

TA245.7
73
.1199

B-1199



CONTROLLING DISEASES ON ORNAMENTAL PLANTS

[Blank Page in Original Bulletin]

CONTROLLING DISEASES ON ORNAMENTAL PLANTS

C. Wendell Horne
Jerral D. Johnson
Walter J. Walla
Extension Plant Pathologists
The Texas A&M University System

Ornamental plants frequently are damaged or killed by various disease organisms such as fungi, bacteria, viruses, nematodes and mycoplasma. In most cases these organisms can be controlled with protective chemicals or by using certain cultural practices such as planting resistant varieties, obtaining disease-free transplants, and proper pruning, watering and fertilizing.

Chemicals and Their Uses

Disease control chemicals are applied as protective sprays or dusts. Therefore, applications must be initiated before disease symptoms appear. Repeated sprays are usually necessary when plants are adding new leaves and during periods of above average rainfall or high humidity.

Most chemicals for nematode control are applied several weeks before planting. Some chemicals, however, may be applied after planting. (Refer to *Control of Plant Parasitic Nematodes Around the Home and Garden*, L-781, Texas Agricultural Extension Service.)

Formulations

Wettable powder sprays are made by mixing the manufactured powder form of the fungicidal or bactericidal materials with water.

Dusts are made by mixing the ground fungicides or bactericides with a filler or carrier such as clay, gypsum, talc, Fuller's earth and others. Dusts are applied directly to plants and cannot be used as sprays.

Emulsion concentrate sprays are made by mixing chemicals, manufactured in a liquid emulsifiable concentrate, with water. In an emulsion ingredients stay well mixed within the spray, and the formula easily spreads and adheres to foliage, fruits and stems of plants.

Granules are made by impregnating an inert material, such as Attaclay® or vermiculite, with the disease control material. Granules are applied to the soil surface and are either incorporated or leached into the soil.

Plant Disease Control Chemicals

Cycloheximide: This is often combined with other fungicides for the control of several turf diseases and powdery mildew of ornamentals. It is available as Acti-dione®.

Benomyl: This white, wettable powder is used as a spray to control powdery mildew, root rots and foliage diseases. It has low toxicity to plants and animals, and is available as Benlate®, Tersan 1991®, Greenlight Systemic Fungicide® and Fertilome Systemic Fungicide with Benomyl®.

Bordeaux mixture: This material is available in powder form, ready to mix with water to make a complete spray. A homemade form may be made by mixing 3 teaspoonfuls of copper sulfate (bluestone) in 3 quarts of water in a wooden, earthenware or glass container. In another container, stir 5 teaspoonfuls of hydrated lime (60 to 80 percent calcium oxide) into 1 quart of water. Pour the copper solution into the lime, stirring rapidly, to make 1 gallon of Bordeaux mixture. Apply spray within 2 or 3 hours after it is prepared. Bordeaux prevents many fungal and bacterial foliage diseases. However, it leaves an objectionable residue and may burn certain foliage. Bordeaux mixture is especially effective on cedars, arborvitae and similar plants.

Captan®: This cream-colored fungicide is sold as a wettable powder, dust or emulsion concentrate. It is an excellent fungicide with low toxicity to animals, humans and plants. It is used as a foliage spray, soil drench, dip for corms and bulbs and as a seed protectant. It is available as Captan®, Orthocide® and in numerous mixes.

Coppers (fixed or neutral): These chemicals are replacing Bordeaux mixture. Fixed or neutral coppers are available as wettable powders under

trade names such as Kocide 101[®], and are added directly to water. Use coppers only on those plants listed on the label, as some plants are sensitive to copper.

Chlorothalonil: This white, wettable powder is used as a spray to control powdery mildew and foliage diseases. It is available as Daconil 2787[®], Bravo[®] and Ferti-lome Broad Spectrum Liquid Fungicide[®].

Formaldehyde: This is a 37 percent solution in water and methanol which is used for soil and basal decay on specific crops, and for disinfecting certain equipment.

