In-Ground Greenhouse Tomato Production

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Acknowledgements

Special thanks goes to the following people and sources of information for making this manual possible.

- UT Extension's Commercial Tomato Production Publication #737
- 2022 Southeast U.S. Vegetable Crop Handbook
- Dr. Annette Wszelaki, UT Vegetable Specialist
- Dr. Allen Straw, Vegetable Specialist
- Cornell University Department of Plant Pathology Website
- Rutgers University, North Carolina Extension, A.F. Sherf, and R. Providenti, University of Maryland Extension, and Cornell pictures

Remember if there is a problem that you cannot ID or you need more assistance with; don't hesitate to contact your local Extension Office.

The Grainger County UT Extension can be reached at 865-828-3411.

Tomato Varieties for Tennessee

VARIETY	*COMMENTS AND CHARACTERISTICS*
Amelia	80 day, produces 10-12 oz globe fruit, R: F(1,2,3), V, M IR: Ssd, TSWV. Determinate.
Biltmore	80 day, produces 10-12 oz deep oblate fruit, R: Aal, F(1,2), V, Ss. Determinate.
BHN 589	74 day, produces 8-10 oz deep oblate fruit, R: F(1,2), ToMV, V Recommended for roadside, smooth fruit, good taste combined with firm texture. Good packout, flavor and appearance in a commercial variety. Determinate.
BHN 641	76 day, produces 12 oz oblate fruit, R: F(1,2), V. Yellow tomato rich flavor, meaty, firm, smooth, & round fruit. Determinate.
Carolina Gold	75 day, produces 8-10 oz deep oblate fruit, R: F(1,2), V, grey wall. Yellow tomato, good flavor. Determinate.
Celebrity	72 day, produces 7-8 oz. fruit that are deep and smooth. R: V, F(1,2), Aal, M, Ss, and TMV. Generally does well in local sales. Soft for excessive handling. Determinate.
Emperador	79 day. Plant produces high yields of large red tomatoes. R: V, F(1,2) Tomatoes are firm and flavorful. Excellent for salads and sandwiches. Suitable for both the roadside market and the shipping. Determinate.
Empire	72 day. Plant produces good yields of large 11 oz red tomatoes. R: V, F(1), Nematodes. This is a crack resistant tomato. Suitable for home gardens and market growers. Determinate. Fabulous flavor, recommended for roadside and gourmet sales
Fabulous (CelebritySurpreme)	77 day, produces 7-12 oz globe fruit, has IR: Aal, F(1,2),Ss, TMV, fabulous flavor, recommended for roadside and gourmet sales. Determinate.
Mountain Fresh Plus	77 day, produces 10-12 oz deep oblate fruit, R: F(1,2), M, V. Nematode tolerant. Determinate.

Disease abbreviations:
R – Resistance
IR – Intermediate resistance
Aal – Alternaria stem canker
M – Root knot caused by Meloidogyne
Ss – Gray leaf spot caused by Stemphylium solani
TSWV – Tomato Spotted Wilt Virus
TMV – Tobacco mosaic virus
ToMV – Tomato mosaic
F – Fusarium wilt (1,2,3) race
V – Verticilium wilt

Growing Methods

Seeding

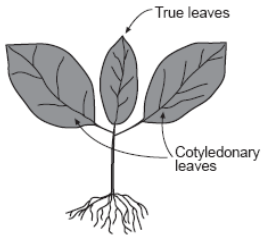
Tomatoes are usually seeded either by (1) vacuum seeding directly into growing containers or (2) hand seeding into trays and transplanting into the growing containers. Vacuum seeding eliminates the labor required for transplanting into growing containers, but some seeds fail to emerge and a certain percentage of seedling vigor is reduced.

