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report on
PLANT
DISEASE

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RHIZOCTONIA ROOT AND STEM ROT OF SOYBEANS

Rhizoctonia root and stem rot, caused by the fungus *Rhizoctonia solani*, is a common early season disease of soybeans throughout Illinois. Although it generally does not cause extensive damage, 50 percent stand losses have been reported. The disease is usually restricted to the early season, causing loss of seedlings (damping-off) in small patches or within rows. It is more common when wet conditions prevail, but may be found in moderately wet soils where germination is slow or emergence is delayed.

Figure 1. Soybeans with stem lesions caused by Rhizoctonia solani.

Symptoms of Rhizoctonia Infection

Rhizoctonia is most often found as a preemergence or post-emergence damping-off of seedlings and can cause seed decay as do *Pythium* and *Phytophthora*. Unlike *Pythium* or *Phytophthora*, *Rhizoctonia* infections do not involve the entire lower stem. Infections are characterized by a shrunken, reddish brown lesion or canker developing at or near the soil line (Figure 1). This decay is a dry, firm rot unlike the soft, watery rot caused by *Pythium* or *Phytophthora*. Under normal growing conditions, the decayed area will be limited to a small lesion; under disease favorable conditions, the decayed area can continue to expand into the stem and roots, causing girdling of the hypocotyl or loss of roots. Rhizoctonia injury may produce wilting when drought conditions occur. A reddish discoloration of the inside of the taproot is characteristic of this disease.

In Illinois, older soybean plants in fields infected with *Rhizoctonia* appear as areas of stunted, uneven growth. Plants are not killed but remain light green in color and stunted until midseason. Although not common in Illinois, plants can be killed if wet conditions persist. Yield reductions are generally slight (up to 10%) where stunting occurs. If stand losses are extensive, yields may be greatly reduced.

CONDITIONS FAVORING DISEASE DEVELOPMENT

Rhizoctonia solani is a common soil inhabitant which can survive many years in the absence of a soybean crop. In addition to being a parasite of soybeans, *Rhizoctonia solani* can survive on crop debris and in soil as black to brownish resting structures (sclerotia) or as resting fungal mycelium (threadlike material). Damage to soybeans is dependent on many factors including soil moisture and temperatures, soil pH,

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herbicides used, fertility levels, and competition from other soil microorganisms. Generally, any factor that slows or delays seedling growth and development will affect the level of losses to *Rhizoctonia*.

Certain herbicides have been shown to have both direct and indirect effects on this fungus. Some herbicides may inhibit soil microorganisms which normally compete with *Rhizoctonia*, allowing a rapid buildup of the fungus. Others may cause growth stresses on young plants, making them more susceptible to injury by *Rhizoctonia*. Excessive herbicide rates, improper application, or poor incorporation may also affect the level of *Rhizoctonia*.

Fertility may also have an important role in disease losses. Damage is usually greatest where phosphorous or potash are deficient or where pH levels are unfavorable. *Rhizoctonia* can also invade tissues at wound sites. Stem infections, hail injury, or mechanical damage from equipment are common and can result in plant death especially when warm, wet conditions prevail.

Control Measures

1. Plant only clean, certified seed with a known cold germination of at least 70 percent or a warm germination of at least 85 percent. High vigor seed is especially important where conditions do not favor rapid germination and emergence.

2. Plant in a warm (above 60°F), well-prepared seedbed. If planting in reduced tillage fields with a history of *Rhizoctonia* problems, delay planting due to the slower warm-up of soils under residue covers.

3. Treat seed with a protectant fungicide which will control *Rhizoctonia*.

4. Avoid chipped, cracked, or discolored seed.

5. Test soils before planting and maintain proper balanced fertility and pH based on a soil test.

6. Avoid planting in areas of compacted soils or use appropriate tillage methods to reduce compaction.

7. Avoid heavy irrigation early in the season.

8. Apply only suggested herbicides at recommended rates and properly incorporate according to label. Follow current recommendations of University of Illinois Extension Agronomists.

9. Where *Rhizoctonia* has been diagnosed on seedlings, cultivate to move soil around the base of plants to encourage the development of adventitious roots. This can save a stand. However, note the situation and plan appropriate action to prevent recurrence in the future.