

Chapter 18. Tomato Production

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Botany and Planting

Tomato - *Solanum lycopersicum*, Solanaceae

Table 18.1. Planting information for tomato.

Planting dates	
North Florida	July-Aug ; Feb-Apr
West-central Florida	Aug-Sept; Jan-Feb
South Florida	Aug-Feb
Planting information	
Distance between rows (in.)	48-72
Distance between plants (in.)	18-32
Days to maturity	70-90
Plant population per acre	3630-4356

Cultivars

For more information on tomato varieties use the link below.

<https://edis.ifas.ufl.edu/hs1189>

1. LARGE FRUITED AND BEEFSTAKE TYPES

Amelia. Vigorous determinate, main season, jointed hybrid. Fruit are firm and aromatic suitable for green or vine ripe. Good crack resistance.

Bella Rosa. Midseason maturity. Fruit are large to extra-large, deep globed shaped with firm, uniform green fruits well suited for mature green or vine-ripe production. Determinate, medium to tall vine.

BHN 602. Early-midseason maturity. Fruit are globe shape but larger than BHN 640, and green shouldered.

BHN 730. Strong plant with good cover, uniform firm fruit with good size through the top of the plant.

BHN 975. Midseason maturity. "Hot set" variety. Strong bush with large, smooth fruit.

BHN 1006. Determinate round variety for spring production in South Florida.

Camaro. Medium plant with limited to no pruning. Extra large globe shaped fruit.

Charger. Vigorous plant with good vine cover. Large, smooth, deep oblate fruit with excellent firmness and color.

Crista. Midseason maturity. Large, deep globe fruit with tall robust plants. It does best with moderate pruning and high fertility. Good flavor, color and shelf-life.

Everglade. Full season maturity with deep oblate fruit. Performs well in cool weather conditions.

Florida 47. A late midseason, determinate, jointed hybrid. Uniform green, globe-shaped fruit.

Florida 91. Midseason variety. Uniform green fruit borne on jointed pedicels. Determinate plant. Good fruit setting ability under high temperatures.

Grand Marshall. Mid-season vigorous plant with hot set and extra large to large oblate fruit.

HM 1823. Determinant round tomato, early maturing variety with a strong plant and large to extra-large round fruit.

Phoenix. Early mid-season. Fruit are large to extra-large, high quality, firm, globe-shaped and are uniformly-colored. "Hot-set" variety. Determinate, vigorous vine with good leaf cover for fruit protection.

Raceway (STM9203). Main season. Mid vigorous with good vine cover, suited for light pruning. Mostly extra-large, smooth, deep oblate fruit with good firmness and color. Mature green and vine ripe.

Red Bounty. Medium maturity, good heat set, extra large globe fruit.

Red Defender. Medium maturity. Vigorous vine with smooth, large deep red fruit with excellent firmness and shelf life.

Red Morning. Early variety with medium plant. Large to extra large round fruit.

Resolute. Mid-season variety with strong plant and extra large to large fruit.

Red Rave (RFT 6153). Main season. Fruit have good eating quality and fancy appearance in a large sturdy shipping tomato and are firm enough for vine-ripe. Large determinate plants.

Sanibel. Main season. Large, firm, smooth fruit with light green shoulder and a tight blossom end. Large determinate bush.

Sebring. A main season, determinate, jointed hybrid with smooth, deep oblate, firm, thick walled fruit.

Skyway. Mainseason variety with a strong plant. Extra large globe shaped fruit.

Solar Fire. An early, determinate, jointed hybrid. "Hot set" variety. Fruit are large, flat-round, smooth, firm, light green shoulder and blossom scars are smooth.

Soraya. Full season. Fruit are high quality, smooth and tend toward large to extra-large. Continuous set. Strong, large bush.

Southern Ripe. Full season maturity with a medium plant. Deep oblate fruit that are adapted to cooler conditions.

SV 7631. Mid season variety with medium to strong plant with extra large to large oblate fruit.

Tasti-Lee. It was released for the premium tomato market. A midseason, determinate, jointed hybrid with moderate heat-tolerance. Fruit are uniform green with a high lycopene content and deep red interior color due to the crimson gene.

Volante. Mid-season "Hot set" variety with determinate, medium to tall vine. Fruit are extra-large and large, deep globed shaped with very firm, uniform green fruits well suited for mature green or vine-ripe production.

2. PLUM AND ROMA TYPES

BHN 685. Midseason. Large to extra-large, deep blocky, globe shaped fruit. Determinate, vigorous bush with no pruning recommended.

Daytona. Midseason compact plant. Blocky elongated large to extra large fruit.

Marianna. Midseason. Fruit are predominately extra-large and extremely uniform in shape. Fruit wall is thick and external and internal color is very good with excellent firmness and shelf life. Determinate, small to medium sized plant with good fruit set.

Picus. Main season, determinate Roma tomato that is widely adapted. Fruits are large, uniform and blocky, maturing to a deep-red color with great firmness at the red stage. Medium to large, vigorous plant that provides good fruit cover and sets well in hot temperatures.

Supremo. Mid-season variety with early maturity. Determinate mid compact plant. Uniform predominately extra-large fruit. Suited for concentrated harvests for vine ripe and mature green markets.

Tachi. Mid-season variety with classic saladette shape. Determinate mid compact plant. Fruit size predominately extra-large, uniform and very similar to Mariana. Wide adaptability and suited for concentrated harvests for vine ripe and mature green markets.

3. CHERRY TYPES

BHN 268. Early to mid-season. Tall bush. An extra firm cherry tomato that holds, packs and ships well. Determinate, small to medium bush with high yields.

BHN 762. Early determinate variety. Globe shaped fruit.

Camelia. Midseason. Deep globe, cocktail-cherry size with excellent firmness and long shelf life. Indeterminate bush. Outdoor or greenhouse production.

Sakura. Early indeterminate hybrid.

Shiren. Compact plant with high yield potential and nice cluster.

Sweet Treats. Early main season with wide adaptability. Strong, vigorous, indeterminate plant. Deep pink, firm, globe shaped fruit with outstanding flavor potential. Strong against cracking.

4. GRAPE TYPES

Amai. Early main season with smooth uniform fruit, ~1-2gr more than Sweet Hearts. Uniform sizing. Dark red, firm, elongated grape-shaped fruit. High yield potential.

BHN 784. Early-midseason determinate grape hybrid. Heat tolerant.

BHN 785. Midseason determinate grape hybrid with a strong set of very uniform size and shape fruit on a vigorous bush with good cover.

BHN 1022. Determinate "hot set" variety.

Brixmore. Very early. Indeterminate. Very uniform in shape and size, deep glossy red color with very high early and total yield. High brix and excellent firm flavor.

Cupid. Early. Vigorous, indeterminate bush. Oval-shaped fruit have an excellent red color and a sweet flavor.

Jolly Girl. Early season. Determinate plant. Extended market life with firm, flavorful grape-shaped fruits. Average 10% brix.

Mountain Vineyard. Indeterminate grape with deep red color.

Smarty. Early, vigorous, indeterminate bush with short internodes. Plants are 25% shorter than Santa. Good flavor, sweet and excellent flavor.

Sweethearts. Early to mid-season. Indeterminate bush with intermediate internodes. Brilliant red, firm, elongated grape-shaped fruit. Matures between 70 and 75 days. Good flavor, crack-resistant and high brix.

Tami G. Early season. Indeterminate, medium tall. Small fruits with nice shape.

Table 18.2 Disease Resistance Packages for Tomato Varieties

Variety	Disease Resistance ²
Large and Beefsteak	
Amelia	R to F-R (1, 2, 3), N, S, TSW, and V (1)
Bella Rosa	R to F-R (1, 2), S, TSW, and V (1)
BHN 602	R to F-R (1, 2, 3), TSW, and V (1)
BHN 730	IR to FCR
BHN 975	R to FCR, F-R (1, 2), and V (1)
BHN 1006	R to FCR, F-R (1, 2), V (1), and TYLCV
Camaro	R to ASC, F-R (1, 2, 3), and V (1) IR to S and TYLC
Charger	R to ASC, F-R (1, 2, 3), and V (1) IR to S and TYLC
Crista	R to ASC, F-R (1, 2, 3), and V (1), N, S, and TYLC
Everglade	R to ASC, F-R (1,2,3), S, V (1), IR to TYLCV
Florida 47	R to F-R (1, 2), V (1), ASC, and S
Florida 91	R to F-R (1, 2), V (1), ASC, and S
Grand Marshall	R to ASC, F-R (1, 2) IR to S and TYLC
HM 1823	R to FCR, F-R (1, 2), and V (1) IR to S
HM 8849 CR	R to FCR, F-R (1, 2), S, and V (1)
Phoenix	R to ASC, F-R (1, 2), S, and V (1)
Raceway (STM9203)	R to ASC, FCR, F-R (1, 2), and V (1) IR to S
Red Bounty	R to V (1), F-R (1, 2), S, TSWV, and N
Red Defender	R to ASC, F-R (1, 2), S, TSW, and V (1)
Red Morning	R to F-R (1, 2), ToM IR to TSW and V (1)
Resolute	R to F-R (1, 2), V (1) IR to TSW
RFT 6153	R to F-R (1, 2), V (1), and S

Variety	Disease Resistance ²
Sanibel	R to ASC, F-R (1, 2), N, S, and V (1)
Sebring	R to FCR, F-R (1, 2, 3), S, and V (1)
Skyway	R to F-R (1, 2) IR to N, TSW, TYLC
Solar Fire	R to F-R (1, 2, 3) and V (1) IR to S
Soraya	R to FCR, F-R (1, 2, 3), S, and V (1)
Southern Ripe	R to FCR, F-R (1, 2), TSW IR to N
SV 7631	R to ASC, F-R (1, 2), TSW, V (1) IR to N
Tasti-Lee	R to F-R (1, 2, 3), V (1), and S
Volante	R to ASC, F-R (1, 2), V (1) IR to S and TSW
Plum	
BHN 685	R to F-R (1, 2, 3), TSW, and V (1)
Daytona	R to ASC, F-R (1,2), N, V (1), IR to TYLCV
Mariana	R to ASC, F-R (1, 2), N, and V (1). IR to S
Picus	R to ASC, TSW, F-R (1, 2), V (1), CLS
Supremo	R to BSK, F-R (1, 2, 3), N, and V (1) IR to TSW
Tachi	R to ASC, F-R (1, 2), N, and V (1) IR to TSW
Cherry	
BHN 268	R to F-R (1) and V (1)
BHN 762	R to F-R (1) and V (1)
Camelia	R to F-R (1), TM, and V (1)
Sakura	R to F-R (1, 2), CLS, and TM
Shiren	R to F-R (1, 2) and ToM IR to N
Sweet Treats	R to CLS, F-R (1, 2), and ToM IR to FCR and S

Table 18.2 Disease Resistance Packages for Tomato Varieties (continued)

Variety	Disease Resistance ^z	Variety	Disease Resistance ^z
Grape		Cupid	R to F-R (1, 2), BSK, ASC
Amai	R to CLS, F-R (1), and ToM. IR to N and S	Jolly Girl	R to C and V (1) IR to F-R (1, 2)
BHN 784	R to F-R (1)	Mountain Vineyard	R to F-R (1, 2, 3) and TSW
BHN 785	R to F-R (1)	Smarty	R to F-R (1,2) and V (1)
BHN 1022	R to F-R (1, 2, 3) and TSW	Sweethearts	R to C, CLS, F-R (1), and TM IR to S
Brixmore	R to V (1), N, and ToM	Tami G	None reported

^z ASC = Alternaria stem canker = *Alternaria alternata* f.sp. *lycopersici*; BSK – Bacterial speck - *Pseudomonas syringae* pv *tomato*; C – Cracking; CLS - Cladosporium leaf mold - *Cladosporium fulvum*; F-R 1, 2, 3 - Fusarium wilt race 1, 2, 3 - *Fusarium oxysporum* f.sp. *lycopersici* races 1, 2, 3; FCR – Fusarium crown rot - *Fusarium oxysporum* f.sp. *radicis-lycopersici*; N – Root knot nematode - *Meloidogyne arenaria*, *M. Incognita*, and *M. javanica*; S – Gray leaf spot - *Stemphylium solani*; ToM = Tomato mosaic virus; TM = Tobacco mosaic; TSW = Tomato spotted wilt; TYLC – Tomato yellow leaf curl; V (1) = Verticillium wilt - *Verticillium albo-atrum* and *Verticillium dahliae* race 1.
R = Resistant; IR = Intermediate Resistance; T = Tolerant.

Table 18.3. Herbicides approved for managing weeds in tomato.

Labels change frequently. Be sure to read a current product label before applying any chemical.

