CROP FOCUS

DUPONT PIONEER

Aphanomyces Root Rot in Alfalfa

Disease Facts

- Causal agent is *Aphanomyces euteiches,* a fungal-like pathogen favored by wet, warm conditions
  - Occurs most often on slowly drained soils
  - Soil temp. of 75 to 82 F is optimum for disease
- Often present in same soils as Phytophthora
- Young seedlings are the most vulnerable
- Two significant races (1 and 2) are detrimental to alfalfa

Aphanomyces Race 2

- First discovered in the 1990s
- Is more virulent than race 1. Varieties resistant to race 1 are often overcome by race 2.
- Has been identified in over 10 states (IA, ID, KY, MD, MN, MI, MS, NC, TN, VA and WI), and Ontario, Canada

Impact on Crop

- Seedling stand establishment is reduced
- Stand longevity is lessened
- Poor root growth and less nodulation may also reduce yields throughout the life of the stand

Symptoms (same for Races 1 and 2)

- Infected seedlings initially develop yellow cotyledons
- A yellowing and purpling of upper leaflets follow
- Stunted seedlings appear to be “standing in place”

- Roots and stems on infected seedlings initially appear gray and water-soaked and then turn brown
- Lateral roots are either dead or decaying
- Plants exhibit symptoms similar to a nitrogen deficiency
- Nitrogen-producing nodules are often absent
- Established plants are slow to green up after winter or harvest
- Aphanomyces causes a “slower” wilting than Phytophthora or Pythium

Aphanomyces Disease Cycle

- Pathogen survives as oospores in the soil or diseased plant tissue
- "Free water" in excess of field capacity promotes disease development
- Other legumes such as pea, clover and snap beans act as alternate hosts

Management of Aphanomyces

- Plant Aphanomyces-resistant alfalfa varieties (see below)
- Avoid poorly drained soils
- Avoid excessive irrigation
- Scout fields and sample soils of problem stands
- Rotate out of alfalfa and avoid pea, clover and snap beans in rotations
- Recognize that alfalfa may not be a good crop choice for poorly drained soils
- Fungicidal seed treatments are NOT effective against Aphanomyces

Aphanomyces-Resistant Varieties

- Pioneer provides varietal ratings[1] to Aphanomyces race 1 and race 2
- All Pioneer® brand fall dormant alfalfa varieties are rated as Highly Resistant (HR) or Resistant (R) to race 1.
- About half of Pioneer fall dormant varieties are rated HR or R to race 2.

Resistant Varieties (continued)

- Where race 2 is known to occur (e.g., in fields where race 1-resistant varieties have shown symptoms and damage), varieties highly resistant or resistant to race 2 should be selected
- If resistance to race 2 is not specified for a competitor's Aphanomyces-resistant variety, growers can assume it is resistant only to race 1
- Pioneer plant breeders are increasing resistance in Pioneer products by screening potential new varieties for resistance to both races

[1] Pioneer's Rating System Explained:

- Alfalfa varieties are like a family of siblings, each plant related but not identical to the others
- Pest resistance traits are classified according to the percentage of plants in the variety expressing resistance

% Resistant Plants	Resistance Class	Class Abbreviation
<6	Susceptible	S
6-14	Low Resistance	LR
15-30	Moderate Resistance	MR
31-50	Resistant	R
>50	High Resistance	HR