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Revisiting an integrated approach to bean leaf beetle and bean pod mottle virus management

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Revisiting an integrated approach to bean leaf beetle and bean pod mottle virus management

Abstract

This article originally [appeared in the 2005 ICM newsletter](#). However, the significance of the bean leaf beetle and bean pod mottle virus has not diminished in recent years. There is still the potential of economic damage from either or both pests. We have recently completed a three-year study that examines the complex issues of managing these two pests, but the data are still being analyzed. We also have identified potential field tolerance to virus disease. Growers are encouraged to query seed dealers regarding tolerance of varieties to virus disease. Ultimately, this will likely be the best management tool for disease control. In the meantime, we give you our best recommendations as we understand the situation in Iowa.

Keywords

Entomology, Plant Pathology

Disciplines

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Revisiting an integrated approach to bean leaf beetle and bean pod mottle virus management

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

This article originally appeared in the 2005 ICM newsletter. However, the significance of the bean leaf beetle and bean pod mottle virus has not diminished in recent years. There is still the potential of economic damage from either or both pests. We have recently completed a three-year study that examines the complex issues of managing these two pests, but the data are still being analyzed. We also have identified potential field tolerance to virus disease. Growers are encouraged to query seed dealers regarding tolerance of varieties to virus disease. Ultimately, this will likely be the best management tool for disease control. In the meantime, we give you our best recommendations as we understand the situation in Iowa.

Growing soybean in Iowa has become a more complicated task in recent years. One early-season dilemma for growers is which management plan to implement for a pest complex of bean leaf beetles and bean pod mottle virus. We have developed a decision guide for the management of these two pests. The decision guide is based on new research and presents a grower with two management plans: one for managing both the beetle and the virus, or one for managing only the beetle.

Ultimately, these management guidelines require knowledge of the soybean field's pest history.

The bean leaf beetle is a pest of soybean. It can substantially reduce grain yields when populations reach damaging levels. This insect has three populations a year that can occur throughout the growing season from soybean emergence to pod maturity.

Population increases of bean leaf beetles in an area typically cause an increase in bean pod mottle virus.

The incidence of bean pod mottle virus is often positively correlated with bean leaf beetle populations. For example, the greatest increase in bean pod mottle virus infection occurs after the first generation of bean leaf beetles reaches peak population density (late July). However, soybeans are most affected when seedlings acquire this virus. The management of bean leaf beetles and bean pod mottle virus typically requires the use of an insecticide, and at least for beetle management, planting soybeans later, as opposed to earlier. Although bean leaf beetle abundance has fluctuated during the past four years, a question remains--what strategy can I use to combat this pest?

The flowchart attempts to resolve new research results that have shed light on the greater impact of this disease complex. A two-pronged decision matrix is necessary to efficiently organize a management strategy for this pest. A flowchart was determined to be necessary because it is highly dynamic. That is, while much information is available for predicting economically important variables for beetle damage, much information is still needed regarding these variables and bean pod mottle virus. As more research is concluded to affect these management decisions, it can be added to the decision guide.

Following the recommendations of this guide, growers will be able to make an informed decision based on the available research results. In particular, this flowchart emphasizes the importance of the early-season decisions that should be considered for managing this pest complex in soybeans. These decisions should be considered in light of the grower's field history. Furthermore, the flowchart prioritizes an integrated system of cultural and chemical tactics.

By closely following the procedures outlined in this scouting plan, producers and crop scouts can determine with an increased degree of confidence whether bean leaf beetle/bean pod mottle virus control measures are necessary to prevent economic damage. Decisions based upon this scouting procedure can result in more economic production of soybeans. The scouting plan also may help producers and crop scouts make better use of limited time and money by

