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Tomato Diseases

The Texas A&M
University System



**Texas
Agricultural
Extension
Service**

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TOMATO DISEASES

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Tomato diseases can be controlled by following recommended practices. Complete eradication seldom is possible, but disease damage can be lessened.

Change the location of your tomatoes each year. Tomatoes should not follow peppers, Irish potatoes or eggplant. Grasses, grain sorghum, corn, rye, wheat, oats and barley are immune to most tomato diseases; hence, include them in your rotation plan. Avoid areas where Southern blight, nematodes and bacterial wilt have been problems.

Grow disease-resistant, adapted varieties. It is important to plant fusarium wilt and nematode-resistant varieties in East and South Texas. Plant verticillium wilt-resistant varieties in West Texas. Varieties designated as VFN types are resistant to verticillium, fusarium and root knot nematodes. Ask your county Extension agent about the newest disease-resistant varieties. Based on soil tests, add some form of calcium to prevent blossom-end rot. Calcium forms include limestone, gypsum and calcium nitrate.

Use transplants grown under disease-free conditions. Disease-free plants are produced as follows:

- Use disease-free or chemically fumigated soil in the plant bed each year.
- Use seed treated with Arasan® or Captan®.
- Water the seedbed in the morning so the surface can dry before night.
- Where hotbeds and coldframes are used, remove the sheets in the daytime when the temperature is 45° F. or higher, provided there is no severe wind or rain.
- Drench the plant bed with a copper fungicide used according to label directions. Drench before plants come up and again when about 1 week old.
- Spray the plants with a copper fungicide every 7 days. Do not apply within 1 week of transplanting.
- Wash hands with laundry soap each time after using tobacco before handling plants.

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- In areas where fruit rot is common, stake or cage tomatoes.
- Follow the spray schedule. Begin when blooms appear and continue at 7- to 10-day intervals as needed. Follow the shortest recommended interval during periods of above average rainfall. Apply sprays at the rate of 50 to 100 gallons of water per acre, depending on plant size and row width.

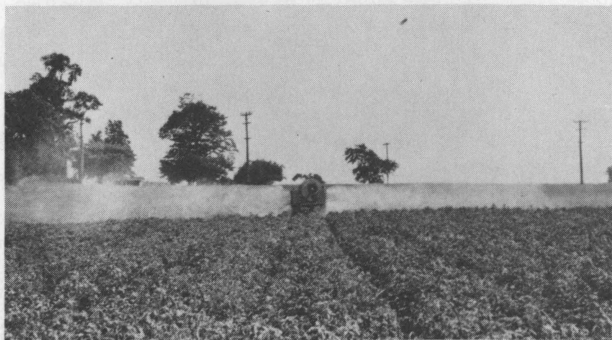
Most cleared fungicides are compatible with insecticides. Combinations are satisfactory if both are needed. Always follow label directions.

Vary the foregoing practices to fit local conditions. A spray program to prevent bacterial and fungal diseases is more necessary some years than others. Above average rainfall increases the incidence of most tomato diseases. Studying regional and local weather patterns aids in timing applications. Many diseases decrease in importance during drought years. If foliage diseases were severe the previous year, they are more likely to be severe during the current year. Check tomato plants often for disease symptoms.

Fungicides prevent diseases rather than curing plants already infected. Important steps to follow in a fungicide program are:

- Use a fungicide that is effective in preventing diseases commonly occurring in the area.
- Apply before plants are infected.
- Apply often enough to cover new growth and to replace fungicides washed off by rain.
- Completely cover all leaves, stems and fruits.

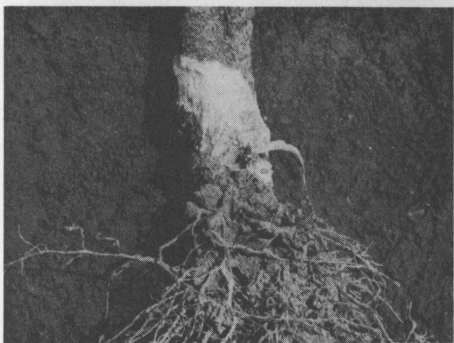
Adjust spray equipment for proper coverage. Adjust each sprayer type so it gives the best distribution and coverage. Use enough nozzles for each row to insure directional coverage for all leaf and fruit surfaces.





