



This is a section from the

2018

Mid-Atlantic

Commercial Vegetable

Production Recommendations

The manual, which is published annually, is **NOT** for home gardener use.

The **full manual**, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section:

<http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>.

The **label** is a legally-binding contract between the user and the manufacturer. The user must follow all rates and restrictions as per label directions. The use of any pesticide inconsistent with the label directions is a violation of Federal law.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

F. Commodity Recommendations

Pesticide Use Disclaimer

THE LABEL IS THE LAW

Before using a pesticide, check the label for up to date rates and restrictions.

Labels can be downloaded from: <http://www.cdms.net/>, <http://www.greenbook.net/> or <http://www.agrian.com/labelcenter/results.cfm>

Guide to the Recommended Pesticide Tables in the Following Crop Chapters:

1. Pesticides are listed by **group or code number based on chemical structure and mode of action**, as classified by the Weed Science Society of America (WSSA) for herbicides, the Insecticide Resistance Action Committee (IRAC) for insecticides, and the Fungicide Resistance Action Committee (FRAC) for fungicides.
If the number is in bold font, the product may have resistance concerns.
2. For **restricted use pesticides**, the restricted active ingredients are labeled with a *. See the Pesticide Safety chapter for more information.
3. **In addition to the pesticides listed below, other formulations or brands with the same active ingredient(s) may be available. ALWAYS CHECK THE LABEL:**
 - a) to ensure a pesticide is labeled for the same use,
 - b) to ensure the pesticide is labeled for the desired crop, and
 - c) for additional restrictions.
4. All pesticide recommendations are made for spraying a **broadcast area of 1 acre** (43,560 square feet). **Adjust the rate for banded applications** (for more information, see the Pest Management chapter, Calibrating Granular Applicators section).
5. Check the label for 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 crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Potatoes

Recommended Varieties

Maturity Group	Varieties ^{1,2}	Table Stock ³	Chipping ³	Yield ³	Spacing (in.)
Early	Andover	+++	+++	+	9-10
	Dark Red Norland D	++	No	+	8-10
	Envol	+++	No	++	8-10
	Michigan Purple (purple skin)	++	No	++	8-10
	Superior (SR, VS)	+++	+	++	8-12
	Vivaldi (yellow flesh)	+++	No	++	8-10
Midseason	Atlantic ⁴	No	+++	+++	7- 9
	Chieftain (red skin)	++	No	++	7- 9
	Dakota Crisp	++	+++	+++	8-10
	Eva	++	++	++	8-10
	Harley Blackwell	++	+++	++	9-12
	King Harry (for organic production)	++	--	++	8-10
	Kueka Gold (pale yellow flesh)	++	+	+++	9-10
	NorDonna (red skin)	++	No	++	9-12
	Norkotah Russet	++	No	+	9-12
	Peter Wilcox (purple skin/yellow flesh)	++	No	++	8-10
	Purple Majesty (purple skin/purple flesh)	++	++	++	9-12
	Reba ⁵	+++	++	++	7- 9
	Yukon Gold ⁵ (yellow flesh)	+++	No	++	8-10
Late	Gold Rush	+++	No	++	8-10
	Katahdin (LR)	++	No	+++	8-10
	Kennebec (VS, LBT) (not for eastern VA)	++	No	+++	7-10
	Lehigh (yellow flesh)	+++	++	+++	8-10
	Marcy	++	+++	+++	7- 9
	Snowden (for chips only)	No	+++	++	8-10

¹Listed alphabetically within maturity group.

²Letters in parentheses indicate disease resistance: LR=leaf roll resistant, LBT=Leaf Blight Tolerant, SR=Scab Resistant, VS=Verticillium Wilt Susceptible.

³+ = fair, ++ = good, +++ = excellent.

⁴Tubers are extremely susceptible to internal necrosis and hollow heart.

⁵Tubers are susceptible to hollow heart during cool growing seasons. Apply one-third of the N at planting and sidedress the remainder when plants are 4-6 inches tall to help reduce hollow heart.

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 the Soil and Nutrient Management chapter. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede recommendations found below.

White Potatoes	N (lb/A)	Soil Phosphorus Level				Soil Potassium Level				Nutrient Timing and Method
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
	150-180 ¹	200	150	100	0 ²	300	200	100	0 ²	Total nutrient recommended
	50	200	150	100	0 ²	300	200	100	0 ²	Broadcast and disk-in
	100	0	0	0	0	0	0	0	0	Sidedress 4-5 weeks after planting
	0-30 ¹	0	0	0	0	0	0	0	0	Adjust rate based on petiole nitrate testing at flowering

Apply 1 lb/A of boron (B) with broadcast fertilizer; see also Table B-7 in the Soil and Nutrient Management chapter. ¹For high yielding crop systems (>250 cwt/A), an extra split N application at flowering may be useful. Consult "Nitrogen Management for White Potato Production" at: <http://pubs.ext.vt.edu/438/438-012/438-012.html>. ²In VA, crop replacement values of 50 lb/A of P₂O₅ and 50 lb/A of K₂O are recommended on soils testing Very High.

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 Potato Tissue Test Values For Most Recently Matured Leaves													
Timing	Value	N	P	K	Ca	Mg	S	Fe	Mn	Zn	B	Cu	Mo
		%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
Row Closure	Deficient	<3.0	0.2	3.5	0.6	0.3	0.3	<40	30	30	20	5	0.1
	Adequate range	3	0.2	3.5	0.6	0.3	0.3	40	30	30	20	5	0.1
		6	0.8	6	2	0.6	0.5	150	60	60	60	10	0.2
	High	>6.0	0.8	6	2	0.6	0.5	>150	60	60	30	10	-
	Toxic (>)	-	-	-	-	-	-	-	-	-	-	-	-
First Blossom	Deficient	<3.0	0.2	3	0.6	0.25	0.2	<40	30	30	20	5	0.1
	Adequate range	3	0.2	3	0.6	0.25	0.2	40	30	30	20	5	0.1
		4	0.5	5	2	0.6	0.5	150	100	60	30	10	0.2
	High	>4.0	0.5	5	2	0.6	0.5	>150	100	60	30	10	-
	Toxic (>)	-	-	-	-	-	-	-	-	-	-	-	-
Tubers Half Size	Deficient	<2.0	0.2	2.5	0.6	0.25	0.2	<40	20	30	20	5	0.1
	Adequate range	2	0.2	2.5	0.6	0.25	0.2	40	20	30	20	5	0.1
		4	0.4	4	2	0.6	0.5	150	100	60	30	10	0.2
	High	>4.0	0.4	4	2	0.6	0.5	>150	100	60	30	10	-
	Toxic (>)	<3.0	0.2	3.5	0.6	0.3	0.3	-	-	-	-	-	-

Variety Selection

Consider market preferences, variety adaptation to local conditions and specific field problems. Use certified, disease-free “seed” (tuber or piece used for planting) of good quality from reputable source to maximize yield and quality. Depending on variety, production area and market, crop takes 90 to 160 days to mature and harvest.

Site Selection, Soil and Fertilization

The best soils are well-drained, deep, well aerated, sandy and sandy loam soils high in organic matter (especially muck soils). Avoid heavy soils and soils that adhere to tubers. Use crop rotation to decrease the incidence of soil-borne diseases. Avoid fields that have had potatoes in the past 2 years, and those with high nematode populations. Test the soil for nematodes and fertility. Optimum soil pH is 5.5 to 6.5. All P and K can be applied before planting. Split the recommended N (See table: Recommended Nutrients Based on Soil Tests above).

Seed-Piece Treatment Use certified seed. See Disease Control below.

