Effect of Cultivar and Alternative Seeding Strategies on Wheat Stem Sawfly Survivorship.

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Introduction

The wheat stem sawfly is a major production constraint in 10 -14 million acres of wheat grown in the southern prairies of Canada. The use of monoculture, hollow-stemmed wheat, grown in wheat-fallow or continuous wheat systems, contributed to the sawfly resurgence. Integrating resistant cultivars with progressive cropping systems will reduce the business risk of growing wheat in regions prone to wheat stem sawfly attack. Our objective was to assess the potential of novel seeding strategies and validate negative impact of solid-stem cultivars on sawfly fitness.

Materials and Methods

- Randomized complete block design
- Experimental unit: 40m x 200m
- Sites: Nobleford, AB; Foremost, AB; Indian Head, SK
- Treatments:
  - Solid-stemmed cultivar (AC Eatonia or AC Abbey) seeded to entire plot.
  - Hollow-stemmed cultivar (AC Barrie) seeded to entire plot
  - 20m of edge seeded to solid-stemmed cultivar; remainder planted to hollow-stemmed AC Barrie
  - 20m of edge seeded to oats; remainder planted to hollow-stemmed AC Barrie
  - 40m of edge seeded to solid-stemmed cultivar; remainder planted to hollow-stem
  - 40m of edge seeded to oats; remainder planted to hollow-stem
  - 1:1 Cultivar blend of solid-stemmed cultivar/hollow-stemmed AC Barrie
  - Treatments seeded using commercial air seeder

Plots were sub-sampled at 5, 20, then at every 25metres to assess larval mortality and to collect agronomic data.

Results and Discussion

Results presented are based on our Foremost, AB site as samples from Nobleford and Inidan Head are still being processed. Foremost is a critical location as it is more arid than Indian Head and Nobleford, and it sustained the highest level of sawfly damage. AC Eatonia and the 40m trap treatments of AC Eatonia/AC Barrie produced the highest grain yield (Fig.1).

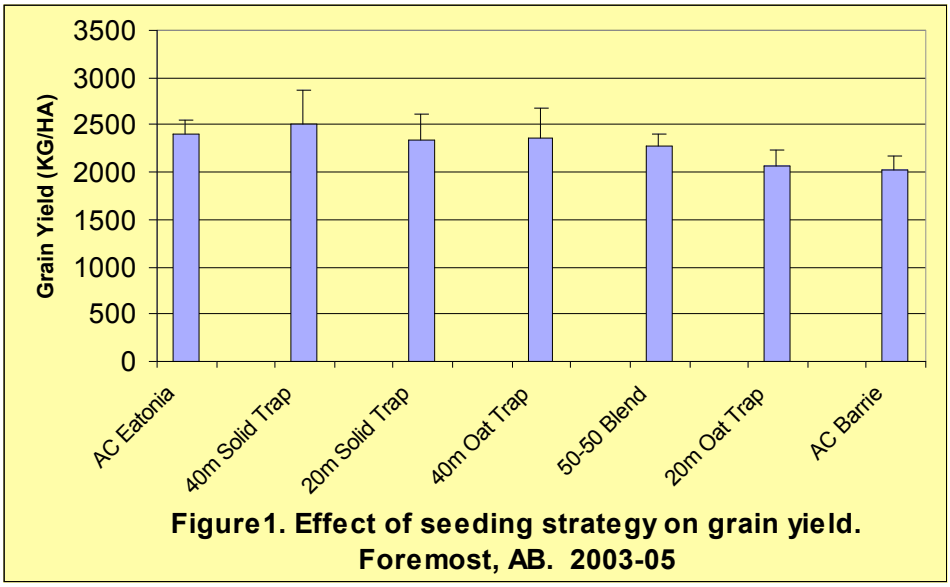

Figure1. Effect of seeding strategy on grain yield. Foremost, AB. 2003-05

AC Eatonia was significantly more effective at reducing sawfly survivorship than any other treatment (Fig. 2), and the cultivar blend was numerically the 2nd most effective treatment. The 20m trap treatments did not stabilize yield and were not effective at killing sawflies. Although the 40m trap treatments stabilized grain yield, they were not effective at reducing sawfly survivorship.

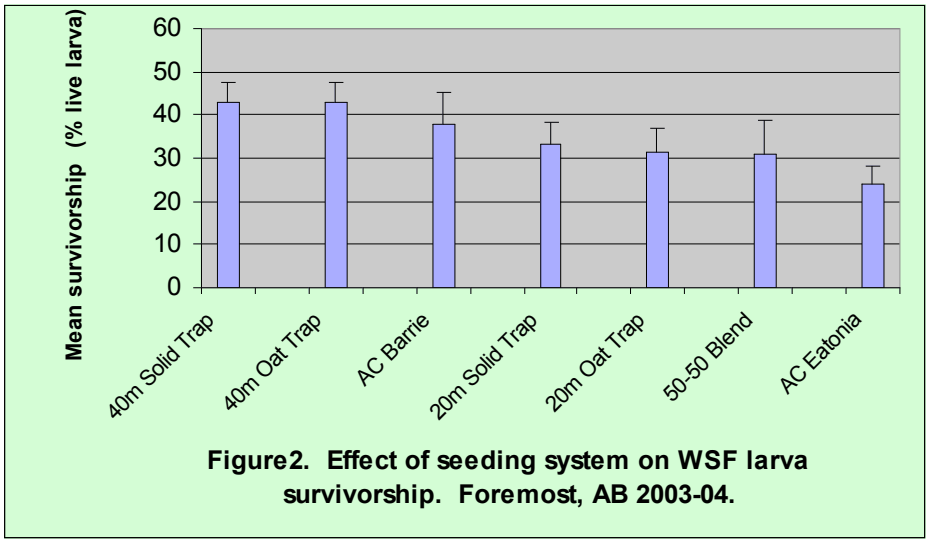

Figure2. Effect of seeding system on WSF larva survivorship. Foremost, AB 2003-04.

Conclusions

- Perception is not reality - AC Eatonia yield as high as 121% of AC Barrie was observed. Release of new solid-stemmed cultivar 'Lillian' will help to show that using solid-stemmed cultivars is a superior business strategy for producing wheat in regions prone to sawfly attack.

- The data from the trap crop treatments suggest that a 20m trap or edge seeded to a tolerant or immune crop is not wide enough to protect the interior crop. A minimum width of 40m is recommended when adopting this strategy.

- A 40m trap crop was effective at stabilizing the yield of AC Barrie planted to the interior of field. However, this practice did not reduce the population of over-wintering larvae and, therefore, should only be considered when sawfly pressure is low or there are inadequate supplies of solid-stemmed cultivars.

- 1:1 cultivar blends improved yield and reduced the sawfly population but yield results were not significantly greater than AC Barrie. However, the mean yield of the blend was 112% of AC Barrie, which means $$$$ for producers.

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