Varieties[1]	AL	GA	KY	LA	MS	NC	SC	TN
TOMATOES								
Fresh Market								
Amelia VR [2,10,11,12,18]		G	K	L	M	N	S	
Bella Rosa [2,3,8,10,11,15,18]	A			L	M			
BHN 216 [3, 10,11,18]				L				
BHN 543 [10,11,14,18]								T
BHN 602 [2,10,11,12,18]	A	G	K	L	M	N	S	T
BHN 640 [2,10,11,12,18]	A	G	K		M	N	S	T
BHN 669 [4]				L	M			
Big Beef [8,10,11,14,15,18]			K	L	M			
Bradley								T
Carolina Gold [10,11,17,18]	A	G	K		M	N	S	T
Celebrity								T
Crista [2,10,11,12,14,18]	A	G	K	L	M	N	S	T
Finish Line [2,10,11,12,15,18]	A			L				
Fletcher [2,14]	A					N		T
Floralina [8,10,11,12,15,18]	A		K	L		N	S	T
Florida 47R [8,10,11,15,18]	A	G	K	L	M	N	S	T
Florida 91 [3,8,10,11,15,18]				L	M			T
Mountain Crest [10,11,18]	A	G	K	L		N	S	T
Mountain Fresh [10,11,18,19]	A	G	K	L	M	N	S	T
Mountain Fresh Plus [10,11,14,18,19]	A		K	L		N	S	T
Mountain Glory [2,10,11,12,18]	A		K			N		T
Mountain Magic [10,11,18,19, 24]	A	G	L		M	N	S	T
Mountain Spring [10,11,15,18]	A	G	K	L	M	N	S	T
Phoenix [3,8,10,11,15,18]	A	G		L		N		T
Quincy [2,8,10,11,15,18]	A	G		L	M			
Red Defender [2,8,10,11,15,18]	A	G	K	L				T
Redline [3,10,11,12,18]	A	G		L				
Rutgers								T
Solar Fire [3,10,11,12,15,18]								T
Solar Set (Fall only) [3,8,10,11,18]			K	L	M	N	S	
Sun Leaper [3,10,11,15,18]	A	G		L		N	S	
Talladega [2,10,11,15]		G		L				
Tygress [10,11,15,18,21]				L				
Cherry Types								
Cherry Grande [8,10,11,15,18]	A	G	K	L	M	N	S	T
Marcelino [6]						N		
Mountain Belle [10,18]	A	G	K	L	M	N	S	
Sun Gold [17]	A				M	N		
Grape Types								
Brixmore [14,18,20]	A					N	S	
Cupid [8,9,10,15]	A	G						T
Elfin [7]		G				N	S	
Jolly Elf [11,18]	A	G			M	N	S	T
Navidad [11]	A	G	K		M	N	S	

[1] Abbreviations for state where recommended.
[2] Tomato Spotted Wilt Virus resistant (TSWV).
[3] Heat set (heat tolerant).
[4] Southern Bacterial Wilt resistant.
[5] Local markets only.
[6] Super sweet medium sized cherry, superior quality.
[7] Determinant grape tomato.
[8] *Alternaria* Stem Canker tolerance/resistance (ASC).
[9] Bacterial Speck tolerance/resistance (BSK-0).
[10,11,12] *Fusarium* Wilt race 1, 2 or 3 tolerance/resistance (F).
[13] *Fusarium* Crown Root Rot tolerance/resistance (FCRR).
[14] Nematode resistance (N).
[15] Gray Leaf Spot resistance (St).
[16] Tobacco Mosaic Virus resistance (TMV).
[17] Yellow fruit.
[18] *Verticillium* Wilt resistance (V).
[19] Early Blight tolerance.
[20] Tomato Mosaic Virus resistance (ToMV).
[21] Tomato Yellow Leaf Curl Virus resistance (TYLCV).
[22] Orange fruit.
[23] Salad size (Campari type).
[24] Late blight tolerance/resistance.

