

For **watermelon**: 10-16 fl. oz. per acre in Missouri only. Applied as with squash and pumpkin, but can also be used both under and over plastic mulch before transplanting. An overhead irrigation or rainfall event between Reflex application and transplanting will ensure herbicide activation and will likely reduce the potential for crop injury due to splashing. REI: 24-hour. PHI: 32-day for squash, and pumpkin; 35-day for watermelon. WSSA 14.

Sandea (75) (halosulfuron)

Cantaloupe/Muskmelon, Cucumber, Pumpkin, Squash, Watermelon | For **cantaloupe/muskmelon, cucumber, pumpkin**: apply 0.5-0.75 oz. per acre to the soil surface after direct-seeding but prior to cracking or apply at least 7 days before transplanting. Or apply 0.5-1.0 oz. per acre either over the top or a directed/hooded spray after the crop has been transplanted for a minimum of 14 days and reached the 2-5 true leaf stage, but before the first female flowers appear. Avoid contact with the top surface of plastic mulch if present. For **watermelon in Illinois, Indiana, Kansas, Michigan, Missouri, and Ohio**: used as directed for cantaloupes/muskmelon but can also be applied under plastic mulch before laying. Wait at least 7 days after application and mulch laying before seeding or transplanting. For **processing summer squash in Missouri**: used as directed for pumpkin, but up to 1 oz. per acre can be used after direct-seeding and before emergence. If weeds are present, add 0.5 pt. NIS per 25 gal. of solution (0.25% v/v). Not recommended for use under cool temperatures due to potential for crop injury. May delay crop maturity. Do not exceed 2 applications or 2 oz. per acre per 12-month period. REI: 12-hour. PHI: 30-day for cucumbers, pumpkins, and squash; 57-day for cantaloupes/muskmelons, and watermelons. WSSA 2.

Grass Weeds Only - Postemergence

Pesticide

clethodim products (clethodim)

Cantaloupe/Muskmelon, Cucumber, Pumpkin,

Squash, Watermelon | Use 2EC formulations at 6-8 fl. oz. per acre with 1 qt. COC per 25 gals. of spray solution (1% v/v). Do not exceed 32 fl. oz. per acre per season. Use Select Max at 9-16 fl. oz. per acre with 1 qt. COC (1% v/v) or 0.5 pt. NIS per 25 gals. of spray solution (0.25% v/v). Do not exceed 64 fl. oz. per acre per season. Use lower rates for annual grasses, the high rates for perennial grasses. Spray on actively growing grass. Wait at least 14 days between applications. REI: 24-hour. PHI: 14-day. WSSA 1.

Poast (1.5EC) (sethoxydim)

Cantaloupe/Muskmelon, Cucumber, Pumpkin, Squash, Watermelon | 1-1.5 pts. per acre. Add 1 qt. COC per 25 gal. of spray solution (1% v/v). Spray on actively growing grass. Do not exceed 3 pts. per acre per growing season. REI: 12-hour. PHI: 14-day for squash, pumpkin, and watermelon; 3-day for cantaloupe and cucumber. WSSA 1.

Prefar 4E (bensulide) *Cantaloupe/Muskmelon, Cucumber, Pumpkin, Squash, Watermelon* | 5-6 qts. per acre. Use low rate on soils with less than 1% organic matter. Apply before planting and incorporate 1-2 in. or apply after seeding before crop emerges and irrigate within 24 hours. REI: 12-hour. WSSA 8.

Fruiting Vegetables - Horticulture

Reviewed by Ben Phillips, Liz Maynard – Oct 2020

Crop Description

Eggplants (*Solanum melongena*): In the midwest the primary eggplant varieties grown are tear-drop shaped and deep purple. There are many other types of eggplant and these should be considered when there is demand for them in your markets.

Traditionally many types have been associated with specific cultures or cuisines. There are longer and thinner types that look more like summer squashes,

Fruiting Vegetables - Horticulture

and smaller and rounder types that are shaped more like beefsteak and cherry tomatoes. They come in a variety of colors from white, green, pink, purple, brown, and striped. There are also ornamental eggplants that make bright orange and red fruits shaped like miniature pumpkins, which can be dried.

Peppers (*Capsicum annuum*, *C. chinense*, *C. baccatum*, *C. frutescens*, and *C. pubescens*): Similar to eggplants, there are pepper types that are closely tied with specific cultures. The most common species grown for midwestern markets is *C. annuum*, which includes sweet green and colored bell peppers, as well as other sweet and hot peppers including banana, Hungarian wax, Italian, jalapeño, serrano, and poblano. These are grown for both fresh market and processing. The four other cultivated species include much hotter peppers that rate above 50,000 on the Scoville scale that is used to measure pepper pungency. These can be a strong niche market, but a little goes a long way, and these smaller-fruited types produce large numbers of fruit per plant. Clearly labeling varieties from seeding to sale is important to prevent look-alike sweet and hot peppers from being confused.

Tomatoes (*Solanum lycopersicum*): There are many types of tomatoes that differ in their fruit shape, size, color, and plant growth habits. Larger beefsteak tomatoes are juicy. Roma and plum types contain less juice and are better for canning and processing. Stuffing tomatoes are large like a beefsteak but without as much flesh or juice inside, leaving a hollow cavity like a pepper. Grape and cherry types tend to be sweeter. Determinate and semi-determinate plants grow 3 to 4 feet tall when trellised. Indeterminate plants continue to grow in height for the entire season and are almost always trellised or otherwise supported.

Planting and Spacing

Fresh market eggplant, peppers, and tomatoes are often grown on raised beds covered with plastic mulch to promote earliness. 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. Bare ground production uses row spacings of 2-1/2 to 5 feet.

Eggplant for fresh market: Space plants 1-1/2 to 2-1/2 feet apart in the row on beds, or 1-1/2 to 3 feet apart in bare ground rows. Eggplant may benefit from staking and support from a trellis-weave system if plants tend to break, lean, or lodge. Eggplants require full sun and well-drained soil. Eggplants grow best with warm soil, and hot weather.

Peppers for fresh market: Space plants 1 to 1-1/2 feet apart in a single or double row on beds, or 1 to 1-1/2 feet apart in bare ground rows. Peppers may benefit from staking and support from a trellis-weave system 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 for processing: Hand harvest is common for processing peppers, and similar spacings are used as for fresh market production. For machine harvested crops, select row spacing and bed formation that will work with available harvesting equipment.

Tomatoes for fresh market: Space plants 1-1/2 to 2-1/2 feet apart in the row on beds, or 1-1/2 to 3 feet apart in bare ground rows. 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 a 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.

Tomatoes for machine harvest and processing:

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.

Fertilizing

pH: Maintain a soil pH of 6.0 to 6.8.

Eggplant, Peppers, and Tomatoes for Fresh

Market: Before planting, apply 30 pounds N per acre, 0 to 240 pounds P₂O₅ per acre, and 0 to 300 pounds K₂O per acre based on soil test results and recommendations from your state. At transplanting, a starter solution at a rate of 1 cup (8 ounces) per plant is recommended. If the transplant flat receives a heavy fertilizer feeding just prior to setting, the starter solution can be eliminated.

Sidedress with 30 to 40 pounds N per acre three to four weeks after transplanting, and then again six to eight weeks after transplanting. Sidedressing may be replaced by supplying N through a 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 1-1/2 pounds per acre per day for peppers and eggplant, and 1-1/2 to 2-1/2 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.

Tomatoes for Processing: Before planting, apply 40 pounds N per acre, 0 to 240 pounds P₂O₅ per

acre, 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.

Sidedress with 40 to 50 pounds N per acre four to five weeks after transplanting or after first fruit set. 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.

Environmental Factors

There are several tomato problems related to environmental and nutrient factors that are not infectious diseases caused by pathogens.

Blossom End Rot: 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. To limit this problem, choose less susceptible varieties, avoid drastic moisture fluctuations with irrigation monitoring and mulches, and Maintain soil pH and calcium levels in desired range.

Catfacing: Flower buds that have been exposed to cold temperatures very early in development have shown a higher proportion of catfaced fruit. Large-fruited varieties tend to be more susceptible to this disorder. In some heirloom varieties, nearly all fruit is catfaced so it does not detract from the fruit’s marketability. Variety selection is the most practical way to limit this problem. Exposure to some herbicides (2, 4-D or dicamba) can lead to similar fruit deformation.

Cracks, radial and concentric: Rapidly growing fruit and fruit exposed to the sun tend to crack more readily. Cracking is more severe under hot, dry conditions followed by rainfall. To defend against growth cracks, select crack-resistant cultivars, maintain healthy foliage, and carefully manage water availability through irrigation management and the use of plastic mulch).

Micro-cracks or rain checks: Very small cracks in the epidermis (called micro-cracks or rain checks) sometimes develop on fruit shoulders under highly humid conditions. Rain check is often more severe on fruit that has been exposed due to poor leaf cover. To minimize the problem, maintain healthy foliage and select varieties with good foliage cover.

Sunscald: Fruit exposed to the sun may overheat and develop sunscald. The affected area turns white and does not ripen. The tissue may shrivel and sink in. It is most common when foliage does not shade fruit exposed to hot afternoon sun. Damage is usually confined to the area of the fruit with greatest exposure to the sun. Tomato variety, mineral nutrition, staking and pruning methods, and disease pressure can all influence the amount of foliage cover. This disorder also is observed on peppers and fruit of other vegetable crops.

Zipper scars: These may be caused when the blossom sticks to the developing fruit. Zipper scars are especially common during cool weather. To avoid this problem, select resistant varieties and maintain proper greenhouse temperatures.

Harvesting

Eggplant for fresh market: Harvests can take place every few days once fruits ripen to a glossy finish. Fruit sizes depend on variety. When the skin sheen gets dull and seeds turn brown, they are past their prime. Fruit quality diminishes late in the season. Fruit should be handled carefully to avoid bruising. Time from transplanting to harvest ranges from 80 to 100 days.

Peppers for fresh market and processing:

Harvests can take place every few days once fruit reaches marketable size or color. Careful selection of early-ripening varieties and passing up green harvests will maximize the yield of colored fruits in our northern climate. Fruit quality diminishes late in the season. Time from transplanting to harvest ranges from 70 to 100 days.

Tomatoes for fresh market: Harvests can take place every few days once fruits start to ripen. Small-fruited varieties such as ‘cocktail’, grape, or cherry tomatoes can be harvested ‘on the vine’ by cutting clusters of fruit. To avoid unnecessary extra handling, place these clusters directly into sales containers. Time from transplanting to harvest ranges from 70 to 90 days.

Tomatoes for machine harvest and processing: Ethephon applications accelerate and concentrate fruit ripening, thus facilitating once-over machine harvesting of processing tomatoes. 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. Time from transplanting to harvest ranges from 90 to 110 days.

Fruiting Vegetables - Diseases

Reviewed by Dan Egel, Mohammad Babadoost – Nov 2020

Recommended Controls

Anthracnose of Fruiting Vegetables - Colletotrichum Fungus

Symptoms usually occur on ripe or over-ripe fruit. Begin fungicide applications at or shortly before fruit set.

various rates. See label for directions. REI: 12-hour. PHI: 0-day. FRAC M5.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for eggplants and tomato, and 125 for 30 minutes for pepper. Rotate to non-Solanaceous crops for 3-4 years. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

Aprovia Top (difenoconazole, benzovindiflupyr)
Eggplant, Pepper, Tomato | 10.5-13.5 fl. oz. per acre. Use of a spreader sticker is recommended. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 7.

azoxystrobin products (azoxystrobin) *Eggplant, Pepper* | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

azoxystrobin products (azoxystrobin) *Tomato* | Use 2 lb. a.i. per gallon formulations (Quadris) at 5.0-6.2 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.1-3.9 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

Cabrio EG (20) (pyraclostrobin) *Eggplant, Pepper, Tomato* | 8-12 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

chlorothalonil products (chlorothalonil)
Eggplant, Pepper, Tomato | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at

Fontelis (1.67SC) (penthioopyrad) *Eggplant, Pepper, Tomato* | 24 fl. oz. per acre. Suppression only for anthracnose. In the greenhouse use a rate of 0.75 fl. oz. per gallon per 1,360 sq. ft. REI: 12-hour. PHI: 0-day. FRAC 7.

Inspire Super (EW) (difenoconazole, cyprodinil)
Eggplant, Pepper, Tomato | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

Luna Sensation (fluopyram, trifloxystrobin)
Eggplant, Pepper, Tomato | 7.6 fl. oz. per acre. Suppression only for anthracnose and white mold. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

mancozeb products (mancozeb) *Pepper* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

mancozeb products (mancozeb) *Tomato* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) *Eggplant, Pepper, Tomato* | 1.75-2.5 pt. per acre. REI: 12-hour. PHI: 3-day. FRAC 49, FRAC M5.

Priaxor (fluxapyroxad, pyraclostrobin) *Eggplant, Pepper, Tomato* | 4-8 fl. oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Quadris Opti (SC) (azoxystrobin, chlorothalonil)
Pepper, Tomato | 1.6 pts. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC M5.

