

endosulfan (Thionex 3EC or OLF) (**looper only**)  
 esfenvalerate (Asana XL)  
 gamma-cyhalothrin (Proaxis)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)  
 methomyl (Lannate LV or OLF)  
 spinetoram (Radiant 2SC) (**looper only**)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF) (**looper only**)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

Pesticide	Use Category <sup>1</sup>	Hours to Reentry	Days to Harvest
<b>INSECTICIDE</b>			
acetamiprid	G	12	7
bifenthrin	R	12	3
carbaryl/carbaryl bait	G	12	3
dimethoate	R	48	7
endosulfan	R	24	5
esfenvalerate	R	12	3
gamma-cyhalothrin	R	24	7
imidacloprid (soil/foliar)	G	12	21/7
lambda-cyhalothrin	R	24	7
malathion	G	12	3
methomyl	R	48	1
spinetoram	G	4	3
spinosad	G	4	3
zeta-cypermethrin	R	12	1
<b>FUNGICIDE (FRAC code)</b>			
Contans WG (biological)	G	4	0
Headline (Group 11)	G	12	7
Quadris (Group 11)	G	12	0
Ridomil Gold (Group 4)	G	48	--

See Table D-6.

<sup>1</sup> G = general, R = restricted

**Disease Control**

**Downy Mildew (Peronospora viciae)**

Plant resistant varieties. Avoid planting next to the previous year's pea fields because the disease can overwinter on old debris. Downy mildew is seed-borne and using seed treatments that are effective for downy mildew such as Allegiance FL or Apron XL can prevent primary systemic infections. Downy mildew development is favored by prolonged cool, wet weather conditions. Control strategies include crop rotations of 3 years or more.

**White Mold**

*Preplant.* The following biological fungicide has been tested in some states; however, limited information is available on effectiveness in the Mid-Atlantic region. Apply 3 to 4 months prior to the onset of disease to allow the active agent to reduce inoculum levels of sclerotia in the soil. Following application, incorporate to a depth of 1 to 2 inches but **do not plow** before seeding beans to avoid untreated sclerotia in lower soil layers from infesting the upper soil layer:

Contans—2.0-4.0 lb 5.3WG/A

**Fusarium Wilt**

Use resistant varieties.

**Damping-Off and Root Rot**

Rotate and allow 4 to 5 years between pea plantings. Do not double crop with bean of any type. For damping-off and root rot caused by Pythium, apply the following as a broadcast treatment at seeding.

Ridomil Gold--0.5-1.0 pt 4E/A (Pythium only), or Quadris--0.40-0.80 fl oz 2.08SC/1000 ft row

**Viruses**

Use resistant varieties when possible and control aphids.

**Bacterial Blight**

Plant clean seed. Avoid walking through fields when vines are wet.

**Ascochyta Blight**

Plant fungicide treated seed. Follow a crop rotation that provides at least 2 years between pea plantings. If Ascochyta blight has been identified in a field, rotations should be extended to 4-5 years. Deeply incorporate crop debris immediately after harvest before the fungus can be dispersed by wind or rain. In fields with a history of blight apply one of the following FRAC code 11 fungicides preventatively:

Quadris--6.2-15.5 fl oz 2.08SC/A, or Headline--6.0-9.0 fl oz 2.1EC/A

**PEPPERS**

Pepper is a warm-season crop that makes its best growth at temperatures of 70° to 75°F (21.1° to 23.9°C). This crop is sensitive to temperature extremes. Poor fruit set and blossom drop can be expected when night temperatures drop below 60° (15.6°C) or day temperatures rise above 85°F (29.4°C).

**Varieties**

Varieties <sup>1</sup>	DE	MD	NJ	PA	VA	WV
<b>Bell Types</b>						
Lantern*	D		N	P		
Alliance* (trial)				V		
Aristotle* (PT,BLSR 1,2,3)	D	M	N	P	V	WV
Lafayette* (yellow)				P	V	WV
Vidi* (PVY,TEV, TMV) (long fruit)	D	M	N	P		WV
Paladin* (PR)	D	M	N	P	V	WV
Revolution* (PT, BLSR,1,2,3,5, CMV)			N	P		WV
X3R Wizard* (BLSR 1,2,3;TMV)	D	M	N	P		WV
X3R Aladin* (yellow)					V	WV
Admiral* (TMV,PVY,BLSR 1,2) (green/yellow)	D	M	N	P		WV
Blushing Beauty* (BLSR 1,2,3;TMV)						WV
<b>Cherry Types</b>						
Cherry Bomb*(hot)	D		N	P		WV
Large Red Cherry		M	N	P	V	WV
Sweet Cherry			N	P		WV
Local strains	D	M	N	P	V	WV
<b>Sweet Frying Types</b>						
Key Largo*	D	M	N	P	V	WV
Aruba* (PR)	D		N	P	V	WV

(table continued next page)

**Varieties (continued)**

Varieties <sup>1</sup>	DE	MD	NJ	PA	VA	WV
<b>Sweet Frying Types</b>						
X3R Key West (BLSR 1,2,3)	D		N		V	
Biscayne*	D		N	P		
Cubanelle	D	M	N	P	V	WV
Corno di Toro						WV
<b>Hot Types</b>						
Volcano* (yellow)	D		N	P		
Surefire* (yellow)	D	M	N	P	V	WV
Hot Portugal (red) (for plant sales)	D	M	N	P	V	WV
Hungarian Wax (yellow)	D	M	N		V	WV
Super Chili*				P		
Long Slim Cayenne		M		P	V	WV
Tam Mild Chile-2 (PVY,TEV,TMV)		M		P	V	WV
Tam Mild Jalapeno #1			N	P	V	WV
Jalapeno M		M		P	V	WV
Zavory (mild Habanero, trial)				P		
Elrey* (BLSR)					V	
Eljete* (BLSR)					V	
<b>Cheese and Pimento Types</b>						
Lipstick (pimento)				P		WV
Local strains			N	P		

<sup>1</sup> Varieties listed by maturity within each type, earliest first.

\* Indicates hybrid variety.

Letters in parentheses indicate disease resistance possessed by varieties. See the "Abbreviations" section in front portion of this publication.

**Recommended Nutrients Based on Soil Tests**

Before using the table below, refer to important notes in Plant Nutrient Recommendations in Section B, Soil And Nutrient Information. These notes provide additional suggestions to adjust rate, timing and placement of nutrients depending on soil type cation exchange capacity and existing fertility levels.

