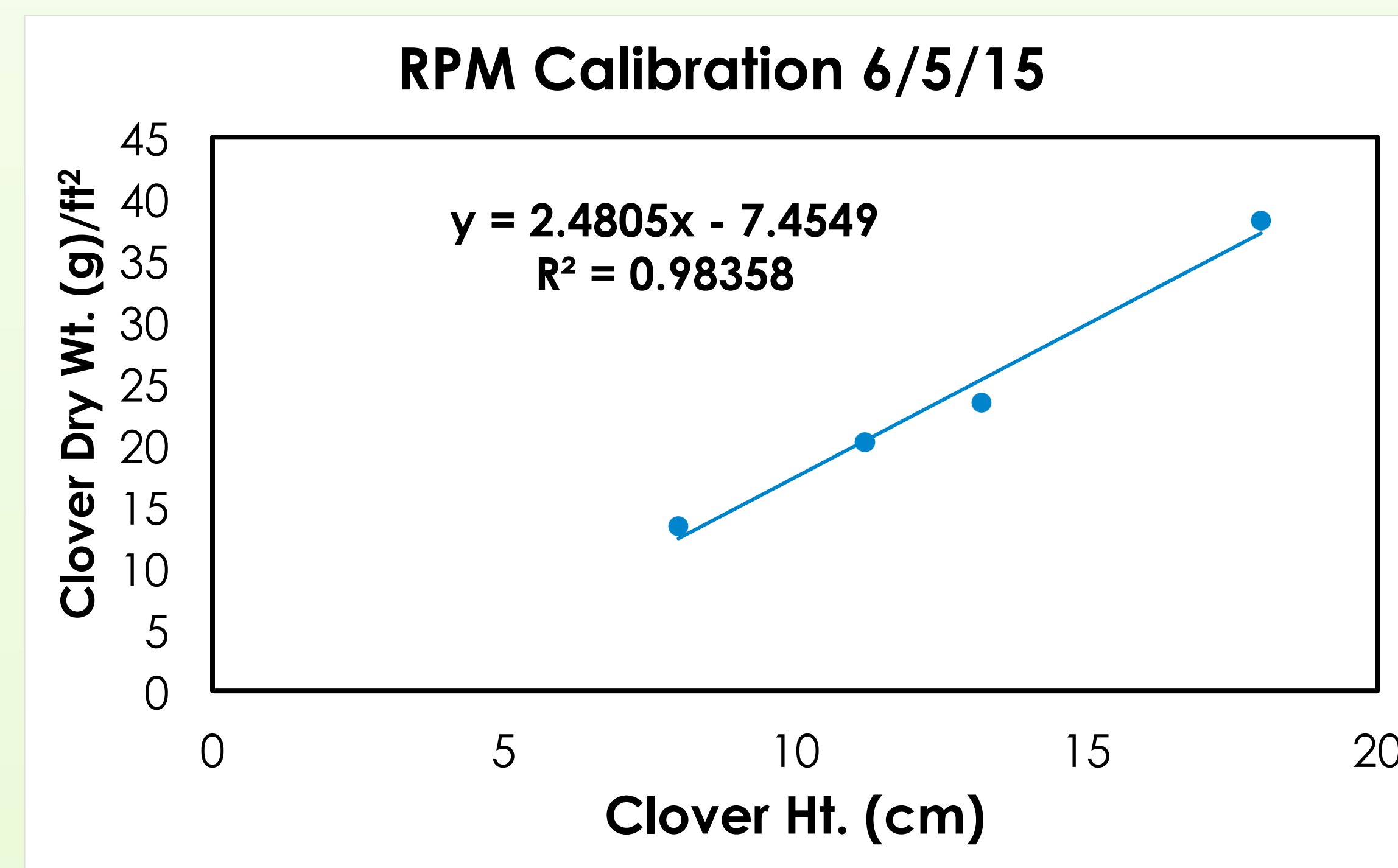


Chart 1: By establishing the relationship between clover height and mass, the mass of the clover can be calculated from the RPM height measurements.



