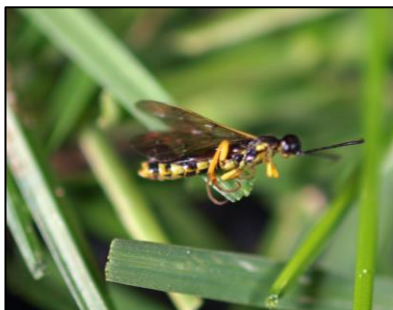


Wheat Stem Sawfly in Colorado – Frequently Asked Questions

Frank Peairs

Q: How do I know if I have wheat stem sawfly in my field and what do they look like?

A:



Starting in early to mid-May, look for small yellow and black wasps on wheat plants along the edges of the field. Resting sawflies will sit on the stem facing the ground. There are insects that are similar in appearance, but they would not have this resting posture or be abundant in field edges. In mid to late-June, stems can be cut open to look for the white, S-shaped larvae or the sawdust-like material resulting from their feeding. Near harvest, look for lodged stems in field margins.

Q: What do wheat stem sawfly larvae look like?

A:

In mid to late-June through harvest, white, S-shaped larvae can be found feeding inside stems of wheat. After harvest, fully grown larvae will be found in what is left of the stem below where it was cut. They will remain here until the following spring.



Q: What does wheat stem sawfly damage look like?

A:

Before the stems dry, you can find evidence of feeding and tunneling, as well as the sawdust-like material resulting from their feeding. When the larvae finish feeding they cut the insides of the stems near the soil, making them prone to lodging, especially after strong winds. Unlike stems lodged from other causes, cut stems are no longer connected to the plant.

Q: How and where do wheat stem sawfly survive the winter?

A:

As the larvae mature they move down to soil level and cut a V-shaped notch around the interior of the stem. They then seal the interior of the stem just below this cut with silk and excrement to form an overwintering chamber. The upper stem often breaks at the cut just prior to harvest. The larvae overwinter in these chambers, just below soil level.

Q: Are there weather conditions that favor wheat stem sawflies?

A:

The parasitic wasps that attack wheat stem sawflies do better in cool, wet conditions, so drier conditions tend to favor the sawfly. Also, there tends to be more movement out of overwintering sites and egg laying activity during warm, dry periods following a rain.

Q: Do we find wheat stem sawfly in all wheat producing counties?

A:

Yes, wheat stem sawfly occurs in all wheat producing counties in Colorado, at least in non-cultivated grasses. Damage to winter wheat has yet to be observed in a few counties. Most damaging infestations have been found in north central CO, with a few lighter infestations occurring as far south as Baca County. Economically significant infestations are spreading to the south and east.

Q: Where are the wheat stem sawflies coming from?

A: The wheat stem sawfly is native to Colorado. Until recently, it inhabited only non-cultivated grasses. It recently started adapting to feeding on winter wheat, becoming our most important insect pest of wheat in the process.

Q: Why are we starting to have wheat stem sawfly problems now?

A: There is no good answer to this question, but it likely is due to some combination of the changes in the wheat stem sawfly's preference for wheat, changes in production practices (e.g., reduced tillage), and changes in climate.

Q: How fast can wheat stem sawflies spread?

A: They're already here, what's spreading is a change in behavior. According to CSU survey results, damage in wheat was mostly limited to the New Raymer area in 2012. By 2015 it had been found infesting wheat as far south as Baca County and as far east as Sherman and Wallace counties in Kansas.

Q: Can we predict wheat stem sawfly infestations ahead of time?

A: According to Canadian guidelines, greater than 10-15% cutting in stubble indicates that adjacent fields should be planted to something other than wheat or to a resistant variety.

Q: How do I prevent wheat stem sawfly infestations in my wheat?

A: Current preventive measures include planting resistant varieties, reducing the amount of wheat in your rotations to avoid planting new wheat next to previous crop stubble, and planting larger blocks to minimize the relatively severe infestations found in field edges.

Q: What rotation crops can reduce the level of wheat stem sawfly infestation?

A: None of the common rotational crops (corn, proso millet, sorghum, sunflower) are affected by wheat stem sawfly. It is very important to plan rotations so as to avoid planting new wheat immediately adjacent to stubble infested during the previous crop.

Q: How long do I have to stay out of wheat to reduce the problem so I can go back to wheat with minimal loss of yield?

A: Wheat stem sawfly infests a wheat crop in May and June and will remain in the stubble from that crop until the following spring. At that time they will disperse from the field looking for new wheat to infest, so that field could be planted to wheat that fall without risk of infestation by the sawflies that infested that field the previous year. However, sawflies from adjacent fields or from even greater distances may infest this new crop.

Q: How effective is tillage in controlling the wheat stem sawfly?