Peppers	Nitrogen (N) Pounds per Acre	Soil Phosphorus Level			Soil Potassium Level		
		Low	Med	Opt.	Low	Med	Opt.
		Pounds P <sub>2</sub> O <sub>5</sub> per Acre			Pounds K <sub>2</sub> O per Acre		
	100-150 <sup>1</sup>	200 <sup>1</sup>	150 <sup>1</sup>	100 <sup>1</sup>	200 <sup>1</sup>	150 <sup>1</sup>	100 <sup>1</sup>
	50 <sup>2</sup>	200 <sup>2</sup>	150 <sup>2</sup>	100 <sup>2</sup>	200 <sup>2</sup>	150 <sup>2</sup>	100 <sup>2</sup>
	50 <sup>3</sup>	0	0	0	0	0	0
	25-30 <sup>4</sup>	0	0	0	0	0	0

<sup>1</sup> Total amount nutrient recommended

<sup>2</sup> Broadcast and disk-ind

<sup>3</sup> Sidedress after first fruit set

<sup>4</sup> Sidedress later in season if needed.

**Note:** If crop is to be mulched with plastic but not drip/trickle fertilized, broadcast 150 pounds of nitrogen (N) per acre with recommended P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O and disk-in or incorporate prior to laying mulch. Apply 1 pound of boron (B) per acre if soil test for B is low.

Drip/Trickle Fertilization: see below for drip/trickle fertilization guides.

**Seed Treatment**

To minimize the occurrence of bacterial leaf spot, dip seed in a solution containing 1 quart of Clorox and 4 quarts of water plus ½ teaspoon of surfactant for 1 minute. Provide constant agitation. Use at the rate of 1 gallon of solution per pound of seed. Prepare a fresh solution for each batch of seed. Wash seed in running water for 5 minutes and dry seed thoroughly. Dust or slurry with 1 teaspoon of thiram 75WP per pound of seed.

**Planting and Spacing**

Transplant into the field May 1 to May 30 for summer harvest. In Virginia and warm areas, transplant July 25 to August 1 for fall harvest.

Space rows 4 to 5 feet apart. Set plants 12 to 18 inches apart in the row. Select fields with good drainage. Plant on raised, dome-shaped beds to aid in disease control. To minimize sunscald when growing peppers on sandy soils and on plastic mulch without drip irrigation, plant varieties that have excellent fruit cover.

**Drip/Trickle Fertilization**

Before mulching, adjust soil pH to around 6.5 and then apply enough farm-grade fertilizer to supply 50 pounds (40 pounds in Pennsylvania) per acre of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O and then thoroughly incorporate into the soil. If the soil tests medium or less in soil potassium, apply a fertilizer with a ratio of 1-1-2 or 1-1-3 carrying 50 pounds of nitrogen per acre.

After mulching and installing the trickle irrigation system, apply completely soluble fertilizers to supply 30 pounds (15 pounds in Pennsylvania) of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O per fertilized-mulched acre during each application. (A description of a fertilized-mulched acre may be found in the "Irrigation" section of this publication.) In Pennsylvania, do not exceed 80 to 90 pounds of N per acre per season. On soils testing low and low to medium in boron, also include 0.25 pound of actual boron per fertilized-mulched acre in each soluble fertilizer application. **For convenience, rates of fertilizer can be converted from a mulched acre to linear foot basis. See Table C-8.**

The first soluble fertilizer application should be applied through the trickle irrigation system within 1 week after field transplanting peppers. The same rate of soluble fertilizer should be applied about every 3 weeks during the growing season for a total of 6 applications through the trickle irrigation system. The soluble fertilizer may be delivered in 12 equally timed applications through the growing season, provided the soluble nutrients are applied at half the above suggested rates per application so that the total seasonal rates of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O and B are the same. The number of fertilizer applications can be reduced for late plantings and in areas where the growing season is short. These rates were developed on sandy loam soils with a cation exchange capacity (CEC) of 3 to 5. If your soil has a lower CEC, you may wish to increase the total seasonal soluble fertilizer nutrient rates by at least one-third. On very coarse, very low CEC soils, it may be profitable to increase the total seasonal soluble fertilizer nutrient rates two-thirds over the first suggestion. On the heavier textured soils with CEC above 3 to 5, you may wish to decrease the total seasonal soluble fertilizer nutrients by one-half to three-quarters. If you are farming very heavy soils with high CEC, you may wish to

apply all the total seasonal plant nutrient requirements (according to soil test) preplant before mulching and installing the trickle irrigation system and then just apply water through the trickle irrigation through the growing season.

### Mulching

The use of black plastic mulch with drip irrigation and double rows can greatly increase yields and percentage of No. 1 sized peppers. Use opaque, white plastic when planting in the summer for fall harvest. Plant on raised, dome-shaped beds to aid in disease control. Plant double rows 12 to 15 inches apart with plants staggered 12 to 18 inches apart in each of the double rows. Use 5-foot wide plastic for double rows and 4-foot wide plastic for single row peppers. Do not use plastic mulch without trickle irrigation on sandy soils.

### Staking

Staking peppers helps protect fruit from sunburn by holding the plants in an upright position. Use 2- to 2½-foot long by 1¼ x 1½-inch Honduran pine stakes (half length tomato stakes). Drive stakes 6 to 8 inches into the soil every 4 to 5 feet in the plant row. Tie plants with polyethylene string that is used for staked tomatoes. Tie the first string 7 to 9 inches above the soil when plants are 10 to 12 inches tall or at first fruit set. For single row peppers, run the string on one side of the row, looping and tightening string around each stake for about 100 feet. Then run the string back on the opposite side of the plant row using the same procedure. Allow 3- to 4-foot untied breaks every 100 feet to make harvesting easier. For double rows of peppers, use one row of stakes in each row of peppers. Tie each row separately as described above for single row peppers.

A second tie should be made at 6 to 8 inches above the first string and before peppers enlarge and fall over the first string. Use the same procedure described above. An alternate method for applying the second string in single and double rows is to run a single string in the center of the plant canopy of each row, allowing the branches to grow up through the string and be caught and supported by the string. Consider the cost of staking versus reduction in losses and increases in quality and price received when making a decision about staking peppers. The higher price offered for red peppers increases the potential for profit when staking for the red compared to the green market.

### Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-2 and E-3.

Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field.

Apply postemergence herbicides when crop and weeds are within the recommended size and/or leaf stage.