Main symptoms. Young seedlings may be killed before or soon after emergence. Since stems are affected at or near the ground level, seedlings wilt, then fall and die. Affected plants usually are confined to certain sections or areas in the plant bed. Smaller plants that survive may have hard, discolored stems.

Principal control methods. To prevent damping-off, use soil free of pathogens with good drainage. Where practical, sterilize the soil. Treat the seed and avoid overcrowding and overwatering the seedlings. Provide adequate ventilation and sunlight in the plant bed. Apply a recommended fungicide before and after seedling emergence.



Main symptoms. Sudden wilting of the entire plant without noticeable change in foliage color. At the soil line, the main stem decays from a white fungal growth adjacent to the ground line. Small, dark, seed-like bodies called sclerotia form in the white fungal growth. This fungus also may attack fruits on or near the ground. Caused by the fungus *Sclerotium rolfsii*, it can live on dead organic matter on or near the soil surface.

Principal control methods. Commercial producers should rotate tomatoes with resistant grass crops such as grain sorghum, rye, wheat, oats or corn. Keep crop residue out of the area near the base of a plant. Deep burial of crop residue before plant establishment is suggested. Control foliage diseases with recommended fungicides.



Main symptoms. Plants severely affected by root knot are stunted and weak. They wilt in dry weather but may recover at night before dying. Roots of infested plants have swellings or galls.

Principal control methods. To prevent root knot damage, use disease-free transplants and avoid nematode-infested soil. Soil fumigation may be required where nematodes are a limiting factor and resistant varieties are not available. Varieties resistant to common species of root knot nematode include Big Set, Bonus, Jackpot, Better Boy and Small Fry (cherry type).



Main symptoms. Lower leaves turn yellow to brown, and the plant may wilt first on only one side. Then the entire plant gradually turns yellow or brown, wilts and dies. Cut stems have dark brown streaks on the inside. The disease is most serious during warm weather and usually appears shortly before the first fruit ripens.

Principal control methods. To prevent fusarium wilt, use disease-resistant, adapted varieties. Resistant varieties include Homestead 24, Homestead Elite, Chico III, Manapal, Floridel, Walter, Big Set, Bonus, Jackpot, Better Boy, Spring Giant and Small Fry (cherry type).

DAMPING-OFF

SOUTHERN BLIGHT

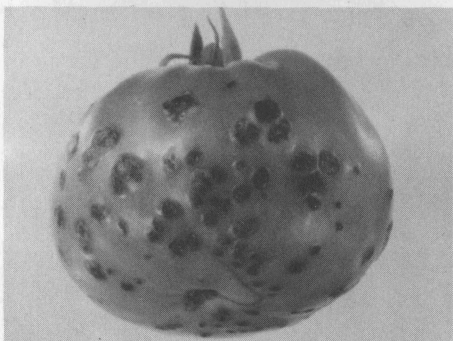
ROOT KNOT

FUSARIUM WILT



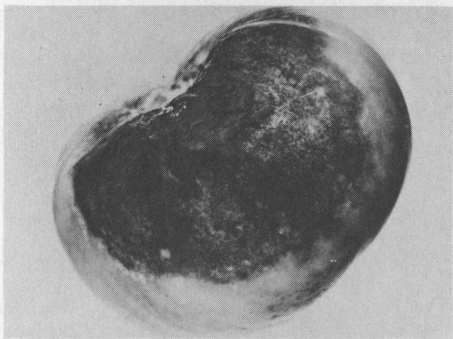
Main symptoms. Plants often are dwarfed, and the base of stems may be a dirty green, brown or black and shriveled. Leaves may wilt within 2 days after stem symptoms appear. When the base of a diseased stem is cut, a slimy, whitish material flows from the water tubes within a few minutes.

Principal control methods. To prevent bacterial wilt, rotate tomatoes with grasses, grain sorghum, corn or small grains. Delay 4 or more years before planting tomatoes, peppers, Irish potatoes or eggplants again. Removing and destroying diseased plants, coupled with insect control, prevents further spread.



Main symptoms. Affected plants have small, dark, irregular greasy spots on the leaves. These spots enlarge, become blackened and then sunken on the underside of the leaf. Affected leaves turn yellow and drop. On green fruit, spots are first small; become white and raised; and later are sunken, light brown and have a rough surface.