Compensation for these problems will need to be made by seeding about 15 to 20 percent more containers than needed. Tomatoes are sometimes seeded in trays in a greenhouse or hot-bed. Seeds are sown in rows 2 inches apart with six to eight seeds per inch of row. They are then transplanted into containers when they are in the two-leaf stage. One ounce of seed contains 5,000 to 8,000 seeds. Allow seven to eight weeks from seeding to setting in the field. Plant the seed to a depth of 1/4 to 1/2 inches, cover them lightly, press the soil with a flat board, moisten and cover the tray with glass or paper. Germinate at a temperature of 75˚ to 80˚F. When the young seedlings can be seen, remove the glass or paper. For further information on plant production refer to Extension PB 819*, Vegetable Transplant Production*, available at the Extension office.

Controlling Seedling Diseases

The following steps may be taken to reduce seedling diseases:

- Purchase fungicide-treated seed to reduce infestation of seed-borne diseases.
- Use commercial growing media. It is better if the media is sterile.
- Seed trays (plastic), benches and other tools should be sterilized before use. Trays should be dipped into or sprayed with a 10% commercial bleach solution and thoroughly rinsed before use.
- Drench the media with a fungicide immediately after seeding.
- Avoid over-watering when growing in systems other than float trays. This creates highly humid conditions conducive to the growth of seedling diseases, particularly "damping-off."
- Maintain good air movement throughout the greenhouse or hotbed at all times. This is very important in controlling rapid plant growth, as well as keeping the growing media at a moisture level which does not encourage "damping off."
- Maintain temperatures in the 65˚ to 75˚F range during growth.



Transplanting from Seed Tray

When seedlings started in seed trays have reached the two true-leaf stage, they should be transplanted to the desired containers. The first two leaves to appear are cotyledonary leaves and will fall off after the seedling becomes established. They have smooth leaf margins. The true-leaves appear after the cotyledonary leaves and have serrated leaf

margins. Transplant when the true leaves have fully expanded, which occurs when plants are about 1.5 inches tall. When transplanting from the seed tray, gently loosen the seedlings by lifting them with a wooden label, broad knife or other similar tool. This avoids breaking of the roots and enables an earlier recovery. Move the seedlings by holding onto the leaves rather than the stems. Rough handling of the tender stems will result in bruise or breakage. Make a hole in the soil mixture with a wooden dowel or round peg about 3/4 inch in diameter and 3 to 4 inches long. Place the seedling 3/4 to 1 1/2 inches deep into the soil. Gently firm the soil with the fingers and place in partial shade for two or three days after transplanting.

Greenhouse built on slope, must keep plants level.

Watering

Overwatering of plants grown with conventional methods results in soft, spindly plants. Keep the media moist, but not saturated. Wait until the media begins to dry before adding water. Apply water during the morning so foliage will dry during the day. This helps prevent diseases. Use a fine nozzle sprinkler for watering. Do not apply enough pressure to the nozzle to splash soil on young seedlings or to knock them over. Water plants near aisles or walkways more heavily than plants in the center because they will dry more quickly than containers in the center aisles.

Growing Temperatures

Germinate tomatoes at 75˚- 80˚F, but reduce the temperature for growing to 65˚- 70˚F. This slows down the rate of growth and encourages the production of stocky, productive plants. This is a very important practice which results in good plants. It will require seven to eight weeks to grow the plants to field transplanting size under these conditions. Avoid allowing greenhouse temperatures to remain above 80˚F or greater during plant growth. Fruit set on the first clusters will be increased if the nighttime temperature is maintained between 55˚and 60˚F for two or three weeks after full expansion of the cotyledonary leaves.

Light

Stocky, strong plants will develop when grown in full light. Reduced light results in elongated plants that have weak stems. These plants do not respond well when transplanted to the field.

Hardening Plants

A week before setting, harden plants to withstand adverse weather by reducing the temperature 10 to 15 degrees, reduce water, increase ventilation, provide full sunlight and spread the plants. Hardened plants show a purplish color in the veins. If plants have a purple color between the veins, they have been overly hardened and will be stunted for a short time after setting. Hardening is of great importance for plants set in the cooler spring temperatures.