Active ingredient lb. a.i./A	Trade name product/A	MOA code	Weeds controlled / remarks
*** PREPLANT / PREEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW or (Aim) 2.0 EC up to 2 fl. oz.	14	Apply as a pre-plant burndown for emerged broadleaves up to 4 inches tall or rosettes less than 3 inches across. Good coverage is essential. A nonionic surfactant, methylated seed oil, or crop oil concentrate is recommended. No pre-transplant interval.
EPTC 2.6	(Eptam) 7 E 3 pt.	8	Annual broadleaves, annual grasses and suppression of yellow/purple nutsedge. Labeled for transplanted tomatoes grown on low density mulch. Do not use under high density, VIF, TIF, or metalized mulches. A 24(c) special local needs label in Florida. 14 day pre-transplant interval.
Flumioxazin up to 0.128	(Chateau) 51 WDG up to 4 oz.	14	Annual broadleaves and grasses. Apply to row middles of raised plastic mulched beds that are at least 4 in. higher than the treated row middle and 24 in. bed width. Label is a Third-Party registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product. Tank mix with a burndown herbicide to control emerged weeds. 0 day pre-transplant interval.
Fomesafen 0.25 - 0.38	(Reflex) 2 EC 1.0 - 1.5 pt.	14	Broadleaves and suppression of yellow/purple nutsedge. Suppression of some annual and perennial grasses. Label is a 24(C) local indemnified label and a waiver of liability must be signed for use. Transplanted crop only. May be applied to bareground production or to plastic mulched beds following bed formation but prior to laying plastic. Use shields or hooded sprayers if applying to row middles and prevent contact with the plastic mulch. 7 and 0 day pre-transplant interval on bare ground and plastic mulch, respectively. 70 day PHI.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaves, grasses, and nutsedge. Apply as a preplant burndown. Consult label for individual product directions.
Halosulfuron 0.024 - 0.05	(Sanda, Profine) 75 DF 0.5 - 1.0 oz.	2	Broadleaf weeds and yellow/purple nutsedge. Do not exceed 2 applications of halosulfuron per 12 month period. 7 day pre-transplant interval. 30 day PHI.
Imazosulfuron 0.19-0.3	(League) 4.0-6.4 oz	2	Broadleaves and suppression of yellow/purple nutsedge. Apply pre-transplant just prior to installation of plastic mulch. 1 day pre-transplant interval. 21 day PHI.
Lactofen 0.25 - 0.5	(Cobra) 2 EC 16 - 32 fl. oz.	14	Broadleaves. Label is a Third-Party registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product. Apply to row middles only with shielded or hooded sprayers. Contact with green foliage or fruit may cause excessive injury. Drift of Cobra treated soil particles onto plant can cause contact injury. Limit of 1 PRE and 1 POST application per growing season. 30 day PHI.
S-metolachlor 1.0 - 1.3	(Brawl, Dual Magnum, Medal) 7.62 EC 1.0 - 1.33 pt. if organic matter less than 3%	15	Annual broadleaves and grasses. Suppression of yellow/purple nutsedge. Apply to bed tops pre-transplant just prior to laying the plastic. May also be used in row middles. Research has shown that the 1.33 pt. may be too high in some Florida soils except in row middles. 30 day PHI. 90 day PHI if rate exceeds 1.33 pt./A.
Metribuzin 0.25 - 0.5	(Sencor DF, TriCor DF) 75 WDG 0.33 - 0.67 lb. (Sencor 4, Metri) 4 F 0.5 - 1.0 pt.	5	Small emerged weeds less than 1 in. tall. Apply preplant in transplanted tomatoes only. Incorporate to a depth of 2-4 inches. Maximum of 1.0 lb. a.i./A within a season. Avoid application for 3 days following cool, wet, or cloudy weather to reduce possible crop injury. 7 day PHI.

Table 18.3. Herbicides approved for managing weeds in tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.			
Active ingredient lb. a.i./A	Trade name product/A	MOA code	Weeds controlled / remarks
Napropamide 1.0 - 2.0	(Devrinol DF-XT) 50 DF 2.0 - 4.0 lb. (Devrinol 2-XT) 2-4 quarts	15	Annual broadleaves and grasses. For direct-seed or transplanted tomatoes. Apply to well worked soil that is moist enough to permit thorough incorporation to a depth of 2 in. Incorporate same day as applied.
Oxyfluorfen 0.25 - 0.5	(Goal 2 XL) 2 EC 1.0 - 2.0 pt. (GoalTender) 4 E	14	Broadleaves. Apply pre-transplant just prior to installation of plastic mulch. 30 day pre-transplant interval. Mulch may be applied any time during the 30-day interval.
Paraquat 0.5 - 1.0	(Gramoxone) 2 SL 2.0 - 4.0 pt. (Firestorm) 3 SL 1.3 - 2.7 pt.	22	Emerged broadleaves and grasses. Apply as a preplant burndown treatment. Surfactant recommended.
Pelargonic acid	(Scythe) 4.2 EC 3 - 10% v/v		Emerged broadleaves and grasses. Apply as a preplant burndown treatment or post transplant with shielded or hooded sprayers. Product is a contact, nonselective, foliar applied herbicide with no residual control.
Pendimethalin 0.48 - 0.72	(Prowl H ₂ O) 3.8 1.0 - 1.5 pt.	3	May be applied pretransplant to bed tops just prior to laying the plastic mulch or to row middles. Do not exceed 3.0 pt./A per year. 70 day PHI.
Pyraflufen 0.001 - 0.003	(ETX Herbicide) 0.208 EC 0.3 - 1.25 fl. oz.	14	Emerged broadleaves less than 4 in. tall or rosettes less than 3 in. diameter. Apply as a preplant burndown treatment. Nonionic surfactant or crop oil concentrate recommended.
Rimsulfuron 0.03 - 0.06	(Pruvin, Solida) 25 WDG 2.0 - 4.0 oz.	2	Annual broadleaves and grasses. Suppression of yellow nutsedge. Requires 0.5-1 in. of rainfall or irrigation within 5 days of application for activation. May be applied as a sequential treatment with a PRE and POST application not exceeding 0.06 lb. a.i./A in a single season. 45 day PHI
Sulfentrazone 0.070 - 0.19	Spartan FL 4F 2.25 - 6.0 oz		Pre-emergent control of broadleaves and grasses. Applications must be made prior to transplant. Do not apply more than 12.0 oz per acre per application or per 12 month period.
Trifluralin 0.5	(Treflan, Trifluralin) 4 EC 1 pt. (Treflan, Trifluralin) 10 G 5 lb.	3	Annual broadleaves and grasses. Do not apply in Dade County. Incorporate 4 in. or less within 8 hr. of application. Results in Florida are erratic on soils with low organic matter and clay contents. Note label precautions against planting noncrop within 5 months. Do not apply after transplanting.
*** POSTTRANSPLANT ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW or (Aim) 2.0 EC up to 2 fl. oz.	14	Emerged broadleaf weeds. Apply as a hooded application to row middles only. Good coverage is essential. May be tank mixed with other herbicides. A nonionic surfactant, methylated seed oil, or crop oil concentrate is recommended. 0 day PHI.
Clethodim 0.09 - 0.25	(Arrow, Select) 2 EC 6 - 16 fl. oz. (Select Max) 1 EC 9 - 32 fl. oz.	1	Perennial and annual grasses. Use higher rates under heavy grass pressure or larger weeds. Surfactant or crop oil concentrate recommended. Consult label. 20 day PHI.
DCPA 6.0 - 7.5	(Dacthal) W-75 8 - 10 lb. (Dacthal) 6 F 8 - 10 pt.	3	Annual grasses and select broadleaves. Apply to weed-free soil 6-8 wk. after crop is established and growing rapidly or to moist soil in row middles after crop establishment. Note label precautions against replanting non-registered crops within 8 months.
Diquat 0.5	(Reglone Desiccant) 1 qt.	22	Broadleaves and grasses. Apply to row middles only. Maximum of 2 applications per season. Prevent drift to crop. Nonionic surfactant recommended. 30 day PHI.
Halosulfuron 0.024 - 0.05	(Sanda, Profine) 75 DF 0.5 - 1.0 oz.	2	Broadleaf weeds and yellow/purple nutsedge. Apply 14 days after transplant but before first bloom. Following first bloom apply with shielded or hooded applicator. May be applied to row middles with shielded or hooded sprayer. Do not exceed 2 oz per 12 month period. Surfactant recommended. 30 day PHI.
Imazosulfuron 0.19-0.3	(League) 4.0-6.4 oz	2	Apply post emergence 3 to 5 days after transplant through early bloom. Only apply if no pre-transplant application was made. Surfactant recommended. PHI 21 days.
Lactofen 0.25 - 0.5	(Cobra) 2 EC 16 - 32 fl. oz.	14	Broadleaf weeds. Apply to row middles only with shielded or hooded sprayers. Contact with green foliage or fruit can cause excessive injury. Drift of Cobra treated soil particles onto plants can cause contact injury. Limit of 1 PRE and 1 POST application per growing season. Do not apply within 18 days of transplant. Surfactant recommended. PHI 30 days.
S-metolachlor 1.0 - 1.3	(Brawl, Dual Magnum, Medal) 7.62 EC 1.0 - 1.33 pt.	15	Annual broadleaf, grasses, and yellow/purple nutsedge. Apply to row middles. Label rates are 1.0-1.33 pt./A if organic matter is less than 3%. Use on a trial basis. Surfactant not recommended. 90 day PHI for rates above 1.33 pt./A. 30 day PHI for rates 1.33 pt./acre or less.

Table 18.3. Herbicides approved for managing weeds in tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.			
Active ingredient lb. a.i./A	Trade name product/A	MOA code	Weeds controlled / remarks
Metribuzin 0.25 - 0.5	(Sencor DF, TriCor DF) 75 WDG 0.33 - 0.67 lb. (Sencor 4, Metri) 4 F 0.5 - 1.0 pt.	5	Small emerged weeds. Apply after transplants or seedlings are well established. Apply in single or multiple applications with a minimum of 14 days between treatments. Maximum of 1.0 lb. a.i./A within a season. Avoid application for 3 days following cool, wet, or cloudy weather to reduce possible crop injury. 7 day PHI.
Paraquat 0.5	(Gramoxone) 2 SL 2 pt. (Firestorm) 3 SL 1.3 pt.	22	Emerged broadleaf and grass weeds. Direct spray over emerged weeds 1-6 in. tall in row middles between mulched beds. Use low pressure and shields to control drift. Do not apply more than 3 times per season. Nonionic surfactant recommended. 30 day PHI.
Pelargonic acid	(Scythe) 4.2 EC 3 - 10% v/v		Emerged broadleaf and grass weeds. Direct spray to row middles. Product is a contact, nonselective, foliar applied herbicide with no residual control. May be tank mixed with several soil residual compounds.
Pendimethalin 0.48 - 0.72	(Prowl H ₂ O) 3.8 1.0 - 1.5 pt.	3	Broadleaf and grass weeds. May be applied post transplant to row middles if previously untreated. Do not exceed 3.0 pt./A per year. 70 day PHI.
Rimsulfuron 0.02 - 0.03	(Pruvin, Solida) 25 WDG 1.0 - 2.0 oz.	2	Broadleaves and grasses. May be applied as a sequential treatment with a PRE and POST application not exceeding 0.06 lb. a.i./A in a single season. Requires 0.5-1.0 in. of rainfall or irrigation within 5 days of application for activation. Nonionic surfactant or crop oil concentrate recommended. PHI 45 days.
Sethoxydim 0.19 - 0.28	(Poast) 1.5 EC 1.0 - 1.5 pt.	1	Actively growing grasses. Do not exceed a total of 4.5 pt./A applied in one season. Unsatisfactory results may occur if applied to grasses under stress. Crop oil concentrate recommended. 20 day PHI.
Trifloxysulfuron 0.005 - 0.009	(Envoke) 75 DG 0.1 - 0.2 oz.	2	Broadleaves and yellow/purple nutsedge. Direct spray solution to the base of transplanted tomato plants. Apply at least 14 days after transplanting and before fruit set. 45 day PHI.
*** POSTHARVEST ***			
Diquat 0.5	(Reglone Desiccant) 2.0 pt.	22	Minimum of 35 gal./A. Thorough coverage is required. Nonionic surfactant recommended.
Paraquat 0.62 - 0.94	(Gramoxone) 2 SL 2.4 - 3.75 pt. (Firestorm) 3 SL 1.6 - 2.5 pt.	22	Broadcast spray over the top of the plants after the last harvest. Thorough coverage is required to ensure maximum herbicide burndown. Do not use treated crop for human or animal consumption. Nonionic surfactant recommended.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato.