Quadris Top (SC) (azoxystrobin, difenoconazole)

Eggplant, Pepper | 8-14 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC 3.

Quadris Top (SC) (azoxystrobin, difenoconazole)

Tomato | 8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC 3.

Revus Top (SC) (mandipropamid, difenoconazole)

Eggplant, Pepper, Tomato | 5.5-7.0 fl. oz. per acre. Do not use on small-fruited varieties. REI: 12-hour. PHI: 1-day. FRAC 40, FRAC 3.

Serenade Opti (26.2WP) (Bacillus subtilis strain QST-713)

Eggplant, Pepper, Tomato | Use Serenade Opti at 14-20 fl. oz. per acre, or Serenade ASO at 2-4 qts. per acre. May help bacterial spot management when copper-resistant strains are present. REI: 4-hour. PHI: 0-day. FRAC 44. *OMRI-listed.*

Tanos (DF) (famoxadone, cymoxanil)

Eggplant, Pepper, Tomato | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Bacterial Canker of Fruiting Vegetables - Clavibacter Bacteria

The bacterium becomes systemic in the plant, causing wilt and leaf/fruit/stem lesions. It can occur on tomato and pepper, but is mainly a problem on tomato.

Sanitize machinery, seedlings, and plant production materials (transplant trays, greenhouse benches, and wooden stakes) with a disinfectant such as 10% chlorine bleach or a quaternary ammonium compound solution.

Inspect seedlings for disease and apply one or two fixed copper product applications before planting. Tank-mix copper products with mancozeb.

Non-Pesticide

Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for eggplants and tomato, and 125 for 30 minutes for pepper. Practice good greenhouse sanitation of equipment, tools propagation trays/pots, and surfaces. Avoid fields with a history of the disease and rotate to non-Solanaceous crops for 3-4 years. Stake and mulch the crops to improve air flow and reduce splashing. Avoid working in wet fields. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Bacterial Speck of Fruiting Vegetables - Pseudomonas Bacteria

Lesions of this disease can be found on leaves, stems, and fruit of peppers and tomatoes. But, it is rarely a problem for eggplants.

Sanitize machinery, seedlings, and plant production materials (transplant trays, greenhouse benches, and wooden stakes) with a disinfectant such as 10% chlorine bleach or a quaternary ammonium compound solution.

While still in the greenhouse, scout and apply fixed copper alternated with streptomycin (Agri-mycin, Firewall, Streptrol). Once in the field, apply fixed copper product tank-mixed with mancozeb on 7-10 day schedule, depending on disease pressure, beginning within 1 week after transplanting. Airblast sprayers with high fan speed can make an outbreak worse by sandblasting plants with droplets

and opening many small wounds that become infected.

Copper Resistance: Strains of the bacterium that cause bacterial spot on tomato that are resistant to copper products are common in the Midwest. Actigard, streptomycin products, mancozeb products, Tanos, and Serenade Max used as labeled may help manage copper-resistant strains.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for eggplants and tomato, and 125 for 30 minutes for pepper. Practice good greenhouse sanitation of equipment, tools propagation trays/pots, and surfaces. Avoid fields with a history of the disease and rotate to non-Solanaceous crops for 2-3 years. Stake and mulch the crops to improve air flow and reduce splashing. Avoid working in wet fields. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) *Pepper, Tomato* | Several formulations of copper (Badge, Champ, Kocide) are labelled for use. See label for directions. Copper-resistant strains of the bacterial spot pathogen are common in the Midwest. Mancozeb products (e.g., Dithane, Manzate, Penncozeb) when tank-mixed with copper products, allow more copper to become available on the leaf surface and so may help manage copper-resistant bacterial strains. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

Regalia (5) (Reynoutria sachalinensis) *Eggplant, Pepper, Tomato* | 1-4 qts. per acre. Use in a program with copper products. REI: 4-hour. PHI: 0-day. FRAC P5. *OMRI-listed*.

Serenade Opti (26.2WP) (Bacillus subtilis strain QST-713) *Eggplant, Pepper, Tomato* | Use Serenade Opti at 14-20 fl. oz. per acre, or Serenade ASO at 2-4 qts. per acre. May help bacterial spot management when copper-resistant strains are present. REI: 4-hour. PHI: 0-day. FRAC 44. *OMRI-listed*.

streptomycin products (Streptomycin sulfate) *Pepper, Tomato* | Use 17% products at 16 oz. per 100 gals of water, or 50% products at 5.3 oz. per 100 gals. of water to maintain a concentration of 200 ppm. Apply one or two times to seedlings, alternated with a fixed copper product compound beginning at the two-leaf stage. Not labeled for use after transplanting (greenhouse only). REI: 12-hour. FRAC 25.

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Bacterial Spot of Fruiting Vegetables - Xanthomonas Bacteria

Lesions of this disease can be found on leaves, stems, and fruit of eggplants, peppers and tomatoes. But, it is rarely a problem for eggplants.

Sanitize machinery, seedlings, and plant production materials (transplant trays, greenhouse benches, and wooden stakes) with a disinfectant such as 10% chlorine bleach or a quaternary ammonium compound solution.

While still in the greenhouse, scout and apply fixed copper alternated with streptomycin (Agri-mycin, Firewall, Streptrol). Once in the field, apply fixed copper product tank-mixed with mancozeb on 7-10 day schedule, depending on disease pressure, beginning within 1 week after transplanting. Airblast sprayers with high fan speed can make an outbreak worse by sandblasting plants with droplets

Fruiting Vegetables - Diseases

and opening many small wounds that become infected.

Copper Resistance: Strains of the bacterium that cause bacterial spot on tomato that are resistant to copper products are common in the Midwest. Actigard, streptomycin products, mancozeb products, Tanos, and Serenade Max used as labeled may help manage copper-resistant strains.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for eggplants and tomato, and 125 for 30 minutes for pepper. Practice good greenhouse sanitation of equipment, tools propagation trays/pots, and surfaces. Avoid fields with a history of the disease and rotate to non-Solanaceous crops for 2-3 years. Stake and mulch the crops to improve air flow and reduce splashing. Avoid working in wet fields. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Actigard (0.5WDG) (acibenzolar-s-methyl) *Pepper, Tomato* | 0.3-0.75 oz. per acre. Begin season with lower rates and increase as plant canopy increases. Do not exceed 6 oz. per season. REI: 12-hour. PHI: 14-day. FRAC P1.

copper products (copper hydroxide, copper octanoate, copper oxo-chloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) *Pepper, Tomato* | Several formulations of copper (Badge, Champ, Kocide) are labelled for use. See label for directions. Copper-resistant strains of the bacterial spot pathogen are common in the Midwest. Mancozeb products (e.g., Dithane, Manzate, Penncozeb) when tank-mixed with copper products, allow more copper to become available on the leaf surface and so may help manage copper-

resistant bacterial strains. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

Regalia (5) (Reynoutria sachalinensis) *Eggplant, Pepper, Tomato* | 1-4 qts. per acre. Use in a program with copper products. REI: 4-hour. PHI: 0-day. FRAC P5. *OMRI-listed*.

Serenade Opti (26.2WP) (Bacillus subtilis strain QST-713) *Eggplant, Pepper, Tomato* | Use Serenade Opti at 14-20 fl. oz. per acre, or Serenade ASO at 2-4 qts. per acre. May help bacterial spot management when copper-resistant strains are present. REI: 4-hour. PHI: 0-day. FRAC 44. *OMRI-listed*.

streptomycin products (Streptomycin sulfate) *Pepper, Tomato* | Use 17% products at 16 oz. per 100 gals of water, or 50% products at 5.3 oz. per 100 gals. of water to maintain a concentration of 200 ppm. Apply one or two times to seedlings, alternated with a fixed copper product compound beginning at the two-leaf stage. Not labeled for use after transplanting (greenhouse only). REI: 12-hour. FRAC 25.

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Buckeye Rot of Tomatoes - Phytophthora Oomycete

These diseases are favored by heavy rains and waterlogged soils. Symptoms include discolored fruit and declining plants. Consider fungicide drench. Regular fungicide schedule may lessen impact of buckeye rot.

Non-Pesticide

Tomato | Rotate to non-Cucurbit, non-Legume, and non-Solanaceous crops for 3 years. Use raised beds, staking, and mulch to improve drainage, air flow,

and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

azoxystrobin products (azoxystrobin) Tomato | Use 2 lb. a.i. per gallon formulations (Quadris) at 5.0-6.2 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.1-3.9 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) Tomato | Several formulations of copper (Badge, Champ, Kocide) are labelled for use and may improve efficacy of fungicides against *Phytophthora* blight when tank mixed at labeled rates. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

Gavel 75DF (zoxamide, mancozeb) Tomato | 1.5-2 lbs. per acre. REI: 48-hour. PHI: 5-day. FRAC 22, FRAC M3.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) Tomato | 1.75-2.5 pt. per acre. REI: 12-hour. PHI: 3-day. FRAC 49, FRAC M5.

Orondis Ultra Premix (SC) (oxathiapiprolin, mandipropamid) Tomato | 5.5-8.0 fl. oz. per acre. Alternate with fungicides that have a different mode of action. Use either soil applications or foliar applications of oxathiapiprolin products, but not both. REI: 4-hour. PHI: 1-day. FRAC 49, FRAC 40.

Quadris Opti (SC) (azoxystrobin, chlorothalonil) Tomato | 1.6 pts. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC M5.

Ridomil Gold Copper (WSB) (mefenoxam, copper hydroxide) Tomato | *For processing tomatoes*: apply 1 pack per 3.7 acres plus 0.8 lb. a.i. per acre of mancozeb. *For fresh market tomatoes*: apply 1 pack per 2.5 acres plus 0.8 lb. a.i. per acre of mancozeb. REI: 48-hour. PHI: 14-day. FRAC 4, FRAC M1.

Tanos (DF) (famoxadone, cymoxanil) Tomato | 8 oz. per acre. For late blight, tank-mix with a contact fungicide with a different mode of action. Disease suppression for Buckeye rot. REI: 12-hour. FRAC 11, FRAC 27.

Damping-Off Seed and Seedling Rots of Multiple Crops - Multiple Pathogens

Non-Pesticide

Eggplant, Pepper, Tomato | Practice good greenhouse sanitation of equipment, tools propagation trays/pots, and surfaces. Avoid excess moisture to the transplants in the greenhouse by monitoring irrigation frequency. Plant in warm field soils. The fungi responsible for damping-off in field soils cause more loss when the seedling is slow to emerge.

Early Blight of Fruiting Vegetables - *Alternaria* Fungus

This pathogen can infect peppers and tomatoes, but is mainly a problem in tomatoes. This disease initially causes lesions on lower leaves of the tomato plant. After field planting, begin protective fungicide applications on a 7-14 day schedule. May be seedborne.

Group 11 Resistance: Strains of the fungus that causes early blight that are resistant to group 11 fungicides have been observed in Indiana and Ohio. Group 11 products labeled for tomato and early blight include Cabrio and Quadris. Tank-mix group 11 fungicides with products that have a different mode of action, or alternate group 11 fungicides with fungicides that have a different group number.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for tomato. Avoid fields with a history of *Fusarium* and *Verticillium* wilts. Rotate to non-Solanaceous crops for 3-4 years. Varieties with partial resistance are available, and varieties resistant to *Fusarium* and *Verticillium* wilt will hold up better against *Alternaria*. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Aprovia Top (difenoconazole, benzovindiflupyr)

Eggplant, Pepper, Tomato | 10.5-13.5 fl. oz. per acre. Use of a spreader sticker is recommended. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 7.

azoxystrobin products (azoxystrobin) *Eggplant, Pepper* | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

azoxystrobin products (azoxystrobin) *Tomato* | Use 2 lb. a.i. per gallon formulations (Quadris) at 5.0-6.2 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.1-3.9 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

Cabrio EG (20) (pyraclostrobin) *Eggplant, Pepper, Tomato* | 8-12 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

chlorothalonil products (chlorothalonil)

Eggplant, Pepper, Tomato | Several formulations of

chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 0-day. FRAC M5.

Endura (WG) (boscalid) *Eggplant, Pepper, Tomato* | 2.5-3.5 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7.

Fontelis (1.67SC) (penthioopyrad) *Eggplant, Pepper, Tomato* | 16-24 fl. oz. per acre. See label for greenhouse uses. REI: 12-hour. PHI: 0-day. FRAC 7.

Inspire Super (EW) (difenoconazole, cyprodinil) *Eggplant, Pepper, Tomato* | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

Luna Sensation (fluopyram, trifloxystrobin) *Eggplant, Pepper, Tomato* | 5-7.6 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

Luna Tranquility (SC) (fluopyram, pyrimethanil) *Tomato* | 11.2 fl. oz. per acre. Disease suppression of powdery mildew. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 9.

mancozeb products (mancozeb) *Pepper* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

mancozeb products (mancozeb) *Tomato* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) *Pepper, Tomato* | 9.2-11.4 fl. oz. per acre. Use high rate for gray mold, suppression only. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 12.