Figure 1: Cutting a clover sample



Figure 2 Using the RPM

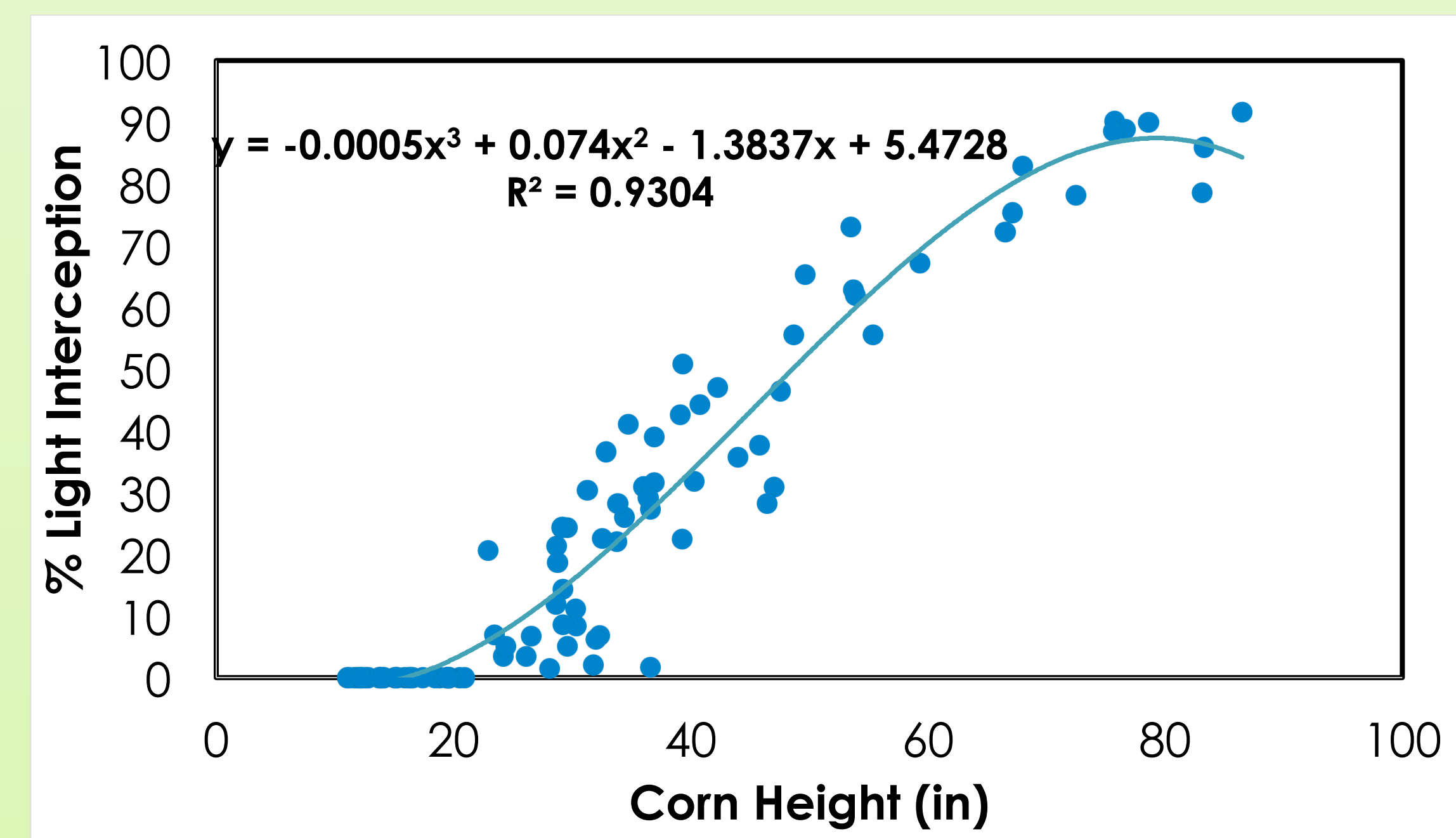


Chart 2: Light interception increased as the corn grew, thus, shading the clover.

Results (cont.)

