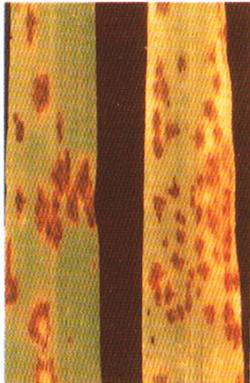


BARLEY AND RYE DISEASES



1. Kernel blight or black point on barley



2. Spot blotch on barley



3. Net blotch on barley



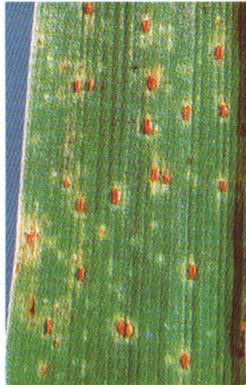
4. Helminthosporium stripe on barley



5. Powdery mildew on barley



6. Leaf rust on barley



7. Barley stem rust



8. Barley scald



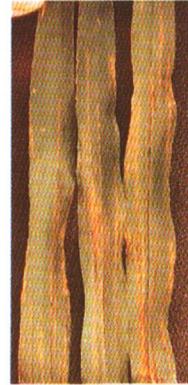
9. Septoria leaf blotch of barley



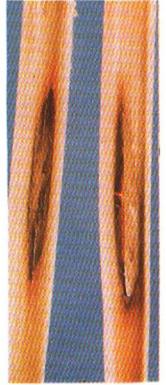
10. Barley yellow dwarf. L, field symptoms; C, plant symptoms; R, aphids



11. Loose and covered smuts of barley



12. Bacterial stripe blight



13. Rhizoctonia culm canker



14. Typhula blight of barley



15. Fusarium culm canker



16. Ergot on rye. L, honeydew stage



17. Take-all on rye

BARLEY AND RYE DISEASES

1. **Kernel Blight or Black Point**, commonly caused by the fungus *Helminthosporium sativum* (synonyms *Bipolaris sorokiniana*, *Drechslera sorokiniana*, *H. sorolinianum*; perfect stage, *Cochliobolus sativus*), appears as small black spots to a dark discoloration of barley glumes and kernels. Affected grains may be shriveled and lightweight. When planted, these kernels fail to germinate or produce dwarfed seedlings that later wither and die. Dark brown sunken lesions form near the seed, in young stems, and in crowns and roots, up to heading. The same fungus causes Spot Blotch (2).

2. **Spot Blotch** appears as enlarging, round-to-oblong, chocolate-brown to black spots on the sheaths over seedling leaves. The lesions may merge to form irregular blotches causing leaves of all ages to wither and die early. The fungus (*Helminthosporium sativum*) overseasons in crop residue, soil, seed, and seedling leaves of winter barley.

3. **Net Blotch**, caused by the fungus *Helminthosporium teres* (perfect stage, *Pyrenophora teres*), occurs as oblong to narrow, chocolate-brown blotches on the leaves and develop a cross-hatched "netting." The lesions enlarge and merge to form long brown stripes with irregular margins. The leaves do **not** split, as with *Helminthosporium Stripe* (4). The fungus overseasons in and on seed and barley residue.

4. **Helminthosporium Stripe** or stripe disease, caused by the fungus *Helminthosporium gramineum*, appears as narrow, pale green-to-yellow streaks that extend the length of barley leaves. The streaks turn tan with reddish or dark brown margins and affected leaves shred lengthwise. Diseased plants are severely stunted, produce few tillers, and usually do not head. The fungus overseasons on and in infected seed and dead leaves.

5. **Powdery Mildew**, caused by the fungus *Erysiphe graminis* f. sp. *hordei*, forms a white-to-light gray, powdery growth on leaves, sheaths, stems, glumes, and awns. Mildewed leaves may turn yellow then wither and die early. If severe, plants may lodge or produce fewer poorly filled heads. Black, speck-sized structures (cleistothecia) form in the mycelial growth on maturing plants. Where winters are mild the fungus overseasons on living plants and in northern areas as cleistothecia on plant residue.

6. **Leaf Rust**, caused by the fungus *Puccinia hordei*, is seen as small, round-to-oval, yellow-orange dusty pustules mostly on leaves and sheaths. Heavily infected leaves die prematurely. The uredial pustules may merge and turn into slate-gray telia usually covered by the epidermis but are nonfunctional in the USA. The fungus overseasons in living plants in the south. The urediospores are wind-borne northward as the season progresses.

7. **Barley Stem Rust**, caused by the rust fungi *Puccinia graminis* f. sp. *secalis* and *P. g. f. sp. tritici*, occurs on stems, leaves, sheaths, and heads. When severe, grain may be shriveled and lightweight. The elongate, reddish-brown, uredial pustules are **tattered** with fragments of barley epidermis. The pustules release masses of dusty urediospores that reinfect barley. The uredia turn into black telial pustules containing teliospores as the crop matures. To complete its life cycle an alternate host, common barberry (*Berberis vulgaris*, *B. canadensis*, *B. fendleri*) or species of Mahonia, is required. The teliospores germinate in early spring to produce basidiospores which infect nearby alternate hosts and form orange-to-yellow leaf spots called pycnia. Later, on the other side of the leaf, aecial "cluster cups" develop containing aeciospores. These spores infect nearby barley plants to complete the disease cycle. The fungus overwinters on barley stubble and in the uredial stage on living plants in the southern USA and Mexico. The urediospores blow northward as the season progresses.

