

AG FACTS

Corn Diseases

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This bulletin provides useful information for diagnosing crop disease problems 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 corn 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.



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CORN DISEASES

DISEASE	MONTH SYMPTOMS APPEAR					ROOT	PLANT PART SHOWING SYMPTOMS					
	MAY	JUNE	JULY	AUG.	SEPT.		OCT.	LEAF	STALK	HUSKS	EAR	ENTIRE PLANT
Stewarts Bacterial Wilt		•	•	•	•		•	•				•
Bacterial Stalk Rot				•			•		•			•
Seed Rots and Seeding Blights	•	•					•	•				•
Root Rot	•						•					•
Northern Corn Leaf Blight				•	•			•				
Northern Corn Leaf Spot			•	•	•			•		•		
Yellow Leaf Blight		•	•	•	•			•		•		
Eye Spot		•	•	•	•			•				
Anthraxnose		•	•	•	•			•		•	•	•
Crazy Top			•	•	•			•		•	•	•
Common Smut			•	•	•			•		•	•	•
Common Rust			•	•	•			•		•	•	•
Stalk Rot (all)			•	•	•		•	•	•	•	•	•
Ear Rot (all)				•	•				•	•	•	
Storage Ear Rot											•	
Maize Dwarf Mosaic Virus			•	•				•	•	•	•	
Wheat Streak Mosaic Virus			•	•	•		•		•	•	•	
Kernel Red Streak				•	•						•	
Genetic Leaf Spot		•	•	•	•			•		•		
Cold Banding	•	•	•					•				
Lasso Injury	•	•	•	•	•		•	•	•	•		•
Magnesium Deficiency		•	•					•				
Zinc Deficiency		•						•		•		

CORN DISEASES

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE		METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Stewarts Bacterial Wilt (<i>Erwinia stewartii</i>)	Long, pale green to yellow streaks with irregular or wavy margins appear parallel to veins; streaks soon become dry and brown; plants infected early will wilt and die.	High temperatures (88° to 98°F) aggravate disease severity.		Corn flea beetle spreads the bacteria. Bacteria overwinter in beetle bodies.	Plant resistant hybrids; high levels of Ca and K tend to decrease susceptibility.	
Bacterial Stalk Rot (<i>Erwinia chrysanthemi</i>)	Tan to dark brown water-soaked, soft or slimy rot occurs above the soil line producing a foul odor; stalks collapse about midseason.	High temperatures (88° to 98°F), heavy rainfall, sprinkler-irrigated river, lake, or impounded water; poor air circulation.		The bacterium lives saprophytically on crop residue in the soil; invades plants through stomates, hydathodes or wounds; also seed-borne.	Plant resistant hybrids; avoid excess watering during hot weather; clean-plow.	
Seed Rots and Seedling Blights (<i>Pythium</i> spp. <i>Fusarium</i> spp. <i>Diplodia</i> spp. <i>Rhizoctonia</i> spp.)	Symptoms range from: yellowing, wilting, death of leaves, soft rot of stem, water-soaking of seedling tissues; small yellowish-brown lesions appearing on primary roots and later on secondary roots, later becoming black and necrotic.	Poorly drained soils during periods of cold, wet weather; soil temperatures below 55°F.		Fungi are found in water, muck and heavy soil.	Plant injury-free seed in warm, moist soil (above 55°F); correctly place fertilizer and herbicides; use seed-protectant fungicides.	
Root Rot (<i>Pythium</i> spp. <i>Fusarium</i> spp.)	Small, yellowish-brown lesions occur on primary roots and later on the secondary roots. Roots later become black and necrotic.	Cold, wet soils.		Mycelia contact root tips of corn by chance or chemical; mycelium proliferates in young tissue; cells collapse and die; pathogen is soil-borne.	Plant early-maturing hybrids; harvest early.	
Northern Corn Leaf Blight (NCLB) (<i>Helminthosporium turcicum</i>)	Long, elliptical, grayish-green or tan lesions occur on lower leaves.	Moderate temperatures (64° to 77°F) and heavy dews.		Overwinters as mycelium and conidia in corn debris; conidia are wind-borne long distances to corn plant leaves.	Plant resistant hybrids. Apply fungicide to seed fields; start when first lesions are observed.	

