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Bean leaf beetles return--with a vengeance

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Bean leaf beetles return--with a vengeance

Abstract
We started detecting bean leaf beetles on April 19 this year as part of our annual bean leaf beetle monitoring program in central Iowa. As noted last week, bean leaf beetle mortality was predicted to be low, and based on last year’s low numbers, we expected a slight increase in their numbers this year. However, we were surprised by the numbers we have found this past week!

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Disciplines
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with low soil temperature early in the spring, potential soil diseases, and early germination problems just to name a few. Chopping residue also can reduce the effectiveness of it in protecting the soil surface from potential water erosion, especially during high intensity rainfall events, where residue will be washed away with the surface runoff. Chopped residue is no longer anchored into the soil and is more prone to plugging tillage implements or planters used in subsequent operations.

To have an effective and manageable residue cover at planting is to have corn residue cut as high as 12 to 24 inches. There are several reasons for that. (1) Cutting residue at that height minimizes the potential damage to equipment tires during planting and other field operations. (2) Standing residue will be much easier to manage during planting, where minimum loose residue on the soil surface can be managed with residue-removal attachments on the planter. (3) Upright residue can provide better protection to the soil surface from wind and water erosions by reducing wind and water flow near the surface. Given these reasons against chopping corn residue, no-till can be managed efficiently without affecting yield.

While cutting residue after harvest is one technique for managing crop residue, it is possible to avoid this step all together. This can be accomplished by calibrating the combine properly to ensure a uniform residue distribution on the soil surface. A few adjustments and fine tuning of a combine prior to harvest can pay off significantly in having uniform residue cover across the field.

The misconception about residue in no-till as an obstacle is widely used to avoid the adoption of no-till. The success of farmers who have been using no-till for many years shows that managing residue is possible and pays off economically and environmentally. Studies show that tilling corn residue prior to soybean planting did not improve soybean yield (see the April 3, 2006, *ICM* article, “Is tillage needed for your soybean crop?”). Removing residue for any purpose needs to be balanced with the potential impact that may take place—especially from water and soil quality perspectives. Although standing residue in the field is sometimes viewed negatively, it actually presents fewer problems for equipment or seedling establishment than chopped, detached residue.

The main idea is to look at no-till and residue management in a system approach by properly calibrating planting and harvesting equipment to achieve the intended results of no-till. Some producers approach no-till with the mindset to prove it does not work. Others approach no-till with the attitude that it can be done and they manage to achieve that. Despite the challenges faced with no-till, there are no shortcuts. No-till residue management should be executed in a system approach and given time to work, bearing in mind that it is a long-term commitment.

Mahdi Al-Kaisi is an associate professor of agronomy with research and extension responsibilities in soil management and environmental soil science.

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**Insects and Mites**

**Bean leaf beetles return—with a vengeance**

**by Jeffrey D. Bradshaw, Marlin E. Rice, and David Dorhout, Department of Entomology**

We started detecting bean leaf beetles on April 19 this year as part of our annual bean leaf beetle monitoring program in central Iowa. As noted last week, bean leaf beetle mortality was predicted to be low, and based on last year’s low numbers, we expected a slight increase in their numbers this year. However, we were surprised by the numbers we have found this past week!

We are finding about 340 bean leaf beetles per 50 sweeps in alfalfa. This average is only 84 beetles less than the early-season high (in alfalfa) from 2002 (our most abundant year to date). With these numbers, some growers may exceed the early-season economic threshold for bean leaf beetle injury (see tables). Palle Pedersen, extension soybean specialist, reported a 400-acre field near Grand Junction that averaged 3 beetles per seedling plant, so large populations can be found in Iowa this spring.

So what can farmers do now? Follow our current recommendations (see flowchart) for soybean management and choose the approach that best fits the end use of the soybeans (see graph).

**Delayed planting**

Planting from this date on could be considered as delayed, but planting in mid to late May still could yield near optimum yields without the beetle pressure. With high beetle pressure, late April and early May planting dates are at risk for sustaining large bean leaf beetle populations, pod damage, and poor seed quality.
Table 1. Economic threshold of overwintered bean leaf beetles in early-stage soybean (beetles per plant). This chart does NOT consider the impact of bean pod mottle virus on soybean quality and yield.

