

Visual QUICK GUIDE Quick

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This reference guide provides information regarding symptoms, risk factors, and management options in order to help improve diagnoses of above- and below-ground diseases that may affect soybean production during the growing season.

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Common soybean diseases in Wisconsin



Soybean Cyst Nematode (SCN) (*Heterodera glycines*)

Symptoms: roots have small, white to tan protrusions (body of the female nematode), which are smaller than nitrogen-fixing nodules; slow to incomplete canopy closure; stunting and chlorosis at high SCN numbers

Risk factors: survives in the soil; growth and development are favored by soil temperatures between 75 and 82°F; several legume weed species support SCN reproduction

Management: resistant cultivars; crop rotations (2–3 years); weed control



Brown Stem Rot (BSR) (*Phialophora gregata* f.sp. *sojae*)

Symptoms: foliar symptoms similar to those for soybean Sudden Death Syndrome (SDS); yellow to brown discoloration of the leaves around the veins initially appearing at R4; upward curling of the leaves; chocolate brown discoloration of the vascular and pith tissues

Risk factors: overwinters in soybean debris; favored by cool temperatures (60–80°F) and good soil moisture before flowering followed by warm and dry temperatures during pod fill; soil pH ≤ 6.5

Management: resistant cultivars; crop rotations (≥ 3 years); tillage





White Mold or Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)

Symptoms: stems appear watery then gray to white in color; cottony growth (mycelium) on stem, petioles, and pods; small, black structures (sclerotia) can be found within mycelium or within the stems; wilting; plant death

Risk factors: overwinters as sclerotia; large host range; favored by cooler temperatures ($\leq 80^{\circ}\text{F}$), rain, fog, high humidity, and dense canopy at flowering

Management: cultivars with partial resistance; decrease seeding rate; reduce tillage; foliar fungicides for susceptible cultivars; crop rotations (≥ 1 year)

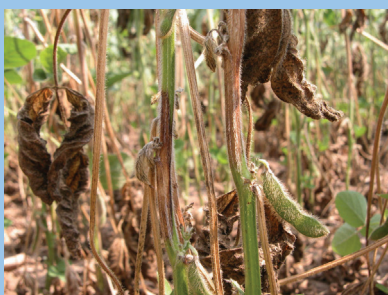


Sudden Death Syndrome (*Fusarium virguliforme*)

Symptoms: foliar symptoms similar to those for BSR; yellow to brown discoloration of the leaves around the veins that begin as small, circular spots; roots can be black and rotted with a slightly blue hue due to growth of the fungus

Risk factors: overwinters in soybean debris and in the soil as chlamydoconidia (resistant fungal structures); favored by high soil moisture during vegetative growth and cool temperatures around flowering

Management: resistant cultivars; rotations (≥ 3 years); later planting when soil temperatures are warm; tillage to increase soil temperature; increase drainage



Northern Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

Symptoms: reddish brown to black discoloration (lesion) on stems and petioles first appearing at R1; lesion originates at the nodes, appears sunken, and may girdle the stem; yellow and brown discoloration of leaves around the veins; wilting; plant death associated with petiole and leaf retention

Risk factors: overwinters in soybean debris; seedborne; favored by warm temperatures ($82\text{--}93^{\circ}\text{F}$) and prolonged rain before flowering followed by a period of dry weather; host range includes several legume plants

Management: resistant cultivars; tillage; fungicide seed treatments; avoid fields recently cropped to alfalfa



Pod and Stem Blight

(*Diaporthe phaseolorum* var. *sojae*)

Phomopsis Seed Decay

(*Phomopsis longicolla*)

Symptoms: visible on mature, wounded, or dead tissues; small, raised, black specks (pycnidia), usually arranged in linear rows; seeds may be white to gray or brown in color, shriveled, and/or have cracks in the seed coat

Risk factors: overwinters in soybean debris; favored by prolonged periods of rain, high relative humidity (100%), and temperatures $\geq 68^{\circ}\text{F}$ during pod development and pod fill

Management: harvest mature plants promptly; tillage; fungicide seed treatments; foliar fungicides from mid-flower to beginning maturity

Phytophthora Stem and Root Rot

(*Phytophthora sojae*)

Symptoms: seed rot or seedling death; after V4, plants develop a brown to black lesion that extends above and below the soil surface; root rot; leaves turn yellow and petioles droop; wilting where tip of plant forms a shepherd's hook; plant death associated with petiole and leaf retention

