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, < 59°F (15 ºC). *Phytophthora* and *Rhizoctonia* are more likely to be the culprit if soils are warmer, 68 to 81°F (20 to 27 ºC).

- Commercial soybean varieties vary little for resistance to seedling pathogens (except for *Phytophthora*, covered in a separate Crop Focus). DuPont Pioneer does not rate varieties for resistance to these other diseases.

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

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

**Management**

- Management of seed and seedling disease is best achieved through sound planting practices to minimize stress, and through use of fungicide seed treatments.

- Because of earlier planting and higher levels of crop residue on fields, soils are often 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.

- The Pioneer Premium Seed Treatment product offering includes DuPont™ Lumisena™ fungicide seed treatment (oxathiapiprolin) paired with EverGol® Energy fungicide seed treatment (prothioconazole, penflufen, metalaxyl) and Gaucho® insecticide seed treatment (imidacloprid).

- Lumisena™ fungicide seed treatment is a new proprietary technology providing protection against *Phytophthora* and downy mildew pathogens.

- EverGol Energy fungicide seed treatment contains three fungicides providing activity against *Pythium* seedling damping off, *Fusarium* root rot and *Rhizoctonia* root rot.

**Pythium**

- Prefers cold soil temperatures of < 59°F (15 ºC); 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.

*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/](http://fyi.uwex.edu/fieldcroppathology/soybean_pests_diseases/seedling_diseases_soybean/)*
**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.
- Normally appears as the weather becomes warm, around 81°F (27 °C); 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.

**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 taproot 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.*

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

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

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

*The foregoing is provided for informational use only. Please contact your Pioneer sales professional for information and suggestions specific to your operation. Product performance is variable and depends on many factors such as moisture and heat stress, soil type, management practices and environmental stress as well as disease and pest pressures. Individual results may vary. Components under the Pioneer Premium Seed Treatment offering for soybeans are applied at a DuPont Pioneer production facility or by an independent sales representative of Pioneer. Not all sales representatives offer treatment services, and costs and other charges may vary. See your Pioneer sales representative for details. Seed treatment offering exclusive to DuPont Pioneer and its affiliates. See your local Pioneer sales representative for details. EverGol® is a registered trademark of Bayer.*