Priaxor (fluxapyroxad, pyraclostrobin) *Eggplant, Pepper, Tomato* | 4-8 fl. oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Quadris Opti (SC) (azoxystrobin, chlorothalonil) *Pepper, Tomato* | 1.3-1.6 pts. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC M5.

Revus Top (SC) (mandipropamid, difenoconazole) *Eggplant, Pepper, Tomato* | 5.5-7.0 fl. oz. per acre. Do not use on small-fruited varieties. REI: 12-hour. PHI: 1-day. FRAC 40, FRAC 3.

Scala (SC) (5) (pyrimethanil) *Tomato* | 7 fl. oz. per acre. Tank-mix with another fungicide. Allow greenhouse/hoophouse to ventilate for 2 hours. REI: 12-hour. PHI: 1-day. FRAC 9.

Switch 62.5WG (cyprodinil, fludioxonil) *Eggplant, Pepper, Tomato* | 11-14 oz. per acre. Do not apply to small fruited varieties in the greenhouse. REI: 12-hour. PHI: 0-day. FRAC 9, FRAC 12.

Fusarium Wilt of Fruiting Vegetables - Fusarium Fungus

May be seedborne.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for eggplants and tomato, and 125 for 30 minutes for pepper. Avoid fields with a history of the disease. Rotate to non-Solanaceous crops for >6 years. Varieties with resistance are available, and resistant rootstocks are available for grafting. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Gray Mold of Multiple Crops - Botrytis Fungus

This disease often occurs in greenhouse production with high humidity.

Non-Pesticide

Eggplant, Pepper, Tomato | Use raised beds and adequate plant spacing to improve drainage, air flow. Monitor humidity in the hoophouse and vent appropriately. Pruning the crop can help increase airflow as well. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Botran 75W (dichloro-nitroaniline) *Pepper, Tomato* | 1lb. per 100 gals. of water. Labeled for stem phase of gray mold. Apply to stems up to a height of 24 inches. Young plants may be injured. REI: 12-hour. PHI: 0-day. FRAC 14.

Cabrio EG (20) (pyraclostrobin) *Eggplant, Pepper, Tomato* | 12-16 oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 11.

chlorothalonil products (chlorothalonil) *Eggplant, Pepper, Tomato* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 0-day. FRAC M5.

Endura (WG) (boscalid) *Eggplant, Pepper, Tomato* | 9-12.5 oz. per acre. Suppression only. REI: 12-hour. PHI: 0-day. FRAC 7.

Fontelis (1.67SC) (penthiopyrad) *Eggplant, Pepper, Tomato* | 16-24 fl. oz. per acre. See label

Fruiting Vegetables - Diseases

for greenhouse uses. REI: 12-hour. PHI: 0-day. FRAC 7.

Inspire Super (EW) (difenoconazole, cyprodinil)

Eggplant, Pepper, Tomato | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

Luna Sensation (fluopyram, trifloxystrobin)

Eggplant, Pepper, Tomato | 7.6 fl. oz. per acre. Suppression only for anthracnose and white mold. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

Luna Tranquility (SC) (fluopyram, pyrimethanil)

Tomato | 11.2 fl. oz. per acre. Disease suppression of powdery mildew. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 9.

Miravis Prime (SC) (pydiflumetofen, fludioxonil)

Pepper, Tomato | 9.2-11.4 fl. oz. per acre. Use high rate for gray mold, suppression only. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 12.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) *Eggplant, Pepper, Tomato* | 1.75-2.5 pt. per acre. REI: 12-hour. PHI: 3-day. FRAC 49, FRAC M5.

Pageant Intrinsic (boscalid, pyraclostrobin)

Tomato | 23 oz. per acre. Labeled for greenhouse-/high tunnel-grown tomatoes. Do not apply on seedlings meant for transplanting in the field. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Priaxor (fluxapyroxad, pyraclostrobin)

Eggplant, Pepper, Tomato | 4-8 fl. oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Scala (SC) (5) (pyrimethanil) *Tomato* | 7 fl. oz. per acre. Tank-mix with another fungicide. Allow greenhouse/hoophouse to ventilate for 2 hours. REI: 12-hour. PHI: 1-day. FRAC 9.

Switch 62.5WG (cyprodinil, fludioxonil)

Eggplant, Pepper, Tomato | 11-14 oz. per acre. Do not apply to small fruited varieties in the greenhouse. REI: 12-hour. PHI: 0-day. FRAC 9, FRAC 12.

Late Blight of Potatoes/Tomatoes - Phytophthora Oomycete

This destructive pathogen causes quick plant death and can be identified by large spreading brown stem lesions, velvety white growth on plant surfaces, and large brown leathery spots on green fruits. It is favored by prolonged cool and damp conditions.

The pathogen overwinters on plant residue, including volunteer potatoes and potato cull piles. The first step to manage this disease is monitoring and destroying cull and volunteer potato emergence in the spring. When it is reported in your region, begin weekly preventive sprays with chlorothalonil and mancozeb for as long as favorable conditions persist. Pay attention to which pathogen strain is identified. If infections start in a field, the strain US-23 is sensitive to mefenoxam (Ridomil).

Non-Pesticide

Tomato | Avoid fields with a history the disease. Rotate to non-Solanaceous crops (including potatoes) for 3-4 years. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the infected crop or finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. In small plantings, remove infected plants from the field and dispose in a sealed trash container, or burn. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

chlorothalonil products (chlorothalonil) *Tomato* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label

for directions. REI: 12-hour. PHI: 0-day. FRAC M5.

Gavel 75DF (zoxamide, mancozeb) *Tomato* | 1.5-2 lbs. per acre. REI: 48-hour. PHI: 5-day. FRAC 22, FRAC M3.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) *Tomato* | 1.75-2.5 pt. per acre. REI: 12-hour. PHI: 3-day. FRAC 49, FRAC M5.

Orondis Ultra Premix (SC) (oxathiapiprolin, mandipropamid) *Tomato* | 5.5-8.0 fl. oz. per acre. Alternate with fungicides that have a different mode of action. Use either soil applications or foliar applications of oxathiapiprolin products, but not both. REI: 4-hour. PHI: 1-day. FRAC 49, FRAC 40.

Presidio (4SC) (fluopicolide) *Tomato* | 3-4 fl. oz. per acre. Must be tank-mixed with a product with a different mode of action. REI: 12-hour. PHI: 2-day. FRAC 43.

Ranman 400SC (34.5) (cyazofamid) *Tomato* | 2.1-2.75 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 21.

Revus Top (SC) (mandipropamid, difenoconazole) *Tomato* | 5.5-7.0 fl. oz. per acre. Do not use on small-fruited varieties. REI: 12-hour. PHI: 1-day. FRAC 40, FRAC 3.

Tanos (DF) (famoxadone, cymoxanil) *Tomato* | 8 oz. per acre. For late blight, tank-mix with a contact fungicide with a different mode of action. Disease suppression for Buckeye rot. REI: 12-hour. FRAC 11, FRAC 27.

Zampro (SC) (ametoctradin, dimethomorph) *Tomato* | 14 fl. oz. per acre. REI: 12-hour. PHI: 4-day. FRAC 45, FRAC 40.

Leaf Blight of Fruiting Vegetables - Septoria Fungus

This pathogen can infect eggplants, peppers, and tomatoes, but is mainly a problem in tomatoes. This disease initially causes lesions on lower leaves of the tomato plant. After field planting, begin protective fungicide applications on a 7-14 day schedule.

Non-Pesticide

Eggplant, Pepper, Tomato | Avoid fields with a history of Fusarium and Verticillium wilts. Rotate to non-Solanaceous crops for 2-3 years. Varieties resistant to Fusarium and Verticillium wilt will hold up better against Septoria. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Aprovia Top (difenoconazole, benzovindiflupyr) *Eggplant, Pepper, Tomato* | 10.5-13.5 fl. oz. per acre. Use of a spreader sticker is recommended. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 7.

azoxystrobin products (azoxystrobin) *Eggplant, Pepper* | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

azoxystrobin products (azoxystrobin) *Tomato* | Use 2 lb. a.i. per gallon formulations (Quadris) at 5.0-6.2 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.1-3.9 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

Fruiting Vegetables - Diseases

Cabrio EG (20) (pyraclostrobin) *Eggplant, Pepper, Tomato* | 8-12 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

chlorothalonil products (chlorothalonil) *Eggplant, Pepper, Tomato* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 0-day. FRAC M5.

Fontelis (1.67SC) (penthioopyrad) *Eggplant, Pepper, Tomato* | 16-24 fl. oz. per acre. See label for greenhouse uses. REI: 12-hour. PHI: 0-day. FRAC 7.

Inspire Super (EW) (difenoconazole, cyprodinil) *Eggplant, Pepper, Tomato* | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

Luna Sensation (fluopyram, trifloxystrobin) *Eggplant, Pepper, Tomato* | 5-7.6 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

Luna Tranquility (SC) (fluopyram, pyrimethanil) *Tomato* | 11.2 fl. oz. per acre. Disease suppression of powdery mildew. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 9.

mancozeb products (mancozeb) *Tomato* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) *Pepper, Tomato* | 9.2-11.4 fl. oz. per acre. Use high rate for gray mold, suppression only. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 12.

Priaxor (fluxapyroxad, pyraclostrobin) *Eggplant, Pepper, Tomato* | 4-8 fl. oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Quadris Opti (SC) (azoxystrobin, chlorothalonil) *Pepper, Tomato* | 1.3-1.6 pts. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC M5.

Quadris Top (SC) (azoxystrobin, difenoconazole) *Tomato* | 8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC 3.

Revus Top (SC) (mandipropamid, difenoconazole) *Eggplant, Pepper, Tomato* | 5.5-7.0 fl. oz. per acre. Do not use on small-fruited varieties. REI: 12-hour. PHI: 1-day. FRAC 40, FRAC 3.

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Leaf Mold of Fruiting Vegetables - *Passalora Fungus*

This pathogen can infect eggplants, peppers and tomatoes, but is mainly a problem in tomatoes. This disease causes yellow lesions on the upper side of the tomato leaf. It is common in greenhouse and high tunnel tomatoes but is less common in open field tomatoes.

Non-Pesticide

Eggplant, Pepper, Tomato | Use disease-free seed and transplants. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 122 F for 25 minutes for tomato. Rotate to non-Solanaceous crops for 2 years. Resistant varieties are available. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Monitor humidity in the hoop house and vent appropriately. Pruning the crop can help increase airflow as well. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Gavel 75DF (zoxamide, mancozeb) *Tomato* | 1.5-2 lbs. per acre. REI: 48-hour. PHI: 5-day. FRAC 22, FRAC M3.

Inspire Super (EW) (difenoconazole, cyprodinil) *Eggplant, Pepper, Tomato* | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

mancozeb products (mancozeb) *Tomato* | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 5-day. FRAC M3.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) *Pepper, Tomato* | 9.2-11.4 fl. oz. per acre. Use high rate for gray mold, suppression only. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 12.

Quadris Top (SC) (azoxystrobin, difenoconazole) *Tomato* | 8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC 3.

Revus Top (SC) (mandipropamid, difenoconazole) *Eggplant, Pepper, Tomato* | 5.5-7.0 fl. oz. per acre. Do not use on small-fruited varieties. REI: 12-hour. PHI: 1-day. FRAC 40, FRAC 3.

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Nematodes

Non-Pesticide

Tomato | Collect soil samples for nematodes in the fall and avoid fields with high numbers. Rotate to a non-broadleaf crop, such as grass grains or sweet

corn for >3 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue and displace nematodes is an important method to prevent nematode build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain nematodes.

Pesticide

Nimitz (4EC) (fluensulfone) *Eggplant, Pepper, Tomato* | 3.5-7 pts. per acre. Do not use on direct-seeded plants. May be broadcast, banded, or drip-applied in the spring up to 7 days before planting at a depth of 8 inches. Effectiveness is reduced on muck and clay soils. REI: 12-hour. IRAC UN.

Sectagon K42 (4.2L) (metam sodium) *Eggplant, Pepper, Tomato* | 37.5-75 gals. per acre. Use high rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K42 or VAPAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP*.

Sectagon K54 (5.63L) (metam potassium) *Eggplant, Pepper, Tomato* | 30-62 gals. per acre. Use high rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K54 or K-PAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP*.

Fruiting Vegetables - Diseases

Telone C-17 (L) (1,3-dichloropropene, chloropicrin) *Eggplant, Pepper, Tomato* | *Muck soils*: Use C-17 formulation at 27.4-30 gals. per acre, and C-35 formulation at 33-36 gals. per acre. *Mineral soils*: Use C-17 formulation at 10.8-17.1 gals. per acre, and C-35 formulation at 13-20.5 gals. per acre. In the fall, when soil at 6 inches is above 50 F and moist, place Telone C-17 or C-35 about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing, irrigation, or plastic. Or, in the spring, InLine may be applied through drip irrigation under unperforated plastic beds at 13-20.5 gals. per acre, on mineral soils only. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 3-5-day. IRAC UN, FRAC NC, IRAC 8B. *RUP*.

