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EC78-1861 Diseases of Nebraska's Major Field Crops : Wheat, oats, Corn, Sorghum, Soybeans, Sugarbeets, Dry Edible Beans

John E. Watkins

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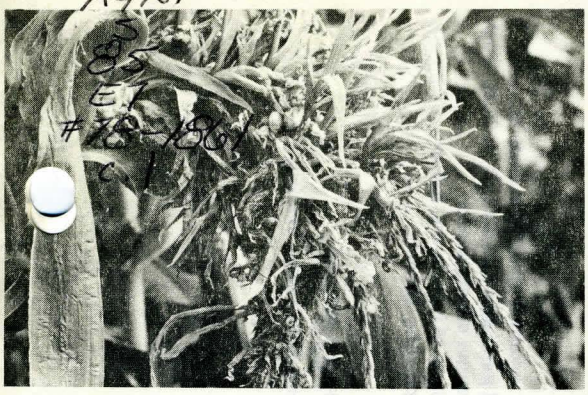
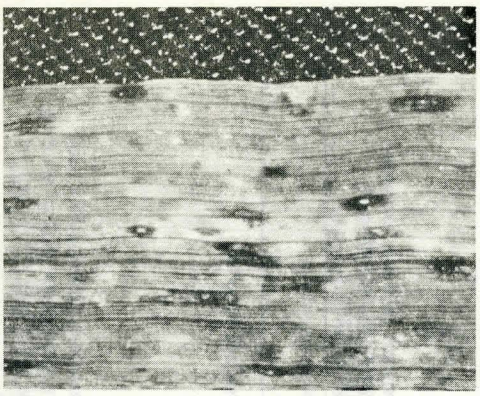
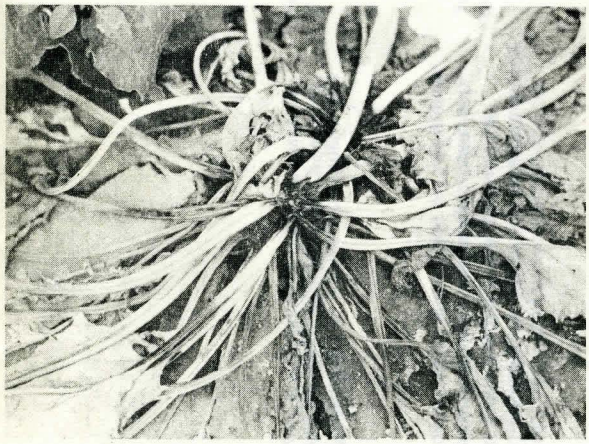


