

Integrating the building blocks of agronomy into an IPM strategy for wheat stem sawfly

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Introduction

The wheat stem sawfly (*Cephus cinctus* Norton [Hymenoptera: Cephidae]) is a serious threat to wheat (*Triticum aestivum* L.) and other cereal grains in the northern Great Plains. Insecticides have proven ineffective for sawfly control; and the use of solid-stemmed cultivars are an effective management tool, but a strong genotype x environmental interaction can negatively effect stem solidness. The management of *C. cinctus*, therefore, requires the integration of crop breeding, agronomy, entomology, and biocontrol. The objective of this project was to develop agronomic strategies to manage wheat stem sawfly and conserve the natural enemy population (*Bracon cephi* Gahan [Hymenoptera: Cephidae]).

Materials and methods

Three experiments were initiated to assess the response of *C. cinctus* and natural enemies of wheat stem sawfly to the following crop management strategies: cultivar selection, residue management, seeding rates, nitrogen and micronutrient management, and harvest management tactics. The final phase of this project involved the deployment of a neural network model to predict cutting damage to solid-stemmed wheat. The results were used to develop a schematic outlining an integrated strategy to manage wheat stem sawfly

Results and discussion

A sustainable strategy must address and break the cycle that leads to a resurgence of this insect pest (Fig. 1). The practices, pest surveillance, and monitoring outlined in Fig. 2 will enable wheat growers to reduce the threat of wheat stem sawfly.

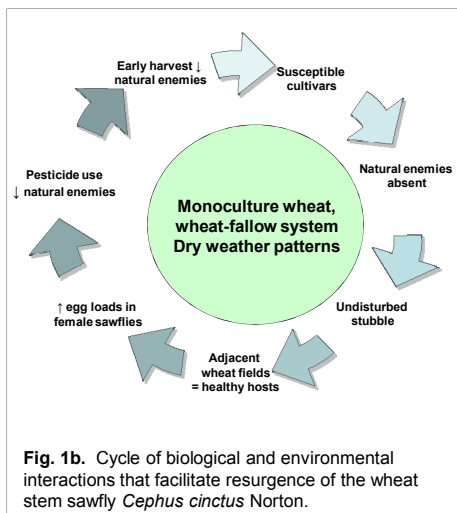
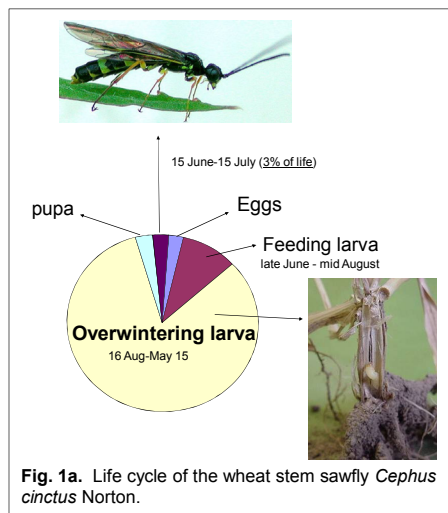


Fig. 2. Management of the wheat stem sawfly *Cephus cinctus* Norton

Conclusions

An agronomic strategy to manage wheat stem sawfly consists of solid-stemmed cultivars, appropriate pre-seed residue management, seeding rates no greater than 300 seeds m⁻², 30 to 60 kg N ha⁻¹, and harvest cutting heights of at least 15 cm.

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References

†Beres, B.L., Cárcamo, H.A., and Bremer, E. 2009. Evaluation of Alternative Planting Strategies to Reduce Wheat Stem Sawfly (Hymenoptera: Cephidae) Damage to Spring Wheat in the Northern Great Plains.. Journal of Economic Entomology, 102: 2137-2145.