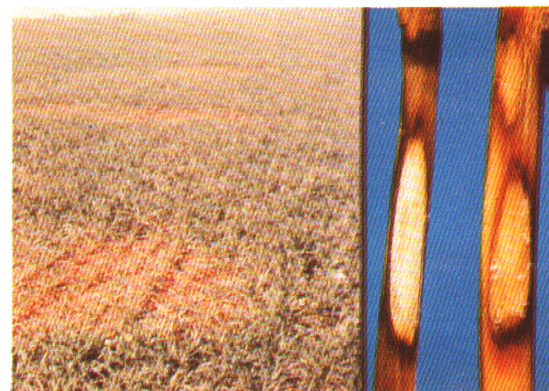


WHEAT DISEASES II



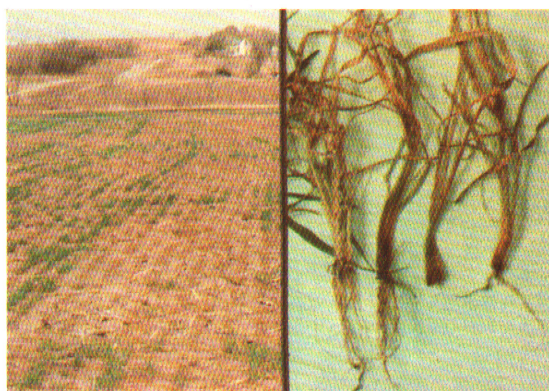
1. Foot rot or eyespot. L, lodging in a field; C, and R, lesions on culms



2. Rhizoctonia bare patch, L; sharp eyespot lesions on culms, R



3. Take-all. L, in the field; C, darkened culm bases; R, white heads



4. Helminthosporium root and crown (foot) rot. L, field; R, decayed crowns



5. Frost injury



6. Winter injury



7. Fusarium root and crown (foot) rot



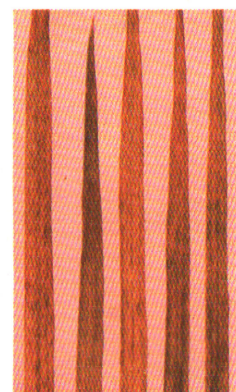
8. Typhula blight or speckled snow mold. L, infected plants; R, sclerotia



9. Soil-borne mosaic. L, in a low-lying field; R, leaf symptoms



10. Barley yellow dwarf



11. Wheat streak mosaic



12. Herbicide (Trifluralin) injury

WHEAT DISEASES II

1. **Foot Rot or Eyespot**, also known as strawbreaker, is caused by the soil-borne fungus *Pseudocercospora* (*Cercospora*) *herpotrichoides*. Maturing plants lean or break over (lodge) in all directions from a basal stem or foot rot that develops during wet weather in autumn, winter and early spring. Lens-shaped, white-to-light tan lesions with dark brown margins and up to 4 cm long, form vertically on the stems and lower leaf sheaths near the soil line. Diseased plants are often yellowish and mature early with white, sterile heads or with poorly filled kernels. The fungus overseasons in cereal and grass debris.

2. **Rhizoctonia Bare Patch or Sharp Eyespot** is caused by the cosmopolitan soil-borne fungus *Rhizoctonia solani*. Unlike Foot Rot or Eyespot (1), both roots and stems of winter and spring wheats are infected with a brownish decay. Bare or thin patches of stunted seedlings and older plants, having a purplish cast to the lower stems and leaves, are scattered throughout a field, and are characteristic of root attack. Sharply defined, lens-shaped, light tan to straw-colored spots with deep brown margins form vertically on the leaf sheaths up to ten inches or more above the soil line. These eye-shaped lesions closely resemble those of Eyespot (1). When roots are infected, plants may lodge and produce white heads. The fungus survives as small, brown-black sclerotia in soil and as mycelium in the debris of many kinds of plants.

3. **Take-All**, caused by the fungus *Gaeumannomyces* (*Ophiobolus*) *graminis* var. *tritici*, is most serious in sandy, alkaline, infertile soils where cereals, especially wheat, and grasses are grown intensively. Winter wheat is more seriously damaged than is spring wheat. Affected plants are stunted to severely dwarfed (uneven in height) in localized areas. Such plants have a reduced number of tillers, somewhat yellowed leaves, ripen early, may lodge in all directions, and develop white heads that are sterile or poorly filled and later darkened by "sooty molds." Roots, crowns and stem bases develop a brittle, dry, brown-to-black rot. A superficial, coal-black mycelial mat forms under the lower leaf sheaths. The fungus overseasons in soil as well as cereal and grass debris.

4. **Helminthosporium Root and Crown (Foot) Rot**, also called dry land foot rot, is caused by the fungus *Helminthosporium sativum* or *H. sorokinianum* (perfect stage, *Cochliobolus sativus*). A reddish-brown to dark brown decay develops in the coleoptiles and subcrown internodes and later in the crowns and roots. Seedlings may be killed before or after emergence. Plants that survive are stunted, lack vigor, produce few tillers, mature early, and form heads that are bronzed to a bleached-white. Such heads have shriveled seed. The disease occurs in random patches and is most severe in plants under stress from drought, high temperatures, nutrient deficiencies, or insect injury. The same fungus incites another disease known as spot blotch. Oval to elongated, dark brown spots with a definite margin form on the leaves. The spots may merge to form large blotches that girdle and kill the leaves. The fungus survives in crop and grass debris, soil, and on or in seed.