Varieties[1]	AL	GA	KY	LA	MS	NC	SC	TN
TOMATOES (con't)								
Grape Types (con't)								
Rosa	A					N		
Santa Claus	A	G				N	S	
St. Nick	A	G			M	N		
Smarty [10,18]	A					N	S	T
Snappy [7]	A					N		
Roma Types								
BHN 410 [9,10,11,18]	A	G				N	S	T
BHN 685 [2,10,11,12,18]	A	G		L	M	N	S	T
BSS 436						N		
Golden Sunshine [22]								T
Mariana [8,10,11,14,15,18]						N		T
Muriel [2,8,10,11,14,15,18]	A	G	K					T
Picus [2,8,10,15,18]	A						S	
Plum Crimson [10,11,12,18,19]	A	G	K			N		T
Plum Regal [2,10,11,18,19,24]	A		K	L	N		S	T
Pony Express [9,10,11,12,14,16,20]			K					T
Spectrum 882 [8,9,10,11,14,15,18]		G	K			N		
Sunoma [9,10,11,14,15,18,20]								T

[1] Abbreviations for state where recommended.
[2] Tomato Spotted Wilt Virus resistant (TSWV).
[3] Heat set (heat tolerant).
[4] Southern Bacterial Wilt resistant.
[5] Local markets only.
[6] Super sweet medium sized cherry, superior quality.
[7] Determinant grape tomato.
[8] *Alternaria* Stem Canker tolerance/resistance (ASC).
[9] Bacterial Speck tolerance/resistance (BSK-0).
[10,11,12] *Fusarium* Wilt race 1, 2 or 3 tolerance/resistance (F).
[13] *Fusarium* Crown Root Rot tolerance/resistance (FCRR).
[14] Nematode resistance (N).
[15] Gray Leaf Spot resistance (St).
[16] Tobacco Mosaic Virus resistance (TMV).
[17] Yellow fruit.
[18] *Verticillium* Wilt resistance (V).
[19] Early Blight tolerance.
[20] Tomato Mosaic Virus resistance (ToMV).
[21] Tomato Yellow Leaf Curl Virus resistance (TYLCV).
[22] Orange fruit.
[23] Salad size (Campari type).
[24] Late blight tolerance/resistance.

Seed Treatment. To minimize the occurrence of bacterial canker, bacterial spot, and bacterial speck, seed should be treated with chlorine. If seed is not treated with chlorine by the seed company, then dip seed in a solution containing 1 quart of household bleach and 4 quarts of water plus one-half teaspoon of surfactant for 1 minute. Provide constant agitation. Use 1 gallon of solution per pound of seed. Prepare a fresh solution for each batch of seed. Wash seed in running water for 5 minutes and dry seed thoroughly. The final rinse should be done with acidified water (1 oz. vinegar per gallon of water). Dust with 1 teaspoon of Thiram per pound of seed.

TOMATO PLANTING DATES

	Spring	Fall
AL North	4/15–6/15	NR
AL South	3/1–4/30	7/15–8/30
GA North	4/15–6/15	NR
GA South	3/1–4/30	7/15–8/30
KY East	5/15-6/1	NR
KY Central	5/5-6/15	NR
KY West	4/20-7/1	NR
LA North	3/15–6/30	7/1–8/10
LA South	3/1–6/30	7/15–8/15

TOMATO PLANTING DATES (con't)

	Spring	Fall
MS North	4/20–6/30	NR
MS South	3/1–3/15	NR
NC East	4/15–5/10	8/1–8/15
NC West	5/15–7/15	NR
SC Coastal Island	3/1-4/30	7/1-7/15
SC East	3/15–4/30	7/1–7/15
SC West	5/1–6/30	NR
TN East	5/1-6/30	NR
TN West	4/20-6/20	NR

Hardening Transplants. It is usually desirable to harden tender tomato seedlings before planting them in the field. Recent research has shown that hardening tomato plants by exposure to cool temperatures (60° to 65°F/day and 50°to 60°F/night) for a week or more causes catfacing. Harden plants by withholding water. Allow plants to wilt slightly between light waterings. Do not harden transplants by withholding fertilizer.

