

Fruiting Vegetables

Fruiting Vegetables — Eggplant

Varieties	Season	Comments
Dusky	extra-early	Good, but low yielding because of small fruit size
Classic	early	Long, slim, tapered
Epic	early	Oval
Ichiban	early	Long, slender
Little Fingers	early	Small, slender, borne in clusters
Millionaire	early	Slender, black, purple calyx
Kiko	early main	Holds color in fall
Nadia	main	Oval, long
Caspar	main	White, cylindrical
Ghostbuster	main	White, oval
Rosita	main	Lavender, long, cylindrical

Fruiting Vegetables — Pepper

Varieties	Season	Fruit Shape	Color ¹	DisTol/Res ²	Comments
Alliance	mid-early	blocky, 3-4 lobes	G>R	BLS-1,2,3,4,5, CMV, PHY, PMV, PVY,	Large peppers
Aristotle X3R	main	Blocky	G>R	BLS-1,2,3	Very consistent
Brigadier	mid-early	deep blocky, 3-4 lobes	G>R	BLS-1,2,3,PVY	
Crusader	main	blocky	G>R	BLS-1,2,3, TMV, PVY, PMV, Stip	Dark green
King Arthur	early	3-4 lobes, blocky	G>R	BLS-2	
Lafayette	main	blocky	G>Y	BLS-1,2,3, PVY	Not for sandy soils
Paladin	early-main	long blocky	G>R	PHY	
Revolution	main	blocky	G>R	BLS-1,2,3,5, CMV, PHY	Large peppers, not recommended for Iowa
Sentry	mid-early	blocky	G>R	BLS-1,2,3	Dark green
Socrates	early	blocky	G>R	BLS-1,2,3, PVY	
Red Knight X3R	early	blocky	G>R	BLS-1,2,3	Very good red

¹Immature to ripe fruit color: G=green, R=red, Y=yellow

²Disease resistance or tolerance as reported by seed company. BLS-1,2,3=bacterial spot strains 1,2, and 3; CMV=cucumber mosaic virus; PHY=Phytophthora; PMV=pepper mottle virus; PVY=potato virus Y; TMV=tobacco mosaic virus.

Colored Bells for trial	Gold Finch (yellow), Orange Grande, Oriole (orange), Sweet Chocolate, Blackbird (brown to black), Blue Jay (lilac), Islander (lavender), Tequila (green to purple to red), Blushing Beauty (ivory to red)
Banana peppers/cubanelles	Sweet Banana (turns red at maturity), Key Largo (cubanelle, orange-red at maturity)
Sweet peppers	Aruba, Corno Verde, Giant Marconi
Hot Peppers	Hungarian Hot Wax: Stoked. Jalapeno: Tula, Grande, Ixtapa, Mitla, Pecos Long Thick Red: Ring of Fire, Copacabana (yellow) Anaheim: Big Chile, Anaheim TMR23

Tomato — Fresh Market Varieties

Varieties	Season	Crack Resistance	Firmness	Vine Type ¹
Sunshine	first early	good	firm	D
Jet Star	early	good	fair	I
Celebrity	early-main	fair	fair	D
Fabulous	early-main	good	firm	D
Florida 91	early-main	excellent	firm	D
Mountain Spring	early-main	excellent	very firm	D
Red Sun	early-main	good	firm	D
Sun Brite	early-main	good		D
Sunsation	early-main		firm	D
Amelia	main	good	firm	D
BHN 589	main	excellent	firm	D
Big Beef	main	good	fair	I
Biltmore	main	good	firm	D
Crista	main	good	very firm	D
Florida 47	main	good	firm	D
Mountain Fresh	main	good	firm	D
Sun Leaper	main-late		firm	D
For trial: Applause (early), Linda				
Yellow: Carolina Gold, Lemon Boy				
Cherry types: Mountain Belle				
Grape types: Santa (indeterminate), Sweet Olive (determinate), Jolly Elf (determinate, for trial), Golden Sweet (yellow)				
Roma types: BHN 411, Plum Dandy, LaRossa				
¹ Vine Type: I=indeterminate (long vine); D=determinate (short vine).				

Transplants

Eggplant, peppers, and tomatoes are typically started as transplants in greenhouses or artificially lit growing rooms — refer to the Transplant Production section (pages 8-10).

For rapid seed germination, maintain the temperature of potting mix at 85°F. Grow eggplant seedlings between 70°F and 80°F during the day and 65°F and 70°F at night, and tomatoes and peppers between 65°F and 75°F during the day and 60°F and 65°F at night.

Pepper and eggplant seedlings should be ready for the field in six to eight weeks and tomatoes in five to seven weeks.

Before transplanting, harden seedlings by exposing them for a few days to higher light and temperatures between 60°F and 65°F. Set tomatoes in the field after the danger of frost has passed. For peppers and eggplant, wait until soil has warmed and average daily temperature reach 65°F.

Production Systems for Fresh Market

Fresh market eggplant, peppers, and tomatoes are often grown on raised beds covered with plastic mulch to promote earliness — refer to the Plastic Mulch section (page 13). Drip irrigation beneath the mulch provides a uniform water supply and can deliver fertilizer during the growing season. Typical beds are 30 inches across, 4 to 6 inches high, and centered 5 to 6 feet apart.

Tomatoes and eggplant: Space 1.5 to 2.5 feet apart in the row.

Peppers: Space 1 to 1.5 feet apart. Or, plant a double row of peppers with 1.5 feet between rows and 1 foot between plants.

Bare ground culture: Space rows 2.5 to 5 feet apart. *Tomatoes and eggplants:* space 1.5 to 3 feet apart in the row. *Peppers:* space 1 to 1.5 feet apart in the row.

Tomatoes may be left to grow over the ground or may be supported by cages, stakes, strings, or a trellis-weave system. Supported tomatoes produce higher quality fruit than unsupported plants and marketable yield is usually

much greater. Tomatoes supported by stakes or trellises are sometimes pruned, which involves removing several or all of the branches up to the branch just below the first flower cluster when the branches are a few inches long. For tomatoes supported by vertical string, only one or two stems are allowed to grow and so pruning continues throughout the season to remove branches that develop above the first flower cluster. Pruned plants produce larger fruit than unpruned plants, but the quantity of fruit is reduced.

