

Disease Facts

- Fungal disease caused by *Fusarium virguliforme*
- Has spread to most soybean-growing states and Ontario, Canada
- Continues to spread to new fields and larger areas of infected fields
- Ranked second only to soybean cyst nematode (SCN) in damage to soybean crop
- Fungus colonizes only crown and roots of the plant
 - Above-ground symptoms are caused by a toxin produced by the fungus and translocated throughout the plant
- Severity varies from area to area and field to field



Conditions Favoring Disease Development

- Cool, moist conditions early in the growing season often result in higher disease incidence
- Favorable disease conditions may result from early planting, high rainfall and/or low-lying, poorly drained or compacted field areas
- If SCN is also a problem in the field, disease may be more severe
- Infection occurs early in the season, but symptoms usually do not appear until mid-summer
- Appearance of symptoms often associated with weather patterns of cooler temperatures and high rainfall during flowering or pod-fill

Fusarium virguliforme Disease Cycle

- Fungus survives in crop debris and as mycelia in the soil
 - Survives best in wet areas such as poorly drained or compacted field areas
- Fungus enters roots early in the growing season
 - Infection may be facilitated by wounds from SCN, insects or mechanical injury
- Fungus colonizes the root system
- Fungus overwinters in diseased soybean residue

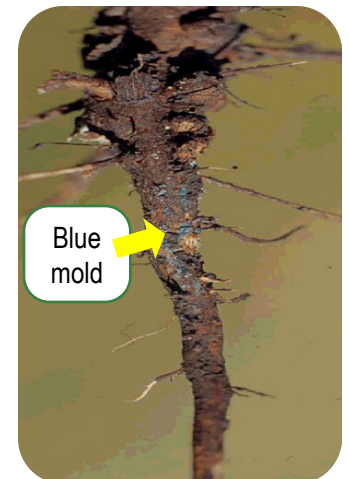
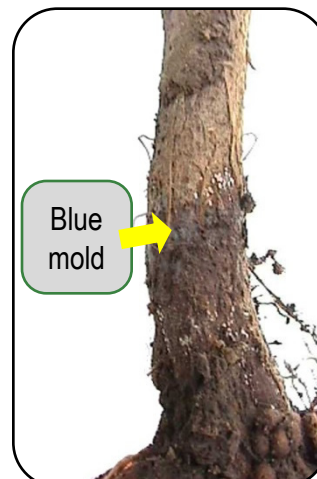
Impact on Crop

Soybean seed yield is reduced as:

- Plants lose leaf area and leaves drop prematurely
- Roots deteriorate, reducing water/nutrient uptake
- Flowers and pods abort, resulting in fewer pods and seeds
- Seeds may be smaller, and late-forming pods may not fill or mature

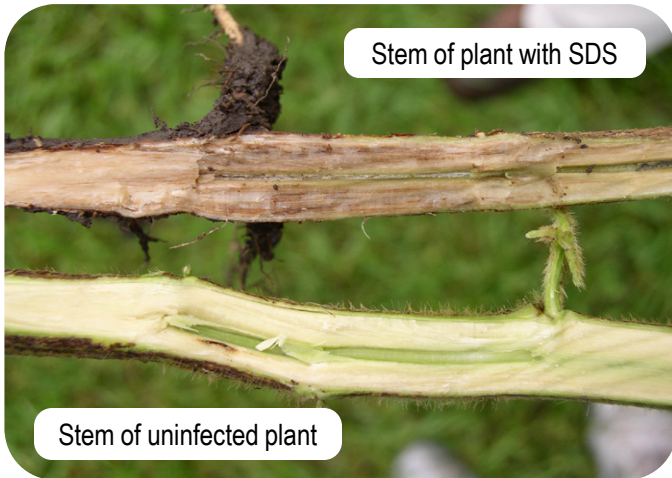
Root Symptoms

- A blue coloration may be found on the outer surface of taproots due to the large number of spores produced
 - These fungal colonies may not appear if the soil is too dry or too wet



Root Symptoms (continued)

- Splitting the root reveals cortical cells have turned a milky gray-brown color while the inner core, or pith, remains white
- General discoloration of the outer cortex can extend several nodes into the stem, but its pith also remains white



Leaf and Plant Symptoms

- Leaf symptoms first appear as yellow spots (usually on the upper leaves) in a mosaic pattern
- Yellow spots coalesce to form chlorotic blotches between the leaf veins
- As chlorotic areas die, leaves show yellow and brown areas contrasted against green veins
- Affected leaves twist and curl and fall from plants prematurely
- Flowers and pods abort, and seeds are smaller
- Later-developing pods may not fill, and seeds may not mature



Management

Use a combination of practices:

- Select SDS-resistant varieties
 - Pioneer has developed elite soybean varieties with improved SDS resistance
 - Soybean breeders have selected for genetic resistance in multiple environments with high levels of natural SDS infection
 - Pioneer rates its varieties and makes ratings available to customers
 - Ratings range from 4 to 8 (9 = resistant), indicating very good resistance is available in elite soybean varieties
- Your Pioneer representative can help you select suitable varieties
- Manage soybean cyst nematode (SCN)
 - Plant varieties resistant to both SDS and SCN
- Improve field drainage and reduce compaction
- Evaluate tillage systems
 - Where possible, some tillage may be needed to bury infected residue
- Reduce other stresses on the crop
- Plant the most problematic fields last in your planting sequence
- Foliar fungicide cannot protect plants from SDS



Very early symptoms of SDS development on soybean leaf



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