

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 30 days and apply no more than 3 pints per acre in one season.

### Postharvest

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. See the label for additional information and warnings.

## Insect Control

### Onion Maggot

malathion (Malathion 57EC) (**flies only**)  
zeta-cypermethrin (Mustang MAX, Respect or OLF) (**flies only**)

### Thrips, Aphids

acetamprid (Assail 30WDG or OLF)  
malathion (Malathion 57EC or OLF)  
spinetoram (Radiant 2SC)  
zeta-cypermethrin (Mustang MAX, Respect, or OLF)

### Armyworms (AW), Cutworms (CW), Cabbage Loopers (CL)

*Bacillus thuringiensis* (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)  
spinosad (Entrust 80W, SpinTor 2SC or OLF) (**AW and CL only**)  
spinetoram (Radiant 2SC) (**AW and CL only**)  
zeta-cypermethrin (Mustang MAX, Respect, or OLF)

Pesticide	Use Category <sup>1</sup>	Hours to Reentry <sup>2</sup>	Days to Harvest
<b>INSECTICIDE</b>			
acetamprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
malathion	G	12	3
spinetoram	G	4	1
spinosad	G	4	1
zeta-cypermethrin	R	12	7
<b>FUNGICIDE (FRAC code)</b>			
Cabrio (Group 11)	G	12	7
chlorothalonil (Group M5)	G	12	14
Endura (Group 7)	G	12	7
Forum (Group 40)	G	12	0
Pristine (Groups 11 + 7)	G	12	7
Quadris (Group 11)	G	4	0

See Table D-6. <sup>1</sup>G = general, R = restricted

<sup>2</sup>Chemicals with multiple designations are based on product and/or formulation differences. CONSULT LABEL.

## Disease Control

### Purple Blotch and Downy Mildew

Begin in fall as soon as transplants are set out. Rotate the following at 10-day intervals as long as night temperatures remain warm.

#### Alternate:

Forum--6.0 fl oz 4.18SC/A (for downy mildew only; must be tank mixed with another fungicide effective for downy mildew), or

chlorothalonil--1.5-3.0 pt 6F/A or OLF; (do not apply chlorothalonil more than three times per season)

#### With one of the following fungicides:

Quadris--6.0-12.0 fl oz 2.08SC/A for purple blotch, or  
Quadris--9.0-15.5 fl oz 2.08SC/A for downy mildew, or  
Cabrio--8.0-12.0 oz 20EG/A (use 12 oz/A for downy mildew), or  
Pristine--10.5-18.5 oz 38WP/A (for purple blotch) or 18.5 oz 38WP/A for downy mildew suppression, or  
Endura--6.8 oz 70WG/A (for purple blotch only)

Materials with different modes of action (FRAC code) should always be alternated.

### White Rot

This disease is severe only on overwintered leeks. Practice crop rotation and use preplant soil fumigation with one of the materials listed in the "Soil Fumigation" section.

# LETTUCE, ENDIVE, AND ESCAROLE

Lettuce and endive are cool-season crops. Properly hardened lettuce transplants can tolerate temperatures as low as 20° to 25°F (-6.67° to -3.89°C). Temperatures above 85°F (29.4°C) for several days will cause seedstalk formation and bolting in lettuce. Temperatures below 70°F (21.1°C) during the seedling stage promote premature seedstalk formation in endive and escarole.

## Varieties

Varieties <sup>1</sup>	DE	MD	NJ	PA	VA	WV
<b>Lettuce: Bibb, Boston and Butterhead Types</b>						
Ermosa (DMR,LMV,TBR)			N	P	V	WV
Buttercrunch	D		N	P	V	WV
Odyssey (TBR)				P		
Esmeralda	D	M	N	P		WV
Optima			N	P		
Bennett				P		
Harmony (DMR,TBR)				P		
Summer Bibb	D		N	P	V	WV
<b>Lettuce: Iceberg Types</b>						
Summer Time				P		
Ithaca (spring)	D	M	N			WV
Ithaca (fall)	D	M	N	P		WV
Maverick II (spring and fall)			N	P		
Mesa 659 (fall)	D	M	N	P		WV
<b>Lettuce: Leaf Types</b>						
Grand Rapids (TBR)	D	M	N	P	V	WV
Royal Green (TBR)	D	M	N	P	V	WV