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
Aphids (including aphid transmitted viruses, green peach aphid, potato aphid)	1A	*Lannate LV (methomyl)	LV: 1.5-3.0 pt	Do not apply more than 21 pt LV/acre/crop (15 for tomatillos) or 7 lb SP /acre/crop (5 lb for tomatillos).	48	1	
	1A	*Lannate SP (methomyl)	SP: 0.5-1.0 lb		48	1	
	1A	*Vydate L (oxamyl)	foliar: 2.0-4.0 pt	Do not apply more than 32 pts/A per season.	48	3	
	1B	Dimethoate 4 EC (dimethoate)	0.5-1.0 pt	Maximum total rate per year is 1 lb ai/A.	48	7	Minimum 6 day reapplication interval.
	1B	Malathion 5 (malathion)	1.0-2.5 pt	10 pints	12	1	8F can be used in greenhouse.
	1B	Malathion 8 F	1.5 pt				
	3A	*Asana XL (0.66EC) (esfenvalerate)	2.9-9.6 fl oz	Do not apply more than 0.5 lb ai per acre per season, or 10 applications at highest rate.	12	1	

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	7-10.67 fl oz	Do not exceed 42.67 fl. oz. total application /A per season.	24	3	
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A & 4A	Leverage* 360 (beta-cyfluthrin & imidacloprid)	3.8-4.1		12	0	
	3A & 6	Gladiator* (avermectin B1 & zeta-cypermethrin)	19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	3A & 28	*Voliam Xpress (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not apply more than 31.0 fl oz /A per season.	24	5	
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	4A	Actara (thiamethoxam)	2.0-5.5 oz	Do not exceed a total of 11.0 oz/Acre per acre per growing season.	12	0	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators. Minimum interval between applications is 5 days.
	4A	Admire Pro (imidacloprid)	7-10.5 fl oz	Maximum allowed on tomato is 10.5 fl. oz/A.	12	21	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Admire Pro (imidacloprid)	0.6 fl oz per 1000 plants		12	0 (soil)	Greenhouse use: 1 application to mature plants, see label for cautions.
	4A	Admire Pro (imidacloprid)	0.44 fl oz per 10,000 plants		12	21	Planthouse: 1 application. See label.
	4A	Assail 70WP (acetamiprid)	0.6-1.7 oz	Do not exceed a total of 6.8 oz. Assail 70 WP per acre per growing season including any pretransplant applications of acetamiprid.	12	7	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting. Begin applications for whitefly when first adults are noticed. Do not make more than 4 applications per season. Do not apply more than once every 7 days.
	4A	Belay 50 WDG (clothianidin)	1.6-2.1 oz (foliar application)	Do not apply more than 6.4 oz per acre per season.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Belay 50 WDG (clothianidin)	4.8-6.4 oz (soil application)	Do not apply more than 6.4 oz per acre per season.	12	Apply at planting	See label for application instructions. Do not release irrigation water from the treated area.
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides.
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.	12	30	
	4A	Provado 1.6F (imidacloprid)	3.8-6.2 fl oz	Maximum per crop per season 19.2 fl oz/A.	12	0	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting.
	4A	Safari 20 SG (dinotefuran)	7.0-14.0 oz		12	1	For transplant production only. Can be applied as foliar spray or soil drench.
	4A	Scorpion (dinotefuran)	soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz/A per season as a soil application. Do not apply more than 10.5 fl. oz/A per season foliarly.	12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
	4A	Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl. oz./A per growing season.	12	30	Several methods of soil application – see label.
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	4C	Closer SC (sulfoxaflor)	1.5 - 2.0 fl oz	Do not exceed 17 fl oz Closer per acre per year.	12	1	DO NOT APPLY UNTIL AFTER PETAL FALL.
	4D	Sivanto Prime (flupyradifurone)	soil: 21.0 - 28.0 fl oz foliar: 7.0 -14.0 fl oz	Do not apply more than 28.0 fl oz per acre per year.	4	soil application: 45 days; foliar: 1 day	Minimum interval between applications: 7 days.
	9B	Fulfill (pymetrozine)	2.75 oz	Do not apply more than 5.5 oz/acre per crop.	12	0	(FL-040006) 24(c) label for growing transplants also (FL-03004).
	23	Movento (spirotetramat)	4.0-5.0 fl oz	Maximum of 10 fl oz/ acre per season.	24	1	
	28	Exirel (cyantraniliprole)	13.5-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatment is 5 days.
	28	Verimark (cyantraniliprole)	6.75-13.5 fl. oz. tray drench/ transplant water. 6.75-10 dripfl. oz..	Do not apply more than 0.4 lb ai/A per crop.	4	1	
	29	Beleaf 50 SG (flonicamid)	2.0-2.8 oz	Do not apply more than 8.4 oz per acre per season.	12	0	Begin applications before pests reach damaging levels. Do not apply more than 2 applications per season. Allow a minimum of 7 days between applications.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.

Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Antifeedant, repellant, insect growth regulator.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25 - 1 quart per acre. Apply in sufficient water to cover foliage, typically 5 - 100 gallons per acre.		4	0	
	-	Grandevo (<i>Chromobacterium subtsugae</i>)	1.0-3.0 lb		4	0	Thorough coverage is necessary for effective control.
	-	Molt-X (azadirachtin)	10 fl oz		4	0	Antifeedant, repellant, insect growth regulator. OMRI-listed.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25 - 1 quart per acre. Apply in sufficient water to cover foliage, typically 5 - 100 gallons per acre.		4	0	OMRI Listed
	-	Neemix 4.5 (azadirachtin)	4.0-16.0 fl oz		12	0	IGR, feeding repellant. OMRI-listed.
	-	PFR-97 (<i>Isaria fumosorosea</i> Apopka strain 97)	1.0-2.0 lbs		4	0	Repeat applications at 3-10 days are needed to maintain control. Can be used in greenhouse for food crop transplants raised to be planted into the field. OMRI listed.
	-	Requiem 25EC (extract of <i>Chenopodium ambrosioides</i>)	2-4 qt	Limited to 10 applications per crop cycle.	4	0	Begin applications before pests reach damaging levels.
	-	SuffOil-X (mineral oil)	1-2 gallons per 100 gallons of water.		4		OMRI listed.
	-	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	OMRI-listed
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	Do not exceed four applications per season.
	-	JMS Stylet-Oil (oil, insecticidal)	3.0-6.0 qt/100 gal water				Organic Stylet-Oil and Saf-T-Side are OMRI-listed.
Beetles (including beetle larvae, blister beetles, Colorado potato beetle, cucumber beetles, flea beetles)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	1A	*Vydate L (oxamyl)	foliar: 2.0-4.0 pt	Do not apply more than 32 pts/A per season.	48	3	
	3A	*Ambush 25W (permethrin)	3.2-12.8 oz	Do not apply more than 76.8 oz/A per season.	12	up to day of harvest	Do not use on cherry tomatoes.
	3A	*Asana XL (0.66EC) (esfenvalerate)	2.9-9.6 fl oz	Do not apply more than 0.5 lb ai per acre per season, or 10 applications at highest rate.	12	1	
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	*Pounce 25 WP (permethrin)	3.2-12.8 oz		12	0	Do not apply to cherry or grape tomatoes (fruit less than 1 inch in diameter). Do not apply more than 0.6 lb ai per acre per season.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	3A & 4A	Leverage* 360 (beta-cyfluthrin & imidacloprid)	3.8-4.1		12	0	
	3A & 6	Gladiator* (avermectin B1 & zeta-cypermethrin)	19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	4A	Actara (thiamethoxam)	2.0-5.5 oz	Do not exceed a total of 11.0 oz/Acre per acre per growing season.	12	0	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators. Minimum interval between applications is 5 days.
	4A	Admire Pro (imidacloprid)	7-10.5 fl oz	Maximum allowed on tomato is 10.5 fl. oz/A.	12	21	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Assail 70WP (acetamiprid)	0.6-1.7 oz	Do not exceed a total of 6.8 oz. Assail 70 WP per acre per growing season including any pretransplant applications of acetamiprid.	12	7	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting. Begin applications for whitefly when first adults are noticed. Do not make more than 4 applications per season. Do not apply more than once every 7 days.
	4A	Belay 50 WDG (clothianidin)	1.6-2.1 oz (foliar application)	Do not apply more than 6.4 oz per acre per season.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.
	4A	Belay 50 WDG (clothianidin)	4.8-6.4 oz (soil application)	Do not apply more than 6.4 oz per acre per season.	12	Apply at planting	See label for application instructions. Do not release irrigation water from the treated area.
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.			
	4A	Provado 1.6F (imidacloprid)	3.8-6.2 fl oz	Maximum per crop per season 19.2 fl oz/A.	12	0	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting.
	4A	Scorpion (dinotefuran)	Soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz/A per season as a soil application. Do not apply more than 10.5 fl. oz/A per season foliarly.	12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
		Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl. oz./A per growing season.	12	30	Several methods of soil application – see label.
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	4D	Sivanto Prime (flupyradifurone)	7.0-14.0 fl. oz.	Do not apply more than 28.0 fl. oz./A per year.	4	1	Minimum interval between applications: 7 days.
	5	Entrust (spinosad)	0.5-2.5 oz	Do not apply more than 9 oz per acre per crop.	4	1	OMRI-listed. For thrips, rotate to other class of effective insecticide after 2 applications of a Group 5 insecticide for at least 2 applications.
	6	*Proclaim (emamectin benzoate)	2.4-4.8 oz	No more than 28.8 oz/A per season.	12	7	Do not use in greenhouses, nurseries, plant propagation houses, or on any plants grown for use as transplants.
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Minimum of 7 days between applications.
	17	Trigard (cyromazine)	2.66 oz	Do not apply more than 15.96 oz./A per season.	12	0	No more than 6 applications per crop. Does not control CPB adults. Most effective against 1 st & 2 nd instar larvae.
	28	Coragen (chlorantraniliprole/rynaxypyr)	3.5-7.5 fl oz	Do not apply more than 15.4 fl oz per acre per crop.	4	1	Can be applied by drip chemigation or as a soil application at planting. See label for details.
	28	Exirel (cyantraniliprole)	7-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatment is 5 days.
	28	Verimark (cyantraniliprole)	6.75-13.5 fl. oz. tray drench/transplant water. 6.75-10 dripfl. oz..	Do not apply more than 0.4 lb ai/A per crop.	4	1	
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Antifeedant, repellent, insect growth regulator.
	-	Neemix 4.5 (azadirachtin)	4.0-16.0 fl oz		12	0	IGR, feeding repellent. OMRI-listed.
	-	SuffOil-X (mineral oil)	1-2 gallons per 100 gallons of water.		4		OMRI listed.
	-	Surround WP (kaolin)	12.5-50 lbs		4	0	OMRI listed.
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	Do not exceed four applications per season.
	-	JMS Stylet-Oil (oil, insecticidal)	3.0-6.0 qt/100 gal water		4	0	

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
Caterpillars: including cabbage looper, corn earworm, garden webworm, hornworms, imported cabbageworm, loopers, saltmarsh caterpillar, tobacco budworm, tomato fruitworm; armyworms (beet armyworm, fall armyworm, southern armyworm, true armyworm, yellowstriped armyworm); cutworms (black cutworm, granulate cutworm).	1A	*Lannate SP (methomyl)	SP: 0.5-1.0 lb		48	1	
	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A XLR; 4F:	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	1A	10% Sevin Granules (carbaryl)	20 lb		12	3	Maximum of 4 applications, not more often than once every 7 days.
	1B	*Diazinon AG500; *50 W (diazinon)	AG500: 1-4 qt 50W: 2-8 lb	Do not make more than one soil application per year regardless of target pest.	48	preplant	Incorporate into soil - see label.
	3A	*Ambush 25W (permethrin)	3.2-12.8 oz	Do not apply more than 76.8 oz/A per season.	12	up to day of harvest	Do not use on cherry tomatoes.
	3A	*Asana XL (0.66EC) (esfenvalerate)	2.9-9.6 fl oz	Do not apply more than 0.5 lb ai per acre per season, or 10 applications at highest rate.	12	1	
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	7-10.67 fl oz	Do not exceed 42.67 fl. oz. total application /A per season.	24	3	
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	*Karate with Zeon (lambdacyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	*Pounce 25 WP (permethrin)	3.2-12.8 oz		12	0	Do not apply to cherry or grape tomatoes (fruit less than 1 inch in diameter). Do not apply more than 0.6 lb ai per acre per season.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	3A & 4A	Leverage* 360 (beta-cyfluthrin & imidacloprid)	3.8-4.1		12	0	
	3A & 6	Gladiator* (avermectin B1 & zeta-cypermethrin)	19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	3A & 28	*Besiege (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not exceed a total of 31 fl oz of Besiege per acre per year.	24	5	

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.

Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.			
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl. oz./A per growing season.	12	30	Several methods of soil application – see label.
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	5	Entrust (spinosad)	0.5-2.5 oz	Do not apply more than 9 oz per acre per crop.	4	1	OMRI-listed. For thrips, rotate to other class of effective insecticide after 2 applications of a Group 5 insecticide for at least 2 applications.
	5	Radiant SC (spinetoram)	5-10 fl oz.	Do not apply more than 34 fl. oz./A per calendar year.	4	1	For thrips, if additional treatment is needed after two applications, switch to an alternate mode of action (not group 5) for at least two applications.
	6	*Proclaim (emamectin benzoate)	2.4-4.8 oz	No more than 28.8 oz/A per season.	12	7	Do not use in greenhouses, nurseries, plant propagation houses, or on any plants grown for use as transplants.
	6 & 28	*Minecto Pro (abamectin & cyantraniliprole)	5.5-10 fl oz	Do not apply more than 20 fl oz per acre per year.	24	7	This label contains pollinator warnings.
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb		4	0	Apply when larvae are small for best control. Can be used in greenhouse. OMRI-listed.
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb		4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed.
	11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb		4	0	Use high rate for armyworms. Treat when larvae are young.
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb		4	0	Use higher rates for armyworms. OMRI-listed.
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-2.0 lb		4	0	Treat when larvae are young. Good coverage is essential. Can be used for organic production.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb		4	0	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb		4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production. OMRI-listed.
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Minimum of 7 days between applications.
	18	Confirm 2F (tebufenozide)	6-16 fl oz	Do not apply more than 64 fl. oz./A per season.	4	7	Product is a slow-acting IGR that will not kill larvae immediately.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	18	Intrepid 2F (methoxyfenozide)	4-16 fl oz	Do not apply more than 64 fl oz per acre per season.	4	1	Product is a slow-acting IGR that will not kill larvae immediately.
	22	Avaunt (indoxacarb)	2.5-3.5 oz	Do not apply more than 14 ounces of product per acre per crop. Minimum spray interval is 5 days.	12	3	
	28	Coragen (chlorantraniliprole/ rynaxypyr)	3.5-7.5 fl oz	Do not apply more than 15.4 fl oz per acre per crop.	4	1	Can be applied by drip chemigation or as a soil application at planting. See label for details.
	28	Exirel (cyantraniliprole)	7-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatments is 5 days.
	28	Verimark (cyantraniliprole)	5-13.5 fl. oz.	Do not apply more than 0.4 lb ai/A per crop.	4	1	
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Antifeedant, repellent, insect growth regulator.
	-	CheckMate TPWF (pheromone)	1.2-6.0 fl oz		0	0	For mating disruption of tomato pinworm- See label for details.
	-	Grandevo (<i>Chromobacterium subtsugae</i>)	1.0-3.0 lb		4	0	Thorough coverage is necessary for effective control.
	-	Molt-X (azadirachtin)	10 fl oz		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	MBI-203 EP (<i>Chromobacterium subtsugae</i>)	4.0-12.0 quarts		4	0	OMRI listed. Can be used in the greenhouse.
	-	Neemix 4.5 (azadirachtin)	4.0-16.0 fl oz		12	0	IGR, feeding repellent. OMRI-listed.
Fire Ants	7A	Extinguish ((S)-methoprene)	1.0-1.5 lb		4	0	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
	7C	Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb		12	1	Apply when ants are actively foraging.
Grasshoppers	1A	10% Sevin Granules (carbaryl)	20 lb		12	3	Maximum of 4 applications, not more often than once every 7 days.
	3A	*Asana XL (0.66EC) (esfenvalerate)	2.9-9.6 fl oz	Do not apply more than 0.5 lb ai per acre per season, or 10 applications at highest rate.	12	1	
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	3A & 28	*Besiege (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not exceed a total of 31 fl oz of Besiege per acre per year.	24	5	
	-	Surround WP (kaolin)	12.5-50 lbs		4	0	OMRI listed.
Lace bugs	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
Leafhoppers	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	1B	Dimethoate 4 EC (dimethoate)	0.5-1.0 pt	Maximum total rate per year is 1 lb ai/A.	48	7	Minimum 6 day reapplication interval.
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	Karate with Zeon* (lambdacyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A & 6	*Gladiator (avermectin B1 & zeta-cypermethrin)	10-19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	3A & 28	*Voliam Xpress (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not apply more than 31.0 fl oz /A per season.	24	5	
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	4A	Actara (thiamethoxam)	2.0-5.5 oz	Do not exceed a total of 11.0 oz/Acre per acre per growing season.	12	0	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators. Minimum interval between applications is 5 days.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Admire Pro (imidacloprid)	7-10.5 fl oz	Maximum allowed on tomato is 10.5 fl. oz/A.	12	21	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Belay 50 WDG (clothianidin)	foliar: 1.6-2.1 oz	Do not apply more than 6.4 oz per acre per season.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.
	4A	Belay 50 WDG (clothianidin)	soil: 4.8-6.4 oz	Do not apply more than 6.4 oz per acre per season.	12	Apply at planting	See label for application instructions. Do not release irrigation water from the treated area.
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.			
	4A	Provado 1.6F (imidacloprid)	3.8-6.2 fl oz	Maximum per crop per season 19.2 fl oz/A.	12	0	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting.
	4A	Scorpion (dinotefuran)	Soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz/A per season as a soil application. Do not apply more than 10.5 fl. oz/A per season foliarly.	12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
	4A	Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl oz per acre per growing season.	12	30	Several methods of soil application – see label.
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	4D	Sivanto Prime (flupyradifurone)	soil: 21.0 - 28.0 fl oz ; foliar: 7.0-10.5 fl oz	Do not apply more than 28.0 fl oz per acre per year.	4	soil application: 45 days; foliar: 1 day	Minimum interval between applications: 7 days.
	6	*Proclaim (emamectin benzoate)	2.4-4.8 oz	No more than 28.8 oz/A per season.	12	7	Do not use in greenhouses, nurseries, plant propagation houses, or on any plants grown for use as transplants.
	16	Courier 40SC (buprofezin)	9.0-13.6 fl oz	Do not apply more than 27.2 fl. oz./A per crop cycle.	12	1	Apply when a threshold is reached of 5 whitefly nymphs per 10 leaflets from the middle of the plant. Product is a slow-acting IGR that will not kill nymphs immediately. No more than 2 applications per season. Allow at least 5 days between applications.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Antifeedant, repellent, insect growth regulator.
	-	Molt-X (azadirachtin)	10 fl oz		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.

Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	-	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	OMRI-listed
	-	SuffOil-X (mineral oil)	1-2 gallons per 100 gallons of water.		4	0	OMRI listed.
	-	Surround WP (kaolin)	12.5-50 lbs		4	0	OMRI listed.
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	Do not exceed four applications per season.
	-	JMS Stylet-Oil (oil, insecticidal)	3.0-6.0 qt/100 gal water		4	0	
Liriomyza leafminers	1A	*Vydate L (oxamyl)	foliar: 2.0-4.0 pt	Do not apply more than 32 pts/A per season.	48	3	
	3A & 6	*Gladiator (avermectin B1 & zeta-cypermethrin)	10-19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
	4A	Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	5	Entrust (spinosad)	0.5-2.5 oz	Do not apply more than 9 oz per acre per crop.	4	1	OMRI-listed. For thrips, rotate to other class of effective insecticide after 2 applications of a Group 5 insecticide for at least 2 applications.
	5	Radiant SC (spinetoram)	5-10 fl oz.	Do not apply more than 34 fl. oz./A per calendar year.	4	1	
	6	*Agri-Mek SC (abamectin)	1.75-3.5 fl oz	Do not apply more than 10.25 fl. oz./A in a growing season.	12	7	Do not make more than 2 sequential applications of Agri-Mek SC or any other foliar applied abamectin-containing product in a growing season.
	6	*Agri-Mek 0.15 EC (abamectin)	8.0-16.0 fl. oz	Do not apply more than 48 fl oz per acre per season.	12	7	Do not make more than 2 sequential applications per season.
	6 & 28	*Minecto Pro (abamectin & cyantraniliprole)	5.5-10 fl oz	Do not apply more than 20 fl oz per acre per year.	24	7	This label contains pollinator warnings.
	28	Coragen (chlorantraniliprole/rynaxypyr)	5-7.5 fl. oz. (soil, drip or foliar)		4	1	For control of larvae.
	28	Exirel (cyantraniliprole)	13.5-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatment is 5 days.
	28	Verimark (cyantraniliprole)	6.75-13.5 fl. oz. tray drench/transplant water. 6.75-10 drip fl. oz.	Do not apply more than 0.4 lb ai/A per crop.	4	1	
	-	Requiem 25EC (extract of Chenopodium ambrosioides)	2-4 qt	Limited to 10 applications per crop cycle.	4	0	Begin applications before pests reach damaging levels.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
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Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
Mites (including broad mites, twospotted spider mites, tomato russett mites, carmine spider mites)	1B	Malathion 5 (malathion)	1.0-2.5 pt	10 pints	12	1	8F can be used in greenhouse.
	1B	Malathion 8 F	1.5 pt				
	3A	*Danitol 2.4 EC (fenpropathrin)	7-10.67 fl oz	Do not exceed 42.67 fl. oz. total application /A per season.	24	3	
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	*Karate with Zeon (lambdacyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A & 6	*Gladiator (avermectin B1 & zeta-cypermethrin)	10-19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	6	*Agri-Mek SC (abamectin)	1.75-3.5 fl oz	Do not apply more than 10.25 fl. oz./A in a growing season.	12	7	Do not make more than 2 sequential applications of Agri-Mek SC or any other foliar applied abamectin-containing product in a growing season.
	6	*Agri-Mek 0.15 EC	8.0-16.0 fl. oz	Do not apply more than 48 fl oz per acre per season.	12	7	Do not make more than 2 sequential applications per season.
	6 & 28	*Minecto Pro (abamectin & cyantraniliprole)	5.5-10 fl oz	Do not apply more than 20 fl oz per acre per year.	24	7	This label contains pollinator warnings.
	20B	Kanemite 15 SC (acequinocyl)	31 fl oz	Do not apply more than 62 fl. oz/A per season.	12	1	Do not use less than 100 gal per acre. Make no more than 2 applications at least 21 days apart.
	21A	Portal (fenpyroximate)	2.0 pt	Do not apply more than 4.0 pints/A per crop cycle.	12	1	Do not make more than two applications per growing season. Allow 14 days between applications.
	23	Movento (spirotetramat)	4.0-5.0 fl oz	Maximum of 10 fl oz/ acre per season.	24	1	
	23	Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	Maximum amount per crop: 25.5 fl oz/A.	12	1	No more than 3 applications.
	-	Acramite-50WS (bifenazate)	0.75-1.0 lb	One application allowed per season.	12	3	One application per season. Field grown only. ACRAMITE-50WS is not systemic in action; therefore complete coverage of both upper and lower leaf surfaces and of fruit is necessary for effective control.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Grandevo (<i>Chromobacterium subtsugae</i>)	1.0-3.0 lb		4	0	Thorough coverage is necessary for effective control.
	-	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	OMRI-listed
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	drench: 40-80 fl. oz.; foliar: 0.5 pint - 2qt		0	0	

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	-	PFR-97 (<i>Isaria fumosorosea</i> Apopka strain 97)	1.0-2.0 lbs		4	0	Repeat applications at 3-10 days are needed to maintain control. Can be used in greenhouse for foo crop transplants raised to be planted into the field. OMRI listed.
	-	SuffOil-X (mineral oil)	1-2 gallons per 100 gallons of water.		4		OMRI listed.
	-	Sulfur (many brands)			24		May burn fruit and foliage when temperature is high. Do not apply within 2 weeks of an oil spray or EC formulation.
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	Do not exceed four applications per season.
	-	JMS Stylet-Oil (oil, insecticidal)	3.0-6.0 qt/100 gal water				
Mole crickets	1B	*Diazinon AG500; *50 W (diazinon)	AG500: 1-4 qt 50W: 2-8 lb	Do not make more than one soil application per year regardless of target pest.	48	preplant	Incorporate into soil - see label.
Plant bugs + tarnished plant bugs	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 XLR; 4F: 0.5-2.0 A	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Do not make applications less than 7 days apart.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	3A & 28	*Besiege (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not exceed a total of 31 fl oz of Besiege per acre per year.	24	5	
	4A	Belay 50 WDG (clothianidin)	foliar: 1.6-2.1 oz	Do not apply more than 6.4 oz per acre per season.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.
	4A	Belay 50 WDG (clothianidin)	soil: 4.8-6.4 oz	Do not apply more than 6.4 oz per acre per season.	12	Apply at planting	See label for application instructions. Do not release irrigation water from the treated area.
	4C	Closer SC (sulfoxaflor)	2.75-4.5 fl oz	Do not apply more than 17 fl oz per acre per year.	12	1	DO NOT APPLY THIS PRODUCT UNTIL AFTER PETAL FALL.
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Minimum of 7 days between applications.
	29	Beleaf 50 SG (flonicamid)	2.0-2.8 oz	Do not apply more than 8.4 oz per acre per season.	12	0	Begin applications before pests reach damaging levels. Do not apply more than 2 applications per season. Allow a minimum of 7 days between applications.
	--	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	OMRI-listed

