Callie Matteson & Ashley Vitti

The Great Climate Debate: Effects of Varying Temperature and Atmospheric CO2 on Plant Growth

We hypothesized that plant growth would be negatively affected by any significant changes from present climatic conditions. Two hundred years ago, we came out of a 500 year cool period known as the "Little Ice Age". We may now be headed for a significantly warmer period. Our project was designed to test the ability of wild native plants (yucca and milkweed) and cultivated crop plants (corn, bean, radish and zinnia) to grow in lower (15-16°C) and higher (32-33°C) than present (23-24°C) temperatures. At the same time, we looked at the effects of elevated CO2 (1000 ppm) and present-day CO2, (400 ppm) in the presence of the cooler past and proposed warmer future temperatures.

Our results partially support our hypothesis. The native plants (yucca and milkweed) germinated and grew the best under current temperature/CO2 conditions. Corn and zinnia grew the best in the environment with both high temperature and high CO2. The bean and radish plants actually grew best in the cooler environments, with little observed effect from CO2 concentration.

Two of our cultivated plants, corn and bean, are significant direct or indirect food sources for people. Both of these plants survive over a fairly broad range of conditions. The agriculture industry should work to keep up with Climate Change through hybridization and bioengineering.

For an extension of this project, we would like to increase the independent variables to include soil nitrates, acid water and even higher temperatures (40°C).