

Plant Pathology Factsheet

ROOT AND LOWER STEM DISEASES OF SOYBEAN

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Wet weather and standing water in soybean fields are favorable to the development of certain root and lower stem diseases of soybean.

The fungus *Pythium ultimum* is a water mold that is common in soils throughout Kentucky. This fungus is especially favored by wet, cool to moderately warm soil conditions. Diseased plants are usually distributed in small circular patches, typically where water has stood (Figure 1). Much larger areas may be affected during extremely rainy weather. *Pythium* may cause a seed rot or death of young seedlings after emergence. Affected seedlings (with a soft, watery rot) wilt, turn brown and die.



Figure 1. Post-emergence damping-off caused by *Pythium ultimum*.



Figure 2. Young plants killed by *Phytophthora* root rot.

The fungus *Phytophthora*, although much less common in Kentucky than *Pythium*, is an important factor in some fields. As with *Pythium*, seedlings may be attacked either before or after emergence. It, too, is a water mold and is favored by high soil moisture.



Figure 3. Mid-season plant death caused by *Phytophthora* root rot.

Unlike *Pythium*, which generally stops being a problem as the seedlings become established, *Phytophthora* can cause plants to wilt and die at any age (Figure 2,3).



Figure 4. Stem lesion characteristic of *Phytophthora sojae* infection.

Generally, a dark brown root rot can be found on older plants and a glossy brown discoloration will be seen extending up the stem into the lower nodes (Figure 4).

Rhizoctonia, like *Pythium*, is present in every soybean field in Kentucky to some extent. It generally only becomes a problem when the crop is stressed. Herbicide damage is often a factor commonly associated with *Rhizoctonia*. Damage, although less dependent on water than either *Pythium* or *Phytophthora* is, nonetheless, usually more severe in heavy, poorly drained areas, especially following the occurrence warm, wet conditions.

Infected plants may die or look unthrifty because of a firm, dry, brown to reddish-brown decay of the roots and stem below or near the soil line (Figure 5). In most cases, plants will not be killed by *Rhizoctonia*, will outgrow the problem and appear to be normal the remainder of the season.



Figure 5. Stem infection caused by *Rhizoctonia*.

Seed and seedling decay caused by *Phomopsis* spp. is very common in Kentucky and is related to the planting of low quality seed, especially into cool wet soil. The causal fungi are seed borne, with initial infections occurring the previous growing season, prior to harvest. Severely infected seed will be shriveled, elongated, cracked, and appear white and chalky (Figure 6). Infected seed, if they germinate, give rise to diseased, malformed seedlings with many brown, stem and seed-leaf lesions. Severely diseased seedlings will die prior to becoming established.



Figure 6. Seed decay caused by *Phomopsis* spp. (left).

Seed and seedling diseases are best managed by waiting to plant until soils have warmed sufficiently to encourage rapid germination and seedling establishment. In addition, plant only certified seed, which will be of uniform quality and high germination. Avoid planting into extremely wet soils, especially during no-till operations. Maintain proper soil fertility and avoid damage to developing seedlings by herbicides, insects, or some other physical factor. Use a broad-spectrum seed treatment fungicide, such as one containing thiram or captan, if seed quality is marginal and/or if you must plant seed into soil of less-than-optimal conditions.