Prepare Ground

Spread fertilizer 12-24-24 at 50 lbs or 6-12-12 at 100 lbs. for a 96 x 32 house. Tile ground making ridge rows. Drive stalks in rows. Next, lay and test drip tape for dry areas. Transplant and lay plastic. The plastic acts as weed control. Plants are next grown similar to field production practices. The only exceptions are ventilation, pollination, and working on a smaller scale (96 x 32 greenhouse equals 0.1 acre).

Ventilation

For modern greenhouses, thermostatically controlled fans and shutters capable of changing the air once per minute, is needed in one end of the house. For air intake, an opening twice the size of the fan is needed in the other end of the greenhouse.
For wooden greenhouses, doors should be opened daily, especially when heating with gas. This may mean crack the doors an hour or open all day (8:30-4:30) depending on the weather. Overhead fans are recommended to circulate the air. Some form of wind break should be used to keep air off the plants. This usually is a strand of plastic, about knee high, stretched across the doorway. The wind break also helps keep unwanted animals (dogs) out of the greenhouse. In cold weather, wait until the temperature is above freezing, crack the door, and fix heater so as to not kick on. Remember to turn heater on and close door when temperature dips again.

Pollination

In the field, tomatoes are self-pollinated by the wind. In the greenhouse, the flowers must be lightly shaken to get effective pollination. Daily shaking is necessary, especially during damp and cloudy weather because the pollen does not release well. Some growers have developed a system of shaking the support wires daily or bumping the stalks. This may not be adequate for lower clusters. Many growers are purchasing hives of bumble bees for pollination. They do a good job of pollinating tomatoes, but the hives are short-lived and may have to be replaced once (or more) depending on the length of the season. Honey bees do not effectively pollinate tomatoes.

Fertility Recommendations

Always follow soil test recommendations. Some varieties may need more or less. This is just a suggestive plan.

Weeks after Transplanting	Preplant	0 to 3	4	5	6	7	8	9	10	11	12	13	14	15	16
Fertilizer Product	12-24-24		CN	PN	CN	PN	20	CN	PN	20	PN	20	PN	20	PN
Fertilizer Rate (lb/GH/week)*	50		5	5	5	5	5	5	5	5	5	5	5	5	5

Key: CN – Calcium Nitrate, PN - Potassium Nitrate, 20 – 20-20-20
lb/GH/week *rate in pounds of material needed for a 96 x 32 greenhouse each week

Pruning & Suckering

Everyone has their own way of pruning tomatoes. This is a topic that can cause heated discussion. With this in mind, the two branch method seems to work the best giving producers the most benefit.

Two branch system:
Leave this branch & sucker---------->

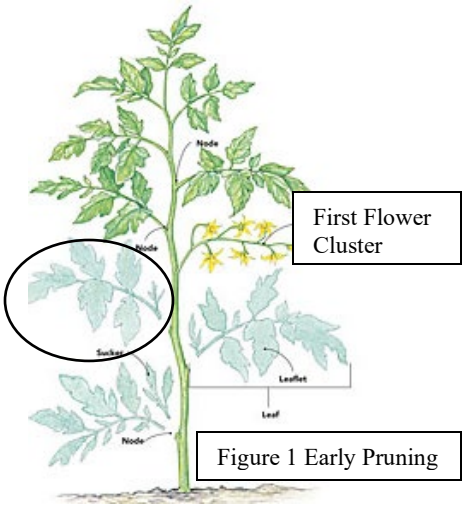


Figure 1 Early Pruning

Leave the branch and sucker just below the first flower cluster then remove all suckers and leaves below this branch. A second stem will arise from this sucker. This two branch system encourages early yield, good yield, and good fruit size. Figure 1 shows to remove all leaves under the first cluster but for more yield and protection from the plant topping itself leave the first branch and sucker for a two branch plant.

Figure 2 shows us two ways to sucker a plant: the Missouri Method and the Simple Method. The one recommended with best results is the Simple Method. In Simple Method, remove the entire sucker at the base.