### For Weed Control Under Plastic Mulch

Black plastic mulch effectively controls most annual weeds by preventing light from reaching the germinated seedling. Herbicides are used under plastic mulch to control weeds around the planting hole, and under the mulch when clear plastic is used. Trickle irrigation tube left on the soil surface may cause weed problems by leaching herbicide away at the emitters. The problem is most serious when clear plastic mulch is used. Bury the trickle tube several inches deep in the bed to reduce this problem.

1. Complete soil tillage, and form raised beds, if desired, prior to applying herbicide(s). Do not apply residual herbicides before forming beds, or herbicide rate and depth of incorporation may be increased, raising the risk of crop injury. When beds are formed and plastic mulch laid in a single pass, the herbicide should be applied after the bed is formed, as a part of the same operation.
2. Apply herbicide(s) recommended for use under plastic mulch in a band as wide as the mulch. Condensation that forms on the underside of the mulch will activate the herbicide. Use the trickle irrigation to provide moisture if the soil is too dry for condensation to form on the underside of the mulch.
3. Complete by laying the plastic mulch and trickle irrigation tubing, if used, immediately after the herbicide application. Delay punching the planting holes until seeding or transplanting.

**Note.** All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft<sup>2</sup>).

### Transplants

S-metolachlor--0.63-0.95 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in transplanted bell peppers in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia. The use of this product is legal ONLY if a waiver of liability provided by the local growers association has been signed by the grower, all fees have been paid, and a label has been provided by the association.** Apply 0.67 to 1 pints per acre Dual Magnum 7.62E to control annual grasses, yellow nutsedge, galinsoga, and certain other broadleaf weeds. Use as a surface-applied pretransplant spray before laying the plastic mulch, or as a directed basal spray after establishment. DO NOT preplant incorporate Dual Magnum. Make only one application during the growing season. DO NOT apply within 65 days of harvest. **Other generic versions of metolachlor and s-metolachlor may be available, and may or may not be labeled for use in the crop. Labeled for use in transplanted bell peppers only in DE, NJ, and PA! Labeled for use in bell, chili, Cubanelle, and tabasco peppers in Delaware, Maryland, and New Jersey.**

### Seeded and Transplants

Clomazone--0.25-0.5 lb/A. Apply 0.66 to 1.33 pints per acre Command 3ME pretransplant before laying plastic mulch. Use the lower rate on fields with coarse-textured soils low in organic matter, when weed pressure is light, or to minimize herbicide carryover that could affect subsequent crops or a winter crop. Use higher rates on fields with fine-textured soils and those with high organic matter, or to improve control of certain weeds, including common cocklebur. Command is an excellent broad-spectrum herbicide that will control annual grasses and most broadleaf weeds, except pigweed sp., carpetweed, morningglory sp., and yellow nutsedge. Combine with Devrinol or Dual Magnum (transplants only) to improve the control of carpetweed and pigweed sp. Labeled for use on all varieties including bell, hot, pimento, and sweet (except banana).

**WARNING: Command spray or vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. Immediate**

incorporation will reduce or eliminate vapor drift. Do not apply when wind or weather conditions favor herbicide drift. Do not apply to fields adjacent to horticultural, fruit, vegetable, or other sensitive crops (see label). Drift injury from offsite Command movement is extremely apparent; therefore, do not use Command on fields near sensitive locations.

Herbicide residues may limit subsequent cropping options when Command is used preplant incorporated for weed control in peppers. See planting restrictions on the label or consult your local Cooperative Extension office for information regarding subsequent cropping options when Command is used for weed control in peppers.

Napropamide--1-2 lb/A. Apply 2 to 4 pounds per acre Devrinol 50DF preemergence in a band under the plastic, immediately before laying the mulch. Condensation that forms on the underside of the mulch will activate the herbicide. Annual grasses and certain annual broadleaf weeds will be suppressed or controlled under the mulch and around the plant hole. Use lower rate on coarse-textured or sandy soil. Devrinol may reduce stand and yield of fall grains. Moldboard plowing will reduce the risk of injury to a small grain follow crop.

#### Soil Strips Between Rows of Plastic Mulch (Directed and Shielded Band Applications)

Use the following land preparation, treatment, planting sequences, and herbicides labeled for the crop to treat **Soil Strips Between Rows of Plastic Mulch**, or crop injury and/or poor weed control may result.

1. Complete soil preparation, apply herbicide(s) under the mulch (see above), and lay plastic and trickle irrigation (optional) before herbicide application between the rows.
2. Spray preemergence herbicide(s), registered and recommended for use on the crop in bands onto the soil and the shoulders of the plastic mulch before planting and weeds germinate, **OR** apply after planting as a shielded spray combined with a postemergence herbicide to control emerged weeds. **DO NOT broadcast spray over the plastic mulch at any time!**
3. Incorporate preemergence herbicide into the soil with ½ to 1 inch of rainfall or overhead irrigation within 48 hours of application.
4. Apply Gramoxone in bands to the soil strips between the plastic mulch before the crop emerges or is transplanted, **AND/OR** as a shielded spray postemergence to control emerged weeds. Use in combination with residual herbicides that are registered for use.

**Note.** All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft<sup>2</sup>).

#### Preplant (surface applied)

##### Transplants

Pendimethalin—0.48 – 1.42 lb/A. Apply 1 to 3 pints per acre Prowl H<sub>2</sub>O as a banded directed shielded spray and activate with one-half inch of rainfall or sprinkler irrigation within 48 hours of application to control most annual grasses and certain broadleaf weeds. Use the lower rate on coarse-textured or sandy soils. **DO NOT apply “over the**

**top” of the crop, or severe injury may occur. Observe a 70 day PHI (PreHarvest Interval). Labeled for use on bell pepper, chili pepper, cooking pepper, pimiento, and sweet pepper.**

S-metolachlor--0.63-0.95 lb/A. A Special Local-Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in transplanted bell peppers in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia. The use of this product is legal **ONLY** if a waiver of liability provided by the local growers association has been signed by the grower, all fees have been paid, and a label has been provided by the association. Apply 0.67 to 1 pints per acre Dual Magnum 7.62E to control annual grasses, yellow nutsedge, galinsoga, and certain other broadleaf weeds. Use as a surface-applied banded directed shielded spray, preemergence to the weeds. Posttransplant banded directed shielded sprays should be applied to weed-free soil. Dual Magnum will not control emerged weeds. Control emerged weeds with Gramoxone added to the shielded and directed banded herbicide spray. Make only one application during the growing season. **DO NOT** apply within 65 days of harvest. **Other generic versions of metolachlor and s-metolachlor may be available, and may or may not be labeled for use in the crop. Labeled for use in transplanted bell peppers only in DE, NJ, and PA! Labeled for use in bell, chili, Cubanelle, and tabasco peppers in Delaware, Maryland, and New Jersey.**

##### Seeded and Transplants

Clomazone--0.25-0.75 lb/A. Apply 0.66 to 2 pints per acre Command 3ME pretransplant as a banded directed shielded spray. Use the lower rate on fields with coarse-textured soils low in organic matter, when weed pressure is light, or to minimize herbicide carryover that could affect subsequent crops or a winter crop. Use higher rates on fields with fine-textured soils and those with high organic matter, or to improve control of certain weeds, including common cocklebur. Command is an excellent broad-spectrum herbicide that will control annual grasses and most broadleaf weeds, except pigweed sp., carpetweed, morningglory sp., and yellow nutsedge. Combine with Devrinol or Treflan (transplants only) to improve the control of carpetweed and pigweed sp. Labeled for use on all varieties including bell, hot, pimiento, and sweet (except banana). See WARNING below.