Planting and Spacing

The recommended planting dates are March 10 to April 5 in MD and VA, March 20 to April 15 in DE, March 20 to April 25 in NJ, and March 25 to June 5 in PA. Space seed 7 to 12 inches apart in 34 or 36-inch rows. Use close spacing for large, cut seed pieces and wider spacing for whole (B-size) seed. Use close spacing for potatoes that are to be marketed in 5 and 10-pound consumer packs, and for ‘Katahdin’ and ‘Kennebec’, which tend to produce few oversized tubers.

Harvest and Storage Considerations

Monitor environmental conditions prior to harvest to determine potential incidence of a disorder associated with adverse conditions (see Common Physiological Disorders below). Consider the susceptibility-tolerance to these disorders when selecting varieties. Preharvest conditioning in potato is critical to set the skin and facilitate harvest. In early harvests, vine killing can hasten or improve skin set on relatively immature potatoes, thus reducing tuber damage during harvest, grading, packing and shipping. Tubers stop growing after vine killing and proper skin set improves shelf life, promotes retention of potato quality during transport, and improves eye appeal. Chemical vine killing is the most common method (see Vine Killing below), but mechanical vine killing (mowing) is also used. Vines of potatoes going into storage should be completely dead at least 14-21 days before harvest. Use potato chain diggers or other means of bulk-harvest with appropriate design to reduce bruises. After harvest, healing of cuts and bruises is most rapid at 50-60°F (10-16°C) tuber temperature and 90-95% relative humidity without water condensation. This temperature should be maintained 2-3 weeks at the beginning of the storage period. The

temperature should then be lowered to 40°F (4°C) for table stock or seed potatoes. Potatoes for processing are stored at 45-50°F (7-10°C), but if a rot-producing agent such as field frost, late blight, or soft rot is present, the curing period should be eliminated, air flow increased, and the temperature lowered to 45°F (7°C) as soon as possible. Monitor the storage daily and, if the rot continues, sell the crop immediately.

Common Physiological Disorders

Disorders that are associated with adverse environmental conditions or cultural practices are listed below.

Disorder	Primary Cause	Occurrence	Market Effect
Blackheart	low oxygen, wet soil	bulking, storage	quality, poor processing
Brown center and hollow heart	rapid growth after stress	early to mid-bulking	quality, poor processing
Chaining	hot soil	mid-bulking	yield (size)
Chilling, Freezing	low temperature	harvest, storage	quality, yield prone to rots
Deformation	growth stops and go	bulking	quality
Greening	light	bulking, storage	quality
Growth crack	wet/dry soil	bulking	quality
Heat necrosis	heat, acid soil (low Ca)	harvest	quality, yield, poor processing
Heat and hair sprouting	hot soil	late bulking, early storage	quality, yield, poor processing
Internal sprouting	piling, sprout inhibition	storage	quality, poor seed
Jelly End, Glassy End	fast vine death, low moisture	harvest	poor processing
Swollen lenticel	wet soil	bulking, harvest	storage rots
Vascular discoloration	fast vine death, low moisture	harvest	poor processing

Air Pollution

Symptoms appear as tiny spots of brown tissue on the upper surface of leaves and a bronzing of the lower surfaces. Some varieties (*e.g.*, Snowden) are particularly sensitive.

Vine Killing

Vine desiccation facilitates harvesting by reducing potato and weed foliage. Decisions as to when to apply vine desiccants are based on market, demand for a given size and the need for high quality, non-skinned tubers.

Group	Product Name	Product Rate	Active Ingredient (*=Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
10	Rely 280 2.34L	21 fl oz/A	glufosinate	0.38 lb/A	9	12
-Apply at the beginning of natural vine senescence in a single application; cover vines thoroughly. - Do not apply to potatoes grown for seed. Do not plant treated areas with wheat, barley and other small grains until 30 or more days after application. Refer to label for rotational restrictions. Presence of heavy or dense vines may require an application of another desiccation product (<i>i.e.</i> Reglone). Rainfastness is 4 hrs. Do not apply more than 1 application per harvest.						
22	Reglone 2SL	1 to 2 pt/A	diquat	0.25 to 0.5 lb/A	7	24
-Add a non-ionic surfactant 0.5% v/v (2 qt/100 gal). Ground application in a minimum of 20 gal/A of water. - Do not apply to drought stressed potatoes. If a second application is necessary, allow at least 5 days between applications. -Rainfastness is 30 minutes. Maximum application of Reglone per season is 4 pt/A						

Other Labeled Products These products are labeled but limited local data is available; and/or are labeled but not recommended in our region due to potential crop injury concerns.

Group	Product Name	Active Ingredient (*=Restricted Use)
14	Aim	carfentrazone
14	Vida	pyraflufen
22	Generic paraquat	paraquat*

Sprout Inhibitors

Group	Product Name	Product Rate	Active Ingredient (*=Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
--	Sprout Nip 3EC	Apply at 1% emulsion	chlorpropham	0.01 lbs ai/1100 lbs potatoes	--	--
-Refer to label for respirator and other PPE requirements. Do not use on seed potatoes. -Use to treat potatoes after storage and washing; use only after bruises and cuts have healed (normally a minimum of 2 weeks) -Use at 1% emulsion by diluting 1 gallon of Sprout Nip 3EC to 35 gallons of water. -Apply at rate of 1 qt of 1% emulsion per 20 bags of potatoes (100 lbs/bag) -Spray uniformly across rollers moving the potatoes.						

Weed Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

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-2) in the Pest Management chapter.
2. Minimize herbicide resistance development. Identify the herbicide site mode of action group and follow recommended good management practices. Include non-chemical weed control whenever possible.

1. Non-Selective or Burndown						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
9	Roundup PowerMax 4.5L "Generic" glyphosate 3L	16 to 32 fl oz/A 24 to 48 fl oz/A	glyphosate	0.75 to 1.10 lb acid equivalent/A	--	4
-Apply prior to planting. Some glyphosate formulations may require an adjuvant, refer to label. -Glyphosate controls many perennial weeds as well as annuals if applied when the weed is actively growing and has reached the stage of growth listed on the label. Repeat applications are allowed, with maximum application of 5.3 qts per acre per year.						
22	Gramoxone SL 2.0	1 to 2 pt/A	paraquat*	0.25 to 0.5 lb/A	--	24
-Apply up to ground cracking, before potato has emerged. Always include an adjuvant (nonionic surfactant or crop oil concentrate). -Tank mix with appropriate herbicides for residual weed control. Paraquat may not control established grasses. Spray coverage is essential for optimum control. Rainfastness 30 minutes. A maximum of 3 applications per year are allowed.						