Prune sucker at base---------->

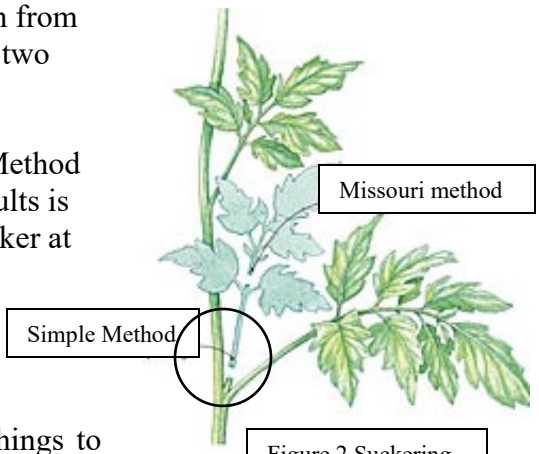


Figure 2 Suckering

Scouting

Disease and insect scouting is one of the most important things to do. It just takes a few moments to do, but it can save you much yield, dollars and headaches. The primary goals of monitoring are to locate and identify insect, mite and disease problems, and to observe changes in the severity of infestation. These are accomplished by random plant inspections throughout the production area and by the use of sticky traps and indicator plants.

Random plant inspections should be performed weekly or, preferably, twice weekly during the entire production season. Monitors should establish a pattern that will cover all areas of the greenhouse and follow the same pattern every time. Scouting must be intensive; the more plants monitored the better. Scouting should start from a major doorway. This is often the location where disease and pest problems begin. Special attention should be paid to plants around any openings in the greenhouse, especially those plants on the outside rows of benches. At least 8 minutes should be spent inspecting 10 or more plants per greenhouse. Individual plants should be chosen at random and inspection should include checking for insects, mites, or disease symptoms. Inspection is begun at the bottom of the plant and proceeds upwards, from older leaves to younger leaves to new growth. Special attention should be paid to buds and blooms. In addition to random plant monitoring, a daily inspection of indicator plants and sticky traps is ideal. The first diseased or pest-infested plant found on a bench becomes an indicator plant. This plant is marked with a stake or in some manner that allows the employee to check the same plant daily. Checking the same plant daily allows for an ongoing close examination of pest populations or symptoms as they spread to surrounding plants. The scout can also follow the development of a pest problem, noting the rate at which the life cycle is progressing. Tracking the development rate provides the manager with necessary information regarding the best time for pest control measures, if necessary. Indicator plants can also be used to check if treatments were effective.

Problem Identification

Photos taken from Cornell University, Rutgers University, North Carolina Extension, A.F. Sherf, R. Providenti, and by Anthony Carver.

Ethylene Injury (Chicken Heater Damage) – Increase air circulation and check heater for leaks

No Bud in Plant – Replace plant

Blooms Blow (Stress on the plant) - not enough or to much fertilizer, or leaking heater

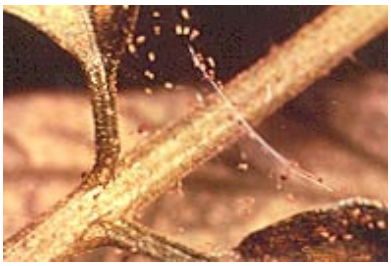
Tray Contamination (Bleach was not rinsed off) – Restart with new trays or dump and rinse old tray.

Drip Trouble (Sand in Well) – check your system, replace lines that are not dripping. Plants in a line will be a darker green color.

Blossom-End Rot (Calcium Deficiency) – Add Calcium Nitrate the 4th, 6th, and 9th week after planting.