**WARNING: Command spray or vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. Immediate incorporation will reduce or eliminate vapor drift. Do not apply when wind or weather conditions favor herbicide drift. Do not apply to fields adjacent to horticultural, fruit, vegetable, or other sensitive crops (see label). Drift injury from offsite Command movement is extremely apparent; therefore, do not use Command on fields near sensitive locations.**

Herbicide residues may limit subsequent cropping options when Command is used preplant incorporated for weed control. See planting restrictions on the label or consult your local Cooperative Extension office for information regarding subsequent cropping options when Command is used for weed control in peppers.

Napropamide--1-2 lb/A. Apply 2 to 4 pounds per acre Devrinol 50DF as a banded directed shielded spray and activate with one-half inch of rainfall or sprinkler irrigation within 48 hours of application to control most annual grasses and certain broadleaf weeds. Use the lower rate on coarse-textured or sandy soils. May reduce stand of and yield of fall grains. Mold board plowing will reduce the risk of injury.

### Postemergence

DCPA--6-10.5 lb/A. Apply 8 to 14 pints per acre Dacthal 6F 4 to 6 weeks after transplanting for preemergence weed control. Emerged weeds will not be controlled. Dacthal will not injure crop foliage. Spray broadcast when crop is grown without plastic mulch or band between the rows when plastic mulch is used. Controls late season annual grasses, common purslane, and other broadleaf weeds.

Halosulfuron--0.023-0.047 lb/A. Apply 0.5 to 1.0 dry ounce Sandea 75WG as a banded directed shielded spray to the soil strips of peppers grown on plastic mulch **ONLY** to suppress or control yellow nutsedge and broadleaf weeds including common cocklebur, redroot pigweed, smooth pigweed, ragweed species, and galinsoga. Sandea applied postemergence will not control common lambsquarter or eastern black nightshade. Add nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution). **DO NOT** use oil concentrate. Susceptible broadleaf weeds usually exhibit injury symptoms within 1 to 2 weeks of treatment. Typical symptoms begin as yellowing in the growing point that spreads to the entire plant and is followed by death of the weed. Injury symptoms are similar when yellow nutsedge is treated but may require 2 to 3 weeks to become evident and up to a month for the weed to die. Sandea is an ALS inhibitor. Herbicides with this mode of action have a single site of activity in susceptible weeds. The risk of the development of resistant weed populations is high when herbicides with this mode of action are used continuously and exclusively to control a weed species for several years or in consecutive crops in a rotation. Integrate mechanical methods of control and use herbicides with a different mode of action to control the target broadleaf weeds when growing other crops in the rotation. **DO NOT** apply Sandea to crops treated with a soil applied organophosphate (OP) insecticide, or use a foliar applied organophosphate (OP) insecticide within 21 days before or 7 days after a Sandea application. **DO NOT exceed total of 0.094 pounds per acre, equal to 2.0 dry ounces of Sandea per crop-cycle. DO NOT exceed a total of 0.094 pound per acre, equal to 2 dry ounces of Sandea applied in one year.**

Pendimethalin--0.48 – 1.42 lb/A. Apply 1 to 3 pints per acre Prowl H<sub>2</sub>O as a banded directed shielded spray and activate with one-half inch of rainfall or sprinkler irrigation within 48 hours of application to control most annual grasses and certain broadleaf weeds preemergence. Tank-mix with paraquat to control emerged weeds. Use the lower rate on coarse-textured or sandy soils. **Do NOT apply “over the top” of the crop, or severe injury may occur. Observe a 70 day PHI (PreHarvest Interval). Labeled for use on bell pepper, chili pepper, cooking pepper, pimiento, and sweet pepper.**

Paraquat--0.6 lb/A. Apply 2.4 pints per acre Gramoxone Inteon 2SC as a banded directed shielded spray between the

rows **ONLY**, to control emerged grass and broadleaf weed seedlings. Do not allow spray to contact plants as injury or residues may result. Use shields to prevent spray contact with crop plants. Do not exceed a spray pressure of 30 psi. Add wetting agent as per label.

Clethodim--0.094-0.125 lb/A. Apply 6 to 8 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 12 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. The use of oil concentrate with Select 2EC 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 20 days.

Sethoxydim--0.2-0.3 lb/A. Apply 1 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) postemergence as a banded directed shielded spray to control annual grasses and certain perennial grasses. **The use of oil concentrate 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 20 days and apply no more than 4.5 pints per acre in one season.

### For Transplanting Into Soil Without Plastic Mulch (Broadcast Applications)

Use the following land preparation, treatment, planting sequences, and herbicides labeled for the crop when **Planting into Soil Without Plastic Mulch**, or crop injury and/or poor weed control may result.

1. Complete soil tillage, apply preplant incorporated herbicide(s), and incorporate. Use a finishing disk or field cultivator that sweeps at least 100% of the soil surface twice, at right angles, operated at a minimum of 7 miles per hour (mph), OR a PTO driven implement once, operated at less than 2 miles per hour (mph).
2. Seed and apply preemergence herbicide(s) immediately after completing soil tillage, and mechanical

incorporation of preplant herbicides. Irrigate if rainfall does not occur, to move the herbicide into the soil and improve availability to germinating weed seeds within 2 days of when the field was last tilled, or plan to control escaped weeds by other methods.

**Note:** All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft<sup>2</sup>).

## Preplant Incorporated

### Transplants

Trifluralin--0.5-1 lb/A. Apply 1 to 2 pints per acre Treflan 4E. Incorporate into 2 to 3 inches of soil within 8 hours after application. Slight stunting may result if weather is cool and damp.