Telone II (9.85L) (1,3-dichloropropene) *Eggplant, Pepper, Tomato* | *Muck soils*: Use at 25 gals. per acre. *Mineral soils*: Use at 9-12 gals. per acre. In the spring or fall, when soil at 6 inches is above 50 F and moist, place Telone II about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, Telone EC may be applied through drip irrigation under unperforated plastic beds at 9-18 gals. per acre on mineral soils only. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC UN, FRAC NC. *RUP*.

Velum Prime (4.16SC) (fluopyram) *Eggplant, Pepper, Tomato* | 6.5-6.84 fl. oz. per acre. Apply through drip irrigation. Do not exceed 13.7 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 0-day. FRAC 7.

Vydate L (2WSL) (oxamyl) *Eggplant* | 2-4 pts. per acre. Apply as a transplant water drench (peppers and tomatoes only), banded directed post-plant soil treatment with at least 20 gals. water per acre incorporated 2-4 inches deep by water or mechanical means, or drip chemigate after

transplanting with at least 40 gals. water per acre. Allow 14 days between applications. *For eggplants*, do not exceed 16 pts. per acre per season. *For peppers*, do not exceed 24 pts. per acre per season. *For tomatoes*, do not exceed 32 pts. per acre per season. *In Kansas*, only drip treatment allowed for eggplant, only low rate allowed for peppers, and up to 8 pts. allowed for tomato drip applications. *In Missouri*, up to 8 pts. per acre allowed for tomato drip applications. REI: 48-hour. PHI: 7-day for eggplants and peppers, 3-day for tomatoes. IRAC 1A. *RUP*.

Phytophthora Blight of Multiple Crops - Phytophthora Oomycete

Phytophthora may cause damping-off, stem infection, and fruit rot in tomatoes and peppers. It is often associated with heavy rains and fields with poor drainage. The first symptoms are usually observed in low areas. It has a wide host range of crops and weeds, including vine crops, beans, nightshades and velvetleaf. Ponds and streams with run-off water from infested soil may be contaminated with Phytophthora.

At planting, use a transplant drench to help prevent *Phytophthora* infection of young plants. *At fruit set*, apply contact or systemic fungicides at first sign of the disease to prevent fruit rots. Systemic fungicides are available.

Non-Pesticide

Eggplant, Pepper, Tomato | Rotate to non-Cucurbit, non-Legume, and non-Solanaceous crops for 3 years. Avoid fields with a history of the disease and poor drainage. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Do not irrigate with surface water. Pepper varieties with moderate to good resistance to the crown and root rot phase of *Phytophthora* blight include the *Bell-types*, *Paladin*, *Aristotle*, *Archimedes*, *Revolution*, *Declaration*, *Intruder*, and *Vanguard*; *Jalapeno-types*, *Hechicero*; and *Ancho-type*, *Sequoia*. These varieties are susceptible to the foliar and fruit rot phases of *Phytophthora* blight. Prompt

destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) *Eggplant, Pepper, Tomato* | Several formulations of copper (Badge, Champ, Kocide) are labelled for use and may improve efficacy of fungicides against *Phytophthora* blight when tank mixed at labeled rates. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

Elumin (4SC) (ethaboxam) *Eggplant, Pepper* | 8 fl. oz. per acre. REI: 12-hour. PHI: 2-day. FRAC 22.

Omega 500F (4.17) (fluazinam) *Eggplant, Pepper* | 16-24 fl. oz. per acre. Apply 24 fl. oz. per acre as a soil drench at transplanting. Then, begin foliar applications using low rates under low disease pressure, and high rates under high disease pressure. REI: 12-hour. PHI: 30-day. FRAC 29.

Orondis Gold (DC) (oxathiapiprolin, mfenoxam) *Eggplant, Pepper, Tomato* | 28-55 fl. oz. per acre. Use as an at-plant soil drench, banded spray in furrow, or through drip irrigation. Do not follow soil applications of Orondis Gold with foliar applications of Orondis Opti, or Orondis Ultra. REI: 4-hour. PHI: 2-day. FRAC 49, FRAC 4.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) *Eggplant, Pepper, Tomato* | 1.75-2.5 pt. per acre. REI: 12-hour. PHI: 3-day. FRAC 49, FRAC M5.

Orondis Ultra Premix (SC) (oxathiapiprolin, mandipropamid) *Eggplant, Pepper, Tomato* | 5.5-8.0 fl. oz. per acre. Alternate with fungicides that

have a different mode of action. Use either soil applications or foliar applications of oxathiapiprolin products, but not both. REI: 4-hour. PHI: 1-day. FRAC 49, FRAC 40.

phosphite and phosphorous acid products (phosphorous acid, potassium phosphite, mono-dipotassium salts of phosphorous acid, mono- and dibasic sodium, potassium, and ammonium phosphites, fosetyl-aluminum) *Pepper, Tomato* | Several phosphite or phosphorus acid products (Aliette, Phostrol, ProPhyt, Rampart) are labeled at various rates. Label includes different crops, PHIs, resistance instructions, and other important information. Some manufacturers recommend tank-mixing. These products may be used in a preventative program until the disease is observed. REI: 4 to 12-hour. FRAC P7.

Presidio (4SC) (fluopicolide) *Eggplant, Pepper, Tomato* | 3-4 fl. oz. per acre. Must be tank-mixed with a product with a different mode of action. REI: 12-hour. PHI: 2-day. FRAC 43.

Ranman 400SC (34.5) (cyazofamid) *Eggplant, Pepper, Tomato* | 2.1-2.75 fl. oz. per acre. For Buckeye rot and *Phytophthora* blight, apply to base of plant or in transplant water. REI: 12-hour. PHI: 0-day. FRAC 21.

Revus (2.08SC) (mandipropamid) *Eggplant, Pepper* | 8 fl. oz. per acre. REI: 4-hour. PHI: 1-day. FRAC 40.

Ridomil Gold SL (4SC) (mefenoxam) *Eggplant, Pepper, Tomato* | 1 pt. per acre. Soil treatment at 1 pt. per acre broadcast (use less for band applications) before transplanting. Subsequent directed sprays may be needed. *Phytophthora crown rot only*. Fungicides will not be effective if plants are planted in poorly drained fields with a history of the disease. REI: 48-hour. PHI: 7-day. FRAC 4.

Tanos (DF) (famoxadone, cymoxanil) *Eggplant, Pepper, Tomato* | 8 oz. per acre. Early blight rate 6-

Fruiting Vegetables - Diseases

8 oz. per acre. Disease suppression for bacterial diseases. REI: 12-hour. PHI: 3-day. FRAC 11, FRAC 27.

Zampro (SC) (ametoctradin, dimethomorph)

Eggplant, Pepper, Tomato | 14 fl. oz. per acre. REI: 12-hour. PHI: 4-day. FRAC 45, FRAC 40.

Powdery Mildew of Fruiting Vegetables - *Leveillula* Fungus

This pathogen can infect eggplants, peppers and tomatoes, but is mainly a problem in tomatoes.

Non-Pesticide

Eggplant, Pepper, Tomato | Avoid fields with a history of the disease. Rotate to non-Solanaceous crops for 2 years. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Aprovia Top (difenoconazole, benzovindiflupyr)

Eggplant, Pepper, Tomato | 10.5-13.5 fl. oz. per acre. Use of a spreader sticker is recommended. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 7.

azoxystrobin products (azoxystrobin) *Eggplant,*

Pepper | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

azoxystrobin products (azoxystrobin) *Tomato* |

Use 2 lb. a.i. per gallon formulations (Quadris) at 5.0-6.2 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.1-3.9 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.08-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

Cabrio EG (20) (pyraclostrobin) *Eggplant,*

Pepper, Tomato | 8-16 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

Inspire Super (EW) (difenoconazole, cyprodinil)

Eggplant, Pepper, Tomato | 16-20 fl. oz. per acre. Do not apply to small fruited varieties such as cherry tomato. REI: 12-hour. PHI: 0-day. FRAC 3, FRAC 9.

Luna Sensation (fluopyram, trifloxystrobin)

Eggplant, Pepper, Tomato | 5-7.6 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

Luna Tranquility (SC) (fluopyram,

pyrimethanil) *Tomato* | 11.2 fl. oz. per acre. Disease suppression of powdery mildew. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 9.

Miravis Prime (SC) (pydiflumetofen, fludioxonil)

Pepper, Tomato | 9.2-11.4 fl. oz. per acre. Use high rate for gray mold, suppression only. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 12.

Priaxor (fluxapyroxad, pyraclostrobin) *Eggplant,*

Pepper, Tomato | 6-8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Quadris Opti (SC) (azoxystrobin, chlorothalonil)

Pepper, Tomato | 1.6 pts. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC M5.

Quadris Top (SC) (azoxystrobin, difenoconazole)

Tomato | 8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11, FRAC 3.

Switch 62.5WG (cyprodinil, fludioxonil)

Eggplant, Pepper, Tomato | 11-14 oz. per acre. Do not apply to small fruited varieties in the greenhouse. REI: 12-hour. PHI: 0-day. FRAC 9, FRAC 12.

Southern Blight of Fruiting Vegetables - Sclerotium Fungus

This disease is normally observed in southern climates or during seasons with above normal temperatures.

Non-Pesticide

Eggplant, Pepper, Tomato | Rotate to a non-broadleaf crop, such as grass grains, sweet corn, or onions for >6 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

Fontelis (1.67SC) (penthiopyrad) *Eggplant, Pepper, Tomato* | 1-1.6 fl. oz. per 1,000 row ft. Apply to base of plant as directed spray 5-10 days after transplanting and 14 days later. Follow up with effective fungicide as needed. REI: 12-hour. PHI: 0-day. FRAC 7.

Viruses of Multiple Crops - Multiple Pathogens

There are three main virus diseases in tomatoes: Impatiens Necrotic Spot Virus (INSV), Tomato Spotted Wilt Virus (TSWV), and Tobacco Mosaic Virus (TMV).

INSV and TSWV is carried by thrips and can cause major loss to tomatoes if they infect young plants. It is more common in greenhouse and high tunnel situations, especially where tomatoes and ornamental flowers share space.

TMV is more of a problem in fresh market tomatoes than processing tomatoes due to extensive handling. Disease can spread through smoking tobacco and tobacco residue.

Non-Pesticide

Tomato | For **INSV and TSWV**: maintain transplant greenhouse sanitation and good weed control is important. Avoid shared space with hanging basket flowers, and Solanaceous weeds like nightshades and horse nettle. Use a monitoring program to time the release of natural enemies of thrips (see insect section). Remove infected transplants and do not plant them out into fields. For **TMV**: establish and enforce break area and handwashing rules and procedures to avoid tobacco residue on tomato plants. Remove infected transplants and do not plant them out into fields.

White Mold (Timber Rot, Drop, Stem Rot) of Multiple Crops - Sclerotinia Fungus

This soil pathogen is long-lived in the soil, and has a wide host range on broadleaved crops and weeds, including beans, vine crops, lettuce, tomatoes, peppers, and cole crops. It goes by other names in other crops, such as Drop, White Mold, Stem Rot, and Timber Rot.

It is more commonly found in greenhouses and high tunnels where humidity and temperatures are high. The fungus often infects flowers, which then drop off and infect the stems that they land on. The stems take on a woody appearance and can split open, revealing small black pellets that are the overwintering body of the pathogen.

Non-Pesticide

Eggplant, Pepper, Tomato | Avoid fields with a history of the problem. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >6 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

Cabrio EG (20) (pyraclostrobin) *Eggplant, Pepper, Tomato* | 12-16 oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 11.

Endura (WG) (boscalid) *Tomato* | 12.5 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7.

Luna Sensation (fluopyram, trifloxystrobin) *Eggplant, Pepper, Tomato* | 7.6 fl. oz. per acre. Suppression only for anthracnose and white mold. REI: 12-hour. PHI: 3-day. FRAC 7, FRAC 11.

Priaxor (fluxapyroxad, pyraclostrobin) *Eggplant, Pepper, Tomato* | 4-8 fl. oz. per acre. Suppression only for Botrytis gray mold and white mold. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

Wilt of Multiple Crops - Verticillium Fungus

This is a soil pathogen. Eggplants are more sensitive to it than other Solanaceous crops.

Non-Pesticide

Eggplant, Tomato | Avoid fields with a history of the disease. Rotate to non-Cucurbit, non-Legume, and non-Solanaceous crops for >6 years. Many tomato varieties with resistance are available, and resistant tomato rootstocks are available for grafting under eggplant. Use raised beds, staking, and mulch to improve drainage, air flow, and reduce splashing. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain this pathogen.

