

Barley Diseases

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This bulletin provides useful information for diagnosing crop diseases in the field and the plant clinic laboratory. It will assist crop disease consultants and their scouts, state agricultural advisers, agribusiness representatives, pest control dealers and applicators, county agricultural agents, students in plant sciences and growers throughout Michigan.

The descriptions of symptoms, environmental conditions favoring disease, method of transmission and recommended control are brief, but complete. The calendar indicates the month in

which symptoms appear and the plant part showing the symptom. More detailed information, including photos of disease symptoms, is available in the barley disease compendium and in Extension bulletins. Contact your county Cooperative Extension Service office or the MSU Bulletin Office to obtain these publications.

For information on resistant hybrids and varieties, chemical control and other measures, consult recent literature, competent area specialists, Extension plant pathologists or informed seed suppliers.

SPRING BARLEY DISEASES

DISEASE	MONTH SYMPTOMS APPEAR							PLANT PART SHOWING SYMPTOMS				
	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	ROOTS	LEAVES	STEM	HEAD	ENTIRE PLANT
Barley Stripe		•	•					•	•			•
Spot Blotch		•	•					•	•			•
Powdery Mildew		•	•						•			
Scald (upper Michigan)				•					•		•	
Leaf Rust			•	•	•				•			
Stem Rust				•	•				•	•		
Loose Smut				•							•	
Scab				•	•						•	
BYDV		•	•	•	•				•		•	•
False Stripe (BSMV) upper Michigan			•	•	•	•			•		•	•
Physiologic Leaf Spots				•	•	•			•			
Color Banding			•						•			
Ergot				•	•	•	•				•	
Crown and Root Rot, Seedling Blight		•						•	•			•
Magnesium (Mg) Deficiency		•							•			•
Manganese (Mn) Deficiency			•	•					•			•

WINTER BARLEY DISEASES

DISEASE	MONTH SYMPTOMS APPEAR							PLANT PART SHOWING SYMPTOMS					
	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	ROOTS	LEAVES	LEAVES	STEM	HEAD	ENTIRE PLANT
Eye Spot Strawbreaker			•	•							•		•
Spot Blotch			•	•							•		
Snow Molds			•					•	•	•			
Powdery Mildew			•	•					•				
Scald			•	•					•				
Net Blotch				•						•			
Leaf Rust				•						•			
Stem Rust						•				•	•		
Loose Smut			•	•								•	
Scab				•								•	
BYDV			•	•	•					•		•	•
Physiologic Leaf Spot			•	•	•			•					
Ergot			•	•	•	•						•	
Crown and Root Rot								•	•	•			•
Take-All			•	•	•			•	•	•			•
Magnesium Deficiency			•	•						•			•
Manganese Deficiency				•						•			•



BARLEY DISEASES

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE	METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Eye Spot or Strawbreaker <i>(Pseudocercospora hepochloides)</i>	Symptoms appear only on winter barley. Symptoms rarely develop more than 5 cm above the soil; the elliptical or eye-shaped lesion is diagnostic. The lesions are distinct, initially gray to tan-brown and oriented longitudinally with the stem. Symptoms appear at heading; infected plants lodge and stems break.	High soil moisture, dense crop canopy, and high humidity near the soil surface. Mild winters and cool springs prolong sporulation and infection periods.	The fungus survives as mycelium on host debris. Conidia are distributed by splashing rain (dispersal radius of 1 to 2 m).	Plant at the end of September; use seeding rate of 1½ bu/acre; use a rotation program in which cereals are not grown for 2 years.	
Barley Stripe <i>(Helminthosporium gramineum)</i>	Symptoms appear on second and third leaves of seedlings and on most leaves produced after that. New leaves will have a yellow stripe; stripes extend the full length of the leaf; leaves soon become necrotic. Infected plants will be stunted; grain is shriveled and often brown.	Infections can occur between 50° and 92°F but 55°F is optimal.	The fungus is seed-borne in the hull, pericarp and seedcoat. Spores are wind-blown to nearby heads. Seeds can be infected at all stages of development.	Use certified seed; treat seed with carboxin-thiram formulations.	
Spot Blotch <i>(Helminthosporium sativum)</i>	Small, dark, oval-shaped spots form on leaves and then turn light tan.	Cool, wet weather in spring.	Conidia produced on crop residue are wind-blown to leaves; conidia can also spread from road side grass to barley; seed-borne.	Use certified, treated seed. If spot blotch is severe, use foliar fungicide.	