### Seeded and Transplants

Napropamide--1-2 lb/A. Apply 2 to 4 pounds per acre Devrinol 50DF before planting and incorporate 1 to 2 inches deep with power-driven rotary cultivators to control most annual grasses and certain broadleaf weeds. Use lower rate on coarse-textured or sandy soil. Devrinol may reduce stand and yield of fall grains. Moldboard plowing will reduce the risk of injury to a small grain follow crop.

Trifluralin--0.5-1 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Trilin in Maryland.** Apply 1 to 2 pints per acre Trilin prior to transplanting. Incorporate to a depth of 3 inches. Use the lower rate on coarse-textured soils low in organic matter, and the higher rate on fine-textured soils with high organic matter. Avoid planting during periods of cold, wet weather to reduce the risk of temporary stunting.

## Preplant (soil surface applied)

### Transplants

S-metolachlor--0.63-0.95 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in transplanted bell peppers in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia. The use of this product is legal ONLY if a waiver of liability provided by the local growers association has been signed by the grower, all fees have been paid, and a label has been provided by the association.** Apply 0.67 to 1 pints per acre Dual Magnum 7.62E to control annual grasses, yellow nutsedge, galinsoga, and certain other broadleaf weeds. Use as a surface-applied pretransplant spray, or as a directed basal spray after establishment. DO NOT preplant incorporate Dual Magnum. Posttransplant directed sprays should be applied to weed-free soil. Dual Magnum will not control emerged weeds. Cultivate and/or hoe to control emerged weeds before treatment. Make only one application during the growing season. DO NOT apply within 65 days of harvest. **Other generic versions of metolachlor and s-metolachlor may be available, and may or may not be labeled for use in the crop. Labeled for use in transplanted bell peppers only in DE, NJ, and PA! Labeled for use in bell, chili, Cubanelle, and tabasco peppers in Delaware, Maryland, and New Jersey.**

### Seeded and Transplants

Clomazone--0.25-0.75 lb/A. Apply 0.66 to 2 pints per acre Command 3ME pretransplant. Use the lower rate on fields with coarse-textured soils low in organic matter, when weed pressure is light, or to minimize herbicide carryover

that could affect subsequent crops or a winter crop. Use higher rates on fields with fine-textured soils and those with high organic matter, or to improve control of certain weeds, including common cocklebur. Command is an excellent broad-spectrum herbicide that will control annual grasses and most broadleaf weeds, except pigweed sp., carpetweed, morningglory sp., and yellow nutsedge. Combine with Devrinol or Treflan (transplants only) to improve the control of carpetweed and pigweed sp. Labeled for use on all varieties including bell, hot, pimento, and sweet (except banana).

**WARNING: Command spray or vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. Immediate incorporation will reduce or eliminate vapor drift. Do not apply when wind or weather conditions favor herbicide drift. Do not apply to fields adjacent to horticultural, fruit, vegetable, or other sensitive crops (see label). Drift injury from offsite Command movement is extremely apparent; therefore, do not use Command on fields near sensitive locations.**

Herbicide residues may limit subsequent cropping options when Command is used preplant incorporated for weed control in peppers. See planting restrictions on the label or consult your local Cooperative Extension office for information regarding subsequent cropping options when Command is used for weed control in peppers.

Napropamide--1-2 lb/A. Apply 2 to 4 pounds per acre Devrinol 50DF prior to transplanting or seeding. Incorporate with one-half inch of sprinkler irrigation within 48 hours of application to control most annual grasses and certain broadleaf weeds. Use the lower rate on coarse-textured or sandy soils. May reduce stand of and yield of fall grains. Mold board plowing will reduce the risk of injury.

### Postemergence

DCPA--6-10.5 lb/A. Apply 8 to 14 pints per acre Dacthal 6F 4 to 6 weeks after transplanting for preemergence weed control. Emerged weeds will not be controlled. Dacthal will not injure crop foliage. Controls late season annual grasses, common purslane, and other broadleaf weeds.

Clethodim--0.094-0.125 lb/A. Apply 6 to 8 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 12 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. The use of oil concentrate with Select 2EC 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 20 days.

Sethoxydim--0.2-0.3 lb/A. Apply 1 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) postemergence to control annual grasses and certain perennial grasses. The use of oil concentrate 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 20 days and apply no more than 4.5 pints per acre in one season.

### Postharvest

#### With or Without Plastic Mulch

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of Gramoxone Inteon 2SC for postharvest desiccation of the crop in Delaware, New Jersey and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC as a broadcast spray after the last harvest. Add nonionic surfactant according to the labeled instructions. Use to prepare plastic mulch for replanting, or to aid in the removal of the mulch. See the label for additional information and warnings.

**Note.** All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft<sup>2</sup>).

### Insect Control

**NOTE:** Copies of specific insecticide product labels can be downloaded by visiting the websites [www.CDMS.org](http://www.CDMS.org) or [www.Greenbook.org](http://www.Greenbook.org). Also, specific labels can be obtained via web search engines.

#### Cutworms

(Also see the "Cutworms" section in Soil Pests--Their Detection and Control.)

##### Preplanting Field Treatment

bifenthrin (Capture LFR, Empower<sup>2</sup> G)

##### Postplanting Treatment

carbaryl (Sevin 5%Bait or OLF)

gamma-cyhalothrin (Proaxis)

lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,

Warrior, Warrior II OLF)

tebufenozide (Confirm 2F)

zeta-cypermethrin (Mustang MAX, Respect or OLF)

#### Flea Beetle

beta-cyfluthrin (Baythroid XL)

bifenthrin (Brigade EC, Sniper or OLF)

carbaryl (Sevin 80S or OLF)

cyfluthrin (Renounce 20WP, Tombstone or OLF)

dinotefuran (soil/foliar-Venom 70SG or OLF)

esfenvalerate (Asana XL)

endosulfan (Thionex 3EC or OLF)

gamma-cyhalothrin (Proaxis)

imidacloprid (soil) (Admire 2F, Admire PRO or OLF)

lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II OLF)

permethrin (Perm-Up, Pounce 3.2 EC or OLF)

thiamethoxam (soil- Platinum 2SC; foliar- Actara 25WDG)

zeta-cypermethrin (Mustang MAX, Respect or OLF)

#### Green Peach Aphid

**Note.** For best green peach aphid control during periods of drought, apply insecticide 2 to 3 days after irrigation. Thorough spray coverage beneath leaves is important when foliar sprays are used.

