# F. Commodity Recommendations

# Pesticide Use Disclaimer

## THE LABEL IS THE LAW

**Before using a pesticide, check the labeling distributed with the product at the point of sale for legally enforceable rates and use restrictions and precautions.** Although labels are available on the Internet from electronic label services such as CDMS (*http://www.cdms.net/*), Greenbook (*https://www.greenbook.net*), or Agrian (*https://www.agrian.com/labelcenter/results.cfm)* the information contained in these electronic labels may not be identical to the labeling distributed with the product. **Please be advised that these electronic label services provide use disclaimers, and in some cases legally binding *User Agreements* assigning all liability to user of service. (**See section D 3.1. Labels and Labeling for more detail.)

## Guide to the Recommended Pesticide Tables in the Following Crop Sections:

1. Pesticides are listed by **group number or code based on chemical structure and mechanism of action**, as classified by the Herbicide Resistance Action Committee (**HRAC**, *https://hracglobal.com/*) for herbicides, the Insecticide Resistance Action Committee (**IRAC**, *https://irac-online.org/*) for insecticides, and the Fungicide Resistance Action Committee (**FRAC, *https***://www.frac.info/[3]) for fungicides.
   **In this guide, if the group number or code is in bold font, there are resistance concerns for the product.**

2. **Restricted use pesticides** are marked with a * in the Tables. These products may only be used by certified and/or licensed pesticide applicators, and when stated on the label, those making applications under their direct supervision. Some labels may restrict use solely to certified and/or licensed applicators. (See section D 3.2.1 Restricted Use Classification Statement for more detail).

3. **In addition to the pesticide products listed in the Commodity Recommendations below, other formulations or brands with the same active ingredient(s) may be commercially available. ALWAYS CHECK THE INDIVIDUAL PRODUCT LABELING:**
   **a) to ensure a pesticide is labeled for the same intended use,**
   **b) to ensure the pesticide is labeled for the desired crop,**
   **c) for differences in application rates and % active ingredient(s), and**
   **d) additional restrictions.**

4. All pesticide recommendations contained in this document are prescribed for spray applications to a **broadcast area of 1 acre** (43,560 square feet). **Adjust the rate accordingly for banded applications** (See section E 1.3. Calibrating Granular Applicators) **or for chemigation** (check labels for amounts per 1,000 feet).

5. Check the label for and do not exceed the maximum amount of pesticide per application and the maximum number of applications per year.

6. **Bee Toxicity Rating (Bee TR)**: N=nontoxic; L=minimum impact on bees; M=moderately toxic, can be used if dosage, timing, and method of application are correct, but should NOT be applied directly to the crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

7. In accordance with the USDA National Organic Program, the Organic Materials Research Institute (OMRI) maintains a directory of all products that OMRI has determined are allowed for use in organic production, processing, and handling. These products are catalogued online in the **OMRI Products List** (see *https://www.omri.org/omri-lists*).

# Eggplant

## Recommended Varieties

| Type | Variety[1,2] | Days[3] | $F_1$[4] | Color | Calyx Color | Shape | Type | TMV[5] |
|---|---|---|---|---|---|---|---|---|
| **Standard Market Type** | Gaudi | 75 | Yes | Black | Green | Oval Long | | |
| | Nadia | 70 | Yes | Black | Green | Oval Long | | X |
| | Night Shadow | 68-75 | Yes | Black | Green | Teardrop | | |
| | Picasso | 65 | Yes | Purple/Black | Green | Teardrop | | |
| | Santana | 80 | Yes | Black/Purple | Green | Elongated Oval | | |
| | White Star | 55 | Yes | White | Green | Teardrop | | |
| **Specialty Types** | Annina | 67 | Yes | Purple Variegated | Green | Teardrop | | |
| | Barbarella | 65 | Yes | Purple | Purple | Round | Sicilian | |
| | Calliope | 64 | Yes | Purple variegated | Green | Oval | Asian | |
| | Gretel | 55 | Yes | White | Green | Mini Slender | Japanese | |
| | Hansel | 55 | Yes | Purple | Green | Mini Slender | Japanese | |
| | Kermit | 60 | Yes | Green and White | Green | Mini Round | Thai | |
| | Megal | 60 | Yes | Purple/Black | Green | Elongated Oval | Italian | X |
| | Millionaire | 55 | Yes | Black | Purple | Slender | Japanese | |
| | Orient Express | 58 | Yes | Purple | Purple | Slender Long | Asian | |
| | Palermo | 70 | Yes | Purple | Purple | Round | Sicilian | |
| | Purple Shine | 70 | Yes | Purple | Purple | Slender Long | Chinese | |
| | Shooting Stars | 57 | No | Purple variegated | Green | Elongated Oval | | |
| | Shoya Long | 55-60 | Yes | Purple | Purple | Slender Long | Japanese | |

[1]**Listed alphabetically within type**.
[2]Variety attributes based on Seed Company information.
[3]Days from transplanting till harvest.
[4]Hybrid (yes/no).
[5]TMV=Tobacco Mosaic Virus. Only those varieties with some resistance or tolerance to TMV are noted with an X.