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
Planthoppers	16	Courier 40SC (buprofezin)	9.0-13.6 fl oz	Do not apply more than 27.2 fl. oz./A per crop cycle.	12	1	Apply when a threshold is reached of 5 whitefly nymphs per 10 leaflets from the middle of the plant. Product is a slow-acting IGR that will not kill nymphs immediately. No more than 2 applications per season. Allow at least 5 days between applications.
Psyllids	4D	Sivanto Prime (flupyradifurone)	7.0-14.0 fl. oz.	Do not apply more than 28.0 fl. oz./A per year.	4	1	Minimum interval between applications: 7 days.
	23	Movento (spirotetramat)	4.0-5.0 fl oz	Maximum of 10 fl oz/ acre per season.	24	1	
	-	Neemix 4.5 (azadirachtin)	4.0-16.0 fl oz		12	0	IGR, feeding repellent. OMRI-listed.
Soil insects (including centipedes, crickets, earwigs, millipedes, sow bugs, springtails) Stink bugs (including brown stink bug and green stink bug)	1A	10% Sevin Granules (carbaryl)	20 lb		12	3	Maximum of 4 applications, not more often than once every 7 days.
	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A XLR; 4F:	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Danitol 2.4 EC (fenpropathrin)	7-10.67 fl oz	Do not exceed 42.67 fl. oz. total application /A per season.	24	3	
	3A	*Hero (bifenthrin & zeta-cypermethrin)	4.0-10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	2.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Not recommended for vegetable leafminer in Florida. Do not make applications less than 7 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A & 4A	*Leverage 360 (beta-cyfluthrin & imidacloprid)	3.8-4.1		12	0	
	3A & 6	*Gladiator (avermectin B1 & zeta-cypermethrin)	10-19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	3A & 28	*Voliam Xpress (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not apply more than 31.0 fl oz /A per season.	24	5	
	3A & 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	See label for limits on each active ingredient.
	4A	Actara (thiamethoxam)	2.0-5.5 oz	Do not exceed a total of 11.0 oz/Acre per acre per growing season.	12	0	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators. Minimum interval between applications is 5 days.
	4A	Belay 50 WDG (clothianidin)	1.6-2.1 oz (foliar application)	Do not apply more than 6.4 oz per acre per season.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Scorpion (dinotefuran)	Soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz/A per season as a soil application. Do not apply more than 10.5 fl. oz/A per season foliarly.	12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Minimum of 7 days between applications.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
Thrips: check label for species controlled (includes melon thrips, western flower thrips, Florida flower thrips, eastern flower thrips, foliar feeding thrips, chilli thrips)	1A	Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 0.5-2.0 A	Do not apply a total of more than 10 lb or 8 qt per acre per crop.	12	3	Do not apply more than seven times.
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	Do not make applications less than 10 days apart.
	3A	*Hero (bifenthrin & zeta-cypermethrin)	10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	
	3A	*Mustang (zeta-cypermethrin)	3.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Not recommended for vegetable leafminer in Florida. Do not make applications less than 7 days apart.
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A & 4A	*Leverage 360 (beta-cyfluthrin & imidacloprid)	3.8-4.1		12	0	
	3A & 6	*Gladiator (avermectin B1 & zeta-cypermethrin)	10-19 fl. oz.	Do not apply more than 57 fl. oz./A per 12 month cropping year.	12	7	
	3A & 28	*Voliam Xpress (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not apply more than 31.0 fl oz /A per season.	24	5	
	4A	Admire Pro (imidacloprid)	7-10.5 fl oz	Maximum allowed on tomato is 10.5 fl. oz/A.	12	21	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Assail 70WP (acetamiprid)	0.6-1.7 oz	Do not exceed a total of 6.8 oz. Assail 70 WP per acre per growing season including any pretransplant applications of acetamiprid.	12	7	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting. Begin applications for whitefly when first adults are noticed. Do not make more than 4 applications per season. Do not apply more than once every 7 days.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.			
	4A	Scorpion (dinotefuran)	Soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz./A per season as a soil application. Do not apply more than 10.5 fl. oz./A per season foliarly.	12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
	4A	Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl. oz./A per growing season.	12	30	Several methods of soil application – see label.
	5	Entrust (spinosad)	0.5-2.5 oz	Do not apply more than 9 oz per acre per crop.	4	1	OMRI-listed ² . For thrips, rotate to other class of effective insecticide after 2 applications of a Group 5 insecticide for at least 2 applications.
	5	Radiant SC (spinetoram)	5-10 fl oz.	Do not apply more than 34 fl. oz./A per calendar year.	4	1	For thrips, if additional treatment is needed after two applications, switch to an alternate mode of action (not group 5) for at least two applications.
	6	*Agri-Mek SC (abamectin)	1.75-3.5 fl oz	Do not apply more than 10.25 fl. oz./A in a growing season.	12	7	Do not make more than 2 sequential applications of Agri-Mek SC or any other foliar applied abamectin-containing product in a growing season.
	6	*Agri-Mek 0.15 EC (abamectin)	8.0-16.0 fl. oz	Do not apply more than 48 fl oz per acre per season.	12	7	Do not make more than 2 sequential applications per season.
	6 & 28	*Minecto Pro (abamectin & cyantraniliprole)	5.5-10 fl oz	Do not apply more than 20 fl oz per acre per year.	24	7	This label contains pollinator warnings.
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Minimum of 7 days between applications.
	23	Movento (spirotetramat)	4.0-5.0 fl oz	Maximum of 10 fl oz/ acre per season.	24	1	
	28	Exirel (cyantraniliprole)	13.5-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatment is 5 days.
	28	Verimark (cyantraniliprole)	10.0-13.5 fl. oz.	Do not apply more than 0.4 lb ai/A per crop.	4	1	
	29	Beleaf 50 SG (flonicamid)	4.2 oz.	Do not apply more than 8.4 oz per acre per season.		0	Begin applications before pests reach damaging levels. Do not apply more than 2 applications per season. Allow a minimum of 7 days between applications.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Antifeedant, repellent, insect growth regulator.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.

Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25 - 1 quart per acre. Apply in sufficient water to cover foliage, typically 5 - 100 gallons per acre.		4	0	Thorough coverage is necessary for effective control.
	-	Grandevo (<i>Chromobacterium subtsugae</i>)	1.0-3.0 lb		4	0	
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	drench: 40-80 fl. oz.; foliar: 0.5 pint - 2qt		0	0	OMRI Listed
	-	Molt-X (azadirachtin)	10 fl oz		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	--	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	Do not exceed four applications per season.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25 quart -1 quart/100 gallons		4	0	Repeat applications at 3-10 days asneeded to maintain control. Can be used in greenhouse for food crop transplants raised to be planted into the field. OMRI listed.
	-	PFR-97 (<i>Isaria fumosorosea</i> Apopka strain 97)	1.0-2.0 lbs		4	0	Begin applications before pests reach damaging levels.
	-	Requiem 25EC (extract of <i>Chenopodium ambrosioides</i>)	2-4 qt	Limited to 10 applications per crop cycle.	4	0	OMRI listed.
	-	Suffoil-X (mineral oil)	1-2% v/v		4	0	OMRI listed.
	-	Surround WP (kaolin)	12.5-50 lbs		4	0	OMRI-listed
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	
Weevils (vegetable weevil)	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	See label for limits on each active ingredient.
	3A, 4A	*Endigo ZC (lambda-cyhalothrin & thiamethoxam)	4.0-4.5 fl oz	Do not exceed a total of 19.0 fl oz per acre per season.	24	5	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	
Whiteflies	1A	*Vydate L (oxamyl)	foliar: 2.0-4.0 pt	Do not apply more than 32 pts/A per season.	48	3	Not recommended for control of vegetable leafminer in Florida.
	3A	*Asana XL (0.66EC) (esfenvalerate)	2.9-9.6 fl oz	Do not apply more than 0.5 lb ai per acre per season, or 10 applications at highest rate.	12	1	
	3A	*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	Do not apply more than 16.8 fl oz per acre per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	7-10.67 fl oz	Do not exceed 42.67 fl. oz. total application /A per season.	24	3	Do not make more than 4 applications per season. Do not make applications less than 10 days apart.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	3A	*Hero (bifenthrin & zeta-cypermethrin)	10.3 oz	Do not apply more than 43.26 fl. oz./A per season.	12	1	
	3A	Karate with Zeon* (lambda-cyhalothrin)	0.96-1.92 fl. oz.	Do not apply more than 23.04 fl. oz. /A per season.	24	5	Not recommended for vegetable leafminer in Florida. Do not make applications less than 7 days apart.
	3A	*Mustang (zeta-cypermethrin)	3.4-4.3 oz	Do not apply more than 25.8 fl. oz./A per season.	12	1	Pyrethrins degrade rapidly in sunlight. Thorough coverage is important. OMRI-listed. Do not apply more than 10 times per season.
	3A	Pyganic Crop Protection EC 5.0 II (pyrethrins)	4.5-18.0 fl oz	11.25 pints.	12	0	
	3A	*Brigade 2EC (bifenthrin)	2.1-5.2 fl oz	Make no more than 4 applications per season.	12	1	
	3A	*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 fl oz	Do not apply more than 2.88 pints per acre per season.	24	5	
	3A	*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	Do not apply more than 23.04 fl. oz/A per season.	24	5	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators. Minimum interval between applications is 5 days.
	3A & 28	*Besiege (lambda-cyhalothrin & chlorantraniliprole)	5.0-9.0 fl oz	Do not apply more than 31.0 fl oz /A per season.	24	5	Do not make applications less than 10 days apart.
	4A	Actara (thiamethoxam)	2.0-5.5 oz	Do not exceed a total of 11.0 oz/Acre per acre per growing season.	12	0	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Admire Pro (imidacloprid)	7-10.5 fl oz	Maximum allowed on tomato is 10.5 fl. oz/A.	12	21	Greenhouse use: 1 application to mature plants, see label for cautions.
	4A	Admire Pro (imidacloprid)	0.6 fl oz per 1000 plants		12	0 (soil)	Planthouse: 1 application. See label.
	4A	Admire Pro (imidacloprid)	0.44 fl oz per 10,000 plants		12	21	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting. Begin applications for whitefly when first adults are noticed. Do not make more than 4 applications per season. Do not apply more than once every 7 days.
	4A	Assail 70WP (acetamiprid)	0.6-1.7 oz	Do not exceed a total of 6.8 oz. Assail 70 WP per acre per growing season including any pretransplant applications of acetamiprid.	12	7	Do not use an adjuvant. Toxic to bees. Do not release irrigation water from the treated area.
	4A	Belay 50 WDG (clothianidin)	1.6-2.1 oz (foliar application)	Do not apply more than 6.4 oz per acre per season.	12	7	See label for application instructions. Do not release irrigation water from the treated area.
	4A	Belay 50 WDG (clothianidin)	4.8-6.4 oz (soil application)	Do not apply more than 6.4 oz per acre per season.	12	Apply at planting	Soil application. Not for use in nurseries, plant propagation houses, greenhouses, or on plants grown for use as transplants. See label for rotational restrictions. Do not use with other neonicotinoid insecticides.
	4A	Platinum (thiamethoxam)	5-11 fl oz	Do not exceed a total of 11 fl. oz. Platinum/A per growing season.	12	30	
	4A	Platinum 75 SG (thiamethoxam)	1.66-3.67 oz	Do not exceed a total of 3.67 Platinum 75 SG/A per growing season.	12	30	Do not apply to crop that has been already treated with imidacloprid or thiamethoxam at planting.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)**Labels change frequently. Be sure to read a current product label before applying any chemical.****Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	4A	Provado 1.6F (imidacloprid)	3.8-6.2 fl oz	Maximum per crop per season 19.2 fl oz/A.	12	0	For transplant production only. Can be applied as foliar spray or soil drench.
	4A	Safari 20 SG (dinotefuran)	7.0-14.0 oz		12	1	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators. Do not combine soil and foliar applications. Use one method or the other.
	4A	Scorpion (dinotefuran)	Soil: 9-10.5 fl. oz.; foliar: 2-7 fl. oz.	Do not apply more than 21 fl. oz/A per season as a soil application. Do not apply more than 10.5 fl. oz/A per season foliarly.	12	1	Use only one application method (soil or foliar). Limited to three applications per season. Toxic to honeybees.
	4A	Venom 20 SG (dinotefuran)	foliar: 0.44-0.895 lb	Do not apply more than 1.34 lb./A per season.	12	1	Use only one application method (soil or foliar). Must have supplemental label for rates over 6.0 oz/acre.
	4A	Venom 20 SG (dinotefuran)	soil: 1.13-1.34 lb	Do not apply more than 2.68 lb/A per season.	12	21	Several methods of soil application – see label.
	4A & 28	Durivo (thiamethoxam & chlorantraniliprole)	10-13 fl oz	Do not exceed a total of 13.0 fl. oz./A per growing season.	12	30	Do not use in greenhouses or on transplants. Do not use if seed has been treated with thiamethoxam or if other Group 4A insecticides will be used. Highly toxic to bees.
	4C	Closer SC (sulfoxaflor)	4.25 - 4.5 fl oz	Do not apply more than 17 fl oz per acre per year.	12	1	DO NOT APPLY THIS PRODUCT UNTIL AFTER PETAL FALL.
	4D	Sivanto Prime (flupyradifurone)	soil: 21.0 - 28.0; foliar: 10.5 - 14.0	Do not apply more 28.0 fl oz per acre per year.		soil application: 45 days; foliar: 1 day	
	4A & 28	Voliam Flexi (thiamethoxam & chlorantraniliprole)	4.0-7.0 oz	Do not exceed 14 oz/A per season.	12	1	Immatures only. Apply when nymphs first appear. Apply when a threshold is reached of 5 nymphs per 10 leaflets from the middle of the plant. Product is a slow-acting IGR that will not kill nymphs immediately. Make no more than two applications per season. Treat whole fields.
	7C	Knack IGR (pyriproxyfen)	8-10 fl oz	Do not exceed 20 fl. oz./A per season.	12	14	(FL-040006) 24(c) label for growing transplants also (FL-03004).
	9B	Fulfill (pymetrozine)	2.75 oz	Do not apply more than 5.5 oz/acre per crop.	12	0	
	15	Rimon 0.83EC (novaluron)	9.0-12.0 fl oz	Do not apply more than 36 fl oz per acre per season.	12	1	Immatures only. Apply when a threshold is reached of 5 whitefly nymphs per 10 leaflets from the middle of the plant. Product is a slow-acting IGR that will not kill nymphs immediately. No more than 2 applications per season. Allow at least 5 days between applications.
	16	Courier 40SC (buprofezin)	9.0-13.6 fl oz	Do not apply more than 27.2 fl. oz./A per crop cycle.	12	1	Do not make more than two applications per growing season. Allow 14 days between applications.
	21A	Portal (fenpyroximate)	2.0 pt	Do not apply more than 4.0 pints/A per crop cycle.	12	1	
	23	Movento (spirotetramat)	4.0-5.0 fl oz	Maximum of 10 fl oz/ acre per season.	24	1	No more than 3 applications.
	23	Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	Maximum amount per crop: 25.5 fl oz/A.	12	1	Application restrictions exist for this product because of risk to bees and other pollinators. Follow application restrictions found in the directions for use to protect pollinators. Minimum application interval between treatment is 5 days.