Pesticide

Sectagon K42 (4.2L) (metam sodium) *Eggplant, Pepper, Tomato* | 37.5-75 gals. per acre. Use high

rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K42 or VAPAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

Sectagon K54 (5.63L) (metam potassium)

Eggplant, Pepper, Tomato | 30-62 gals. per acre. Use high rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K54 or K-PAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

Telone C-17 (L) (1,3-dichloropropene,

chloropicrin) *Eggplant, Pepper, Tomato* | *Muck soils:* Use C-17 formulation at 27.4-30 gals. per acre, and C-35 formulation at 33-36 gals. per acre. *Mineral soils:* Use C-17 formulation at 10.8-17.1 gals. per acre, and C-35 formulation at 13-20.5 gals per acre. In the fall, when soil at 6 inches is above 50 F and moist, place Telone C-17 or C-35 about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing, irrigation, or plastic. Or, in the spring, InLine may be applied through drip irrigation under unperforated plastic beds at 13-20.5 gals. per acre, on mineral soils only. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 3-5-day. IRAC UN, FRAC NC, IRAC 8B. *RUP.*

Fruiting Vegetables - Insects

Reviewed by Laura Ingwell, Raymond Cloyd, Luis Cañas – Nov 2020

Recommended Controls

Aphids

Aphids and thrips transmit viral diseases.

Non-Pesticide

Eggplant, Pepper, Tomato | For greenhouses, consider purchasing and releasing the predatory midge *Aphidoletes aphidimyza*, lady beetles *Adalia bipunctata* and *Hippodamia convergens*, and lacewings *Chrysopa carnea* and *Chrysoperla rhyfolabris*. Also depending on the aphid species, consider co-releasing a parasitoid wasps like *Aphelinus abdominalis*, *Aphidius colemani*, *Aphidius ervi*, or *Aphidius matricariae*. Avoid insecticides when deploying natural enemies.

Pesticide

Actara (25WDG) (thiamethoxam) *Eggplant, Pepper, Tomato* | 2-3 oz. per acre. Apply as a foliar spray. Do not exceed 11 oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 0-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) *Eggplant, Pepper, Tomato* | 1.3-2.2 fl. oz. per acre foliar application for eggplant, pepper, and tomato. 7.0-10.5 fl. oz. per acre soil application on eggplant and tomato, up to 14 fl. oz. per acre for pepper. Do not exceed 6.7 fl. oz. per acre for foliar applications. Do not exceed 10.5 fl. oz. per acre for soil applications on eggplant and tomato, or 14 fl. oz. for pepper. REI: 12-hour. PHI: 0-day for foliar application, or 21-day for soil application. IRAC 4A.

Assail 30SG (acetamiprid) *Eggplant, Pepper, Tomato* | Use 30SG formulations at 2.0-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 0.8-1.7 oz. per acre and do not exceed 6.8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Beleaf (50SG) (flonicamid) *Eggplant, Pepper, Tomato* | 2.0-4.28 fl. oz. per acre. Do not exceed 8.4 oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 29.

Dimethoate 4EC (dimethoate) *Pepper, Tomato* | Use 2.67EC formulations at 0.75-1.0 pt. per acre on peppers, or 0.75-1.5 pts. per acre on tomatoes and do not exceed 4.95 pts. per acre per season on peppers or 3 pts. per acre per season on tomatoes. Use 4EC, LV-4, and 400EC formulations at 0.5-0.6 pt. per acre on peppers, or 0.5-1.0 pt. per acre on tomatoes and do not exceed 3.33 pts. per acre per season on peppers, or 2 pts. per acre per season on tomatoes. REI: 48-hour. PHI: 0-day for pepper, 7-day for tomato. IRAC 1B.

Fulfill (50WDG) (pymetrozine) *Eggplant, Pepper, Tomato* | 2.75 oz. per acre. Do not exceed 5.5 oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 9B.

Lannate LV (2.4L) (methomyl) *Eggplant, Pepper, Tomato* | 0.75-3.0 pts. per acre. Do not exceed 21 pts. per acre per season. REI: 48-hour. PHI: 1-day for tomato, 3-day for pepper, 5-day for eggplant. IRAC 1A. RUP.

M-Pede (3.8) (potassium salts of fatty acids) *Eggplant, Pepper, Tomato* | 1-2% by volume. Must contact target insects to be effective. REI: 12-hour. PHI: 0-day. IRAC UN, FRAC NC. OMRI-listed.

Malathion 5EC (malathion) *Eggplant, Pepper, Tomato* | Use 5EC formulations at 1.5-2.5 pts. per acre for eggplant, 1.0-2.5 pts. per acre for pepper, 1.5 pts. per acre for tomato. Use 57EC formulations at 1.0-1.5 pts. per acre on eggplant, 1.25-1.5 pts. per

Fruiting Vegetables - Insects

acre on pepper, 1.0-1.25 pts. per acre for tomato. Do not exceed 2 applications per season on peppers, or 4 applications per season on tomatoes. REI: 12 to 24-hour. PHI: 1-day for tomato, 3-day for eggplant and pepper. IRAC 1B.

Movento (2SC) (spirotetramat) *Eggplant, Pepper, Tomato* | 4-5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. IRAC 23.

Orthene 97 (S) (acephate) *Pepper* | For Bell Pepper: Application rate is 0.5-1 lb. per acre. For all other peppers: Application rate is 0.5 lb. per acre. REI: 24-hour. PHI: 7-day. IRAC 1B.

Platinum 2SC (thiamethoxam) *Eggplant, Pepper, Tomato* | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

Sivanto 200 (1.67SL) (flupyradifurone) *Eggplant, Pepper, Tomato* | 7-12 fl. oz. per acre foliar application, or 21-28 fl. oz. per acre soil application. REI: 4-hour. PHI: 1-day for foliar application, or 45-day for soil application. IRAC 4D.

Vydate L (2WSL) (oxamyl) *Eggplant, Pepper, Tomato* | 2-4 pts. per acre. Apply as a foliar spray. Drip application allowed in peppers. *For eggplants*, do not exceed 16 pts. per acre per season. *For peppers*, do not exceed 24 pts. per acre per season. *For tomatoes*, do not exceed 32 pts. per acre per season. *In Kansas*, only low rate allowed for peppers, and do not exceed 12 pts. per acre per season. REI: 48-hour. PHI: 1-day for eggplant, 3-day for tomato, 7-day for pepper. IRAC 1A. *RUP*.

Caterpillars

There are many caterpillar pests of fruiting vegetables, including corn earworm/tomato fruitworm, tomato hornworm, tomato pinworm,

European corn borer, cutworms, loopers, and armyworms. Always check the label for the specific list of caterpillars that the product can be used on.

Pesticide

Asana XL (0.66EC) (esfenvalerate) *Eggplant, Pepper, Tomato* | 2.9-9.6 fl. oz. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms in tomatoes. For corn borers, fruitworms, and loopers in eggplants. For armyworms, corn borers, fruitworms, and loopers in peppers. Do not exceed 67.8 fl. oz. per acre per season for eggplant and pepper. Do not exceed 96.9 fl. oz. per acre per season for tomato. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP*.

Avaunt (30WDG) (indoxacarb) *Eggplant, Pepper, Tomato* | 2.5-3.5 fl. oz. per acre. For armyworms, fruitworms, hornworms, and loopers in tomatoes, peppers and eggplants. For corn borers in bell peppers only. Do not exceed 14 oz. per acre per season. REI: 12-hour. PHI: 3-day. IRAC 22.

Bacillus thuringiensis products for caterpillars (Bacillus thuringiensis aizawai strain ABTS-1857, Bacillus thuringiensis aizawai strain GC-91, Bacillus thuringiensis kurstaki strain ABTS-351, Bacillus thuringiensis kurstaki strain EVB-113-19, Bacillus thuringiensis kurstaki strain SA-11) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms. Various Bt products are available for control of young caterpillars (Agree, Biobit, Dipel, Javelin, etc.) Different Bt subspecies have different control properties. Check labels for rates, timing of application and required safety equipment. REI: 4-hour. PHI: 0-day. IRAC 11A.

Baythroid XL (1EC) (beta-cyfluthrin) *Eggplant, Pepper, Tomato* | 1.6-2.8 fl. oz. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms. Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days

between applications. REI: 12-hour. PHI: 0-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP.*

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP.*

Coragen (1.67SC) (chlorantraniliprole) *Eggplant, Pepper, Tomato* | 2.0-7.5 fl. oz. per acre. For armyworms, corn borers, fruitworms, hornworms, loopers, and pinworms. Can be applied as either a foliar application or via drip chemigation. Chemigation will provide up to 30 days of control. Do not exceed 15.4 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

Danitol 2.4EC (30.9) (fenpropathrin) *Eggplant, Pepper, Tomato* | 10.67 fl. oz. per acre. For armyworms, cutworms, fruitworms, hornworms, and loopers. Do not exceed 42.67 fl. oz. per acre per season. REI: 24-hour. PHI: 3-day. IRAC 3A. *RUP.*

Diazinon AG500 (4ES) (diazinon) *Tomato* | For cutworms. Use 50W formulations at 4-8 lbs. per acre as a pre-plant incorporation and do not exceed 8 lbs. per acre per season. Use AG500 formulations at 64-128 fl. oz. per acre as a pre-plant incorporation and do not exceed 128 fl. oz. per acre per season. Use AG600 formulations at 51-102 fl. oz. per acre as a pre-plant incorporation and do not exceed 102 fl. oz. per acre per season. REI: 2 to 4-day. IRAC 1B. *RUP.*

Entrust SC (2) (spinosad) *Eggplant, Pepper, Tomato* | For armyworms, fruitworms, hornworms, loopers, and pinworms. Use 2SC formulations at 3.0-8.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season. Use 80WP formulations at 1.0-2.5 oz. per acre and do not exceed 9 oz. per acre per season. Allow 4 days between applications. REI: 4-hour. PHI: 1-day. IRAC 5. *OMRI-listed.*

Exirel (0.83SE) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 7.0-13.5 fl. oz. per acre. For armyworms, corn borers, fruitworms, hornworms, loopers, and pinworms. Do not exceed 61.7 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

Harvanta (0.42SL) (cyclaniliprole) *Eggplant, Pepper, Tomato* | 10.9-16.4 fl. oz. per acre. For armyworms, corn borers, fruitworms, hornworms, loopers, and pinworms. Use with adjuvant. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

Intrepid 2F (methoxyfenozide) *Eggplant, Pepper, Tomato* | 4-16 oz. per acre. For armyworms, corn borers, hornworms, and loopers. Do not exceed 64 oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 18.

Lannate LV (2.4L) (methomyl) *Eggplant, Pepper, Tomato* | 1.5-3.0 pts. per acre. For armyworms, fruitworms, and pinworms in eggplant. For armyworms, cutworms, fruitworms, hornworms, loopers, and pinworms in tomatoes. For armyworms, cutworms, corn borers, and loopers in peppers. Do not exceed 21 pts. per acre per season for tomato. Do not exceed 12 pts. per acre for pepper. Do not exceed 15 pts. per acre for eggplant. REI: 48-hour. PHI: 1-day for tomato, 3-day for pepper, 5-day for eggplant. IRAC 1A. *RUP.*

Mustang Maxx (0.8) (zeta-cypermethrin) *Eggplant, Pepper, Tomato* | 2.24-4.0 fl. oz. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms. Do not exceed 24 fl. oz. per acre per season. Allow at

Fruiting Vegetables - Insects

least 7 days between applications. REI: 12-hour.

PHI: 1-day. IRAC 3A. *RUP*.

Orthene 97 (S) (acephate) *Pepper* | 0.75-1.0 lb. per acre. For corn borers, hornworms, and loopers in bell pepper only. REI: 24-hour. PHI: 7-day. IRAC 1B.

Perm-Up 25DF (permethrin) *Eggplant, Pepper, Tomato* | For armyworms, fruitworms, hornworms, loopers, and pinworms. Use 25W, 25WP or 25DF formulations at 3.2-12.8 fl. oz. per acre for tomato, 9.6 fl. oz. per acre for eggplant, or 6.4-12.8 fl. oz. per acre for pepper and do not exceed 38.4 fl. oz. per acre per season for eggplant and tomato or 51.2 fl. oz. per acre per season for pepper. Use 3.2EC formulations at 2-8 fl. oz. per acre for tomato, 6 fl. oz. per acre for eggplant, or 4-8 fl. oz. per acre for pepper and do not exceed 24 fl. oz. per acre per season for eggplant and tomato or 32 fl. oz. per acre per season for pepper. REI: 12-hour. PHI: 0-day for tomato, 3-day for eggplant and pepper. IRAC 3A. *RUP*.

Radiant 1SC (spinetoram) *Eggplant, Pepper, Tomato* | 5-10 fl. oz. per acre. For armyworms, corn borers, fruitworms, hornworms, loopers and pinworms. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

Rimon 0.83EC (novaluron) *Eggplant, Pepper, Tomato* | 9-12 fl. oz. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms. Do not exceed 36 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 15.