Karathane: Available as a wettable powder, liquid or dust, Karathane is used primarily to control powdery mildew.

Maneb + zinc-ion: This is a wettable powder or dust with low plant and animal toxicity. Maneb is used as a foliage fungicide to control many diseases. It is available as Manzate 200[®], Dithane M-45[®], Fore[®] or Greenlight General Purpose Fungicide[®].

PCNB: Pentachloronitrobenzene is available as a wettable powder, emulsifiable concentrate, dust or granule under the trade name Terraclor[®]. It is used for brown patch and certain other soil-borne diseases.

Folpet: This is a wettable powder which controls powdery mildew and other diseases. It is available as Phaltan[®] or Greenlight Rose and Flower Dust[®].

Sulfur: Wettable sulfur is a finely meshed product to which a wetting agent has been added. This wetting agent makes the sulfur form a uni-

form suspension throughout the water to which it is added. Wettable sulfurs control powdery mildew and other diseases, but may damage some plants, especially at high temperatures. Sulfur is often used as a dust.

Thiram: This is a wettable powder which has low toxicity to plants, seeds and bulbs. It is available as Arasan[®], Tersan[®] and Thylate[®].

Vapam[®]: This is a convenient-to-use soil fumigant which controls nematodes and other soil pests. It is available as Greenlight Vapam Soil Fumigant[®] or as Vapam[®]. *Do not use around living plants.*

Zineb[®]: This wettable powder can be used as a spray to control many foliage diseases, or mixed with the soil to control certain soil-borne diseases. The chemical is a general purpose fungicide with low toxicity to plants and animals.

Most of these chemicals are available at your local feed and seed and fertilizer dealer, or at nurseries and garden centers.

Handling of Chemicals

All chemicals used in plant disease control are poisonous and should be handled with care. If these poisons contact the skin, wash immediately and thoroughly with soap and water.

Store plant disease control chemicals out of the reach of small children and irresponsible persons. Keep the materials in their original, properly labeled containers, away from food, and where there is no fire hazard. Follow directions listed on the label in applying any chemical.

Table 1. Fungicides for use in gallon lots of spray.

Fungicide	Pounds per 100 gallons						
	1/2	1	1 1/2	2	4	6	8
		Level tbsps. per 1 gal. spray					
Captan 50% WP*		3/4	1 1/8	1 1/2			
Fixed copper		1/2	3/4	1	2		
Karathane [®]	1/3	2/3					
Maneb		1/2	3/4	1			
Folpet 75% WP			1 1/2				
Terraclor [®] 75% WP		1	1 1/2	2			
Thiram 65% (Thylate [®])		2/3	1	1 1/3			
Thiram 75% WP		3/4	1 1/8	1 1/2			
Wettable sulfur		1/2	3/4	1	2	3	
Zineb		2/3	1	1 1/3			
Benomyl	1						

*Wettable powder

Tablespoon amounts are based on a level tablespoon containing 1/2 ounce. 16 level tablespoons = 1 cup. 3 level teaspoons = 1 level tablespoon.

Table 2. Suggestions for controlling diseases on ornamental plants.