Crazy Top

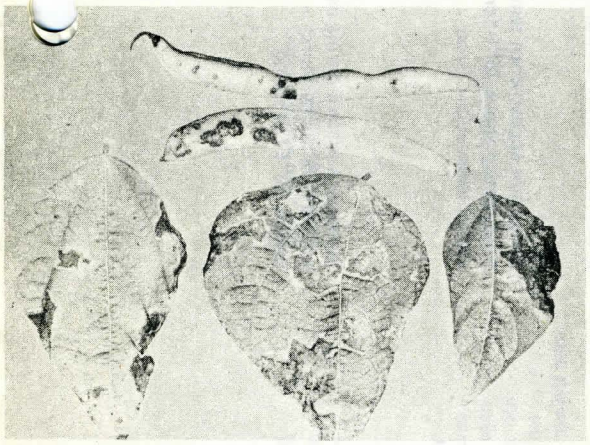


Tan Spot of Wheat

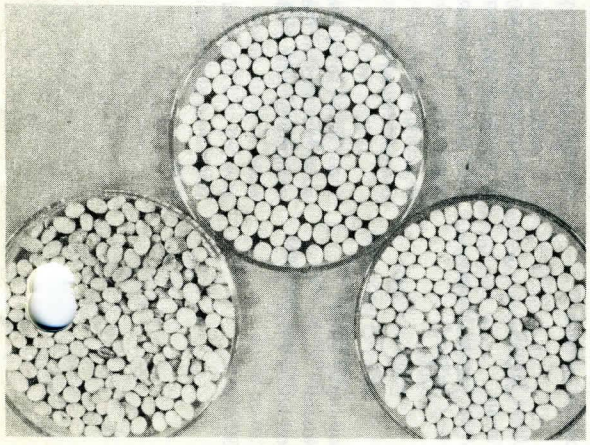
Anthracnose of Alfalfa



Rhizoctonia Crown Rot of Sugarbeets



Bacterial Blight of Dry Edible Beans



Soybean Seed Treatment

EC 78-1861

DISEASES OF NEBRASKA'S MAJOR FIELD CROPS

Wheat, Oats, Corn, Sorghum Soybeans, Sugarbeets Dry Edible Beans

This chart is intended to serve as a quick reference of the principal diseases of Nebraska's major field crops. The information within the chart is of general nature. For more specific information, particularly on disease control, contact the local county extension office, the district extension office or the Department of Plant Pathology, University of Nebraska-Lincoln.

John E. Watkins
Extension Plant Pathologist

EXTENSION WORK IN "AGRICULTURE, HOME ECONOMICS AND SUBJECTS RELATING THERETO,"
THE COOPERATIVE EXTENSION SERVICE, INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES,
UNIVERSITY OF NEBRASKA-LINCOLN, COOPERATING WITH THE COUNTIES AND THE U.S. DEPARTMENT OF AGRICULTURE
LEO E. LUCAS, DIRECTOR

WHEAT DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Loose Smut *Ustilago tritici*	Black smutty spore masses replace both grain and chaff; smutted heads emerge earlier from the boot than healthy heads.	Cool, cloudy, wet weather at the time of flowering.	Wind carries smut spores to healthy plants at flowering; spores germinate and infect developing grain; smut fungus carried internally within seed to next crop.	Use certified seed; treat seed with Vitavax.
Bunt or Stinking Smut *Tilletia caries, Tilletia foetida*	Grain is replaced by black powdery spore mass; smut balls give off fishy odor.	Cool, moist weather at the time of seed germination.	Smut balls break during threshing and spores collect on seeds and in the soil; spores germinate and infect young seedlings following planting.	Seed treatment.
Leaf Rust *Puccinia recondita tritici*	Circular to oval reddish-orange pustules on leaves, stems, and head; orange spores will rub off onto a person's fingers.	Cool nights combined with warm days (65-80°F) and 6 to 8 hours of dew on the leaves.	Orange spores are spread from plant to plant by wind; spores are produced every 7 to 14 days during growing season.	Plant resistant varieties; two applications of a foliar fungicide if rust is severe on susceptible varieties.
Stem Rust *Puccinia graminis tritici*	Reddish-brown oblong pustules on leaves, stems, and heads; spores will rub off onto a person's fingers; pustules more elongate and darker than leaf rust pustules.	Cool nights combined with warm days (65-80°F) and 6 to 8 hours of dew on the leaves and stems.	Brown spores are wind-borne; new infection occurs every 7 to 14 days.	Plant resistant varieties.
Crown and Root Rot, Seedling Blight *Helminthosporium sativum, Fusarium roseum cerealis*	Yellowing of leaves; roots and crown are rotted; crowns are gray to black in color; plant dies or becomes stunted; poor tillering.	Drought stressed plants are more susceptible to infection; dry falls and winters favor crown and root rot development.	Fungi survive in the soil.	Seed treatment; plant healthy seed; follow recommended date-of-planting schedule; plant into a firm mellow seedbed.
Wheat Streak Mosaic Wheat Streak Mosaic Virus (WSMV)	Yellow and green streaking of leaves; plants stunted; field takes on a yellowed appearance; symptoms evident in spring and on early planted fall wheat.	Symptoms appear when temperatures remain above 75°F for several days.	Transmitted by the wheat curl mite during its feeding activity; transmission can occur from volunteer wheat, corn, oats, foxtail millet and certain pasture grasses.	Destroy volunteer wheat that arose as a result of a hail storm at the soft-medium dough stage (consult county agent); record dates of hail storms; follow date-of-planting schedule.
Soil-borne Wheat Mosaic Soil-borne Wheat Mosaic Virus (SBWMV)	Light green to yellow irregular blotches on the leaves; symptoms most evident in low areas in field; plants stunted and infected area takes on a yellowed appearance.	Symptoms evident during extended cool temperatures (below 60°F) in spring.	Transmitted by a soil-borne fungus that invades wheat roots in fall.	Plant resistant varieties.