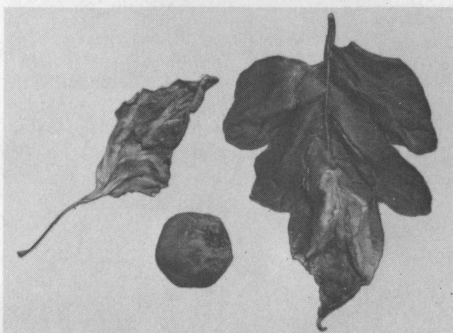
Principal control methods. When bacterial spot is found on a few plants, destroy or remove them from the field immediately. Avoid letting them contact other plants. Spray plants with fixed copper according to manufacturers' suggestions. Use seed from healthy plants.



Main symptoms. All above ground structures can be affected by the late blight fungus. On leaves, greenish-black, irregular, water-soaked spots develop. Under damp conditions, the spots enlarge rapidly. A moldy growth may develop on the lower leaf surface. Rainy, foggy weather with temperatures of 40° to 60° F. at night and 70° to 80° F. in the daytime favors disease development. Elongated black cankers may develop on stem and

leaf petioles. On the fruit, water-soaked spots develop, enlarge rapidly and gradually turn greenish-brown. The surface of the diseased area is firm and irregular, sometimes covering half the fruit.

Principal control methods. To avoid damage from late blight, use disease-free transplants and follow a regular spray schedule. Staking or caging helps reduce fruit losses.



Main symptoms. Gray mold occurs mainly in greenhouse-grown tomatoes when the relative humidity is extremely high and temperatures are cool inside. Disease symptoms include gray, powdery tufts of fungus on affected leaves, roots and stems.

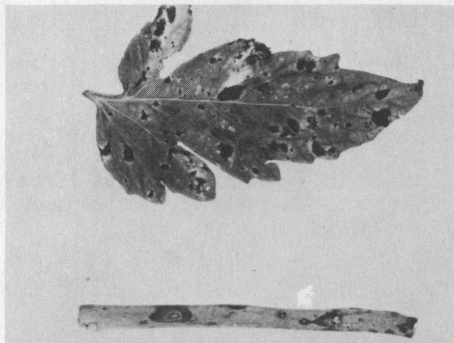
Principal control methods. To control damage from gray mold, practice good sanitation by removing dead plant parts from the greenhouse. Utilize a preventive spray schedule to avoid development of high fungal spore populations. Shorter spray intervals may be required to get the disease under control. Improve air circulation in greenhouses.

BACTERIAL WILT

BACTERIAL SPOT

LATE BLIGHT

GRAY MOLD



Main symptoms. Plants affected by early blight and collar rot show large, dark circular spots with concentric markings (target spot effect) on leaves and darkened spots on stems. Spots occur on the lower leaves first; during severe attacks, lower leaves are killed. Fruits may develop dark, leathery spots at or near the stem end. This organism also may cause a girdling of plants in seedbeds (collar-rot).

Principal control methods. To avoid this disease, use disease-free transplants, practice rotation and apply approved fungicides regularly. Prevent collar rot in the plant bed by using recommended fungicide sprays.



Main symptoms. Gray leaf spot causes grayish-brown, shiny spots ($\frac{1}{16}$ to $\frac{1}{8}$ inch in diameter) to appear on leaves. Affected leaves turn yellow and drop from the plant. The disease usually starts on lower leaves and then works up the plant.

Principal control methods. Use the same control methods suggested for early blight.



Main symptoms. Yellowish-green blotches on the upper sides of the leaves, accompanied by greenish-brown, moldy spots on the lower sides appear on plants having leaf mold. Leaf mold may be destructive in fields in cool, wet weather and in greenhouses.

Principal control methods. To prevent leaf mold, follow a regular spray schedule. Improve air circulation in greenhouses and avoid overcrowding the plants.



Main symptoms. Diseased plants have mottled leaves and often are stunted. Fruit may be fewer in number and smaller than those formed on healthy plants. Wrinkling and strapping leaflets may occur when severe strains of the virus are present. The mottling symptoms in leaves may disappear in hot weather. The virus, present in some types of tobacco products, can be transmitted on the hands, and it survives in crop residue in the soil. Once the virus is established in plants, it can be distributed to other plants mechanically.

Principal control methods. To avoid contamination, wash hands with laundry soap before handling plants. Avoid excessive handling of plants in plant beds or in the field. Removing diseased plants is helpful only if they do not contact normal plants.

