Gray Leaf Spot

Gray Leaf Spot is an economically important disease in many midwestern and eastern corn belt states. It was initially detected in the southeastern coastal corn growing states of Virginia, Georgia and the Carolinas in the 1920s. In those states it was limited to the corn grown in foggy, humid, mountainous valleys where the warm weather and high humidity created a perfect environment for the disease to increase and spread. GLS has become a major problem across wide areas of the corn belt during the past three or four years.

Gray Leaf Spot, or GLS, is only known to affect corn. The symptoms of the disease vary with the severity of the infection and stage of corn development at which the infection occurred. The disease is first detectable as small grayish lesions on the lower leaves, which run parallel to the veins. As the disease progresses the lesions may coalesce (grow together) and cause the entire leaf to turn brown or gray. The lesions may also appear on the ear husks.

Spores, commonly known as innoculum, that overwinter on the residue of the previous year's crop spread the disease. Wind and surface water movements move these spores. In order to infect the plant, the GLS pathogen requires a moisture film on the corn leaf that lasts from twelve to thirteen hours or more. Then, if air temperatures remain in the 70 to 85 degree F range, the spores germinate and grow into the cuticle of the leaves. The disease moves up the plant with each successive generation. The disease can reach the top of the plant with as little as three generations.

Once infected, the disease destroys the plant's green tissue. This results in kernel abortion, shallower grain fill, reduced plant health, and reduced stalk and root quality. If the disease kills the leaf tissue late in its development cycle, the effect will be minimal. If the plants are infected early and a high percentage of the leaf tissue is lost for most of the growing season, yield losses could reach 30 to 50 percent.

As the advent of no-till and reduced tillage created higher residue situations over the corn growing area from Ohio to Nebraska, a perfect environment was created for innoculum to perpetuate itself from one season to the next. Plant pathologists also believe that the disease mutated slightly and became able to flourish under drier conditions. The climate in the western corn belt has changed since 1987 and many parts of Iowa and Nebraska now receive three to four more inches of rainfall than in the previous years. Pivot irrigation has become more popular in the more arid corn growing areas. The so called "opportunity time" mist emitted by the low pressure systems are also thought to create the 12 to 13 hour long moisture film on the leaves allowing entry by, and a rapid spread of, the foliar disease.

True resistance to GLS is seen in some inbreds. However, none of these inbreds are currently being used in commercial hybrids. Currently, the best resistance is from inbreds developed in the southeastern states or from those deprived from tropical germplasm.

Chemical control of GLS is possible by applying “Tilt”, marketed by Syngenta, to the at-risk fields. Two applications at $18 per acre per application might be needed and may be too expensive for commercial acres, only allowing it to be used on seed production acres.

Control of the disease to acceptable levels will take an effort on many growers’ part. The best defense against GLS is to plant hybrids with good GLS tolerance. This means that some corn producers may have to abandon their favorite hybrid. Good tolerance to GLS is available in different hybrids that also yield and perform well under other stresses. It is best to choose 3 to 4 hybrids of different genetics, and flowering dates, each containing good GLS tolerance. However, no hybrid is completely immune to GLS. If high levels of innoculum from the previous year, or an infected neighboring field are present, and weather conditions are perfect, even the immune system of a good hybrid can be overwhelmed. Therefore, the best management program should combine hybrid selection with a tillage program to bury the disease innoculum.

Most current Hoegemeyer commercial hybrids, as well as many of the experimentals, fare very well under GLS pressure. 2635, 2649, 2661, 2679, and 2694 hybrids are quite good. Only 2666 and HBt665 are among the 106 to 115 RM offerings would be classified as being quite susceptible.

CREDITS: University of Nebraska
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