Soybean Diseases I
Michigan State University
Cooperative Extension Service
Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University
June 1980
2 pages

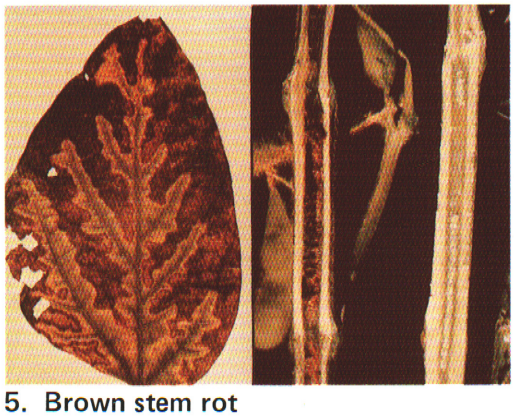
SOYBEAN DISEASES I

1. Pythium seedling rot

2. Rhizoctonia root rot

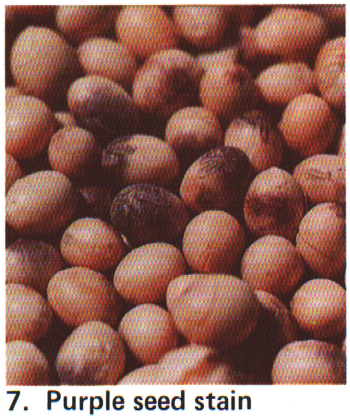
3. Soybean cyst nematode. L, field damage; R, cysts on roots

