

**TEN KEY FACTORS CONSIDERED IMPORTANT
BY SUCCESSFUL TOMATO GROWERS**

by

Roland E. Roberts, PhD.
Professor and Extension Horticulturist
Texas A & M University Res. & Ext.Ctr. at Lubbock
Route 3, Box 213AA, Lubbock TX 79401 Phone 806-746-6101

**1. SELECT DISEASE RESISTANT VARIETIES
WITH STRONG HEAT TOLERANCE**

Hundreds of tomato cultivars are offered for sale by major seed companies in the United States of America. Listed here are hybrid cultivars which produced good yields of high quality fruit for commercial growers and home gardeners in demonstrations conducted on the High Plains.

Proven Varieties

Carnival V*,F,N,TMV,Asc,St;Petoseed
Cherry Grande V,F,Asc,St;Petoseed
Heatwave V,F,St,TMV;Peto, Abb.&Cobb
Santiago V,F,N,St,TMV- Petoseed
Small Fry V,F,N,Asc,St;Petoseed
Spitfire V,F,ASt; Ferry Morse
Supersweet 100 V,F;Northrup King
Surefire (GS 12) V,F;Northrup King

Varieties Worth Trial

Casa del Sol V,F,N; Abbott & Cobb
Champion V,F,N,TMV; Ball Seed
Cherry King V,F,N,TMV;Northrup King
Heartland V,F,N; Ball Seed
Merced V,F,St,TMV; Northrup King

* = refers to disease resistances

V=verticillium wilt F=fusarium wilt, N=nematodes, TMV=tobacco mosaic virus,
Asc=alternaria
stem canker, St=stemphylium (gray leaf spot)

Heatwave, Heartland, Casa del Sol, Roma, Napoli, Surefire, Red Cherry, Cherry Grande,
and most
small fruited varieties have been observed to set fruit well at day temperatures over 92
degrees F.

We have not been able to include all available varieties in our trials. Some people have
favorites
which are not on this list.

11. ESTABLISH & MAINTAIN HIGHLY FERTILE SOIL

SAMPLE SOIL SOIL TEST RESULTS ORGANIC MATTER PREPLANT FERTILIZATION SIDE DRESSING

Tomato responds to highly fertile soil. Be certain that your soil is highly fertile before planting by having soil tested and apply nutrients according to guideline suggestions based on your soil test. Some useful tomato suggestions are given in Home Garden Soil Fertility Guide for Texas High and Rolling Plains, (L-2439) available from your County Extension Agent. Fertilizer Potassium is rarely needed in our soils most of which are naturally high in this element. If phosphorus is recommended, apply one pound of 16-20-0 per 100 square feet, broadcast evenly and tilled into the top 8 to 12 inches of garden soil. The ideal soil for tomato production is very high in organic matter.

If your soil is not high in organic matter apply compost or manure. Before planting, apply well decomposed compost at the rate of 40 to 60 pounds per 100 square feet of garden in addition to the above recommended nutrients.

In addition to the compost recommended above, manure can be used instead of dry fertilizer. Manures vary widely in nutrient concentration and salt content, so take care to not apply too much. Too much manure in the soil will hurt tomato growth. Compared to chemically formulated fertilizers, use of manures is a less precise method of fertilization. A safe application of sheep, rabbit, or cow manure is a rate of no more than 50 pounds per 100 square feet (10 tons per acre). Mix it well into the top 8 to 12 inches of soil by tilling or spading. If a dried manure is used do not apply more than the amount recommended on the bag.

Side dress tomato plants with nitrogen every two to three weeks, starting when first fruit are still tiny. Apply one level tablespoon of urea per plant by sprinkling it uniformly over a six-foot diameter circular pattern over the mulch or soil around each plant. Then, immediately irrigate with one inch of water. One inch of water over 28 square feet (a circle with radius of 3 feet) is 16 gallons. One inch of water over 50 square feet (a circle with radius of 4 feet) is 31 gallons.