2. Soil-Applied (Preemergence/Drag-Off)						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
2	Matrix 25DF	1.0 to 1.5 oz/A	rimsulfuron	0.0156 to 0.023 lb/A	60	4
-Apply immediately after hilling or drag-off. -Apply with nonionic surfactant at 0.25% v/v (1.0 qt/100 gal of spray solution) if weeds are emerged at time of application. -Controls many weeds including foxtail species, pigweed species, wild mustard, and wild radish. Suppresses common lambsquarters, common ragweed, jimsonweed, morningglory species, and yellow nutsedge. Tank mix with other residual products to improve spectrum of weed control. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. -Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. -Repeated applications may be needed to control certain perennial grasses. -Temporary chlorosis may occur to potatoes under stress from drought, cold temperatures, high temperatures, or extreme temperature variations. - Do not tank-mix with or apply within 1 week before or after any pesticide unless labeled. The risk of crop injury may be increased, or reduced control of grasses may result. Matrix 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. Maximum for Matrix: 2.5 oz/A per year.						
3	Prowl H2O 3.8CS	1.5 to 3.0 pt/A	pendimethalin	0.71 to 1.43 lb/A	--	24
-Apply preemergence after planting, but before potatoes and weeds emerge, or after drag-off. -Activity of Prowl H2O is improved by incorporation. Apply preemergence incorporated after planting but before potatoes and weeds emerge. Where drag-off is practiced, apply and incorporate before, at, or after drag-off, but before potatoes and weeds emerge. -Ensure incorporation equipment does not damage seed pieces or elongating sprouts. -Prowl H2O controls certain broadleaf weeds and annual grasses. Does not control yellow nutsedge. -Use lower rates on coarse-textured soils with < 3% organic matter and higher rates on medium- and fine-textured soil with > 3% organic matter. Tank mix with appropriate postemergence herbicides if weeds are emerged at time of application. Tank-mix with other residual herbicides such as Lorox or Metribuzin to improve broadleaf control. -Application to 'White Rose' variety during or followed by cool and/or wet conditions may result in crop injury. -A maximum of 1 application per season is allowed.						
5	Metribuzin 75DF	0.5 to 0.66 lb/A	metribuzin	0.38 to 0.5 lb/A	60	12
-Apply just prior to emergence or after drag-off. Metribuzin primarily controls broadleaf weeds and is weak on grasses. -Tank mix with Dual Magnum or Prowl H2O, or use in addition to Eptam for preemergence annual grass control. -A pre-mix of Dual Magnum and Metribuzin is sold under the trade name Boundary. -Metribuzin has some postemergence activity. To get consistent control, apply Metribuzin before weeds are 1 inch tall. -Tank mix with appropriate postemergence herbicides if weeds are emerged at time of application. -Preemergence application to 'Atlantic' and 'Norland' or to any early maturing, smooth, white- or red-skinned potato varieties, may cause crop injury, especially under adverse weather conditions and when higher labeled rates are used. -'Atlantic', 'Bellchip', 'Centennial', 'Chipbell', and 'Shepody' are sensitive to Metribuzin and may be injured by preemergence applications under adverse weather conditions on coars soils, under high soil pH, with higher rates, and with mechanical incorporation. -Maximum for Metribuzin 75DF: May be applied once preemergence and once postemergence. Do not exceed 1.33 lb/A per season.						

2. Soil-Applied (Preemergence/Drag-Off) continued on next page

2. Soil-Applied (Preemergence/Drag-Off) - continued

7	Lorox 50DF Linex 4L	0.8 to 2.0 lb/A 0.75 to 2 pt/A	linuron	0.4 to 1.0 lb/A	--	24
<p>-Apply just prior to emergence or after drag-off.</p> <p>-Primarily controls broadleaf weeds and is weak on grasses. Tank mix with Dual Magnum for preemergence annual grass control.</p> <p>-Use lower rates on coarse-textured soil low in organic matter and higher rates on medium- or fine-textured soils with greater organic matter. Linuron has some postemergence activity. To get consistent control, apply just before or when weed seedlings emerge. If weeds are emerged add a nonionic surfactant at 0.5% v/v (2 qt/100 gal spray solution).</p> <p>-Maximum for Lorox: 3 lb/A per year. Maximum for Linex: 3 pt/A per year.</p>						
8	Eptam 7E	3.4 to 5.1 pt/A	EPTC	3.0 to 4.5 lb/A	30	12
<p>-Apply at one of the following timings: 1) just before planting and disking. For plantings before April 1, Eptam may reduce early vigor and yields slightly; 2) just after drag-off and incorporate with 1 or 2 cultivations by a spike-tooth harrow or similar piece of equipment; and 3) just before first or second cultivation.</p> <p>-Eptam controls annual grasses, yellow nutsedge, and a few broadleaf weeds. Tank mix with Lorox or Metribuzin to improve broadleaf weed control. Maximum for Eptam: 14 pt/A per season.</p>						
14	Chateau 51WDG	1.5 oz/A	flumioxazin	0.048 lb/A	--	12
<p>-A Supplemental Label has been approved for the use of Chateau on potato in DE, MD, NJ and VA.</p> <p>-Apply preemergence after hilling or drag-off. Chateau primarily controls broadleaf weeds and is weak on grasses.</p> <p>-Tank mix with Dual Magnum, Prowl H2O, or use in addition to Eptam for preemergence annual grass control.</p> <p>-A minimum of 2 inches of soil must cover potato shoots at time of application; less than 2 inches of soil may result in crop injury.</p> <p>-Maximum Chateau: 1.5 oz/A per single application; 1.5 oz/A per growing season.</p>						
14	Reflex 2SL	0.75 to 1.0 pt/A	fomesafen	0.188 to 0.25 lb/A	70	24
<p>-Apply after planting but before potato emergence.</p> <p>-DO NOT preplant incorporate nor apply to emerged potatoes or severe injury will occur.</p> <p>-Reflex primarily controls broadleaf weeds and is weak on grasses.</p> <p>-Tank mix with Dual Magnum, Prowl H2O, or use in addition to Eptam for preemergence annual grass control.</p> <p>-Reflex has postemergence activity. To get consistent control, apply before weeds reach 4 inches.</p> <p>-Potato varieties vary in response to Reflex. Determine crop tolerance before using.</p> <p>-Maximum for Reflex 2SL: 1 pt/A per season on potatoes. Maximum fomesafen for all crops: NJ and most of PA 0.313 lb/A in alternate years; DE, MD, VA, and parts of PA 0.375 lb/A in alternate years.</p>						
15	Dual Magnum 7.62E	1.0 to 2.0 pt/A	s-metolachlor	0.96 to 1.91 lb/A	60	24
<p>-Apply preplant incorporated, postplant incorporated up to drag-off, preemergence, delayed preemergence, or after drag-off prior to emergence of potatoes and weeds. If incorporate, use appropriate equipment to evenly distribute the herbicide into the top 2 to 3 inches of soil. Ensure incorporation equipment does not damage seed pieces or elongating sprouts.</p> <p>-Dual Magnum controls most annual grasses (except Texas panicum), small seeded broadleaf weeds, and suppresses yellow nutsedge.</p> <p>-Tank mix with Lorox or Metribuzin for additional broadleaf weed control.</p> <p>-A pre-mix of Dual Magnum and Metribuzin is sold under the trade name Boundary.</p> <p>-If cool, wet soil conditions occur after application, s-metolachlor may delay maturity and/or reduce yield of 'Superior' and other early maturing potato varieties. DO NOT use on muck or peat soils. DO NOT apply both a preemergence and an incorporated treatment.</p> <p>-Maximum for Dual Magnum: 3.6 pt/A per crop season.</p>						

2. Postemergence

Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
1	Select 2EC Select Max 0.97EC	6 to 8 fl oz/A 9 to 16 fl oz/A	clethodim	0.07 to 0.12 lb/A	30	24
1	Poast 1.5EC	1.0 to 2.5 pt/A	sethoxydim	0.2 to 0.47 lb/A	30	12
<p>-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: Apply with COC at 1.0% v/v.</p> <p>-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 nonionic surfactant when grasses are small and soil moisture is adequate.</p> <p>-Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control.</p> <p>-Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will not be controlled.</p> <p>-Controls many annual and certain perennial grasses, including annual bluegrass, but will not consistently control goosegrass. Control may be reduced if grasses are large or under hot or dry weather conditions.</p> <p>-If repeat applications are necessary, allow 14 days between applications.</p> <p>-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.</p> <p>-Rainfastness 1 hr.</p> <p>-Do not apply more than 8 fl oz of Select 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.</p> <p>-Do not apply more than 2.5 pt/A Poast in single application and do not exceed 5 pt/A for the season.</p>						

