



# Extension FactSheet

Plant Pathology, 2021 Coffey Road, Columbus, OH 43210-1087

## Phytophthora Root Rot of Alfalfa

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**P**hytophthora root rot is the most serious root disease of alfalfa in Ohio. This disease is especially severe on heavy, poorly drained soils. Although *Phytophthora* is most damaging to seedlings, mature plants may also be weakened and eventually killed.

### Cause of the Disease

Phytophthora root rot is caused by a soil-borne fungus, *Phytophthora medicaginis*, which is present in most alfalfa field soils. This fungus survives in organic debris and becomes active in wet soil. Water-saturated soils allow production of zoospores which have the capability to “swim” to roots and begin the infection process. Infection usually occurs on small lateral roots. From these initial infection points, the fungus gradually grows into the taproot.

### Symptoms

A yellow, red, or purple discoloration of leaves is the most characteristic above-ground symptom of *Phytophthora* root rot (Figure 1). Stems may wilt or remain upright. Damage is most evident in low or poorly-drained areas of a field (Figure 2). In fields with tile drainage, healthy plants are often seen over the tile lines, while plants between tile lines show characteristic symptoms of the disease.

*Phytophthora* on taproots produces dark brown to black lesions that frequently girdle the taproot (Figure 3). Taproots are often pruned off immediately below the crown region, resulting in a “pencil-point” symptom. Plants with girdled taproots usually die, but some plants may survive and produce adventitious lateral taproots immediately above the region of *Phytophthora* infection (Figure 4). These lateral taproots are less efficient during droughty periods than normal taproots since they do not reach deep into the soil profile.

*Phytophthora* also causes damping off of emerging seedlings. Typical post-emergence damping off occurs when plants are in the cotyledon stage. Stems (hypocotyls) collapse and seedlings topple to the soil surface. Here they rapidly decompose leaving no trace.

### Control

#### Field Selection

Alfalfa should be planted only in well-drained fields. Although alfalfa may be established on sites with inferior drainage, *Phytophthora* root rot will usually cause stands to thin rapidly.

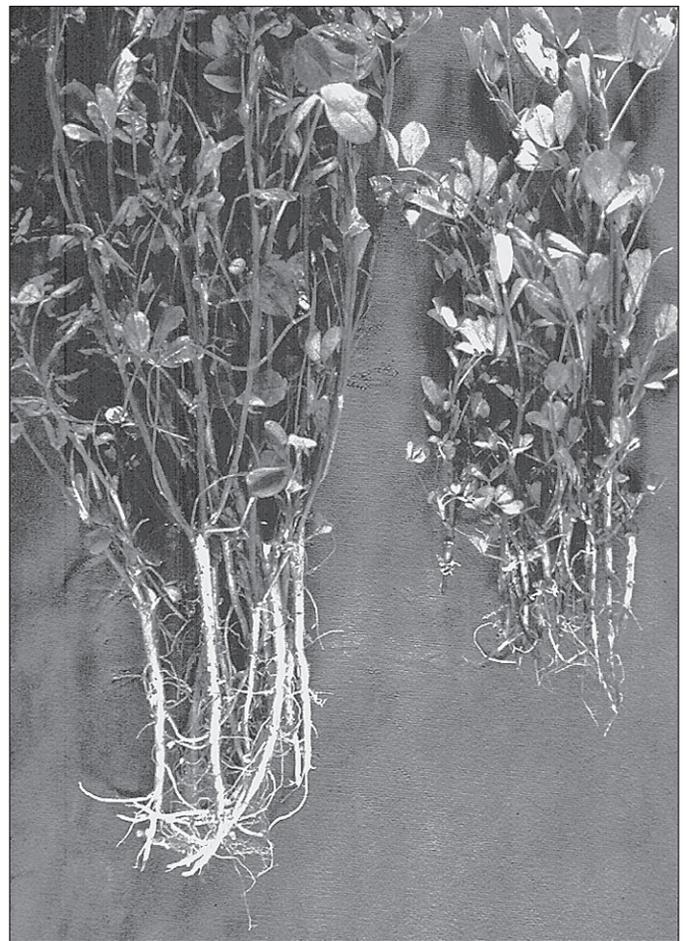


Figure 1. Stunted plants with chlorotic (yellowed) or reddened leaves characteristic of *Phytophthora* root rot (right). Healthy plants on left.



Figure 2. *Phytophthora* root rot in low area of field (upper right in photo) while plants on higher ground (foreground) remain healthy.

