

Dryland Foot Rot, Common Root Rot, Fusarium Crown Rot

Summary

The diseases are caused by several fungi that can invade a wide range of cereals and grasses, and can survive and multiply on many crop residues, all producing similar symptoms.

The diseases produce localized losses by thinning stands and decreasing the number of tillers and by reducing head size and grain weight due to premature ripening.

Rotation, plowing in residues, and management practices (late seeding with appropriate seeding and fertilizer rates) help reduce disease incidence.

Symptoms

Foot and root rots impact winter wheat by reducing plant stand, number of tillers and ultimately yield, and like Take-All, are found in localized patches. Infected plants are first noticed by their stunted appearance. Later in the season plants turn yellow and die.



Figure 1. Foot and root rot lesions on wheat seedlings. APS Digital Image.

Main symptoms are crown and root browning and rot, and discoloration (not-black) of the lower culm (Figure 1). In late spring, plants under water stress ripen prematurely, producing small white heads. Symptoms are usually more acute on ridges and slopes where soil is dryer. Other symptoms are seed rot and seedling blight. Roots of diseased seedlings are light-brown and appear soaked with water (Figure 1). Eventually the roots and foot are covered by a pink or grey to brown mycelia. Severe root damage is reflected in chlorotic leaves, stunting, and eventually seedling death.

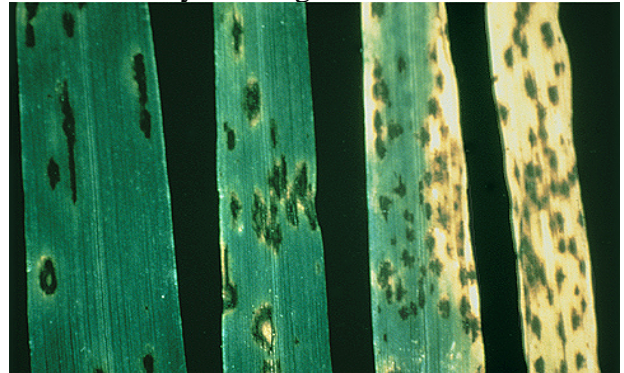


Figure 2. Leaf spots caused by *Bipolaris* on wheat. APS Digital Image.

Under wet weather, leaf lesions may appear, primarily on lower leaves. Leaf lesions would be elongated dark brown-black if *Bipolaris* caused (Figure 2), or brown or ash-colored if *Fusarium* caused.

Causal Agent

Common root rot is caused by *Bipolaris sorokiniana* (formerly *Helminthosporium sativum*; teleomorph/sexual stage *Cochliobolus sativus*). Dryland foot (crown) rot is caused

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primarily by *Fusarium graminearum* (teleomorph/sexual stage *Gibberella zeae*) and *Fusarium pseudograminearum* (teleomorph/sexual stage *Gibberella coronicola*); other fungi involved are *Fusarium culmorum* and other *Fusarium* species. *Fusarium* produces macroconidia and chlamidospores (thick-walled, asexual resistant spores). *Bipolaris* produces conidia.

Inoculum Source and conditions

The pathogens are ubiquitous, and survive for months as spores or mycelia, in the soil or in infested plant debris. Spores can also spread by wind, water, and on seed. Spores germinate and produce hyphae, which infect mainly through crown and roots. The pathogen then invades internodal tissues. Disease incidence has been increasing with reduced tillage practices, with disease being most prevalent on loose and dry soils. Wheat seed and seedlings are sensitive to attack when weather conditions are unfavorable for rapid seedling emergence and seedling growth. Moisture is essential for infection, but water stress conditions generated by warm weather and dry soils exacerbate the symptoms.

Control

- Sanitation, including plowing under or burning of infected stubble, straw, corn stalks, rotten ears and weed grasses help reducing primary inoculum.
- Crop rotation with broadleaf crops will reduce inoculum buildup and also help decompose residues. Avoid oats before wheat.
- Avoid early seeding. Later plantings in well-prepared seedbed with good moisture reduce

early incidence by favoring rapid seed germination and seedling establishment.

- Management practices such as proper seeding rates, well prepared seed bed, and balanced fertility help reduce water stress at later stages.
- Fungicide seed dressings (captan, mancozeb, PCNB, and thiram) are effective in protecting seed and seedlings for about two weeks after planting.

References

1. Compendium of Wheat Diseases. 2nd Ed. 1987. M. V. Wiese. APS Press. The American Phytopathological Society.
2. Wheat diseases Atlas. McCoy N. L. and R. W. Berry. Texas Agricultural extension Service. Texas A&M University System.
3. Wheat Diseases and Pests: a guide for field identification. J. M. Prescott, P. A. Burnett, E. E. Saari, J. Ranson, J. Bowman, W. de Milliano, R. P. Singh, G. Bekele. International Maize and Wheat Improvement Center.
4. Diseases of cereal grains. APS Digital Images Collections. 2001. APS Press. The American Phytopathological Society.

Links

<http://www.uky.edu/Ag/IPM/scoutinfo/wheat/disease/diagnost.htm>

<http://wheat.pw.usda.gov/ggpages/wheatpests.html>

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