

Research efforts to control insect pests after harvest

By Gadi V.P. Reddy

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One might wonder what field research work can be done after crops have been harvested in the fall — especially in Montana. The Entomology/Insect Ecology team at the Montana State University of Western Triangle Agricultural Research Center (WTARC) is actively working on biological control methods against wheat stem sawfly. In Montana, and other neighboring states, the wheat stem sawfly causes millions of dollars worth of wheat crop loss each year. Wheat stem sawfly larvae feed internally within the stem. Come fall, they move to the bottom of the stem to diapause (state of physiological inactivity). However, before the crop can be harvested, the larvae chew around

the inside of the stem causing the wheat stalk to fall to the ground. The diapausing larvae remain in the wheat stubble until the following spring. Dr. Scott Portman, a Postdoctoral Research Associate, has been conducting research on applying predatory nematodes (round worms) to the wheat stubble. Ms. Amber Ferda, a Research Associate is focusing her research work on using insect fungal pathogens such as *Beauveria bassiana* and *Metarhizium brunneum*. Dr. Gadi V.P. Reddy, Superintendent and Principle Investigator, plans to expand the work on biological controls to other Montana pest insects such as orange wheat blossom midge and canola insect pests. Drs. Brian Thompson and Frank Antwi, postdoctoral researchers have been working on these projects

as well.

Entomopathogenic (insect killing) nematodes are small naturally occurring round worms that live in the soil. The worms find their prey by sensing carbon dioxide release, vibration, and chemical cues from the insects. Many nematodes species have been successfully used as environmental friendly bio-pesticides in insect control programs. These tiny predatory worms do not pose a danger to humans and other beneficial organisms. Moreover, they only prey on a small number of specific target insects. Because they are environmentally safe, predatory nematodes have been exempted from the pesticide registration process set by the United States Environmental Protection Agency (US EPA).

Insect pathogens (entomopathogens) such as bacteria, fungi, protozoans, and viruses cause sickness and death in insects. Many insect pathogens are commercially available for application in the field to control insect pests. In some cases, application of the pathogen alone provides insufficient control. However,

entomopathogens can be applied in conjunction with other control methods and research shows promising results when they are used as part of an integrated pest management (IPM) plan. Researchers at WTARC are currently working on methods to improve the effectiveness of entomopathogens for controlling insect pests in Montana. Overall the research being carried out at WTARC is very beneficial to growers in Montana because it focuses on finding safe and practical solutions to agricultural insect pest problems in the region.

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