Botrytis Gray Mold – Scala 5SC 1 Tablespoon & Fontelis 1-1.5 Tablespoon/1 gal treats 1360 sq ft

Magnesium Deficiency – Shows up on lower leaves first
Epson Salt at 4 lb/greenhouse every other week


Spider Mites –top of the plants will be the first to show signs
M-Pede 2TBSP/gal or mineral oil 1gal/100 gal or Floramite 0.5 tsp/gal


Aphids – M-pede 2 TBSP/gal or Admire Pro 0.6 fl oz/1000plants

Milestone and other Chemical Injury – Milestone stays in the ground for 3 years. Be careful where you spray herbicide and ask neighbors to be careful also.

underside of leaf

Leaf Mold - increase ventilation and prune to limit overgrowth

Septoria Leaf Spot - avoid wetting foliage, increase ventilation and avoid soil splashing

Gray Leaf Spot – early symptoms on left and late on right

Greenhouse Tomato Disease Control

Table taken from 2022 Southeast Vegetable Crop Handbook

Pest	Fungicide	Suggested Rate/Acre	PHI day	*Maximum Use/Acre/* Season	Remarks & Precautions
TOMATO, Transplant Production					
Early Blight, Gray Leaf Spot, Late Blight, Leaf Mold	Mancozeb 80WP	1.5-2 lb/43,560 sq ft		22.4 lb	Apply in 100 gal of water
Bacterial Spot and Speck Small, dark spots on foliage and fruit.	Streptomycin sulfate	1 lb/100 gal			For transplant production only – apply if symptoms appear and repeat at 4-5 day intervals until transplanting.
	AgriPhage	3-8 fl oz/9600 sq ft			Apply every day if symptoms present. Do not mix with copper products.
Botrytis – general	Decree 50 WDG	1.5 lb/43,560 sq ft		6 lb	Do not make more than 2 applications of Decree or Fontelis or 1 app of Veranda O before rotating with a different mode of action.
	Veranda O	6.2 oz/43,560 sq ft		5 app	
	Fontelis	1 -1.5 TBSP/gal/1360 sq ft		2.2 fl oz	
	Serenade	2-6 qt/43,560 sq ft			
Powdery Mildrew	Terraguard SC	2-4 fl oz/100 gallon		16 fl oz	For use in commercial greenhouse only. For use only as a foliar spray. Do not exceed four applications per crop.
Pythium root rot	Previcur Flex 6F	Stock solution 12.8 fl oz/100 gal		2 app	Before transplanting: apply stock solution to pre-wet cubes at 3.4 – 6.8 fl oz per cube. Refer to label for application to soil or soilless seed bed.
	Ranman Or Segway O	3 fl oz/100 gal		1 app	Drench the growing medium at time of planting or anytime thereafter up until 1 week before transplanting.

TOMATO, GREENHOUSE After Transplant	Fungicide	Suggested Rate/Acre	PHI day	*Maximum Use/Acre/* Season	Remarks & Precautions
Early & Late Blight, Gray Leaf Spot, Leaf Mold	mancozeb 80WP + Copper	1.5 - 2 lb/100 gal (see label)	5	22.4 lb	Tanos must be tank mixed with mancozeb.
	Tanos 50WG	6-8 oz/43,560 sqft	3	72 oz	
	Fontelis	.75 fl oz/gal	0	72 fl oz	
Botrytis Stem Canker	Botran 75WP	1 lb/100 gal	10	4 app	Botran is sprayed to stem of plant from ground level up to 18- 24 in
Bacterial Speck & Spot Early & Late Blight, Septoria Leaf Spot	ManKocide (Mancozeb +Copper)	3/4 lb/4 gal spray	5	26.7 lbs	Foliar sprays
	Kocide DF	2 - 4 Tbsp/1000 sq ft			
	Kocide 2000	1.5 - 2.25 Tbsp/1000 sq ft			
Gray Mold (Botrytis)	Switch 62.5WG	3.5oz/4 gal spray	0	56oz	Foliar sprays. Do not make more than 2 applications of Degree or Fontelis or 1 app of Veranda O before rotating to a different mode of action. Scala must be tank mixed with a different MOA fungicide. Ventilate for at least 2 hours after Scala application to avoid plant damage from vapor.
	Inspire Super	5 oz/4 gal spray	0	80 fl oz	
	Fontelis	1 -1.5 TBSP/gal/1360 sq ft	0	2.2 fl oz	
	Veranda O	6.2 oz/43560 sq ft	0	5 app	
	Scala 5SC	7 fl oz/100 gal	1	35 fl oz	
	Degree 50WDG	1.5 lb/43,560 sq ft	0	6 lb	
	Serenade	2–6 qt/43,560 sqft	0		
Sclerotinia Stem Rot (Timber Rot)	Inspire Super	16-20 oz/acre		80 fl oz	Alternate after 2 sprayings
	Contans WG	.75 – 1.5 oz/1000 sq ft			Apply to soil 3 months prior to planting. Till 2-8 in depth. Botran should give some control, also.
Powdery Mildew	Sulfur 90WP	5 lb/43,560 sq ft			Spray at 1st sign of mildew and repeat at 5- to 14-day intervals. Due to sulfur's high effectiveness extended spray intervals may be possible. Re-apply only if mildew resumes activity. Do not apply if temps will exceed 90F within 3 days after spraying. Must rotate after 2 sprays of prolivo or other group 50's.
	Prolivo 300SC	4-5 fl oz/acre		16 fl oz	
	Rally 40WP	2.5-4 oz/43,560 sq ft			
Pythuim Root Rot	Previcur Flex	12.8 fl oz/100 gal	5	4 app	Applied with drip system. See label directions.
	Terramaster4EC	6.5 fl oz/500 gal	3	4 app	

