Nematode Control In Soybean

DR. ALLEN WRATHER

PORTAGEVILLE, MO.

Two different nematodes damage soybean in Missouri; soybean cyst nematode and root-knot nematode. Crop-threatening levels of root-knot nematodes (RKN) are present in some fields in southeast Missouri but not other parts of Missouri. Crop-threatening levels of soybean cyst nematode (SCN) are present in about 50 percent of fields throughout Missouri.

Both nematodes attack soybean behind the growing point of roots during the growing season. They each have a spear like device in their head to create tunnels into roots, and they move into roots through these tunnels and then feed. This damages roots, stunts root growth, and most importantly reduces the roots ability to move water and nutrients from the soil to leaves.

Attack by these nematodes during the first 40 days after plant emergence is more damaging to plants than attack after the first 40 days. This is because young plant roots stunted by nematode attack never grow well the rest of the summer. Roots protected from nematodes for the first 40 days develop well during that time and can supply needed water and nutrients to the leaves through the summer even though attack by nematodes may damage roots after the first 40 days.

Symptoms of nematode attack will be visible above ground when damage to roots is moderate to severe. The symptoms will be visible 4-8 weeks after soybean emergence and may include yellow-green leaf color, stunted leaf and stem growth, and the leaves of damaged plants may wilt more quickly than healthy plants during a hot afternoon. Symptoms of nematode attack may not be visible above ground when damage to roots is slight. Plants injured by root-knot nematodes will have swollen areas, galls, visible on infected roots from about 5 weeks after emergence until soon after harvest. Soybean roots start to rot soon after harvest and galls may not be visible after rot begins. Soybean cyst nematode females may be visible on plant roots 4 to 8 weeks after emergence. Farmers and/or consultants should be cautious about diagnosing the cause of yellow-green leaf color, stunt, and wilt of leaves on midseason soybean because other factors such as low soil pH, drought, and other root problems may cause these symptoms.

To determine if SCN is present in a field, farmers should collect soil samples from the field any time during the year, but near harvest is best, and send them to the University of Missouri Nematode Diagnostic laboratory for analysis. To determine if RKN is present in a field, farmers should collect soil samples from the field during June to late October, October is best, and send them to the University of Missouri Nematode Diagnostic laboratory for analysis. There are no reliable methods to test soil for the presence of root-knot nematodes from November to May. This is because these nematodes are dormant in eggs during this time, and current methods can't detect eggs in the soil. Current tests for these nematodes rely on detecting the newly hatched worms, and this is only possible from June through October. We learned from experiments that the best method for detecting the location of yield-robbing RKN in soybean fields is to examine soybean roots for galls soon after harvest. This method was more reliable, more rapid, and less expensive than analysis of soil samples for rootknot nematodes.

Farmers can take action to protect their crop against these nematodes during 2011, but their options are limited to planting resistant varieties, crop rotation, and use of seed treatment nematicides when labeled. Some varieties are high yielding and SCN resistant, but most are only resistant to 1 or 2 races of SCN. Also, SCN seems able to overcome so-called resistant varieties after a few seasons. A few soybean varieties have some resistance to RKN. Soybean cyst nematode can be controlled by rotating soybean with corn, cotton, or some other crop that is not susceptible to SCN. This technique works better in south than north Missouri. Root-knot nematodes attack corn, cotton, and grain sorghum so they can't be controlled by rotating soybean with these crops. Growers should consider treating seed of nematode susceptible or moderately susceptible soybean varieties with either Avicta (Syngenta) or Votivo (Bayer) when planting in fields with these nematodes. These products have not yet received a federal label for use on soybean, but the labels are expected by early 2011. There are advantages and disadvantages to the use of each of these products.

For more information contact Allen Wrather at the University of Missouri Delta Center (Phone: 573-379-5431, E-mail: wratherj@missouri.edu) or check the Delta Center Web Page (aes.missouri.edu/delta). Δ

DR. ALLEN WRATHER: Professor Plant Pathology, University of Missouri