## Recommended Nutrients Based on Soil Tests

In addition to using the table below, check the suggestions on rate, timing, and placement of nutrients in your soil test report and chapter B Soil and Nutrient Management. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede recommendations found below.

| | | Soil Phosphorus Level | | | | Soil Potassium Level | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Low | Med | High (Opt) | Very High | Low | Med | High (Opt) | Very High | |
| **Eggplant[1,2]** | **N (lb/A)** | **$P_2O_5$ (lb/A)** | | | | **$K_2O$ (lb/A)** | | | | **Nutrient Timing and Method** |
| | 125-150[3] | 250 | 150 | 100 | 0 | 250 | 150 | 100 | 0 | Total nutrient recommended |
| | 50-100 | 250 | 150 | 100 | 0 | 250 | 150 | 100 | 0 | Broadcast and disk-in |
| | 25-50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Sidedress 3-4 weeks after planting |
| | 25-50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Sidedress 6-8 weeks after planting |

**For plasticulture, fertilization rates are based on a standard row spacing of 6 ft.**
[1]Apply 1-2 lb/A of boron (B) with broadcast fertilizer; see also Table B-7. in chapter B Soil and Nutrient Management.
[2]Apply 25-30 lb/A of sulfur (S) for most soils.
[3]If crop is to be mulched with plastic but not drip/trickle fertilized, broadcast 125 lb/A N with recommended $P_2O_5$ and $K_2O$ and disk-in or incorporate prior to laying mulch.

## Plant Tissue Testing

Plant tissue testing can be a valuable tool to assess crop nutrient status during the growing season to aid with in-season fertility programs or to evaluate potential deficiencies or toxicities. Critical eggplant tissue test values for most recently matured leaves at early fruit set are N 4.2-6.0 %, P 0.3-0.7 %, K 3.5-5.0 %, Ca 0.8-1.5%, Mg 0.25-0.6% and S 0.4-0.6%. For additional nutrients and other growth stages consult with a tissue testing laboratory or this web link at the University of Florida: *https://edis.ifas.ufl.edu/publication/ep081*.

## Seed Treatment

Use hot water seed treatment - see section E 4.3. Disease Control in Seeds, Plant Growing Mix and Plant Beds.

## Transplant Production and Transplanting Dates

Sow seed in the greenhouse 8-10 weeks before field planting. Three to four ounces of seed are necessary to produce plants for 1 acre. Optimum temperatures for germination and growth are 70-75°F. Seedlings should be transplanted to 2-inch or larger pots any time after the first true leaves appear, or seed can be sown directly into the pots and thinned to a single plant per pot.

Harden plants for a few days at 60-65°F and set in field after danger of frost when average daily temperatures have reached 65-70°F. Usual transplanting period is May 15 to June 5. Eggplant is a warm-season crop that grows best at temperatures between 70-85°F. Temperatures below 65°F result in poor growth and fruit set.

## Spacing

Rows: 4-5 feet apart; plants: 2-3 feet apart in the row. Space plants 18-30 inches apart in PA.

## Drip/Trickle Fertilization

Before mulching, adjust soil pH to around 6.5 and then apply enough farm-grade fertilizer to supply 60 lb/A of N, $P_2O_5$ and $K_2O$. Thoroughly incorporate fertilizer into the soil. If soil tests medium or less in soil K, apply a fertilizer with a ratio of 1-1-2 or 1-1-3 carrying 60 lb/A of N. After mulching and installing the drip irrigation system, apply completely soluble fertilizers to supply 40 lb/A (10-20 lb/A in PA) of N, $P_2O_5$ and $K_2O$ during each application. On soils testing low and low to medium in B and that have not received any pre-plant B fertilizer, include 0.25 lb/A of actual B in each soluble fertilizer application. The first soluble fertilizer application should be applied through the trickle irrigation system within 1 week after field transplanting. The same rate of soluble fertilizer should be applied about every 3 weeks during the growing season for a total of 6-7 applications.

## Mulching and Fumigation

The use of black plastic mulch can increase eggplant yield and promote earliness. Various widths of plastic are available depending on production system and available equipment. At least 50% of the N should be in nitrate form ($NO_3^{-1}$) when planting in fumigated soil under plastic mulch. For more details, see the Weed Control section below.

## Staking

High intensity eggplant production can benefit from staking, but the heavy fruit load results in a high cost for staking materials. Use a staking system similar to that described for tomatoes. Pruning is not required for eggplant but removing the two lowest branches helps with plastic removal at seasons end if the plants are mowed off.

## Harvest and Post-Harvest Considerations

Fruit should be harvested when the skin is still a glossy color, and the seed and pulp are white. Soft fruit and dark seed indicate over maturity. Mature fruit must be harvested to ensure continued fruit set. Harvested fruit should be moved to a protected area as soon as possible. If left in direct sunlight the fruit will sunburn. Cool eggplants in a cold room, forced-air or forced-air and evaporative cooling. Fruit are sensitive to temperatures below 50°F (see fruit disorders below) but can be stored for 1-2 weeks at 50-54°F and 90-95% relative humidity.

## Fruit Disorders

**Liver Spot and Pitting**:

'Liver spot' and 'pitting' are late season physiological disorders that become apparent on the fruit surface post-harvest. Light tan to copper colored spots and scratching may appear after washing; scratching is most likely caused by rough handling or contact of fruit with the ground. Pitting (small slightly sunken brown pits) may also occur. Liver spot and/or pitting are thought to be the caused by a thinner waxy fruit cuticle as a result of cooler temperatures. Temperatures at or below 50°F are often associated with both disorders.

**Internal Seed Cavity Browning**:

Symptoms of internal seed cavity browning include the discoloration or browning of the fruit tissue directly surrounding the seed cavity. The discoloration can be caused by low temperatures and/or bruising and compression injury during harvest and post-harvest handling.

# Weed Control

## THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F.

## Recommended Herbicides

**1.** Identify the weeds in each field and select recommended herbicides. More information is available in the "Herbicide Effectiveness on Common Weeds in Vegetables" (Table E-3) in chapter E Pest Management.

**2.** Minimize herbicide resistance development. Identify the herbicide mode of action group number and follow recommended good management practices; **bolded group numbers in tables below are herbicides at higher risk for selecting resistant weed populations.** Include non-chemical weed control whenever possible.

