The production of corn is extremely important to the United States for food, seed, and other non-industrial purposes. Due to industrial development and pollution, levels of ozone gas at ground-level are increasing. While ozone in the upper atmosphere protects us from damaging UV radiation, ground-level ozone is a health hazard and harmful to crop production. Because of its structure, ozone is very reactive and can damage plants and lower crop yield. We will test the effects of ozone on three types of sweet corn. One type, Ruby Queen Hybrid, contains a red pigment called anthocyanin, which is an antioxidant. Because of its antioxidant properties, corn with anthocyanin could germinate more quickly due to anthocyanin acting as a defense against the ozone. The two other types do not have anthocyanin. It is expected that these types of corn will take longer to germinate. The corn seeds will be put in Petri dishes and exposed to ozone in a chamber. In addition, we will examine gene expression using microarray hybridization and quantitative PCR. These tests will tell us how the plant is responding to the treatment with ozone by telling us which genes are turned on or off. We will also test caterpillar feeding preferences and growth by allowing the “corn earworm” caterpillar to feed on the different types of corn. The information from this project will allow us to determine the impact of increasing ozone on an important crop, as well as its effects on a major crop pest.