Guide to common foliar diseases of cereal crops in Montana
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Tan spot (Pyrenophora tritici-repentis) of wheat

**Symptoms:** Small, yellow spots on the leaves when the fungus first infects the leaf which expand into an ‘eye’ shape, sometimes with a brown (necrotic) ‘pupil’ and a yellow halo if there is enough moisture; yellow halo much broader than seen with Septoria; straw will have tiny black, raised structures (pseudothecia); seed can have red smudge

**Risk Factors:** Continuous wheat production, no-till with wheat residue, irrigation; infection requires 6-24 hours of moisture and moderate temperatures (68-82°F)

**Management:** Crop rotation, residue reduction, use of best-yielding variety in your region; protect flag leaf area with fungicides

Septoria leaf spot (Septoria tritici and Stagonospora nodorum) of wheat and barley

**Symptoms:** Small, yellow spots on the leaves when the fungus first infects the leaf which expand into tan to brown and irregular to lens-shaped lesions with little to no yellow halo; if very moist small black specks (pycnidia) will be formed in the lesion

**Risk factors:** Continuous cereal production, no-till with cereal residue, irrigation; infection requires 6-24 hours of moisture and moderate temperatures (68-82°F)

**Management:** Crop rotation, residue reduction, use of best-yielding variety in your region; protect flag leaf area with fungicides

Physiological leaf spot (abiotic disorder) of wheat and barley

**Symptoms:** Can be confused with tan spot and Septoria leaf spot but symptoms are uniform on leaf and symptoms on all leaves, not just lower leaves; edges of lesions are distinct, not diffuse

**Risk factors:** High pH soil, variety susceptibility

**Management:** Variety selection; soil pH modification with potash is limited in effectiveness

Bacterial leaf blight and black chaff (Xanthomonas translucens pv. translucens and X. campestris pv. vesicatoria) of wheat and barley

**Symptoms:** Small, water-soaked spots on leaves which elongate into linear streaks that become necrotic tan or brown; often the tips of the leaves become shredded; leaves feel 'shellaced' or slick; when very wet bacteria ooze from leaves or glumes

**Risk factors:** Saving seed from a crop infested with bacterial blight or black chaff

**Management:** Variety selection; use clean seed

Net blotch and spot blotch (Pyrenophora teres) and spot blotch (Bipolaris sorokiniana) of barley

**Symptoms:** Small, round to oblong brown spots or netlike necrosis; net blotch can occur in a spot form

**Risk factors:** Continuous barley; no-till with barley residue, irrigation

**Management:** Crop rotation, variety selection, irrigation management to reduction of humidity in the canopy, light tillage to reduce residue, and fungicide application.
### Scald (Rhynchosporium secalis) of barley

**Symptoms:** Very distinct dark brown ring around a tan center  
**Risk factors:** Continuous barley; no-till with barley residue, irrigation  
**Management:** Crop rotation, variety selection, irrigation management to reduce of humidity in the canopy, light tillage to reduce residue, and fungicide application.

### Stripe rust (Puccinia striiformis) of wheat and barley

**Symptoms:** Yellow pustules occurring in stripes; different subspecies infect wheat and barley; spores are wind-dispersed; overwinters on wheat and other grasses  
**Risk factors:** Overwintering stripe rust, incidence of stripe rust in other wheat-growing regions in North America  
**Management:** Variety selection, fungicides

### Leaf rust of wheat (Puccinia triticina) and barley (Puccinia hordei)

**Symptoms:** Small, red-orange spore masses (pustules) on leaves; spores rub off on your finger; older pustules or those on resistant varieties will appear black; spores are wind-dispersed  
**Risk factors:** Incidence of leaf rust in other cereal-growing regions in North America (particularly south and east of Montana), wind conditions and time of infection; infection is favored by 6-8 hours of dew and temperatures from 60 to 80°F  
**Management:** Variety selection, fungicides

### Stem rust of wheat and barley (Puccinia graminis f. sp. tritici)

**Symptoms:** Small, red-brown spore masses (pustules) with frayed edges on stems and leaves; spores rub off on your finger; older pustules or those on resistant varieties will appear black; spores are wind-dispersed  
**Risk factors:** Incidence of stem rust in other cereal-growing regions in North America (particularly south and east of Montana), wind conditions and time of infection; infection is favored warm day temperatures from 77 to 86°F and cool night temperatures 59 to 68°F and dew; barberry is the alternate host  
**Management:** Variety selection, fungicides

Photos courtesy of the MSU Pathology Department slide collection; Rick Engel, Land Resources & Environmental Sciences, MSU; North Dakota State University