Septoria Leaf and Glume Blotch *Septoria tritici, Septoria nodorum, Septoria avenae tritici*	Disease first appears as light green to yellow spots which rapidly form light brown irregular spots on the leaves; spots may contain small black dots.	Cool, wet weather favors disease development.	Fungus survives from season to season on wheat stubble; new infections from wind-blown spores.	Two applications of a foliar fungicide if leaf spot is severe.
Tan Spot, Eye Spot or Yellow Leaf Blotch *Pyrenophora trichostoma*	Disease first appears on leaves as small, dark, oval lesions with light centers; later develops into large tan blotches with yellow border; leaves die from tip toward base.	Cool, wet weather favors disease development.	Pathogen overwinters in wheat stubble as small, raised, black perithecia; new infections from wind-borne ascospores; secondary spread by wind-blown conidia.	Two applications of a foliar fungicide if leaf spot is severe.
Take-all *Gaeumannomyces graminis (Ophiobolus graminis)*	Stunted plants become evident during heading in more or less circular patches in fields; plants take on a bleached dead straw color and heads are empty; black streaks form on lower stem and crown.	Disease development associated with soil fertility.	Fungus directly associated with crop residue in the soil.	Crop rotation with legumes and maintenance of balanced soil fertility program.

OAT DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Black Loose Smut *Ustilago avenae*	Grain replaced by powdery mass of black smut spores; usually entire head affected; spore masses shattered easily by rain and wind.	Cool, wet weather at the time of seed germination.	Spore masses break during threshing and collect on seed and in soil; spores germinate and infect young seedlings following planting.	Seed treatment; plant resistant varieties; use certified seed.
Covered Smut *Ustilago kolleri*	Grain replaced by powdery mass of black smut spores contained within a thin membrane; spore masses do not shatter easily.	Cool, moist weather at the time of seed germination.	Spore masses break during threshing and collect on seed and in soil; spores germinate and infect young seedlings following planting.	Plant resistant varieties; seed treatments; use certified seed.
Crown (Leaf) Rust *Puccinia coronata*	Elongated orange-yellow pustules on the leaf sheaths and heads; heavy infections cause lodging and premature ripening.	Cool nights combined with warm (65-80°F) days and dew formation favor rust development.	Orange spores are wind-blown with new infections occurring every 7 to 14 days during growing season.	Plant resistant varieties; two applications of a foliar fungicide if rust is severe on susceptible varieties.

Halo Blight *Pseudomonas coronafaciens*	Spots with dead centers surrounded by pale yellow green halo-like margins.	Disease is favored by cool, wet weather.	Bacteria overwinter in seed and on infected crop residue; crop residue is main source of infection in spring.	Plant resistant varieties.
Septoria Blight *Septoria avenae*	Circular to elongate light yellow to gray lesions surrounded by a dull brown border on leaves; severe stem infections can cause lodging; centers of spots contain small black pepper grain bodies.	Cool, wet weather favors infection.	Fungus overwinters on stubble and straw left in field; in spring, spores are blown to green plants.	Plant resistant varieties; stubble mulching.
Blast	Sterility at heading in the form of white empty hulls on lower half of head.	Nonparasitic disease associated with extremes in temperature, rain, soil fertility, and light from tillering to flowering.		
Barley Yellow Dwarf Barley Yellow Dwarf Virus (BYDV)	On oats symptoms begin as greenish blotches near the tip of leaves that later turn red or reddish-orange; plants stunted and sterility is common. On winter wheat symptoms range from no symptoms to severe yellowing of leaves beginning at the tip. On Barley, symptoms are yellowing of leaves, stunting and sterility.	Foliar symptoms are favored by moderate temperatures.	Virus transmitted by aphids. Barley, oats, wheat and several lawn, weed, pasture and range grasses are hosts for BYDV.	Some varieties of barley, oats and wheat are resistant or tolerant to BYDV. For winter small grains follow Hessian fly free planting dates.