Peppers and eggplant may benefit from staking if plants tend to break, lean, or lodge. If peppers are in a double row on a bed, a row of short stakes strung with twine along the outside of each row will support the plants. Peppers and eggplant may also be supported using a trellis-weave system.

Production Systems for Processing Tomatoes

Select row spacing and bed formation that will work with available harvesting equipment. Double rows 16 to 20 inches apart on 5 to 6 feet centers are common, with plants 1 to 2 feet apart in the row.

Ethephon applications accelerate and concentrate fruit ripening, thus facilitating once-over machine harvesting of processing tomatoes.

For Machine Harvest: Apply 3.25 pts. Ethrel® or Cepha® in 5 to 70 gallons of water per acre as a spray over the entire plant when 10 to 30 percent of fruits are ripe. Harvest 15 to 21 days after treatment for optimum ripe fruit accumulation.

Fertilizing

Lime: To maintain a soil pH of 6.0 to 6.8.



Fresh Market Eggplant, Peppers, and Tomatoes: Before planting, apply 30 pounds N per acre, 0 to 240 pounds per acre P₂O₅, and 0 to 300 pounds K₂O per acre based on soil test results and recommendations from your state. At transplanting, apply a starter solution


containing N and P — see Fertilizing, Liming, and Soil Sampling (page 7). If the transplant flat received a heavy fertilizer feeding just prior to setting, eliminate the starter solution. Three to four weeks after transplanting, and then six to eight weeks after transplanting, apply 30 to 40 pounds N per acre as a sidedressing. Sidedressing may be replaced by supplying N through the drip irrigation system at about 1 pound N per acre per day. Reduce the amount of fertilizer N applied by the value of N credits from green manures, legume crops grown in the previous year, compost and animal manures, and soils with more than 3 percent organic matter. The total amount of N from fertilizer (including starter) and other credits should be 100 to 120 pounds per acre. K₂O may also be supplied through drip irrigation at a rate of 1 to 1.5 pounds per acre per day for peppers and eggplant, and 1.5 to 2.5 pounds per acre per day for tomatoes. Reduce the amount of K₂O applied before planting by the amount that will be supplied through drip irrigation.


Processing Tomatoes: Before planting, apply 40 pounds N per acre, and P₂O₅ and K₂O based on soil test results and recommendations from your state. At transplanting, apply a starter solution containing N and P — see Fertilizing, Liming, and Soil Sampling (page 7) Four to five weeks after transplanting or after first fruit, set sidedress with 40 to 50 pounds N per acre. Reduce the amount of fertilizer N applied by the amount of N credits from green manures, legume crops grown in the previous year, compost and animal manures, and soils with more than 3 percent organic matter. The total amount of N from fertilizer (including starter) and other credits should be 80 to 100 pounds per acre.


Calcium: Tomatoes and peppers are susceptible to calcium deficiency even when adequate calcium levels are present in the soil. Deficiency results in a disorder called “blossom end rot.” It often occurs under conditions of inadequate or excessive watering and/or excessive N fertilization with an ammonium source. Where the soil pH has been adjusted to 6.0 or higher, additional soil-applied calcium does not correct the disorder.


Disease Control


Diseases Controlled	Treatment	Comments
Anthracnose (pepper and tomato only)	Use disease-free seed and/or transplants. Practice a 3-4 year crop rotation.	
	Amistar 80WP® at 2-5 oz. per acre.	Do not apply Amistar® more than once before alternating to a fungicide with a different mode of action. 0-day PHI.
	Cabrio EG® at 8-12 oz. per acre.	Do not make more than 1 sequential application before alternating to a fungicide with a different mode of action. See label to avoid practices that could result in crop injury. 0-day PHI.
	Several chlorothalonil formulations (e.g., Bravo®, Echo®, and Equus®) are available at various rates.	Fungicides and application schedules effective against early blight and Septoria leaf spot will protect against anthracnose infection. Note that higher rates may be required for anthracnose protection. 0-day PHI.
	Several formulations of mancozeb (e.g., Dithane®, Manzate®, Penncozeb®) or maneb (e.g., Maneb®, Manex®) are labeled at various rates. Do not use mancozeb products on pepper.	5-day PHI.
	Maneb 75DF® or 80WP® at 1.5-3.0 lbs. per acre, or Manex® at 1.2-2.4 qt. per acre.	7-day PHI.
	Quadris Flowable® at 6.0-15.5 oz. per acre.	Do not apply Quadris® more than twice before alternating to a fungicide with a different mode of action. 0-day PHI.
	Quadris Opti® at 1.6 pts. per acre.	See comments for Quadris Opti® under anthracnose. 0-day PHI.
	Revus Top 2.08SC® at 5.5-7 fl. oz. per acre.	Adjuvant recommended. 1-day PHI.
Tanos® at 8-10 oz. per acre.	Do not apply Tanos® more than once before alternating with a fungicide with another mode of action. 3-day PHI.	
Bacterial Spot/Speck (bacterial spot on pepper and tomato only; bacterial speck on tomato only)	Resistant varieties available for bacterial spot of pepper. Note that several races of bacterial spot exist that can affect pepper.	Use disease-free seed and/or transplants.
	Actigard® at 0.3-0.75 oz. per acre. Use low rate early in season and increase with time. See label. Tomato only.	Use up to 8 weekly applications. May be effective when used with other labeled pesticides. 14-day PHI.
	Agri-mycin 17® at 200 ppm.	Begin applications at the 2-leaf stage on a 4-5 day schedule until transplanted in the field.
	 For greenhouse use, several formulations of copper products (e.g., Kocide®, Champ®, Cuprofix®) are labeled at tablespoon (TBSP) per 1,000 square feet rates.	Repeat according to label directions. Carefully note re-entry and personal protection warnings.
	 In the field, use copper sprays to reduce the rate of bacterial spread.	Avoid consecutive seasons with peppers or tomatoes in the same field. Avoid working in fields when plants are wet.
Blossom-End Rot	Avoid drastic moisture fluctuations. Mulching plants may help. Avoid excessive nitrogen or potassium fertilization, rapid plant growth, and root pruning during cultivation. Maintain soil pH and calcium levels in desired range. Choose less susceptible varieties.	Blossom-end rot is caused by a calcium deficiency in the fruit, although calcium levels in the soil may be sufficient. Wide fluctuations in soil water levels can trigger the disorder.