<table>
<thead>
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<th>Market Value ($/Bu)</th>
<th>Growth Stage/Cost of Treatment ($/Acre)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>VC 6</td>
</tr>
<tr>
<td>5.00</td>
<td>2.4</td>
</tr>
<tr>
<td>6.00</td>
<td>2.0</td>
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</tbody>
</table>

Table 2. Economic threshold of 1st generation bean leaf beetles in soybean (beetles per 20 sweeps). This chart does NOT consider the impact of bean pod mottle virus on soybean quality and yield.

<table>
<thead>
<tr>
<th>Market Value ($/Bu)</th>
<th>Cost of Treatment ($/Acre)</th>
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</thead>
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<tr>
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<td>11.8</td>
</tr>
<tr>
<td>13.00</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Evaluate soybean field history

Symptoms and damage of soybeans found with abundant beetle populations and virus pressure.

Plant within the range of acceptable planting dates for optimum yield. Late planting under high pest pressure can delay beetle colonization of the soybean field and help protect yield and seed quality.

Insecticides (particularly pyrethroids) during these times can reduce the abundance of vectors that transmit bean pod mottle virus.

Applied when first general (soft & gray), adult beetles found.

Insecticides for 1st generation control should prevent development of an economically-damaging 2nd generation. Scouting for pod damage should not be necessary.

1. Significant yield reductions (10-20 bu/acre) from previous yields
2. "Green stem" previous September (delayed leaf least dry down).
3. Soybeans with "bleeding" or stained hila.
4. Economic damage to pods from beetles.

Insect field and apply insecticide at early soybean stage (VC-V1 stage) when beetles are first observed.

Or plant seed with a systemic seed-applied insecticide.

Scout field and apply insecticide in early July (emergence of 1st generation beetles).

This approach manages both the beetles and the virus.

1. Yields ok, no significant drop.
2. No "green stem" in September.
3. No "bleeding" hila on soybeans.
4. No economic damage to pods last year.

Do not apply insecticide unless overwintered beetles exceed economic threshold.

Scout 1st generation beetles one week after predicted peak emergence.

Scouting at predicted peak for 1st generation beetles, for at most three sequential sampling periods will estimate the likelihood of a pod-damaging 2nd generation.

Week 1. Scout. If numbers below threshold continue sampling one week later.

Week 2. Scout. If numbers below threshold stop sampling until late August.

Week 3. If numbers above threshold stop sampling until late August.

If economically important populations for virus transmission not expected during the early season.

First generation leaf beetles are estimated to emerge (50%) at 121 DD (base of 46 F).

Scout for emergence of 2nd generation adults in August. Spray if 1st generation threshold was exceeded and teneral beetles now present in August.

This approach manages only the beetle.
Consider an early-season insecticide

For managing bean pod mottle virus, which is the pathogen transmitted by bean leaf beetles, our studies indicate that an early-season, foliar insecticide is critical for suppressing virus incidence under high bean leaf beetle pressure. It is important to apply this insecticide as soon as beetles are present in your soybean field.

Consider a mid-season insecticide

Additionally, our studies indicate that although a mid-season insecticide by itself cannot prevent an increase in bean pod mottle virus, it seems necessary to improve seed quality. Furthermore, if combined with an early-season insecticide, the two treatments give an added positive effect on yield and seed quality.

Scout 1st generation beetles

Finally, continue to scout your field 1 week following the predicted 1st generation emergence (1212 degree days, base 46 °F) to determine if your field is at risk for 2nd generation beetle damage. More information will be published in Integrated Crop Management later this summer regarding these management recommendations. If you are already following a virus-management plan, bean leaf beetles may not rebound in your field and a third insecticide may not be necessary; however, scouting would be good insurance.

We will continue to keep you informed regarding the progress of the bean leaf beetle population this summer.

Jeffrey D. Bradshaw is a graduate student in the Department of Entomology. Marlin E. Rice is a professor of entomology with extension and research responsibilities in field and forage crops. David Dorhout is a graduate student in the Department of Entomology.