KANSAS SOYBEAN COMMISSION

Biology and Management of the Soybean Stem Borer in Kansas

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JUSTIFICATION: The soybean stem borer has caused severe lodging problems to soybean in some parts of Kansas, however research on the basic biology and management options for this pest have been very limited.

PROJECT OBJECTIVES:

1. Evaluate the efficacy of feeding and oviposition scars to detect differences in host plant resistance in soybean varieties.
2. Evaluate the efficacy of KSC sponsored KSU produced genetically engineered soybeans containing chitinases in reducing soybean stem borer feeding, oviposition and infestation.
3. Evaluate the efficacy of systemic insecticides on soybean stem borers when applied to plants when first-instar larvae begin feeding in the plants.
4. Study the impact of stubble management practices on stem borer over-wintering success.
5. Expand web pages associated with soybean insect pests.

RESULTS:

Objective 1: We planted 10 varieties to represent the range of short-season to full-season maturities at three irrigated locations with soybean stem borer infestations Scandia, St. John and Garden City. The Garden City site was dropped because some varieties did not recover from iron chlorosis caused by high soil pH. Beetle activity was heavy at St. John. At Scandia the beetle activity was light. Oviposition scars appeared to be a usable parameter to measure Dectes activity on the plants; however, none of the variables had strong correlations among varieties across locations. Entry nodes or tunneling in the plant base may be usable parameters to measure larval survival in plants. All variables were inconsistent across locations. These results demonstrate the difficulty in assessing host resistance to Dectes stem borers in soybean. Future studies will examine optimum sample size and should include a truly resistant plant (perhaps simulated through insecticide protection) to determine if a "real" treatment can be identified consistently.

Objective 2: This work will be done this spring in the greenhouse by the new graduate student.

Objective 3: We have conducted two small-plot trials with systemic insecticides near Garden City: We tested eight insecticides as soil treatments and Regent and Provado gave significant reduction in numbers of larvae per 20 plants. The Aug. 3 treatments appeared to be more effective than the 19 July treatments. We tested seven insecticides as foliar treatments and Regent and Poncho gave significant reduction in numbers of larvae per 20 plants. The 22 July treatments appeared to be more effective than the 13-17 Aug. treatments. Regent provided up to 100% control and a significant yield improvement of 6.6 bu/acre. This implies a yield loss of 10% for Dectes stem borer infestations. We also conducted an aerial trial of Furadan on three cooperator fields in the Pawnee Co. Unfortunately, the beetle activity in these fields was light. After harvest, we evaluated Dectes tunneling, numbers of larvae and girdling activity in 400 plant bases. Check plots averaged 16.9 and 20.1 plants tunneled per 100 bases. The half pint and one pint Furadan treatments averaged 15.8 and 9.9 plants tunneled per 100 bases. The one pint treatment was significantly lower that the check plots ($P = 0.015$), but this was only 46% control.

Objective 4: This experiment was installed in soybean stubble from 2003. A bush-hog mower was used to mow the stubble in fall or in spring. A blade was used to undercut the stubble at two depths and a rolling packer was used to break the soybean stubble. There was no impact of these treatments on any of the stem borer variables.

Objective 5: We have developed a series of web pages based on our Soybean Insect Management Guides. This will allow us to link images and other documents to the short descriptions and control options given in that document. **http://www.oznet.ksu.edu/entomology/extension/InsectInfo/Soybean/Soybean%20Insects.html**

SIGNIFICANCE: We have developed two new options for managing Dectes stem borers in soybean with insecticides: Beetle sprays and systemic insecticides. We can use registered insecticides for Beetle sprays. The systemic insecticides are experimental at this time and the new use will need be registered before it can be used by producers. Producers are also encouraged to make sure harvest is timely in areas where infestations are detected. Information from these studies is used to update and expand our web pages, management guides and presentations on soybean pest management. Data from these studies are also used to guide future research.