Greenhouse Tomato/Pepper Insect Control

Table taken from 2022 Southeast US Vegetable Crop Handbook

Insecticide	Rate	REI	PHI (days before picking)	Remarks
Aphids				
Beleaf 50 SG	0.1 oz/100sq ft	12hrs	0	May be applied to the soil as a drench or drip irrigation for preventive control, or as a spray for rescue treatments. Will also control whiteflies.
Altus 1.67 SL Foliar Soil	 7-14 fl oz per 50 gal 1.4- 1.9 fl oz per 50 gal	12hrs	1 tomato 3 pepper	Spray crop to wet, not to drip. Through, uniform coverage is required for good control. Use higher rates for whiteflies. Apply as a soil drench using micro-irrigation, drip irrigation, overhead irrigation, or hand-held motorized calibrated equipment. Use sufficient volume to wet potting medium without loss of liquid from the bottom of the container. Irrigate carefully during the next 10 days to avoid loss of product due to leaching.
Admire Pro 4.6	0.6 fl oz/1000 plants	12hrs	0	Apply in a minimum of 16 gallons water. Apply only to plants grown in field-type soils, potting media, or mixtures thereof. Do not apply to plants grown in non-soil medias such as perlite, vermiculite, rock wool, or other soil-less media, or plants growing hydroponically. Do not apply to peppers. Do not exceed one application per crop. Also controls whiteflies
Malathion Various 10A 57 EC 25 WP	 1 lb/50,000 cu ft 1qt/100 gal water 4 lb/100 gal water	12hrs	15 hrs 1 1	
insecticidal soap (M-Pede)49 EC	2 tbsp/gal water	12hrs	0	May be used alone or in combination. Acts as an exciter
Mycotrol WP	0.25 lb/20 gal water		0	Apply when whiteflies are observed. Repeat in 4-to 5-day intervals
Armyworm, Fruitworm, Cabbage looper,Pinworm				
Bt Javein WG Agree WP Dipel DF Xentan DF	 0.5 lb to 1.25 lb/100 gal 1 to 2 lb 0.5 to 1.25 lb 0.5 to 1.5 lb	4 hrs	0	
Pylon 2SC	6.5 to 13 fl oz/100 gal water, or per acre area	12hrs	0	Do not make more than two applications at 5- to 10-day intervals before rotating to an insecticide with a different mode of action
Exirel SE	7 to 13.5 fl oz per acre, or per 100 gal	12hrs	1	
Entrust SC	3 fl oz/100 gal	4 hrs	1	Do not make more than two consecutive applications. Do not apply to seedling tomatoes or peppers grown for transplants.