CORN DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Seed Rots and Seedling Blights *Pythium* spp.	Symptoms range from complete killing of embryo before germination to small rotted areas on the roots of seedlings; above-ground symptoms are yellowing, wilting, and death of seedling leaves.	These diseases are prevalent in poorly drained soils during periods of cold, wet weather; soil temperatures of 50-55°F favor seedling blight.	Fungi causing seedling blights persist in soil.	Seed treatment; use high quality uncracked seed; proper seedbed preparation.

Fusarium Stalk Rot *Fusarium moniliforme*	Symptoms on roots, base of stem, and first internode; pith becomes shredded and a pinkish color; plants ripen prematurely and often lodge; symptoms become evident as plants mature.	Dry conditions early in season accompanied by warm (80-85°F) wet weather 2 to 3 weeks after silking; high nitrogen, low potassium; hail, and disease or insect damage predispose plants to infection; high plant populations.	Fungus survives in soil and on crop residue; spores spread by wind.	Resistant varieties; maintain balanced soil fertility; use recommended plant populations; use full season hybrids; harvest at maturity; plant adapted hybrids.
Charcoal Rot *Macrophomina phaseoli*	First appears as brown to black lesions on roots of seedlings and young plants; spreads into crown and lower internode as plants mature; grayish streaks on lower internode and internal shredding of pith; small black sclerotia on shredded stalk tissue.	Soil temperatures of 95 - 100°F favor infection.	Fungus survives in soil on crop residue as sclerotia.	Maintain adequate soil moisture after tasseling; maintain balanced soil fertility; plant adapted hybrids; use recommended plant populations.
Fusarium Kernel or Ear Rot *Fusarium moniliforme*	Symptoms appear as a pinkish discoloration of caps of kernels followed by the formation of a cottony-pink mold growth.	Dry conditions early in season accompanied by warm (80-85°F) wet weather 2 to 3 weeks after silking.	Infection from wind-borne spores usually follows injury to ear such as corn borer, bird, etc.; fungus survives in the soil and on crop residue.	Control corn earworms; maintain balanced soil fertility.
Common Smut *Ustilago maydis*	Symptoms occur on all above ground parts; galls first appear as shiny green to gray raised areas which enlarge, forming large gray galls containing black powdery spore masses.	Smut development favored by dry conditions and temperatures of 80 - 90°F; high nitrogen and injury favor disease development.	Smut spores overwinter in soil; initial infections from wind-blown spores.	Avoid mechanical injury to plants; maintain balanced soil fertility.
Common Rust *Puccinia sorghi*	Brownish-red oblong pustules on leaves; spores rub off on fingers.	Cool temperatures (60-70°F) and high humidity.	Spores are wind-blown with new infections occurring every 7 to 14 days.	Plant resistant varieties.
Downy Mildew (Crazy Top) *Sclerophthora macrospora*	Excessive tillering, rolling and twisting of upper leaves; tassel resembles mass of leafy tissue; stunting, narrow leaves.	Disease develops where soils have been saturated for 24 to 48 hours shortly after planting.	Fungus survives in soil, new infections from soil-borne spores.	Adequate soil drainage; avoid planting in low, wet areas.

Northern Corn Leaf Blight *Helminthosporium turcicum*	Long, eliptical gray to tan lesions originating on the lower leaves and progressing upward on plant.	Disease is favored by temperatures of 65 - 80°F accompanied by heavy dews during the growing season.	Fungus survives on crop residue; initial and secondary infections from wind-blown spores.	Plant resistant varieties; two applications of a foliar fungicide if susceptible varieties are grown.
Southern Corn Leaf Blight *Helminthosporium maydis*	Small tan lesions running parallel to the leaf borders; lesions may develop dark, reddish-brown margins and can occur on husks, shanks, ears, and cobs.	Temperatures of 70 - 90°F combined with high humidity.	Fungus survives from season to season on crop residue in field and on kernels in cribs, bins, and elevators; spores spread by wind and splashing rain.	Plant resistant hybrids; two applications of a foliar fungicide if susceptible varieties are grown; stubble mulching.
Holcus Spot *Pseudomonas syringae*	Round to oval spots on lower leaves; spots dark green at first then becoming light tan and later turning brown with reddish-brown margins.	Warm temperatures (75-85°F), wet, windy weather early in season.	Bacteria survive on crop residue, spread by splashing rain, blowing soil particles, and cultivation during heavy dews.	Plant resistant varieties; crop rotation.
Goss's Bacterial Wilt (Leaf Freckles) *Corynebacterium nebraskense*	Shiny dark green to grayish tan areas on leaves containing many small dark spots; pith contain orange streaks; severely infected plants stunted.	Warm, moist weather.	Bacteria survive on crop residue; thought to be seed-borne to a limited extent; spread by hail, splashing rain, and blowing soil particles.	Plant resistant or tolerant varieties; crop rotation.