Risk factors: overwinters in soil and soybean debris as oospores (highly resistant fungal structures); favored by high soil moisture when soil temperatures are between 60 and 77°F

Management: cultivars with partial or race-specific resistance; avoid low-lying areas with poor drainage; systemic fungicide seed treatments

Bacterial Blight

(*Pseudomonas syringae* pv. *glycinea*)

Symptoms: similar to those observed for brown spot; occurs on younger leaves, stems, petioles, and pods; symptoms begin as small, angular, watery, brown to reddish brown spots (lesions) surrounded by a yellow halo; lesions may enlarge and grow together; infected seed may become slimy

Risk factors: overwinters in soybean debris; seedborne; favored by stormy weather/rain accompanied by cooler temperatures (75–78°F)

Management: resistant cultivars; tillage



Brown Spot

(*Septoria glycines*)

Symptoms: similar to those observed for bacterial blight; occur mainly on older leaves; symptoms begin as irregular, red to brown spots (lesions) varying in size and surrounded by a yellow halo; lesions enlarge and grow together becoming dark brown to black in color; leaves become yellow to orange-brown in color and drop prematurely

Risk factors: overwinters in soybean debris; seedborne; favored by rain with prolonged periods of leaf wetness (≥ 6 hours) and warmer temperatures (77–83°F)

Management: crop rotations (≥ 1 year); foliar fungicides from R1 to R6

Asian Soybean Rust

(*Phakospora pachyrhizi*)

Symptoms: visible on leaves, stems, petioles and pods; symptoms first appear on lower leaves, on the underside, and along veins; symptoms begin as gray to green specks that enlarge, becoming tan, brown, or reddish brown; leaves turn yellow and abscise

Risk factors: rust spores (urediniospores) are wind-blown from the southern U.S.; favored by temperatures between 59 and 86°F with extended periods of leaf wetness (≥ 8 hours) and high relative humidity (75–80%)

Management: preventative fungicides before symptom development when risk factors are present (www.sbrusa.net); curative fungicides when $\geq 10\%$ of plant is expressing symptoms; early planting



Frogeye Leaf Spot

(*Cercospora sojae*)

Symptoms: primarily seen on leaves but can occur on stems, pods, and seeds; brown to reddish brown, irregularly shaped spots (lesions) with a light brown to gray center and a red to purple margin; seeds develop areas of gray to brown discoloration

Risk factors: overwinters in soybean debris; seedborne; favored by warm temperatures (77–86°F) and high relative humidity ($\geq 90\%$); prolonged periods of rain and wind

Management: resistant cultivars; crop rotations (≥ 2 years); tillage; foliar fungicides applied from flowering through early pod fill





Leaf Spot and Purple Seed Stain (*Cercospora kikuchii*)

Symptoms: similar to sunburn; upper leaves develop reddish to purple discoloration during pod fill; seeds are reduced in size and develop a light to dark purple discoloration

Risk factors: overwinters in soybean debris; seedborne; favored by extended periods of warm temperatures (75–86°F), high relative humidity ($\geq 92\%$), and prolonged leaf wetness (18–24 hours)

Management: resistant cultivars (leaf spot and purple stain controlled by different resistance genes); fungicide seed treatments; foliar fungicides



Downy Mildew (*Peronospora manshurica*)

Symptoms: pale green to yellow specks on the upper surface of leaves with matching areas of gray fluff (mycelium) on the underside; seeds appear whitish to gray in color

Risk factors: cool temperatures (68–72°F) with a prolonged period of leaf wetness (6–12 hours)

Management: resistant cultivars; tillage; fungicide seed treatment; crop rotations (≥ 1 year)



Powdery Mildew (*Microsphaera diffusa*)

Symptoms: white, powdery areas on the surface of leaves, stems, petioles, and pods

Risk factors: overwinters as cleistothecia (resistant fungal structures) on soybean debris; favored by low humidity and cool temperatures between 64 and 75°F; infection can occur from windblown spores

Management: resistant cultivars; foliar fungicides

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For additional information, visit the UW-Madison Soybean Plant Health web site (www.plantpath.wisc.edu/soyhealth) or the UW Nutrient and Pest Management Program (ipcm.wisc.edu/).

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