2. Postemergence continued on next page

F Potatoes

2. Postemergence - continued

2	Matrix 25DF	1.0 to 1.5 oz/A	rimsulfuron	0.0156 to 0.023 lb/A	60	4
<p>-Apply early postemergence; typically weeds at 1 inch tall or less; crop stage is not defined on label.</p> <p>-Apply with nonionic surfactant at 0.25% v/v (1.0 qt/100 gal of spray solution).</p> <p>-Controls many small weeds including foxtail species, pigweed species, wild mustard, and wild radish. Suppresses common lambsquarters, common ragweed, jimsonweed, morningglory species, and yellow nutsedge.</p> <p>-Temporary chlorosis may occur to potatoes under stress from drought, cold temperatures, high temperatures, or extreme temperature variations.</p> <p>-Matrix provides both residual and postemergence control of susceptible weed species. Matrix 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.</p> <p>-Rainfastness is 4 hrs. Maximum for Matrix: 2.5 oz/A per year.</p>						
5	Metribuzin 75DF	0.33 to 0.66 lb/A	metribuzin	0.25 to 0.50 lb/A	60	12
<p>-Apply just prior to emergence or after drag-off. Metribuzin primarily controls broadleaf weeds and is weak on grasses.</p> <p>-Tank mix with Dual Magnum or Prowl H2O, or use in addition to Eptam for preemergence annual grass control.</p> <p>-Metribuzin has some postemergence activity. To get consistent control, apply Metribuzin before weeds are 1 inch tall.</p> <p>-Tank mix with appropriate postemergence herbicides if weeds are emerged at time of application.</p> <p>-Postemergence application can used only on russet or white-skinned varieties that are not early maturing.</p> <p>DO NOT use on red-skinned or early maturing, smooth, white-skinned varieties.</p> <p>-Potato varieties vary in sensitivity to Metribuzin. Determine tolerance on a trial basis before using on field scale. 'Atlantic', 'Bellchip', 'Centennial', 'Chipbell', and 'Shepody' are sensitive to Metribuzin. Avoid postemergence applications to these varieties.</p> <p>-Apply only if there have been at least three successive sunny days prior to application. May cause some chlorosis or minor necrosis.</p> <p>-Maximum for Metribuzin: 0.66 lb/A postemergence. May be applied once preemergence and once postemergence.</p> <p>-Do not exceed 1.33 lb/A per season. Rainfastness is 6 hrs.</p>						

3. Postharvest

Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
22	Gramoxone SL 2.0	2.25 to 3 pt/A	paraquat*	0.56 to 0.75 lb/A	--	24
<p>-A Special Local-Needs 24© label has been approved for the use of Gramoxone SL 2.0 for postharvest crop desiccation in DE, NJ and VA. Apply after the last harvest. Always include an adjuvant. Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings. Rainfastness 30 minutes. A maximum of 2 applications for crop desiccation are allowed.</p>						

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	Active Ingredient (* = Restricted Use)
3	Treflan	trifluralin
15	Outlook	dimethenamid

Insect Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

Recommended Insecticides

Soil Pests

Wireworms See also the Pest Management chapter (Insect Management section).

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Preplant Application: Broadcast and incorporate just before planting.						
1B	Mocap EC	2/3 to 1.0 gal/A	ethoprop*	n/a	48	H
3A	Bifenture EC, Sniper, Sniper Helios	19.2 fl oz/A	bifenthrin*	n/a	12	H
3A	Capture LFR, Sniper LFR	12.75 to 25.5 fl oz/A	bifenthrin*	n/a	12	H
Planting Application						
1B	Mocap EC	2/3 to 1.0 gal/A	ethoprop*	AP	48	H
1B	Thimet 20G	8.5 to 11.3 oz/1000 ft at planting and post-emergence light or sandy soils; 13.0 to 17.3 oz/1000 ft at planting only heavy or clay soils	phorate*	90	48	H

Wireworms continued on next page

Wireworms Planting Application - continued

2B	Regent 4SC	2.9 to 3.2 fl oz/A (see label for rate based on row spacing)	fipronil	90	0	H
3A+4A	Brigadier	16.0 to 25.6 fl oz/A	bifenthrin*+imidacloprid	21	12	H
3A+4A	Swagger	32.0 to 51.2 fl oz/A	bifenthrin*+imidacloprid	21	12	H
3A	Bifenture EC, Sniper, Sniper Helios	19.2 fl oz/A	bifenthrin*	21	12	H
3A	Capture LFR, Sniper LFR	12.75 to 25.5 fl oz/A	bifenthrin*	21	12	H
Lay-by Application						
3A	Bifenture EC, Sniper, Sniper Helios	3.2 to 9.6 fl oz/A	bifenthrin*	21	12	H
3A	Capture LFR, Sniper LFR	12.75 to 25.5 fl oz/A	bifenthrin*	21	12	H

Above-ground Pests**Aphids**

Insecticide treatments are recommended when aphid counts exceed 2 per leaf prior to bloom, 4 per leaf during bloom, and 10 per leaf within 2 weeks of vine kill.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV	1.5 to 3.0 pt/A	methomyl*	6	48	H
1A	Vydate L	2.0 to 4.0 pt/A	oxamyl*	7	48	H
1B	Dimethoate 400 / 4EC	0.5 to 1.0 pt/A	dimethoate*	0	48	H
3A + 4A	Brigadier	16.0 to 25.6 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A + 4A	Brigadier	3.8 to 6.14 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A + 4A	Leverage 360	2.8 fl oz/A	imidacloprid + beta-cyfluthrin*	7	12	H
3A + 4A	Swagger	32.0 to 51.2 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A + 4A	Swagger	7.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A	Hero EC	4.0 to 10.3 fl oz/A	zeta-cypermethrin* + bifenthrin*	21	12	H
4A	Admire Pro	5.7 to 8.7 fl oz/A	imidacloprid - soil	AP	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid - foliar	7	12	H
4A	Assail 30SG	2.5 to 4.0 oz/A	acetamiprid	7	12	M
4A	Belay	9.0 to 12.0 fl oz/A	chlorothianidin - soil	AP	12	H
4A	Belay	2.0 to 3.0 fl oz/A	chlorothianidin - foliar	14	12	H
4A	Platinum 75SG	1.66 to 2.67 oz/A	thiamethoxam - soil	AP	12	H
4A	Actara 25WDG	3.0 oz/A	thiamethoxam - foliar	14	12	H
4A + 28	Voliam Flexi	4.0 oz/A	thiamethoxam + chlorantraniliprole - foliar	14	12	H
4D	Sivanto 200SL	7.0 to 10.5 fl oz/A	flupyradifurone - foliar	7	4	L
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone - foliar	7	4	L
4H	Transform WG	0.75 to 1.5 oz/A	sulfoxaflor	7	24	H
9B	Fulfill 50WDG	2.75 to 5.5 oz/A	pymetrozine	14	12	L
9C	Beleaf 50SG	2.0 to 2.8 oz/A	flonicamid	7	12	L
23	Movento	4.0 to 5.0 fl oz/A	spirotetramat	7	24	L
28 + 3	Minecto Pro	10.0 fl oz/A	cyantraniliprole + abamectin*	14	12	H
n/a	Requiem 25EC	2.0 to 3.0 qt/A	<i>Chenopodium</i> extract (biopesticide)	0	4	L

Colorado Potato Beetles (CPB) - Pesticide Resistance Management

Do not rely exclusively on the neonicotinoid class of insecticides (Class 4: Actara, Assail, Cruiser, Gaucho, imidacloprid, Leverage 360, Platinum, Scorpion, or Venom) for CPB control. It is important to use all available effective pest management strategies, including crop rotation, pest scouting, treatment thresholds, and alternative (different class) insecticides, such as abamectin* (Agri-Mek), Avaunt plus PBO, Blackhawk, Coragen, Entrust, Radiant, Rimon, Verimark, Voliam Xpress, or Vydate.