111. TRANSPLANT 5- TO 6-WEEK OLD PLANTS GROWN IN 4- TO 5-INCH POTS GARDEN SPACING 4 TO 6 FEET

Plants of determinate tomato varieties older than 5 to 6 weeks and plants grown in pots less than 4 to 5 inches diameter have been shown to be less productive in carefully conducted research. So buy plants no more than 4 to 5 weeks old in 4 to 5-inch pots. Space plants to allow full access from all sides of plant during culture and harvest. Plant spacings of 4 feet to 6 feet in rows 6 to 8

feet apart for caged production of vigorous determinate-plantcultivars or for mulched ground culture work well. Smaller determinate-plantcultivars like Surefire are more productive planted two feet apart in the row.

IV. BUILD AND USE PLASTIC/GROW-WEB WRAPPED CAGES

LOW TEMPERATURE PROTECTION WIND, HAIL, INSECTS DISEASE CONTROL

The tomato is a subtropical plant. Tomatoes inside Grow-Web-wrapped cages are happier. Use concrete reinforcing wire to form a cage that is 18 to 24 inches in diameter and 5 feet in height. Wrap cage with Grow-Web and clamp the material to the wire with clothespins to keep it in place. The Grow-Web wrapped cage will slow wind, keep air and soil warmer around plant, prevent entry into cage by virus-carrying insects, and let in plenty of light. An additional wrap of clear polyethylene film increases temperature inside the cage during day by 20 to 30 degrees F. and at night by 3 degrees F. if the cage top is covered with the plastic.. Remove plastic from over the cage top during the day to prevent overheating (temps. inside cage over 90 degrees F. hurt the plant) . Cut vent holes in plastic at cage base to permit cooling chimney effect during warm days. Remove plastic when cage diameter is filled with tomato foliage. When leaves touch Grow-Web, unwrap and drape it over and around the cage to continue repelling insects while liberating the plant to grow and set fruit.

V. ERECT OR GROW WINDBREAKS

SHINGLES, SHAKES, BOARDS ELBON RYE, HEADLESS SORGHUM, SUNFLOWERS TEN-FEET-FOR-ONE EFFECT

Tomato is not a wind tolerant plant. To reach its potential for yield and quality, the tomato plant must be protected from stresses imposed by our normally wonderful West Texas climate. Windbreaks can be grown or constructed. Elbon rye, triticale, and tall-growing wheat started the previous September or October work well. Tall-growing sorghum and sunflowers make good windbreaks and offer some hail protection. Windbreaks are valuable protection for cages to prevent them from being blown over.

VI. APPLY AND MAINTAIN DEEP LAYER OF MULCH

CONSERVES SOIL MOISTURE MAINTAINS OPTIMUM SOIL TEMPERATURE ENCOURAGES EXTENSIVE ROOT SYSTEM

The optimum root zone temperature for tomato is 75 degrees F. Apply and maintain four to six inches depth of clean wheat straw, or grass clippings, starting as soon as the soil temperature has reached 70 degrees F. Mulch outward at least four to six feet from stem (center) of plant. This will conserve soil moisture, maintain near optimum root zone temperature, allow roots to grow in soil right to the surface, and prevent weed growth. The plant mulched in this manner will be much

more productive. Any fruit which touch dry mulch will not rot as they do when resting on moist soil.

Consider using tensiometer to monitor soil moisture. Position the tensiometer one foot away from the plant stem with ceramic tip one foot deep. Irrigate when soil moisture tension is over 20 centibars in the morning of what will be a sunny, warm day with normal afternoon breeze.

VII. KEEP SOIL MOISTURE NEAR OPTIMUM

HOW MUCH WATER HOW FREQUENTLY TO WATER

The tomato plant is a water spender. It can not be conditioned to thrive on limited soil moisture. Consequences of soil moisture deficit are aborted blossoms, blossom end rot, radial fruit cracking, small fruit and lower yield, also insufficient leaf growth and sunburn of fruit directly exposed to strong sunlight.

