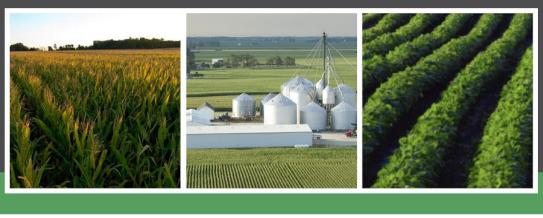

Agronomic Spotlight

Early-Season Bean Leaf Beetle in Soybean

- Though economic damage from early-season bean leaf beetles (BLB) is rare, potential for yield losses exists in early-planted soybeans and in fields that are isolated from other soybean fields.
- Fields at risk should be monitored closely after planting.
- Control of early-season BLB may be accomplished with use of seed treatments as well as foliar insecticides.

Description

The adult bean leaf beetle (BLB) (Cerotoma trifurcate) is about 1/4 inch long with variable coloration. The most common BLB color is light yellow or tan; however, some are green, orange, or red. All BLB, regardless of coloration, have a distinctive black triangle just behind the head. Additionally, they usually have four black spots with stripes along the body edges; however, these markings may be absent (Figure 1).

Mild Winter Survival

Adult BLB overwinter in leaf litter on the edges of wooded areas near soybean fields and in soybean residue. Overwintering BLB are susceptible to low temperatures; mortality rates increase with accumulating days of subfreezing temperatures and when snow cover (which provides insulation) is minimal or absent. Mild winters favor the survival of overwintering BLB. They become active in the spring when temperatures reach 50 °F. Adult BLB are strongly attracted to soybeans and will move into fields with newly emerging plants. The earliest planted soybean fields and those that are isolated from other soybean fields have the greatest risk of economic feeding injury. At-risk fields should be monitored closely after a mild winter given that the potential for survival of overwintering BLB is significant.

Injury to Soybeans

Research has shown that early-season BLB feeding rarely results in economic damage due to the soybean plant's ability to compensate for tissue loss.[1] Potential for economic damage may occur when BLB feeding damages the growing point or cotyledons before the unifoliate leaves emerge. Damaging levels of BLB are most common in fields that are the first in the surrounding area to emerge or are isolated from other soybean fields.

Although feeding injury can be important, the transmission of bean pod mottle virus (BPMV) can have a significant impact on yield. BLB is a common vector of BPMV. Virus transmission can occur at any growth stage; however, early infection poses the greatest risk of potential yield loss due to reduced seed size and pod set. Soybean varieties differ in susceptibility to BPMV.

Figure 1. Bean leaf beetle without (left) and with (right) spots. Note the characteristic black triangle behind the head on both.

Scouting and Thresholds

For seedling stage soybeans, scouting should be accomplished by examining individual plants. Be careful not to disturb the plants since beetles will drop from the leaves and hide within soil cracks and debris. Seedling stage scouting requires a determination of the number of beetles per foot of row or per plant, depending on the threshold recommendations you are following. Also note the extent of defoliation when counting beetles. Scouting should be conducted in at least five different locations throughout the field.

As the plants grow larger, drop cloths or sweep nets are the preferred method for scouting.

Drop cloths: Place a cloth of known length between the rows. Bend the plants from one row over the cloth and shake them vigorously so beetles fall onto the cloth. Count the beetles on the cloth and divide by the total number of feet examined (the length of the cloth) to get the number of beetles per foot of row. Do this in five different locations throughout the field to get a representative sample.

Sweep nets: Sweep net sampling recommendations usually call for sets of 10-20 sweeps at each of five different locations throughout the field. The average number of beetles per set of sweeps is determined by adding the number of beetles in the net at all five locations and dividing by 5.

Management thresholds vary by region, growth stage, and crop value. Management recommendations can be found in your local University Extension publications or can be obtained by contacting your Extension entomology specialist.

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Several states' recommendations for when to implement control measures for early-season BLB are outlined below:

Seedling stage:

- Treat when 20% or more of the seedlings are cut and the stand has gaps of 1 foot or greater; or treat if at least 1 seedling per foot of row is destroyed (Univ. of Illinois).
- The University of Nebraska has developed a table for economic thresholds on seedling soybean which takes into account control costs, crop values, and growth stage (Table 1).

Vegetative stages:

- Treat when defoliation from early-season BLB feeding becomes greater than 50%, plants are being stunted, and beetles are still actively feeding (Ohio State Univ.).
- Treat when defoliation reaches 30% and there are 5 or more beetles per foot of row (Univ. of Illinois).

Management Options

Research indicates that early loss of both cotyledons can result in about a 5% yield loss.[1] If the beetles appear to be injuring or clipping the cotyledons and growing points, and an insecticide seed treatment was not used, then a foliar insecticide treatment may be warranted.

Figure 2. Soybeans treated with a seed treatment (left) exhibited far less bean leaf beetle feeding compared to untreated soybeans (right).

Planting date: Later-planted soybeans generally have less early-season damage because more soybeans are available for BLB to feed upon.

Seed treatments: Insecticidal seed treatments help protect seedlings from early-season BLB feeding (Figure 2). Consult with your local brand representative for seed treatment options.

Foliar sprays: Several foliar insecticides (pyrethroid, carbamate, organophosphate) are labeled for BLB management.

To prevent BPMV transmission, a two-pronged approach is suggested. The first step is to protect young soybean seedlings from overwintering BLB adults by using an insecticidal seed treatment. If seed treatments aren't used, a foliar insecticide application should be applied soon after crop emergence when BLB are present. A second insecticide application should be made at the first sign of first generation BLB in July.

Table 1. Economic thresholds (beetles per plant) for treating BLB at VC or V1 stage of soybean growth

VC stage - Cost of treatment ($/acre)				
Crop value ($/bushel)	**$6**	**$8**	**$10**	**$12**
$8	2	2	3	4
$9	2	2	3	3
$10	1	2	2	3
$11	1	2	2	2
$12	1	1	2	2
V1 stage - Cost of treatment ($/acre)				
Crop value ($/bushel)	**$6**	**$8**	**$10**	**$12**
$8	3	3	4	5
$9	2	3	4	4
$10	2	3	3	4
$11	2	2	3	4
$12	2	2	3	3

Source: Hunt, T. and Jarvi, K. 2011. Watch for bean leaf beetles in early emerging soybeans. Crop Watch. University of Nebraska-Lincoln. https://cropwatch.unl.edu.

Sources

[1] Hunt, T. and Jarvi, K. 2011. Watch for bean leaf beetles in early emerging soybeans. Crop Watch. University of Nebraska-Lincoln. https://cropwatch.unl.edu.
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