For rotated fields adjacent to CPB overwintering sites or to previous year's potato fields, most of the colonizing adults can be killed by treating only a strip of rows along the field edge where the invasion front is expected. Fields should still be monitored for beetles and other insect pests throughout the season.

DO NOT use foliar applications of any neonicotinoid insecticide (clothianidin, imidacloprid, thiamethoxam, dinotefuron, acetamiprid) in fields previously treated with seed-treatment or at-planting neonicotinoids.

F Potatoes

Colorado Potato Beetles - continued

Apply one of the following formulations. Preplant or planting application.						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A + 4A	Brigadier	16.0 to 25.6 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A + 4A	Swagger	32.0 to 51.2 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
4A	Admire Pro	5.7 to 8.7 fl oz/A	imidacloprid - soil	AP	12	H
4A	Belay	9.0 to 12.0 fl oz/A	clothianidin - soil	AP	12	H
4A	Imidacloprid 2F	13.0 to 20.0 fl oz/A	imidacloprid - soil	AP	12	H
4A	Platinum 75SG	1.66 to 2.67 oz/A	thiamethoxam - soil	AP	12	H
4A	Scorpion 35SL	11.5 to 13.25 fl oz/A	dinotefuran - soil	AP	12	H
4A	Venom 70SG	11.5 to 13.25 fl oz/A	dinotefuran - soil	AP	12	H
28	Verimark	6.75 to 13.5 fl oz/A	cyantraniliprole - soil	AP	4	H

Colorado Potato Beetles - Postemergence Application

Rotation to non-solanaceous crops (crops other than potato, tomato, eggplant, and pepper) is extremely important in reducing CPB problems. Avoid applying late-season sprays to prevent the buildup of insecticide-resistant beetles.

Beginning at plant emergence, sample fields weekly for CPB to determine the need to spray. Select at least 10 sites per field along a V- or W-shaped path throughout the field. At each site, select 1 stem from each of 5 adjacent plants and count and record all adults, large larvae (larger than half-grown), and small larvae (smaller than half-grown). If more than 50 adults or 75 large larvae or 200 small larvae are counted per 50 stems, treatment is recommended. Yield loss as a result of CPB feeding depends on the age of the potato plant. 'Superior' variety (short season) cannot compensate for early season defoliation by overwintered beetles, but during the last 30 days of the season, 'Superior' can withstand up to 50% defoliation without yield loss.

Note: Several of these insecticides may no longer be effective in certain areas due to CPB resistance. Check with your county Extension agent for most effective control.

Apply one of the following formulations. Postemergence application.						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Vydate L	1.0 to 4.0 pt/A	oxamyl*	7	48	H
1B	Imidan 70W	1 1/3 lb/A	phosmet	7	120	H
3A+4A	Brigadier	4.8 to 6.14 fl oz/A	bifenthrin* + imidacloprid	21	12	H
3A+4A	Leverage 360	2.8 fl oz/A	imidacloprid + bifenthrin*	7	12	H
3A+4A	Swagger	9.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid	21	12	H
3A+28	Besiege	6.0 to 9.0 fl oz/A	lambda-cyhalothrin* + chlorantraniliprole	14	24	H
3A+4A	Endigo ZC	3.5 to 4.0 fl oz/A	lambda-cyhalothrin* + thiamethoxam	14	24	H
4A	Actara 25WDG	1.5 to 3.0 fl oz/A	thiamethoxam	14	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid	7	12	H
4A	Assail 30SG	1.5 to 4.0 oz/A	acetamiprid	7	12	H
4A	Belay	2.0 to 3.0 fl oz/A	chlothianidin	14	12	H
4A	Scorpion 35SL	2.0 to 2.75 fl oz/A	dinotefuran	7	12	H
4A	Venom 70SG	1.0 to 1.5 oz/A	dinotefuran	7	12	H
4A + 28	Voliam Flexi	4.0 oz/A	thiamethoxam + chlorantraniliprole	14	12	H
4D	Sivanto 200SL, Sivanto Prime	10.5 to 14.0 fl oz/A	flupyradifurone	7	4	L
5	Blackhawk	1.7 to 3.3 fl oz/A	spinosad	7	4	M
5	Radiant SC	4.5 to 8.0 fl oz/A	spinetoram	7	4	H
6	Agri-Mek 0.7SC	1.75 to 3.5 fl oz/A	abamectin*	14	48	H
11	Trident (OMRI)	3.0 to 6.0 qt/A	<i>Bacillus thuringiensis tenebrionis</i>	0	0	L
15	Rimon 0.83EC	6.0 to 12.0 fl oz/A	novaluron	14	12	H
17	Trigard	2.66 oz/A	cyromazine	7	12	L
22	Avaunt 30WDG	3.5 to 6.0 oz/A	Indoxacarb - addition of the synergist piperonyl butoxide (PBO) is needed	7	12	H
28	Coragen 1.67SC	3.5 to 7.5 fl oz/A	chlorantraniliprole	14	4	L
28	Exirel	5.0 to 13.5 fl oz/A	cyantraniliprole	7	12	H
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	14	12	H
n/a	Azatin O, AzaDirect, Ecozin, Neemis (OMRI)	Refer to individual labels for rates	azadirachtin (biopesticide)	0	4	N

Cutworms - See also the Pest Management chapter, Insect Management section.

Present during July and August. Especially troublesome to tubers where soil cracking occurs. Variegated cutworms feed on lower leaves and petioles, and protective sprays should be applied if numbers exceed 6 worms per plant or foliar loss is more than 10%. Black cutworms are largely underground feeders, but will occasionally feed on leaves.

Apply one of the following formulations. Note: No materials are effective if larvae do not feed above ground (foliar and systemic insecticides are ineffective). Several spray applications may be required for control.

Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV	1.5 pt/A	methomyl*	6	48	H
1A	Sevin XLR plus	1.0 to 2.0 qt/A	carbaryl	7	12	H
3A	Baythroid XL	0.8 to 1.6 fl oz/A	beta-cyfluthrin*	0	12	H
3A+4A	Leverage 360	2.8 fl oz/A	imidacloprid + beta-cyfluthrin*	7	12	H
3A+28	Besiege	5.0 to 8.0 fl oz/A	lambda-cyhalothrin*+chlorantraniliprole	14	24	H
3A	Asana XL	5.8 to 9.6 fl oz/A	esfenvalerate*	7	12	H
3A	Hero EC	2.6 to 6.1 fl oz/A	zeta-cypermethrin* + bifenthrin*	21	12	H
3A	Lambdy-cy, LambdaT	1.92 to 3.2 fl oz/A	lambda-cyhalothrin*	7	24	H
3A	Mustang Maxx	1.28 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H
3A	Perm-up 3.2EC, Permethrin 3.2EC	4.0 to 8.0 fl oz/A	permethrin*	14	12	H
3A	Tombstone, Tombstone Helios	0.8 to 1.6 fl oz/A	cyfluthrin*	0	12	H
3A	Warrior II	0.96 to 1.6 fl oz/A	lambda-cyhalothrin*	7	24	H
3A+4A	Endigo ZC	3.5 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	14	24	H

European Corn Borers (ECB)

