Kansas State University Agricultural Experiment Station and Cooperative Extension Service

KANSAS CROP PESTS

K-STATE Research and Extension

Bean Leaf Beetle

The bean leaf beetle, *Cerotoma trifurcata* (*Chrysomelidae: Coleoptera*) is one of the most economically important insect pests of soybean in the United States. Damage is primarily caused by foliage- and pod-feeding adults, which can significantly reduce seed quality and yield. Larvae feed on soybean nodules and roots, but economic impact is not well documented. In addition to physical damage from feeding, the bean leaf beetle is known to transmit bean pod mottle virus disease.

Figure 1

Description

Adult: The bean leaf beetle is a red to light tan, ¼-inch-long beetle found in all parts of the state. The upper back is marked by the distinct black triangle behind the neck and four large rectangular (or trapezoidal) spots near the midline, bordered by a narrow black band (Figure 1). The beetles prefer feeding on undersides of leaves and react to disturbances by dropping motionless to the ground, avoiding detection.

Egg: The egg is lemon-shaped, orange, and about 0.85 mm long.

Larvae: Larvae are whitish with dark brown plates at both ends and segmented with three pairs of small legs near the head. They grow up to 10 mm long and are often mistaken for corn rootworm larvae.

Pupa: The pupa is soft-bodied, white, and about 5 mm long.

Life cycle

Bean leaf beetles overwinter as adults beneath leaf litter and plant debris and in clumps of weeds or other vegetation adjacent to or near soybean fields. Once temperatures reach 50 to 55°F around early April, beetles become active and feed on various plants and weeds until soybeans, their preferred host, becomes available. After feeding voraciously for several days, mated females lay eggs in small clusters of 12 to 24 (producing 175 to 250 in a lifetime) in the upper 5 inches of soil adjacent to soybean stems. In a week to 10 days, eggs hatch and larvae feed on soybean roots and nodules for about 30 days. Mature larvae form earthen cells in which to pupate. Adults emerge from the soil in mid-July and begin to feed, mate, and lay eggs. There are two generations of bean leaf beetles per year in Kansas, with the second emerging in September (Figure 2). After a limited feeding period, beetles begin to seek overwintering sites under crop and leaf debris. Adults are strong fliers, so movement from field to field is common.

Damage

Feeding damage occurs primarily because the adult bean leaf beetle prefers young, tender tissues such as cotyledons, leaves, and pods (Figure 3a). High adult populations can rapidly destroy seedlings and reduce vigor and yield of plants due to extensive defoliation. Feeding appears as distinctive, small oval holes between the major leaflet veins (Figure 3b).

Figure 3a

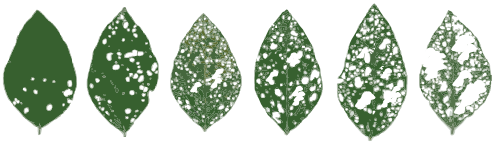
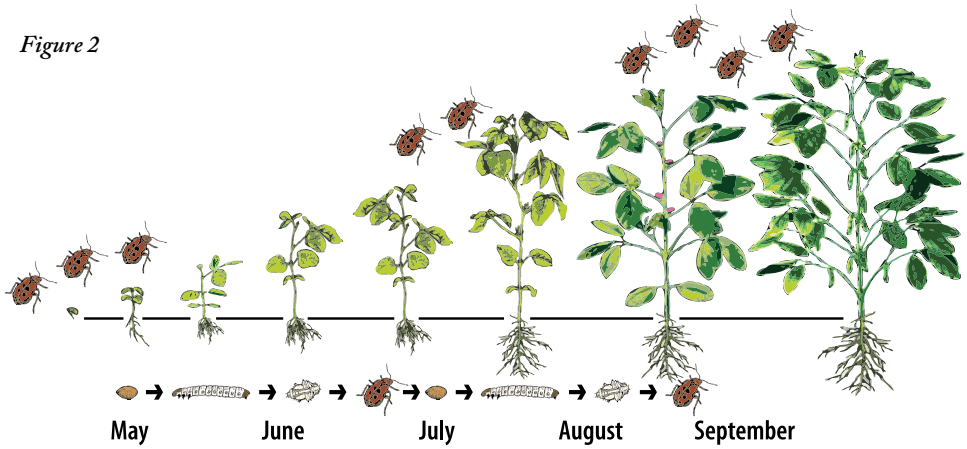


Figure 3b

During seed filling, pod damage by adult beetles is the most important type of injury because it provides an entry point for fungal diseases. Bean leaf beetle adults also transmit bean pod mottle virus, a disease that may cause stunted growth and a mosaic pattern on leaves. According to one study, bean pod mottle virus disease can reduce soybean yields between 3 and 52 percent, but it has not been a significant problem in Kansas.

Figure 2



Management options

Decisions to apply an insecticide treatment against bean leaf beetles should be based on economic thresholds as determined by information from regular scouting and monitoring programs. Economic thresholds for bean leaf beetles are based upon damage to aboveground parts of the plant. Severe cotyledon feeding, threatened destruction of the growing point, or populations of seven beetles per row-foot on soybeans with four or fewer nodes and 25 percent defoliation may justify treatment. Late-season defoliation does not reduce yields unless beetle populations meet or exceed 50 per row-foot. Treatments may be economically justified if pod feeding results in the loss of three or more seeds per plant, pods are not completely dry, or beetles are not yet leaving the fields.

This insect is known to transmit bean pod mottle virus disease. Research is ongoing to determine whether reducing the treatment threshold reduce the likelihood of infection, but this disease is not common in Kansas.

Seed treatment: Seed treatments with thiamethoxam and imidacloprid are labeled for early season protection against bean leaf beetle injury. However, unless bean leaf beetle populations are a recurring problem locally, some other controllable threat, i.e. wireworm or white grubs, would be needed to justify the use of a systemic seed treatment.

Foliar treatment: Several registered insecticides provide reasonable control of bean leaf beetles as either early or mid-season foliar treatments. Generally, soybeans are relatively tolerant of bean leaf beetle foliar feeding, but pod feeding may rapidly reduce yield. Scouting during vulnerable stages is critical with timely insecticide application if scouting reveals beetles feeding on pods.

Photo Credits

Figure 1. Marlin Rice, Iowa State University

Figure 2. Kansas State University
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Figure 3a. University of Missouri Extension

Figure 3b. Kansas State University
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