

## Guide to common root and crown diseases of cereal crops in Montana

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### Damping off (*Pythium*, *Fusarium*, *Rhizoctonia* and other fungi)

**Symptoms:** Small, yellow plants; reduced emergence; plants emerge then die  
**Risk Factors:** Continuous crop production, cool soil temperatures, moist soil; lack of seed treatment

**Management:** Fungicide seed treatment. Use a mix of chemistries to target both oomycetes such as *Pythium* (metalaxyl or mefanoxam) and fungi such as *Fusarium* and *Rhizoctonia*

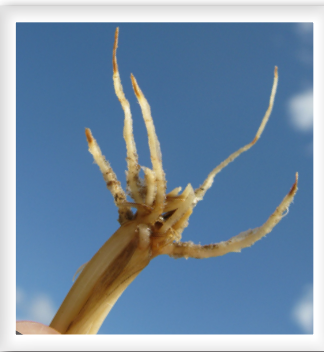


### Root rot (*Pythium*, *Fusarium*, other fungi)

**Symptoms:** Small, yellow plants; smaller root mass than healthy plants; brown roots; outer root cortex easily peels off, leaving the inner stele (vascular system) of the root

**Risk factors:** Continuous crop production, cool soil temperatures, moist soil and continued cool temperatures during early crop growth; lack of seed treatment at planting

**Management:** Seed treatments are effective for 2-3 weeks after planting.

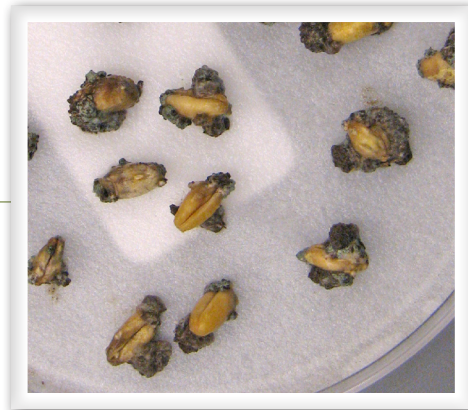


### Rhizoctonia root rot (bare patch) (*Rhizoctonia solani*)

**Symptoms:** Similar to damping off and dry seed decay; Spear-tipping of roots when they are washed (tapered, dark brown or black root tips)

**Risk factors:** Continuous cereal crop production, spraying glyphosate on volunteer and grassy weeds and planting seed within a few days

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



### Dry seed decay (*Penicillium*, *Aspergillus* and other fungi)

**Symptoms:** Seeds may decay in the soil or seedlings may become blighted and killed below the soil surface. Stands are thin and uneven or lacking plants in small to large areas. Seeds may be covered with green or white fungal mycelia, soil may stick to seeds

**Risk factors:** Planting into dry soil with no moisture for 2-3 weeks after planting; lack of seed treatment

**Management:** Fungicide seed treatment.

### Cephalosporium stripe (*Cephalosporium tritici*) of winter wheat

**Symptoms:** Dwarfed plants with one or two continuous yellow stripes on the leaf; nodes on stem may be darkened; white heads at maturity

**Risk factors:** Continuous winter wheat cropping; freeze-thaw cycles which allow the fungus to enter the roots; early seeding

**Management:** Variety selection, crop rotation, delayed planting, tillage

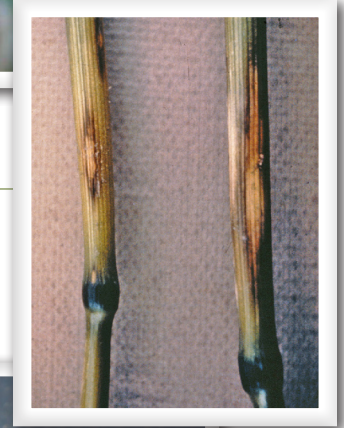


### Sharp eyespot (*Rhizoctonia cerealis*)

**Symptoms:** Lesions on crown elongated eye-shape; dark halo surrounding tan center; white heads at maturity; lodging; infects through leaf sheath, lesions often start on external leaf sheath and expand into center of stem, girdling plant

**Risk factors:** Continuous cereals; no-till with crop residue, moist, cool weather

**Management:** Crop rotation, variety selection, irrigation management to reduce humidity in the canopy, light tillage to reduce residue, and fungicide application.



### Eyespot/strawbreaker foot rot (*Pseudocercospora herpotrichoides*)

**Symptoms:** Lesions on crown elongated eye-shape; dark halo surrounding brown center; white heads at maturity; lodging; infects through leaf sheath, lesions often start on external leaf sheath and expand into center of stem, girdling plant

**Risk factors:** Continuous cereals; no-till with crop residue, moist, cool weather

**Management:** Crop rotation, variety selection, irrigation management to reduce humidity in the canopy, light tillage to reduce residue, and fungicide application



### Fusarium crown rot (*Fusarium* spp.)

**Symptoms:** Brown discoloration of subcrown internode and first two nodes of the crown, white heads at maturity

**Risk factors:** Continuous wheat production; no-till with wheat crop residue, high nitrogen, soil moisture fluctuations

**Management:** Crop rotation, variety selection, proper fertilization, irrigation management to maintain continuous moisture, light tillage to reduce residue where applicable



### Take-all (*Gaeumannomyces graminis* var. *tritici*)

**Symptoms:** Solid or streaked 'obsidian' black discoloration of first one or two nodes of the crown, black discoloration of subcrown internode; white heads at maturity

**Risk factors:** Continuous wheat production (although after many years of continuous wheat there may be take all decline, a reduction in disease); no-till with wheat crop residue, high soil pH, nutritional stress

**Management:** Crop rotation, variety selection, proper fertilization, grassy weeds control, light tillage to reduce residue where applicable



### Snow mold (*Typhula*, *Microdochium*)

**Symptoms:** Speckled snow mold (*Typhula*): leaves are bleached white/tan, small dark fungal structures (sclerotia) scattered; Pink snow mold (*Microdochium*): pink fungal structures (mycelium, conidia) on yellow or dying leaves

**Risk factors:** Prolonged deep snow

**Management:** Crop rotation, early seeding to develop larger, more tolerant plants



### Common root rot (*Cochliobolus sativus*)

**Symptoms:** Brown to black, often 'streaky' discoloration of first one or two nodes of the crown, dark brown spots on subcrown internode; white heads at maturity

**Risk factors:** Continuous wheat production; no-till with wheat crop residue, high nitrogen, soil moisture fluctuations

**Management:** Crop rotation, variety selection, proper fertilization, irrigation management to maintain continuous moisture, light tillage to reduce residue where applicable

