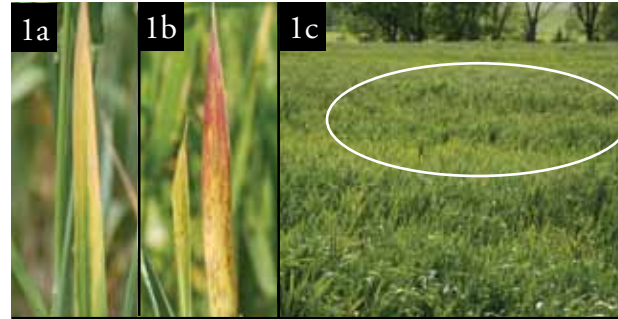


# Wheat Disease Profiles I

NU Extension Plant Pathology Team

Stephen N. Wegulo, Robert M. Harveson,  
Loren J. Giesler, Tamra A. Jackson, Amy D. Timmerman



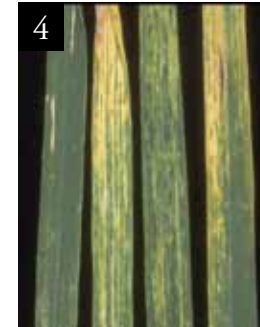
1. Barley Yellow Dwarf



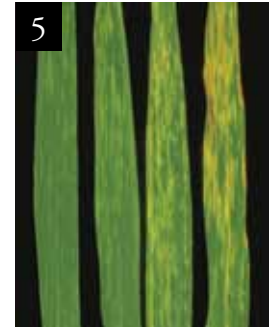
2. Wheat Soil-borne Mosaic



3. Wheat Streak Mosaic



4. High Plains Disease



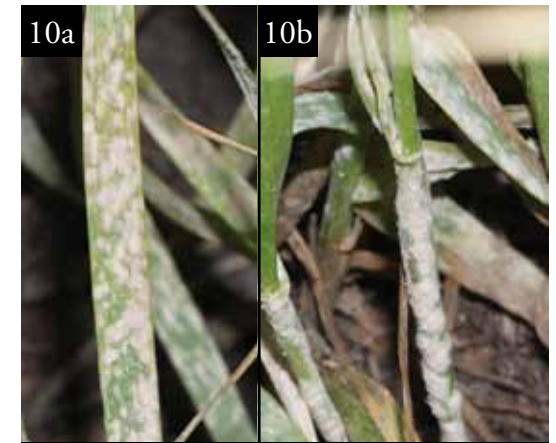
5. Wheat Spindle Streak Mosaic



6. Stripe Rust



7. Tan Spot



10. Powdery Mildew



8. Septoria Tritici Blotch



9. Common Root Rot and Crown Rot

Disease	Symptoms
<b>1. Barley Yellow Dwarf (BYD)</b> <i>Barley yellow dwarf virus</i> (BYDV) <b>Management:</b> Aphid control, control of weedy hosts of the virus or aphids	BYDV is transmitted by aphids. Leaf discoloration in shades of yellow ( <i>Fig. 1a</i> ), purple ( <i>Fig. 1b</i> ), or red occurs from the tip to the base or from the margin to the midrib. Symptoms occur from mid spring to plant maturity. Plants may be stunted ( <i>Fig. 1c</i> ) and occur singly or in small patches that conform to patterns of aphid feeding. In the field, BYD is tentatively diagnosed by the presence of aphids, leaf discoloration, and stunting.
<b>2. Wheat Soilborne Mosaic (WSBM)</b> <i>Wheat soilborne mosaic virus</i> (WSBMV) <b>Management:</b> Resistant cultivars, avoid early planting	WSBMV is transmitted by <i>Polymyxa graminis</i> , a soilborne slime mold. Mild green to yellow mosaics occur on leaves ( <i>Fig. 2a</i> ). Young leaves appear mottled and develop parallel dashes and streaks. Diseased plants are moderately to severely stunted and may occur uniformly in the field or, more often, occur in low-lying wet areas in the field ( <i>Fig. 2b</i> ). In highly susceptible cultivars, rosetting (short, bunched growth habit) may occur. Symptoms are most noticeable in early spring. As temperatures rise, disease development slows down and eventually stops.
<b>3. Wheat Streak Mosaic (WSM)</b> <i>Wheat streak mosaic virus</i> (WSMV) <b>Management:</b> Volunteer wheat control, avoid early planting	WSMV is transmitted by the wheat curl mite (WCM). Yellowing is often noticed first on the edges of fields, but can occur throughout the field ( <i>Fig. 3a</i> ). Diseased plants are usually stunted and have leaves with greenish yellow, parallel, and discontinuous streaks ( <i>Fig. 3b</i> ). Leaf rolling and trapping ( <i>Fig. 3c</i> ) are indicative of infestation with the WCM vector. The mites are enclosed and protected within the rolled leaves. Stunting and yellowing become more prominent ( <i>Fig. 3d</i> ) as temperatures rise in the spring. Severe WSM results in rosetting or sprawling ( <i>Fig. 3e</i> ). A new virus of wheat, <i>Triticum mosaic virus</i> (TriMV), is also transmitted by the wheat curl mite. Field symptoms of TriMV have not been characterized; they are most likely similar to those of WSMV.
<b>4. High Plains Disease (HPD)</b> <i>High Plains virus</i> (HPV) <b>Management:</b> Volunteer wheat control, do not plant wheat next to late maturing corn	HPV is also transmitted by the wheat curl mite. A general mosaic ( <i>Fig. 4</i> ), often preceded by isolated spots, can vary from mild to severe with subsequent necrosis (death of tissue). In the field, HPD symptoms first appear in late spring and become more severe with rising temperature.
