CROP FOCUS

DUPONT PIONEER

Soybean Seed and Seedling Diseases

Disease Facts

- Pathogens that attack soybean seeds and seedlings (*Phytophthora, Pythium, Rhizoctonia and Fusarium)* survive in diseased plant material and in the soil.
- These diseases are most common when soil is very wet in the first few weeks after planting, especially in heavy, poorly drained, compacted or high-residue fields.
- Diagnosing soybean seedling diseases can help in understanding later symptoms and final yields, and managing these diseases in future years.
- *Pythium* and *Fusarium* are more likely to occur when soil temperatures are cooler (<60° F). *Phytophthora* and *Rhizoctonia* are more likely to be the culprit if soils are warmer (70 to 80° F).
- Commercial soybean varieties vary little for resistance to seedling pathogens (except for *Phytophthora,* covered in a separate *Crop Focus*). Pioneer Hi-Bred does not rate varieties for resistance to these other diseases.

Management

- Management of seed and seedling disease is best achieved through sound planting practices to minimize stress, and through use of fungicide seed treatments.
- Pioneer Premium Seed Treatment helps protect against all of these stand-reducing pathogenic fungi.

Because of earlier planting and higher levels of crop residue on fields, soils are generally colder and wetter at planting, and seedling diseases have increased as a result. Consequently, more growers are seeing an advantage for fungicide seed treatments. Adding an insecticide to the treatment helps prevent insect feeding that provides an entry port for disease infection. Pioneer offers several fungicide, insecticide and biological seed treatment choices to help meet specific local needs for stand protection.

Fungicide choices include

1) Allegiance® for *Pythium and Phytophthora control, and 2) EverGoITM Energy (new for 2013), a* next-generation technology with multiple modes of action for enhanced protection against a broad spectrum of early-season disease pathogens, including *Rhizoctonia, Fusarium and Pythium.*

Table 1. Summary of seed and seedling disease symptoms*.

Disease / Growth Stage	Pathogen	Symptoms
Seed rot / V0-VE	*Pythium* *Phytophthora* *Phomopsis*	Soft decay of seed; missing seedlings in row.
Seedling mortality (damping off, seedling blight) / VE-V4	*Phytophthora* *Rhizoctonia* *Pythium*	Wilting, yellow leaves. Necrotic lesions on stems. Death of seedlings can occur quickly. Leaves remain attached to stem.
Root and lower stem decay / VE-V6	*Rhizoctonia* *Fusarium* *Phytophthora*	Reddish-brown lesions on taproot and hypocotyl; often superficial. *Phytophthora* causes brown lesions on stem above soil-line.

Pythium

- Prefers cold soil temperatures (<60° F); may be the first soybean disease found in a growing season.
- High-residue fields, and heavy or compacted soils are at higher risk because of cooler, wetter conditions.
- Pathogen may attack seeds before or after germination; seeds killed before germination are soft and rotted with soil adhering to them.
- Plants may be killed by "damping off" before or after emergence. On infected plants, the hypocotyl becomes narrow and is commonly "pinched off" by the disease.

- Emerged plants may be killed before the first true leaf stage. These plants have a rotted appearance.
- Diseased plants may easily be pulled from the soil because of rotted roots.

Rhizoctonia

- Is more common in wet soils or moderately wet soils where germination is slow or emergence is delayed.
- Infection is characterized by a shrunken, reddish-brown lesion on the hypocotyl at or near the soil line.
- Infection may be superficial, causing no noticeable damage, or may girdle the stem and kill or stunt plants.

Reddish-brown lesion on soybean hypocotyl near the soil line is characteristic of *Rhizoctonia* infection.

- Normally appears as the weather becomes warm (~80F); more often seen in late-planted soybean fields.
- Causes loss of seedlings (damping-off) in small patches or within rows; is usually restricted to the seedling stage.

Stand loss due to *Rhizoctonia* infection. Microenvironments favorable for disease development may lead to losses in "patches", or in sections of rows.

Fusarium

- Infection is caused by a complex of different species that prefer different conditions; some prefer warm and dry soils, while others prefer cool and wet soils.
- Some species attack corn, wheat and other host plants.
- Causes light- to dark-brown lesions on soybean roots that may spread over much of the root system.
- May attack the tap root and promote adventitious root growth near the soil surface, and may also degrade lateral roots, but usually does not cause seed rot.

Dead plant due to *Fusarium* infection, with healthy plants in background. Less severe infections may degrade roots without resulting in plant death.

Stand loss due to *Fusarium* infection. Note the "patchy" nature of infection occurring in a specific area of the field.

*Table 1 adapted from: University of Wisconsin Field Crops Plant Pathology - Plant Health Initiative
http://fyi.uwex.edu/fieldcroppathology/soybean_pests_diseases/seedling_diseases_soybean/