SORGHUM DISEASES

Disease	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Fusarium Stalk Rot *Fusarium moniliforme*	Plants may die prematurely and lodge; heads are dull and grain is light weight; pith has disintegrated in area where stalk has broken and is red in color.	Damage most severe during cool wet weather following hot, dry periods.	Fungus survives in soil and on crop residue.	Maintain balanced soil fertility; use recommended plant populations; sorghum grown in an ecofallow cropping system develops less stalk rot.
Charcoal Rot *Macrophomina phaseoli*	Premature ripening followed by lodging of stalks, pith is shredded and darkly colored.	Charcoal rot favored by low soil moistures and high temperatures.	Fungus survives as dark colored sclerotia in the soil and in crop residue.	Plant adapted varieties; maintain balanced soil fertility; use recommended plant populations.

Bacterial Leaf Diseases Stripe: *Pseudomonas andropogoni* Streak: *Xanthomonas holcicola*	Bacterial stripe appears as tan to brick-red to dark purple stripes generally on tips of lower leaves. Bacterial streak occurs as light yellow to red streaks on leaves, surrounded by narrow dark margins; some streaks may form large oval spots with tan centers and red margins.	Excessive moisture and warm temperatures.	Bacteria spread by wind, splashing rain, insects, hail, blowing dust, etc.	Crop rotation and cultivation to reduce crop residue if applicable.
Sooty Stripe *Ramulispora sorghi*	Disease first appears on older leaves as small purplish-tan spots that enlarge rapidly and are surrounded by a broad yellow margin; leaves often turn yellow and die.	Warm, humid weather.	Fungus survives from season to season on crop residue; spores are spread by wind and splashing rain.	Cultivation to reduce crop residue.
Head Smut *Sphacelotheca reiliana*	Entire head transformed into black powdery mass of spores or portion of head sterile or leafy; smut first becomes evident at heading.	Cool, dry soils.	Smut spores survive in soil; infection occurs from soil-borne spores.	Resistant varieties.

ALFALFA DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Diseases*	*Method of Transmission*	*Recommended Control*
Bacterial Wilt *Corynebacterium insidiosum*	Thinning of stand generally during third year and thereafter; plants stunted, yellowed and wilt during warm weather.	Cooler weather of spring and early summer enhances disease development; ample moisture for yield also favors disease.	Bacteria are soil-borne and enter plant through wounds from winter injury and mechanical damage.	Plant resistant varieties; maintain balanced soil fertility; prevent root and crown injury.
Seedling Blight *Pythium* spp., *Rhizoctonia solani*, *Phytophthora megasperma*	Seed decay before and after emergence; soft rot of roots and stems; seedlings become yellowed and die rapidly.	Disease occurs during cool, wet weather of spring and early summer.	Fungus is soil-borne.	Proper seedbed preparation; maintain balanced soil fertility.