4. Phytophthora root and stem rot

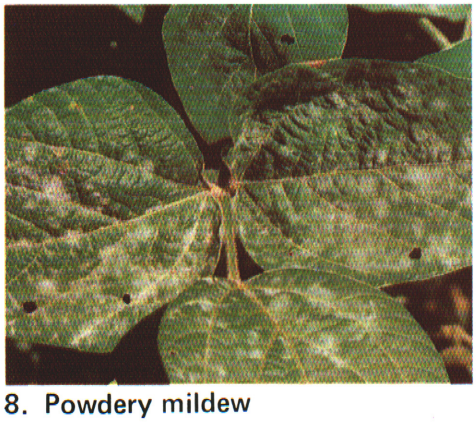


5. Brown stem rot

6. Charcoal rot

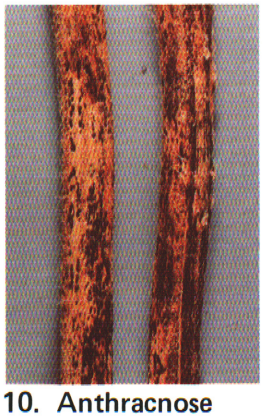


7. Purple seed stain



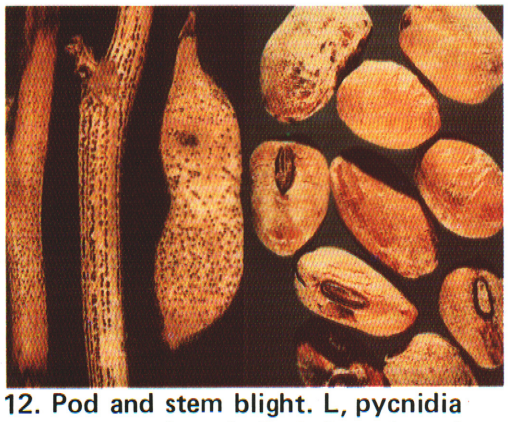
8. Powdery mildew

9. Septoria brown spot

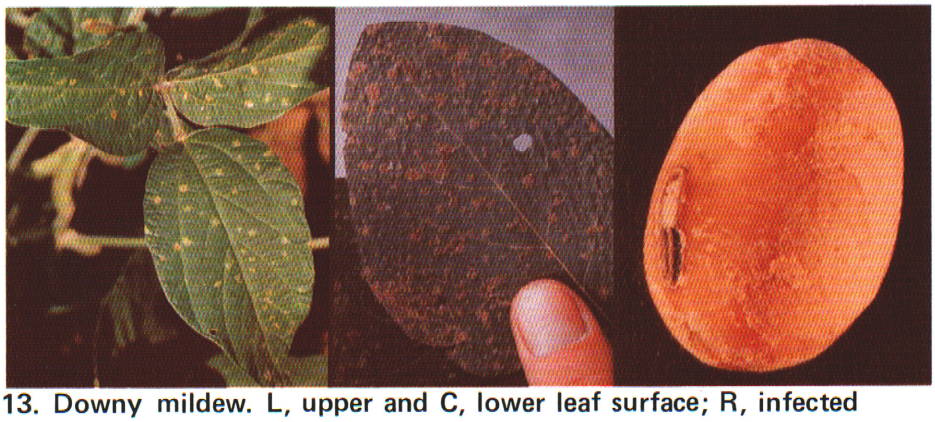


10. Anthracnose

11. Stem canker



12. Pod and stem blight. L, pycnidia on stems and pod; R, infected seed



13. Downy mildew. L, upper and C, lower leaf surface; R, infected seed

MICHIGAN STATE UNIVERSITY
COOPERATIVE EXTENSION SERVICE

EXTENSION BULLETIN E-1418
JUNE 1980
FILE 27.326

SOYBEAN DISEASES I

1. Pythium Seedling Rot is caused by several species of soil-borne fungi in the genus *Pythium*. Diseased plants may occur singly, in small circular patches--especially in low areas in the field--or uniformly over an entire field following a rainy period. Seedlings may rot before emergence. Plants that do emerge may wilt later, then turn brown and die. Pythium causes a soft watery rot. Damge is most severe in cold, wet soil. The fungi survive in soil and crop debris as oospores and mycelium.

2. Rhizoctonia Root Rot is caused by the common soil-borne fungus *Rhizoctonia solani*. Seedlings or somewhat older plants wilt and may die from a firm, dry, brown to reddish-brown decay of the roots and stem below or near the soil line. The fungus also causes pre- and post-emergence damping-off. Damage is most severe in heavy, poorly-drained soils where groups of affected plants commonly wilt and die in areas 4 to 10 feet in diameter. The *Rhizoctonia* fungus survives indefinitely in soil as mycelium and sclerotia.

3. Soybean Cyst Nematode, caused by *Heterodera glycines*, is a serious pest and major threat to soybean production. Severely infected plants are stunted and yellowed (chlorotic) and may die in areas of fields. Lightly infected plants appear normal, especially when growing conditions for soybeans are favorable. Pinhead-sized, shiny, white to yellow females or brown cysts (dead female bodies) are attached to the roots. The cysts are much smaller than the larger and loosely attached bacterial nodules. The dark brown cysts persist for years in the soil. The cysts are easily spread in even small bits of soil.

4. Phytophthora Root and Stem Rot is caused by the soil-borne fungus *Phytophthora megasperma* var. *sojae*. Affected plants turn yellow, wilt, wither and die at any age, leaving short to long gaps in rows. Seedlings may be attacked and die before or after emergence. A dark brown root rot can be found on older plants, with the dull brown discoloration extending up the stem into the lower branches. Phytophthora rot is most severe in low, poorly-drained, heavy clay soils following cool and rainy weather. The *Phytophthora* fungus survives in soil and buried crop debris as oospores or mycelum.

5. Brown Stem Rot is caused by the soil-borne fungus *Phialophora gregata* (synonym *Cephalosporium gregatum*). The disease usually becomes apparent about midseason by a dark reddish-brown discoloration inside the lower stem when the stem is split. The browning can be confused with that caused by other pathogens and should **not** be considered as diagnostic. Certain fungal strains cause the leaves to scorch between the veins, wither, and drop early. External symptoms are not observed on infected plants until pod set. The causal fungus survives in soybean debris as mycelium.