Drip Fertilization. Before mulching, adjust soil pH to 6.5 and, in the absence of a soil test, apply enough fertilizer to supply 50 pounds per acre of N, P_2O_5 and K_2O, (some soils will require

100 pounds per acre of K_2O) then thoroughly incorporate into the soil.

After mulching and installing the drip irrigation system, the soluble fertilizer program should be initiated according to that described in the following table. On soils testing low to low-medium boron, also include 0.5 pound per acre of actual boron.

The first soluble fertilizer application should be applied through the drip irrigation system within a week after field-transplanting the tomatoes. Continue fertigating until the last harvest.

Suggested Fertigation Schedule for Tomato (low soil potassium)

Days after planting	Daily nitrogen	Daily potash	Cumulative nitrogen	Cumulative potash
	(lb / A)			
Preplant			50.0	125.0
0–14	0.5	0.5	57.0	132.0
15–28	0.7	1.4	66.8	151.6
29–42	1.0	2.0	80.8	179.6
43–56	1.5	3.0	101.8	221.5
57–77	2.2	4.4	148.0	313.9
78–98	2.5	5.0	200.5	418.9

Suggested Fertigation Schedule for Tomato (high soil potassium)

Days after planting	Daily nitrogen	Daily potash	Cumulative nitrogen	Cumulative potash
	(lb / A)			
Preplant			50.0	125.0
0–14	0.5	0.5	57.0	132.0
15–28	0.7	0.7	66.8	141.8
29–42	1.0	1.0	80.8	155.8
43–56	1.5	1.5	101.8	176.5
57–77	2.2	2.2	148.0	223.0
78–98	2.5	2.5	200.5	275.5

* Adjust based on tissue analysis

Fresh Market. Yield, fruit size, and fruit quality of fresh market tomatoes are increased by the use of black plastic mulch in combination with drip irrigation. When air temperature exceed 85F use white on black plastic mulch, or paint black plastic with a 5:1 (v/v) mixture of exterior, flat white latex paint and water. Form-raised, dome-shaped beds to aid in disease control. Lay black plastic mulch tightly over the beds.

See the "Drip Irrigation" section of General Production Recommendations for detailed recommendations on fertilizing tomatoes grown with plastic mulch and drip irrigation. Lay black plastic mulch tightly over the beds.

Ground Culture. Space *determinate* varieties in rows 4 to 5 feet apart with plants 15 to 24 inches apart in the row. For *indeterminate* varieties, space rows 5 to 6 feet apart with plants 24 to 36 inches apart in the row.

Stake Culture. Staking tomatoes is a highly specialized production system. The following recommendations are for the short-stake cultural system using determinate cultivars that grow 3 to 4 feet in height or for indeterminate varieties that grow 6 to 7 feet in height. Use between row spacings of 5 to 6 feet with in-row spacings of 18 to 24 inches. See state specific guides for a full description of staking.

Pruning: Pruning is practiced to establish a desired balance between vine growth and fruit growth. Little to no pruning results in a plant with a heavy load of smaller fruit. Moderate pruning results in fewer fruits that are larger and easier to harvest. Pruning can result in earlier maturity of the crown fruit and improves spray coverage and pest control.

Removing all suckers up to the one immediately below the first flower cluster is adequate for most determinate cultivars. Removing the sucker immediately below the first flower cluster or pruning above the first flower cluster can result in severe leaf curling and stunting of the plant and should be avoided.

Prune when the suckers are no more than 2 to 4 inches long. A second pruning may be required to remove suckers that are too small to be easily removed during the first pruning and to remove ground suckers that may develop. Pruning when suckers are too large requires more time and can damage the plants, delay maturity, and increase disease incidence. Do not prune plants when they are wet to avoid spread of diseases. Pruning should be done before the first stringing because the string can slow the pruning process. Pruning is variety-and fertility-dependent.