Sevin XLR Plus (4SC) (carbaryl) *Eggplant, Pepper, Tomato* | 1-2 qts. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, and pinworms. Do not exceed 8 qts. per acre per season. REI: 12-hour. PHI: 3-day. IRAC 1A.

Verimark (1.67SC) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 5-10 fl. oz. per acre. For armyworms, corn borers, fruitworms, hornworms, loopers, and pinworms. Can be applied as either a

foliar application or via drip chemigation. Do not exceed 30.54 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

Warrior II (2.08CS) (lambda-cyhalothrin) *Eggplant, Pepper, Tomato* | 0.96-1.92 fl. oz. per acre. For armyworms, corn borers, cutworms, fruitworms, hornworms, loopers, and pinworms. Do not exceed 23 fl. oz. per acre per season. REI: 24-hour. PHI: 5-day. IRAC 3A. *RUP*.

Colorado Potato Beetle

Pesticide

Actara (25WDG) (thiamethoxam) *Eggplant, Pepper, Tomato* | 2-3 oz. per acre. Apply as a foliar spray. Do not exceed 11 oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 0-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) *Eggplant, Pepper, Tomato* | 1.3-2.2 fl. oz. per acre foliar application for eggplant, pepper, and tomato. 7.0-10.5 fl. oz. per acre soil application on eggplant and tomato, up to 14 fl. oz. per acre for pepper. Do not exceed 6.7 fl. oz. per acre for foliar applications. Do not exceed 10.5 fl. oz. per acre for soil applications on eggplant and tomato, or 14 fl. oz. for pepper. REI: 12-hour. PHI: 0-day for foliar application, or 21-day for soil application. IRAC 4A.

Agri-Mek SC (0.7) (abamectin) *Eggplant, Pepper, Tomato* | Use 0.7SC formulations at 1.75-3.5 fl. oz. per acre and do not exceed 3.5 fl. oz. per acre per season. Use 0.15SC formulations at 8-16 fl. oz. per acre and do not exceed 10.25 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP*.

Asana XL (0.66EC) (esfenvalerate) *Eggplant, Tomato* | 5.8-9.6 fl. oz. per acre. Do not apply more than 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant. IRAC 3A. *RUP*.

Assail 30SG (acetamiprid) *Eggplant, Pepper, Tomato* | Use 30SG formulations at 1.5-2.5 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 0.6-1.1 oz. per acre and do not exceed 6.8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Baythroid XL (1EC) (beta-cyfluthrin) *Eggplant, Pepper, Tomato* | 1.6-2.8 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 0-day for tomato, 7-day for eggplant and pepper. IRAC 3A. RUP.

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. RUP.

Coragen (1.67SC) (chlorantraniliprole) *Eggplant, Pepper, Tomato* | 3.5-5 fl. oz. per acre. REI: 4-hour. PHI: 1-day. IRAC 28.

Entrust SC (2) (spinosad) *Eggplant, Pepper, Tomato* | Use 2SC formulations at 3.0-6.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season. Use 80WP formulations at 1.0-2.0 oz. per acre and do not exceed 9 oz. per acre per season. Allow 4 days between applications. Observe resistance management restrictions. REI: 4-hour. PHI: 1-day. IRAC 5. *OMRI-listed*.

Exirel (0.83SE) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 7.0-13.5 fl. oz. per acre. Do not

exceed 61.7 fl. oz. per acre per season REI: 12-hour. PHI: 1-day. IRAC 28.

Harvanta (0.42SL) (cyclaniliprole) *Eggplant, Pepper, Tomato* | 10.9-16.4 fl. oz. per acre. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

Mustang Maxx (0.8) (zeta-cypermethrin) *Eggplant, Pepper, Tomato* | 2.24-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow at least 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. RUP.

Novodor FC (10) (Bacillus thuringiensis tenebrionis strain NB-176) *Eggplant, Tomato* | 1-4 qts. per acre. Effective on small (up to 1/4 inch) larvae only. Use higher rate for mixed sizes or heavier infestations. REI: 4-hour. PHI: 0-day. IRAC 11A.

Perm-Up 25DF (permethrin) *Eggplant, Tomato* | Use 25W, 25WP or 25DF formulations at 3.2-12.8 fl. oz. per acre for tomato or 9.6 fl. oz. per acre for eggplant and do not exceed 38.4 fl. oz. per acre per season. Use 3.2EC formulations at 2-8 fl. oz. per acre for tomato, or 6 fl. oz. per acre for eggplant and do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day for tomato, 3-day for eggplant. IRAC 3A. RUP.

Platinum 2SC (thiamethoxam) *Eggplant, Pepper, Tomato* | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

Radiant 1SC (spinetoram) *Eggplant, Pepper, Tomato* | 5-10 fl. oz. per acre. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

Rimon 0.83EC (novaluron) *Eggplant, Pepper, Tomato* | 9-12 fl. oz. per acre. Do not exceed 36 fl.

Fruiting Vegetables - Insects

oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 15.

Scorpion 35SL (3.24) (dinotefuran) *Eggplant, Pepper, Tomato* | *Soil application:* Use Scorpion 35SL at 9.0-10.5 oz. per acre, or Venom 70SG at 5.0-7.5 oz. per acre. *Foliar application:* Use Scorpion 35SL at 2.0-7.0 fl. oz. per acre, or Venom 70SG at 1-4 oz. per acre. See pollination precautions. REI: 12-hour. PHI: 21-day as soil application, 7-day as foliar application IRAC 4A.

Sivanto 200 (1.67SL) (flupyradifurone) *Eggplant, Pepper, Tomato* | 10.5-14 fl. oz. per acre. REI: 4-hour. PHI: 1-day. IRAC 4D.

Trident (14.32) (Bacillus thuringiensis tenebrionis strain SA-10) *Eggplant, Pepper, Tomato* | 3-6 qts. per acre. For control of young larvae. REI: 4-hour. PHI: 0-day. IRAC 11A. *OMRI-listed.*

Verimark (1.67SC) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 5-10 fl. oz. per acre. REI: 4-hour. PHI: 1-day. IRAC 28.

Vydate L (2WSL) (oxamyl) *Eggplant, Tomato* | 2-4 pts. per acre. *For eggplants,* do not exceed 16 pts. per acre per season. *For peppers,* do not exceed 24 pts. per acre per season. *For tomatoes,* do not exceed 32 pts. per acre per season. REI: 48-hour. PHI: 1-day for eggplant, 3-day for tomato. IRAC 1A. *RUP.*

Warrior II (2.08CS) (lambda-cyhalothrin) *Eggplant, Pepper, Tomato* | 1.28-1.92 fl. oz. per acre. Do not exceed 23 fl. oz. per acre per season. Not for use against *western flower thrips*. REI: 24-hour. PHI: 5-day. IRAC 3A. *RUP.*

Flea Beetles

Pesticide

Actara (25WDG) (thiamethoxam) *Eggplant, Pepper, Tomato* | 2-3 oz. per acre. Apply as a foliar

spray. Do not exceed 11 oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 0-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) *Eggplant, Pepper, Tomato* | *Soil Application.* 7.0-10.5 fl. oz. per acre for eggplant and tomato. 7-14 fl. oz. per acre for pepper. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 4A.

Asana XL (0.66EC) (esfenvalerate) *Eggplant, Pepper, Tomato* | 5.8-9.6 fl. oz. per acre. Do not apply more than 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP.*

Baythroid XL (1EC) (beta-cyfluthrin) *Eggplant, Pepper, Tomato* | 2.8 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 0-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP.*

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP.*

Mustang Maxx (0.8) (zeta-cypermethrin) *Eggplant, Pepper, Tomato* | 2.24-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow at least 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

Perm-Up 25DF (permethrin) *Eggplant, Pepper* | Use 25W, 25WP or 25DF formulations at 9.6 fl. oz.

per acre for eggplant, or 6.4-12.8 fl. oz. per acre for pepper and do not exceed 38.4 fl. oz. per acre per season for eggplant or 51.2 fl. oz. per acre per season for pepper. Use 3.2EC formulations at 6 fl. oz. per acre for eggplant, or 4-8 fl. oz. per acre for pepper and do not exceed 24 fl. oz. per acre per season for eggplant or 32 fl. oz. per acre per season for pepper. REI: 12-hour. PHI: 3-day. IRAC 3A. *RUP.*

Platinum 2SC (thiamethoxam) *Eggplant, Pepper, Tomato* | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

Sevin XLR Plus (4SC) (carbaryl) *Eggplant, Pepper, Tomato* | 0.5-1 qt. per acre. Do not exceed 8 qt. per acre per crop. REI: 12-hour. PHI: 3-day. IRAC 1A.

Warrior II (2.08CS) (lambda-cyhalothrin) *Eggplant, Pepper, Tomato* | 1.28-1.92 fl. oz. per acre. Do not exceed 23 fl. oz. per acre per season. Not for use against *western flower thrips*. REI: 24-hour. PHI: 5-day. IRAC 3A. *RUP.*

Fruit Flies

Pesticide

EverGreen Pro 60-6 (L) (piperonyl butoxide, pyrethrins) *Tomato* | 1 tsp. per 12.5 pts. water. 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. Treat harvested fruit and hampers as soon as filled, and move hampers to processing plant as soon as possible. REI: 12-hour. PHI: 0-day. IRAC UN, IRAC 3A.

Malathion 5EC (malathion) *Eggplant, Pepper, Tomato* | Use 5EC formulations at 1.5-2.5 pts. per acre for eggplant, 1.0-2.5 pts. per acre for pepper,

1.5 pts. per acre for tomato. Use 57EC formulations at 1.0-1.5 pts. per acre on eggplant, 1.25-1.5 pts. per acre on pepper, 1.0-1.25 pts. per acre for tomato. Do not exceed 2 applications per season on peppers, or 4 applications per season on tomatoes. REI: 12 to 24-hour. PHI: 1-day for tomato, 3-day for eggplant and pepper. IRAC 1B.

Mites

Non-Pesticide

Eggplant, Pepper, Tomato | For greenhouses, consider purchasing and releasing the predatory mites *Amblyseius andersonii*, *Amblyseius californicus*, *Amblyseius fallacis*, *Galendromus occidentalis* and *Phytoseiulus persimilis*. Also consider co-releasing a flying predator such as the predatory midge *Feltiella acarisuga*, and lady beetle *Stethorus punctillum*. Avoid insecticides when deploying natural enemies.

Pesticide

Acramite 50WS (bifenazate) *Eggplant, Pepper, Tomato* | 0.75-1 lb. per acre. *Two-spotted spider mites only*. Do not exceed 1 application per season. REI: 12-hour. PHI: 3-day. IRAC UN.

Agri-Mek SC (0.7) (abamectin) *Eggplant, Pepper, Tomato* | Use 0.7SC formulations at 1.75-3.5 fl. oz. per acre and do not exceed 3.5 fl. oz. per acre per season. Use 0.15SC formulations at 8-16 fl. oz. per acre and do not exceed 10.25 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP.*

Kanemite 15SC (1.25) (acequinocyl) *Eggplant, Pepper, Tomato* | 31 fl. oz. per acre. *Spider mites only*. REI: 12-hour. PHI: 1-day. IRAC 20B.

Microthiol Disperss (80W) (sulfur) *Tomato* | 5-20 lb. per acre. *Russet mites only*. Sulfur as a dust is also effective. Thorough coverage is required. Do not apply when temperatures are above 95F or during a heavy dew. REI: 24-hour. PHI: . FRAC M2, IRAC UN. *OMRI-listed.*

Movento (2SC) (spirotetramat) *Eggplant, Pepper, Tomato* | 4-5 fl. oz. per acre. *Russet mites and broad mites only*. Do not exceed 10 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. IRAC 23.

Nealta (1.67SC) (cyflumetofen) *Tomato* | 13.7 fl. oz. per acre. *Spider mites only*. Do not exceed 27.4 fl. oz. per acre per crop. REI: 12-hour. PHI: 3-day. IRAC 25A.

Oberon 2SC (spiromesifen) *Eggplant, Pepper, Tomato* | 7-8.5 fl. oz. per acre. Do not exceed 25.5 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 23.

Portal (0.4EC) (fenpyroximate) *Eggplant, Pepper, Tomato* | 2 pt. per acre. Do not exceed 2 applications per season. REI: 12-hour. PHI: 1-day. IRAC 21A.

Vydate L (2WSL) (oxamyl) *Eggplant* | 2-4 pts. per acre. Do not exceed 16 pts. per acre per season. REI: 48-hour. PHI: 1-day. IRAC 1A. *RUP*.

Zeal (72WP) (etoxazole) *Eggplant, Pepper* | 2-3 oz. per acre. *Spider mites only*. Limit 1 application per season. REI: 12-hour. PHI: 7-day. IRAC 10B.