<b>5. Wheat Spindle Streak Mosaic (WSSM)</b> <i>Wheat spindle streak mosaic virus</i> (WSSMV) <b>Management:</b> Resistant cultivars	WSSMV is also transmitted by <i>Polymyxa graminis</i> . Yellow-green mottling, dashes, and streaks ( <i>Fig. 5</i> ) appear on leaves in early spring. The streaks are discontinuous, parallel to the leaf veins, and taper to form chlorotic (yellow) spindles. Mild stunting occurs in infected plants, which produce fewer tillers, heads, and seeds. Symptoms fade before heading.
<b>6. Stripe Rust</b> <i>Puccinia striiformis</i> f. sp. <i>tritici</i> <b>Leaf rust</b> <i>Puccinia triticina</i> <b>Stem Rust</b> <i>Puccinia graminis</i> f. sp. <i>tritici</i> <b>Management:</b> Resistant cultivars, foliar fungicides	<b>Stripe rust:</b> Pustules are small, round, yellow-orange in color, and merge to form stripes on leaves ( <i>Fig. 6a</i> ). Pustules do not cause tears in epidermal tissues at pustule margins. Observed in the field starting in April to early May. Optimal temperature range: 50-60°F. <b>Leaf rust:</b> Round or slightly elongated orange-brown pustules occur mainly on the upper leaf surface and are scattered randomly ( <i>Fig. 6b</i> ). Pustules do not cause conspicuous tears in epidermal tissues at pustule margins. Observed in the field starting in mid-May. Optimal temperature range: 60-70°F. <b>Stem rust:</b> Pustules are oval-shaped or elongated, orange-red in color, and occur on leaves and stems ( <i>Fig. 6c</i> ). They are visible on both sides of the leaf surface. They cause conspicuous tears in epidermal tissues at pustule margins. Observed in the field starting in June. Optimal temperature range: 75-85°F.
<b>7. Tan Spot</b> <i>Pyrenophora tritici-repentis</i> <b>Management:</b> Crop rotation, tillage that buries crop residue, resistant cultivars, foliar fungicides	Initial lesions are small, dark, round to oval spots with light centers and dark margins ( <i>Fig. 7a</i> ), and are first observed in the field in early spring. They develop into larger lesions or blotches with yellow margins ( <i>Fig. 7b</i> ). Dark, erumpent (bursting forth) sexual fruiting structures develop and mature on wheat straw in the fall and winter ( <i>Fig. 7c</i> ).
<b>8. Septoria Tritici Blotch</b> <i>Septoria tritici</i> <b>Management:</b> Resistant cultivars, foliar fungicides	Lesions appear in early spring on lower leaves, often on areas of leaves in contact with the soil surface. They are elliptical with a tan center and usually have a distinct yellow margin ( <i>Fig. 8a</i> ). In older lesions, black, asexual fruiting structures are visible in the necrotic area ( <i>Figs. 8a and 8b</i> ).
<b>9. Common Root Rot and Crown Rot</b> <i>Cochliobolus sativus</i> <i>Fusarium graminearum</i> <i>F. culmorum</i> <b>Management:</b> Crop rotation, certified, fungicide-treated seed, firm seedbed	Dead and dying plants are visible in the field in early spring ( <i>Fig. 9a</i> ). Infected plants tiller poorly, have smaller heads, and appear spindly. Crowns, subcrown internodes ( <i>Fig. 9b</i> ), and roots are darkened and rotted. Symptoms are often associated with winter injury.
<b>10. Powdery Mildew</b> <i>Blumeria graminis</i> f. sp. <i>graminis</i> <b>Management:</b> Resistant cultivars, foliar fungicides	Cottony patches containing mycelium and spores appear on leaves ( <i>Fig. 10a</i> ) and stems ( <i>Fig. 10b</i> ). The patches, which grow superficially on the plant surface, are white initially, but later turn a dull gray-brown. Symptoms develop any time after seedling emergence and usually are first observed on lower leaves.

**Photo Credits:** Figures 2a, 3d, 4, and 5 courtesy of Robert L. Bowden, Kansas State University.