CORN DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE	METHODS OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Northern Corn Leaf Spot (NCLS) <i>(Helminthosporium carbonum)</i>	Small, grayish-tan lesions appear on leaf sheaths; husks are surrounded by a light to dark border.	Cool temperatures and high humidity.	Overwinters as mycelium and conidia in corn debris; conidia are wind-blown to new corn plants.	Plant resistant hybrids. Apply fungicides to seed fields; start when first lesions are observed.	
Yellow Leaf Blight (YLB) <i>(Phyllosticta maydis)</i>	Rectangular to oval yellow, cream or tan-colored lesions occur on lower leaves, leaf sheaths and husks. Black specks called pycnidia appear on lesions. Early infections cause leaves to appear yellow.	Cool, wet weather.	Overwinters in corn and grass debris; ascospores are produced in the spring; conidia developing in pycnidia on large lesions provide secondary inoculum.	Plant resistant hybrids with normal cytoplasm.	
Eye Spot <i>(Kabatiella zeae)</i>	Small, water-soaked lesions occur on leaves and later develop tan to cream centers surrounded by a brown or purple ring with a narrow yellow halo that looks like an eye spot.	Cool, humid weather.	Pathogen overwinters in corn debris; conidia is wind-blown to new corn plants; lesions appear 5 to 10 days after infection; secondary spread is by rain and wind-blown spores; fungus can also be seed-borne.	Plant resistant hybrids; clean plow and rotate crops.	
Anthracnose <i>(Colletotrichum graminicola)</i>	Small, oval to elongated, water-soaked spots appear on leaves, and become dark brown in the center with red, reddish-brown or yellow-orange borders; small fruiting bodies (acervulus) with whisker-like structures (setae) appear on surfaces of leaf.	High temperatures and long periods of cloudy weather. Free water on leaves is necessary for disease development.	Fungi overwinter as a saprophyte on corn residue and seed as spores and mycelia; spores are wind-blown to the leaves; penetration occurs directly through the epidermis or stomata; pathogen has a wide host range; also causes stalk rot.	Plant resistant hybrids; clean plow, rotate crops and balance soil fertility.	

CORN DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE	METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Downy Mildew (Crazy Top) (<i>Scleroththora macrospora</i>)	Excessive tillering, rolling and twisting of upper leaves occurs; tassel resembles mass of leafy tissue; leaves are stunted and narrow; some plants may be red.	Soils saturated for 24 to 48 hours a few weeks after planting. Optimum temperature for sporulation is 75° to 82°F.	Fungus survives in soil; new infections occur from soil-borne spores.	Provide adequate soil drainage; avoid planting in areas that stay wet for more than 48 hours.	
Common Smut (<i>Ustilago maydis</i>)	Smut occurs on all plant parts above ground; galls are first greenish-gray to silvery-white, changing to large gray galls containing black powdery spore masses.	Dry conditions and temperatures of 78° to 94°F, high N and injury.	Spores overwinter in soil; initial infections occur from wind-borne spores.	Avoid mechanical injury to plants; maintain balanced soil fertility.	
Common Rust (<i>Puccinia sorghi</i>)	Brick-red oblong pustules form on leaves; pustules become erumpent and powdery.	Cool temperatures (60° to 73°F), high humidity and bright days.	Spores are wind-blown with new infections occurring every 14 days.	Plant resistant hybrids.	
Stalk Rot (Gibberella) (<i>Fusarium</i> spp.)	On early infected plants, leaves turn dull gray-green; internodes soften and turn tan to dark brown; pith becomes shredded and pinkish in color; bluish-black perithecia form on the stalk surface.	Dry conditions early in season accompanied by warm, wet weather 2 to 3 weeks after silking; high N, low K, hail or insect damage predispose plant to infection; also high plant population.	The pathogen survives in soil and on crop residue; spores are wind-borne.	Plant resistant hybrids, maintain balanced soil fertility; use average plant populations; harvest at maturity.	
Pythium Stalk Rot (<i>Pythium aphanidermatum</i>)	Rot is confined to the internode just above the soil line. Stalks are not broken off; diseased area is brown, water-soaked, soft, and collapsed; infected plants remain green and turgid for several weeks; vascular bundles remain intact.	Hot (90°F), wet or very humid weather; poor soil drainage and air circulation.	Pathogen is found in water, muck and heavy soil.	Plant on well drained soils and use lower plant populations.	Pythium attacks plants before anthesis. This stalk rot is evident shortly before or after tasseling.

CORN DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE		METHODS OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Diplodia Ear Rot (<i>Diplodia maydis</i>)	Early infected ears have bleached or straw-colored husks; if infection occurs 2 weeks after silking the entire ear turns grayish-brown, shrunk, very lightweight and completely rotten. Lightweight ears stand upright. Husks adhere tightly to one another; black pycnidia may be on the husks, cob tissues, and sides of kernels.	Dry weather early in the season followed by wet conditions just before and after silking.	The fungus overwinters on plant debris; spores are exuded in early spring or during the growing season; spores are spread by wind, rain and insects.	Plant resistant hybrids; harvest early; store properly (below 18% ear moisture and 15% for shelled grain).	Infection usually begins at the earbase and moves toward the tip.	
Diplodia Stalk Rot (<i>Diplodia maydis</i>)	The disease appears after silking; affected plants die suddenly; leaves wilt, become dry, appear grayish-green resembling frost damage. Lower parts of the stalk turn brown, spongy and crush easily. Brown to black fruiting bodies appear just under the nodes. White fungal growth may also be present on the stalk's surface.	Dry weather early in the growing season; ample rainfall and warm temperatures (80° to 86°F) 2 to 3 weeks after silking, high N and low K.	Fungus overwinters on plant debris; spores are exuded in early spring or during the growing season; spores are spread by wind, rain and insects; infection takes place at the crown of the plant and spreads upward.	Maintain balanced soil fertility; avoid high levels of N and low levels of K; reduce plant populations.		
Fusarium Ear Rot (<i>Fusarium moniliforme</i>)	A salmon-pink to reddish-brown discoloration occurs on caps of kernels. Late infected kernels develop whitish streaks on the pericarp.	Dry, warm weather.	Pathogen is soil-borne from crop residue on or in the soil; fungi infect ears either directly or by wounds from birds feeding, corn earworms, corn borers or other insects.	See Diplodia Ear Rot.		

