**Investigating Novel Sources of Resistance to Wheat Stem Sawfly, a Devastating Pest of Wheat**

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Research/Extension project goals:

1. Investigate and quantify resistance traits in wild wheat relatives to wheat stem sawfly infestations for future wheat breeding efforts to integrate.
2. Inform and connect with local producers, via extension resources, about current and future research goals to help them make better production decisions.

Student learning objectives:

1. Collect and analyze data on plant resistance traits in wild wheat species to wheat stem sawfly infestations.
2. Articulate project objectives and results in portions of bi-weekly newsletters (3 total) that will be circulated to wheat producers and stakeholder groups.
3. Gain experience in managing agricultural experiments, including plant care, planning, and resource management.
4. Broaden the student’s professional network of producers, extension agents, and researchers.

Wheat stem sawfly is a prolific pest in Colorado grown wheat and causes an estimated $30 million in losses annually, the most devastating areas of damage being northeastern Colorado. It is a stem boring pest that spends much of its lifecycle inside of stems, making traditional insecticides ineffective at controlling. Solid stem varieties of wheat have been shown to be effective in impeding larval development and movement, thus reducing larval survival. However, the solid-stemmed cultivars are not preferred by growers because of low yield (10-15% reduction) compared to hollow-stemmed cultivars and inconsistent solidness expression. Given the limited sources of resistance to wheat stem sawfly in the current breeding germplasm, there is a need to evaluate diverse wheat genetic resources for additional alleles that can enhance development of wheat stem sawfly-resistant varieties. Applied research on this topic has been ongoing at CSU for over ten years and continues to be a major point of interest for the crop entomology research group.

A student intern is needed to investigate possible resistance mechanisms in wild wheat relatives to wheat stem sawfly. They will achieve this by carrying out an experiment that will involve growing wild wheat species in a greenhouse, transporting these plants to a local producer’s fields with heavy wheat stem sawfly infestation, and then collecting data on the insect’s development within plants. This objective will take place mainly on CSU’s main campus (Larimer county) with some field collections in Weld and Morgan county farms. This data will be critical for wheat breeders to integrate into their breeding decisions in the future as they find novel ways to combat this pest.

There are a myriad of research projects involving wheat stem sawfly ongoing every year at CSU. Our outreach objective for the student intern will ensure that this research project is adequately explained to local stakeholder groups and producers as the intern fosters connections with those groups through their writing and in person extension activities. The extension outreach events will take place in Sedgwick, Phillips, and Morgan counties, with the outreach newsletters reaching a wider audience of nearly all wheat growers in eastern Colorado.