 May be acceptable for use in certified organic production. Check with your certifier before use.

Diseases Controlled	Treatment	Comments
Bacterial Canker (tomato only)	Some seed treatments show promise for reducing bacterial canker incidence. Use disease-free seed and transplants. Transplant facility treatments listed under bacterial spot and speck will help reduce the severity of bacterial canker. However, copper sprays in the field are generally ineffective for controlling canker.	Fields with a history of canker should be planted to crops other than tomatoes, potatoes, peppers, or eggplant for at least 3 years. Sanitize machinery, seedlings, and plant production materials (wooden flats, plastic trays, greenhouse benches, and wooden stakes) with a disinfectant such as 10% chlorine bleach solution or another appropriate solution. Avoid working in wet canker fields.
Botrytis Gray Mold (tomato only)	Keep greenhouse temperatures 70°F or higher, and keep relative humidities lower than 90%.	Use ventilation or forced air.
	Lime soils and keep fertility levels up.	A calcium to phosphorus ratio of 2 or higher in leaf petiole tissues aids in control.
	Several chlorothalonil formulations (e.g., Bravo®, Echo®, Equus®) are available at various rates.	Field use only. 0-day PHI.
	 Many copper formulations used for managing bacterial disease are labeled for greenhouse use for gray mold.	
	Endura® at 9-12.5 oz. per acre.	Field use only. Do not make more than 2 sequential applications of Endura® before alternating to a fungicide with a different mode of action. 0-day PHI.
	Scala® at 7 fl. oz. per acre.	Scala® may be used in greenhouses (see label for restrictions). Use only in tank mixture. 1-day PHI.
Buckeye Rot (tomato only)	Rotate away from tomatoes or other related crops for 3 years. Avoid low areas of fields. Plastic mulch may reduce splash infection.	
	Amistar® at 1.6-2.0 oz. per acre.	See comments for Amistar® under anthracnose. 0-day PHI.
	Gavel 75DF® at 1.5-2 lbs. per acre.	Start applications when seedlings emerge or transplants are set, and repeat at 7-10 day intervals. Adding a surfactant may improve performance. 5-day PHI.
	Quadris 2.08EC® at 5.0-6.0 fl. oz. per acre.	Do not apply Quadris® more than once before alternating to a fungicide with a different mode of action. 0-day PHI.
	Quadris Opti at 1.6 pts. per acre.	See comments for Quadris Opti® under anthracnose. 0-day PHI.
Early Blight, Septoria Leaf Blight (tomato only)	Plant resistant varieties.	Use wilt resistant “VF” cultivars, and avoid fields with a wilt history. Tomatoes weakened by wilt disease may be more prone to leaf blights.
	3-4-year rotation with unrelated crops.	Rotate out of fields with a history of early blight or Septoria leaf spot.
	Amistar® at 1.6-2.0 oz. per acre.	See comments for Amistar® under anthracnose. 0-day PHI.
	Cabrio EG® at 8-12 oz. per acre.	Begin application prior to disease development and continue on a 7-14-day schedule. Do not apply more than once before alternating to a fungicide with a different mode of action. See label to avoid practices that could result in crop injury. 0-day PHI.
	Several chlorothalonil formulations (e.g., Bravo®, Echo®, Equus®) are available at various rates.	0-day PHI.


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Diseases Controlled	Treatment	Comments
Early Blight, Septoria Leaf Blight (tomato only) (continued)	Endura 70WG® at 2.5-3.5 oz. per acre. Early blight only.	Do not make more than 2 sequential applications before alternating to a fungicide with a different mode of action. 0-day PHI.
	Gavel 75DF® at 1.5-2 lbs. per acre.	Start applications when seedlings emerge or transplants are set, and repeat at 7-10 day intervals. Adding a surfactant may improve performance. 5-day PHI.
	Several formulations of mancozeb (e.g., Dithane®, Mancozeb®, Penncozeb®), or maneb (e.g., Maneb®, Manex®) are labeled at various rates.	5-day PHI.
	Quadris 2.08EC® at 5.0-6.0 fl. oz. per acre.	Apply at 7- to 14-day intervals. Quadris® provides best control of foliar disease when applied between initial flower formation and color break of fruit. Do not make more than 1 sequential application of Quadris® before alternating to a fungicide with a different mode of action. 0-day PHI.
	Quadris Opti® at 1.6 pts. per acre.	See comments for Quadris Opti® under anthracnose. 0-day PHI.
	Reason® at 5.5-8.2 fl. oz. per acre. Septoria suppression only. See label for plant back restrictions.	Do not make more than 1 application of Reason® before alternating to a fungicide with a different mode of action. 14-day PHI.
	Revus Top 2.08SC® at 5.5-7 fl. oz. per acre.	Adjuvant recommended. 1-day PHI.
	Scala® at 7 fl. oz. per acre. Early blight only.	May be used in greenhouses (see label for restrictions). Use only in tank mixture. 1-day PHI.
	Tanos® at the following rates: Early blight: 6-8 oz. per acre. Septoria: 8 oz. per acre.	See comments under anthracnose.
	Ziram 76DF® at 3-4.0 lbs. per acre. Not for cherry tomatoes.	Use with effective spreader sticker. 7-day PHI.
Fusarium Crown and Root Rot (tomato only)	Use long crop rotations.	Steam or fumigate soil in the greenhouse prior to transplanting.
Fusarium Wilt (tomato only)	Plant resistant varieties.	Avoid fields with a history of root knot nematode.
Leaf Mold (tomato only)	Practice good sanitation and crop rotation. Provide good aeration between plants.	This disease is most often observed in greenhouse situations.
	Several chlorothalonil formulations (e.g., Bravo®, Echo®, Equus®) are available at various rates. Field use only.	0-day PHI.
	 Some copper formulations are labeled and may be organically certified.	Some formulations may be labeled for the greenhouse.
	Several formulations of mancozeb (e.g., Dithane®, Manzate®, Penncozeb®) are labeled at various rates.	5-day PHI.
	Revus Top 2.08SC® at 5.5-7 fl. oz. per acre.	Adjuvant recommended. 1-day PHI.
	Tanos® at 8 oz. per acre.	3-day PHI.
Late Blight (tomato only)	Agri-Fos 50WP® at 1.5-2 qts. per acre.	0-day PHI
	Amistar® at 2.0 oz. per acre.	See comments for Amistar® under anthracnose. 0-day PHI.