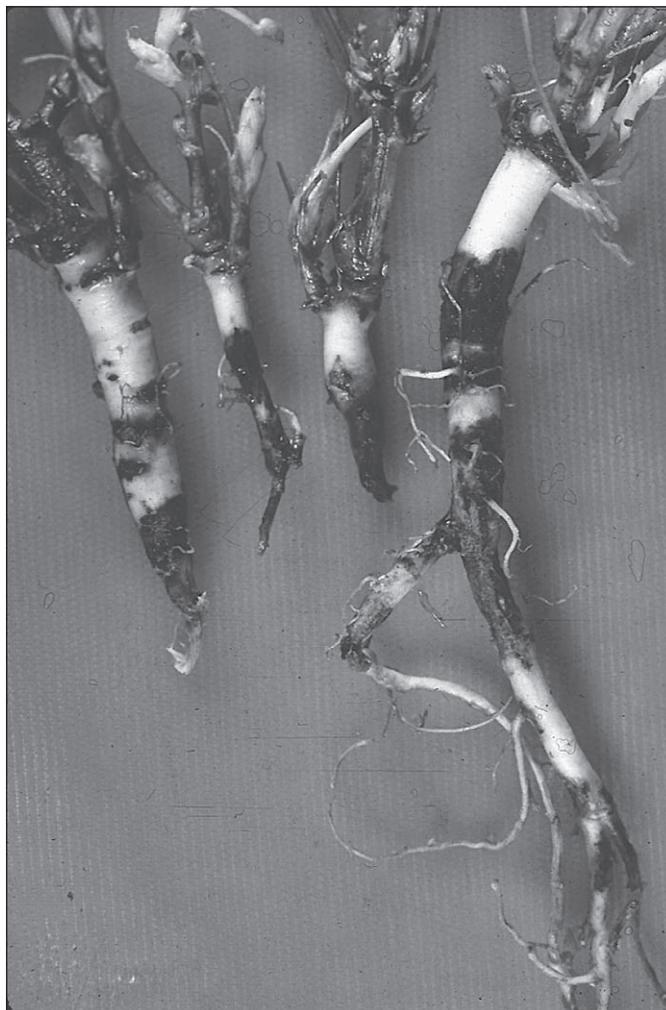


Figure 3. Black lesions encircling alfalfa taproots. Roots are frequently pruned off by *Phytophthora*, leaving a characteristic "pencil point."

### **Crop Rotation**

Alfalfa should follow corn or small grain in a rotational sequence. Never follow alfalfa with alfalfa. *Phytophthora* populations gradually build up in an alfalfa crop, and high inoculum levels left in the soil frequently result in destruction of a newly-seeded crop in the same soil. Likewise, attempts to thicken an existing stand by reseeding will usually result in failure.

### **Resistant Varieties**

Many alfalfa varieties now have genetic resistance to *Phytophthora* root rot. (See OSU Extension Factsheet AC-41 for a complete list of current varieties with *Phytophthora* resistance.)

Varieties with genetic resistance will sustain less damage under conditions that favor *Phytophthora* (Figure 5); however, some root rot will occur and some plants may be killed. This

is because individual plants within the population of plants that make up a variety are not genetically identical. The designation of "Resistance" or "High Resistance" means only that a certain percentage of plants within that variety will carry resistance to *Phytophthora* root rot. For this reason, moderate and sometimes severe damage can be sustained on a resistant alfalfa variety when conditions are favorable for disease development. Also, even resistant varieties are somewhat susceptible as young seedlings.

### **Apron Seed Treatment**

Apron is a seed treatment formulation of the systemic fungicide metalaxyl, which can provide some degree of protection against damping off caused by *Phytophthora* as well as species of *Pythium*. Seed of many alfalfa varieties is now pre-treated with Apron. The treatment is relatively inexpensive and pro-

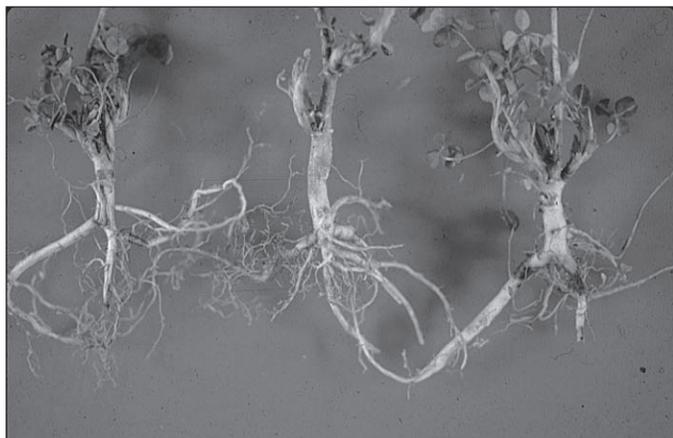


Figure 4. Lateral “taproots” forming after loss of main taproot to *Phytophthora*.



Figure 5. Alfalfa variety trial plots showing differences in susceptibility to *Phytophthora* root rot.

vides an extra measure of protection against early season stand losses. Apron seed treatment should only be used in conjunction with *Phytophthora*-resistant alfalfa varieties as well as other management practices that reduce the risk of *Phytophthora* damage.

#### **Ridomil Soil Treatment**

The fungicide Ridomil 2E is labeled for soil application at planting. The active ingredient of Ridomil is metalaxyl, which is the same active ingredient in Apron. Ridomil 2E may be applied as a broadcast surface soil spray or may be impregnated on fertilizer granules and applied beneath the seed with a band

seeder. Apply no more than one pint per acre of Ridomil 2E if Apron seed treatment is also used.

#### **Stand Repair**

Damage from *Phytophthora* root rot is often localized in low or poorly-drained areas of a field, while plants in the remainder of the field continue to be healthy and productive. When this situation occurs, “stand repair” is sometimes warranted. Red clover/orchardgrass or red clover/timothy mixtures may be spot-seeded in these areas using appropriate methods. Spot-seeding will reduce erosion and weed encroachment, and provide forage which can be harvested with the remaining alfalfa.

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