8. **Barley Scald** is caused by the fungus *Rhynchosporium secalis*. Large, oval to lens-shaped lesions with a gray-tan center and dark brown or purple-brown margin develop on leaves and sheaths. Lesions may merge to form irregular blotches that kill the leaves. Older lesions may be zonate. The fungus overseasons in seed, living leaves, and crop debris.

9. **Septoria Leaf Blotch** is caused by the fungus *Setoria passerinii*. Elongated, yellowish to light brown leaf spots often merge to form irregular blotches with "pinched" margins. Dark brown pycnidia form

in older, straw-colored spots. The fungus overseasons on and in barley debris and volunteer plants.

10. **Barley Yellow Dwarf** is caused by virus that causes barley plants to be stunted to dwarfed (very uneven in growth) and turning golden-yellow starting at the tips of older leaves. Diseased plants tiller excessively and form few heads that are poorly filled. Early infected plants are most seriously affected. The BYD virus overseasons in living winter cereals, perennial grasses and about a dozen species of aphids that transmit the virus to healthy plants.

11. **Loose and Covered Smuts** are caused by two fungi: Loose smut by *Ustilago nuda* and covered smut by *U. hordei*. Barley grains are replaced by masses of smut spores covered by a whitish-gray membrane. The dark-brown loose smut spores are released when the head emerges from the boot leaving only a naked spike (rachis) at harvest. The membrane covering purplish-black masses of covered smut spores ruptures at or near grain maturity. The loose smut fungus overseasons as dormant mycelium **inside** normal-appearing seed. The covered smut fungus mostly survives as spores on seed.

12. **Bacterial Stripe Blight**, caused by the bacterium *Xanthomonas translucens*, appears as water-soaked dots on the leaves and sheaths that enlarge into irregular, narrow, light yellow to dark brown streaks. Small droplets on the lesions dry into a flaky, glossy film. The bacterium overseasons in seed, plant refuse, living plants, and soil.

13. **Rhizoctonia Culm Canker** (sharp eyespot and Rhizoctonia root rot), caused by the fungus *Rhizoctonia solani*, may infect barley at any growth stage. Lens-shaped lesions with tan centers and dark brown margins form on the lower leaf sheaths. Small, dark brown-to-black sclerotia may form on lesions and between the culm and leaf sheath. Seedlings may die but surviving plants often produce new roots. When severe, a brown root and crown rot, causes plants to lodge and produce white heads. The fungus survives in soil and debris of many plants.

14. **Typhula Blight** is caused by the fungi *Typhula incarnata* and *T. idahoensis*. In northern barley-growing areas, a white-to-gray mycelial mat grows over moist plant parts and soil under the snow cover. Many small brown sclerotia in the mycelial growth gives a characteristic speckled look to the withered leaves. Plants usually recover unless the crown is seriously infected; then plants may die over extensive areas. The *Typhula* fungi overseason in soil and on living or dead plants.

15. **Fusarium Culm Canker**, caused mostly by the fungus *Fusarium roseum* f. sp. *cerealis*, may produce Kernel Blight or Black Point (1), Scab, Root Rot, and Seedling Blight. Often occurring in patches, diseased plants are stunted, pale green, mature early, and produce few tillers with withered lower leaves. Brownish girdling cankers may form at the crown, base of lower leaf sheaths, and at the stem nodes. Seedlings often turn yellow and die. Roots may develop a reddish-brown decay. Scab appears as a bleached, premature ripening of all or part of a head. Kernels may be shrunken, grayish-brown and lightweight. The fungi overseason in soil, seed, and crop residue.

16. **Ergot**, caused primarily by the fungus *Claviceps purpurea*, attacks cereals and grasses. The fungus infects open flowers producing a yellowish, sugary liquid (honeydew) filled with spores. Insects attracted to the honeydew, feed on it, and carry the spores to healthy flowers where new infections occur. Near maturity, each infected kernel turns into a large hornlike, purplish-black ergot body or sclerotium on or in the soil or with grain.

17. **Take-all**, caused by the fungus *Gaeumannomyces (Ophiobolus) graminis* var. *tritici*, occurs wherever rye and other cereals are grown intensively. In localized areas the plants are very uneven in height, form few tillers, and ripen prematurely with bleached, sterile heads. Roots, crown and stem bases develop a brittle, brown-to-black rot. A superficial, coal-black mycelial mat forms just **under** the lower leaf sheaths. The fungus overseasons in soil as well as crop residue.

For chemical control suggestions, a listing of 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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