Insecticide	Rate	REI	PHI (days before picking)	Remarks
Leafminer				
Exirel SE	3.5 to 20.5 fl oz/acre or per 100 gal	12hrs	1	
Pylon 2SC	9.8 to 13 fl oz/100 gal or per acre	12hrs	0	Do not make more than two applications at 5- to 10-day intervals before rotating to a different mode of action.
Entrust SC	10 fl oz/100 gal	4 hrs	1	Do not apply to seedlings grown for transplants
Slug				
metaldehyde (various) bait	Follow label directions	12hrs		Apply to soil surface around plants. Do not contaminate fruit.
Iron phosphate(Sluggo)	½ teaspoon per 9-inch pot		0	
Spider mites, Broad mites, Rust mites				
Kanemite 15 SC Shuttle O 1.25SC	31 fl oz per 43,560 sq ft or per 100 gal water	12hrs	1	
Floramite SC	4 to 8 fl oz/100 gal water (1/4 to 1/2 tsp/gal)	12hrs	3	For use on tomatoes more than 1 inch in diameter at maturity. Not registered on pepper. Not for Rust mite
TriTek	1 to 2 gal/100 gal		0	Begin applications when mite populations are low, and repeat at weekly intervals
Pylon 2SC	9.8 to 13 fl oz/100 gal or per acre area		0	Do not make more than two applications at 5- to 10-day intervals before rotating to an insecticide with a different mode of action.
Sultan 1.67SC	13.7 fl oz/100 ga	12hrs	1	Do not make more than 2 applications
Akan 5 SC	1 to 2 pts per 100 gal	12hrs	1	
M-Pede 49 EC	2 tbsp/gal water	12hrs	0	
Thrips, including western flower				
Mycotrol WP	0.25 lb/20 gal water		0	Use screens on intake vents. Apply when whiteflies observed. Repeat in 4- to 5-day intervals
Exirel SE	13.5 to 20.5 fl oz per acre or per 100 gal	12hrs	1	For foliage-feeding thrips only, not those in flowers.
Beleaf 50 SG	0.1 oz per 1000 sq ft	12hrs	1	For use on tomato only.
Entrust SC	5.5 fl oz/100 gal	4 hrs	1	Do not make more than two consecutive applications, and do not apply more than 6 times in a 12-month period against thrips. Do not apply to seedlings grown from transplants
Neem Oil	See label			

Insecticide	Rate	REI	PHI (days before picking)	Remarks
Whitefly				
Admire Pro 4.6	0.6 fl oz/1000 plants	12hrs	0	Apply in a minimum of 16 gallons water. Apply only to plants grown in field-type soils, potting media, or mixtures thereof. Do not apply to plants grown in non-soil medias such as perlite, vermiculite, rock wool, or other soil-less media, or plants growing hydroponically. Do not apply to peppers. Do not exceed one application per crop. Also controls aphids.
Tristar 8.5 SL	1.25 fl oz/1000 plants	12hrs	1	Apply only to plants growing in rock wool, perlite, or other soilless growing media. Do not apply to crops that have already been treated with imidacloprid, dinotefuran, or another neonicotinoid
Beleaf 50 SG	0.1 oz per 1000 sq ft	12hrs	0	For use on tomato only.
Altus 1.67 SL	See Aphids			
M-Pede 49 EC	2 tbsp/gal water	12hrs	0	
Pyganic 5 EC	0.25-0.5 fl oz per gal	12hrs	0	May be used alone or tank mixed with a companion insecticide. (See label for details).
Mycotrol WP	0.25 lb/20 gal water	4 hrs	0	Apply when whiteflies are observed. Repeat in 4- to 5-day intervals. OMRI listed
Talus 40SC	9 to 13.6 oz/100 gal water or pre acre area	12hrs	1	Insect growth regulator that affects immature stages of whiteflies. Will not kill adults. For use on tomatoes only
Distance .86 EC	6 fl oz/100 gal water	12hrs	Less than 1	Do not use on tomatoes less than 1 inch in diameter. Insect growth regulator that affects immature stages of whiteflies. Will not kill adults. Do not use on tomatoes more than 1 inch in diameter. Do not apply on non-bell peppers