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Diseases Controlled	Treatment	Comments
Late Blight (tomato only) (continued)	Cabrio EG® at 8-16 oz. per acre.	Begin application prior to disease development and continue on a 7-14 day schedule. Do not apply more than once before alternating to a fungicide with a different mode of action. See label to avoid practices that could result in crop injury. 0-day PHI.
	Chlorothalonil and mancozeb products may be used.	Higher rates may be required for late blight control. 0-day PHI for chlorothalonil. 5-day PHI for mancozeb.
	Curzate® at 3.2-5 oz. per acre.	Apply Curzate® plus a contact (protectant) fungicide. Use the 5 oz. rate if late blight is present. 3-day PHI.
	Gavel 75DF® at 1.5-2 lbs. per acre.	Start applications of Gavel® when seedlings emerge or transplants are set, and repeat at 7-10 day intervals. Adding a surfactant may improve performance. 5-day PHI.
	Previcur Flex® at 0.7-1.5 pts. per acre.	Increase the rate with increasing disease pressure (see label). Always tank mix with a protectant (contact) fungicide. 5-day PHI.
	Prophyt 54.5F® at 4 pts. per acre.	0-day PHI.
	Quadris 2.08EC® at 6 fl. oz. per acre.	Do not apply Quadris® more than once before alternating to a fungicide with a different mode of action. Do not exceed 6 applications per year. 0-day PHI.
	Quadris Opti® at 1.6 pts. per acre.	Do not apply Quadris Opti® for 21 days after transplanting or 35 days after seeding. Do not apply more than once before alternating to a non-group 11 fungicide. 0-day PHI.
	Ranman 400SC® at 2.1-2.75 fl. oz. per acre.	0-day PHI.
	Reason® at 5.5-8.2 fl. oz. per acre. See label for plant back restrictions.	Do not apply Reason® more than once before alternating to a fungicide with a different mode of action. 14-day PHI.
	Several formulations of Ridomil® are labeled for late blight control. Consult label for rates and other important restrictions.	PHI varies widely by formulation.
Tanos 50WP® at 8 oz. per acre.	Should be tank mixed with a contact fungicide with a different mode of action. 3-day PHI.	
Powdery Mildew (pepper and tomato only)	Amistar® at the following rates: Tomato: 1.6-2.0 oz. per acre. Pepper: 2-5 oz. per acre.	See comments for Amistar® under anthracnose. 0-day PHI.
	Cabrio® at 8-16 oz. per acre.	Do not apply more than twice before alternating to a fungicide with a different mode of action. 0-day PHI.
	Quadris 2.08EC® at the following rates: Tomato: 5.0-6.2 fl. oz. per acre. Pepper: 6-15.5 fl. oz. per acre.	Apply at 7-14 day intervals Do not apply Quadris® more than once before alternating to a fungicide with a different mode of action. 0-day PHI.
	Quadris Opti® at 1.6 pts. per acre. Tomato only.	Do not apply Quadris Opti® within 21 days after transplanting or 35 days after seeding. Do not apply more than once before alternating to a non-group 11 fungicide. 0-day PHI.
	Rally 40WSP® at 2.5-4.0 oz.	Do not exceed 21 days between applications. 0-day PHI.
	Revus Top 2.08SC® at 5.5-7 fl. oz. per acre.	Adjuvant recommended. 1-day PHI.

Fruiting Vegetables (continued)
Disease Control (continued)

Diseases Controlled	Treatment	Comments
Phytophthora Blight Timing Critical Fungicides applied for Phytophthora blight are most effective if applied when disease threatens, but before symptoms become severe.	Avoid waterlogged root zones throughout the season.	Peppers are very susceptible. Use well-drained fields. Planting on raised beds will increase soil drainage. Rotate infested fields with non-host crops for several years.
	Use resistant varieties if available for commercial production. See Table 22.	Water management is of primary importance for Phytophthora control.
	Agri-Fos 400® at 1.5-2.0 qt. per acre.	0-day PHI.
	Phostrol® at 1-2 qt per acre.	0-day PHI.
	Ridomil Gold SL® treat soil at 1 pt. per acre (broadcast; use less for band application) before transplanting. Subsequent directed sprays may be needed. Phytophthora crown rot only.	Fungicides will not be effective if peppers are planted in poorly drained fields with a history of the disease. 7-day PHI.
Root Knot Nematode	Methyl bromide, or sodium methyl dithiocarbamate, or Vydate L®.	Sample fields during growing season for plant parasitic nematodes before planting. Avoid fields with high numbers of root knot nematodes. Methyl bromide and sodium methyl dithiocarbamate give best results when nematode populations are moderate to high. Vydate® gives adequate control when nematode populations are low to moderate. Vydate® and Methyl bromide formulations are RUPs.
Verticillium Wilt (eggplant and tomato only)	Avoid fields with a history of Verticillium wilt. Rotate with small grains where possible.	Use of long rotations out of solanaceous crops will prevent rapid increase of pathogen populations. Tomato varieties with resistance are available.
	Fumigate with Vapam® at 37.5-75 gals. per acre under plastic mulch.	Allow at least 21 days between application of fumigant and transplanting. Observe the 48-hour REI. See label for important application instructions.
Virus Diseases	Grow resistant varieties. Plant disease-free transplants. Eliminate broadleaf weeds within 150 feet of field before crops are established.	Some broadleaf weeds may be reservoirs for pepper viruses. Aphids may spread virus diseases from weeds to peppers and from diseased peppers to healthy peppers. Oil sprays timed with aphid flight periods may prevent virus transmission by aphids but have short-term residual effectiveness. Light-colored and reflective mulches may deter aphids from landing on plants and transmitting the virus.
White mold (timber rot)	Avoid fields with history of the problem. Pathogen has large host range.	Avoid tomato after tomato rotations.
	 Contans WG® at 1-4 lbs. per acre.	Contans® is applied with conventional spray equipment directly to the soil surface at planting. See label for additional treatment information.