**Labeled Application Sites for Eggplant**

| Herbicide (*=Restricted Use) | HRAC group number | Plastic mulch production | | | | | Bareground production | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Soil-Applied | | Postemergence | | | | | |
| | | Under Plastic | Row Middles | Over Plastic | Row Middles | Post-Harvest | Soil-applied | POST | Post-harvest |
| Sandea | 2 | | YES | | YES | | directed[1] | | |
| Dacthal | 3 | | | | | | | YES[2] | |
| Prowl H20 | 3 | | YES | | | | YES[3] | | |
| Prefar | 8 | YES | YES | | | | YES | | |
| Devrinol | 15 | YES | YES | | | | YES | | |
| Poast | 1 | | | YES | | | | YES | |
| Select | 1 | | | YES | | | | YES | |
| SelectMax | 1 | | | YES | | | | YES | |
| Gramoxone*[5] | 22 | | | | YES | YES | YES[4] | | YES |

[1] Sandea is labeled for bareground only if the spray is directed to the row middles.
[2] Dacthal is labeled for over the top application, but it will not control emerged weeds.
[3] Transplants only.
[4] Gramoxone can be applied early pre-plant or after planting but before crop emergence.
[5] Special Local Needs Label 24(c), be sure it is registered for the specific state and for the intended use.

### 1. Soil-Applied

| Group | Product Name (*=Restricted Use) | Product Rate | Active Ingredient | Active Ingredient Rate | PHI (d) | REI (h) |
|---|---|---|---|---|---|---|
| **2** | Sandea 75DF | 0.5 to 1 oz/A | **halosulfuron** | 0.023 to 0.047 lb/A | 30 | 12 |
| -**Plasticulture**: row middles only; adjust equipment to keep the spray off the plastic.<br>-**Bareground**: apply between rows of direct-seeded or transplants.<br>-**Do not** apply as broadcast application; avoid contact of the herbicide with the planted crop<br>-Suppresses or controls yellow nutsedge and certain broadleaf weeds. Sandea provides both residual and postemergence control of susceptible weed species. Effective postemergence control requires an adjuvant.<br>-Sandea is an ALS inhibiting herbicide and resistant weed populations are common in the region. -**Do not** use Group 2 herbicides repeatedly in the same field. **Do not** apply Sandea to crops treated with a soil applied organophosphate insecticide or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application.<br>-Maximum Sandea applications per year is 2 and **do not** exceed 2 oz/A during the crop season. | | | | | | |
| 3 | Dacthal 6F<br>Dacthal W-75 | 8 to 14 pt/A<br>6 to 14 lb/A | **DCPA** | 6 to 10.5 lb/A | -- | 12 |
| -Labeled for applications over the top of transplants without injury (will not control emerged weeds); transplants should be well established and growing conditions favorable for good plant growth. Label recommends 4 to 6 weeks after transplanting or direct-seeded plants at 4 to 6 inches in height. Post-transplant applications can only be made with bareground production.<br>-Dacthal will not control emerged weeds; apply to weed-free soils. Primarily controls annual grasses and a few broadleaf weeds, including common purslane. Results have been most consistent when used in fields with coarse -textured soils low in organic matter, and when the application are followed by rainfall or irrigation. Maximum application not addressed on label. | | | | | | |
| 3 | Prowl H2O 3.8CS | 1 to 3 pt/A | **pendimethalin** | 0.48 to 1.42 lb/A | 70 | 24 |
| -**Plasticulture**: recommended for row middles only. Labeled for under plastic, but no local data or experience with this application.<br>-**Bareground**: broadcast pre-plant or pre-plant incorporated before transplanting; not labeled for direct-seeded crop.<br>-Avoid root contact with Prowl-treated soil when placing transplants into furrow or hole or injury may occur.<br>-Prowl labeled for directed application to transplanted or established direct-seeded eggplant; avoid contact with leaves or stems.<br>-Prowl will not control emerged weeds, only provides residual control; row middle applications may be made with Gramoxone using shielded sprayers. Use the lower rate on coarse-textured or sandy soils. Activate with ½ inch of rainfall or sprinkler irrigation within 48 hours of application to control most annual grasses and certain broadleaf weeds.<br>-Maximum Prowl H2O application per season: 3 pt/A. | | | | | | |

*Soil Applied - continued next page*

*Soil Applied - continued*

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | Prefar 4E | 5 to 6 qt/A | **bensulide** | 5 to 6 lb/A | -- | 12 |
| -**Plasticulture** under plastic: apply in a band under the plastic, immediately before laying the mulch. Allow 7 day before making transplant holes to allow condensation to incorporate the herbicide. Plasticulture: row middles application is labeled.<br>-**Bareground**: apply preemergence or pre-plant incorporated.<br>-**Do not** incorporate more than 2 inches deep (1 inch is optimum). If applied preemergence, irrigate within 36 h of application with ½ inch of water; if not incorporated with irrigation or rainfall within 36 h, weed control maybe reduced.<br>-Provides control/suppression of some annual grass weeds and some broadleaves including pigweeds, purslane, and lambsquarters. | | | | | | |
| 15 | Devrinol 2-XT 2EC<br>Devrinol DF-XT 50DF | 2 to 4 qt/A<br>2 to 4 lb/A | **napropamide** | 1.0-2 lb/A | -- | 24 |
| -**Plasticulture**: labeled for under plastic mulch; apply in a band under the plastic, immediately before laying mulch. Condensation that forms on the underside of the mulch will activate the herbicide. Plasticulture: row middles application is labeled.<br>-**Bareground**: apply as broadcast, preemergence treatment for transplanted eggplant. Rainfall or irrigation within 24 h after application improves performance (½ inch sprinkler irrigation).<br>-Annual grasses and certain annual broadleaf weeds will be suppressed or controlled. May reduce stand and yield of fall planted small grain crop. Moldboard plowing will reduce the risk of injury. -Maximum application per season: 4 qt/A (2-XT) or 4 lb/A (DF-XT). | | | | | | |