Table 18.4 . Insecticides labeled for management of arthropod pests on tomato. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.
Also refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks ²
	28	Exirel (cyantraniliprole)	13.5-20.5 fl. oz.	Do not apply a total of more than 0.4 lb ai/A per crop.	12	1	
	28	Verimark (cyantraniliprole)	6.75-13.5 fl. oz. tray drench/transplant water; 6.75-10.0 fl. oz. drip.	Do not apply more than 0.4 lb ai/A per crop.	4	1	Begin applications before pests reach damaging levels. Do not apply more than 2 applications per season. Allow a minimum of 7 days between applications.
	29	Beleaf 50 SG (flonicamid)	4.2 oz.	Do not apply more than 8.4 oz per acre per season.		0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		4	0	Antifeedant, repellent, insect growth regulator.
	-	Azatin XL (azadirachtin)	5-21 fl oz		4	0	Thorough coverage is necessary for effective control.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25 - 1.0 quart per acre. Apply in sufficient water to cover foliage, typically 5 - 100 gallons per acre.		4	0	
	-	Grandevo (<i>Chromobacterium subtsugae</i>)	1.0-3.0 lb		4	0	
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	drench: 40-80 fl. oz.; foliar: 0.5 pint - 2qt		0	0	OMRI Listed
	-	Molt-X (azadirachtin)	10 fl oz		4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25 - 1 quart per acre. Apply in sufficient water to cover foliage, typically 5 - 100 gallons per acre.		4	0	OMRI Listed
	-	Neemix 4.5 (azadirachtin)	4.0-16.0 fl oz		12	0	Repeat applications at 3-10 days are needed to maintain control. Can be used in greenhouse for food crop transplants raised to be planted into the field. OMRI listed.
	-	PFR-97 (<i>Isaria fumosorosea</i> Apopka strain 97)	1.0-2.0 lbs		4	0	Begin applications before pests reach damaging levels.
	-	Requiem 25EC (extract of <i>Chenopodium ambrosioides</i>)	2-4 qt	Limited to 10 applications per crop cycle.	4	0	OMRI listed.
	-	SuffOil-X (mineral oil)	1-2 gallons per 100 gallons of water.		4		OMRI-listed
	-	M-Pede 49% EC (Soap, insecticidal)	1-2% V/V		12	0	Do not exceed four applications per season.
	-	Ultra Fine Oil, Saf-T-Side, others	1.0-2.0 gal/100 gal		4	0	Organic Stylet-Oil and Saf-T-Side are OMRI-listed.
	-	JMS Stylet-Oil (oil, insecticidal)	3.0-6.0 qt/100 gal water				Incorporate into soil - see label.
Wireworms	1B	*Diazinon AG500; *50 W (diazinon)	AG500: 1-4 qt 50W: 2-8 lb	Do not make more than one soil application per year regardless of target pest.	48	preplant	

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 8.2 March 2017. Number codes (1 through 29) are used to distinguish the main insecticide mode of action groups, with additional letters for certain sub-groups within each main group. All insecticides within the same group (with same number) indicate same active ingredient or similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

² Information provided in this table applies only to Florida. Be sure to read a current product label before applying any product. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by the University of Florida Cooperative Extension Service nor discrimination against similar products or services not mentioned. OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²	
			Applic.	Season	Harvest	Reentry		
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.								
Anthracnose	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days.	Mancozeb enhances bactericidal effect of fix copper compounds.	
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate FL, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5	1		
	M3	Ziram 76DF (ziram)	4 lb	23.7 lb	7	2	Do not use on cherry tomatoes.	
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lb	112 lb	5	2		
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.	
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Limit is 4 applications per season.	
	(suppression)	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	For Disease suppression only. No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5		
	(suppression)	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.	
(suppression)	11	Equation	6.2 fl oz	37 fl oz	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.	
		Heritage	3.2 oz	1.6 lb	0	4 hr		
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr		
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr		
	11	Flint	4 oz	16 oz	3	0.5	Limit is 5 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.	
		Gem 500 SC (trifloxystrobin)	3.8 floz	16 fl oz	3	0.5		
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.	

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
(suppression)	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	1.9 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	19	Ph-D WDG Oso 5% SC (polyoxin D zinc salt)	6.2 oz 13 fl oz	31.0 oz 78 fl oz	0 0	4 hr 4 hr	Alternate with a non-FRAC code 19 fungicide.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	Limit is 4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
Bacterial canker	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	Mancozeb enhances the bactericidal effect of fix copper compounds.
(suppression)	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
Bacterial spot and Bacterial speck	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	Mancozeb enhances the bactericidal effect of fix copper compounds.
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate FL, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5	1	Bacterial spot control only when tank mixed with a copper fungicide.
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lb	112 lb	5	2	
(suppression)	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical.							
Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
Black mold (<i>Alternaria</i> spp.)	25	Agri-mycin 17 Ag Streptomycin Bac-Master FireWall 17 WP or 50 WP (streptomycin sulfate)	200 ppm	-	-	0.5	See label for details. For transplant production only. Many isolates are resistant to streptomycin.
	P	Actigard (acibenzolar-S-methyl)	0.75 oz	4.75 oz	14	0.5	Begin applications within one week of transplanting or emergence. Make up to 8 weekly, sequential applications.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Limit is 4 applications per season.
	3	Mentor (propiconazole)	8 oz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. See label for details.
	3 & 9	Chairman (propiconazole + fludioxonil)	32 floz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. Lower rates for small diameter fruit. See label for details.
	7	Endura (boscalid)	12.5 oz	25 oz	0	0.5	Alternate with non-FRAC code 7 fungicides, see label
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	11	Heritage Quadris FL Equation Satori (azoxystrobin)	3.2 oz 6.2 fl oz 6.2 fl oz 6.2 fl oz	1.6 lb 37 fl oz 37 fl oz 37 fl oz	0 0 0 0	4 hr 4 hr 4 hr 4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 1 year plant back restriction for certain off label crops.	
11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.	

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	1.9 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Botrytis, Gray Mold	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	3 & 9	Chairman (propiconazole + fludioxonil)	32 fl oz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. Lower rates for small diameter fruit. See label for details.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
(suppression)	7	Endura (boscalid)	12.5 oz	25 oz	0	0.5	Alternate with non-FRAC code 7 fungicides.
	7	Luna Privelege	6.84 fl oz	13.7 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
(suppression)	7 & 11	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	1	0.5	Use only in a tank mix with another effective non-FRAC code 9 fungicide; Has a 30 day plant back with off label crops.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz per year	0	0.5	After 2 appl. Alternate with non-FRAC code 9 or 12 fungicides for next 2 applications. Has a 30 day plant back with off label crops.
(suppression)	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential appl. Allowed. Limit is 6 appl/ crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	12	Emblem (fludioxonil)	7 fl oz	28 fl oz	0	0.5	<u>Transplant and Greenhouse use only.</u> Limit to 4 applications per year. No more than 2 sequential applications before rotating to a different mode of action for 2 applications.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	14	Botran 75 W (dichloran)	1 lbs per 100 gal.	5.33 lb	10	0.5	Greenhouse use only. Limit is 4 applications. Seedlings or newly set transplants may be injured.
	17	Decree 50 WDG (fenhexamid)	1.5 lb	6 lb	0	0.5	Transplant and Greenhouse use only. Do not make more than 2 consecutive applications.
	19	Ph-D WDG Oso 5% SC (polyoxin D zinc salt)	6.2 oz 13 fl oz	31.0 oz 78 fl oz	0 0	4 hr 4 hr	Alternate with a non-FRAC code 19 fungicide.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	1.9 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Buckeye rot Phytophthora fruit rot (Phytophthora spp.) (suppression)	M1 + 4	Ridomil Gold Copper (copper hydroxide + mefenoxam)	2 lb	6 lb	14	2	Limited to 3 apps per season. Tankmix with mancozeb.
	11	Heritage	3.2 oz	1.6 lb	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr	
		Equation	6.2 fl oz	37 fl oz	0	4 hr	
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr	
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential appl. Allowed. Limit is 6 appl/ crop. Must alternate or tank mix with a fungicide from a different FRAC group, see label.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	See label
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
U15 + 40	Orondis Ultra (oxathiapiprolin + mandipropamid)	8.0 fl oz	32 fl oz	1	4 hr	Do use Orondis Ultra following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Ultra should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. See label for greenhouse instructions.	