Proper timing of ECB sprays is critical. Apply first spray when 10% of the stems have entry holes in fresh market varieties or 25% in processing varieties. Make 2 to 3 applications on a 5-10-day schedule. Consult your county Extension agent and/or area pest management newsletter.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Baythroid XL	1.6 to 2.8 fl oz/A	beta-cyfluthrin*	0	12	H
3A+4A	Brigadier	4.8 to 6.14 fl oz/A	bifenthrin* + imidacloprid	21	12	H
3A+4A	Swagger	9.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid	21	12	H
3A+28	Besiege	6.0 to 9.0 fl oz/A	lambda-cyhalothrin*+chlorantraniliprole	14	24	H
3A	Asana XL	5.8 to 9.6 fl oz/A	esfenvalerate*	7	12	H
3A	Hero EC	4.0 to 10.3 fl oz/A	zeta-cypermethrin* + bifenthrin*	21	12	H
3A	Lambda-cy, LambdaT	2.56 to 3.84 fl oz/A	lambda-cyhalothrin*	7	24	H
3A	Mustang Maxx	1.76 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H
3A	Perm-up 3.2EC, Permethrin 3.2EC	4.0 to 8.0 fl oz/A	permethrin*	14	12	H
3A	Tombstone, Tombstone Helios	1.6 to 2.8 fl oz/A	cyfluthrin*	0	12	H
3A	Warrior II	1.28 to 1.92 fl oz/A	lambda-cyhalothrin*	7	24	H
3A+4A	Endigo ZC	4.0 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	14	24	H
4A+28	Voliam Flexi	4.0 oz/A	thiamethoxam + chlorantraniliprole	14	12	H
5	Blackhawk	1.7 to 3.3 fl oz/A	spinosad	7	4	M
5	Radiant SC	6.0 to 8.0 fl oz/A	spinetoram	7	4	H
15	Rimon 0.83EC	6.0 to 12.0 fl oz/A	novaluron	14	12	L
22	Avaunt 30WDG	3.5 to 6.0 oz/A	indoxacarb	7	12	H
28	Coragen 1.67SC	3.5 to 7.5 fl oz/A	chlorantraniliprole	14	4	L
28	Verimark	10.0 to 13.5 fl oz/A	cyantraniliprole - soil	AP	4	H
28	Exirel	7.0 to 12.5 fl oz/A	cyantraniliprole - foliar	7	12	H
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	14	12	H

Flea Beetles

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV	1.5 pt/A	methomyl*	6	48	H
1A	Vydate L	2.0 to 4.0 pt/A	oxamyl*	7	48	H

Flea Beetles continued on next page

F Potatoes

Flea Beetles - continued

1B	Imidan 70W	1 1/3 lb / A	phosmet	7	120	H
3A	Baythroid XL	1.6 to 2.8 fl oz/A	beta-cyfluthrin*	0	12	H
3A+4A	Brigadier	16.0 to 25.6 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A+4A	Brigadier	4.8 to 16.4 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A+4A	Leverage 360	2.8 fl oz/A	imidacloprid + beta-cyfluthrin*	7	12	H
3A+4A	Swagger	32.0 to 51.2 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A+4A	Swagger	9.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A+28	Besiege	6.0 to 9.0 fl oz/A	lambda-cyhalothrin*+chlorantraniliprole	14	24	H
3A	Asana XL	5.8 to 9.6 fl oz/A	esfenvalerate*	7	12	H
3A	Bifenture 2EC, Sniper, Sniper Helios	2.1 to 6.4 fl oz/A	bifenthrin*	21	12	H
3A	Hero EC	2.6 to 6.1 fl oz/A	zeta-cypermethrin* + bifenthrin*	21	12	H
3A	Lambda-cy, LambdaT	2.56 to 3.84 fl oz/A	lambda-cyhalothrin*	7	24	H
3A	Mustang Maxx	1.76 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H
3A	Perm-up 3.2EC, Permethrin 3.2EC	4.0 to 8.0 fl oz/A	permethrin*	14	12	H
3A	Tombstone, Tombstone Helios	1.6 to 2.8 fl oz/A	cyfluthrin*	0	12	H
3A	Warrior II	1.28 to 1.92 fl oz/A	lambda-cyhalothrin*	7	24	H
3A+4A	Endigo ZC	3.5 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	14	24	H
4A	Admire Pro	5.7 to 8.7 fl oz/A	imidacloprid - soil	AP	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid - foliar	7	12	H
4A	Assail 30SG	1.5 to 2.5 oz/A	acetamiprid	7	12	H
4A	Belay	9.0 to 12.0 fl oz/A	chlothianidin - soil	AP	12	H
4A	Belay	2.0 to 3.0 fl oz/A	chlothianidin - foliar	14	12	H
4A	Platinum 75SG	1.66 to 2.67 oz/A	thiamethoxam - soil	AP	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam - foliar	14	12	H
4A	Scorpion 35SL	11.5 to 13.25 fl oz/A	dinotefuran - soil	AP	12	H
4A	Scorpion 35SL	2.0 to 2.75 fl oz/A	dinotefuran - foliar	7	12	H
4A	Venom 70SG	6.5 to 7.5 oz/A	dinotefuran - soil	AP	12	H
4A	Venom 70SG	1.0 to 1.5 oz/A	dinotefuran - foliar	7	12	H
4A+28	Voliam Flexi	4.0 oz/A	thiamethoxam + chlorantraniliprole	14	12	H

Potato Leafhoppers

Monitor fields for the buildup of leafhoppers from early June until early August. Treatment is suggested if leafhopper counts exceed 1 adult per sweep or 1 nymph per 10 leaves.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV	1.5 to 3.0 pt/A	methomyl*	6	48	H
1A	Vydate L	2.0 to 4.0 pt/A	oxamyl*	7	48	H
1B	Dimethoate 400/4EC	0.5 to 1.0 pt/A	dimethoate*	0	48	H
1B	Imidan 70W	1 1/3 lb/A	phosmet	7	120	H
3A	Baythroid XL	0.8 to 1.6 fl oz/A	beta-cyfluthrin*	0	12	H
3A+4A	Brigadier	16.0 to 25.6 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A+4A	Brigadier	3.8 to 6.14 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A+4A	Leverage 360	2.8 fl oz/A	imidacloprid + beta-cyfluthrin*	7	12	H
3A+4A	Swagger	32.0 to 51.2 fl oz/A	bifenthrin* + imidacloprid - soil	21	12	H
3A+4A	Swagger	7.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A	Asana XL	5.8 to 9.6 fl oz/A	esfenvalerate*	7	12	H
3A	Hero EC	4.0 to 10.3 fl oz/A	zeta-cypermethrin* + bifenthrin*	21	12	H
3A	Lambda-cy, LambdaT	1.92 to 3.2 fl oz/A	lambda-cyhalothrin*	7	24	H
3A	Mustang Maxx	3.2 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H
3A	Perm-up 3.2EC, Permethrin 3.2EC	4.0 to 8.0 fl oz/A	permethrin*	14	12	H
3A	Tombstone, Tombstone Helios	0.8 to 1.6 fl oz/A	cyfluthrin*	0	12	H
3A	Warrior II	0.96 to 1.6 fl oz/A	lambda-cyhalothrin*	7	24	H
3A + 4A	Endigo ZC	3.5 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	7	24	H
4A	Admire Pro	5.7 to 8.7 fl oz/A	imidacloprid - soil	AP	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid - foliar	7	12	H
4A	Assail 30SG	1.5 to 4.0 oz/A	acetamiprid	7	12	H

