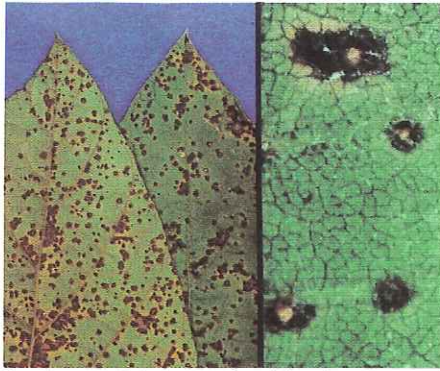


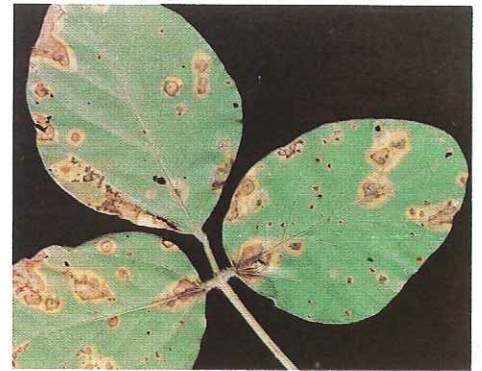
# SOYBEAN DISEASES II



1. Bacterial blight



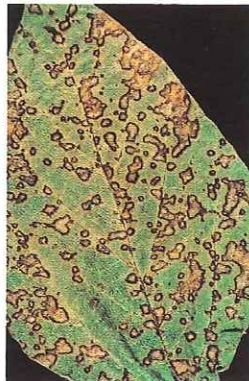
2. Bacterial pustule. R, close up of pustules



3. Wildfire



4. Alternaria leaf spot



5. Frogeye leaf spot



6. Phyllosticta leaf spot



7. Sclerotinia stem rot. L, cottony mycelium; R, sclerotia on stems



8. Soybean mosaic. L, and C, leaf symptoms; R, mottling of seed coats



9. Yellow mosaic



10. Bud blight. L, necrosis of terminal buds; R, blotches on pods



11. Lightning damage



12. Hail injury



13. Frost damage



14. Iron deficiency



15. Potassium deficiency

## SOYBEAN DISEASES II

1. **Bacterial Blight** is caused by the bacterium *Pseudomonas glycinea* (synonym *Pseudomonas syringae*). Leaf spots are small, angular and yellow, later turning dark brown to black, commonly **with** water-soaked margins, and bordered by a yellowish-green halo. The enlarging lesions may merge to form large, irregular dead areas. In windy and rainy weather, the centers of older lesions drop out or tear away with the leaves appearing ragged and shredded. The disease is common following cool wet weather up to about midseason. The bacterium survives in crop debris on or above the soil surface and in seed.

2. **Bacterial Pustule**, caused by the bacterium *Xanthomonas phaseoli* var. *sojensis*, develops during warm, wet weather. Small, angular, yellowish-green spots with dark, reddish-brown centers, **without** water-soaked margins, form on the leaves. The center of each lesion has a minute, raised pustule, especially on the lower surface. The lesions may merge to produce large, irregular dead areas. The dead tissue may rupture and tear away during windy and rainy weather. The bacterium survives in crop debris and seed.

3. **Wildfire** is caused by the bacterium *Pseudomonas tabaci*. The same organism causes a worldwide disease of tobacco. Light brown to dark brown or black spots with a **broad yellow halo**, up to 1.25 cm wide, appear on soybean leaves. The lesions may enlarge in damp weather and merge to kill large irregular areas that become dry and tear away. If severe, almost complete defoliation can occur. Wildfire almost always is found associated with Bacterial Pustule (2). The bacterium survives in crop debris and seed.

4. **Alternaria Leaf Spot** is caused by one or more species of fungi in the genus *Alternaria*. Dark brown, concentrically-ringed spots 0.8 to 2.5 cm in diameter, form on the leaves of plants as they near maturity. The lesions often enlarge and merge to kill large areas of leaves. Infected seed may show a dull brown discoloration. The *Alternaria* fungus survives as mycelium in crop residues and seed.

5. **Frogeye Leaf Spot**, caused by the fungus *Cercospora sojina*, is most common in the southern half of the USA in warm humid weather. The disease appears as small, irregular to angular, light gray to tan spots on the leaves with narrow, dark reddish-brown borders. Several lesions may merge to form large, irregular spots. Where severe, infected leaves may wither and drop early. Lesions also develop on the stems, pods and seed. The fungus overwinters as mycelium in crop refuse and seed.