acephate (Orthene 97S or OLF)

acetamiprid (Assail 30SG or OLF)

endosulfan (Thionex 3EC or OLF)

flonicamid (Beleaf 50SG)

imidacloprid (soil-Admire 2F, Admire PRO; foliar-Nuprid 1.6F, Provado 1.6F or OLF)

methomyl (Lannate LV or OLF)

oxydemeton (Metasystox-R 2 SC)

pymetrozine (Fulfill 50WDG)

spirotetramat (Movento)

thiamethoxam (soil-Platinum 2SC; foliar-Actara 25WDG or OLF)

#### Pepper Maggot

Pepper maggot flies are active from June 1 to mid-August.

dimethoate (Dimate 4EC or OLF)

endosulfan (Thionex 3EC or OLF)

zeta-cypermethrin (Mustang MAX, Respect or OLF)

**Note:** Use of acephate for corn borer control will reduce pepper maggot infestations.

#### Pepper Weevil (PW)

PW is a pest occasionally imported on older transplants or transplants with flowers or fruit.

acetamiprid (Assail 30SG or OLF)

bifenthrin (Brigade EC, Sniper, or OLF)

cryolite (Krocide 96W, Prokill 96)

gamma-cyhalothrin (Proaxis)

imidacloprid (foliar) (Nuprid 1.6F, Provado 1.6F or OLF)

oxamyl (Vydate L)

permethrin (**sweet, bell pepper only**) (Perm-Up, Pounce 3.2EC or OLF)

thiamethoxam (Actara 25WDG)

zeta-cypermethrin (Mustang MAX, Respect or OLF)

#### European Corn Borer (ECB)

**Note.** Begin treatments when fruit are ¼ to ½ inch in diameter or larger and ECB moths are being caught in either local pheromone or blacklight traps. Consult your county Extension agent or integrated pest management reports for additional information about trap catches, phenology predictions, and proper timing of sprays for ECB.

acephate (**bell pepper only**) (Orthene 97S or OLF)

beta-cyfluthrin (Baythroid XL)

bifenthrin (Brigade EC, Sniper, or OLF)

chlorantraniliprole (Coragen 1.67SC)

cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 esfenvalerate (Asana XL)  
 flubendiamide (Synapse WG)  
 gamma-cyhalothrin (Proaxis)  
 indoxacarb (**bell pepper only**) (Avaunt 30WDG or OLF)  
 lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,  
 Warrior, Warrior II, OLF)  
 methomyl (Lannate LV or OLF)  
 methoxyfenozide (Intrepid 2F)  
 permethrin (**sweet, bell-type only**) (Perm-Up, Pounce  
 3.2EC or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 tebufenozide (Confirm 2F)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

### Leafminers

abamectin (Agri-Mek EC, Abba EC, Temprano, or OLF)  
 cyromazine (Trigard 75WSP)  
 dinotefuran (Venom 70SG or OLF)  
 oxamyl (Vydate L)  
 permethrin (**sweet, bell type only**) (Perm-Up, Pounce 3.2EC  
 or OLF)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)

### Tomato Fruitworm also called Corn Earworm (CEW), Hornworms (HW)

Control CEW and HW beginning in mid-July

beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper, or OLF) (**CEW only**)  
 carbaryl (Sevin 80S or OLF)  
 chlorantraniliprole (Coragen 1.67SC)  
 cyfluthrin (Renounce 20WP, Tombstone) (**CEW only**)  
 emamectin (Proclaim 5SG)  
 esfenvalerate (Asana XL) (**CEW only**)  
 endosulfan (Thionex 3EC or OLF) (**HW only**)  
 flubendiamide (Synapse WG)  
 gamma-cyhalothrin (Proaxis)  
 lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,  
 Warrior, Warrior II, or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

### Beet Armyworm

chlorantraniliprole (Coragen 1.67SC)  
 emamectin (Proclaim 5 SG)  
 flubendiamide (Synapse WG)  
 indoxacarb (Avaunt 30WDG)  
 methoxyfenozide (Intrepid 2F)  
 methomyl (Lannate LV or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 tebufenozide (Confirm 2F)

### Fall Armyworm

*Bacillus thuringiensis* (Biobit, Dipel, Diple 2X, Javelin,  
 XenTari or OLF)  
 chlorantraniliprole (Coragen 1.67SC)  
 emamectin (Proclaim 5SG)  
 flubendiamide (Synapse WG)  
 gamma-cyhalothrin (Proaxis)  
 indoxacarb (Avaunt or OLF)

lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,  
 Warrior, Warrior II or OLF)  
 methomyl (Lannate LV or OLF)  
 methoxyfenozide (Intrepid 2F)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 tebufenozide (Confirm 2F)  
 zeta-cypermethrin (Mustang MAX, Respect)

### Cabbage Looper

acephate (Orthene 97S or OLF)  
*Bacillus thuringiensis* (Biobit, Dipel, Diple 2X, Javelin,  
 XenTari or OLF)  
 beta-cyfluthrin (Baythroid XL)  
 chlorantraniliprole (Coragen 1.67SC)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 emamectin (Proclaim 5 SG)  
 esfenvalerate (Asana XL)  
 flubendiamide (Synapse WG)  
 gamma-cyhalothrin (Proaxis)  
 indoxacarb (Avaunt 30WDG)  
 lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,  
 Warrior, Warrior II or OLF)  
 methomyl (Lannate LV or OLF)  
 methoxyfenozide (Intrepid 2F)  
 permethrin (**sweet, bell-type only**) (Perm-Up, Pounce 3.2EC  
 or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 tebufenozide (Confirm 2F)

### Thrips

Diseased plants should be rogued out. After spraying for thrips, place diseased plants in a plastic bag and remove from the field. Several species of thrips spread Tomato Spotted Wilt Virus. Scout for thrips and begin treatments when observed. Do not produce vegetable transplants with bedding plants in the same greenhouse.

abamectin (Agri-Mek EC, Abba EC, Temprano or OLF)  
 acetamiprid (Assail 30SG or OLF)  
 beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper or OLF)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 dinotefuran (soil/foliar-Venom 5SG)  
 gamma-cyhalothrin (Proaxis)  
 Oxamyl (Vydate L)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)

**Note.** Use of acephate for aphid or ECB control will reduce thrips population.

### Stink bugs

beta-cyfluthrin (Baythroid XL)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 dinotefuran (soil, foliar) (Venom 70SG or OLF)  
 gamma-cyhalothrin (Proaxis)  
 lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer,  
 Warrior, Warrior II or OLF)  
 thiamethoxam (Actara 25WDG)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

**Mites**

abamectin (Agri-Mek EC, Abba EC, Temprano or OLF)  
 bifenthrin (Brigade EC, Sniper, or OLF)  
 bifentzate (Acramite 50WS)  
 spiromesifen (Oberon 2SC)

**Nematode Control**

See "Nematodes" section of Soil Pests--Their Detection and Control. Use fumigants listed in the "Soil Fumigation" section or use oxamyl (Vydate L) for control. Consult label before use.