Light Interception and Biomass for Different Row Spacing and Spray Bands

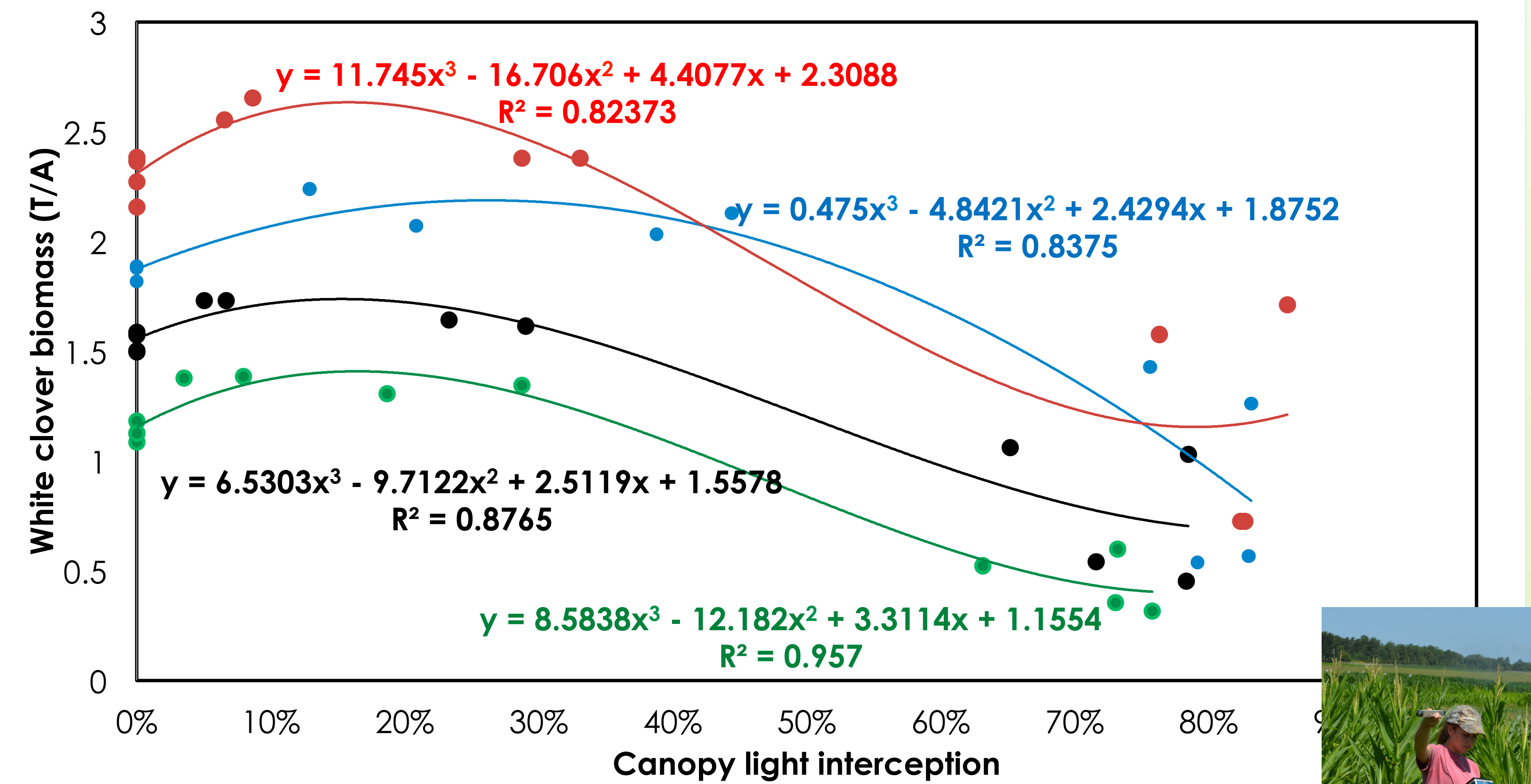


Chart 3: As percent light interception increased, clover biomass decreased.

Figure 3: Measuring light interception.



Conclusion

Light interception increased with corn height which caused clover to senesce its leaves. It is hypothesized that the nitrogen from the senesced and decaying clover will be taken up by the corn. In order to test this, corn and clover were sampled and will be analyzed for their nitrogen content to validate the hypothesis.

Personal Experience

By participating in this project, I have been given insight into how research is conducted and how the scholarly world works. I have had the opportunity to collect and process data as well as present the data to professors, graduate students, and the public.

Acknowledgements

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