Less-vigorous determinate cultivars generally require less pruning. Growers should experiment with several degrees of pruning on a small scale to determine pruning requirements for specific cultivars and cultural practices.

Staking. Staking improves fruit quality by keeping plants and fruit off the ground and providing better spray coverage. Staked tomatoes are easier to harvest than ground tomatoes.

Staking tomatoes consists of a series of wooden stakes with twine woven around the stakes to train the plants to grow vertically off the ground. Stakes 4 to 4.5-feet long by 1-inch square are driven about 12 inches into the soil between the plants.

Vigorous cultivars may require larger and longer stakes. A stake placed between every other plant is adequate to support most determinate varieties. Placing an additional stake at an angle and tied to the end stake of each section will strengthen the trellis system. Stakes can be driven by hand with a homemade driving tool or with a commercially available, power-driven stake driving tool. Drive stakes to a consistent depth so that spray booms can be operated in the field without damaging the trellis system.

Select "tomato twine" that is resistant to weathering and stretching and that binds well to the wooden stakes. Tomato twine is available in 3- to 4-pound boxes. Approximately 30 pounds of twine is required per acre. To make tying convenient, use a homemade stringing tool. This tool can be made from a length of metal conduit, schedule 40PVC pipe, broom handle, or wooden dowel. With conduit, the string is fed through the pipe. With a broom handle or wooden dowel, two small parallel holes, each about 1 inch from the end, must be drilled to feed the string through one hole along the length of the tool and through the

other hole. The tool serves as an extension of the worker's arm (the length cut to the worker's preference) and helps to keep the string tight.

Proper stringing consists of tying the twine to an end stake passing the string along one side of the plants, and then looping the twine around each stake until the end of a row or section (100-foot sections with alleys may be helpful for harvesting) is reached. The same process is continued on the other side of the row. The string tension must be tight enough to hold the plants upright. **Note:** If strings are too tight, they can make harvesting fruit difficult and can scar fruit.

The first stringing should be strung 8 to 10 inches above the ground when plants are 12 to 15 inches tall and before they fall over. Run the next string 6 to 8 inches above the preceding string before plants start to fall over. Three to four stringings are required for most determinate varieties. Stringing should be done when the foliage is dry to prevent the spread of diseases.

Heirloom Tomatoes. Heirloom tomatoes are varieties that have been available for 50 years or more, are open pollinated, and grow "true to type" from seed saved from fruit each year. They are generally indeterminate, requiring trellising and constant pruning. Most varieties have little disease resistance. The fruit are usually thin-skinned, soft, and tend to crack. Consumers are attracted to heirloom tomatoes because many varieties are very flavorful, colorful, come in many sizes and shapes, and have interesting names. For the growers, heirloom tomatoes are challenging to produce and difficult to ship, but can bring high prices on the local market.

There are hundreds of varieties of heirloom tomatoes available. Some of the most popular include Brandywine, German Johnson, Mr. Stripey, Cherokee Purple, and Green Zebra.

Because most heirloom tomatoes are indeterminate, they must be grown on a tall, strong trellis. A trellis can be constructed of 3 inch diameter, or larger, posts set 10-15 feet apart within the row. Use 7-8 ft. long posts, leaving 6-7 ft. above ground. Run a stout wire (12 gauge) across the tops of the posts and secure it with staples. Pieces of twine, long enough to reach the ground, should be tied to the top wire above each plant. The twine can be anchored with a loop to each plant or to a bottom line of twine that is strung about 6 in. off the ground and secured to the posts. Some growers use the standard string and weave-staked culture system for heirloom tomatoes, as described for the determinate tomatoes, but they use 6-ft. long stakes instead of the normal 4-ft. long stakes.

In a trellis system, plants are usually spaced 8-10 in. apart within the row and pruned to a single stem system. A two stem system may also be used, in which the plants should be spaced 18-30 in. apart within the row. If using a standard staking system, plants should be spaced 18-24 in. apart. Once the plants are established, suckers must be removed several times a week. If the main growing point is broken off, a sucker can be trained to take its place.