(table continued on next page)

**Varieties** *(continued)*

Varieties <sup>1</sup>	DE	MD	NJ	PA	VA	WV
<b>Lettuce: Leaf Types</b>						
New Redfire			N	P	V	WV
Red Sails (Direct Market)						WV
Salad Bowl (Direct Market)	D	M		P		WV
Royal Oakleaf				P		
Waldmann's Green	D		N	P		
Tropicana				P		
<b>Lettuce: Leaf Types (continued)</b>						
Two Star			N	P	V	WV
Red Express (trial)				P		
<b>Lettuce: Romaine (COS) Types</b>						
Ideal Cos (spring,fall)(TBR)			N	P	V	WV
Green Forest (CRR,TBR)	D		N	P	V	WV
Coastal Star (CRR)				P		
Rouge de Hiver (red)(fall)				P		
Capistrano (TBR)				P		
Pyramid Cos			N	P		
<b>Lettuce: Batavia Types</b>						
Magenta (red)				P		
Nevada				P		
<b>Endive</b>						
Green Curled	D		N	P	V	WV
Salad King	D		N	P		WV
<b>Escarole</b>						
Florida Deep Heart	D		N	P		WV
Full Heart Batavian	D		N	P	V	WV

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

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.

Crop	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		
Leaf Lettuce	100-125 <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>
Endive,	50-75 <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>
Escarole	25-50 <sup>3</sup>	0	0	0	0	0	0
Iceberg Lettuce	60-80 <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>
	25-50 <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>
	25-30 <sup>3</sup>	0	0	0	0	0	0

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

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

<sup>3</sup> Sidedress 3-5 weeks after planting

**Seed Treatment**

Dust seed with thiram 65WP at the rate of 1 level teaspoon per pound of seed (3 ounces per 100 pounds).

**Seeding and Transplanting**

*Spring crop.* The early endive crop is usually grown from transplants shipped into the state. Lettuce transplants are started in frames or greenhouses. Seed for the lettuce crop is sown in frames in November, in unheated greenhouses in December, and in heated greenhouses in January and February at the rate of 4 to 6 ounces of seed for 1 acre of plants. Plants are ready for field planting early in March.

Direct-seeded lettuce is sown in prepared beds as early in the spring as the ground can be worked. Seed should be sown shallow-some of the seed will actually be uncovered and visible. Pelleted seed should be watered at night during high-temperature periods (soil temperatures above 80°F [26.7°C]) until germination occurs. The spring lettuce crop can be field-seeded through May. In Maryland, field-seeding in May results in seed stalk formation. Only leaf lettuce should be seeded as late as May. Successive plantings of endive can be made through the middle of August.

*Fall lettuce crop.* Seed in the field July 25 to August 10 in Pennsylvania and other cool areas, and August 5 to 20 in warmer areas.

**Spacing**

**Lettuce.** Head lettuce is planted in rows 2 feet apart with plants 12 to 15 inches apart in the row. Leaf and Boston type lettuce are planted 3 to 4 rows per bed with beds spaced 66 to 72 inches on centers. Space plants 9 to 12 inches apart in the row.

**Endive.** Plant three to four rows per bed and space beds 66 to 72 inches on centers. Space plants 9 to 15 inches apart in the row.

**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 recommended size and/or leaf stage.

Bensulide--5-6 lb/A. Apply 5 to 6 quarts per acre Prefar 4E before planting and incorporate 1 to 2 inches deep with power-driven rotary cultivators, or apply preemergence and activate with one-half inch of sprinkler irrigation within 36 hours to control most annual grasses. Use the maximum recommended rate preemergence followed by irrigation to suppress certain annual broadleaf weeds including common lambsquarter, smooth pigweed, and common purslane.

Pronamide--1-2 lb/A. Apply 2 to 4 pounds per acre Kerb 50W to seeded or transplanted lettuce. Labeled for all types of lettuce plus endive and escarole. Irrigation (1 to 2 inches) should follow application. Primarily controls annual grasses and certain broadleaf weeds. Unlabeled crops should not be planted for 3 to 12 months, depending on herbicide rate used and crop. See label. Labeled crops include artichokes, lettuce, endive, and escarole

**Postemergence**

Clethodim--0.094-0.125 lb/A. Apply 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. 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 14 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 30 days (head types) or 15 days (leaf types) and apply no more than 3 pints per acre in one season. Labeled for head and leaf-type lettuces.

