

## EXECUTIVE SUMMARY -

Different pathogens consistently cause substantial yield losses in soybean. The control of these plant pathogens requires the adoption of integrated management practices. Our ultimate goal is to **reduce yield losses caused by seedling diseases of soybean by exploiting native bio-control agents** (BCAs) already present in the soil and by refining management strategies to enhance and optimize the activity of these beneficial organisms against pathogens detrimental to soybean production.

Throughout this project **we identified BCAs that were effective against Pythium species, Rhizoctonia solani, Fusarium virguliforme, and Macrophomina phaseolina**. The activity of the BCAs was confirmed in laboratory, growth chamber, and greenhouse studies. Field studies were conducted in 2016 and 2017 against *F. virguliforme*, *M. phaseolina*, *R. solani*, and 6 different Pythium species. The tested BCAs did not show a significant effect on Pythium, *F. virguliforme*, or *R. solani* under the tested conditions. **With M. phaseolina, select BCAs decreased the incidence of the disease in the field**. A series of experiments revealed that **in addition to their antibiotic activity against plant pathogens, tested BCAs also induced resistance mechanisms in soybean**, thus providing an additional layer of protection against seedling pathogens. Finally, variation in the sensitivity of the BCAs to the different fungicides was observed. **Some of these BCAs could therefore be added with a fungicide to the seed**.

Our data shows that **BCAs can be successfully used to manage several diseases of soybean**. Additional work is needed to optimize the delivery of the BCAs in the field and to develop methodologies to integrate their use with fungicides. Another area that needs to be expanded upon is the use of emerging techniques to characterize the incidence and activity of the BCAs in different soils and with different management practices. The ultimate goal would be to develop recommendations to enrich soils with native BCAs.

We are collaborating with SIU's Office of Technology Transfer (OTT) to assess the commercial potential of the performed work and to **protect some of the findings through patenting and/or trademarking**.