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Weed Control

Weeds Controlled ¹	Treatment ²	Comments
Annuals (emerged) — treatment applied before transplanting or as a directed spray	Gramoxone Inteon 2L [®] at 2-4 pts. per acre.	Use 1 qt. of COC or 4-8 fl. oz. of nonionic surfactant per 25 gallons of spray solution. Broadcast before transplanting, or use lowest rate as a directed spray between rows after crop establishment. 30-day PHI for tomatoes. RUP.
Annuals and Perennials (emerged) — treatment applied before transplanting or as a directed spray	Glyphosate products at 0.75-3.75 lbs. acid equivalent (ae) per acre. Use formulations containing 3 lbs. ae/gal. (4 lbs. isopropylamine salt/gal.) at 1-5 qts. per acre, or formulations containing 4.5 lbs. ae/gal. (5 lbs. potassium salt/gal.) at 0.66-3.3 qts. per acre.	Broadcast before transplanting, or apply between crop rows with hooded or shielded sprayers or wiper applicators. Wait at least 3 days before transplanting eggplant or peppers. Remove herbicide residue from plastic mulch prior to transplanting. Do not use row-middle applications for tomatoes grown on sandy soils because crop injury may occur. Use low rate for annuals and higher rates for perennials. See label for suggested application volume and adjuvants. 14-day PHI.
Broadleaves (emerged) — crop not present or protected from spray	Aim EC [®] at 0.5-2 fl. oz. per acre.	Apply prior to transplanting tomatoes or peppers, or apply between crop rows with hooded sprayer for all crops in this section. Do not apply before direct seeding. Do not allow spray to contact crop. Use COC or nonionic surfactant. Weeds must be actively growing and less than 4 inches tall. Do not exceed 6.1 fl. oz. per acre per season.
Broadleaves and Grasses (not emerged)	Command 3ME [®] at 0.67-2.67 pts. per acre. Pepper only. Not for banana peppers.	Use lower rate on coarse soils, and higher rate on fine soils. Apply before transplanting. May cause temporary bleaching of crop leaves.
	Devrinol 50DF [®] at 2-4 lbs. per acre.	Use lower rate on coarse soil. Apply and incorporate before seeding or transplanting. After harvest or prior to planting succeeding crops, deep moldboard or disk plow. Do not seed alfalfa, small grains, sorghum, corn, or lettuce for 12 months after application.
	Dual Magnum [®] at 1-2 pts. per acre. Tomato only.	Use lower rate on coarse soils. Apply prior to transplanting, or as a directed spray after transplanting. Crop injury may occur under unfavorable growing conditions. Not recommended for fresh market tomatoes. 90-day PHI.
	Prowl H ₂ O [®] at 1-3 pts. per acre. Pepper and tomato only.	Not for use under plastic mulch. Apply and incorporate before planting, apply before planting without incorporation, or apply to established transplants as a directed spray. Avoid any contact with leaves or stems of crop. 70-day PHI.
	Trifluralin [®] products at 0.5-1 lb. a.i. per acre. Apply 4EC formulations at 1-2 pts. per acre.	Use low rate on soils with less than 2% organic matter. Broadcast and incorporate before transplanting, or apply directed spray between rows after transplanting and incorporate. Not effective on muck or high organic matter soils. May cause early stunting if growing conditions are unfavorable, especially on eggplant. To minimize injury, dip transplant roots in carbon slurry (2 lbs. per gal.) prior to planting, or include 2 oz. of carbon per gallon of transplant water.
Grasses (not emerged)	Dacthal W-75 [®] at 6-14 lbs. per acre, or Dacthal Flowable [®] at 6-14 pts. per acre.	Apply 4-6 weeks after transplanting when growing conditions favor good plant growth. May be applied over the top of transplants.
	Prefar 4E [®] at 5-6 qts. per acre. Pepper only.	Use low rate on soils with less than 1% organic matter. Apply and incorporate before planting.

Weeds Controlled ¹	Treatment ²	Comments
Broadleaves and Grasses (not emerged and newly emerged)	Matrix 25DF® at 1-2 oz. per acre. Tomato only.	Use 0.5 pt. of nonionic surfactant per 25 gallons of spray solution if emerged weeds are present. Apply when weeds are less than 1 in. tall. Soil activity requires rainfall within 5 days of application. If crop is stressed, chlorosis may occur. Do not exceed 4 oz. per acre per year. 45-day PHI.
Broadleaves (not emerged and newly emerged)	Sencor® products at the following rates: Broadcast and incorporated before transplanting, or broadcast after transplants are established: Sencor 4F® at 0.5-1 pt. per acre, or Sencor 75DF® at 0.33-0.66 lb. per acre. In a directed spray between crop rows after transplants are established: Sencor 4F® at up to 2 pts. per acre, or Sencor 75DF® at 1.33 lbs. per acre. Tomato only.	May be applied preplant incorporated with trifluralin products for improved weed control. Crop injury may occur if applied over the top of plants within 3 days of cool, wet, or cloudy weather. Wait at least 14 days between applications. Do not exceed 2 pts. of Sencor 4F®, or 1.33 lbs. of Sencor 75DF® per acre per season. 7-day PHI.
Broadleaves and Nutsedge (not emerged or emerged)	Sandea® at 0.5-1 oz. per acre.	Use lower rates on coarse soils with low organic matter. Use 0.5-1 pt. of nonionic surfactant per 25 gallons of spray solution if emerged weeds are present. Pre-transplant for tomatoes: apply to soil surface after final soil preparation or bed shaping and just before applying plastic mulch. Wait 7 days after application and lay mulch before transplanting. Post-transplant on bare ground for tomatoes: apply over the top of well-established, actively growing plants no sooner than 14 days after transplanting and before first bloom. Row-middle application for all crops in this section: apply between rows of crop, avoiding contact with crop. Not recommended for use under cool temperatures due to potential for crop injury. Avoid contact with surface of plastic mulch if present. Do not exceed 2 applications and 2 oz. per acre per crop-cycle per year. 30-day PHI.
Grasses (emerged)	Poast 1.5E® at 1-1.5 pts. per acre.	Use 1 qt. COC per acre. Spray on actively growing grass. Use high rate on quackgrass. Do not exceed 4.5 pts. per acre per season. 20-day PHI.
	Select Max® at 12-32 fl. oz. per acre, or Select 2EC® at 6-16 fl. oz. per acre.	Use 1 qt. COC per 25 gallons of spray solution (1% v/v). Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 64 fl. oz. Select Max®, or 32 fl. oz. Select 2EC® per acre per season. 20-day PHI.

