

Title: Wheat-straw management to enhance sawfly parasitoid survival.

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Location: Western Triangle Research Center, Conrad, MT.

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Objective: Two species of parasitoids, *Bracon cephi* and *B. lissogaster*, have shown promise in managing wheat stem sawfly, and parasitism levels in excess of 90% have been documented. *Bracon cephi* and *B. lissogaster* are naturally occurring parasitoids that overwinter as larvae within a cocoon in the wheat stem. The parasitoids produce their cocoons at the point of parasitism of the sawfly larva. Overwintering larvae located high in wheat stems may be exposed to damage by harvest operations. This study was designed to measure the impact of harvest operations on the survival of the parasitoids. With this information, management recommendations can be made to wheat producers which will lead to conservation of higher numbers of parasitoids for biological control of wheat stem sawfly.

Methods: A two-acre plot of Reeder spring wheat was planted on the Western Triangle Research Center, where large populations of sawfly and both parasitoid species occur. At harvest, five treatments were imposed: **1) Standing** (control) = left unharvested; **2) Heads Off** = cut to remove all viable wheat heads (24 inches of standing residue); **3) 2/3 height** = 16 inches of standing residue; **4) 1/3 height** = 8 inches of standing residue, and stems through the plot harvester not chopped into small pieces; and **5) 1/3 height plus chopped** = 8 inches of standing residue, and stems through the plot harvester chopped into small pieces.

The harvest treatments remained in the field over the winter. In late April, samples were collected from each treatment, cleaned and placed into emergence barrels. The number of parasitoids emerging were recorded daily over an 8 week period (June – July).

Results: In a companion study, the vast majority of parasitoids were found in the bottom 1/3 of the stem, and within 25 to 100 feet of the field edge. The bottom 1/3 portion of the stem, therefore, is the most critical in conserving parasitoid populations.

Of the five harvest treatments, Standing and Heads Off were not statistically different (Table 1). Two-thirds height, 1/3 height with whole straw and 1/3 height with chopped straw were also not statistically different. These two groupings were different from each other. Even though all three of the shorter treatments left the critical residue untouched, they impacted survival of the parasitoids.

Using a special harvesting attachment, such as a stripper-header which removes the heads only, would result in significantly higher survival of parasitoids.

Recommended Practices (based on this study)

1) Leave at least the bottom 1/3 of residue standing during harvest operations. Doing so protects critical parasitoid overwintering habitat.

2) Special efforts to conserve parasitoids should be concentrated in the critical area, 25 to 100 feet from the field margin.

3) Removing only the wheat heads at harvest results in maximum parasitoid conservation.

Future Plans: None. The straw-height management study is concluded.

Table 1. Effects of harvest management on parasitoid emergence.

Stubble height		Parasitoid emergence, %
Standing	24"+ head	25 a
Heads Off	24"	24 a
2/3 Height	16"	18 b
1/3 Height, whole	8"	17 b
1/3 Height, chopped	8"	16 b

P= 0.0001