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
Early blight	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	Mancozeb or maneb enhances bactericidal effect of fix copper compounds. See label for details.
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate FL, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5	1	
	M3	Ziram 76DF (ziram)	4 lbs	23.7 lb	7	2	Do not use on cherry tomatoes.
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lb	112 lb	5	2	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Limit is 4 applications per season.
	3	Tebuzol 3.6F Toledo 3.6F (tebuconazole)	8 fl oz	48 fl oz	7	0.5	Limit is 6 appl./crop. Minimum appl. interval of 7 days.
	4 & M5	Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam)	3 lb	12 lb	14	2	Limit is 4 appl./crop.
	7	Endura (boscalid)	12.5 oz	25 oz	0	0.5	Alternate with non-FRAC code 7 fungicides.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse usage.
	7	Luna Privelege	6.84 fl oz	13.7 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse usage.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse usage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	1	0.5	Use only in a tank mix with another effective non-FRAC code 9 fungicide ; Has a 30 day plant back with off label crops.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz per year	0	0.5	After 2 apps. alternate with non-FRAC code 9 or 12 fungicides for next 2 applications. Has a 30 day plant back with off label crops.
	11	Heritage	3.2 oz	1.6 lb	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr	
		Equation	6.2 fl oz	37 fl oz	0	4 hr	
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr	
	11	Evito Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Limit is 4 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Reason 500 SC (fenamidone)	8.2 oz	24.6 lb	14	0.5	Must alternate with a fungicide from a different FRAC group. See supplemental label for restrictions and details.
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential apps. allowed. Limit is 6 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Flint	4 oz	16 oz	3	0.5	Limit is 5 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
		Gem 500 SC (trifloxystrobin)	3 fl oz	16 fl oz	3	0.5	
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 1 year plant back restriction for certain off label crops.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	12	Emblem (fludioxonil)	7 fl oz	28 fl oz	0	0.5	<u>Transplant and Greenhouse use only.</u> Limit to 4 applications per year. No more than 2 sequential applications before rotating to a different mode of action for 2 applications.
	19	Ph-D WDG	6.2 oz	31.0 oz	0	4 hr	Alternate with a non-FRAC code 19 fungicide.
		Oso 5% SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	
	22 & M5	Zing! (zoaximide + chlorothalonil)	36 fl oz	288 fl oz	5	0.5	Limit is 8 apps per season. No more than 2 sequential applications before alternating to a different mode of action.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	3.0 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	28	Previcur Flex (propamocarb hydrochloride)	1.5 pt	7.5 pt	5	0.5	Must tank mix with chlorothalonil or mancozeb.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	28	Promess (propamocarb hydrochloride)	1.5 pt	7.5 pt	5	0.5	Must tank mix with chlorothalonil or mancozeb.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	Limit is 4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Late blight	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5	1	
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lb	112 lb	5	2	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	4 & M3	Ridomil MZ 68 WP (mefenoxam + mancozeb)	2.5 lb	7.5 lb	5	2	Limit is 3 apps./crop.
	4 & M1	Ridomil Gold Copper 64.8 W (mefenoxam + copper hydroxide)	2 lb	6 lb	14	2	Limit is 3 apps./crop. Tank mix with mancozeb fungicide.
	4 & M5	Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam)	3 lb	12 lb	14	2	Limit is 4 apps./crop.
	11	Heritage	3.2 oz	1.6 lb	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr	
		Equation	6.2 fl oz	37 fl oz	0	4 hr	
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr	
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential appl. Allowed. Limit is 6 appl/ crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Flint	4 oz	16 oz	3	0.5	Limit is 5 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
		Gem 500 SC (trifloxystrobin)	3.8 floz	16 fl oz	3	0.5	
	11	Evito Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Limit is 4 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
(suppression)	11	Reason 500 SC (fenamidone)	8.2 oz	24.6 lb	14	0.5	Must alternate with a fungicide from a different FRAC group.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	7	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	19	Oso 5% SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	Alternate with a non-FRAC code 19 fungicide.
	21	Ranman (cyazofamid)	2.75 oz	16oz	0	0.5	Limit is 6 apps./crop.
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	
	22 & M5	Zing! (zoaximide + chlorothalonil)	36 fl oz	288 fl oz	5	0.5	Limit is 8 apps per season. No more than 2 sequential applications before alternating to a different mode of action.
	27	Curzate 60DF (cymoxanil)	5 oz	30 oz per year	3	0.5	Must tank mix with another effective product.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	3.0 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	28	Previcur Flex (propamocarb hydrochloride)	1.5 pt	7.5 pt	5	0.5	Must tank mix with Chlorothalonil or mancozeb.
	28	Promess (propamocarb hydrochloride)	1.5 pt	7.5 pt	5	0.5	Must tank mix with Chlorothalonil or mancozeb.
	33	Aliette 80 WDG (fosetyl-al)	5 lb	20lb	14	0.5	See label for warnings concerning the use of copper compounds.
	33	Alude (mono- and di-potassium salts of phosphorous acid)	1.5 qt/ acre/ 25 gal	-	-	4 hr	For transplants only.
	40	Forum (dimethomorph)	6 oz	30 oz	4	0.5	Only 2 sequential appl. See label for details
	40	Revus (mandipropamid)	8 fl oz	32 fl oz	1	4 hr	No more than 2 sequential appl. Rotate with another effective fungicide; See label.
40	Micora (mandipropamid)	8 fl oz/ 5,000 sq ft	16 fl oz/ 5,000 sq ft	n.a.	4 hr	Micora is only labeled for transplant and retail sale to consumers.	
40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants. See label	
43	Presidio (Fluopicolide)	4 fl oz	12 fl oz/per season	2	0.5	4 apps per season; no more than 2 sequential apps. 10 day spray interval; Tank mix with another labeled non-FRAC code 43 fungicide; 18 month rotation with off label crops; see label.	
45 & 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	4	0.5	Addition of a spreading or penetrating adjuvant is recommended to improve performance. Limit of 3 applications per season.	

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
	U15 + 40	Orondis Ultra (oxathiapiprolin + mandipropamid)	8.0 fl oz	32 fl oz	1	4 hr	Do use Orondis Ultra following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Ultra should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. See label for greenhouse instructions.
Leaf mold	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5		
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	19	Oso 5% SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	Alternate with a non-FRAC code 19 fungicide.
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
Grey leaf spot (<i>Stemphyllium</i> spp.)	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	Mancozeb or maneb enhances bactericidal effect of fix copper compounds.
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5	1	
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lb	112 lb	5	2	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	4 & M5	Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam) (mefenoxam + chlorothalonil)	3 lb	12 lb	14	2	Limit is 4 apps./crop.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	11	Flint Gem 500 SC (trifloxystrobin)	4 oz 3.8 floz	16 oz 16 fl oz	3 3	0.5 0.5	Limit is 5 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 1 year plant back restriction for certain off label crops.
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	
	27 & M5	Ariston (cymoxanil + chlorothalonil)	3.0 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Phytophthora crown rot, Phytophthora root rot (<i>Phytophthora</i> spp.)	4	Ridomil Gold SL	1 pt	3 pt	28	2*	Do not apply more than 1.5 lb mefenoxam/A per crop to the soil. *There is a reentry interval exemption if material is soil-injected or soil-incorporated.
		Ultra Flourish (mefenoxam)	2 pt	6 pt	7	2*	
	4	Metastar 2E (metalaxyl)	2 qt	6 qt	2	28	Soil applied by drip injection.
	11	Reason 500 SC (fenamidone)	8.2 oz	24.6 lb	14	0.5	Must alternate with a fungicide from a different FRAC group. (<i>Phytophthora capsici</i> -suppression only)
	14	Terramaster 4EC (etridiazole)	7 fl oz	27.4 fl oz	3	0.5	<u>Greenhouse use only.</u>
	21	Ranman (cyazofamid)	2.75 fl oz	16.5 fl oz	0		Apply to the base of plant at the time of transplanting. Make additional applications on a 7 to 10 day schedule if conditions are favorable for disease.
	28	Previcur Flex (propamocarb hydrochloride)	SEE LABEL		5	0.5	GREENHOUSE APPLICATION: 6 apps/crop cycle. Do not mix with other products. Can cause phytotoxicity if applied in intense sunlight.
	33	Aliette 80 WDG Linebacker WDG (fosetyl-aluminum)	5 lb	2 lb	14	0.5	See label for warnings concerning the use of copper compounds.
	33	Alude (mono- and di-potassium salts of phosphorous acid)	1.5 qt/acre/ 25 gal	-	-	4 hr	For transplants only.
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	2	0.5	4 apps per season; no more than 2 sequential apps. 10 day spray interval; Tank mix with another labeled non-FRAC code 43 fungicide; 18 month rotation with off label crops.
	45 & 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	4	0.5	Addition of a spreading or penetrating adjuvant is recommended to improve performance. Limit of 3 applications per season.
	U15	Orondis Gold 200 (oxathiapiprolin)	9.6 fl oz	19.2 fl oz	0	4 hr	Soil applications cannot be combined or followed by foliar applications of Orondis Opti or Orondis Ultra. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Gold should not exceed more than 33% of the total fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
	U15 + 40	Orondis Ultra (oxathiapiprolin + mandipropamid)	8.0 fl oz	32 fl oz	1	4 hr	Do use Orondis Ultra following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Ultra should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. See label for greenhouse instructions.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
Powdery mildew	M2	(sulfur) Many brands available: Cosavet DF, Kumulus DF, Micro Sulf, Microfine Sulfur, Microthiol Disperss, Sulfur 6L, Sulfur 90W, Super Six, That Flowable Sulfur, Tiolux Jet, Thiosperse 80%, Wettable Sulfur, Wettable Sulfur 92, Yellow Jacket Dusting Sulfur, Yellow Jacket Wettable Sulfur	SEE INDIVIDUAL LABELS		1	1	Follow label closely, may cause leaf burn if applied during high temperatures.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Limit is 4 applications per season.
	3	Rally 40WSP Nova 40 W Sonoma 40WSP (myclobutanil)	4 oz	1.25 lb	0	1	Note that a 30 day plant back restriction exists.
	3	Trionic 4SC (triflumizole)	4 fl oz/ 100 gal	16 fl oz	1	0.5	Greenhouse use only. Limit is 4 applications per season.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
	7	Luna Privelege Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage. See Velum Prime label for soil applications.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz per year	0	0.5	After 2 apps alternate with non-FRAC code 9 or 12 fungicides for next 2 applications. Has a 30 day plant back with off label crops.
	11	Heritage Quadris FL Equation Satori (azoxystrobin)	3.2 oz 6.2 fl oz 6.2 fl oz 6.2 fl oz	1.6 lb 37 fl oz 37 fl oz 37 fl oz	0 0 0 0	4 hr 4 hr 4 hr 4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential apps. allowed. Limit is 6 appl/ crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Flint Gem 500 SC (trifloxystrobin)	4 oz 3.8 floz	16 oz 16 fl oz	3 3	0.5 0.5	Limit is 5 apps/crop; must alternate or tank mix with a fungicide from a different FRAC group.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 1 year plant back restriction for certain off label crops.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	12	Emblem (fludioxonil)	7 fl oz	28 fl oz	0	0.5	<u>Transplant and Greenhouse use only.</u> Limit to 4 applications per year. No more than 2 sequential applications before rotating to a different mode of action for 2 applications.
	19	Ph-D WDG Oso 5% SC (polyoxin D zinc salt)	6.2 oz 13 fl oz	31.0 oz 78 fl oz	0	4 hr 4 hr	Alternate with a non-FRAC code 19 fungicide.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U8	Vivando (metrafenone)	15.4 fl oz	46.2 fl oz	0	0.5	3 apps per season; no more than 2 sequential apps. Do not mix with horticultural oils.
Pythium diseases (<i>Pythium spp.</i>)	4	Ridomil Gold GR Ridomil Gold SL Ultra Flourish (mefenoxam)	20 lb 2 pt 2 pt	40 lb 3 pt 6 pt	28	2* 7 2	Do not apply more than 1.5 lb mefenoxam/A per crop to the soil. *There is a reentry interval exemption if material is soil-injected or soil-incorporated.
	4	Metastar 2E (metalaxyl)	2 qt	6 qt	28	2	Soil applied by drip injection.
	14	Terramaster 4EC (etridiazole)	7 fl oz	27.4 fl oz	3	0.5	<u>Greenhouse use only.</u>
	21	Ranman (cyazofamid)	3 fl oz/ 100 gal	-	0	-	For greenhouse transplant production; make a single application to the seedling tray 1 week prior up to the time of transplanting. Do not use any surfactant.
	28	Previcur Flex (propamocarb hydrochloride)	SEE INDIVIDUAL LABELS		5	0.5	GREENHOUSE APPLICATION: 6 apps/crop cycle. Do not mix with other products. Can cause phytotoxicity if applied in intense sunlight.
	28	Previcur Flex (propamocarb hydrochloride)	1.5 pts/ treated acre	7.5 pt/ treated acre	5	0.5	(Root rots and seedling diseases) Applied to lower portion of plant and soil, or as a soil drench or drip irrigation.
	28	Promess (propamocarb hydrochloride)	1.5 pt	7.5 pt	5	0.5	Must tank mix with chlorothalonil or mancozeb.
	33	Alude (mono- and di-potassium salts of phosphorous acid)	1.5 qt/ acre/ 25 gal	-	-	4 hr	For transplants only.
	Rhizoctonia root rot, Rhizoctonia fruit rot (<i>Rhizoctonia solani</i>)	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5
	7	Fontelis (penthiopyrad)	1.0 - 1.6 fl oz/ 1000 row-ft	24 fl oz	0	0.5	Apply at-plant, pre-plant incorporated, in-furrow, as a transplant drench, or by drip irrigation.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
(suppression)	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	11	Cabrio (pyraclostrobin)	16 oz	96 oz	0	0.5	Limit is 2 sequential applications before alternating to another effective fungicide from a different FRAC group.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	7	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	14	Blocker 4F Terraclor 75 WP (PCNB)	SEE INDIVIDUAL LABELS		Soil treatment at planting	0.5	See label for application type and restrictions
	14	Par-Flo 4F (PCNB)	12 fl oz per 100 gal.	2 app.	Soil drench	0.5	Limited to only container-grown plants in nurseries or greenhouse.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	1.9 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Rhizopus rot	3 & 9	Chairman (propiconazole + fludioxonil)	32 fl oz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. Lower rates for small diameter fruit. See label for details.
Septoria leaf spot	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 50W HB, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ F2 FL, Champ WG, Champion WP, C-O-C DF, C-O-C WP, Copper Count N, Cuprofix Ultra 40D, Cueva, Kentan DF, Kocide 3000, Kocide 2000, Kocide DF, Nordox, Nordox 75WG, Nu Cop 50WP, Nu Cop 3L, Nu Cop 50DF, Nu Cop HB	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days.	
	M3	(mancozeb) Many brands available: Dithane DF, Dithane F45, Dithane M45, Koverall, Manzate, Manzate Pro-Stik, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP	SEE INDIVIDUAL LABELS		5		
	M3	Ziram 76DF (ziram)	4 lbs	23.7 lb	7	2	Do not use on cherry tomatoes.
	M3 & M1	ManKocide (mancozeb + copper hydroxide)	5 lbs	112 lb	5	2	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	4 & M5	Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam)	3 lb	12 lb	14	2	Limit is 4 apps./crop.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential apps. before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
	7	Luna Privelege	6.84 fl oz	13.7 fl oz	0	0.5	No more than 2 sequential applications before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	11	Heritage	3.2 oz	1.6 lb	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr	
		Equation	6.2 fl oz	37 fl oz	0	4 hr	
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr	
	11	Reason 500 SC (fenamidone)	8.2 oz	24.6 lb	14	0.5	Must alternate with a fungicide from a different FRAC group.
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential appl. Allowed. Limit is 6 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Flint (trifloxystrobin)	4 oz	16 oz	3	0.5	Limit is 5 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Up to a 1 year plant back restriction for certain off label crops.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	22 & M3	Gavel 75DF (zoaximide + mancozeb)	2.0 lb	16 lb	5	2	

