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Biological control of bean leaf beetles

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Biological control of bean leaf beetles

Abstract

Bean leaf beetles have few known natural enemies and even less is known about the use of these organisms to combat the beetle. Flies, mites, fungi, and nematodes attack bean leaf beetles. Below is a research summary of our current knowledge on the biological control of bean leaf beetle.

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INTEGRATED CROP MANAGEMENT

Biological control of bean leaf beetles

Bean leaf beetles have few known natural enemies and even less is known about the use of these organisms to combat the beetle. Flies, mites, fungi, and nematodes attack bean leaf beetles. Below is a research summary of our current knowledge on the biological control of bean leaf beetle.



Bean leaf beetle that has been parasitized by fungus. Note how the fungus erupts from between the beetle's segments.

[Enlarge](#) [1]

Louisiana

Researchers at Louisiana State University found that 22 percent of overwintered beetles were attacked by tachinid flies. Parasitized beetles laid very few or no eggs; one beetle laid a maximum of five eggs.

North Carolina

Two species of fungi, *Beauveria* and *Metarhizium*, attacked overwintered beetles in North Carolina. The highest incidence was 22 percent of the beetles infected by *Beauveria* during December, while the beetles were in hibernation. Beetles also were attacked by tachinid fly larvae during the spring.

Nebraska

University of Nebraska entomologists found tachinid flies parasitizing adult bean leaf beetles, but the rate of parasitism in east central Nebraska was very low, ranging from 0 to 1.1 percent. They also found Trombidium mites and the range of parasitism was 0-40 percent.

Minnesota

In 1983, University of Minnesota entomologists found a tachinid fly parasitizing adult bean leaf beetles at the Rosemount Experiment Station in southern Minnesota. They monitored two fields and found that the seasonal rate of parasitism fluctuated dramatically, reaching a maximum parasitism of 91 percent in one field but only 3 percent in a nearby field. The

tachinid fly appeared to have four generations per year, and the average parasitism of adult beetles was 17 percent throughout the summer. The researchers concluded that the parasitic fly larvae greatly reduced bean leaf beetle oviposition in one of the fields and that they were responsible for considerable mortality of overwintered beetles, which resulted in a 4-fold difference in the first generation of the beetle between the two study fields.

Iowa

A research team led by Larry Pedigo at Iowa State University found two species of external parasitic mites, *Trombidium*, on adult bean leaf beetles. Larval mites of both species were found under the wing covers where they attached with their mouthparts to the soft tissue between the abdominal segments. Mites parasitized both sexes of beetles but primarily attacked females. Parasitism rates for both sexes combined were less than 5 percent in 1986 and less than 1 percent in 1987 and 1988. The study found that most parasitism occurred among overwintering bean leaf beetles after spring emergence, but not until mid-June as beetle populations began to decline. Parasitism rates for first-generation beetles were consistently less than for overwintered beetles. Second-generation beetles (mid-August and later) were not parasitized by the mites. Parasitized beetles averaged two to three mites but sometimes hosted as many as 36 mites.

Recently, Rayda Krell (former graduate student at Iowa State University) discovered an unidentified nematode that had emerged from a bean leaf beetle. No reports have been made of nematodes parasitizing bean leaf beetles and nothing is known about its affect on bean leaf beetle populations. More research is needed to determine the species and life history of this animal before it could be used as a biological control agent for bean leaf beetles.

In short, bean leaf beetles are attacked by a variety of organisms. The impact of parasitic organisms on bean leaf beetles is apparently low; however, the abundance of these parasites does vary greatly from year to year and field to field. If we knew more about the influence of these factors and their impact on bean leaf beetles, we might better be able to manage them in the soybean ecosystem for our benefit.

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