## 2. Postemergence

| Group | Product Name (*=Restricted Use) | Product Rate | Active Ingredient | Active Ingredient Rate | PHI (d) | REI (h) |
|---|---|---|---|---|---|---|
| **1** | Select 2EC<br>Select Max 0.97EC | 6 to 8 fl oz/A<br>9 to 16 fl oz/A | **clethodim** | 0.07 to 0.125 lb/A | 20 | 24 |
| | Poast 1.5EC | 1 to 2.5 pt/A | **sethoxydim** | 0.2 to 0.5 lb/A | 20 | 12 |
| -**Select 2EC**: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution). **Select Max**: use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution). **Poast**: Use COC at 1.0% v/v.<br>-**The use of COC may increase the risk of crop injury when hot or humid conditions prevail.** To reduce the risk of crop injury, omit additives or switch to NIS when grasses are small and soil moisture is adequate.<br>-Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control.<br>-Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will not be controlled. -Controls many annual and certain perennial grasses, including annual bluegrass, but Poast is preferred for goosegrass control. For best results, treat annual grasses when they are actively growing and before tillers are present. Control may be reduced if grasses are large or if the weather is hot or dry.<br>-Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications. -Rainfastness is 1 h.<br>-**Do not** tank mix with or apply within 2 to 3 days of any other pesticide, unless labeled, as this may increase the risk of crop injury or reduce the control of grasses. -**Do not** apply more than 8 fl oz of Select 2EC in a single application and **do not** exceed 2 pt/A for the season; **do not** apply more than 16 fl oz of Select Max in a single application and **do not** exceed 4 pt/A for the season.<br>-**Do not** apply more than 1.5 pt/A Poast 1.5EC in a single application and **do not** exceed 4.5 pt/A for the season. | | | | | | |
| 3 | Dacthal 6F<br>Dacthal W-75 | 8 to 14 pt/A<br>6 to 14 lb/A | **DCPA** | 6.0 to 10.5 lb/A | -- | 12 |
| -Labeled for applications over the top of transplants. Dacthal will not control emerged weeds; apply to weed-free soils.<br>-**See comments under soil applied section** | | | | | | |
| 22 | Gramoxone SL 2.0*<br>Gramoxone SL 3.0* | 2 pt/A<br>1.3 pt/A | **paraquat** | 0.5 lb/A | -- | 24 |
| -Gramoxone can be applied before or after seeding to control emerged broadleaf weeds and grass seedlings.<br>-For use in plasticulture: row middles as a shielded application.<br>-Include a nonionic surfactant at 0.25% v/v. **Do not** allow spray to contact crop foliage as injury may result. Use flaps that drag along the edge of plastic mulch and use low spray pressure (maximum of 30 psi) to reduce small droplets that are prone to drift.<br>-See the label for additional information and warnings. Rainfastness is 30 min. A maximum of 3 applications per year are allowed.<br>-***Restricted-use pesticide***. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (*http://usparaquattraining.com*); certified applicators must repeat training every three years. | | | | | | |

## 3. Postharvest

| Group | Product Name (*=Restricted Use) | Product Rate | Active Ingredient | Active Ingredient Rate | PHI (d) | REI (h) |
|---|---|---|---|---|---|---|
| 22 | Gramoxone SL 2.0*<br>Gramoxone SL 3.0* | 2.25 to 3 pt/A<br>1.5 to 2 pt/A | **paraquat** | 0.56 to 0.75 lb/A | -- | 24 |
| -**A Supplemental Label in DE for the use of both Gramoxone formulations for postharvest application to desiccate the crop.**<br>-Apply after the last harvest for bareground or plasticulture. Always include an adjuvant. -Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings. -Rainfastness 30 min. A maximum of 2 applications for crop desiccation are allowed. -***Restricted-use pesticide***. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load, or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (*http://usparaquattraining.com*); certified applicators must repeat training every three years. | | | | | | |

| **4. Other Labeled Herbicides** These products are labeled but limited local data are available; and/or are labeled but not recommended in our region due to potential crop injury concerns. | | |
|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Active Ingredient** |
| **14** | Aim | **carfentrazone** |
| **14** | Vida | **pyraflufen** |
| **14** | Aquestra, others | **sulfentrazone** |

# Insect Control

## THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F. Recommended Insecticides

## Aphids

Green peach aphids (GPA) are the most common aphids on eggplant. Winged females can produce numerous live pale, yellow or pink-colored young (nymphs). Tremendous numbers can build up on the undersides of leaves often following pyrethroid insecticide applications. Aphids are sucking insects. They excrete a sugary, sticky substance ("honeydew") that can cause growth of black sooty mold fungus. Both honeydew and mold on fruit can hurt its marketability. Predators and parasitoids (braconid wasps) often can keep aphid populations below damaging levels. Broad-spectrum insecticides, like pyrethroids, destroy these natural enemies. Use selective insecticides whenever possible. Sample plants for aphids as well as the presence of natural enemy species. Spray only when aphid densities appear to be increasing in the absence of predators.