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	27 & M5	Ariston (cymoxanil + chlorothalonil)	3.0 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Sour Rot (<i>Geotrichum candidum</i>)	3	Mentor (propiconazole)	8 oz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. See label for details.
	3 & 9	Chairman (propiconazole + fludioxonil)	32 floz /100 gal or /50,000 lb of fruit	-	-	-	Apply as a post-harvest dip, drench, or high-volume spray for the post-harvest control of certain rots. Lower rates for small diameter fruit. See label for details.
Southern blight	7	Fontelis (penthiopyrad)	1.0 - 1.6 fl oz/ 1000 row-ft	24 fl oz	0	0.5	Apply at-plant, pre-plant incorporated, in-furrow, as a transplant drench, or by drip irrigation.
(suppression)	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	11	Evito Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Limit is 4 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
(suppression)	11	Cabrio (pyraclostrobin)	16 oz	96 oz	0	0.5	Limit is 2 sequential applications before alternating to another effective fungicide from a different FRAC group.
(suppression)	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	14	Blocker 4F Terraclor 75 WP (PCNB)	SEE INDIVIDUAL LABELS		Soil treatment at planting	0.5	See label for application type and restrictions.
(suppression)	19	Oso 5% SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	Alternate with a non-FRAC code 19 fungicide.
Target spot	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo Zn, Chloronil 720, Echo 720, Echo 90 DF, Echo Zn, Equus 500 Zn, Equus 720 SST, Equus DF, Initiate 720, Orondis Opti B	SEE INDIVIDUAL LABELS		0	0.5	Use higher rates at fruit set and lower rates before fruit set.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Limit is 4 applications per season.
	4 & M5	Ridomil Gold Bravo 76.4 W (chlorothalonil + mefenoxam)	3 lb	12 lb	14	2	Limit is 4 appl./crop.
	7	Endura (boscalid)	12.5 oz	25 oz	0	0.5	Alternate with non-FRAC code 7 fungicides.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No more than 2 sequential apps. before switching to another effective fungicide with a different mode of action. See label for additional instructions pertaining to greenhouse useage.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	No more than 2 sequential applications on a 7-day interval before rotating to a non-FRAC group 7 fungicide; subsequent applications on no shorter than a 14-day interval. Limit of 4 apps per a year. See label for surfactant precautions. Not labeled for greenhouse use.
	7 & 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	54.7 fl oz	1	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. See label for additional instructions pertaining to greenhouse useage.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	1	0.5	Use only in a tank mix with another effective non-FRAC code 9 fungicide; has a 30 day plant back with off label crops.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	47 fl oz	0	0.5	Limit is 5 apps./season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 8 month plant back restriction with off label crops.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz per year	0	0.5	See 2 (ee) label. After 2 apps. alternate with non-FRAC code 9 or 12 fungicides for next 2 applications. Has a 30 day plant back with off label crops.
	11	Heritage	3.2 oz	1.6 lb	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
		Quadris FL	6.2 fl oz	37 fl oz	0	4 hr	
		Equation	6.2 fl oz	37 fl oz	0	4 hr	
		Satori (azoxystrobin)	6.2 fl oz	37 fl oz	0	4 hr	
	11	Evito Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Limit is 4 appl/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential appl. Allowed. Limit is 6 appl/ crop. Must alternate or tank mix with a fungicide from a different FRAC group.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	8 pt	0	0.5	Must alternate with a non-FRAC code 11 fungicide; use of an adjuvant may cause phytotoxicity.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	32 fl oz	0	0.5	Limit is 4 applications per season. Do not use adjuvants or EC formulated tank mix partners. The addition of silicone or oil based additives may cause injury at high temperatures. Do not exceed 0.125% (v/v) adjuvant levels.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	8 fl oz	47 fl oz	0	0.5	Limit is 4 apps per season with no more than 2 sequential apps. Must tank mix or alternate with another effective fungicide from another FRAC group. Has up to a 1 year plant back restriction for certain off label crops.
	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.
	11 & 27	Tanos (famoxadone + cymoxanil)	8 oz	72 oz	3	0.5	Do not alternate or tank mix with other FRAC group 11 fungicides.
	27 & M5	Ariston (cymoxanil + chlorothalonil)	3.0 pt	30.2 pt	3	0.5	Check copper manufacturer's label for specific precautions and limitations for mixing with this product.

Table 18.5. Tomato fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.							
	40 & 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	1	0.5	4 apps per season; no more than 2 sequential apps. Not labeled for transplants.
	U15 + M5	Orondis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt	0	4 hr	Do use Orondis Opti following a soil app. of another oxathiapiprolin product. No more than 2 sequential apps. before rotating to another mode of action; 7 day minimum app. interval. Applications of Orondis Opti should not exceed more than 33% of the total foliar fungicide apps., or 4 apps. per crop, whichever is fewer. Limit on multiple crops is 6 apps. per acre per year. Not labeled for greenhouse use.
Timber Rot, Sclerotinia stem rot, or White mold (<i>Sclerotinia sclerotiorum</i>) (suppression)	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	3	0.5	No more than 2 sequential applications before rotating with another effective fungicide from a different FRAC group. Limit of 5 apps per a year.
	11	Heritage Quadris FL (azoxystrobin)	3.2 oz 6.2 fl oz	1.6 lb 37 fl oz	0	4 hr	Must alternate or tank mix with a fungicide from a different FRAC group; use of an adjuvant or tank mixing with EC products may cause phytotoxicity.
(suppression)	11	Cabrio 2.09 F (pyraclostrobin)	16 fl oz	96 fl oz	0	0.5	Only 2 sequential apps. allowed. Limit is 6 apps/crop. Must alternate or tank mix with a fungicide from a different FRAC group.
(suppression)	11 & 7	Priaxor (pyraclostrobin + fluxapyroxad)	8 fl oz	24 fl oz	0	0.5	Limit is 3 apps per season; no more than 2 sequential apps. See label about compatibility with other formulated products and adjuvants.

¹ FRAC code (fungicide group): Number (1 through 46) and letters (U and P) are used to distinguish the fungicide mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 2018; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

² Information provided in this table applies only to Florida. Be sure to read a current product label before applying any chemical. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by the University of Florida Cooperative Extension Service nor discrimination against similar products or services not mentioned.

Table 18.6. Non-fumigant nematicides for tomatoes in Florida.

Product	Application Directions
Vydate L (a.i oxamyl)	Apply 1/2 to 1 gal/acre at planting, preferably via drip application. Make additional applications on a 10-14 day interval. Do not apply more than 4 gal per acre per season. Minimum retreatment interval is 7 days unless a longer interval is stated. Do not make more than 8 applications per season.
Nimitz (a.i fluensulfone)	All applications must be incorporated either physically or via drip or overhead irrigation. Make preplant applications at a rate of 3.5 to 7 pints, (56.0 to 80.0 fl. oz.) per acre, a minimum of seven days before planting. Do not plant any unlisted crops into treated land for 365 days after application of the product. Do not apply more than one application per crop, and no more than 112 fl. oz. of product per acre, per year (365 days). Provides control only for nematodes. Growers applying Nimitz must consult the product label to observe the plant-back (recropping) intervals for a variety of leafy vegetables and brassica crops, onions, bananas, sugarcane, and other crops.
Velum (a.i fluopyram)	Apply max 6.84 fl oz/acre using only Chemigation into root-zone through low-pressure drip, trickle, micro-sprinkler or equivalent equipment. Observe minimum 5-day interval between soil applications. Do not apply more than 13.7 fl oz of Velum (0.446 lbs Fluopyram) per acre per year, regardless of formulation (Velum and/or Luna) or method of application (soil or foliar). For soil application, to limit the potential for development of disease resistance to this chemical class, the first foliar fungicide application after Velum should be a product from a different FRAC group.

Vydate is an insecticide/nematicide; Velum is a fungicide/nematicide; Nimitz is a true nematicide. Unlike fumigants, these products are not volatile and will move through the soil via water; depending on the water solubility, these products will have different recommendations as far as how to best apply them (see specific label recommendations); when nematode pressure is high, they may not be as consistently effective against root nematodes as the fumigants.

Table 18.7. Fumigant nematicides for tomatoes in Florida.

Nematicide	Broadcast Application ¹		In the Row Applications
	Gallons or Lbs Per acre	Fl oz /1000 ft / chisel spaced 12" apart	
Telone II ^{2,3}	9 to 12 gal	26 to 35	For any row spacing, application rates given may be concentrated in the row, but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-17 ^{2,3}	10.8 to 17.1 gal	31.8 to 50.2	For any row spacing, application rates given may be concentrated in the row, but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-35 ^{2,3}	13 to 20.5 gal	38 to 60	For any row spacing, application rates given may be concentrated in the row, but shall never exceed labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone InLine ^{2,3}	13 to 20.5 gal	-	For drip fumigation, consult the product label for overall rate, drip concentration and flow modifying application directions.
Pic Clor 60 ^{2,3}	19.5 - 31.5 gal	57 to 90	Consult product label for overall rate and chisel flow modifying application directions.
Pic Clor 60 EC ^{2,3}	19.5 - 31.5 gal	-	For drip fumigation, consult product label for proportionately reduced overall rates, drip concentration and drip flow modifying directions and procedures.
Vapam HL	75 gal	-	For drip or in-row fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration and flow modifying directions and procedures.
KPam HL	60 gal	-	For drip or in-row fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration and flow modifying directions.
Dimethyl ² Disulfide (DMDS)	51.3 gal	-	Compared to broadcast application, apply proportionately less for in the row applications based on the ratio of bed width to row spacing. Consult the product label for additional detail and rate modifying recommendation and mandatory requirements for totally impermeable plastic mulch films (TIF).
Allyl Isothiocyanate (AITC)	40 gal	-	For drip or in-row fumigation and crop termination, consult product label for overall rates, drip concentration and flow modifying directions
Dominus			

¹ Gallons /acre and Fl oz / 1000 feet provided only for mineral soils. Higher rates may be possible for heavier textured (loam, silt, clay) or highly organic soils.

² All of the fumigants mentioned are for retail sale and use only by state certified applicators or persons under their direct supervision. New supplemental labeling for the Telone products must be in the hands of the user at the time of application. See label details for additional use restrictions based on soil characteristics, buffer zones, requirements for Personal Protective Equipment (PPE), mandatory good agricultural practices (GAP's), product and applicator training certification, and rate modifying recommendations with use of highly retentive Totally Impermeable mulch films (TIF).

³ Higher application rates are possible in the presence of cyst-forming nematodes.

Rates are believed to be correct for products named, and similar products of other brand names, when applied to mineral soils. Higher rates are required for muck (organic) soils. However, the **grower** has the final responsibility to see that each product is used legally; **read the label** of the product to be sure that you are using it properly.