¹For specific weeds controlled by each herbicide, check Table 19 on page 37.

²Rates given are for overall coverage. For band treatment, reduce amounts according to the portion of acre treated.

Insect Control

Insects Controlled	Treatment	Comments
Aphids	Conserve natural enemies.	Limiting the use of some insecticides will conserve predators and parasites that help control aphid populations.
	Actara® at 2-3 oz. per acre.	Do not exceed 11 oz. per acre per season. 0-day PHI.
	Admire PRO® at the following rates: Pepper: 7-14 fl. oz per acre. Other labeled crops: 7.0-10.5 fl. oz. per acre.	Do not exceed 0.38 lb. a.i. of per acre per season. 21-day PHI.

Insects Controlled	Treatment	Comments
Aphids (continued)	Assail 70 WP® at 0.8-1.7 oz. per acre.	Do not exceed 4 applications acre per season. 7-day PHI.
	Diazinon 50W® at 0.5 lb. per acre. Tomato only.	Do not exceed 5 applications per season. 1-day PHI.
	Dimethoate 4E® at 0.5-1 pts. per acre. Pepper and tomato only.	7-day PHI for tomato. 2-day PHI for pepper.
	Endosulfan 3EC® at 0.66-1.33 qts. per acre.	Do not exceed 2 lb. a.i. per acre per season. Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Fulfill® at 2.75 oz. per acre.	Do not exceed 5.5 oz. per acre per season. 0-day PHI.
	Lannate SP® at 0.25-1 lb. per acre.	Tomatillo, pepper, and eggplant: Do not exceed 4.5 lbs. a.i. per acre per crop. 3-day PHI for pepper. 5-day PHI for eggplant. Other labeled crops: Do not exceed 6.3 lb. a.i. per acre per season. 1-day PHI for tomato. RUP.
	Malathion 5EC® at 1-3.5 pt per acre.	1-day PHI for tomato. 3-day PHI for pepper and eggplant.
	Movento® at 4-5 fl. oz. per acre.	1-day PHI.
	M-Pede® at 1-2% by volume.	Must contact aphids to be effective. 0-day PHI.
	Orthene 97® at 0.5-1 lb. per acre. Pepper only.	Do not exceed 2 lbs. a.i. per acre per season. 7-day PHI.
	Platinum® at 5-11 fl. oz. per acre.	30-day PHI.
	Colorado Potato Beetles (tomato and eggplant only)	Crop rotation.
Scouting.		Regular (weekly) scouting will allow you to determine the need for insecticides and to improve application timing.
Admire PRO® at 7-10.5 fl. oz. per acre.		Do not exceed 0.38 lb. a.i. per acre per season. 21-day PHI.
Agri-Mek 0.15EC® at 8-16 fl. oz. per acre.		Allow at least 7 days between applications. Do not exceed 48 fl. oz. per acre per season. Make no more than 2 successive applications. 7-day PHI.
Asana XL® at 5.8-9.6 fl. oz. per acre.		Do not apply more than 0.35 lb. a.i. per acre per season. 1-day PHI for tomato. 7-day PHI for eggplant. RUP.
Assail 70WP® at 0.6-1.1 oz. per acre.		Do not exceed 0.3 lb. a.i. per acre per season. 7-day PHI.
Baythroid® at 1.6-2.8 fl. oz. per acre.		Do not exceed 16.8 fl. oz. or per acre per season. Allow 7 days between applications. 0-day PHI for tomato. 7-day PHI for eggplant. RUP.
Brigade 2EC® at 2.1-6.4 fl. oz. per acre, or Brigade WSB® at 5.3-16 oz. per acre.		Eggplant: Do not exceed 0.2 lb. a.i. per acre per season. Tomato: Do not exceed 4 applications per season. 7-day PHI. RUP.

Fruiting Vegetables (continued)

Insect Control (continued)