### Postharvest

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. See the label for additional information and warnings.

### 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.

**Note:** Not all pesticides are labeled for each crop in this section. Refer to Days to Harvest Table at the end of this section to determine which pesticides are labeled on specific crops.

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

beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper, or OLF)  
 carbaryl (Sevin 5%Bait or OLF)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)  
 methomyl (Lannate LV or OLF)

permethrin (Perm-Up, Pounce 3.2EC or OLF)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

### Thrips

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. **Note.** Use of lambda-cyhalothrin (Warrior;generics available) for other pests will reduce the thrips population.

beta-cyfluthrin (Baythroid XL)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 methomyl (Lannate LV or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

### Leafhopper

Control of leafhoppers will prevent spread of lettuce yellows. In the spring, spray when plants are one-half inch tall; repeat as needed. In the fall, spray seedlings four to five times at 5-day intervals:

acephate (Orthene 97S or OLF)  
 beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper or OLF)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 dimethoate (Dimate 4EC or OLF)  
 dinotefuron (soil, foliar) (Venom 70SG or OLF)  
 gamma-cyhalothrin (Proaxis)  
 imidacloprid (soil-Admire 2F, Admire PRO; foliar-Nuprid 1.6F, Provado 1.6F or OLF)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)  
 methomyl (Lannate LV or OLF)  
 permethrin (Perm-Up, Pounce 3.2EC or OLF)  
 thiamethoxam (soil- Platinum 2SG; foliar- Actara 25WDG)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

### Aphid

On fall crop, seedling protection from aphids is important. Spray if the aphid population reaches 1 aphid/plant during the seedling stage of plant development, or >4 aphids/plant beyond the seedling stage:

acephate (Orthene 97S or OLF)  
 acetamiprid (Assail 30SG or OLF)  
 diazinon (Diazinon 4EC or OLF)  
 dimethoate (Dimate 4EC or OLF)  
 dinotefuron (soil/foliar-Venom 30SG 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)  
 pymetrozine (Fulfill 50WP)  
 spirotetremat (Movento)  
 thiamethoxam (soil- Platinum 2SG; foliar- Actara 25WDG)

### Leafminer

abamectin (Abba EC, Agri-mek EC, Temprano or OLF)  
 cyromazine (Trigard 75WSP)  
 dimethoate (Dimate 4EC or OLF)  
 dinotefuron (soil/foliar-Venom 70SG or OLF)  
 permethrin (Perm-Up, Pounce 3.2EC or OLF)

spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)

**Cabbage Looper**

*Bacillus thuringiensis* (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)

beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper or OLF)  
 chlorantraniliprole (Coragen 1.67SC)  
 cyfluthrin (Renounce 20W, Tombstone or OLF)  
 emamectin (Proclaim 5SG)  
 flubendiamide (Synapse WG)  
 gamma-cyhalothrin (Proaxis)  
 indoxycarb (Avaunt 30WDG)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II or OLF)  
 methomyl (Lannate LV or OLF)  
 methoxyfenozide (Intrepid 2F)  
 permethrin (Perm-Up, Pounce 3.2EC or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust, SpinTor or OLF)  
 tebufenozide (Confirm 2F)  
 thiodicarb (Larvin 3.2F)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

**Beet Armyworm**

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

**Corn Earworm (CEW)**

**Note.** Head lettuce seedlings, in the 7- to 18-leaf stage, are vulnerable to CEW attack in August to September. Control must be achieved before center leaves start to form a head (15- to 18-leaf stage). Apply Lannate every 2 to 5 days or permethrin every 5 to 10 days according to CEW moth populations and pest management alerts:

beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper or OLF)  
 chlorantraniliprole (Coragen 1.67SC)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 emamectin (Proclaim 5SG)  
 gamma-cyhalothrin (Proaxis)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II or OLF)  
 methomyl (Lannate LV or OLF)  
 permethrin (Perm-Up, Pounce3.2EC or OLF)  
 spinetoram (Radiant 2SC)  
 spinosad (Entrust 80W, SpinTor 2SC or OLF)  
 thiodicarb (Larvin 3.2F)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