LEAF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Anthracnose (several fungi)	V-shaped spots on leaf edges. Spots in centers of leaves may be angular to circular in shape. Twigs may die back, especially on sycamores. Cankers may occur on limbs.	A. Bordeaux mixture B. Maneb	Apply as spray when buds begin to swell. Apply again when leaves are half grown and repeat in about 2 weeks. Prune and destroy dead twigs. Fertilize and irrigate. Avoid wetting foliage when watering. Propagate from disease-free plants. Commonly affects sycamores, oaks and several other shade trees. Use bordeaux mixture on dogwoods, elms, hollyhocks, maples, sycamores, oaks and plums only. Use maneb on carnations, pansies and dogwoods.
Chlorosis	Leaves range from light green to almost white. Most often caused by lack of iron. Prevalent in areas with alkaline, calcareous soils. Deficiencies of sulfur, manganese or nitrogen may cause chlorosis. Poor drainage, poor aeration or virus diseases may also cause loss of leaf color.	A. Iron sulfate (copperas) B. Iron chelate	Spray foliage late in afternoon when plants are growing. Apply as manufacturer directs. With badly damaged plants, first spray, then make soil application at regular intervals. Avoid getting material on brick or concrete structures.
Petal blight	Distorted leaf and bud growth with whitish, thickened areas. Affects azaleas and camellias.	A. Terraclor® B. Copper sulfate (basic)	Spray just before buds open and again after flowering. Handpick and destroy affected galls. Use copper sulfate on azaleas only.
Leaf blister	Leaves are deformed, curled or have blister-like depressions, and may drop. Affects oaks.	A. Copper sulfate (basic)	Apply as early spring spray. Water and fertilize properly. Control other diseases and insects.

LEAF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Leaf spots (bacterial)	Small, dark green or water-soaked spots that later become angular or irregular, brownish spots. Margins of newly affected spots may reflect light. Larger dead areas may occur as spots grow together.	A. Bordeaux mixture	Apply sprays every 2 to 4 weeks or as needed. Destroy fallen leaves or add to compost. Avoid wetting foliage when watering. Propagate from disease-free plants. Use copper bordeaux mixture on the following plants: boxwoods, begonias, chrysanthemums, gardenias, irises, narcissus, delphiniums, dogwoods, elms, gladioli, geraniums, hollyhocks, ivies, lilacs, lilies, maples, sycamores, peonies, phlox, privet and rhododendrons.
Leaf spots (fungal)	Spots of various sizes and shapes that may run together to kill larger areas. Leaves usually drop. Pin-point size dots may appear in dead spots. (Compare with scorch or scald.)	A. Zineb B. Captan C. Maneb D. Folpet E. Benomyl	Apply preventive sprays at 7- to 14-day intervals beginning when the first evidence of disease occurs or during periods of the year when the problem is expected. Destroy fallen, dead leaves or add to compost. Avoid wetting foliage when watering. Select disease-free planting stock. Use maneb on carnations, pansies, dahlias, irises, zinnias, peonies, chrysanthemums (septoria), gladioli (stemphylium) and roses (black spot and cercospora). Use zineb on asters, carnations, chrysanthemum, cyclamens, dahlias, delphiniums (cercospora and septoria), English ivy (cercospora and septoria), gladioli (septoria and stemphylium), hollyhocks (septoria and stemphylium), pansies (septoria and stemphylium) and hydrangea (alternaria). Use zineb also on dogwoods, euonymus, hawthorns, hickories and lilacs. Use captan on carnations (alternaria) and chrysanthemums (septoria). Use folpet for alternaria leafspot on carnations, marigolds and zinnias; septoria leafspot on chrysanthemums; didymellina leafspot on irises.

LEAF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Mosaic, leaf curl, crinkle, ring spots (viruses)	Light-green, distorted, mottled areas on young leaves. Veins may appear light. Symptoms appear and disappear. Plants or trees may be stunted. Leaves may shed prematurely.	Control insect vectors.	Aphids and certain other leaf-sucking insects may transmit viruses. Control insects and destroy infected plants. Select disease-free plants.
Oedema	Small, corky, hard, raised bumps occur on leaves. Bumps may break open. Caused by excessive rain or overwatering.	Avoid overwatering. Provide good drainage.	
Powdery mildew (several fungi)	Whitish or grayish, mold-like growth over lower and upper leaf, bud or young twig surfaces. Leaves and flowers may be deformed.	A. Karathane WP B. Folpet C. Sulfur D. Acti-dione PM® E. Benomyl	Begin regular spray applications at the first sign of disease and continue as needed. Roses, crape myrtles, euonymus, zinnias and phlox are particularly susceptible to this disease. Use folpet on asters, chrysanthemums, lilacs, phlox, roses and snapdragons. Karathane not cleared on phlox. Refer to label for exact ornamentals on which acti-dione is cleared.
Rusts (several fungi)	Orange, brownish-orange, rusty red, dark brown or black raised spots (powdery pustules) occur mainly on the under surfaces of leaves. The rust rubs off and can be easily seen on a white cloth. Badly rusted leaves shed.	A. Zineb B. Maneb	Begin spray applications about the time that the disease usually appears and continue at 7- to 14-day intervals as needed. Destroy alternate hosts. Hand pick and destroy diseased leaves. Use manebe on snapdragons, asters and select grasses. Use zineb on asters, chrysanthemums, dahlias, delphiniums, hollyhocks, hydrangeas, irises, roses, snapdragons, crabapples, hawthorns and for cedar apple rust on junipers and red cedars.