Pesticide	Use Category <sup>1</sup>	Hours to Reentry	Days to Harvest <sup>2</sup>
<b>INSECTICIDE</b>			
abamectin	R	12	7
acephate	G	24	7
acetamiprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
beta-cyfluthrin	R	12	7
bifenthrin	R	12	7
bifentzate	G	12	3
carbaryl/carbaryl bait	G	12	3
cryocide	G	12	14
cyfluthrin	R	12	7
cyromazine	G	12	0
dimethoate	G	48	7
dinotefuran( soil/foliar)	G	12	21/1
emamectin	R	12	7
endosulfan	R	24	4
esfenvalerate	R	12	7
flonicamid	G	12	0
gamma-cyhalothrin	R	24	5
imidacloprid (soil/foliar)	G	12	21/0
indoxacarb	G	12	3
lambda-cyhalothrin	R	24	5
methomyl	R	48	3
methoxyfenozide	G	4	1
oxamyl	R	48	7
oxydemeton	R	48	3
permethrin	R	12	3
pymetrozine	G	12	0
spinetoram	G	4	1
spinosad	G	4	1
spiromesifen	G	12	7
tebufenozide	G	4	7
thiamethoxam (soil/foliar)	G	12	30/0
zeta-cypermethrin	R	12	1
<b>FUNGICIDE (FRAC code)</b>			
Agri-Mycin/Agri-Strep (Group 25)	G	12	AP
Cabrio (Group 11)	G	12	0
copper, fixed (Group M1)	G	24	0
Flint (Group 11)	G	12	3
Forum (Group 40)	G	12	4
maneb (Group M3)	G	24	7
MetaStar (Group 4)	G	48	7
Presidio (Group 43)	G	12	2
Quadris (Group 11)	G	4	0
Revus (Group 40)	G	12	1
Ridomil Gold (Group 4)	G	12	7
Ridomil Gold Copper (Groups 4 + M1)	G	48	7

(table continued)

Pesticide	Use Category <sup>1</sup>	Hours to Reentry	Days to Harvest <sup>2</sup>
<b>FUNGICIDE (FRAC code) (continued)</b>			
Tanos (Groups 11 +27)	G	12	3
Terraclor (Group 14)	G	12	--
Ultra Flourish (Group 4)	G	12	7

See Table D-6.

<sup>1</sup> G = general, R = restricted;<sup>2</sup> AP=At Plant**Disease Control****Damping-Off**

Use the disease-free planting mix described in Tables A-2 and A-3. Consideration should be given to using soilless mixes containing microorganisms that suppress damping-off fungi. Use of the following will assist in control:

SoilGard 12G--1.0-1.5 lb/cu yd of soilless mix

SoilGard is a naturally occurring soil fungus that is an antagonist to plant pathogenic fungi. Uniformly add SoilGard 12G when soilless mixes are being blended by mechanical devices. After one day of incubation (keep at room temperature), seed or transplants can be added to the treated mix.

Where planting mix is not used, pretreat seedbeds with metam-sodium (Vapam HL) at 0.75 quart per 100 square feet.

**Bacterial Leaf Spot**

Follow good crop rotation and plant cultivars (such as X3R Aladdin, Aristotle, Revolution, X3R Wizard, and X3R Key West) that have resistance to all three races (races 1, 2 and 3) of the pathogen that occur in the mid-Atlantic region. When producing transplants, be sure to use the Clorox or heat seed treatment described under the preceding "Seed Treatment" section. Buy heat-treated seed or disease-free transplants. In some years, there can be a high risk of developing bacterial leaf spot when using southern-produced transplants. Be sure to purchase only certified transplants. Prior to transplanting, apply streptomycin (Agri-Mycin 17, Agri-Strep) sprays (1.0 lbs per 100 gallons, 1¼ teaspoons per gallon) when first true leaves appear and continue every 4 to 5 days until transplanting. Streptomycin cannot be used on transplants after they are transplanted in field.

Loss from bacterial spot may be reduced by maintaining a high level of fertility. Maintaining high fertility levels will stimulate additional leaf formation to replace those lost from bacterial spot infections. However, sufficient restraint must be used to ensure that plants do not become overly vegetative, or fruit set may be severely reduced. Where disease is present or anticipated, do not work in fields when plant surfaces are wet. Disk field as soon as possible after the growing season. This will hasten breakdown of the crop debris that is harboring the bacteria and minimize overwintering of the bacteria in the field.

**Field sprays to reduce spread: If growing susceptible varieties,** applying fixed copper (see Table E-8 for listing of available fixed copper fungicides) at labeled rates plus maneb at 1.5 lb 75DF/A, or fixed copper (at labeled rates) or maneb at 1.5 lb 75DF/A plus Tanos at 8.0–10.0 oz 50WDG/A are of value in helping to suppress the spread of the disease. Start preventative fungicide applications shortly after transplanting and repeat every 7 to 10 days.

### Anthracnose Fruit Rot

Anthracnose fruit rot (AFR) is increasing in the mid-Atlantic region. ‘Hot spots’ typically develop in areas of field with prior history of AFR. Heavy winds and rain help spread spores of pathogen to healthy areas of field. Excessive fertility programs may also help create thick, dense canopies which reduce chemical control and create microclimates conducive for fruit infection. Scout on a regular basis as fruit begin to develop. Use adequate water volume to insure good penetration into canopy. Apply preventative applications before onset of fruit infections in fields with history of disease. Remove infected fruit from heavily infested areas of field if possible.

*Beginning at flowering apply on a 7 day schedule:*

#### **Alternate:**

maneb--2.0-3.0 lb 75DF/A or OLF every 7-10 days

*With one of the following FRAC code 11 fungicides:*

Quadris--6.2–15.5 fl oz 2.08SC/A, or

Cabrio--8.0-12.0 oz 20EG/A, or

Flint--3.0-4.0 oz 50WDG/A, or

Tanos--8.0–10.0 oz 50WDG/A

Do not make more than two consecutive applications of any FRAC code 11 fungicide.

