

INTEGRATED CROP MANAGEMENT

1999 season review of soybean diseases

The soybean diseases encountered in the 1999 growing season were different from those of the last couple of years. Brown stem rot and white mold were not concerns in 1999, but diseases that favored warmer weather gradually emerged as production problems. In this article, I review the prevalence of soybean diseases that occurred in the 1999 growing season.

Sudden death syndrome (SDS) continues to be an increasing threat to soybean production; nine more Iowa counties reported this disease in 1999. Preventing the spread of this disease is necessary by Iowa growers. SDS spreads fast as indicated by 1998 and 1999 surveys in Illinois. The disease can be found in an average of more than 30 percent of soybean in central Illinois. Compared with Illinois, Iowa had much lower disease incidence in 1999, although the disease had been initially reported the same year (1993) in central Illinois and eastern Iowa. The slower spread of this disease in Iowa may be due to Iowa growers' efforts in monitoring and preventing this disease. The Iowa Soybean Promotion Board and seed companies have devoted considerable effort in education of disease prevention since the disease was found in Iowa.

Phomopsis/Diaporthe is a group of fungi that causes several related diseases (top dieback, northern stem canker, *Phomopsis* seed decay). **Top dieback** (also called tip blight) was mainly reported in eastern and part of central Iowa this past growing season. Symptoms of the disease occurred after the mid-August. Initial symptoms of top dieback are yellowing and death of leaves in the upper portion of the plant canopy followed by discoloration of internodes. Plants die prematurely when the disease is severe. A preliminary study indicated that symptoms of this disease can be enhanced by nutrient deficiencies in soybeans.

Northern stem canker occurred in higher frequency this past summer not only in Iowa but also in neighboring states. The same fungus that causes top dieback also may cause northern stem canker. Infected plants, noticeable because of leaf necrosis at the top of the plant, may be scattered or found in patches within the field. Like top dieback, this disease is seedborne and infected seeds are small and shriveled.

***Phomopsis* seed decay** may cause more damage than realized. Phomopsis/Diaporthe occur widely in fields where soybean has been grown. There are two possible sources of inoculum--infected seeds and infested debris from previous soybean crops. The potential damage caused by using severely infected seeds is through increased risk of seedling damping-off. If inoculum is from spores produced from the previous growing season's soybean debris, young seedlings may become infected and symptoms may be found before the first trifoliolate stage (V1). The fungi infect pods and seeds, which often are small and shriveled at harvest. Seed decay may occur during storage and such seeds have a reduced

germination rate.

Management options are similar for the Phomopsis/Diaporthe diseases. If you had fields with high levels of infection this summer, avoid using infected seed to reduce the risk of damping-off. Try to avoid practices that increase stress on soybean because stress enhances top dieback. Because the pathogens survive in infested soybean residues, use tillage practices that bury infested soybean residues if top dieback and northern stem canker were severe. Use of seed treatment also can reduce disease risk if seeds are infected.

Soybean mosaic virus (SMV) may have been prevalent in some areas of southern Iowa this year. In Iowa, the initial source of the disease in a production field is likely to be from infected soybean seeds. Aphids, which spread the virus during a growing season, cannot overwinter in Iowa and enter Iowa on air currents during the growing season. In a soybean field, aphids transmit the virus to new plants after feeding on infected plants, which start from infected seed. Seeds from plants infected by SMV sometimes have discolored or mottled seed coats. However, mottled seed coats can be caused by other organisms. Many reports on discolored seeds were received in the last 2 years. Because there is no resistance information available for soybeans grown in Iowa, the only available management option is using seed free of SMV.

Bean pod mottle virus (BPMV) is a relatively new disease to many Iowa growers. Laboratory tests show that this disease may have become prevalent in western and central Iowa. Unlike SMV, BPMV is transmitted by the bean leaf beetle during the growing season. It is not clear, however, if the bean leaf beetle vector of this virus can harbor the virus over the winter and be a source of initial infection. The level of bean leaf beetle feeding is correlated with severity of BPMV. Seed from infected plants may be discolored with a gray seed coat. Like SMV, no resistance information is available. In other states, use of insecticides to control bean leaf beetles has been recommended for management of this disease. The control efficacy may not be consistent because bean leaf beetles migrate.

Cercospora leaf spot causes purple seed stain; thus, the disease also is called purple seed stain. This disease has been increasing in prevalence. It occurs in a warm growing season and under extended periods of high humidity. In Iowa, the leaf symptoms of this disease often appear after mid-August and last until soybean maturity. The disease is more severe in early-maturing varieties compared with late-maturing varieties. In infested fields, diseased leaves (turning a light purple) are first observed at the top of the plants. At harvest, seeds from plants severely infected by *Cercospora* have purple seed coats. To manage this disease, avoid using infected seed and use tillage practices that reduce the amount of infested soybean residue. If production is for seed, consider foliar application of fungicides, such as Topsin.

Table 1. **Prevalence of soybean diseases in 1999 growing season.**

Name of disease	Occurrence	Reported damage	Management recommendations
White mold	No report	No occurrence	Select tolerant varieties
Brown stem rot	One report only	No occurrence	Monitoring
Sudden death	Increasing	Eastern and	Tillage, variety selection,

syndrome		central iowa	prevention
<i>Phomopsis</i> seed decay	Increasing	Eastern, central, and western iowa	Seed treatment, use healthy seed, use tillage
Top dieback	Same as 1998	Eastern iowa	Use healthy seed, use tillage, reduce stress
Northern stem canker (minor seed problem)	Increasing compared with 1998	Eastern, central, and western iowa	Use healthy seed, use tillage
Purple seed stain	Increasing compared with 1998	All regions in iowa	Use quality seed and tillage, use fungicide in growing season
Soybean mosaic virus (SMV)	More reports than in 1998	West, central, and southeast iowa	Use seed free of SMV
Bean pod mottle virus (BPMV)	More reports than in 1998	West, central, and southeast iowa	Use seed free of BPMV, control bean leaf beetle

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