A: Both fall and spring tillage have been used to expose crowns containing overwintering larvae to moisture and temperature extremes. However, if just 10% of the larvae survive this treatment, infestations will be similar to the previous season, and tillage rarely causes this level of mortality. Also, tillage will negatively impact the natural enemies that attack wheat stem sawfly.

Q: Are there varieties that are resistant to wheat stem sawfly?

A: The available highly resistant varieties, none of which are adapted to Colorado, have a trait called “solid stem”. CSU has released a moderately resistant variety, Fortify SF, a medium maturity variety with wheat curl mite resistance and a similar yield potential to Byrd under normal field conditions. It is not highly resistant because it has only a semi-solid stem, however, it is substantially more resistant than other locally adapted varieties.



Photo Credit: D. Kluth

Q: What is known about the consistency of expression of stem solidness, or degree of resistance conferred by the new semi-solid varieties?

A: Reports from Montana and Canada suggest that certain environmental conditions, such as lower light intensity from increased cloudiness or lower elevation, may result in reduced expression of solidness. We do not yet know for certain how much of an issue this will be here in Colorado with our higher light intensities. The level of expression of semi-solidness observed has provided significant reduction in stem cutting in field trials.

Q: How much "yield drag" should we expect with the new semi-solid varieties?

A: In three years of field trials (2016-2018) grain yield of the new semi-solid lines has been roughly equivalent to the yield observed with Byrd and Denali varieties.

Q: Does the wheat stem sawfly have any natural enemies?

A: A few insect species feed on wheat stem sawfly. The most important of these are two parasitic wasps, *Bracon cephi* and *Bracon lissogaster*, whose larvae can be found feeding on wheat stem sawfly larvae inside wheat stems.

Q: How important are these parasitic wasps in Colorado?

A: To date, very few of either wasp species have been found feeding on wheat stem sawfly larvae infesting winter wheat. They are more easily found on wheat stem sawfly larvae infesting non-cultivated grasses. These wasps are considered to be important in the Northern Plains, which have a longer history of wheat stem sawfly infestations in wheat.

Q: Are there practices that will encourage the parasitic wasps that attack wheat stem sawfly?

A: These parasitic wasps are expected to become more important as they adapt to wheat stem sawfly infestations in wheat. Tillage and swathing are two practices known to affect them negatively.

Q: How can I control existing wheat stem sawfly infestations in my wheat?

A: Management practices emphasize prevention. Little can be done once your wheat is infested. No effective chemical controls are available. Stem cutting can be reduced by swathing. Stripper headers are better at picking up cut stems than traditional headers.

Q: Can wheat stem sawfly larvae be controlled with insecticides?

A: No. The larvae are found within the stem, making them inaccessible to insecticides.

Q: Can wheat stem sawfly adults be targeted to reduce egg laying?

A: The flight lasts about a month, so several applications might be necessary. Also, the adults do not feed, thus limiting their insecticide exposure. Additionally, currently available insecticides don't kill quickly enough to prevent individual females from laying at least some eggs.

Q: Will swathing my wheat reduce losses to wheat stem sawfly?

A: Wheat can be swathed before stem cutting starts. Disadvantages to swathing include the cost of an extra field operation and negative effects on the parasitic wasps that are feeding on sawfly larvae at this time. Costs can be reduced by swathing just the field margins, where infestations generally are more severe. Effects on natural enemies can be minimized by leaving the lower third of the stem intact.

Q: What is the best way to recover cut stems during harvest?

A: Combines equipped with stripper headers are most efficient in picking up cut stems at harvest.

Q: Can the wheat stem sawfly be eradicated?

A: No. To date, we have no appropriate management methods that can eliminate this insect from even a single field. Further, this insect is native to Colorado and well adapted to our environment. Finally, you would need to eradicate them from non-cultivated grasses as well as from wheat, which would be next to impossible.

Q: What research is being conducted at CSU in response to the wheat stem sawfly outbreak?

A: CSU is emphasizing the development of high quality, productive wheat varieties resistant to wheat stem sawfly. Other research projects include improved biological control, trap crops, new approaches to chemical control and surveys to track the spread of this pest.

Acknowledgements: Thanks to Tyler Benninghoven, Darren Cockrell, Brad Erker, Assefa Gebre-Amlak, Scott Haley, Jerry Johnson, and Sally Jones-Diamond for providing questions and for reviewing earlier versions of this work.

Additional Resources:

https://wiki.bugwood.org/HPIPM:Wheat_Stem_Sawfly

<https://extension.colostate.edu/topic-areas/insects/wheat-stem-sawfly-a-new-pest-of-colorado-wheat-5-612/>

<https://www.ag.ndsu.edu/publications/landing-pages/crops/wheat-stem-sawfly-e-1479>