| **Apply one of the following formulations (note: spray coverage to the underside of the leaf is important):** | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| 1A | Lannate LV* (GPA only) | 0.75 to 3.0 pt/A | methomyl | 5 | 48 | H |
| 1B | Malathion 57 EC | 1 to 1.5 pt/A | malathion | 3 | 12 | H |
| 4A | neonicotinoid insecticides registered for use on eggplant: see table at the end of insect control. | | | | | |
| 4C | Closer SC | 1.5 to 2.0 fl oz/A | sulfoxaflor | 1 | 12 | H |
| 4C | Transform WG | 0.75 to 1.0 oz/A | sulfoxaflor | 1 | 24 | H |
| 4D | Sivanto Prime or 200SL | 21.0 to 28.0 fl oz/A | flupyradifurone - **soil** | 45 | 4 | M |
| 4D | Sivanto 200SL | 7.0 to 12.0 fl oz/A | flupyradifurone - **foliar** | 1 | 4 | M |
| 4D | Sivanto Prime | 7.0 to 14.0 fl oz/A | flupyradifurone - **foliar** | 1 | 4 | M |
| 9B | Fulfill 50WDG | 2.75 oz/A | pymetrozine | 0 | 12 | L |
| 9B | PQZ | 2.4 to 3.2 fl oz/A | pyrifluquinazon | 1 | 12 | L |
| 9D | Sefina | 3.0 fl oz/A | afidopyropen | 0 | 12 | L |
| 21A | Torac | 17.0 to 21.0 fl oz/A | tolfenpyrad | 1 | 12 | H |
| 23 | Movento | 4.0 to 5.0 fl oz/A | spirotetramat | 1 | 24 | L |
| 23 + 7C | Senstar | 8 to 10 fl oz/A | spirotetramat and pyriproxyfen | 1 | 24 | L |
| 28 + 6 | Minecto Pro* | 10.0 fl oz/A | cyantraniliprole + abamectin | 7 | 12 | H |
| 29 | Beleaf 50SG | 2.0 to 4.3 oz/A | flonicamid | 0 | 12 | L |
| UNF | Botani Gard ES | 0.25 to 1 qt/A | *Beauveria bassiana,* strain GHA | 0 | 4 | L |

## Colorado Potato Beetles (CPB)

CPB has the ability to rapidly develop resistance to insecticides (see also section E 3.2. Insecticide Mode of Action: Reducing the Risk of Insecticide Resistance Development). Augmentative releases of the egg parasitoid, *Edovum puttleri*, has been shown to control CPB effectively in eggplant, or apply one of the following insecticides.

| **Apply one of the following formulations:** | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| 1A | Vydate L* | 2.0 to 4.0 pt/A | oxamyl - **foliar** | 1 | 48 | H |
| 4A | Neonicotinoid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 4D | Sivanto Prime or 200SL | 10.5 to 14.0 fl oz/A | flupyradifurone - **foliar** | 1 | 4 | M |
| 5 | Entrust SC (OMRI) | 3.0 to 6.0 fl oz/A | spinosad | 1 | 4 | M |
| 5 | Radiant SC | 5.0 to 10.0 fl oz/A | spinetoram | 1 | 4 | M |
| 6 | Agri-Mek SC* | 1.75 to 3.5 fl oz/A | abamectin | 7 | 12 | H |
| 11A | Trident (OMRI) [1] | 3.0 to 6.0 qt/A | *Bacillus thuringiensis tenebrionis*[1] | 0 | 4 | L |

*Colorado Potato Beetles - continued next page*

*Colorado Potato Beetles - continued*

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | Rimon 0.83EC | 9.0 to 12.0 fl oz/A | novaluron | 1 | 12 | M |
| 21A | Torac | 14.0 to 21.0 fl oz/A | tolfenpyrad | 1 | 12 | H |
| 28 | Coragen 1.67SC | 3.5 to 7.5 fl oz/A | chlorantraniliprole - **soil and foliar** | 1 | 4 | L |
| 28 | Exirel | 7.0 to 13.5 fl oz/A | cyantraniliprole | 1 | 12 | H |
| 28 | Verimark | 5.0 to 10.0 fl oz/A | cyantraniliprole - **soil** | 1 | 4 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyclaniliprole | 1 | 4 | H |
| 28 + 6 | Minecto Pro* | 5.5 to 10.0 fl oz/A | cyantraniliprole + abamectin | 7 | 12 | H |

[1]Larval reduction may not be noticeable for 48-72 h. Apply when eggs begin to hatch and repeat at 5-7-day intervals. If rainfall occurs within 24 h post-treatment, reapplication may be necessary.

## Eggplant Lacebugs

Eggplant lacebug is a small sucking insect with lacey wings and conspicuous veins. It can cause stippling and yellowing/whitening of leaves. Most insecticides are not labeled for this sporadic pest; however, use of any insecticide labeled for flea beetles will provide adequate control of this pest. Good insecticide coverage is essential.

## Flea Beetles

| **Apply one of the following formulations:** | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| 3A | Pyrethroid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 4A | Neonicotinoid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 5 | Entrust SC (OMRI) | 4.0 to 8.0 fl oz/A | spinosad | 1 | 4 | M |
| 21A | Torac | 17.0 to 21.0 fl oz/A | tolfenpyrad | 1 | 12 | H |
| 28 | Verimark | 6.75 to 13.5 fl oz/A | cyantraniliprole - **soil** | 1 | 4 | H |
| UNF | Botani Gard ES | 0.25 to 1 qt/A | *Beauveria bassiana*, strain GHA | 0 | 4 | L |

## Leafminers

| **Apply one of the following formulations:** | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| 3A | Pyrethroid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 4A | Neonicotinoid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 5 | Entrust SC (OMRI) | 6.0 to 10.0 fl oz/A | spinosad | 1 | 4 | M |
| 5 | Radiant SC | 6.0 to 10.0 fl oz/A | spinetoram | 1 | 4 | M |
| 6 | Agri-Mek SC* | 1.75 to 3.5 fl oz/A | abamectin | 7 | 12 | H |
| 15 | Rimon 0.83EC | 12 fl oz/A | novaluron | 1 | 12 | M |
| 28 | Exirel | 13.5 to 20.5 fl oz/A | cyantraniliprole | 1 | 12 | H |
| 28 | Verimark | 6.75 to 10.0 fl oz/A | cyantraniliprole | 1 | 4 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyclaniliprole | 1 | 4 | H |
| 28 + 6 | Minecto Pro* | 5.5 to 10.0 fl oz/A | cyantraniliprole + abamectin | 7 | 12 | H |