Insects Controlled	Treatment	Comments
Colorado Potato Beetles (tomato and eggplant only) (continued)	Endosulfan 3EC® at 0.66-1.33 qts. per acre.	Do not exceed 1 lb. a.i. per acre per season. 1-day PHI for eggplant. 2-day PHI for tomato.
	Entrust® at 1-2 oz. per acre.	Do not exceed 9 oz. per acre per season. Observe resistance management restrictions. 1-day PHI.
	Kryocide® at 8-16 lbs. per acre.	Do not exceed 64 lbs. per acre per season. 14-day PHI.
	Mustang MAX® at 2.24-4.0 fl. oz. per acre.	Do not exceed 0.15 lb. a.i. per acre per season. Allow 7 days between applications. 1-day PHI. RUP.
	Platinum® at 5-8 fl. oz. per acre.	Do not exceed 8.0 fl. oz. per acre per season. 30-day PHI.
	Pounce 25WP® at 3.2-12.8 oz. per acre.	Tomato: Do not exceed 1.2 lbs. a.i. per acre per season. 0-day PHI. Eggplant: Do not exceed 2.0 lbs. a.i. per acre per season. 3-day PHI.
	Prokil Cyolite 50D® at 15-30.5 lbs. per acre.	Do not exceed 112 lbs. per acre per season. 14-day PHI.
	Provado 1.6F® at 3.8 fl. oz. per acre.	Do not exceed 18.8 fl. oz. per acre per season. Allow 5 days between applications. 0-day PHI.
	SpinTor 2SC® at 3-6 fl. oz. per acre.	Do not exceed 29 fl. oz. per acre per season. Observe resistance management restrictions. 1-day PHI.
	Vydate L® at 2-4 pts. per acre.	Do not exceed 32 pts. per acre per season. 3-day PHI.
	Warrior® at 2.56-3.84 fl. oz. per acre.	Do not exceed 2.88 pts. per acre per season. 5-day PHI.
Flea Beetles	Actara® at 2-3 oz. per acre.	Do not exceed 11 oz. per acre per season. 0-day PHI
	Admire PRO® at the following rates: Pepper: 7.0-14 fl. oz. per acre. Eggplant and tomato: 7.0-10.5 fl. oz. per acre.	Pepper: Do not exceed 14 fl. oz. per acre per season. Eggplant and tomato: Do not exceed 10.5 fl. oz. per acre per season. 21-day PHI.
	Asana XL® at 5.8-9.6 fl. oz. per acre.	Do not apply more than 0.35 lb. a.i. per acre per season. 1-day PHI for tomato. 7-day PHI for eggplant. RUP.
	Baythroid® at 2.8 fl. oz. per acre.	Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days between applications. 0-day PHI for tomato. 7-day PHI for pepper and eggplant. RUP.
	Brigade 2EC® at 2.1-6.4 fl. oz. per acre, or Brigade WSB® at 5.3-16 oz. per acre.	Eggplant: Do not exceed 0.2 lb. a.i. per acre per season. Tomato: Do not exceed 4 applications per season. 7-day PHI. RUP.
	Endosulfan 3EC® at 0.66-1.33 qts. per acre.	Do not exceed 2 lb. a.i. per acre per season. Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Mustang MAX® at 2.24-4.0 fl. oz. per acre.	Do not exceed 0.15 lb. a.i. per acre per season. Allow 7 days between applications. 1-day PHI. RUP.

Insects Controlled	Treatment	Comments
Flea Beetle (continued)	Platinum® at 5-11 fl. oz. per acre.	30-day PHI.
	Pounce 25WP® at 6.4-12.8 oz. per acre.	Do not exceed 2 lbs. a.i. per acre per season. 3-day PHI. RUP.
	Sevin XLR PLUS® at 0.5-1 qt. per acre.	Do not exceed 8 qts. per crop. 3-day PHI.
	Warrior® at 2.56-3.84 fl. oz. per acre.	Do not exceed 2.88 pts. per acre per season. 5-day PHI.
Mites, Spider Mites, and Russet Mites	Acramite 50WS® at 0.75-1 lb. per acre. Spider mites only.	Do not exceed 1 application per season. 3-day PHI.
	Agri-mek 0.15EC® at 8-16 fl. oz. per acre.	Do not exceed 48 fl. oz. per acre per season. 7-day PHI. RUP.
	Epi-mek 0.15EC® at 8-16 fl. oz. per acre.	
	Oberon 2SC® at 7-8.5 fl. oz. per acre. Spider mites only.	Do not exceed 25.5 fl. oz. per acre per season. 7-day PHI.
	Wetttable sulfur (84-95%) at 10 lbs. per acre.	Sulfur dusts also are effective. Thorough coverage is required. Do not apply when temperatures are above 95°F or during a heavy dew.
Cutworms, Hornworms, Fruitworms, and European Corn Borers	Asana XL® at the following rates: Cutworms and fruitworms: 5.8-9.6 fl. oz. per acre. Hornworms: 2.9-5.8 fl. oz. per acre. Not for European corn borers.	Do not apply more than 0.35 lb. a.i. per acre per season. 1-day PHI for tomato. 7-day PHI for eggplant. RUP.
	Avaunt 30WDG® at 2.5-3.5 oz. per acre. Not for cutworms.	Use higher rate for fruitworms. Can provide European corn borer control in bell peppers only. Do not exceed 14 oz. per acre per season. 3-day PHI.
	Various <i>Bacillus thuringiensis</i> products (Agree®, Biobit®, Dipel®, Javelin®, Lepinox®, Xentari®). Follow label directions. Not for cutworms.	0-day PHI.
	Baythroid® at the following rates: Cutworms: 2.1-2.8 fl. oz. per acre Hornworms and fruitworms: 1.6-2.8 fl. oz. per acre.	Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days between applications. 0-day PHI for tomato. 7-day PHI for pepper and eggplant. RUP.
	Brigade 2EC® at 2.1-5.2 fl. oz. per acre, or Brigade WSB® at 5.3-12.8 oz. per acre.	Eggplant: Do not exceed 0.2 lb. a.i. per acre per season. 1-day PHI. Tomato: Do not exceed 4 applications per season. 7-day PHI. RUP.
	Coragen® at 3.5-5.0 fl. oz. per acre.	Coragen® can be applied as either a foliar application or via drip chemigation. Chemigation will provide up to 30 days control. Do not exceed 15.4 fl. oz. per acre per season. 1-day PHI.
	Danitol 2.4EC® at 10.67 fl. oz. per acre. Tomato only. Not for cutworms or European corn borers.	Do not exceed 42.67 fl. oz. per acre per season. 3-day PHI.
	Diazinon 50W® at 4-8 lbs. per acre. Cutworms on tomato only.	Do not exceed 5 applications per season. Apply before planting.
	Endosulfan 3EC® at 0.66-1.33 qts. per acre. Not for cutworms or European corn borers.	Use higher rate for fruitworms. Do not exceed 2 lb. a.i. per acre per season. Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Entrust® at 1-2 fl. oz. per acre. Not for cutworms.	Do not exceed 9 oz. per acre per season. Observe resistance management restrictions. 1-day PHI.