Phytophthora Root Rot *Phytophthora megasperma*	Rotting of taproots; rotted areas initially yellow later turn dark brown; crown rot causes yellowed leaves followed by death of plants.	Root rot occurs on poorly drained soils during periods of extensive rainfall.	Fungus is soil-borne and becomes active during periods of extensive rain.	Plant resistant varieties; proper seedbed preparation; maintain balanced soil fertility; provide adequate drainage.
Fusarium Root Rot *Fusarium* spp.	Damage to roots varies from irregular brown rotted areas to complete destruction of root and crown; as symptoms progress plants yellow, wilt, and die.	Symptoms become more evident during periods of severe moisture or heat stress.	Fungus is soil-borne.	Maintain plants in virorous growing condition.
Anthracnose *Collectotrichum trifolii*	Light to dark brown sunken lesions on stems containing small back pepper grain bodies; bluish-black discoloration of crown; dead, straw colored stems scattered throughout field.	Infection spreads rapidly during periods of warm, humid weather.	Fungus persists on crown and stems; spores spread by wind.	Plant resistant varieties.
Common Leaf Spot *Pseudopeziza medicaginis*	Small, circular, black or brown spots on leaves; leaves turn yellow and drop as disease progresses.	Disease develops during moist periods of cool to moderate temperatures.	Fungus survives on crop residue; spores are spread by wind.	Harvest at one-tenth bloom; destroy volunteer plants in fence rows; plant resistant varieties.
Stemphylium Leaf Spot *Stemphylium botryosum*	Dark, sunken, oval to irregular-shaped spots on leaves; older spots large and concentrically ringed.	Warm moist weather in July and August favor infection.	Fungus survives on crop residue; spores spread by wind.	Plant resistant varieties; harvest at one-tenth bloom if leaf drop is severe.
Spring Black Stem *Phoma medicaginis*	Black, irregular spots on leaves and stems; stem lesions enlarge until lower stem appears black; young shoots are often killed.	Cool moist weather in May favors this disease; usually only a problem on first cutting.	Fungus survives on crop residue; spores spread by wind.	Plant resistant varieties; harvest at one-tenth bloom or earlier if leaf drop is severe.
Summer Black Stem *Cercospora medicaginis*	Large, circular ash gray spots on leaves; spots surrounded by yellow halo; brown to black lesions appear on stem.	Warm moist weather enhances disease development.	Fungus persists in old stems; spores spread by wind.	Plant resistant varieties; harvest at one-tenth bloom or earlier if leaf drop is severe.

Rust *Uromyces striatus*	Dark reddish-brown rust pustules form on leaves, petioles and stems; leaves on heavily rusted plants shrivel and fall prematurely; stems attacked when harvest is delayed.	Infections occur in late summer or early fall; warm days and cool nights that result in heavy dews favor infection.	Spores wind blown reaching Nebraska in late August.	Rust should not be a problem if stands are cut regularly; destroy volunteer plants in fence rows.
Downy Mildew *Peronospora trifoliorum*	Light green to yellow blotches on leaves; leaves twisted and rolled.	Cool, moist weather of spring and fall.	Fungus persists from season to season in crowns; spores spread by wind.	Harvest at one-tenth bloom; plant resistant varieties.
Alfalfa Mosaic Alfalfa Mosaic Virus (AMV)	Yellow streaks between leaf veins or yellow to green patches on leaves; leaves may be dwarfed and crinkled.	Symptoms most evident during cool weather of spring and fall.	Virus transmitted by aphids and is also seed-borne.	Use certified seed.

SOYBEAN DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Seedling Blights *Pythium* spp. *Fusarium* spp. *Rhizoctonia solani*	Seed decays before or after emergence; seedlings wilt and die; roots and lower portion of stems rotted.	Environmental conditions favoring root rot range from cold, wet soils in spring to warm, dry soil conditions in summer.	Fungi survives in soil and on crop residue and attacks seedlings when environmental conditions favor infection.	Plant clean undamaged seed into a properly prepared seedbed; use fungicide seed treatment when germination tests below 85%.
Phytophthora Root Rot *Phytophthora megasperma* var. *sojae*	Germinating seed decays before or after emergence; seedlings wilt and die; older plants become yellowed, wilt, and show a dark discoloration of the lower stem; roots of older plants are rotted.	Disease occurs mostly in low, poorly drained areas but also can occur on higher ground during wet weather; unlike other root rotting fungi, *Phytophthora* develops most rapidly at temperatures above 75°F.	Fungus survives from season to season in the soil and on crop refuse.	Plant resistant varieties.
Pod & Stem Blight *Diaporthe phaseolorum* var. *sojae*	Symptoms on plants nearing maturity are numerous, small black dots on lower stems and pods; infected seed shriveled and cracked.	Wet, warm weather at mid-pod stage or later.	Fungus survives on pods and stems left in field and is also seed-borne; spread is by wind-blown and rain splashed spores.	Plant disease-free seed; use fungicide seed treatment.
Stem Canker *Diaporthe phaseolorum* var. *caulivora*	Symptoms present from mid-July to maturity as light brown sunken areas at branches near soil line; dead plants with dried, attached leaves.	Warm, humid weather.	Fungus survives in soil, on crop residue and is seed-borne; spread by wind-blown spores and infected seed.	Plant high quality disease-free seed.