**Tarnished Plant Bug**

This insect can cause serious damage to the fall crop; it is usually numerous where weeds abound.

carbaryl (Sevin 80S or OLF)

beta-cyfluthrin (Baythroid XL)  
 bifenthrin (Brigade EC, Sniper or OLF)  
 cyfluthrin (Renounce 20WP, Tombstone or OLF)  
 gamma-cyhalothrin (Proaxis)  
 lambda-cyhalothrin (Lambda-cy, LambdaT, Silencer, Warrior, Warrior II or OLF)  
 zeta-cypermethrin (Mustang MAX, Respect or OLF)

Pesticide	Use Category <sup>1</sup>	Hours to Reentry <sup>2</sup>	Days to Harvest			
			Head Let.	Leaf Let.	En-dive	Esca- role
<b>INSECTICIDE</b>						
abamectin(Agri-mek)R		12	7	7	7	7
acephate	G	24	21	-	-	-
acetamiprid	G	12	7	7	7	-
<i>Bacillus</i>						
<i>thuringiensis</i>	G	4	0	0	0	0
beta-cyfluthrin	R	12	0	0	0	0
bifenthrin	R	12	7	-	-	-
carbaryl	G	12	14	14	14	14
chlorantraniliprole	G	4	1	1	1	1
cyfluthrin	R	12	0	0	0	0
cyromazine	G	12	7	7	7	7
dimethoate	R	48	7	14	14	14
dinotefuran (soil)	G	12	21	21	21	21
(foliar)	G	12	7	7	7	7
emamectin	G	12	7	7	7	7
flonicamid	G	12	0	0	0	0
flubendiamide	G	12	1	1	1	1
gama-cyhalothrin	R	24	1	1	-	-
imidacloprid (soil)	G	12	21	21	21	21
imidacloprid (foliar)	G	12	7	7	7	7
indoxacarb	G	12	3	3	3	3
lambda-cyhalothrin	R	24	1	1	-	-
methomyl (<1.5 pt)	R	48	7	7	10	10
methomyl (>1.5 pt)	R	48	10	10	10	10
methoxyfenozide	G	4	1	1	1	1
permethrin	R	12	1	1	1	-
phorate	R	48	At plant application only			
pymetrozine	G	12	7	7	7	-
spinetoram	G	4	1	1	1	1
spinosad	G	4	1	1	1	1
spirotetramat	G	24	3	3	3	3
tebufenozide	G	4	7	7	7	7
thiodicarb	R	48	14	14	14	14
thiamethoxam(foliar)G		12	7	7	7	-
<b>FUNGICIDE (FRAC code)</b>						
Aliette (Group 33)	G	12,24	3	3	3	3
Botran (Group 14)	G	12	14	14	14	14
Contans WG						
(biological)	G	4	0	0	0	0
Endura (Group 7)	G	12	14	14	--	--
Forum (Group 40)	G	12	0	0	0	--
iprodione (Group 2)	G	12	14	14	14	14
maneb (Group M3)	G	12	10	10	10	10
MetaStar (Group 4)	G	48	At plant application only			
Previcur Flex						
(Group 28)	G	12	2	2	2	2
Quadris (Group 11)	G	4	0	0	0	0
Ridomil Gold						
(Group 4)	G	12	At plant application only			

(table continued next page)

Pesticide	Use Category <sup>1</sup>	Hours to Reentry <sup>2</sup>	Days to Harvest			
			Head Let.	Leaf Let.	En-dive	Esca- role
Tanos (Groups 11 + 27)	G	12	3	--	--	--
Ultra Flourish (Group 4)	G	48	At plant application only			

See Table D-6.

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

<sup>2</sup> Chemicals with multiple designations are based on product and/or formulation differences. CONSULT LABEL.

Dash (-) in table indicates pesticide is **not** labeled for that crop.

## Disease Control

### Damping-Off and Other Seedling Diseases

(See the "Disease Control in Plantbeds" section in this publication.) Apply the following in a 7-inch band after seeding or transplanting. Use formula given in the "Calibration for Changing from Broadcast to Band Application" section of Calibrating Granular Application Equipment to determine amount of Ridomil Gold or Ultra Flourish needed per acre:

mefenoxam--(Ridomil Gold--1.0-2.0 pt 4EC/A or 2.0-4.0 pt Ultra Flourish 2E/A), or  
metalaxyl (MetaStar)--4.0 to 8.0 pt 2EAG/A

At planting, application of mefenoxam or metalaxyl will also help suppress Downy mildew development.

