

BEAN LEAF BEETLE BIOLOGY AND MANAGEMENT

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In the past few years, Iowa bean leaf beetle densities have reached record levels. Bean leaf beetles are present in Iowa soybean fields every year, but recently many producers have had to apply insecticides to manage this pest.

The bean leaf beetle has two generations annually in Iowa. Beetles overwinter as adults in wooded areas in plant debris. In late May, they emerge from overwintering habitats and begin feeding on available legumes, typically alfalfa. As soon as soybean emerge, beetles move to soybean to feed. In June, the overwintered beetles mate and females lay eggs in the soil near soybean plants. First-generation beetles reach peak levels in mid to late July. Second-generation beetle densities peak in late August or early September. Beetles stay in soybean fields until soybean plants reach harvest maturity.

Beetles of both generations feed on soybean foliage, but second-generation beetles also feed on soybean pod tissue. In 1999, pod feeding was documented on pods and on beans within pods. Beetle injury to pods can result in direct yield loss and in reduced return as a result of reduction in soybean quality. Beetle pod feeding allows entrance of fungi into pods and can cause the beans to desiccate.

The latest soybean management recommendations have encouraged early soybean planting. While early planting can increase yield, it can also encourage higher bean leaf beetle densities because female beetles reared on hosts other than soybean have shorter lifespans and produce fewer eggs. It is suspected that increased adoption of early planted soybeans and recent mild winters have contributed to the high bean leaf beetle densities currently reported.

New research on bean leaf beetle examined one site over a ten-year period and found that summer precipitation and density of the second-generation beetle population in the previous year can affect beetle densities in the following year. Other recent research examined the potential of using precision agriculture technology for bean leaf beetle management. In the precision agriculture study, it was also observed that bean leaf beetle density was positively related to the density of the previous generation. The location of the densest beetle areas was consistent between first and second-generation beetles, and at one site between second-generation populations in two different years. Field characteristics related to the densest beetle areas were examined, and these characteristics varied within each field.

Monitoring bean leaf beetle density should play a central role in management of this pest. Beetles can be sampled using a ground cloth or a sweep net. Monitoring first generation beetles may help to make predictions about second-generation beetle density. Monitoring second-generation beetles may aid in estimating risk of high populations in the next season. When economic thresholds for bean leaf beetle are exceeded, applying an insecticide is recommended. However, late soybean planting should be considered for locations that have noticed consistently high bean leaf beetle densities to deter increase of local populations.

References

- Krell, R. K. 1999. Potential of site-specific soybean insect management. M. S. Thesis. Iowa State University, Ames, IA.
- Krell, R. K. and L. P. Pedigo. 1999. Site-specific soybean insect management: benefits and barriers. Integrated Crop Management Newsletter IC-482 (Special Precision Ag Edition).
- Lam, W. F. 1999. Winter survival and population dynamics of the bean leaf beetle (Coleoptera: Chrysomelidae). Ph.D. Dissertation. Iowa State University, Ames, IA.
- Pedigo, L. P. and M. R. Zeiss. 1996. Effect of soybean planting date on bean leaf beetle (Coleoptera: Chrysomelidae) abundance and pod injury. J. Econ. Entomol. 89: 183—188.
- Smelser, R. B. and L. P. Pedigo. 1991. Phenology of the bean leaf beetle *Cerotoma trifurcata* (Forster), on soybean and alfalfa in central Iowa. Environ. Entomol. 20: 514—519.
- Smelser, R. B. and L. P. Pedigo. 1992. Soybean seed yield and quality reduction by bean leaf beetle (Coleoptera: Chrysomelidae) pod injury. J. Econ. Entomol. 85: 2399—2403.
- Zeiss, M. R. and L. P. Pedigo. 1996. Timing of food plant availability: effect on survival and oviposition of the bean leaf beetle (Coleoptera: Chrysomelidae). Environ. Entomol. 25: 295—303.