Fruiting Vegetables (continued)

Insect Control (continued)

Insects Controlled	Treatment	Comments
Cutworms, Hornworms, Fruitworms, and European Corn Borers (continued)	Intrepid 2F® at the following rates: Early season on hornworms: 4-8 fl. oz. per acre. Mid- to late season on hornworms: 8-16 fl. oz. per acre. Fruitworms: 10-16 fl. oz. per acre. Not for cutworms.	Do not exceed 64 fl. oz. per acre per season. 1-day PHI.
	Lannate SP® at the following rates: Cutworms: 0.5 lb. per acre. Hornworms and fruitworms: 0.5-1.0 lb. per acre.	Tomatillo, pepper, and eggplant: Do not exceed 4.5 lbs. a.i. per acre per crop. 1-day PHI for tomato. 3-day PHI for pepper. 5-day PHI for eggplant. Other labeled crops: Do not exceed 6.3 lb. a.i. per acre preseason. RUP.
	Mustang MAX® at 2.24-4.0 fl. oz. per acre.	Do not exceed 0.15 lb. a.i. per acre per season. Allow 7 days between applications. 1-day PHI.
	Pounce 25WP® at 6.4-12.8 oz. per acre.	Do not exceed 2 lbs. a.i. per acre per season. 3-day PHI. RUP.
	Sevin XLR PLUS® at 1-2 qts. pre acre.	Do not exceed 8 qts. per acre per season. 3-day PHI.
	SpinTor 2SC® at 3-6 fl. oz. per acre. Not for cutworms.	Do not exceed 29 fl. oz. per acre per season. Observe resistance management restrictions. 1-day PHI.
	Warrior® at the following rates: Cutworms and hornworms: 1.92-3.20 fl. oz. per acre. Fruitworms: 2.56-3.84 fl. oz. per acre.	Do not exceed 2.88 pts. per acre per season. 5-day PHI.
Stink Bugs	Baythroid® at 1.6-2.8 fl. oz. per acre.	Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days between applications. 0-day PHI for tomato. 7-day PHI for pepper and eggplant. RUP.
	Brigade 2EC® at 2.1-5.2 fl. oz. per acre, or Brigade WSB® at 5.3-12.8 oz. per acre.	Eggplant: Do not exceed 0.2 lb. a.i. per acre per season. Tomato: Do not exceed 4 applications per season. 7-day PHI. RUP.
	Danitol 2.4EC® at 10.67 fl. oz. per acre. Tomato only.	Do not exceed 42.67 fl. oz. per acre per season. 3-day PHI.
	Endosulfan 3EC® at 1-1.33 qts. per acre.	Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Mustang MAX® at 3.2-4.0 fl. oz. per acre.	Do not exceed 0.15 lb. a.i. per acre per season. Allow 7 days between applications. 1-day PHI.
	Warrior® at 2.56-3.84 fl. oz. per acre.	Do not exceed 2.88 pts. per acre per season. 5-day PHI.
Whiteflies	Actara at 3.0-5.5 oz. per acre.	Do not exceed 11.0 oz per acre per season. 0-day PHI.
	Admire PRO® at the following rates: Pepper: 7.0-14 fl. oz. per acre . Eggplant and tomato: 7.0-10.5 fl. oz. per acre.	Pepper: Do not exceed 14 fl. oz. per acre per season. Eggplant and tomato: Do not exceed 10.5 fl. oz. per acre per season. 21-day PHI for soil application.
	Align® according to label directions.	0-day PHI.
	Asana XL® at 5.8-9.6 fl. oz. per acre. Not for eggplant	Do not apply more than 0.35 lb. a.i. per acre per season. 1-day PHI for tomato. 7-day PHI for pepper. RUP.

Insects Controlled	Treatment	Comments
Whiteflies (continued)	Assail 70WP® at 1.1-1.7 oz. per acre.	Do not exceed 4 applications per season. 7-day PHI.
	Brigade 2EC® at 2.1-5.2 fl. oz. per acre, or Brigade WSB® at 5.3-12.8 oz. per acre.	Eggplant: Do not exceed 0.2 lb. a.i. per acre per season. Tomato: Do not make more than 4 applications per season. 7-day PHI. RUP.
	Danitol 2.4EC® at 7-10.67 fl. oz. per acre. Tomato only.	Do not exceed 42.67 fl. oz. per acre per season. 3-day PHI.
	Endosulfan 3EC® at 0.66 qts. per acre.	Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Fulfill® at 2.75 oz. per acre.	Do not exceed 5.5 oz. per acre per season. 0-day PHI.
	Knack® at 8-10 fl. oz. per acre.	Do not exceed 2 applications per acre per season. 14-day PHI.
	Movento® at 4-5 fl. oz. per acre.	1-day PHI.
	M-Pede® at 1-2% by volume.	Must contact whiteflies to be effective. 0-day PHI.
	Neemix® according to label directions.	0-day PHI.
	Oberon 2SC® at 7-8.5 fl. oz. per acre. Spider mites only.	Do not exceed 25.5 fl. oz. per acre per season. 7-day PHI.
	Phaser 3EC® at 0.66 qts. per acre.	Eggplant and pepper: Do not exceed 2 applications per season. 1-day PHI for eggplant. 4-day PHI for pepper. Tomato: Do not exceed 4 applications per season. 2-day PHI.
	Platinum® at 5-11 fl. oz. per acre.	No more than 1 application per season. 30-day PHI.
	Provado 1.6F® at 3.8-6.2 fl. oz. per acre.	Do not exceed 18.8 fl. oz. per acre per season. Allow at least 5 days between applications. 0-day PHI.
Fruit Flies and Vinegar Flies (<i>Drosophila</i> spp.)	For additional cultural practices, see Fruit Fly and Vinegar Fly Management below.	
	Starting 2 weeks before harvest, place bait fruits in fields in late afternoon, and examine next morning. If half of the baits show eggs, spray fields immediately at 4-6 day intervals with:	
	Diazinon 50W® at 0.5-1.5 lbs. per acre.	Do not exceed 5 applications per season. 1-day PHI.
	Dust fruit and hampers as soon as filled with a dust containing 0.1% stabilized pyrethrins plus 1.0% piperonyl butoxide, and move hampers to processing plant as soon as possible.	

Fruit Fly and Vinegar Fly Management

To prevent contamination of tomato products by fruit fly and vinegar fly eggs and maggots, follow these cultural practices:

1. Provide unplanted driveways through fields to prevent fruit damage, and avoid crushing fruit with trucks or spray equipment
2. Pick fruit carefully to avoid bruising
3. Fill hampers, boxes, and trucks so fruits will not be damaged during transit
4. Do not leave filled hampers in the field overnight
5. Process tomatoes the day they are picked and as rapidly as possible
6. Keep hampers and trucks clean