Brown Spot *Septoria glycines*	Angular dark brown spots mostly on lower leaves; infected leaves become yellow and are shed prematurely.	Warm, moist weather and poorly drained soils; most severe under continuous soybean cropping practices.	Fungus survives on crop residue and in infected seed; spread by wind and splashing rain.	Crop rotation with nonsusceptible host; use disease-free seed; cultivation to reduce crop residue.
Bacterial Pustule *Xanthomonas phaseoli* var. *sojensis*	Reddish-brown spots with raised, light colored centers surrounded by yellow-green margins; spots not water-soaked.	Warm weather with frequent showers.	Bacteria survive in crop residue and seed; spread is by wind, splashing rain and during cultivation when foliage is wet.	Plant resistant cultivars; use disease-free seed; do not cultivate when foliage is wet.
Bacterial Blight *Pseudomonas glycinea*	Small angular water soaked spots on leaves later turning brown; spots surrounded by yellow borders.	Bacterial blight favored by cool, wet weather but will occur throughout the growing season.	Bacteria survive in crop residue and in seed; spread is by wind, splashing rain, cultivating equipment, etc.	Plant disease-free seed; crop rotation; do not cultivate when foliage is wet.
Downy Mildew *Peronospora manshurica*	Early symptoms appear as indefinite yellow-green areas on upper leaf surface which later become gray-brown with yellow-green margins.	Frequent dews and moderately cool temperatures enhance disease development.	Fungus survives in crop residue and on seed; spread is by wind blown spores and infected seed; over 25 races of the pathogen have been identified.	Use disease-free seed; plant resistant varieties, seed treatment.
Soybean Mosaic Soybean Mosaic Virus (SMV)	Mosaic symptoms appear as alternate light and dark green patches on leaves; leaf surface has crinkled appearance; plants stunted and yellowed; leaf margins curl downward.	Symptoms most pronounced during cool weather and tend to disappear during hot weather.	Virus transmitted by aphids and also seed-borne.	Plant seed from virus-free fields; practice effective weed control.
Bud Blight Tobacco Ringspot Virus (TRSV)	In plants infected before flowering, apical bud and shoot turn brown, curve downward, and become dry and brittle; young leaves have rusty flecking appearance; plants dwarfed and produce no seed. Infection during flowering produces small undeveloped pods. Infection after flowering results in poorly filled pods with dark blotches.	Disease occurs over a wide range of environmental conditions.	Virus transmitted by grasshoppers, immature thrips, and nematodes; also by infected seed.	Eliminate other hosts (alfalfa, sweet clover, red clover, pig weed, ragweed, sunflower) from nearby areas along with volunteer soybeans.