Stink Bugs

Pesticide

Actara (25WDG) (thiamethoxam) *Eggplant, Pepper, Tomato* | 3.0-5.5 oz. per acre. Apply as a foliar spray. Do not exceed 11 oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 0-day. IRAC 4A.

Azera (C) (azadirachtin, pyrethrins) *Eggplant, Pepper, Tomato* | 1-3.5 pts. per acre. REI: 12-hour. PHI: 0-day. IRAC UN, IRAC 3A. *OMRI-listed*.

Baythroid XL (1EC) (beta-cyfluthrin) *Eggplant, Pepper, Tomato* | 1.6-2.8 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. Allow 7

days between applications. REI: 12-hour. PHI: 0-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP*.

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP*.

Danitol 2.4EC (30.9) (fenpropathrin) *Eggplant, Pepper, Tomato* | 10.67 fl. oz. per acre. Do not exceed 42.67 fl. oz. per acre per season. REI: 24-hour. PHI: 3-day. IRAC 3A. *RUP*.

Lannate LV (2.4L) (methomyl) *Pepper, Tomato* | 1.5-3.0 pts. per acre. *Brown Marmorated Stink Bugs only*. Do not exceed 21 pts. per acre per season. REI: 48-hour. PHI: 1-day for tomato, 3-day for pepper. IRAC 1A. *RUP*.

Mustang Maxx (0.8) (zeta-cypermethrin) *Eggplant, Pepper, Tomato* | 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Scorpion 35SL (3.24) (dinotefuran) *Eggplant, Pepper, Tomato* | *Soil application*: Use Scorpion 35SL at 9.0-10.5 oz. per acre, or Venom 70SG at 5.0-7.5 oz. per acre. *Foliar application*: Use Scorpion 35SL at 2.0-7.0 fl. oz. per acre, or Venom 70SG at 1-4 oz. per acre. See pollination precautions. REI: 12-hour. PHI: 21-day as soil application, 7-day as foliar application IRAC 4A.

Warrior II (2.08CS) (lambda-cyhalothrin)

Eggplant, Pepper, Tomato | 1.28-1.92 fl. oz. per acre. Do not exceed 23 fl. oz. per acre per season. Not for use against *western flower thrips*. REI: 24-hour. PHI: 5-day. IRAC 3A. *RUP*.

Thrips

Aphids and thrips transmit viral diseases.

Non-Pesticide

Eggplant, Pepper, Tomato | For greenhouses, consider purchasing and releasing the predatory mites *Amblyseius swirskii*, *Neoseiulus cucumeris* and *Stratiolaelaps scimitus*, minute pirate bug *Orius spp.* and beneficial nematode *Steinernema feltiae*.

Pesticide

Admire Pro (4.6SC) (imidacloprid) *Eggplant, Pepper, Tomato* | *Soil Application*. 7.0-10.5 fl. oz. per acre for eggplant and tomato. 7-14 fl. oz. per acre for pepper. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 4A.

Agri-Mek SC (0.7) (abamectin) *Eggplant, Pepper, Tomato* | Use 0.7SC formulations at 1.75-3.5 fl. oz. per acre and do not exceed 3.5 fl. oz. per acre per season. Use 0.15SC formulations at 8-16 fl. oz. per acre and do not exceed 10.25 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP*.

Assail 30SG (acetamiprid) *Eggplant, Pepper, Tomato* | Use 30SG formulations at 4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.7 oz. per acre and do not exceed 6.8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Azera (C) (azadirachtin, pyrethrins) *Eggplant, Pepper, Tomato* | 2-3.5 pts. per acre. REI: 12-hour. PHI: 0-day. IRAC UN, IRAC 3A. *OMRI-listed*.

Baythroid XL (1EC) (beta-cyfluthrin) *Eggplant, Pepper, Tomato* | 2.1-2.8 fl. oz. per acre. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP*.

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms, fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP*.

Entrust SC (2) (spinosad) *Eggplant, Pepper, Tomato* | Use 2SC formulations at 4.0-8.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season. Use 80WP formulations at 1.25-2.5 oz. per acre and do not exceed 9 oz. per acre per season. Allow 4 days between applications. Observe resistance management restrictions. REI: 4-hour. PHI: 1-day. IRAC 5. *OMRI-listed*.

Exirel (0.83SE) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 13.5-20.5 fl. oz. per acre. Do not exceed 61.7 fl. oz. per acre per season REI: 12-hour. PHI: 1-day. IRAC 28.

Grandevo (30) (Chromobacterium subtsugae strain PRAA4-1) *Eggplant, Pepper, Tomato* | 2-3 lb. per acre. REI: 4-hour. PHI: 0-day. IRAC UNB. *OMRI-listed*.

Minecto Pro (1.13SC) (cyantraniliprole, abamectin) *Eggplant, Pepper, Tomato* | 10.0 fl. oz. per acre. REI: 12-hour. PHI: 1-day. IRAC 28, IRAC 6. *RUP*.

Movento (2SC) (spirotetramat) *Eggplant, Pepper, Tomato* | 4-5 fl. oz. per acre. Do not exceed 10 fl.

Fruiting Vegetables - Insects

oz. per acre per season. REI: 24-hour. PHI: 1-day. IRAC 23.

Mustang Maxx (0.8) (zeta-cypermethrin)

Eggplant, Pepper, Tomato | 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Neemix (0.39) (azadirachtin) *Eggplant, Pepper, Tomato* | 4-16 fl. oz. per acre. REI: 4-hour. PHI: 0-day. IRAC UN. *OMRI-listed*.

Platinum 2SC (thiamethoxam) *Eggplant, Pepper, Tomato* | 5-11 fl. oz. per acre. REI: 12-hour. PHI: 30-day. IRAC 4A.

Radiant 1SC (spinetoram) *Eggplant, Pepper, Tomato* | 6-10 fl. oz. per acre. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

Rimon 0.83EC (novaluron) *Eggplant, Pepper, Tomato* | 12 oz. per acre. Do not exceed 36 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 15.

Torac (1.29SC) (tolfenpyrad) *Eggplant, Pepper, Tomato* | 21 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 21A, FRAC 39.

Transform WG (50) (sulfoxaflor) *Eggplant, Pepper, Tomato* | Use Transform 50WG at 2.0-2.25 oz. per acre or Closer 2SC at 4.25-4.5 fl. oz. per acre. REI: 24-hour. PHI: 1-day. IRAC 4C.

Venerate (94.46) (Burkholderia spp. strain A396) *Eggplant, Pepper, Tomato* | 1-8 qts. per acre. REI: 4-hour. PHI: 0-day. IRAC UNB. *OMRI-listed*.

Warrior II (2.08CS) (lambda-cyhalothrin) *Eggplant, Pepper, Tomato* | 1.28-1.92 fl. oz. per acre. Do not exceed 23 fl. oz. per acre per season. Not for use against *western flower thrips*. REI: 24-hour. PHI: 5-day. IRAC 3A. *RUP*.

Whiteflies

Non-Pesticide

Eggplant, Pepper, Tomato | For greenhouses, consider purchasing and releasing the predatory mite *Amblyseius swirskii*, lady beetle *Delphastus catalinae*, and mirid bug *Dicyphus hesperus*. Also consider co-releasing a parasitoid wasps like *Encarsia formosa*, or *Eretmocerus eremicus*. Avoid insecticides when deploying natural enemies.

Pesticide

Actara (25WDG) (thiamethoxam) *Eggplant, Pepper, Tomato* | 3.0-5.5 oz. per acre. Apply as a foliar spray. Do not exceed 11 oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 0-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) *Eggplant, Pepper, Tomato* | 1.3-2.2 fl. oz. per acre foliar application for eggplant, pepper, and tomato. 7.0-10.5 fl. oz. per acre soil application on eggplant and tomato, up to 14 fl. oz. per acre for pepper. Do not exceed 6.7 fl. oz. per acre for foliar applications. Do not exceed 10.5 fl. oz. per acre for soil applications on eggplant and tomato, or 14 fl. oz. for pepper. REI: 12-hour. PHI: 0-day for foliar application, or 21-day for soil application. IRAC 4A.

Asana XL (0.66EC) (esfenvalerate) *Tomato* | 5.8-9.6 fl. oz. per acre. Do not apply more than 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Assail 30SG (acetamiprid) *Eggplant, Pepper, Tomato* | Use 30SG formulations at 2.5-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.1-1.7 oz. per acre and do not exceed 6.8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Brigade 2EC (bifenthrin) *Eggplant, Pepper, Tomato* | For armyworms, corn borers, cutworms,

fruitworms, and loopers in tomatoes, peppers, and eggplants. For hornworms, and pinworms in peppers and eggplants only. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 25.6 fl. oz. per acre per season for tomatoes or 12.8 fl. oz. per acre per season on eggplants or pepper. Use 10DF, 10WP, or 10WSB formulations at 5.3-12.8 oz. per acre and do not exceed 51.2 oz. per acre on tomatoes or 32 oz. per acre per season on eggplants or peppers. Allow 7 days between applications. REI: 12-hour. PHI: 1-day for tomato, 7-day for eggplant and pepper. IRAC 3A. *RUP*.

Coragen (1.67SC) (chlorantraniliprole) *Eggplant, Pepper, Tomato* | 5.0-7.5 fl. oz. per acre. Can be applied as either a foliar application or via drip chemigation. Chemigation will provide up to 30 days of control. Do not exceed 15.4 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

Exirel (0.83SE) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 13.5-20.5 fl. oz. per acre. Do not exceed 61.7 fl. oz. per acre per season REI: 12-hour. PHI: 1-day. IRAC 28.

Knack (0.86) (pyriproxyfen) *Eggplant, Pepper, Tomato* | 8-10 fl. oz. per acre. Do not exceed 2 applications per season. REI: 12-hour. PHI: 1-day. IRAC 7C.

Movento (2SC) (spirotetramat) *Eggplant, Pepper, Tomato* | 4-5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. IRAC 23.

Neemix (0.39) (azadirachtin) *Eggplant, Pepper, Tomato* | 4-16 fl. oz. per acre. For nymph (immature) control. REI: 4-hour. PHI: 0-day. IRAC UN. *OMRI-listed*.

Oberon 2SC (spiromesifen) *Eggplant, Pepper, Tomato* | 7-8.5 fl. oz. per acre. Do not exceed 25.5 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 23.

Platinum 2SC (thiamethoxam) *Eggplant, Pepper, Tomato* | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

Portal (0.4EC) (fenpyroximate) *Eggplant, Pepper, Tomato* | 2 pt. per acre. Do not exceed 2 applications per season. REI: 12-hour. PHI: 1-day. IRAC 21A.

Sivanto 200 (1.67SL) (flupyradifurone) *Eggplant, Pepper, Tomato* | 10.5-14 fl. oz. per acre foliar application, or 21-28 fl. oz. per acre soil application. REI: 4-hour. PHI: 1-day for foliar application, or 45-day for soil application. IRAC 4D.

Transform WG (50) (sulfoxaflor) *Eggplant, Pepper, Tomato* | Use Transform 50WG at 2.0-2.25 oz. per acre or Closer 2SC at 4.25-4.5 fl oz. per acre. REI: 24-hour. PHI: 1-day. IRAC 4C.

Verimark (1.67SC) (cyantraniliprole) *Eggplant, Pepper, Tomato* | 6.75-13.5 fl. oz. per acre. Apply via drip chemigation or soil injection. REI: 4-hour. PHI: 1-day. IRAC 28.

Fruiting Vegetables - Weeds

Reviewed by Stephen Meyers, Ben Phillips – Nov 2020

Recommended Controls

All Weeds

The fruiting vegetables are warm-season crops nearly always started as transplants. When growers transplant crops into plastic mulch, they sometimes use herbicides underneath the mulch. There are several herbicides labeled for the control of weeds preemergence, applied before crops are

Fruiting Vegetables - Weeds

transplanted, or directed between the rows only after transplanting.

For specific weeds controlled by each herbicide, check Relative Effectiveness of Herbicides for Vegetable Crops table.

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

Non-Pesticide

Eggplant, Pepper, Tomato | Because these are warm-season, transplanted crops, there should be enough time in the spring to prepare a stale seedbed before planting, which should reduce weed pressure in the crop. These crops can also benefit from the soil warming properties of plastic mulch in addition to the in-row weed control. Mulches provide good weed control when planted into, when used for between row spaces, or in combination in-row and between-row. Materials include landscape cloth, plastic, biodegradable plastic. Straw mulch can delay growth by suppressing soil temperatures. Weeds between beds and along the edges of beds can be controlled with a combination of cultivation, mowing, or hand hoeing/pulling. Weeds along the edge of the mulches can be a particular challenge to avoid ripping the mulch. Some fresh market plantings are often small enough to accommodate some hand hoeing or pulling. For larger plantings it may make more sense to mechanically cultivate with tow-able tools between plastic rows or between bare-soil rows.