6. **Phyllosticta Leaf Spot** is caused by the fungus *Phyllosticta sojaecola*. This minor disease commonly appears as pale-green, round to oval or V-shaped areas at the margins of the first few trifoliate leaves of young plants. The lesions soon dry, turn tan or a dull gray with a narrow, dark brown or purplish border. The lesions later tear and fall away. Numerous black specks, fungal fruiting bodies (pycnidia), form in the older lesions. The fungus survives as mycelium in crop refuse and seed.

7. **Sclerotinia Stem Rot** or white mold is caused by the soil-borne fungus *Sclerotinia* (or *Whetzelinia*) *sclerotiorum* var. *sojae*. The lower stems of affected plants are covered with a white cottony mold in prolonged moist weather. Small to large, black, round to irregular, fungal bodies (sclerotia) form in the cottony mold both outside and inside the stems, and occasionally within the pods. Diseased plants may die early with the wilted then withered leaves remaining attached for some time. The fungus may also cause a pre- and postemergence damping-off of soybean seedlings. The fungus survives for long periods as sclerotia in the soil and with the seed.

8. **Soybean Mosaic**, caused by the soybean mosaic virus, produces variable symptoms depending on the soybean cultivar and strain of the virus. Diseased plants are usually somewhat stunted with distorted (crinkled, puckered, ruffled, narrow, stunted) leaves. The symptoms are largely masked at temperatures above 85° to 88° F. The pods

are often stunted, flattened, or curved and contain fewer and smaller seed. Certain virus strains cause a dark brown to black mottling of the seed coat. Infected seeds fail to germinate, or they produce diseased seedlings. The virus overseasons in living plants and is spread by the feeding of aphids and other insects and by sowing virus-infected seed.

9. **Yellow Mosaic** is caused by the bean yellow mosaic virus. Mixed infections of the virus with the soybean mosaic virus are not uncommon. Initial symptoms of both viruses are essentially the same. Characteristic of yellow mosaic is a conspicuous yellow mottling of the leaves. The yellow areas are scattered over the leaf blade or occur in indefinite bands along the major veins. Rusty spots later form in the yellowed areas. Veinal necrosis often occurs. Some virus strains produce severe mottling or crinkling in the leaves. Infected plants are not noticeably stunted. The virus infects a wide range of weed and crop plants. It is transmitted by several species of aphids. Seed transmission in soybean has not been reported.

10. **Bud Blight**, caused mostly by the tobacco ringspot virus, produces a variety of symptoms. The tip (terminal) bud on young plants turns brown, dies, and curves downward to form a "shepherd's crook". Later, other buds turn brown, die, and become very brittle. Diseased plants are often stunted to dwarfed, produce few or no pods, and **remain green until frost**. The pods that do form may drop early or develop dark blotches. Bud blight usually starts at a field margin and progresses inward. The causal virus infects many weed and crop plants and is transmitted by young thrips, grasshoppers, probably other insects, as well as dagger nematodes. The few seeds produced by systemically-infected plants give rise to diseased seedlings.

11. **Lightning Damage** causes soybean plants to be killed in generally circular spots, up to about 50 feet in diameter, with a border of damaged plants. Lower parts of the stems may be blackened with numerous, dead, attached leaves. Lightning can be distinguished from root rot by the sudden death of both soybeans and weeds in the affected area, the clearly defined margins, no evidence of a pathogen, and that the spot does not increase in size.

12. **Hail Injury** is easy to recognize. Leaves are ragged and torn. Stems may be "cut off," broken, or show sunken dark areas on one side. Hail injuries may be colonized later by pathogenic organisms and result in girdling cankers and/or weakened stems.

13. **Frost Damage** is most common on early-planted soybeans. Often only the upper parts of the plants in low-lying areas of fields is killed or damaged. Regrowth soon appears at a nondamaged node. If such growth is vigorous, and the number of severely damaged plants is small, replanting is not needed.

14. **Iron Deficiency** appears as a yellowing of the interveinal areas on the younger leaves. Later, even the veins may turn yellow with the whole leaf finally turning ivory-colored to almost white. Brown dead spots may form near the leaf margins. Iron deficiency, which closely resembles manganese deficiency, is common in alkaline soils, usually well above pH 7.0.

15. **Potassium Deficiency** appears as a yellow mottling to a more or less continuous, irregular yellow border around the margins of leaflets. The yellowish areas may spread inward with the older parts often turning brown. The leaf margins may cup downward. The dead tissues tend to drop away giving the leaves a ragged appearance. Symptoms first appear on the younger leaves.

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