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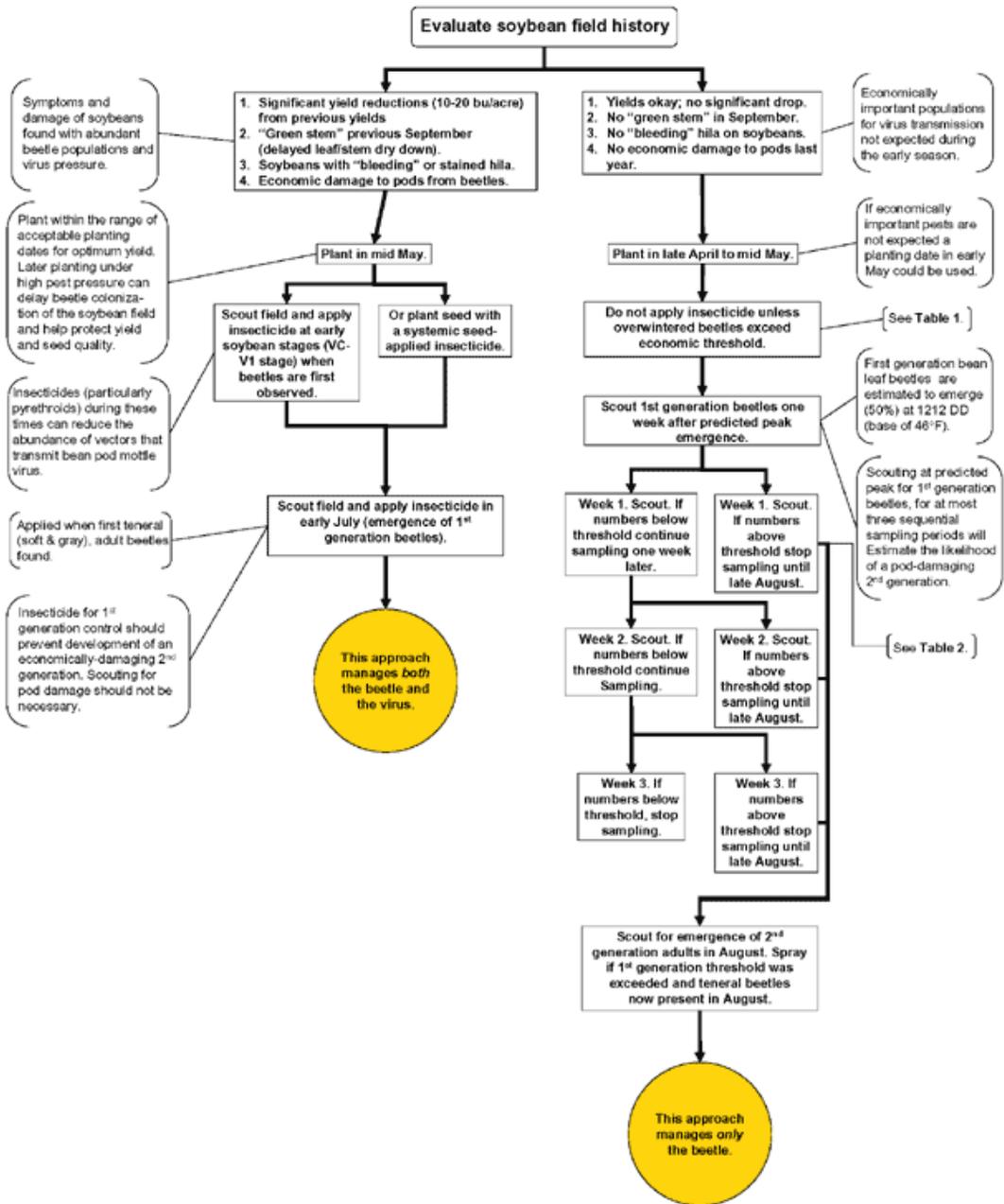
Table 1. Economic threshold of overwintered bean leaf beetles in early-stage soybean (beetles per plant).

Market Value (\$/Bu)	Growth Stage/Cost of Treatment (\$/Acre)								
	VC			V1			V2		
	6	8	10	6	8	10	6	8	10
5.00	2.4	3.2	4.0	3.7	5.0	6.2	5.9	7.8	9.8
6.00	2.0	2.7	3.4	3.1	4.1	5.2	4.9	6.5	8.1

Table 2. Economic threshold of 1st generation bean leaf beetles in soybean (beetles per 20 sweeps)

Market Value (\$/Bu)	Cost of Treatment/Acre				
	7	8	10	12	15
5.00	23.0	26.2	32.6	39.0	48.6
6.00	19.3	22.0	27.3	32.6	40.6
8.00	14.6	16.6	20.6	24.6	30.6
10.00	11.8	13.4	16.6	19.8	24.6
13.00	9.2	10.5	12.9	15.4	19.1

Figure 1. Flowchart. For a higher-resolution [PDF version](#), click on the flowchart below.



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