LEAF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Scorch or scald (physiogenic)	Leaves may droop, wither, scorch or burn. Leaf edges die back. Drying wind, high light intensity, insufficient soil moisture, excessive commercial fertilizer, smoke or gas injury, careless transfer of transplants, salty water or root diseases may be involved. (See Root Diseases.)	Water and fertilize properly. Remove dead limbs.	Plant adapted trees and shrubs. Trouble is more likely in low rainfall areas and during prolonged drought on trees and shrubs not native to the area. New homes, driveways or patios should be constructed at proper distances from trees. Avoid too much fill soil or scraping off of surface soil near trees. (Tree roots may extend two or three times the length of the limb spread.)
Sooty mold (white flies) (aphids)	Black coating on surface of leaves or fruit is easily rubbed off by hand. Caused by fungi which live on secretions from aphids and immature stages of white flies.	Control insects.	Control white flies and aphids. Repeat insecticide applications at weekly intervals.

STEM, BRANCH AND TRUNK DISEASES

Cankers (fungi)	Brown or black, irregular dead areas may encircle stem or branch. Bark often cracks between canker and live wood. When canker encircles, dieback results from canker to tip. Canker organisms gain entrance from small twigs into larger branches and through injuries or wounds. Normal healing of wound is prevented.		Destroy severely infected, small plants. Cut out dead areas, limbs or stems on trees and shrubs. Dip pruning shears after each cut in a solution containing 1 part household bleach to 9 parts water. Use disinfectant tree paints on cuts and wounds at regular intervals until wounds heal.
Dieback	Browning or blackening and death of stem or branch begins at tip of branch or flower. Dieback progresses downward toward larger branch or stem.	Prune about 6 inches below visible sign of canker.	Maintain healthy plant, shrub or tree by controlling diseases and insects and by watering and fertilizing properly. Plant adapted trees and shrubs. Plants weakened by drought, disease, insect damage or lack of proper management are more susceptible.

STEM, BRANCH AND TRUNK DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Dodder	A yellowish, climbing, parasitic vine. The seed plant grows in dense masses over cultivated plants. Seed may germinate after being in the soil 25 years.	If little dodder is present, remove by hand. Destroy badly infected plants.	Use noninfected soil for growing transplants. Infected transplants should be discarded. Obtain disease-free soil. Do not use dodder-infested manure in flower beds.
Gall (bacteria or fungi)	Galls or irregular swellings form on branches, trunks, stems, leaves or flowers.	Prune infected portions, sterilizing shears between each cut.	See Canker control for sterilizing solution. Treat wounds and cuts with tree disinfectant paint. Propagate from healthy plants. Prevent wounds.
Lichens (fungi and algae)	Most often occurs along the Gulf Coast and in East Texas. A paper-like growth of various colors that occurs on bark of limbs and trunks. The lobed or curled growth may be from one to several inches in size.		A lichen is a combination of fungus and algae growing together, each dependent on the other for survival. These growths are harmless and do not require control measures.
Mistletoe	A parasitic plant with small flowers and white berries.	Prune the parasite on infected trees during winter.	Make cut 1 foot or more below infection. In older branches the bark and some wood should be cut out 1 foot or more away from each infection. Apply disinfectant tree paint to cut surfaces. It is difficult to eliminate mistletoe if it prevails in nearby trees. Birds carry the seed while feeding on berries.
Spanish Moss	Spanish moss hangs in long festoons and ball moss forms a rosette-shaped ball. Moss roots or holdfasts serve only to anchor it to where it grows. Water and mineral salts are absorbed from the air. Moss reduces the amount of sunlight for trees and newly formed buds.	Spanish moss — remove by mechanical means. Ball moss — 6 pounds of Kocide 101® per 100 gallons of water.	Do not graze livestock on grass under sprayed trees. Avoid spray drift to nearby fruit trees, as defoliation will occur.