EARLY BLIGHT AND COLLAR ROT

GRAY LEAF SPOT

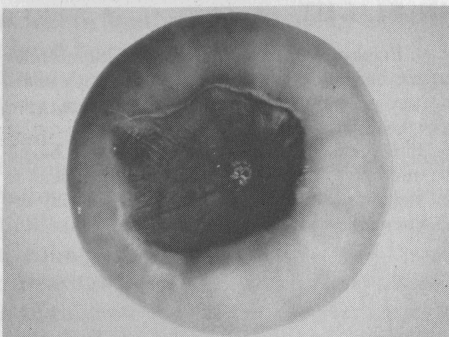
LEAF MOLD

MOSAIC



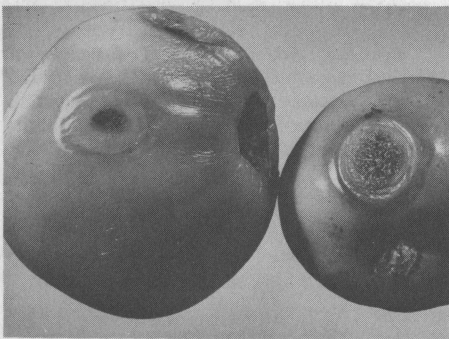
Main symptoms. Curly top is a disease occurring primarily in irrigated areas of West and South Texas. Upper leaves turn grayish-green. Soon these become crisp, brittle and roll upward. Leaves then turn light green to yellow, with purple veins on the lower side. Plants stop growing, fail to ripen fruit and die within a few weeks.

Principal control methods. This virus is transmitted by the beet leafhopper. Insecticide use may limit the damage, but it will not prevent all infection. The condition can best be prevented by using resistant varieties such as Ropac, Roza, Columbia or Salad-master.



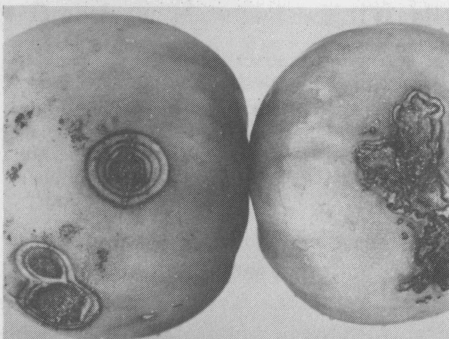
Main symptoms. Dark, sunken, leathery spots appear on the blossom-end of green fruits. The spots vary in size, sometimes affecting half the fruit. This is a physiological disease caused by a fluctuating moisture supply and a lack of calcium.

Principal control methods. Based on a soil test, add adequate limestone or gypsum to balance deficient soils. Use adapted varieties. The addition of calcium chloride to the spray may be beneficial. Maintain a uniform soil moisture supply with irrigation and mulch.



Main symptoms. Light-brown, circular, sunken spots with darker colored rings develop on ripe fruit. Small black specks often develop in the center of these spots. Soft rots may develop.

Principal control methods. To control anthracnose, apply regular sprays of approved fungicides. Practice rotation and avoid poorly drained soil. Caging, staking or mulching reduces fruit infection by the fungus.



Main symptoms. Fruits touching wet soil often develop large, cracked, rotten spots with alternating bands of light and dark-brown color. The rot is caused by the fungus *Rhizoctonia* that is common in cultivated soil.

Principal control methods. To prevent soil rot, cage and tie plants to stakes or wires or use a plastic mulch. Time the irrigation to keep soil dry under the plants as much as possible during harvest. Follow the regular spray schedule.

CURLY TOP

BLOSSOM-END ROT

ANTHRACNOSE

SOIL ROT

Fungus, Bacterial and Nematode Diseases and Their Causal Organisms

Disease	Causal organism
Damping-off	<i>Pythium</i> and <i>Rhizoctonia</i> spp.
Collar rot and early blight	<i>Alternaria solani</i>
Southern blight	<i>Sclerotium rolfsii</i>
Root knot	<i>Meloidogyne</i> spp.
Fusarium wilt	<i>Fusarium oxysporum</i> f.
Bacterial wilt	<i>Pseudomonas solanacearum</i>
Gray mold	<i>Botrytis cinera</i>
Bacterial spot	<i>Xanthomonas vesicatoria</i>
Late blight	<i>Phytophthora infestans</i>
Gray leaf spot	<i>Stemphylium solani</i>
Leaf mold	<i>Cladosporium fulvum</i>
Anthracnose	<i>Gleosporium atramentarium</i>
Soil rots	<i>Rhizoctonia</i> spp. and <i>Phytophthora</i> spp.

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