Tomato roots will not grow in dry soil to find moist soil. Maintain optimum soil moisture from the center of the plant outward at least three to four feet to encourage maximum root development which will result in optimum plant health and highest possible fruit quality and yield. I observed that roots of a healthy tomato plant with full fruit load will have grown outward three to four feet from the base of the stem in all directions. This is an area around the plant of over 28 square feet for a 3-foot radius circle and over 50 square feet for a circle with a 4-foot radius. One inch of water over 28 square feet (a circle with radius of 3 feet) is about 16 gallons. One inch of water over 50 square feet (a circle with radius of 4 feet) is about 31 gallons. A half inch diameter hose delivers about 3 gallons/minute at 50 to 60 psi. Know the delivery rate of your irrigation system, and run your system long enough to get the desired gallons.

The soil area inhabited by tomato roots will require irrigation every 3 to 5 days depending the temperature and wind. Volume of water required will increase as the plant grows larger. I have found that by early to midsummer I irrigated every other day to every 3 days to maintain soil moisture near optimum. Continuous deep mulch over soil surface out at least 4 feet from stem will greatly increase water use efficiency.

VIII. INSPECT PLANT FOR INSECTS AND DISEASES

LOWER LEAF UNDERSIDE FOR MITES GROWING TIPS AND UPPER LEAVES FOR APHIDS LOWER LEAVES FOR EARLY BLIGHT LOWER LEAVES AND FRUIT CALYX FOR PINWORM

Mites seem to get started each spring on the lower surface of oldest tomato leaves nearest the ground. You may need a magnifying glass to see the two spotted spider mites.

Aphids go for young succulent growth in emerging young leaves in growing tips at top of plant. When aphids are confined to growing tips, one can often dislodge them with a fine, strong stream of water or insecticide aimed right at the little cluster of aphids.

Early blight gets started in oldest leaves, low on plant where it is dark and moist. Apply Decanal

2787 fungicide to both surfaces of all leaves if you see early blight spots (target like pattern) and manage irrigation to encourage complete drying of foliage before nightfall.

Pinworm adults (tiny nocturnal moths) love to lay eggs on lower surface of bottom leaves near center of plant. From there they spread upward on the plant acting much like leaf miners and rolling the leaf around them as they build their little cocoon in which to pupate. Pheromone traps combined with timely use of Bacillus thuringiensis will control pinworm in most gardens.

IX. HARVEST CAREFULLY AND TIMELY

**PICK FRUIT WHEN PINK AT BLOSSOM END
REMOVE CALYX TO PREVENT PUNCTURE
KEEP 75 TO 55 DEGREES F.**

Tomato fruit do not ripen on the plant any better than off the plant if picked when pink color is visible on the blossom end (side facing the ground) and held at room temperature in light or dark.. This is a truth and reality that is hard for many people to believe. Harvesting fruit when fruit are just beginning to turn pink at the blossom end will maximize both quality and yield by getting them out of harm's way. Wise tomato growers continue to harvest from the same plants all summer into fall and right up to first frost.

IX. MAINTAIN PLANT HEALTH

**PRUNE OUT OLD LEAVES, FRUITING TRUSSES, AND UNPRODUCTIVE STEMS
ROTATE EVERY YEAR (4 YEAR ROTATION BEST)
KEEP AREA AROUND PLANTS MULCHED**

By midseason, older leaves at base of caged plants become infected with Early Blight or infested with pinworm. These leaves are shaded by those above and no longer benefit fruit growth. Basically all nonproductive plant tissue (fruiting trusses, old yellowing or diseased leaves, spindly nonfruiting stems) can be removed from the older (lower) regions of the plant to let in more sunlight.

Long rotation (4 years) will prevent soil borne diseases and nematodes from becoming a problem. Do not plant an area to tomato or any other member of the nightshade family (includes potato, pepper, eggplant, tomato) or okra any more often than once every 4 years.

Mulch, mulch, mulch -- mulching can not be overemphasized for West Texas tomato health, both in commercial fresh market and home garden plantings. Mulching has been strongly emphasized in horticulture education for generations as an important technique for promoting plant health. Good sources of mulch include clean wheat straw, rye straw, alfalfa, vetch, crimson clover, sorghum, haygrazer and lawn clippings which have been allowed to heat to over 140 degrees F. for 24 to 48 hours in plastic bags.