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## Beetle-virus relationship in soybean

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# Beetle-virus relationship in soybean

## **Abstract**

Bean leaf beetles and bean pod mottle virus have gained much attention in recent years. However, neither of these pests is new in the Midwest. Bean leaf beetles were first reported as a pest in 1875, in Kansas. Then, in 1980, about 16,000 acres of soybean was treated for bean leaf beetles in Illinois. The magnitude of the bean leaf beetle problem in 1980 gained the respect of growers and researchers in the Midwest.

## **Keywords**

Entomology

## **Disciplines**

Agricultural Science | Agriculture | Entomology | Plant Pathology

# INTEGRATED CROP MANAGEMENT

## Beetle-virus relationship in soybean

Bean leaf beetles and bean pod mottle virus have gained much attention in recent years. However, neither of these pests is new in the Midwest. Bean leaf beetles were first reported as a pest in 1875, in Kansas. Then, in 1980, about 16,000 acres of soybean was treated for bean leaf beetles in Illinois. The magnitude of the bean leaf beetle problem in 1980 gained the respect of growers and researchers in the Midwest.

Similarly, bean pod mottle virus has been around a long time. This virus was first identified in the United States in 1948, in North Carolina. The first report of bean pod mottle virus in Iowa was in 1968, from soybean in Ottumwa. Both the beetle and the virus have been in the Midwest on native, perennial legumes. However, the abundance of bean leaf beetles has apparently never been high enough, until recent years, to create the situation that soybean growers currently face--economic damage to soybean from bean leaf beetles and bean pod mottle virus. From what we currently know, this problem is due to six factors: mild winters, early-planted soybean, virus-transmitting beetles, seed transmission of the virus, perennial legume hosts, and susceptible soybean cultivars.

Both mild winters and early planting have increased the abundance of bean leaf beetles in Iowa. Iowa's recent mild winters (2000-2001 and 2001-2002) have allowed more beetles to survive and infest soybean in the spring. Typically, bean leaf beetles move to alfalfa (which is not a known host of bean pod mottle virus) in late April to early May to feed, but the beetles typically do not reproduce in alfalfa. Early-planted soybean is a preferred host and beetles eventually move into this crop where they can develop large populations.

The virus can come from several different sources. Research by Rayda Krell, at Iowa State University, indicated that approximately 1.5 percent of overwintered beetles can transmit bean pod mottle virus to V1-V2-stage soybean and that some (<0.1 percent) bean pod mottle virus-infected soybean results from virus-infected seed. Rayda's research also showed that in addition to soybean, showy tick trefoil, which is a native host for bean leaf beetles, can carry the virus. Furthermore, Rayda and Brent Werner, an undergraduate student at Iowa State University, identified a new beetle host for bean pod mottle virus--the soybean leafminer. The soybean leafminer is an early- and mid-season pest of soybean; however, the bean leaf beetle is still the most abundant and problematic pest.



**A cluster of 37 soybean leafminers in the terminal of a soybean plant.**

So what does this all mean? This bean pod mottle virus-pest problem has many complex interactions that all play a part in perpetuating the disease cycle. Early-season management of the insect and the virus may be important to prevent crop damage. There are no known commercial soybean varieties with resistance to bean leaf beetles or bean pod mottle virus. Therefore, the only available options for growers planting commercial soybean may be carefully timed soybean planting and pesticide applications for bean leaf beetle management. Research on the management of this pest complex is ongoing.

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