5. **Frost Injury** often occurs to winter wheat plants in low-lying areas in the spring. Affected leaves may have a bronzed appearance or the leaf tips are bleached. Heads that emerge are often variously distorted, bleached, at least partially sterile, and susceptible to attack by various "sooty molds." Early spring frosts can kill plants to the soil line. Frost injury often predisposes surviving plants to root and crown rotting fungi.

6. **Winter Injury** is more serious to winter wheat than is frost damage since much larger areas are usually affected. Plants may be heaved out of the soil from repeated freezing and thawing. Heaved plants, with sheared-off roots, are vulnerable to desiccation by sun and wind. Unless new roots are regenerated in the spring, such plants turn yellow, wither and die. Small patches to large areas of weak or dead plants are evident in early spring.

7. **Fusarium Root and Crown (Foot) Rot**, caused primarily by the fungus *Fusarium graminearum* (synonym *R. roseum* f. sp. *cerealis* 'Graminearum'), which incites Scab or Head Blight, invades injured root and stem (crown) tissues in cool wet weather, but damage is most evident in warm-to-hot weather when plants are under stress. Other species of *Fusarium* common in wheat roots include *F. avenaceum* and

F. culmorum. Seedlings may wither and die while older plants mature early producing fewer tillers and white heads with mostly shriveled seed. Dry, light-brown to reddish-brown lesions develop in invaded coleoptile, crown (foot) and root tissue. The greatest yield loss occurs when infection of the crown or foot reduces the stand in random or irregular patches. Surviving diseased plants are brittle, stunted, and a lighter green than normal plants. The fungi overseasons on plant refuse, seed and in soil.

8. **Typhula Blight or Speckled Snow Mold** is caused by two closely related fungi, *Typhula incarnata* and *T. idahoensis*. Disease symptoms appear when the snow melts in northern winter wheat growing regions. Under snow cover, a dense, white-to-gray mold (mycelium) grows over moist plant parts. Numerous small brown sclerotia amongst the mycelia growth gives the characteristic speckled appearance. Dead withered leaves are common but diseased plants usually recover in warm dry weather unless the crown is seriously infected. In this case plants may be killed over extensive areas. The *Typhula* fungi overseason as sclerotia in soil or as mycelium in plant residue.

9. **Soil-Borne Mosaic** is a virus disease transmitted from diseased to healthy plants by a soil-borne fungus, *Polymyxa graminis*. Winter wheat plants growing in poorly drained, low-lying areas of fields appear light green to bronzy-yellow or light purple, patchy, or uneven during prolonged, cool spring weather. The disease is sometimes mistaken for Winter Injury (6). Leaves and leaf sheaths are irregularly mottled and striped light and dark green to lemon-yellow. The stunted or dwarfed and yellowish plants tend to recover and appear normal when the weather turns warm. Kernels in affected heads are often shriveled and light weight. The virus and its fungus vector overseason in soil and crop residues.

10. **Barley Yellow Dwarf** is a prevalent virus disease of wheat and other cereals. Disease outbreaks coincide with flights of aphids that transmit the virus when they feed on a diseased plant and then a healthy one. Plants may be stunted to dwarfed and yellowish. Leaves are stiffer and more erect than normal. Early-infected plants are flattened and may winter-kill due to poor root development. Tillering is reduced, maturity is slowed, and spikelets may be blasted. Kernels in affected heads are often shriveled and light weight. In tolerant wheats the symptoms can be nondescript and easily confused with nutrient deficiencies, winter injury, root rot, or other virus disease. The yellow dwarf virus overseasons in living grass and cereal plants and is transmitted by about a dozen species of aphids, which are blown northward as the season progresses.

11. **Wheat Streak Mosaic** is a virus disease transmitted up to 1½ miles by the wheat curl mite (*Aceria tulipae*) and from plant-to-plant by leaf contact. The disease is worst in early-seeded, autumn-infected fields. Light green to faint yellow blotches, dashes and streaks, parallel to the veins, develop in wheat leaves during mid to late spring. Infected plants become stunted with golden-yellow, mottled and streaked leaves. Plants tend to spread more than normal and to tiller excessively. Early-infected plants fail to head or may produce only a few shriveled kernels. When severe, plants may die before maturity. The virus overseasons in living cereal, grass and corn plants.

12. **Herbicide (Trifluralin) Injury** is most common in turning areas at the edge of a field that receive an excessive amount of chemical. In other cases, misapplication is the problem. Where wheat is grown in rotation with a legume crop, carryover of the herbicide may injure wheat seedlings. The leaves on such plants may have reddish margins. The roots appear pruned and "stubby."

For chemical control suggestions, resistant varieties, and other control measures, consult the Extension Plant Pathologist at your land-grant university, or your county extension office.

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