Broadleaf and Grass Weeds - Postemergence

Pesticide

glyphosate products (glyphosate) *Eggplant, Pepper, Tomato* | 0.75-3.75 lbs. acid equivalent (ae) per acre. Use formulations containing 3 lbs. ae per gal. (4 lbs. isopropylamine salt per gal.) at 1-5 qts. per acre, or formulations containing 4.5 lbs. ae per

gal. (5 lbs. potassium salt per gal) at 0.66-3.3 qts. per acre. Broadcast 3 days before transplanting, or apply between crop rows with hooded or shielded sprayers. Use low rate for annuals and higher rates for perennials. 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. REI: 4 to 12-hour. PHI: 14-day. WSSA 9.

paraquat products (paraquat) *Eggplant, Pepper, Tomato* | 2-4 pt. per acre of 2.0 lb. per gal. formulation or 1.3-2.7 pt. per acre of 3 lb. per gal. formulation. Add 1 qt. COC (1% v/v) or 0.5 pt NIS (0.25% v/v) per 25 gal. of solution and apply to weeds less than 6 in. tall. Apply prior to transplanting. The lowest rate can be applied directed between rows. Do not make more than 3 applications per year. Certified applicators must successfully complete an EPA-approved training program before mixing, loading, and/or applying paraquat. REI: 12 to 24-hour. PHI: 30-day for tomato WSSA 22. *RUP*.

Broadleaf and Grass Weeds - Preemergence

Pesticide

Command 3ME (clomazone) *Pepper* | 0.67-2.67 pt. per acre. *Not for banana pepper*. Use lower rate on coarse soils, and higher rate on fine soils. Apply before transplanting. Set plant roots below herbicide. May cause temporary bleaching of crop leaves. *For banana peppers in Michigan only (MI 24c exp 05/13/24)*: follow instructions for other peppers. REI: 12-hour. WSSA 13.

Dacthal W-75 (DCPA) *Eggplant, Tomato* | 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. REI: 12-hour. WSSA 3.

Devrinol DF-XT (50) (napropamide) *Eggplant, Pepper, Tomato* | 2-4 lbs. per acre. Use lower rate on coarse sandy soils and higher rate on heavy clay soils and between rows. Apply and incorporate before transplanting. Applied prior to laying plastic mulch. 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. REI: 24-hour. WSSA 15.

Dual Magnum (7.62EC) (s-metolachlor) *Eggplant, Pepper, Tomato* | For **tomatoes in all states:** Apply 1-2 pts. per acre. For **peppers in Illinois (IL 24c exp. 03/25/24), Indiana, Michigan (MI 24c exp. 12/31/21), Minnesota (MN 24c exp. 12/31/20), and Ohio (OH 24c exp. 12/31/22.):** apply 0.5-1.0 pt. per acre. For **eggplants** in all states listed above *except Ohio:* 0.5-1.33 pts. per acre. Apply to soil before transplanting or within 48 hours after transplanting. Do not incorporate. Reduce risk of crop injury by applying after transplanting and by using a directed spray rather than spraying over the top of transplants. Crop injury may occur under unfavorable growing conditions. See label for additional precautions. Do not exceed 1 application per crop. REI: 24-hour. PHI: 30-day for tomatoes at rates less than 1.33 pts. per acre; 60-day for eggplants, and peppers; 90-day for tomatoes at rates greater than 1.33 pts. per acre. WSSA 15.

pendimethalin products (pendimethalin) *Eggplant, Pepper, Tomato* | 1 to 3 pts. per acre. Use 3.8 formulations. For use under plastic, apply as a band to top of bed after bed formation and before laying plastic, and/or apply to row middles after transplanting. On bare ground, apply and incorporate before transplanting, or apply before transplanting without incorporation, or apply to established plants as a directed spray. Avoid root contact with treated soil and avoid any contact with leaves or stems of crop. REI: 24-hour. PHI: 21-day for tomato, 70-day for pepper and eggplant. WSSA 3.

Prefar 4E (bensulide) *Eggplant, Pepper* | 5-6 qts. per acre. Use low rate on soils with less than 1% organic matter. Apply and incorporate before planting. REI: 12-hour. WSSA 8.

trifluralin products (trifluralin) *Pepper, Tomato* | Use 4EC formulations at 1-2 pts. per acre and do not exceed 4 pts. per acre per season on fine soils. Use 10G formulations at 5-10 lbs. per acre and do not exceed 20 lbs. per acre per season on fine soils. For **peppers:** broadcast and incorporate before transplanting. For **tomatoes:** apply as in peppers or apply directed spray between rows after transplanting and incorporate. May cause early stunting if growing conditions are unfavorable. To minimize injury, dip transplant roots in carbon slurry (2 lbs. per gal.) prior to planting, or include 2 oz. of carbon per gal. of transplant water. Use higher rates on heavier soils. 4-6 weeks of residual activity. Not effective on muck or high organic matter soils. REI: 12-hour. WSSA 3.

Broadleaf Weeds Only - Postemergence

Pesticide

Aim EC (2) (carfentrazone) *Eggplant, Pepper, Tomato* | 0.5-2 fl. oz. per acre. Apply a minimum of 1 day prior to transplanting, or apply between crop rows with hooded sprayer. Do not allow spray to contact crop. Add 1 qt. COC (1% v/v) or 0.5 pt. NIS per 25 gal. of spray solution (0.25% v/v). Weeds must be actively growing and less than 4 inches tall. Do not exceed 6.1 fl. oz. per acre per season. REI: 12-hour. WSSA 14.

League (75WDG) (imazosulfuron) *Pepper, Tomato* | 4.0-6.4 oz. per acre. For **peppers:** apply to row middles after peppers are well-established and at least 10 inches tall. Avoid contact with crop and plastic mulch if present. Or apply as a directed spray under the pepper canopy and contacting no more than the lower 2 inches of stem and avoiding contact with fruit. For **tomatoes:** Apply to prepared bed at least 1 day before transplanting just prior to laying plastic, if applicable. Or apply over the top or

Fruiting Vegetables - Weeds

directed to row middles of transplanted tomatoes from 3-5 days after transplanting through early bloom stage. If small, emerged weeds are present include a manufacturer-approved surfactant. REI: 12-hour. PHI: 21-day. WSSA 2.

Matrix SG (25WSG) (rimsulfuron) Tomato | 1-4 oz. per acre. Can be applied at 2-4 oz. per acre for preemergence weed control. Apply at 1-2 oz. per acre for postemergence weed control to tomato plants of at least the cotyledon stage. Add 0.5 pt. of NIS per 25 gals. of spray solution (0.25% v/v) if emerged weeds are present. Apply when weeds are less than 1 inch 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. REI: 4-hour. PHI: 45-day. WSSA 2.

metribuzin products (metribuzin) Tomato | 4F formulations: 0.5-1 pt. per acre. 75DF formulations: 0.33-0.66 lb. per acre. Broadcast and incorporate before transplanting, or broadcast after transplants are established. Or, use 4F formulations at up to 2 pts. per acre, or 75DF formulations at 1.33 lbs. per acre and apply a directed spray between crop rows after transplants are established. 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 4F formulations, or 1.33 lbs. of 75DF formulations per acre per season. REI: 12-hour. PHI: 7-day. WSSA 5.

Sandea (75) (halosulfuron) Eggplant, Pepper, Tomato | 0.5-1.0 oz. per acre. For **tomato**: apply 0.5-1.0 oz. per acre to the soil surface after final soil preparation or bed shaping and just before applying plastic mulch. Wait at least 7 days before transplanting. Or apply a minimum of 14 days after transplanting over the top or as a directed/shielded spray, avoiding contact with crop and plastic mulch, if present. For **eggplant and pepper**: apply 0.5-1.0 oz per acre to row middles, avoiding contact with crop and plastic mulch, if present. If weeds are

present, add 0.5 pt. NIS per 25 gal. of solution (0.25% v/v). Do not exceed 2 applications or 2 oz. per acre per 12 month period. REI: 12-hour. PHI: 30-day. WSSA 2.

Broadleaf Weeds Only - Preemergence

Pesticide

League (75WDG) (imazosulfuron) Pepper, Tomato | 4.0-6.4 oz. per acre. For **peppers**: apply to row middles after peppers are well-established and at least 10 inches tall. Avoid contact with crop and plastic mulch if present. Or apply as a directed spray under the pepper canopy and contacting no more than the lower 2 inches of stem and avoiding contact with fruit. For **tomatoes**: Apply to prepared bed at least 1 day before transplanting just prior to laying plastic, if applicable. Or apply over the top or directed to row middles of transplanted tomatoes from 3-5 days after transplanting through early bloom stage. If small, emerged weeds are present include a manufacturer-approved surfactant. REI: 12-hour. PHI: 21-day. WSSA 2.

Matrix SG (25WSG) (rimsulfuron) Tomato | 1-4 oz. per acre. Can be applied at 2-4 oz. per acre for preemergence weed control. Apply at 1-2 oz. per acre for postemergence weed control to tomato plants of at least the cotyledon stage. Add 0.5 pt. of NIS per 25 gals. of spray solution (0.25% v/v) if emerged weeds are present. Apply when weeds are less than 1 inch 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. REI: 4-hour. PHI: 45-day. WSSA 2.

metribuzin products (metribuzin) Tomato | 4F formulations: 0.5-1 pt. per acre. 75DF formulations: 0.33-0.66 lb. per acre. Broadcast and incorporate before transplanting, or broadcast after transplants are established. Or, use 4F formulations at up to 2 pts. per acre, or 75DF formulations at 1.33 lbs. per acre and apply a directed spray between crop rows after transplants are established. May be applied preplant incorporated with trifluralin products for

Grass Weeds Only - Postemergence**Pesticide**

clethodim products (clethodim) *Eggplant, Pepper, Tomato* | Use 2EC formulations at 6-8 fl. oz. per acre with 1 qt. COC per 25 gals. of spray solution (1% v/v). For tomatoes, use up to 16 fl. oz. per acre. Do not exceed 32 fl. oz. per acre per season. Use Select Max at 9-16 fl. oz. per acre with 0.5 pt. NIS per 25 gals. of spray solution (0.25% v/v). For tomatoes, use up to 32 fl. oz. per acre. Do not exceed 64 fl. oz. per acre per season. Use low rates for annual grasses, the high rates for perennial grasses. Spray on actively growing grass. Wait at least 14 days between applications. REI: 24-hour. PHI: 20-day. WSSA 1.

Poast (1.5EC) (sethoxydim) *Eggplant, Pepper, Tomato* | 1.0-1.5 pt. per acre. Add 1 qt. COC per 25 gal. of spray solution (1% v/v). Spray on actively growing grass. Use high rate on quackgrass. Do not exceed 4.5 pt. per acre per season. REI: 12-hour. PHI: 20-day for eggplant and tomato, 7-day for peppers. WSSA 1.

Leafy Vegetables and Herbs - Horticulture

Reviewed by Ben Phillips, Liz Maynard – Dec 2020

Crop Description

Most leafy vegetables and herbs grow well under the same sunlight, fertility, soil and growing conditions, and cultural techniques similar to many other vegetable crops. Pay special attention to drainage and moisture requirements of certain herbs, as many are very sensitive to soil moisture conditions. Using plastic mulches, trickle irrigation, and raised beds may provide the necessary moisture and drainage requirements for the herb crop.

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 4F formulations, or 1.33 lbs. of 75DF formulations per acre per season. REI: 12-hour. PHI: 7-day. WSSA 5.

Reflex (2L) (fomesafen) *Pepper, Tomato* | 1 pt. per acre. *For peppers and tomatoes in Michigan, Minnesota, and tomatoes Ohio only (MI & MN 24c exp. 12/31/23. OH 24c exp. 12/31/24):* apply before transplanting. Do not incorporate. For use under plastic, apply after bed formation and before laying plastic. Use only once in two years on the same soil. See rotational crop restrictions. Use on transplanted tomato and pepper only. REI: 24-hour. PHI: 60-day for pepper, 70-day for tomato. WSSA 14.

Sandea (75) (halosulfuron) *Eggplant, Pepper, Tomato* | 0.5-1.0 oz. per acre. For **tomato:** apply 0.5-1.0 oz. per acre to the soil surface after final soil preparation or bed shaping and just before applying plastic mulch. Wait at least 7 days before transplanting. Or apply a minimum of 14 days after transplanting over the top or as a directed/shielded spray, avoiding contact with crop and plastic mulch, if present. For **eggplant and pepper:** apply 0.5-1.0 oz per acre to row middles, avoiding contact with crop and plastic mulch, if present. If weeds are present, add 0.5 pt. NIS per 25 gal. of solution (0.25% v/v). Do not exceed 2 applications or 2 oz. per acre per 12 month period. REI: 12-hour. PHI: 30-day. WSSA 2.

Spartan 4F (sulfentrazone) *Tomato* | 2.25-8.0 fl. oz. per acre. Apply before transplanting as a broadcast or banded application. Will also control nutsedge. Do not use on soils classified as sand, which have less than 1% organic matter. Do not exceed 12 fl. oz. per year. REI: 12-hour. WSSA 14.