6. Charcoal Rot is caused by the fungus *Macrophomina phaseolina*. The disease appears in dry, hot weather or when plant growth is limited by some factor. Affected plants lack vigor and die early. Numerous black specks (sclerotia) appear when the "bark" is peeled from the stem base and roots giving diseased tissues a grayish-black color. Black streaks appear inside the roots and lower stem when the plant is split open. Sclerotia are frequently formed in the pithy area of the stem. The disease is most common in the southern half of the USA. The fungus survives as sclerotia in soil and the debris of many crops, including soybeans.

7. Purple Seed Stain is caused by the fungus *Cercospora kikuchii*. A pink or pale to dark purple coloration of the seedcoat is the most characteristic symptom. Diseased seed are often dull, cracked and rough. Small, inconspicuous, angular, reddish-brown spots form on the leaves, stems and pods. Infected seeds may reduce the stand or often produce diseased seedlings. The fungus survives in seed and crop debris as mycelium with infection favored by prolonged moist weather from pod set to harvest.

8. Powdery Mildew is caused by the fungus *Microsphaera diffusa*. Superficial, white to pale gray powdery patches form on the leaves. The soybean tissue underneath is reddened. Where the disease is severe, affected leaves wither and drop early. The mildew fungus is believed to survive in living leaves in the southern states. The disease is favored by warm dry days and cool nites.

9. Septoria Brown Spot or brown spot is caused by the fungus *Septoria glycines*. Small, angular to irregular, chocolate- to reddish-brown spots form on both surfaces of the leaves. The lower and older leaves gradually turn yellow and drop early. Black specks (pycnidia) form in the older lesions. In wet weather, infections progress from the lower to the upper leaves. Late in the growing season, infected leaves turn rusty-brown and drop early. The fungus survives as mycelium in crop debris and seed.

10. Anthracnose may be caused by two fungi, *Colletotrichum dematium* var. *truncata* and *Glomerella glycines*. The former fungus is much more common in the Midwest, infecting plants of all ages. *G. glycines* only infects older plants. Both fungi produce similar symptoms. Indefinite, enlarging, reddish- or dark-brown areas develop on the stems and pods. Later, these areas are covered with black fungal fruiting bodies (acervuli) that resemble tiny pin cushions containing black spines (setae) that are easily seen with a hand lens. Infected seed may be shriveled and moldy, or near normal in appearance. The anthracnose fungi survive as mycelium in crop debris and in seed.

11. Stem Canker is caused by the fungus *Diaporthe phaseolorum* var. *caulivora*. Dark, reddish-brown then tan, girdling cankers form in the stem at the base of a branch or leaf petiole, usually at the 4th or 5th nodes, starting about the beginning of pod set. Affected plants, which are usually scattered in a field, commonly wilt, wither and die early with the dead, dried leaves remaining attached. Small, reddish-brown lesions on the cotyledons may cause infected seedlings to wither and die. The fungus survives in crop debris and seed as mycelium.

12. Pod and Stem Blight is caused by the fungus *Diaporthe phaseolorum* var. *sojae*. Plants when near maturity develop large numbers of black specks, fungal fruiting bodies (pycnidia), in straight rows along the stems and scattered on dry, poorly developed pods. Heavily infected seed are dull, badly cracked, shriveled, and often covered partially or completely with a white mold growth. Sowing diseased seed commonly results in seed decay, seedling blights, and often a poor stand in the field. The fungus survives as mycelium in crop residues and seed.

13. Downy Mildew is caused by the fungus *Peronospora manshurica*. Indefinite, yellowish-green areas appear on the upper leaf surface. The lesions enlarge and turn a grayish-brown to dark brown surrounded by a yellow-green margin. The disease gets its name from the grayish to pale purple tufts of mold that form directly on the undersides of the leaf lesions in damp weather. If severe, some leaves wither and drop early. A whitish crust, composed of mycelium and oospores of the fungus, may form on infected seed. The fungus survives as thick-walled oospores in infected leaves and on the seed.

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 county extension office.

Photo credits: R. F. Nyvall (1, 7), G. W. Simone (2, 13L), University of Illinois (3, 4, 5R, 6, 8, 9, 11, 12L, 13L and R), J. M. Dunleavy (5L), T. M. Sjulin (10), R. W. Samson (12R), and K. L. Athow (13C).