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Bean leaf beetle and bean pod mottle virus management: An integrated approach

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Bean leaf beetle and bean pod mottle virus management: An integrated approach

Abstract

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.

Keywords

Entomology, Plant Pathology

Disciplines

Agricultural Science | Agriculture | Entomology | Plant Pathology

INTEGRATED CROP MANAGEMENT

Bean leaf beetle and bean pod mottle virus management: An integrated approach

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.

Last week's newsletter addressed the increase in bean leaf beetles, which subsequently has caused 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 declined during the past two years, a question remains--what strategy can I use to combat this pest?

The flowchart below 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 may also help producers and crop scouts make better use of limited time and money by targeting their scouting activities to specific times of critical importance.

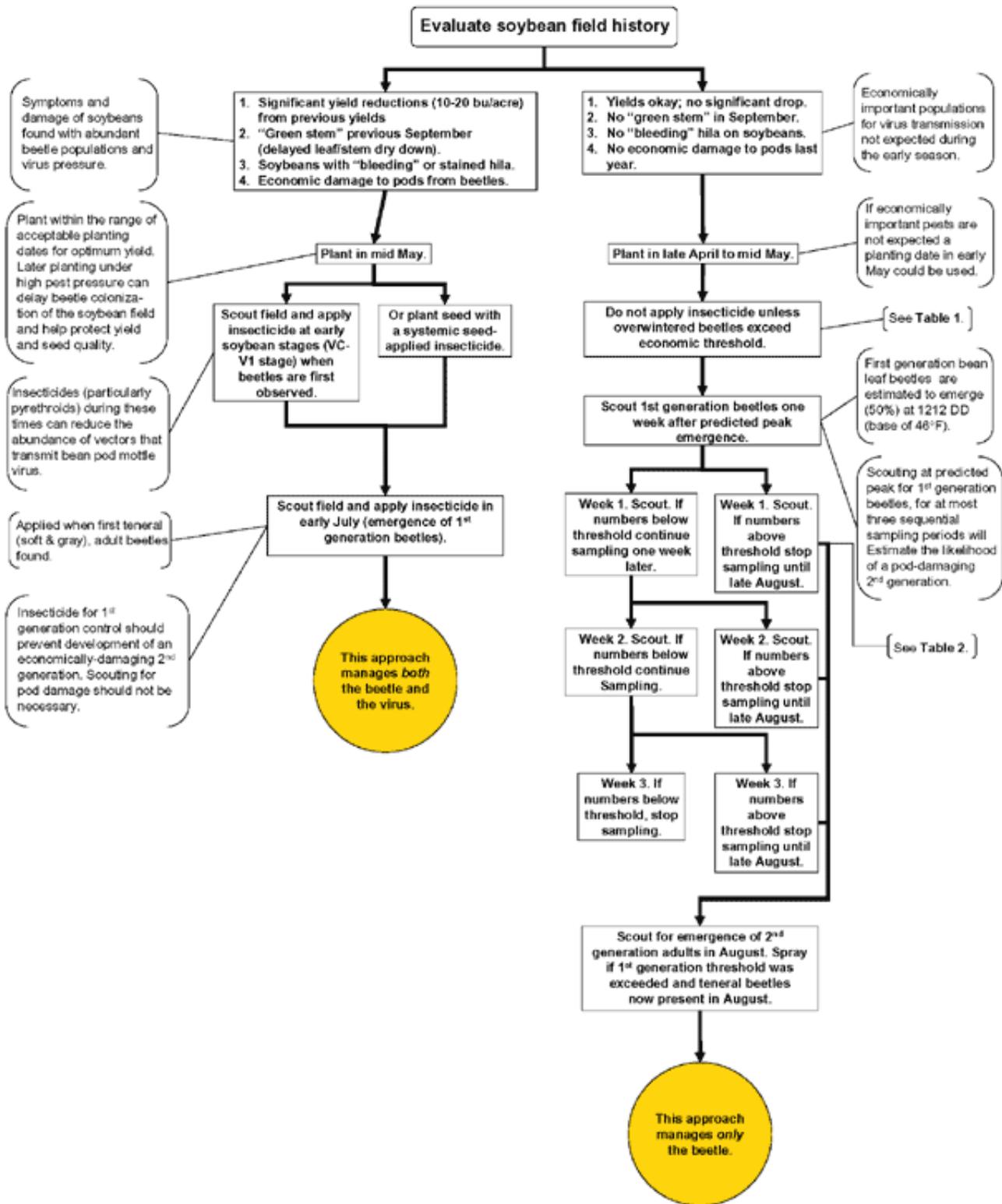
Table 1. Economic threshold of overwintered bean leaf beetles in early-stage soybean (beetles per plant).

	Growth Stage/Cost of Treatment (\$/Acre)								
Market Value	VC			V1			V2		
(\$/Bu)	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	Cost of Treatment/Acre				
(\$/Bu)	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 \[1\]](#), click on the flowchart below.



[2]

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[1] http://www.ipm.iastate.edu/ipm/icm/2005/5-2-2005/isu_flowchart.pdf
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