

## **Montana BioAgriculture Inc. is to develop commercial product**

**for wheat stem sawfly:** "it is now time to CRISPR edit and play with wheat stem sawfly gene and regulatory elements to develop a product for farmers" said Dr. Hikmet Budak, Chief Science Officer.

Insects, diseases, and abiotic stressors cause losses of millions of tons of wheat and cost farmers \$100s of millions each year. Solutions can come from understanding and working with interactions between naturally occurring fungi and plants in the common agroecology of US and Canadian wheat growing areas. MBA are working to develop biological solutions to cross border problems affecting North American farmers and global food security.

The wheat stem sawfly, WSS, is the number one insect pest of wheat in North America. There are no effective insecticides. The larvae which cause the damage live their life cycle protected inside the wheat stem. "Solid stem" wheat varieties can limit damage however lower yields than conventional varieties. WSS apparently first adapted from native grasses to infest spring wheat in North Central Montana spreading into North Dakota and into Canadian prairie provinces. WSS has now adapted to winter wheat, expanding east and south in the US. Our recent forum (International Virtual Wheat Stem Sawfly Forum: *Farmer's Voices*

<https://www.linkedin.com/feed/update/urn:li:activity:6906012389427290112/v>) in June, 2022 declared that biopesticide and other products are necessary to control WSS.

Montana BioAgriculture (MT BioAg), has been working on WSS using interdisciplinary tools. It has received two large grants from the US Department of Agriculture to (i) develop a fungus which induces tolerance to drought in wheat and barley, and (ii) use genomics tools to fight against wheat stem sawfly, a major problem in great plains. MT BioAg licensed the fungus to develop as a commercial product.

*"These awards is a major boost to Mt BioAg's work to develop integrated, biological solutions for farmers to reduce losses in grain yield from drought, insects and diseases."* Noted by Cliff Bradley MT BioAg president. One of the awards from USDA to evaluate fungi to control wheat stem sawfly and Fusarium head blight (FHB), the most important insect and disease of wheat in Montana. MBA licensed use of fugal stains originally isolated from wheat in Montana by scientist with the USDA Agricultural Research Service. These fungi are natural pathogens of the WSS and are endophytes, that is the fungi colonize the stem without causing damage to the wheat. The fungi infect and kill the WSS larvae inside the stem. Dr. Hikmet Budak, Chief Science officer at MT BioAg said, *"these projects will utilize new genomics tools in combination with speed breeding. This has been further helping us to CRISPR edit gene(s) to control Wheat Stem Sawfly,*

*FHB and drought stress*". With these USDA grants and funds from the Montana Department of Commerce program, MT BioAg has been working on developing production and delivery systems needed to bring these naturally occurring fungi to commercial use. This could lead to higher incomes for grain growers, better nutrition for world populations and new wheat and barley varieties. The research and new findings especially small RNAs (microRNAs, LncRNA) targeting wheat stem sawfly gene and metabolites also offer immense potential for our breeding program to create new discoveries when it comes to advancing global food security." Montana BioAg. Inc., Chief Science Officer said.

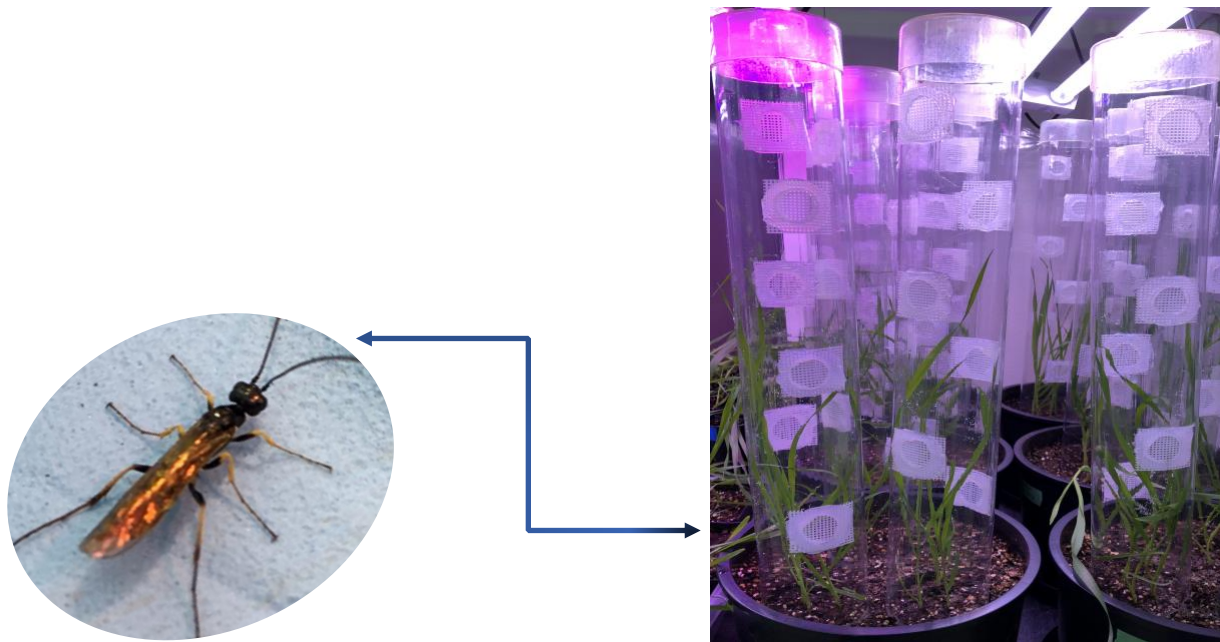


Figure: WSS screening in cereals (wheat, barley and oat).