DRY BEAN DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Root Rots *Rhizoctonia solani, Fusarium solani* f. sp. *phaseoli, Pythium* spp.	Reddish-brown to dark brown rotted areas on taproot at or below soil line; plants stunted; may or may not yellow.	Mid to late season disease favored by dry, compacted soil.	Spread is not a factor since the fungi already persist in soil and attack roots during favorable weather conditions; spread is by anything that moves soil.	Crop rotation; adequate irrigation; minimize soil compaction by subsoiling; seed treatment for seed decay and seedling blights.
White Mold *Sclerotinia sclerotiorum*	Infection first seen as small, soft, watery spots on stems, pods, and leaves; spots enlarge to become a rotted watery mass often covered by a white moldy growth; plants wilt and die; stems contain small black bodies; seeds are a chalky color and lightweight.	Weather conditions favoring mold growth are 60-75°F temperatures accompanied by long hours of dew or light frequent rains; lush, vigorous vine growth creates conducive microenvironment within the plant canopy.	Fungus survives in soil and on crop residue as hard black bodies (sclerotia); spores spread by wind and irrigation water.	Use of less viny varieties; weed control; avoid late season irrigation when possible; avoid fields with recent history of white mold; avoid using irrigation runoff from these fields.
Bacterial Blights Common: *Xanthomonas phaseoli* Halo: *Pseudomonas phaseolicola*	Small, watery spots on leaves which rapidly enlarge and turn brown; spots often surrounded by a light green (halo) to lemon yellow (common) border; seed are shriveled, discolored and shrunken.	Common blight favored by warm, moist weather; cool temperatures favor halo blight; hail can predispose plants to infection.	Bacteria seed-borne and spread by splashing rain, small animals, insects, cultivation, and irrigation water; survive on bean residue for 2 years.	Use certified seed; 3 year rotation; avoid entering the field when foliage is wet; seed treatment of registered and foundation seed with Streptomycin for surface contaminated seed; plant varieties tolerant to common blight; avoid reuse of irrigation water coming from infected fields.
Rust *Uromyces phaseoli*	Dark reddish-brown pustules on leaves; spores rub off onto fingers when touched.	Infection occurs during cool nights and warm 60-70°F days when heavy dews remain on foliage for several hours.	Spores wind blown; new infections occur every 10-15 days under favorable weather conditions.	3 year crop rotation; apply foliar fungicide if infection is severe; cultivation to remove crop residue; rust more severe on late planted beans.
Bacterial Wilt *Corynebacterium flaccumfaciens*	Leaf symptoms similar to common blight; wilt occurs at any growth stage; wilted leaves dry and turn brown; dark green lesion on pods; seed discolored, shrunken, and wrinkled.	Warm temperatures accompanied by heavy dews, driving rains, and hail favor disease development.	Bacteria are seed-borne and survive for 2 years on crop residue; spread by wind, irrigation water, splashing rain, and hail.	Plant disease-free seed from certified fields; crop rotation; cultivation to reduce crop residue; plant tolerant varieties.

SUGARBEET DISEASES

Diseases	*Symptoms*	*Environmental Conditions Favoring Disease*	*Method of Transmission*	*Recommended Control*
Crown Rot *Rhizoctonia solani*	Early symptoms are blackening of leaf stems of outer leaves followed by extensive rotting of crown and root tissue; infected leaves collapse.	Disease occurs throughout the growing season during warm weather.	Fungus survives in soil and roots of certain weeds.	Crop rotation; weed control.
Powdery Mildew *Erysiphe polygoni*	Light gray mold growth covering leaf surface; leaves yellow, become dry and collapse.	Disease development is favored by warm, dry weather.	Spores of fungus spread by wind.	Sulfur sprays or dusts.
Cercospora Leaf Spot *Cercospora beticola*	Small, brown to gray spots with purple borders appear on leaves and leaf stems; spots merge, leaves turn yellow then brown and finally collapse.	Disease favored by warm (75-80°F) temperatures combined with high humidity or dew formation on leaves.	Fungus survives on crop residue; spores spread by wind.	Plant resistant varieties; crop rotation; cultivation to reduce crop residue; use foliar fungicide on susceptible varieties.
Sugarbeet Nematode *Heterodera schachtii*	Field symptoms first appear as small scattered areas of stunted or dead plants; young beets wilt and die; surviving beets stunted and yellowed; small roots have hairy appearance.	Nematode most active at soil temperatures of 55-80°F.	Eggs in nematode cysts survive for long periods of time in soil; spread is by irrigation water and contaminated soil on equipment.	Use nematicides in combination with crop rotation; field sanitation measures; weed control.
Root-Knot Nematode *Meloidogyne* spp.	Symptoms become evident in mid-season; foliage yellow and wilts on warm days; galls form on taproot and lateral roots.	Nematode most active when soil temperatures are warm in mid-season.	Nematode survives in the soil and on weed hosts.	Use nematicides in combination with crop rotation; weed control; field sanitation measures.
Root Galling Nematode (False Root-Knot) *Nacobbus aberrans*	Beets in heavily infected fields stunted and wilt prematurely; numerous galls on lateral roots; small rootlets from galls cause hairy or whiskery appearance.	Nematode most active when soil temperatures are 75-95°F.	Nematode survives in soil, crop residue and on certain weed hosts; spread is by irrigation water and contaminated soil particles on equipment.	Use nematicides in combination with crop rotation; weed control; field sanitation measures; early planting.

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