Because most heirloom tomatoes have little disease resistance, it is important to maintain a good fungicide spray schedule. For organic production, it might be necessary to grow heirloom tomatoes under high tunnels, especially in areas with high disease pressure.

TOMATO DISORDERS

Your state Extension service has bulletins that describes fruit disorders in detail. Here are several common disorders of tomato and their causes: **catfacing** (cool day and/or night temperatures or very hot dry days), **internal browning, graywall and blotchy ripening**, (tobacco mosaic virus, overcast cloudy environment, high N, low K or soil compaction), **yellow shoulder** (direct sun exposure, worse on green shouldered varieties), **sunburn and sunscald** (direct rapid exposure to the sun), **weathercheck** (fruit exposed to dew), **blossom end rot** (low soil calcium and/or soil moisture), **cracking** (variety, irregular water, growth, and/or nutrition).

SPECIAL NOTES ON PEST MANAGEMENT

INSECT MANAGEMENT

Colorado Potato Beetle (CPB), FleaBeetles (FB): While flea beetles are a common pest of tomato throughout the southeastern US, Colorado potato beetle are most common in areas where significant acreage of potatoes is also grown. Flea beetles are primarily a problem early in the season shortly after planting, and are usually controlled by insecticides applied for other insects. Adults feed on foliage, resulting in small round holes on leaves. In most situations this damage does not affect early season growth or subsequent yields, but control may be necessary when populations are high (20-30% defoliation).

Colorado potato beetle adults and larvae feed on tomato foliage and can cause extensive defoliation if not controlled. CPB feed only on solanaceous plants, and populations tend to be concentrated in areas where potato, eggplant and tomato have previously been grown. Consequently, rotation to non-solanaceous crops is very effective in helping to avoid infestations. Thoroughly scout fields and spray only when necessary. Treatment should be made if populations exceed 15 adults per 10 plants or a combination of 20 CPB larvae and/or adults per 10 plants. Insecticide sprays should be made after most egg masses have hatched, but before larvae become large. CPB have developed resistance to many different insecticides, so knowledge of the resistance status of populations is essential in choosing which insecticides to use.

Tomato Fruitworm: The tomato fruitworm, also known as the corn earworm and cotton bollworm, is potentially the most damaging pest of tomato. However, there are many insecticides that provide excellent control. The key to controlling this insect is to ensure that there is a toxic pesticide residue on the plant during egg laying periods so that larvae are killed shortly after hatching, because larvae feed on leaf tissue for only a short time before boring into fruit. Tomato fruitworm moth activity can be monitored with pheromone traps and serves as a measure of the adult population within an area. Corn that is in the silking stage is a preferred host of fruitworm, but when corn silks begins to dry, moths will switch egg laying to other hosts, including tomato.

Armyworms: At least three species of armyworms are potential pests of tomato, including the beet armyworm, southern army-

worm and yellowstriped armyworm. Infestations are usually sporadic in the more northern regions of the southeastern US, but are an annual problem in more southern areas. In contrast to tomato fruitworm, armyworms will also feed extensively on foliage as well as fruit, and the presence of feeding damage on leaves can help differentiate between fruitworm and armyworm damage. Beet armyworm is notorious for exhibiting resistance to a wide range of insecticides, but the recent registration of newer insecticides has greatly aided the management of this pest.

Tomato Pinworm: The tomato pinworm is more common in the southern compared with northern regions of the southeast, but late-season infestations are common in northern areas. Moths lay eggs on foliage, and larvae feed within leaves, creating blotchy mines. As larvae increase in age they bore into stems and/or fruit. The use of pheromone-based mating disruption is an effective control method. Initiate mating disruption at the first sign of mines on foliage. Numerous insecticides also control pinworm.