CORN DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE		METHOD OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Gibberella Ear Rot (<i>Gibberella zeae</i>)	A reddish mold develops on the ear tip; pinkish to reddish mold grows between husks and ear; blue-black perithecia occur on husks and ear shank.	Cool, wet weather within 3 weeks of silking.		Fungus survives on crop debris on and in the soil; spores are wind-blown to the ear. Fungi infect ears direct or by wounds from earworms, corn borers or other insects.	See Diplodia Ear Rot.	Gibberella-infected ears are toxic to swine and other animals.
Storage Ear Rot (<i>Aspergillus</i> spp.)	<i>A. niger</i> appears as a black mold growth; <i>A. flavis</i> as a greenish yellow mold growth; <i>A. glaucus</i> as a greenish mold growth.	Grow on corn stored at a moisture content of 15% or above; growth may occur in the field in tunnels of earworms or at ear tips.		Spores are wind-borne.	Dry corn below 15% moisture soon after harvest; reduce insect injury during the growing season.	
Maize Dwarf Mosaic Virus (MDMV)	The bases of young leaves are irregular, light and dark green, with mottled or mosaic patterns that may develop into narrow, light green or yellowish streaks along the veins. Plants are slightly stunted.	Warm weather (78° to 86°F) produces chlorosis and mottling.		Virus is aphid and mechanically transmitted. Virus overwinters on Johnson grass. The aphid transmits the virus in the spring from overwintering host to corn and from corn plant to corn plant during the growing season.	Plant resistant hybrids.	Over 20 species of aphids are vectors of this virus. The Corn Leaf Aphid is the most common. Seen in counties bordering Ohio and Indiana.
Wheat Streak Mosaic Virus (WSMV)	Small chlorotic spots or broken streaks develop on young leaves. Streaks elongate parallel to veins; yellowing and stunting may occur.	Warm to hot temperatures (80° to 86°F).		Wheat-curl mite transmits the virus.	Plant resistant hybrids.	WSMV infects wheat, other cereals and a wide range of wild grasses. WSMV is more common in sweet corn, popcorn and hybrid seed fields.
Kernel Red Streak (KRS)	Red streaking of the pericarp; streaks are common at the ear tips if the husks are loose. Streaks extend from kernel base to the crown and vary from deep red in yellow kernels to pink-purple in white kernels.	High temperatures (80° to 86°F) favor mite feeding.		KRS is associated with toxin production from the feeding of the wheat curl mite (vector of the WSMV that affects corn).	Effective control is not available.	KRS occurs more on yellow dent than white corn.

CORN DISEASES *Continued*

DISEASE	SYMPTOMS	ENVIRONMENTAL CONDITIONS FAVORING DISEASE	METHODS OF TRANSMISSION	RECOMMENDED CONTROL	SPECIAL NOTES
Genetic Leaf Spot	Many white-to-yellow flecks, spots and streaks develop on the leaves but not uniformly over a plant; affected plants are often scattered throughout the field.	Nothing environmental.	Genetic.	Avoid hybrids with this problem.	
Cold Banding	Irregular, light gray to silvery blotches or bands appear on both surfaces of leaves. Sometimes, yellow bands occur on leaves of very young plants.	Chilly (35° to 45°F), clear, dewy nights followed by clear sunny mornings.	Nonparasitic.	Plants will outgrow this problem with the increase of night temperature.	
<i>Lasso</i> Injury	Injured seedlings and older plants may have stunted or malformed shoots that fail to unfurl. Plants are twisted and knotted; plants tend to leaf out underground.	Cool, wet weather prior to emergence is usually associated with seedling injury; majority of the plants will outgrow the damage.	Herbicide.	Plant when soil temperatures are above 50°F.	
Magnesium (Mg) Deficiency	Whitish stripes develop along the veins, accompanied by a purplish color on the underside of lower leaves.	Strongly acid, sandy soils in regions of moderate to high rainfall; high K ₂ O and soil treated with limestone low in magnesium.	Nutrient.	Add dolomitic lime on acid soils 1000 lb/A. Foliar feed 10 to 20 lb of Epsom salts in 30 gal. of water per acre. Apply when plant stress is low; early morning or evening.	
Zinc (Zn) Deficiency	The midrib, margins and leaf tip remain green; new leaves are sometimes almost white; later, leaf edges and interior of the stalks at the nodes turn reddish-purple.	Deficiency is favored by high P in soil or fertilizer; soil pH above 6.3; cool, wet soil; low organic matter.	Nutrient.	Plants will outgrow the problem with warm day and night temperatures. It is possible to spray a solution of Zn on the leaves. Spray the foliage with ½ to 1 lb of Zn per acre.	

See also Extension bulletins E-1510, *Common Smut and Rust of Corn*, E-1416, *Corn Diseases I*, and E-1417, *Corn Diseases II*.