## Mites

| **Apply one of the following formulations:** | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| 6 | Agri-Mek SC* | 1.75 to 3.5 fl oz/A | abamectin | 7 | 12 | H |
| 6 + 3A | Gladiator* | 19.0 fl oz/A | abamectin + zeta-cypermethrin | 7 | 12 | H |
| 6 + 28 | Minecto Pro* | 5.5 to 10.0 fl oz/A | abamectin + cyantraniliprole | 7 | 12 | H |
| 10A | Onager 1EC | 12 to 24 fl oz/A | hexythiazox | 1 | 12 | N |
| 10B | Zeal Miticide | 2.0 to 3.0 oz/A | etoxazole | 7 | 12 | L |
| 12B | Vendex 50WP* | 2.0 to 3.0 lb/A | fenbutatin-oxide | 3 | 48 | N |
| 20B | Kanemite 15SC | 31 fl oz/A | acequinocyl | 1 | 12 | L |
| 21A | Magister SC | 24.0 to 31.0 fl oz/A | fenazaquin | 3 | 12 | H |
| 21A | Portal | 2.0 pt/A | fenpyroximate | 1 | 12 | L |
| 21A | Torac (broad mite only) | 14.0 to 21.0 fl oz/A | tolfenpyrad | 1 | 12 | H |
| 23 | Oberon 2SC | 7.0 to 8.5 fl oz/A | spiromesifen | 1 | 12 | M |
| 23 | Movento (broad mite and tomato russet mite) | 4 to 5 fl oz/A | spirotetramat | 1 | 24 | L |
| 20D | Acramite 50WS | 0.75 to 1.0 lb/A | bifenazate | 3 | 12 | M |

## Thrips

| Apply one of the following formulations: | | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
| **3A[1]** | Pyrethroid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| **4A[2]** | Neonicotinoid insecticides registered for use on Eggplant: see table at the end of Insect Control. | | | | | |
| 5 | Entrust SC (OMRI) | 4.0 to 8.0 fl oz/A | spinosad | 1 | 4 | M |
| 5 | Radiant SC | 6.0 to 10.0 fl oz/A | spinetoram | 1 | 4 | M |
| 21A | Torac | 21.0 fl oz/A | tolfenpyrad | 1 | 12 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyclaniliprole | 1 | 4 | H |

**[1]Resistance concerns with western flower thrips**
**[2]Resistance concerns with tobacco thrips**

### Group 3A Pyrethroid Insecticides Registered for Use on Eggplant

**Apply one of the following formulations (check if the product label lists the insect you intend to spray; the label is the law):**

| **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
|---|---|---|---|---|---|
| Asana XL* | 5.8 to 9.6 fl oz/A | esfenvalerate | 7 | 12 | H |
| Baythroid XL*[1] | 2.1 to 2.8 fl oz/A | beta-cyfluthrin | 7 | 12 | H |
| Brigade 2EC*, others | 2.1 to 6.4 fl oz/A | bifenthrin | 7 | 12 | H |
| Hero EW*[1] | 4.0 to 10.3 fl oz/A | zeta-cypermethrin + bifenthrin | 7 | 12 | H |
| Lambda-Cy EC*, others | 1.92 to 3.84 fl oz/A | lambda-cyhalothrin | 5 | 24 | H |
| Mustang Maxx* | 2.24 to 4.0 fl oz/A | zeta-cypermethrin | 1 | 12 | H |
| Permethrin 3.2EC*, others | 4.0 to 6.0 fl oz/A | permethrin | 3 | 12 | H |
| Proaxis* | 2.56 to 3.84 fl oz/A | gamma-cyhalothrin | 5 | 24 | H |
| PyGanic Crop protection EC 5.0 II (OMRI) | 4.5 to 15.61 fl oz/A | pyrethrins | 0 | 12 | H |
| Tombstone*, others | 1.6 to 2.8 fl oz/A | cyfluthrin | 7 | 12 | H |
| Warrior II*[1] | 1.28 to 1.92 fl oz/A | lambda-cyhalothrin | 5 | 24 | H |
| **Combo products containing a pyrethroid** | | | | | |
| Besiege* | 6.0 to 9.0 fl oz/A | lambda-cyhalothrin + chlorantraniliprole (Group 28) | 5 | 24 | H |
| Brigadier* | 3.8 to 9.85 fl oz/A | bifenthrin + imidacloprid (Group 4A) **- foliar** | 7 | 12 | H |
| Endigo ZC* | 4.0 to 4.5 fl oz/A | lambda-cyhalothrin + thiamethoxam (Group 4A) | 5 | 24 | H |
| Leverage 360* | 3.8 to 4.1 fl oz/A | beta-cyfluthrin + imidacloprid (Group 4A) | 7 | 12 | H |

**[1]Resistance concerns with Western flower thrips.**

### Group 4A Neonicotinoid Insecticides Registered for Use on Eggplant

**Apply one of the following formulations (check if the product label lists the insect you intend to spray; the label is the law):**