STEM, BRANCH AND TRUNK DISEASES

STEM, BRANCH AND TRUNK DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Rust (several fungi)	Conspicuous orange, yellowish or reddish swelling on twigs, branches or galls in the spring.	See Rust under Leaf Diseases. Cut and destroy galls. Prune and destroy infected limbs during winter.	Apply disinfectant tree paint to cut surfaces. Occurs on ashes, cedars, junipers, arborvitae, cypresses, mimosas, pines and others.
Slime flux (bacteria)	Sap often flows for a prolonged period from pruning cuts, broken crotches and other injuries on elms and other shade trees.	Install tubes in the infected parts of the tree to drain the excess fluids and relieve pressure.	
Wood rots (several fungi)	Mushroom-type fungal growths appear on trunk, limbs or roots near the soil surface. Rots may be present for several years before mushrooms appear. Tree becomes susceptible to wind damage.	Remove rotted wood from decayed areas.	Large cavities should be filled with special filling. Cavity filling by an amateur often is injurious rather than beneficial. Give prompt surgical treatment to badly bruised, cut or splintered wood. Wounded edges should be smoothed to promote healing. Treat wounds with disinfectant tree paint. Control cankers and boring insects. See Canker control.

ROOT DISEASES

Bulb rot of flowers (several fungi and bacteria)	Plants may die back starting at leaf tips. Corms or bulbs show various stages of dry or soft rots. See Botrytis blight, Southern blight, Cotton root rot and Root and stem rot.	<ul style="list-style-type: none"> A. Thiram B. Captan C. PCNB D. Benomyl 	Discard diseased corms at transplanting time. Dust corms as manufacturer directs before planting. Use captan for tuber rot of begonias and corm rot of gladioli. Purchase only healthy corms. Plant in a new, disease-free location or in sterilized soil. Control insects that damage bulbs. Avoid crowding of bulbs and excessive watering. Use thiram for basal rot decay, scab, botrytis and fusarium root rot on gladioli. Use thiram for botrytis and fusarium root rot of hyacinths, irises, lilies, narcissus and tulips.
---	---	---	---

ROOT DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Cotton root rot (fungi)	Small flowering plants die within a few days. Shrubs and trees die more slowly. Large trees may die within several months or possibly 1 to 3 years. Affected plants slip from the soil with little effort. Outer bark rots off the roots.	Destroy roots of dead trees and shrubs.	This fungal disease is most prevalent in heavy, alkaline soils. It is found in most areas of Texas. For additional information see "Cotton Root Rot," L-390, Texas Agricultural Extension Service, available from your county Extension agent.
Crown gall	Primarily affects trees and shrubs. Large galls appear on the lower part of the stem and also on the larger roots. Affected plants may be deformed, stunted or killed. Young plants are affected more seriously than older ones.		Remove diseased plants. Use disease-free plants and avoid mechanical injury to roots and crowns.
Mushroom root rot	Affects trees and shrubs much the same way as cotton root rot. Dead areas appear in the bark on the main stem and larger roots just beneath the soil surface. When the dead bark is peeled or cut back, a whitish fungal growth is visible over the surface of the wood. The disease occurs most frequently in wooded areas or in recently cleared wooded land. Honey-colored or light brown toadstools or mushrooms may cluster about the base of infected trees or shrubs during certain times of the year.		Plant resistant varieties.