BARLEY DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE		METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Snow Mold (<i>Typhula incarnata</i>)	White mycelial growth along with sclerotia appear on living and dead plants.	Unfrozen soil under heavy snow.		The conidia are air-borne, but sclerotia may survive in soil for a year or more.	Avoid planting barley in areas of long, persistent snow cover.	
Powdery Mildew (<i>Erysiphe graminis f. sp. hordei</i>)	Powdery mycelium and conidia white in color appear on the upper surfaces of the leaves. Mycelia may contain black fruiting bodies called clerostothecia.	Cool, humid and cloudy weather; free moisture on the leaves is not required.		Spores are wind-borne.	Grow resistant varieties.	
Scald (<i>Rhynchosporium secalis</i>)	Large, oval-shaped, yellow or dark gray to brown spots with a crenated border appear on leaves.	Cool, wet weather.		The pathogen survives on crop residue; spores are wind-borne. May also be seed-borne.	Plant resistant varieties, clean plow and use a 2-year rotation program away from barley or rye.	
Net Blotch (<i>Helminthosporium teres</i>)	Long, narrow net-like lesions form on the leaf. Dark brown longitudinal and transverse streaks produce the net-like pattern.	Cool, humid weather.		Fungus overwinters on barley stubble; spores are splashed or wind-borne to healthy leaves. May also be seed-borne.	Plant resistant varieties, use certified treated seed; clean plow and use a 2-year rotation away from cereals.	
Leaf Rust (<i>Puccinia hordei</i>)	Small, round, light orange-brown uredia develop on the leaf sheath and sometimes on the head of highly susceptible varieties.	Cool (59°F) nights, free moisture on leaves for 6 to 8 hours; warm, bright (77°F) days.		Urediospores are wind-borne and new infections occur every 10 days during the growing season.	Plant resistant or early maturing varieties.	

BARLEY DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE		METHODS OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Crown and Root Rot, Seeding Blight (<i>Helminthosporium</i> , <i>Fusarium</i> spp.)	Plants are stunted with brownish roots and coleoptile. Crowns are rotten; plants produce less tillers; many of the plants die.	Drought stressed plants are more susceptible to infection. Dry autumns, open winters and dry springs.		Pathogens are seed-borne; also survive in the soil.	Plant healthy, treated seed; plant into a firm, mellow seedbed.	
Take-All (<i>Gaeumannomyces graminis</i>)	Plants are stunted, often with white heads. Roots are brittle and black, with black hyphae on the root surface. Base of culm is covered with black, scurvy mycelium.	Alkaline, nitrogen- and phosphorus-deficient soils that remain cool and wet for long periods.		Soil-borne; spread from plant to plant by runner hyphae advancing through soil and across root bridges.	Use a 3-year rotation program with corn and legumes; maintain a balanced soil fertility program; control quack grass and other wild grasses that serve as hosts.	Take-all goes to wheat, barley, bromegrass, quackgrass and bentgrass.
Magnesium (Mg) Deficiency	Plants are stunted, pale, yellow. Necrotic areas appear near leaf margins.	Highly acid soils.		Nonparasitic.	Apply by foliar spray: 10 to 20 lb/A of Epsom salt in 30 gal. of water. Apply when plant stress is low, in early morning or evening.	
Manganese (Mn) Deficiency	Chlorotic leaves with mottled brown spots and stripes appear.	Highly alkaline and calcareous soils.		Nonparasitic.	Apply by foliar spray: 1 lb/A Mn on small plants and 2 lb/A on larger plants.	

See also the barley compendium and Extension bulletin E-1425, *Barley and Rye Diseases*.



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BARLEY DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS		METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
		FAVORING DISEASE				
Snow Mold (<i>Typhula incarnata</i>)	White mycelial growth along with sclerotia appear on living and dead plants.	Unfrozen soil under heavy snow.		The conidia are air-borne, but sclerotia may survive in soil for a year or more.	Avoid planting barley in areas of long, persistent snow cover.	
Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>hordei</i>)	Powdery mycelium and conidia white in color appear on the upper surfaces of the leaves. Mycelia may contain black fruiting bodies called cleistothecia.	Cool, humid and cloudy weather; free moisture on the leaves is not required.		Spores are wind-borne.	Grow resistant varieties.	
Scald (<i>Rhynchosporium secalis</i>)	Large, oval-shaped, yellow or dark gray to brown spots with a crenated border appear on leaves.	Cool, wet weather.		The pathogen survives on crop residue; spores are wind-borne. May also be seed-borne.	Plant resistant varieties, clean plow and use a 2-year rotation program away from barley or rye.	
Net Blotch (<i>Helminthosporium teres</i>)	Long, narrow net-like lesions form on the leaf. Dark brown longitudinal and transverse streaks produce the net-like pattern.	Cool, humid weather.		Fungus overwinters on barley stubble; spores are splashed or wind-borne to healthy leaves. May also be seed-borne.	Plant resistant varieties, use certified treated seed; clean plow and use a 2-year rotation away from cereals.	
Leaf Rust (<i>Puccinia hordei</i>)	Small, round, light orange-brown uredia develop on the leaf sheath and sometimes on the head of highly susceptible varieties.	Cool (59°F) nights, free moisture on leaves for 6 to 8 hours; warm, bright (77°F) days.		Urediospores are wind-borne and new infections occur every 10 days during the growing season.	Plant resistant or early maturing varieties.	