### Big-Vein

The disease is favored by cool temperatures (<60°F) and high soil moisture conditions. Produce the crop on raised beds and avoid planting in fields with low-lying areas. Soil fumigation is helpful. Refer to the "Soil Fumigation" section for details on application.

### Corky Root

Development of the disease is favored by continual cropping and by high soil moisture conditions. Cultural practices that reduce soil compaction, such as the use of a rye cover crop and use of high beds should be considered. Limiting irrigation between transplanting or thinning should be adopted to reduce disease incidence.

### Downy Mildew

An application of mefenoxam (Ridomil Gold 4EC or Ultra Flourish 2E), or metalaxyl (MetaStar 2EAG) for damping-off will assist in control of downy mildew. See "Damping-Off and Other Seedling Diseases" above for use pattern. Use one of the following during periods of high moisture and moderate temperatures.

#### Alternate:

maneb--1.5-2.0 lb 75DF/A (7 to 10-day schedule) or OLF, or  
Aliette--3.0 lb 80WDG/A (14-day schedule)

#### With one of the following FRAC code 40 tank mixes:

Revus--8.0 fl. oz 2.08SC/A plus 1.5-2.0 lb maneb 75DF/A,  
or  
Forum--6.0 fl oz 4.18SC/A plus 1.5-2.0 lb maneb 75DF/A

#### or one of the following FRAC code 11 tank mixes:

Quadris--6.0-15.5 fl oz 2.08SC/A plus 1.5-2.0 lb maneb  
75DF/A, or

Tanos--8.0 oz 50W/A plus 1.5-2.0 lb maneb 75DF/A, or  
Previcur Flex--1.33 pt 6F/A plus 1.5-2.0 lb maneb 75DF/A

### Leaf Spots

When conditions favor disease development, alternate the following and repeat every 7 to 14 days:

Quadris--6.0-15.5 fl oz 2.08SC/A, or  
maneb--1.5-2.0 lb 75DF/A or OLF

### Bottom Rot (Rhizoctonia)

A midsummer application of a soil fumigant will be beneficial for the fall crop (Refer to "Soil Fumigation" section for details on materials and application techniques). For the spring and fall crops, all fields should receive one of the following fungicide applicationx one week after transplanting or thinning and 10 and 20 days later:

Endura--8.0-11.0 oz 70W/A, or  
iprodione--1.5-2.0 lb 50WP/A or OLF

### Lettuce Drop (Sclerotinia)

Use one of the following at seeding, transplanting and/or thinning (see labels for restrictions):

iprodione--1.5-2.0 lb 50WP/A or OLF, or  
Endura--8.0-11.0 oz 70WG/A, or  
Botran--2.0-5.5 lb 75WP/A

*Preplant:* The following biological fungicide has been tested in some states; but only limited information is available on effectiveness in the Mid-Atlantic region. Apply 3 to 4 months prior to the anticipated 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 or transplanting lettuce to avoid untreated sclerotia in lower soil layers from infesting the upper soil layer.

Contans--2.0-4.0 lb 5.3WG/A

### Gray Mold (Botrytis)

Gray mold is most troublesome in plant beds where air movement is poor. Avoid overcrowding plants and water early in the day to help reduce leaf wetness overnight. Use one of the following as a foliar spray:

Botran--3.0 tbsp 75WP/gal, or  
iprodione--2.0 tbsp 50WP/gal or OLF

### Yellows

Control leafhopper vectors with insecticides. Refer to the preceding "Leafhopper" section under Insect Control.

### Viruses

*LMV* (lettuce mosaic virus): Use virus-free or MT lettuce seed.

*TuMV* (turnip mosaic virus): Troublesome in late summer and early fall plantings. Control weed hosts around risers and areas bordering fields.

### Tomato Spotted Wilt Virus (TSWV)

TSWV is spread from flowering ornamental plants (flowers) to lettuce by thrips. Do not grow any ornamental bedding plants in the same greenhouse as lettuce transplants. Scout and monitor for greenhouse thrips regularly and begin an insecticide control program once observed.