Former MSU researchers discover biocontrol agent

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Ground breaking research originating from Montana State University (MSU) is one step closer to being able to help farmers control wheat stem sawfly after it received a U.S. patent in January. Dr. Gadi V.P. Reddy, entomologist and former superintendent of the Western Triangle Ag Research Center in Conrad, Mont., worked with a team to isolate five strains of fungi that are lethal to the insect.

This discovery is scientifically revolutionary because the plan is to use the fungi in some sort of application as a way to control the wheat stem sawfly. In addition, these fungal strains can also be used to kill Hessian flies.

Reddy collaborated with Dr. Stefan Jaronski of USDA's Northern Plains Agriculture Research Laboratory located in Sidney, Mont. A combination of Reddy's discovery and the work performed at Jaronski's laboratory helped bring this biocontrol method to fruition.

"We started trying to find a fungi or some sort of naturally occurring fungal spores that could kill the wheat stem sawfly. We discovered some specimens on a plant and we sent samples of it to Jaronski because he had a lab to do the work. He identified these fungal formulations," Reddy explained.

In total, five fungal specimens were found to be detrimental to the wheat stem sawfly. After the fungi were discovered and isolated from the wheat plant in 2013, both Reddy and Jaronski were able to start conducting trials.

During these trials, the researchers learned that when the fungi spores come in contact with the insects themselves they germinate, releasing enzymes and other substances that ultimately are toxic to the wheat stem sawfly. Since the fungi are naturally occurring, they have proven to be completely safe for both humans and the wheat plant.

MSU has long been a leader in research that could help control the wheat stem sawfly. To date, there is no insecticide or pesticide that affects wheat stem sawfly, and therefore, no way to chemically control them. Solid stem varieties of wheat can reduce the insect's devastation, but they are by no means a cure all and solid stem varieties do not yield as well as hollow stem.

"The wheat stem sawfly causes millions of dollars of loss for the farmers because there has been no control method," Reddy stated.

Reddy went on to emphasize the whole process of getting this research patented did not happen overnight. The research was truly a collaboration between MSU and USDA, so there was a lot of paperwork involved. USDA applied for the patent in 2017, but it wasn't officially issued until Jan. 14, 2020.

"It is quite an honor to have this work patented and it has been a pleasure to work on it, but most importantly, this is going to help the farmers. They are the ones growing the wheat," Reddy said.

Since being patented and approved, Montana Bioagriculture, Inc., based in Missoula, Mont., has been entrusted to commercialize the biocontrol agent and develop it into a product that can be used by farmers. The company is in the beginning stages of ground work, so an official release date is yet to be determined, but a commercial spray that can be used to control wheat stem sawflies is definitely on the horizon.

Reddy has since left the Western Triangle Ag Research Center and now works as a research leader for USDA's Southern Insect Management Research Unit in Stoneville, Miss. Jaronski, too, has moved on as he is now retired from USDA ARS. Regardless, both researchers and their teams are to be applauded for their exhilarating contribution to the advancement of farming. ★