ROOT DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Root and stem rot	Stunting and general yellowing of the foliage may occur. The disease may be a continuation of seedling blight. Brownish or blackish spots of various sizes and shapes occur on the stem at or near the soil surface and on the roots. Tips of small roots may decay. Complete rotting of the roots and lower stem eventually occurs.	A. PCNB B. Zineb	Avoid overwatering, especially in winter. Use only decomposed organic matter in the seed placement area. Avoid crowding plants in the plant bed. Water potted plants and flower beds with a solution containing wettable formulations of chemicals. Use according to manufacturer's directions. Chemicals listed may be mixed with the soil before planting. Use zineb on asters, carnations, dahlias and delphiniums.
Root knot and other nematodes	Plants may be unthrifty or stunted, and may gradually die. Fewer blooms are present. When diseased roots and soil are removed with a shovel, roots may be irregular, swollen and gnarled. Other symptoms are stubby root systems, excessively branching roots, small roots larger near the tip ends, wilting of plants during the day and revival at night, and brown or black spots or streaks on roots.	A. Vapam (Do not use around the roots of living plants.)	Apply chemicals as manufacturer directs. Transplant nematode-free plants. Propagate plants in nematode-free soil. (For more information refer to "Control of Plant Parasitic Nematodes Around the Home and Garden," L-781, Texas Agricultural Extension Service.) Soil samples may be sent to the Plant Parasitic Nematode Detection Laboratory for diagnosis.
Seedling blight or damping-off	Young plants may die. Roots and stems show various stages of rotting whether or not plants die. Stem at soil surface may be partly or completely rotted. Under certain conditions, rot may move up the stem. The disease may appear suddenly and spread rapidly to all seedlings in the planting, or it may be restricted to scattered spots among plants.	See treatment of Root and stem rot. Sterilize soil before planting.	Bake small lots of soils for 3 to 4 hours in a 160-degree oven. To sterilize larger quantities, conduct live steam from a boiler into an inverted box and move it over the loosened soil. Drain tile or iron pipe buried in the soil helps to distribute the steam. Heat the soil until a medium-sized potato buried several inches deep is cooked thoroughly. Use formaldehyde as manufacturer directs. Water in the morning and allow to dry before night. Give plants as much light as is practical. Seed treatment with thiram or captan as manufacturer directs will prevent seed rot and help prevent damping-off.

ROOT DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Southern blight	Plants suddenly wilt and die within a few days, especially in sandy or loamy type soils. Small, seed-like structures (sclerotia) appear along with whitish, fungal growths at the bases of infected plants. The plant is rotted primarily in the upper 2 inches of soil. A soil temperature of 75 degrees to 95 degrees Fahrenheit is necessary for the disease to develop.		Remove dead plants and surrounding soil from gardens and flower beds. Use of calcium nitrate fertilizer will aid in the control of this disease.

DISEASES AFFECTING ALL PLANT PARTS

Aster yellows	Plants are stunted and bushy; numerous secondary shoots are produced. Foliage is yellow and may lose green color in immature leaves. Flower parts may develop into leafy structures.	Control insect vectors.	Spray healthy plants at weekly intervals to prevent feeding of leaf hoppers. This insect transmits the pathogen from infected wild hosts to flowers.
Verticillium wilt	Plants are stunted. Leaves droop, turn yellow, wilt and die. A portion of the plant may show symptoms followed later by the entire flower, shrub or tree. Flowers die within a few days. Shrubs or trees may die over a longer period. The disease is most active during the fall and spring when temperature is cool. The wood just beneath the bark of the stem or roots may be discolored.		Remove diseased roots and destroy affected plants. Do not use gin trash where verticillium is a problem on cotton.