Potato Leafhoppers continued on next page

Potato Leafhoppers - continued

4A	Belay	9.0 to 12.0 fl oz/A	chlorothianidin- soil	AP	12	H
4A	Belay	2.0 to 3.0 fl oz/A	chlorothianidin - foliar	14	12	H
4A	Platinum 75SG	1.66 to 2.67 oz/A	thiamethoxam - soil	AP	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam - foliar	14	12	H
4A	Scorpion 35SL	11.5 to 13.25 fl oz/A	dinotefuran - soil	AP	12	H
4A	Scorpion 35SL	2.0 to 2.75 fl oz/A	dinotefuran - foliar	7	12	H
4A	Venom 70SG	6.5 to 7.5 oz/A	dinotefuran - soil	AP	12	H
4A	Venom 70SG	1.0 to 1.5 oz/A	dinotefuran - foliar	7	12	H
4A + 28	Voliam Flexi	4 oz/A	thiamethoxam + chlorantraniliprole	14	12	H
4C	Transform WG	1.5 to 2.25 fl oz/A	sulfoxaflor	7	12	H
4D	Sivanto 200SL	7.0 to 10.5 fl oz/A	flupyradifurone	7	4	L
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone	7	4	L
21A	Portal XLO	2.0 pt/A	fenpyroximate	7	12	L

Potato Tuberworms

Treat when foliage injury is first noted; 4 to 5 applications at 7 to 14 day intervals may be needed. Tuberworms are primarily a problem on the fall crop. Because moths are actively flying at dusk, sprays are most effective when applied early evening.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV	1.5 to 3.0 pt/A	methomyl*	6	48	H
3A	Baythroid XL	1.6 to 2.8 fl oz/A	beta-cyfluthrin*	0	12	H
3A+4A	Brigadier	4.8 to 6.14 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A+4A	Leverage 360	2.8 fl oz/A	imidacloprid + beta-cyfluthrin*	7	12	H
3A+4A	Swagger	9.6 to 12.28 fl oz/A	bifenthrin* + imidacloprid - foliar	21	12	H
3A+28	Besiege	6.0 to 9.0 fl oz/A	lambda-cyhalothrin*+chlorantraniliprole	14	24	H
3A	Asana XL	2.9 to 9.6 fl oz/A	esfenvalerate*	7	12	H
3A	Lambda-cy, LambdaT	2.56 to 3.84 fl oz/A	lambda-cyhalothrin*	7	24	H
3A	Perm-up 3.2EC, Permethrin 3.2EC	4.0 to 8.0 fl oz/A	permethrin*	14	12	H
3A	Tombstone, Tombstone Helios	1.6 to 2.8 fl oz/A	cyfluthrin*	0	12	H
3A	Warrior II	1.28 to 1.92 fl oz/A	lambda-cyhalothrin*	7	24	H
3A+4A	Endigo ZC	4.0 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	7	24	H
15	Rimon 0.83EC	6.0 to 12.0 fl oz/A	novaluron	14	12	L
28	Coragen 1.67SC	3.5 to 7.5 fl oz/A	chlorantraniliprole	1	4	L
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	14	12	H

Disease Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

Recommended Fungicides

Nematodes

See the Nematodes and Soil Fumigations sections in the Pest Management chapter (including “Nonchemical Management of Nematodes” - certain mustard green cover crops planted in the fall and incorporated prior to planting may offer nematode suppression). Use fumigants listed in the Soil Fumigation section in the Pest Management chapter, or one of the following:

Code	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Vydate L*	1.0 to 2.0 gal/A in at least 20 gal/A preplant in-furrow treatment. See label.	oxamyl*	AP	48	H
1B	Mocap 6F*	4.4 fl oz/1000 ft row in 12 inch band over the row at planting. See label.	ethoprop	AP	48	H

Seed-Piece Treatment

Use certified seed. Keep seed at 65-70°F (18-21°C) for 2-3 weeks before planting to encourage rapid emergence. Plant seed pieces immediately after cutting or store under conditions suitable for rapid healing of the cut surfaces (60-70°F, 16-21°C plus high humidity). Dust seed pieces with fungicides immediately after cutting. Some fungicide seed-piece treatments are formulated with fir or alder bark. Bark formulations have been effective treatments.

Apply one of the following formulations:						
Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
For <i>Fusarium</i> spp.:						
M3	mancozeb 8D ¹	1.0 lb/cwt	mancozeb	--	--	N
M3	Polyram 7D	1.0 lb/cwt	metiram	--	--	N
M4	Captan 7.5D	1.0 lb/cwt	captan	--	--	N
For <i>Fusarium</i> spp. and <i>Rhizoctonia</i> spp.:						
1+M3+27	Evolve	0.75 lb/cwt	thiophanate methyl + mancozeb + cymoxanil	--	--	N
1	Tops 2.5D	1.0 lb/cwt	thiophanate methyl	--	--	N
1 + M3	Tops MZ 8.5D ¹	0.75 to 1.0 lb/cwt	thiophanate methyl + mancozeb	--	--	N
7 + M3	MonCoat MZ 7.5D ¹	0.75 to 1.0 lb/cwt	flutolanil + mancozeb	--	--	N
12	Maxim 0.5D	0.5 lb/cwt	fludioxonil	--	--	N
12 + M3	Maxim MZ ¹	0.5 lb/cwt	fludioxonil + mancozeb	--	--	N

¹Seed-piece fungicides that contain EBDC fungicides or cymoxanil also provide protection against seedborne late blight infections.

Bacterial and Fungal Diseases

Bacterial Soft Rot

Prevent wounding and make certain tubers are dry before packing. Free chlorine wash maintained at 25 ppm chlorine or use of a fresh chlorine rinse maintained at 50 ppm chlorine may help reduce soft rot.

Common Scab

Potato scab is caused by a soil-inhabiting fungus (*Streptomyces scabies*). The disease is suppressed in acid soils and the optimum soil pH for growing scab susceptible varieties is about 5.0-5.2. Scab resistant varieties may be grown at pH 5.5 to 6.2. If lime is needed, apply after potato harvest and before subsequent crops grown in rotation.

Plant scab-free seed potatoes. Use resistant varieties and rotate with small grains, corn, or alfalfa. Avoid rotations using red clover. Maintain adequate soil moisture during and after tuber set. Avoid heavy application of manures.

Dickeya diathicola and *Pectobacterium* spp.

In 2015, *Dickeya dianthicola* was introduced to the Mid-Atlantic region. *Dickeya* is transmitted via infested seed pieces and is thought to have limited survival in our soils. Rotations that contain corn followed by brassicas should be avoided prior to potato planting. Growers should purchase certified seed that has been properly inspected and determined free of *Dickeya*. Fields where *Dickeya* has been confirmed should be avoided for the upcoming year. Growers are reminded to practice sound sanitation practices when handling seed pieces (particularly those not tested for *Dickeya*) to prevent contamination of other potato lots.

