



Cut stubble high to preserve wheat stem sawfly parasitoids

CATEGORY [insects](#) | June 24, 2025

Most overwintering parasitoid cocoons (>80%) occurred in the bottom third of standing wheat stems from 0 to six inches (0-15 cm). Cutting wheat at six inches or higher at harvest increased *Bracon cephi* spring emergence by 40%, while cutting just below the wheat head increased emergence by 60% compared to cutting near ground level.

In the southern Prairies of Canada, Montana, the Dakotas, and western Minnesota, the wheat stem sawfly (*Cephus cinctus*) is one of the most economically important insect pests of wheat. Wheat stem sawfly larva bore into the stems of wheat, and eventually move to the base of the wheat stem where they notch a groove around the stem before cocooning below the groove. This groove weakens the stem, and the wheat plant falls to the ground where harvest is difficult. The associated damage from stem boring and lodging can reduce wheat yield by more than 25%.

Bracon cephi and *Bracon lissogaster* are the most important natural enemies of wheat stem sawfly. While their parasitoid impact on wheat stem sawfly is variable, they are still an important beneficial insect that management practices could help to conserve.

A research study was conducted to improve the understanding of the interaction between agronomics and parasitoid conservation. The objectives were to determine within-host distribution

and infestation patterns of the two *Bracon* parasitoids, and to investigate how variety, and stubble height and straw management at harvest affect wheat stem sawfly parasitoids.

To determine within-host distribution and infestation patterns, 19 locations in Montana, and Saskatchewan were sampled over two years. Samples were analyzed for the presence of wheat stem sawfly by dissecting the stem with an Exacto knife by splitting the stem lengthwise. Larvae in the infested stem were classified as cut stem (normal), live (rare), dead, not found, or parasitized. Height above soil level was recorded for dead and abnormal cutting.

If a parasitoid was found, the emergence hole or cocoon height above soil level and the internode of occurrence was recorded. The emergence holes are generally indicative of the first generation *Bracon* spp. while the cocoons are most likely from second generation parasitoids.

To address the impact of agronomics on the parasitoids, a simulated study was first conducted in at Conrad, MT, Swift Current, SK, and Lomond, AB. This was followed up with field validation at Coalhurst and Nobleford, AB in southern Alberta from 2006 – 2009. AC Avonlea (durum), AC Lillian (CWRS, solid stem), and CDC Go (CWRS, hollow stem) spring wheat were planted into wheat stubble naturally infested with wheat stem sawfly. Wheat was harvested at heights of ground level, six inches (15 cm), and spikes only. Straw management was conducted at harvest by operating the combine with the chopper either engaged or shut off, with the chopped straw and non-chopped straw directly deposited to the ground behind the combine where it was immediately covered in mesh.

The following spring, 1m x 1m cages were installed over the straw management plots, so *B. cephi* adults emerging from the straw in the various treatments could be trapped and counted.

Greater parasitoid survival at higher stem heights

The initial field surveys and simulated harvest studies in 2002 and 2003 found that *B. cephi* and *B. lissogaster* cocoons and emergence holes were generally found in the bottom 30 to 40% of the wheat stem – typically 0 to six inches in height.

In the harvest management study from 2006 – 2009, female *B. cephi* populations were not altered by variety, straw management, or harvesting height treatments.

Male *B. cephi* emergence responded to straw management and cutting height. Male *B. cephi* populations were about 20% lower when straw was chopped prior to spreading compared to when the straw was not chopped. However, the benefits of spreading chopped straw including improved

residue clearance under no-till seeding means that leaving straw unchopped is usually not a viable strategy for preserving *B. cephi* populations.

Male *B. cephi* populations were 40% higher when stubble was cut at six inches, and 60% higher when cut taller at the spikelet height compared to cutting near ground level. A stripper header could conceivably improve conservation of parasitoids compared to conventional combine headers cutting the wheat crop lower.

The overall level of parasitism in the study was 54%, and was similar to other studies conducted in Canada.

Rates of parasitism did differ for the varieties. The hollow-stemmed AC Avonlea had the lowest parasitoid emergence, indicating a preference by wheat stem sawfly and subsequent parasitism for the hard red spring wheat varieties, AC Lillian and CDC Go, which had similar levels of parasitism.

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Wheat stem sawfly cutting photo by Brian Beres