### Bacterial Soft Rot

During periods of humid weather, the stem ends of harvested peppers may turn brown due to bacterial soft rot. If necessary, pack peppers dry without washing to minimize soft rot losses. If peppers must be washed, maintain 25 ppm of chlorine (1 tablespoon of Clorox per 8 gallons of water) in the wash water. Avoid washing peppers with water more than 10°F (6°C) cooler than the fruit temperature to prevent movement of bacteria into the stem end of the fruit.

### Phytophthora Blight

Plant loss can be severe in all pepper types. Phytophthora blight typically develops in low-lying areas of fields after rain and can spread quickly throughout the entire field. Planting on a ridge or raised, dome-shaped bed will help provide better soil drainage. Use at least a 3-year crop rotation with crops other than peppers, cucurbits, lima and snap beans, eggplants, or tomatoes. In fields with low-lying or wet areas, plant only Phytophthora-tolerant cultivars such as ‘Paladin’, ‘Aristotle’, or ‘Revolution’. In heavily-infested fields with a known history of Phytophthora blight, plant only tolerant cultivars to help reduce plant losses. If mfenoxam-insensitivity is known to exist in a field/farm, plant only tolerant cultivars. Do not apply mfenoxam or metalaxyl in fields where insensitivity is known to exist.

#### **For control of the crown rot phase of blight, apply:**

mefenoxam--1.0 pt Ridomil Gold 4EC/A or 1.0 qt Ultra

Flourish 2E/A, or

metalaxyl (MetaStar)--4.0-8.0 pt 2E/A

Apply broadcast prior to planting or in a 12 to 16-inch band over the row before or after transplanting. Make two additional postplanting directed applications at 1.0 pint Ridomil Gold 4EC/A or 1.0 qt Ultra Flourish 2E/A or 4.0 pt MetaStar 2E/A to 6 to 10 inches of soil on either side of the plants at 30-day intervals. Use the formula in Chapter E – Calibrating Granular Applicators "Calibration for Changing

from Broadcast to Band Application” to determine amount of Ridomil Gold needed per acre when band applications are made.

When using polyethylene mulch, apply Ridomil Gold 4E at the above rates and timing by injection through the trickle irrigation system. Dilute Ridomil Gold 4E prior to injecting to prevent damage to injector pump.

#### **For prevention of the stem and fruit rot phase of blight:**

The following materials are labeled for suppression of the aerial phase of phytophthora blight on pepper fruit. For best results tank mix one of the following with a copper containing fungicide and rotate on a 7 day schedule with 2.5 lb Ridomil Gold Copper 65WP/A.

#### **Alternate:**

Revus--8.0 fl oz 2.08SC/A *plus* fixed copper at labeled rates,

or

Presidio--3.0-4.0 fl oz 4SC/A *plus* fixed copper at labeled rates, or

Forum--6.0 fl oz 4.18SC/A *plus* fixed copper at labeled rates

#### **With:**

Ridomil Gold Copper--2.5 lb 65WP/A. Rotate on a 7 day schedule with Revus, Presidio or Forum *plus* copper. Only apply Ridomil Gold 4E at planting and 30 days later. The third application of Ridomil Gold 4E cannot be made when Ridomil Gold Copper is applied.

### Blossom End Rot

This physiological disorder is caused by reduced calcium uptake and calcium movement into the fruit when soil moisture is low. To control blossom end rot, maintain proper soil calcium and nutrient balance. Avoid root pruning and damage. The most effective control is to maintain uniform, favorable soil moisture. This is especially important when cropping in raised beds for Phytophthora control, because soil in raised beds will dry more quickly than in flat bed culture.

### Sunscald

To reduce sunscald, select varieties with good foliage cover. Maintain vigorous vegetative growth by following recommended fertilizer (especially nitrogen) program and timely irrigation. Harvest carefully to avoid damaging stems, branches and foliage.

### Southern Blight (Sclerotium)

High soil moisture and temperature favor disease development. Long crop rotations with corn and small grains help reduce disease incidence. Additionally, use the following in the transplant water:

Terraclor--3.0 lb 75WP/100 gal of water or OLF and apply 0.5 pint per plant.

### Verticillium Wilt

The soil-borne fungus can infect a number of crops including eggplant, tomato, pepper, potato, and strawberries and can survive in the soil for many years. Therefore, a long, proper crop rotation is necessary to reduce losses due to verticillium wilt. DO NOT grow tomato, potato, strawberries, or eggplant in rotation or consecutively in the same field and never plant other solanaceous crops, such as eggplants or tomatoes, between pepper plantings.

## Viruses

*Tobacco mosaic virus (TMV)*: TMV is transmitted mechanically. Use resistant varieties to control TMV.

*Aphid-transmitted viruses (PVX, CMV, TEV, PVY, and AMV)*: CMV has caused problems in peppers in the mid-Atlantic region the past few growing seasons. Infected fruit may develop small, irregular brown spots. Young developing leaves may develop mosaic symptoms. The positive identification of pepper viruses with laboratory tests can be difficult. Importantly, these viruses of pepper cannot adequately be controlled with insecticide applications, but symptom expression can be delayed through their use. Since aphids transmit the virus, growers may wish to use yellow trap pans containing water to determine when mass flights of winged aphids occur. Repeated applications of a contact aphicide at those times are most beneficial.

*Thrips-transmitted virus (Tomato Spotted Wilt Virus, TSWV, and Impatiens Necrotic Spot Virus, INSV)*: Resistant varieties are available. TSWV can be severe on peppers during both greenhouse transplant and field production of the crop. INSV causes similar symptoms on peppers as TSWV; however, the virus is not as severe and does not limit production to the same extent as TSWV. Both viruses are transmitted by a number of thrips (Western flower thrips most notably) in a persistent manner (ie. thrips can transmit the virus during their entire life cycle). During transplant production, thrips can transmit the virus from infected ornamental plants (flowers). **DO NOT GROW** any ornamental bedding plants in the same greenhouse as pepper transplants. **Monitor greenhouses and scout fields regularly for thrips populations.** Begin an insecticide program once thrips are observed. When thrips are observed in the field, treat with an insecticide and rogue out any plant showing TSWV symptoms.

## Skin separation or ‘silvering’ of bell pepper fruit

Skin separation or ‘silvering’ in bell pepper fruit reduces aesthetic fruit quality. Research in New Jersey has shown that phytophthora-tolerant bell pepper cultivars (such as ‘Paladin’ and ‘Aristotle’) are more prone to the development of skin separation or ‘silvering’ in fruit compared to phytophthora-susceptible varieties such as ‘Alliance’ or ‘Camelot’.

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