Early Blight

Begin preventative sprays and continue every 7-10 d according to a disease forecasting system where available. If late blight is a threat, then begin sprays when plants are 8 inches tall.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Rotate and TANK-MIX one of the following protectant fungicides:						
M3	mancozeb 75DG	1.5 to 2.0 lb/A	mancozeb	0	12	N
M3	Polyram 80DF	2.0 lb/A	metiram	14	24	N
M5	chlorothalonil 6F	1.0 to 1.5 pt/A	chlorothalonil	0	12	N
M5 + 22	Zing! 4.9SC	32.0 to 34.0 fl oz/A	chlorothalonil + zoxamide	7	12	N
30	Super Tin 4L	3.0 to 6.0 fl oz/A	triphenyltin hydroxide	7	48	--

WITH one of the following pre-mix fungicides - table continued on next page

Early Blight - continued

WITH one of the following pre-mix fungicides:						
M5 + 11	Quadris Opti 5.5 SC	1.6 pt/A	chlorothalonil + azoxystrobin	14	12	N
3 + 11	Quadris Top 2.72SC	8.0 to 14.0 fl oz/A	tebuconazole + azoxystrobin	0	12	--
3 + 40	Revus Top 4.16 SC	5.5 to 7.0 fl oz/A	difenoconazole + mandipropamid	1	12	M
7 + 9	Luna Tranquility 4.16SC	8.0 to 11.2 fl oz/A	fluopyram + pyrimethanil	7	12	--
7 + 11	Priaxor 4.17SC	4.0 to 8.0 fl oz/A	boscalid + pyraclostrobin	7	12	N
11 + 27	Tanos 50W	6.0 oz/A	famoxadone + cymoxanil	3	12	--
OR tank mix a protectant fungicide with one of the following single-active ingredient fungicides:						
3	Quash 50WDG	2.5 to 4.0 oz/A	metconazole	1	12	--
7	Endura 70WG	2.5 to 4.5 oz/A	boscalid	0	12	--
11	azoxystrobin 2.08F	6.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Gem 25WDG	6.0 to 8.0 oz/A	trifloxystrobin	7	12	N
11	Headline 2.1F	6.0 to 9.0 fl oz/A	pyraclostrobin	3	12	N
11	Reason 500SC	5.5 to 8.2 fl oz/A	fenamidone	14	12	--

Late Blight

Begin fungicide applications when plants are 6 inches tall and repeat every 7 d or apply fungicides according to a disease forecasting system such as BLITECAST or WISDOM. Monitor for progress of the disease by following local Extension reports or visiting the following website (<http://www.usablight.org/>). When a field contains new late blight infections and harvest is near, vines should be destroyed immediately to help prevent tuber infection.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
One of the following protective fungicides should be applied early in the season PRIOR to occurrence of any disease in the region:						
M3	mancozeb 75DG ¹	1.5 to 2.0 lb/A ¹	mancozeb	0	12	N
M3	Polyram 80DF ¹	2.0 lb/A ¹	metiram	14	24	N
M3 + 22	Gavel 75DF	1.5 to 2.0 lb/A	mancozeb + zoxamide	5	48	N
M5	chlorothalonil 6F	1.0 to 1.5 pt/A	chlorothalonil	0	12	N
M5 + 22	Zing! 4.9SC	34.0 gl oz/A	chlorothalonil + zoxamide	7	12	N
Once late blight is detected in your area, rotate and tank mix one of the following fungicides with a protectant fungicide listed above. Apply on a 7 day schedule as long as conditions are favorable for disease development.						
3 + 40	Revus Top 4.16SC	5.5 to 7.0 fl oz/A	difenoconazole + mandipropamid	1	12	M
11 + 27	Tanos 50W	6.0 to 8.0 oz/A	famoxadone + cymoxanil	3	12	--
21	Ranman 400SC	1.40 to 2.75 fl oz/A	cyazofamid	0	12	L
27	Curzate 60DF	3.33 oz/A	cymoxanil	3	12	N
28	Previcur Flex 6F	1.2 pt/A	propamocarb HCL	5	12	N
29	Omega 500F	5.5 fl oz/A	fluazinam	14	48	N
30	Super Tin 4L*	3.0 to 6.0 fl oz/A	triphenyltin hydroxide	7	48	--
40	Forum 4.18SC	4.0 to 6.0 fl oz/A	dimethomorph	4	12	N
43	Presidio 4SC	4.0 fl. oz/A	fluopicolide	2	12	L
U15+M5	Orondis Opti	1.75 to 2.5 pt/A	oxathiapiprolin + chlorothalonil	7	12	--

¹DO NOT apply more than a combined total of 15.0 lb/A of mancozeb 75DG or Polyram 80DF per crop

Leak (*Pythium*) and Pink Rot (*Phytophthora*)

Leak usually enters the tubers through bruises occurring in conjunction with the harvesting of immature tubers during hot weather. Pink rot generally occurs in poorly drained areas. Rotate field out of potatoes for at least 2 yr.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following fungicides in a 6-8 inch band directly over the seed-piece prior to row closure:						
4A + 4	Platinum Ridomil Gold 1.6E	2.2 fl oz/1000 ft row	thiamethoxam + mefenoxam	AP	48	N
4	Ridomil Gold 4SL	0.42 fl oz/1000 ft row	mefenoxam	AP	48	N
4	Ultra Flourish 2E	0.84 fl oz/1000 ft row	mefenoxam	AP	48	N
21	Ranman (Section 2ee)	0.42 fl oz/1000 ft row (see label)	cyazofamid	AP	12	N
As an alternative, apply one of the following fungicides with as much water as possible for ground applications and a minimum of 5 gal/A for aerial applications. Apply at flowering and 14 d later. If the field has a history of pink rot or leak a third application might be warranted 14 d after that. Be sure to get some coverage of the soil surrounding plants for root uptake to occur.						
4 + M1	Ridomil Gold Copper 65WP	2.0 lb/A	mefenoxam + copper	14	48	N
4 + M3	Ridomil Gold MZ 68WP	2.5 lb/A	mefenoxam + mancozeb	14	48	N
4 + M5	Ridomil Gold Bravo 76WP	2.0 lb/A	mefenoxam + chlorothalonil	14	48	N

Rhizoctonia stem canker and black scurf

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations as an in-furrow spray at planting:						
7	Moncut 70DF	0.79 to 1.18 oz/1000 ft row	flutolanil	AP	12	N
7 + 11	Elatus 45WG	0.34 to 0.50 oz/1000 ft row	benzovindiflupyr + azoxystrobin	AP	12	N
11	azoxystrobin 2.08F	0.4 to 0.6 fl oz/1000 ft row	azoxystrobin	AP	4	N

Verticillium Wilt

Select fields with a low incidence of wilt. Use resistant varieties where possible. Do not plant tomato, eggplant, or pepper in rotation with potato. The use of Sudangrass in rotation with potato may reduce nematode levels. The use of Mocap will reduce lesion nematode levels in the soil, resulting in less Verticillium wilt.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following through center pivot irrigation in the fall to fallow fields for suppression of Verticillium and lesion nematode:						
--	K-Pam HL*	30 to 60 gal/A	potassium methyldithiocarbamate	AP	48	N
--	Vapam HL*	37.5 to 70 gal/A	metam-sodium	AP	48	N

White Mold

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following immediately prior to row closing and repeat 28 d later with a different FRAC code:						
1	thiophanate-methyl 70WP	1.0 to 1.5 lb/A	thiophanate methyl	14	12	N
2	iprodione 4L AG	2.0 pt/A	iprodione	14	24	N
7	Endura 70WG	5.5 to 10.0 oz/A	boscalid	0	12	--
29	Omega 500F	5.5 to 8.0 fl oz/A	fluazinam	14	48	N

Viruses

Numerous seed borne viruses can occur in potato including potato leafroll, potato virus S, potato virus M, and several strains of potato virus Y. There has been an increase in occurrence of the potato virus YN strain in the region. Control these seed borne viruses by obtaining virus-free certified or foundation seed.

For Immediate Medical Attention

Call 911

**For a Pesticide Exposure Poisoning
Emergency Call**



For All States

This number will automatically connect you to the poison center nearest you.

Anyone with a 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 Pesticide Spills

Small Spills: See the product label for cleanup advice.

Large spills: Call the National Response Center at 1-800-424-8802 or CHEMTREC at 800-424-9300 (24 hours) - Industry assistance with emergency response cleanup procedures for large, dangerous spills.

Be aware of your responsibility to report spills to the proper state agency.