

THE ANALYZATION OF BACILLUS SUBTILIS AND BACILLUS PUMILUS FOR INDUCED SYSTEMATIC RESISTANCE IN CORN

DWFI-Supported Student Research

Each year DWFI leverages Robert B. Daugherty Foundation funds and additional donor funds to support graduate and undergraduate student research and creative activity. Funds are matched one-to-one by their DWFI Faculty Fellow advisors. This year we had to cancel our annual research forum, scheduled for April 2, and missed seeing the students present their work in person.

To celebrate the incredible research being done, students have shared a brief summary of their work and its impact. We're excited to share their work with you here. View more research from DWFI's supported students » <http://dwfi.us/Gx3150ze6F5>



Student: Katie Bathke, Robert and Karla Baltzell Student Innovation Award recipient and UNL undergraduate student studying plant biology and

Advisor: Gary Yuen, Professor, Department of Plant Pathology, University of Nebraska–Lincoln

WHAT?

My research for the past four years has been focused on working to understand the bacterial disease, Bacterial Leaf Streak that affects many types of corn. This disease originates from Nebraska and has been present for approximately 5 years in field all across the corn belt of the United States. There is still no known control method for this disease. Therefore, I have been working to understand how effective probiotic, bacterial strains can be against the disease when integrated into the environment of the corn.

Bacillus subtilis and Bacillus Pumilus are probiotic bacterial strains naturally found in the soil environment. Both strains show to be effective biological control agents against various diseases in agriculture.

Therefore, to test this against the disease, I treated the seeds with the Bacillus strains and grew the corn plants to late V3 stage. Then inoculated the plants with the disease to study the incidence and severity of the disease in a greenhouse setting.

SO WHAT?

The results showed when the seeds were treated with the Bacillus Pumilus strain, disease severity decreased significantly with an average below 2 mm in lesion length. Bacillus subtilis also appeared to be effective in slightly different ways. Such as the lesions were medium sized overall but showed signs of hypersensitivity. The reactions of the treated plants are believed to occur this way to due a mechanism of Induced Systematic Resistance where the probiotic bacteria have altered the way the plant responds to stresses like disease.

NOW WHAT?

My dreams for the project are to develop a product that can be introduced into the environment of the corn that is naturally beneficial for the plant in terms of disease control and plant growth promotion. I am interested in studying the genetic signals within the plant that are being manipulated by the bacterial strains to reduces disease severity. However, my main goal and concern for this research is to find a solution that farmers can sustainably practice in their fields to prevent this disease from occurring.