BARLEY DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE	METHODS OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Stem Rust <i>(Puccinia graminis tritici)</i>	Brick-red pustules with ragged edges develop on the stem, leaves, and head. The pustules are oblong and much larger than leaf rust.	Cool (59° to 77°F) nights, warm, bright days and 6 to 8 hours of free moisture on the leaves and stems.	Brown spores are wind-borne; new infections occur every 14 days.	Plant resistant or early maturing varieties.	
Loose Smut <i>(Ustilago nuda)</i>	At heading, black masses of smut spores covered by a grayish membrane form on the head of the plant.	Cool, moist, cloudy weather at flowering.	Spores are wind-blown to healthy plants at flowering. Spores germinate and infect developing grain. Smut fungus is carried internally within the seed to the next crop.	Use certified seed treated with carboxin.	Scabby seed is toxic to humans and farm animals.
Scab or Head Blight <i>(Fusarium)</i>	A salmon-pink to reddish, fluffy, dust-like mycelial growth appears at the base of the spikelet. Kernels shrivel; early-infected heads become speckled with blue-black perithecia by harvest time.	Hot, humid weather during flowering to harvest.	Pathogen survives on infected cereal and grass residues in soil. Spores are wind-borne.	Rotate to crops other than wheat, corn, barley or rye; clean plow.	
Barley Yellow Dwarf Virus <i>(BYDV)</i>	Leaves yellow starting at the tips. Plants are stunted and sterile.	Moderate temperatures.	Virus is transmitted by aphids: Green Bug, Corn Leaf, English Grain, Oat Bird-Cherry.	Plant varieties resistant or tolerant to (BYDV). For winter barley, plant after the middle of September. Plant spring barley as early as possible.	Barley, oats, wheat, corn, lawn and pasture grasses are host for BYDV.

BARLEY DISEASES *Continued*

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Barley Stripe Mosaic virus or False Stripe (BSMV)	Yellow to white motting, spotting and streaking; and brownish necrotic stripes, often V-shape or chevron fashion occur on leaves. Infected plants may show moderate to severe stunting and sterile heads.	Seed transmission occurs at 68° to 75°F; age of plant at time of infection, strain or virus and barley variety influence the level of seed transmission.	Seed-borne; transmitted via infected pollen or ovules. The virus can also be transmitted mechanically, by wind, hail, or animals.	Plant certified, virus-free seed.	Appears mostly in the upper peninsula.	
Physiologic Leaf Spots (Noninfectious)	Dark to light brown irregular spots appear on leaves.	Extreme temperatures, rain, soil fertility, and light, from tillering to flowering. Sometimes genetic.	Nonparasitic.	Maintain a balanced fertility program.		
Color Banding	One to 4 distinct, yellow-white, transverse bands form on seedling leaves. The bands are up to 2 cm wide and alternate with bands of normal green tissue.	Deep-seeded in compacted soils, water-saturated leaves are dried rapidly by surface soil heat, generated by bright sunshine.	Nonparasitic.	Tissue sensitivity to temperature extreme. Declines rapidly with age and reduced water.		
Ergot (<i>Claviceps purpurea</i>)	Amber colored honeydew appears, followed by hard, purple-black, hornlike sclerotia that replace the kernels.	Cool, wet weather.	Indigenous to wild grasses; spores are wind-borne to barley heads during flowering. Sclerotia can live in soil for 1 year.	Mow grasses on roadsides adjacent to barley fields before heading. Plant clean, certified seed; plow deep; use a 2-year rotation program away from rye and wheat.		

BARLEY DISEASES *Continued*

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Crown and Root Rot, Seedling Blight (<i>Helmintosporium</i> , <i>Fusarium</i> spp.)	Plants are stunted with brownish roots and coleoptile. Crowns are rotten; plants produce less tillers; many of the plants die.	Drought stressed plants are more susceptible to infection. Dry autumns, open winters and dry springs.		Pathogens are seed-borne; also survive in the soil.	Plant healthy, treated seed; plant into a firm, mellow seedbed.	
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