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Seed treatments in soybean: Managing bean leaf beetles

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Abstract

To date, our recommendation for the chemical control of bean leaf beetles and bean pod mottle virus has been for an early and a mid-season application of a pyrethroid insecticide (e.g., Asana[®], Mustang[®], or Warrior[®]). These insecticide applications should be timed such that fields are treated as soon as bean leaf beetles are first detected in the field (the early-season application) and again when the first generation emerges in early July (the mid-season application). These applications have been shown to improve yield and seed quality under high disease and beetle pressure.

Keywords

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Seed treatments in soybean: Managing bean leaf beetles

by Jeffrey D. Bradshaw and Marlin E. Rice, Department of Entomology, and John H. Hill, Department of Plant Pathology

To date, our recommendation for the chemical control of bean leaf beetles and bean pod mottle virus has been for an early and a mid-season application of a pyrethroid insecticide (e.g., Asana®, Mustang®, or Warrior®). These insecticide applications should be timed such that fields are treated as soon as bean leaf beetles are first detected in the field (the early-season application) and again when the first generation emerges in early July (the mid-season application). These applications have been shown to improve yield and seed quality under high disease and beetle pressure. However, the hope of greater yield and convenience has driven earlier soybean planting dates and a number of growers will likely use seed-applied insecticides this year. We have recently completed a three-year seed treatment study and here we report the results on beetle suppression. Next week we will address the effects of seed treatments on virus disease control.



Bean leaf beetle. (Marlin E. Rice)

Our study

During 2002-2004, at three Iowa locations, we studied the effects of seed- and foliar-applied insecticides to manage bean leaf beetles and bean pod mottle virus in soybean. Bean leaf

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beetle populations reached a record high in 2002 and declined thereafter. However, these changes in beetle populations gave us the opportunity to test our recommended management program for this pest complex under differing levels of beetle infestation. Overall, we wanted to know if a seed-applied insecticide could replace an early-season foliar application within the framework of our current recommendation.

We compared systemic seed-applied insecticides and foliar-applied pyrethroids with untreated checks. Note that we did not apply any insecticides according to the recommended threshold for late-season beetle injury to pods.

Our results

In our study, an early-season insecticide gave the greatest reduction in beetle abundance with the reduction being most consistent for seed-applied insecticides. Often the addition of a mid-season foliar application did give a greater suppression in overall beetle abundance than the seed-treated insecticide application alone.

Soybean yield can be improved if a seed treatment is used in place of an early-season foliar insecticide applied for bean leaf beetle. In contrast, seed quality was most consistently improved with an early- plus mid-season foliar application (targeting the over-wintered population and first generation). Compared to seed treatments alone, the early-season foliar application resulted in the greatest improvement in seed quality (~5% improvement). The addition of a second insecticide application (to target the first generation) improved seed quality further still (~10% improvement). However, soybeans that received a seed treatment alone often had reduced seed quality even if a mid-season foliar application was added. This relationship between seed quality and yield was most pronounced in 2002 (our outbreak bean leaf beetle year). However, in 2003 and 2004 (years when bean leaf beetle populations were smaller), the use of either a seed treatment or an early-season foliage-applied insecticide produced similar levels of seed quality.

The economic gain threshold as determined in this study was ~2.0 bushels per acre for an early- plus mid-season insecticide application (assuming a crop value of \$6.33). The use of a seed-applied insecticide for the early-season application improved yield ~2.4 bu/acre beyond the gain threshold, while using a foliar application for both timings gave ~2.1 bu/acre beyond the gain threshold. Look in next week's Integrated Crop Management newsletter to learn about the impact of these insecticides and timings on virus disease control.

Jeffrey D. Bradshaw is an entomology research associate studying the beetle/virus interaction and their management. Marlin E. Rice is a professor of entomology with extension and research responsibilities. John H. Hill is a professor of plant pathology with research and teaching responsibilities in virology.

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