| **Product Name (*=Restricted Use)** | **Product Rate** | **Active Ingredient(s)** | **PHI (d)** | **REI (h)** | **Bee TR** |
|---|---|---|---|---|---|
| Admire Pro | 7.0 to 10.5 fl oz/A | imidacloprid - **soil** | 21 | 12 | H |
| Admire Pro | 1.3 to 2.2 fl oz/A | imidacloprid - **foliar** | 0 | 12 | H |
| Assail 30SG | 1.5 to 4.0 oz/A | acetamiprid | 7 | 12 | M |
| Belay 50WDG | 1.6 to 2.1 oz/A | chlothianidin - **foliar** | 7 | 12 | H |
| Belay 50WDG | 4.8 to 6.4 oz/A | clothianidin - **soil** | 7 | 12 | H |
| Actara 25WDG | 2.0 to 3.0 oz/A | thiamethoxam | 0 | 12 | H |
| Platinum 75SG | 1.66 to 3.67 oz/A | thiamethoxam | 30 | 12 | H |
| Scorpion 35SL | 9.0 to 10.5 fl oz/A | dinotefuran - **soil** | 21 | 12 | H |
| Scorpion 35SL | 2.0 to 7.0 fl oz/A | dinotefuran - **foliar** | 1 | 12 | H |
| Venom | 5.0 to 7.5 oz/A | dinotefuran - **soil** | 21 | 12 | H |
| Venom | 1.0 to 4.0 oz/A | dinotefuran - **foliar** | 1 | 12 | H |
| **Combo products containing a neonicotinoid** | | | | | |
| Brigadier* | 3.80 to 9.85 fl oz/A | imidacloprid + bifenthrin (Group 3A) - **foliar** | 7 | 12 | H |
| Durivo | 10.0 to 13.0 fl oz/A | thiamethoxam + chlorantraniliprole (Group 28) | 30 | 12 | H |
| Endigo ZC* | 4.0 to 4.5 fl oz/A | thiamethoxam + lambda-cyhalothrin (Group 3A) | 5 | 24 | H |
| Leverage 360* | 3.8 to 4.1 fl oz/A | imidacloprid + beta-cyfluthrin (Group 3A) | 7 | 12 | H |
| Voliam Flexi | 4.0 to 7.0 oz/A | thiamethoxam + chlorantraniliprole (Group 28) | 1 | 12 | H |

# Disease Control

## THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F. Recommended Fungicides

## Nematodes

See sections E 1.5. Soil Fumigation and E 1.6. Nematode Control.

## Seed Treatment

Use hot water seed treatment - see section E 4.3. Disease Control in Seeds, Plant Growing Mix and Plant Beds.

## Damping-off caused by *Phytophthora*, *Pythium*, and *Rhizoctonia*

| Code | Product Name (*=Restricted Use) | Product Rate | Active Ingredient(s) | PHI (d) | REI (h) | Bee TR |
|---|---|---|---|---|---|---|
| **Apply one of the following at-planting (see label for application methods and restrictions):** | | | | | | |
| **Phytophthora and Pythium root rot**[1] | | | | | | |
| **4** | Ridomil Gold 4SL | 0.5 to 1.0 pt/A | mefenoxam | 5 | 48 | N |
| **4** | Ultra Flourish 2E | 2.0 to 4.0 pt/A | mefenoxam | 5 | 48 | N |
| **4** | MetaStar 2E AG | 4.0 to 8.0 pt/A | metalaxyl | AP | 48 | N |
| **Phytophthora, Pythium, and Rhizoctonia root rot** | | | | | | |
| **4** + 11 | Uniform 3.66SE | 0.34 fl oz/1000 ft row. Avoid direct seed contact, which may cause delayed emergence. | mefenoxam + azoxystrobin | AP | 0 | N |
| **Rhizoctonia root and stem rot** | | | | | | |
| 11 | azoxystrobin 2.08F[2] | 0.40 to 0.80 fl oz/1000 ft row | azoxystrobin | AP | 4 | N |
| 3 + 7 | Aprovia Top 1.62EC[3] | 10.5 to 13.5 fl oz/A | difenoconazole + benzovindiflupyr | 14 | 12 | -- |

[1]Also see Phytophthora Blight - Root and Crown Rot below.
[2]Rhizoctonia can become a problem in transplants that have been in transplant trays for too long prior to transplanting, or in transplants shortly after planting where the root zone is allowed to become excessively dry. To help suppress Rhizoctonia root rot apply the following via drip at transplanting.
[3]Apply as a foliar application for bare soil beds; will also help suppress Southern Blight

## Bacterial and Fungal Diseases

### Phytophthora Blight (*Phytophthora capsici*) - Root and Crown Rot

To minimize the occurrence of Phytophthora blight, rotate fields away from susceptible crops (such as cucurbits, peppers, eggplants, and tomatoes) for as many years as possible. Avoid using mefenoxam if insensitivity is known to exist. Sensitivity to mefenoxam can return if it has not been used in recent years.

| Code | Product Name (*=Restricted Use) | Product Rate | Active Ingredient(s) | PHI (d) | REI (h) | Bee TR |
|---|---|---|---|---|---|---|
| **Apply one of the following formulations via drip application at transplanting and 30 days later:** | | | | | | |
| **4** | Ridomil Gold 4SL | 1.0 pt/A | mefenoxam | 7 | 12 | N |
| **4** | Ultra Flourish 2E | 1.0 qt/A | mefenoxam | 7 | 12 | N |
| 49 + **4** | Orondis Gold 1.67SC[1] | 1.0 pt/A | oxathiapiprolin + mefenoxam | 7 | 4 | -- |
| **If conditions favor disease development, apply the following drip application 14 d after at-transplanting applications:** | | | | | | |
| 43 | Presidio 4SC | 3.0 to 4.0 fl oz/A | fluopicolide | 2 | 12 | L |

[1]If Orondis Gold is applied via drip application it cannot be applied as a foliar spray. See label for restrictions.