A14837 565973

DISEASES AFFECTING ALL PLANT PARTS

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Botrytis blight	Flowers and stems become discolored and water-soaked. Flowers may become covered with a thread-like, gray mold growth. Leaves also may be infected.	A. Zineb B. Thiram	Spray when disease is a problem and add a spreader-sticker to the spray. Space plants to allow for good air circulation. Avoid areas of high humidity and low light intensity. Use thiram on gladioli, hyacinths, irises, lilies, narcissus, tulips and daffodils. Use zineb on asters, carnations, chrysanthemums, cyclamens, dahlias, delphiniums, gladioli, geraniums, hydrangeas, lilies, snapdragons and tulips.

DISEASES AFFECTING FLOWERING PARTS

Bud drop	Flower buds shrivel, turn brown and drop from the plant before they open.	Control other diseases and insects.	Abnormal temperature, humidity or watering, as well as gas injury, extreme fluctuations in soil temperature or light and overfertilization are a few of the environmental conditions which may cause bud drop.
----------	---	-------------------------------------	--

LAWN AND TURF DISEASES

Brown patch	Roughly circular, brown areas of grass varying in size from a few inches wide to as much as 20 feet or more. Usually, only leaves and sheaths are damaged.	A. PCNB B. Benomyl C. Chlorothalonil D. Maneb	Apply fungicide 1 to 2 weeks before disease usually appears. Make additional applications as needed. Avoid late afternoon or night watering. Disease usually appears in the fall during periods of cool temperature. May occur in spring if temperature conditions are correct.
-------------	--	--	---

LAWN AND TURF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Chlorosis	Grass turns yellow between leaf veins. Eventually, entire leaves may appear yellow or lose green color.	A. Iron sulfate (copperas) B. Iron chelate	Apply as manufacturer directs and when needed. Avoid getting material on brick and concrete.
Dollar spot	Bleached spots about the size of a dollar appear during wet, cool weather. Affected grass is killed and grass is left pitted. Disease is severe on bent grasses.	A. Maneb B. Benomyl	Apply chemicals in early stages as manufacturer directs.
Fading out (melting out)	Irregularly shaped dead areas from a few inches to more than several feet in diameter. Spots may run together. Sprigs of live grass are left among the dead.	A. Zinc-ion mane B. Captan	Water, fertilize, mow and aerate properly. Most destructive during late spring, summer and early fall on grass given improper care.
Fairy ring or mushrooms	Toadstools appear singly or in rings after rains or heavy watering during certain times of the year. Grass sometimes dies.	Handpick and destroy mushrooms or toadstools.	Remove all old tree stumps, roots and lumber from soil. Avoid thick buildup of old grass clippings. If soil becomes dry, spade with fork and thoroughly soak with water. Two ounces of household detergent per 5 gallons of water will help wet soil.
Gray leafspot	Small, circular, brown or tan spots may run together and kill leaves.	A. Chlorothalonil	Apply spray as needed. Water in the morning. Disease is more severe in dense shade where grass dries out more slowly. Avoid excessive nitrogen fertilization.
Rust	Yellowish-orange or reddish-brown powdery pustules appear on leaves. When a cloth is rubbed against leaves, rust-colored spores adhere to cloth.	A. Maneb B. Chlorothalonil	Apply chemicals as needed in early stages of disease. Use as manufacturer directs.

LAWN AND TURF DISEASES

Disease	Symptoms	Treatment (See dilution chart for mixing sprays)	Remarks
Slime mold	Black or grayish incrustations appearing as a powdery mass.	Wash off with a water spray at 20 or 40 pounds of pressure.	If slime mold persists apply zineb or captan sprays, using enough water to wet all of the grass.
Smut of Bermuda grass	Dark brown to black mass of smut spores replace the seed head.	No chemical control. Mow close and often to prevent smut becoming a nuisance.	The disease fungus is in all parts of the plant. Adequate moisture usually prevents seed head formation.

Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socio-economic level, race, color, sex, religion or national origin.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.

20M—9-79, Revision

PP