Stink Bugs: The green and brown stink bug can be important direct pests of tomato, but they are sporadic in occurrence. Stink bugs are most common in smaller fields (i.e., 5 acres or less) that are surrounded by weedy borders, or fields that are adjacent to soybeans. In fact, chemical control of stink bugs is often not necessary in fields that do not fit the previous description. Unfortunately, there is not a good sampling method to assess population densities before damage occurs, and preventive strategies are used. Depending on the surrounding habitat and abundance of stink bugs within an area, one to three applications of an insecticide are necessary to prevent damage.

Thrips: Thrips can cause direct damage to tomato fruit by their feeding or oviposition scars on small fruits, and are also indirect pests of tomato due to their ability to transmit tomato spotted wilt virus (TSWV). The tobacco thrips and western flower thrips are vectors of tomato spotted wilt virus. The majority of virus infections are the result of primary spread (thrips transmitting the virus from surrounding weeds directly to tomatoes or greenhouse infections), and insecticides do not kill thrips quickly enough to prevent inoculation. However, an aggressive early insecticide control program early in the season (3 to 4 weeks after transplanting) and the use of reflective mulches have helped to reduce the incidence of TSWV in tomatoes. Thrips can also cause direct damage to tomato fruit. This is the result of thrips feeding and/or laying eggs in small fruits before stamens are shed from flowers. This damage appears as small dimples in fruit. Sample thrips in tomato flowers by placing a white index card below flowers and tapping the flowers with a finger. An average of 1 thrips per flower has worked well as a treatment threshold level.

Whiteflies: The greenhouse whitefly and silverleaf whitefly can both infest tomatoes in the southeast. Generally, the silverleaf whitefly is more common in the southern region and the greenhouse whitefly is more common in the northern region of the southeast. Once whitefly populations of either species become established on a crop, they are very difficult to control. Hence, preventive control is usually necessary for effective, season-long management. Preventive control can be achieved with soil-applied systemic insecticides applied to the soil or at planting, or the application of other insecticides when populations are low.

Mites: Mites have become an increasingly important problem on tomatoes and other vegetables grown in the southeast. Twospotted spider mite is the most common mite pest, but the broad mite and carmine spider mite can also infest tomatoes. Mites overwinter on weeds and move into tomatoes in the spring as weeds die. Mites can also move from other crops (including other tomato fields) into tomatoes throughout the season. Localized infestations can be spot treated, but thorough coverage of foliage is important. Mites can be sampled by using a sample of 10 leaflets (terminal leaflet on a leaf from the upper one-third of the plant), from a minimum of 5 sample sites per field. When mites reach an average of 2 mites/leaflet, a miticide should be applied. Note that certain pesticides, such as pyrethroids and some neonictinoids, aggravate mite populations and can lead to high mite densities.

DISEASE MANAGEMENT

Damping-Off: *Plantbed:* Use seed treatment and plant in a disease-free mix.

VIRUSES

Aphid-transmitted Viruses (TMV, PVX, CMV, TEV, PVY): Use tolerant or resistant varieties to control these viruses when available and provided that the fruit quality is consistent with market demands. Use these varieties in areas where these viruses have been prevalent or when high aphid pressure is expected. Generally, these viruses cannot be adequately controlled with insecticide applications, but symptom expression can be delayed through their use combined with the use of reflective mulches.. Because aphids transmit these virus, growers may wish to use yellow trap pans containing water to determine when mass flights of winged aphids occur.

Thrips-transmitted virus (Tomato Spotted Wilt Virus, TSWV): Use tolerant or resistant varieties. TSWV can be severe on tomatoes during both greenhouse production of transplants and during field production of the crop. The virus is spread to tomatoes by thrips. During transplant production, thrips transmit the virus from infected ornamental plants (flowers). Be sure not to grow any ornamental bedding plants in the same greenhouse as tomato transplants. Monitor greenhouses and scout fields for thrips. Begin an insecticide program BEFORE a problem is observed.

Nematode Management. Use nematicides listed in the "Nematodes" section of Soil Pests–Their Detection and Control.

HARVESTING AND STORAGE

See Table 14 for postharvest information.