### Phytophthora Blight (*Phytophthora capsici*) - Fruit and Stem Rot

| Code | Product Name (*=Restricted Use) | Product Rate | Active Ingredient(s) | PHI (d) | REI (h) | Bee TR |
|---|---|---|---|---|---|---|
| **For suppression of the aerial stem and fruit rot phase of Phytophthora Blight, apply and rotate the following with a fixed copper at labeled rates on a 7 to 10 day schedule or when environmental conditions are conducive for disease development:** | | | | | | |
| 21 | Ranman 400SC | 2.75 fl oz/A *PLUS* a non-ionic surfactant **(do not apply Ranman with copper)** | cyazofamid | 0 | 12 | L |
| 40 | Forum 4.17SC | 6.0 fl oz/A | dimethomorph | 0 | 12 | N |
| 43 | Presidio 4SC | 3.0 to 4.0 fl oz/A | fluopicolide | 1 | 12 | L |
| 49 + **4** | Orondis Gold 1.67SC[1] | 1.0 pt/A[1] | oxathiapiprolin + mefenoxam | 7 | 4 | -- |

[1]If Orondis Gold is applied via a foliar application it cannot be applied via drip system. See label for restrictions.

## Fungal Fruit Rots

Scout regularly and begin preventative sprays when weather conditions favor disease development and repeat every 7-10 days. Do not apply FRAC code 11 fungicides more than 4 times in a single year. Tank mix and rotate with a protectant fungicide such as fixed copper or chlorothalonil and rotate with other FRAC codes to help reduce resistance development.

| Code | Product Name (*=Restricted Use) | Product Rate | Active Ingredient(s) | PHI (d) | REI (h) | Bee TR |
|---|---|---|---|---|---|---|
| **Tank mix chlorothalonil 1.5 pt 6F/A or fixed copper at labeled rates with one of the following FRAC code 11 fungicides:** | | | | | | |
| 3 + 11 | Quadris Top 1.67SC | 8.0 to 14.0 fl oz/A | difenoconazole + azoxystrobin | 0 | 12 | -- |
| 7 + 11 | Priaxor 4.17SC | 4.0 to 8.0 fl oz/A | fluxapyroxad + pyraclostrobin | 7 | 12 | N |
| **And rotate with one of the following:** | | | | | | |
| M01 | copper (OMRI)[1] | at labeled rates | copper | 0 | 24 | N |
| M05 | chlorothalonil 6F | 1.5 pt/A | chlorothalonil | 3 | 12 | N |

[1]There are several OMRI listed copper-based products; see labels for specifics. Copper applications may help suppress some fungal pathogens in organic production systems.

## Fungal Leaf Spots

Scout on a regular basis and begin preventative sprays when weather conditions favor disease development, or when symptoms of disease first appear, and repeat every 7-10 days. Do not apply FRAC code 11 fungicides more than 4 times in a single year. Tank mix FRAC code 7 or 11 fungicides with a protectant fungicide and rotate with other FRAC codes to help reduce resistance development.

| Code | Product Name (*=Restricted Use) | Product Rate | Active Ingredient(s) | PHI (d) | REI (h) | Bee TR |
|---|---|---|---|---|---|---|
| **Tank mix chlorothalonil 6F 1.5 pt/A or fixed copper at labeled rates with one of the following fungicides:** | | | | | | |
| 7 | Fontelis 1.67SC | 10.0 to 24.0 fl oz/A | penthiopyrad | 7 | 12 | L |
| 7 + 12 | Miravis Prime | 9.2 to 11.4 fl oz/A | pydiflumetofen + fludioxonil | 0 | 12 | -- |
| **Tank mix chlorothalonil 6F 1.5 pt/A or fixed copper at labeled rates with one of the following fungicides:** | | | | | | |
| 11 | azoxystrobin 2.08F | 6.0 to 15.5 fl oz/A | azoxystrobin | 0 | 4 | N |
| 11 | Cabrio 20EG | 8.0 to 12.0 oz/A (Leaf Spots only) | pyraclostrobin | 0 | 12 | N |
| 3 + 11 | Quadris Top 1.67SC | 8.0 to 14.0 fl oz/A | difenoconazole + azoxystrobin | 0 | 12 | -- |
| **And rotate with one of the following:** | | | | | | |
| M01 | copper (OMRI)[1] | at labeled rates | copper | 0 | 24 | N |
| M05 | chlorothalonil 6F | 1.5 pt/A | chlorothalonil | 3 | 12 | N |

[1]There are several OMRI listed copper-based products; see labels for specifics. Copper applications may help suppress some fungal pathogens in organic production systems.

## Verticillium Wilt

Best control can be accomplished by using a 4 to 5 year rotation with crops other than tomato, potato, pepper, strawberry, or any of the brambles. Varieties which appear to maintain yield in infested fields include Classic, and Epic. Soil fumigation will provide some control by delaying symptom expression. Use metam-sodium (Vapam HL - see label for specifics and restrictions). Broadcast treatments are superior to row treatments. Refer to section E 1.5. Soil Fumigation for details on application.

# Viruses

## Tomato Spotted Wilt Virus

Tomato Spotted Wilt Virus is spread by thrips from flowering ornamental plants to eggplant. Do not grow any ornamental bedding plants in the same greenhouse as eggplant transplants. Monitor and scout greenhouses for thrips and begin an insecticide control program once observed.

# If you are having a medical emergency after using pesticides, call 911 immediately.

**If you have any of the following symptoms during or shortly after using pesticides: headache, blurred vision, pinpoint pupils, weakness, nausea, cramps, diarrhea, and discomfort in the chest, call a physician and the National Poison Control Center hotline (1-800-222-1222).**

**Your call will be routed to your State Poison Control Center.**
Anyone with a pesticide exposure poisoning emergency can call the toll-free telephone number for help. Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

**For immediate medical attention call 911. Prompt action and treatment may save a life.**


## In Case of an Accident

- **Remove the person from exposure.**
- **Get away from the treated or contaminated area immediately.**
- **Remove contaminated clothing.**
- **Wash with soap and clean water.**
- **Call a physician and the Poison Control Center (1-800-222-1222) or agency in your state.**
- **Have the pesticide label with you! Follow the First Aid Precautionary Statements.**
- **Be prepared to give the EPA registration number to the responding center/agency.**