

Potato - Horticulture

Reviewed by Ben Phillips, Liz Maynard – Oct 2020

Crop Description

Potatoes (*Solanum tuberosum*) are staple food grown from small tubers of a mother plant that is grown by specialized seed-potato producers. The Midwest produces potatoes primarily for table stock and processing into potato chips. Varieties used for chipping are usually brown skinned, white-fleshed, and globe-shaped to facilitate slicing from any direction. Table stock potatoes include ‘starchy’ (high dry matter) baking varieties and ‘waxy’ (low dry matter) boiling varieties in numerous skin and flesh color combinations with widely variable sizes and shapes. Starchy varieties include the Russets. Waxy varieties include Norland Reds. Some varieties are intermediate between those two types, like Yukon Gold.

An important disease that affects the marketability of table stock potatoes is scab. One way to manage scab is to maintain a soil pH of 5.0 to 5.2. However, low soil pH reduces phosphorus availability, and most rotational crops will not perform well at the low pH. In fields with a history of scab, using scab-resistant varieties is the best option to avoid having to adjust pH to the detriment of rotational crops.

Planting and Spacing

Tuber production: Rows 34 to 36 inches apart. Seed pieces 9 to 11 inches apart in row, depending on variety and intended use. Seed 16 to 18 100-pound bags per acre. Seed piece should be 1-1/2 to 2 ounces. Using B-size certified seed will save cutting labor and reduce tuber-borne diseases.

Seed stock production: Select seed stock from high-yielding hills that are smooth, well-shaped, and free of diseases and insect injury. When possible, obtain certified G1 or G2 (generation)

seed stock. Store seed stock in new crates to avoid disease contamination. Seed potatoes should be at least 1-1/2 to 2 ounces in weight. If cutting larger seed potatoes, warm to 45 F before cutting, then sort to remove blind, slab, sliver, ripped, and undersized pieces after cutting. Cure cut stock at 38 to 40 F, with 85 to 95% humidity in piles less than 6 feet deep, with good air circulation for 6 to 10 days. To supply one acre of seed potatoes, you need roughly 14,000 to 26,000 seed pieces.

Fertilizing

pH: Maintain a soil pH of 5.5 to 6.5.

Before planting, do not fertilize with N or P, but apply 50 to 400 pounds K₂O per acre based on soil test results and recommendations from your state. The most efficient way to spread the remaining fertilizer is with a banded application at planting at least 2 inches below and 2 inches to both sides of the tuber. As a banded starter fertilizer, apply 0 to 30 pounds N per acre, 0 to 150 pounds P₂O₅ per acre, and 0 to 200 pounds K₂O per acre. The rate of K₂O should not exceed 200 pounds per acre when banded.

Manganese may be needed when the soil pH is above 6.5 on mineral soils and above 5.8 on organic soils. Use a soil test to determine the amount of manganese needed. Include the required amount of manganese in the starter fertilizer, or spray the foliage with 1 to 2 pounds of manganese per acre at least twice during active growth. On sandy soils, broadcast 30 pounds or band 15 pounds sulfur per acre.

Sidedress once at emergence and once at hilling or tuber initiation with 50-75 pounds N per acre each time. The second application can be adjusted according to rainfall and a petiole nitrate-N analysis. Use lower end of range for early-maturing varieties. Reduce the amount of fertilizer N applied by the value of N credits from green manures, legume crops grown in the previous year, compost and animal manures, and soils with more than 3

percent organic matter. The total amount of N from fertilizer and other credits should be 100 to 150 pounds per acre.

Harvesting

“New” potatoes can be dug by hand from the sides of hills for continual harvest for fresh market sale, but they do not keep as well as a mature tuber. New potatoes can also be once-over harvested in sections at a time, but the chain conveyors can blemish the soft skins of these immature tubers.

Storage potato market life can be lengthened by preventing sprouting of potatoes in storage, use maleic hydrazide (Royal MH-30 or Sprout-Stop) according to label directions one week after blossoms fall. For varieties and conditions where flowering does not occur, apply four to six weeks before potatoes are mature and ready for harvest. Make only one application. Apply when no rain is expected for 24 hours. Potatoes treated with maleic hydrazide cannot be used for seed because sprouting will be inhibited. Follow label directions.

Storage potatoes benefit from uniform maturation for mechanical harvest. This can be accomplished by killing the vines with a labeled herbicide. Once vines are down and dried, mechanical harvest can begin with chain-conveyor diggers. The labeled vine-killing herbicides are listed below, along with instructions.

Vine Kill Herbicides

Defol 750 (7.5L) (sodium chlorate) 3.2 qts. per acre of 750 formulations, and 4.8 qts. per acre of the 5 formulations with 10-20 gals. per acre water by ground or 5-10 gals. per acre water by air. Apply 10 days before harvest. Do not apply in extreme heat during the middle of the day. REI: 12-hour. WSSA NC.

paraquat formulations (paraquat) 0.8-1.5 pts. per acre of 2.5L or 0.6-1.0 pt. per acre of 3L in 50-100 gals. of water plus 1 gal. COC or 1-2 pts. nonionic

surfactant per 100 gals. spray solution. **Not for potatoes to be stored or used for seed.** Begin applications when leaves begin to turn yellow. Immature potato foliage and drought-stressed potato foliage are tolerant to this product. Maximum 3 pts. of 2.5L or 2 pts. of 3L per acre per season. For split applications, use lower rate and wait 5 days between applications. Read label for complete instructions. *3L formulation not for use in Iowa or Missouri.* REI: 24-hour. PHI: 3-day. WSSA 22. *RUP.*

Reglone (2L) (diquat) 1-2 pts. in 20-100 gals. water plus 8-64 fl. oz. nonionic surfactant. A second application can be made if necessary. Allow at least 5 days between applications. REI: 24-hour. PHI: 7-day. WSSA 22.

Rely 280 (2.34L) (glufosinate) 21 fl. oz. per acre. **Not for potatoes to be used for seed.** Do not make more than 1 application. REI: 12-hour. PHI: 9-day. WSSA 10.

Potato - Diseases

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Recommended Controls

Aster Yellows (Purple-Top Wilt) of Multiple Crops - *Phytoplasma Mollicutes*

This pathogen is transmitted by leafhoppers. Infection rates can jump when adjacent crops are harvested mid-season, such as alfalfa or wheat.

Non-Pesticide

Plant only certified seed tubers. Practice clean cultivation. Rogue first infected plants, including tubers.

Pesticide

Insecticides | Use an insecticide to control leafhoppers that transmit the disease. Leafhoppers must be controlled before they feed. See Insect section.

Black Dot of Potatoes - *Colletotrichum* Fungus

Pesticide

azoxystrobin products (azoxystrobin) | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-20.0 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-12.8 fl. oz. per acre. REI: 4-hour. PHI: 14-day. FRAC 11.

chlorothalonil products (chlorothalonil) | *Michigan only -- Bravo Weather Stik (exp. 12/31/2024), Bravo ZN (exp. 12/31/2020), Echo 720 (exp. 12/31/2024), and Echo 90DF (exp. 12/31/2024)* can apply up to 16 lbs. a.i. per acre per year. All other states do not exceed 11.25 lbs. a.i. per acre per year. Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See product labels. REI: 12-hour. PHI: 7-day. FRAC M5.

Headline (SC) (2.08) (pyraclostrobin) | 6-9 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 11.

Luna Tranquility (SC) (fluopyram, pyrimethanil) | 8-11.2 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 9.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) | 9.2-11.4 fl. oz. per acre. Black dot suppression only. Use high rate for potato. REI: 12-hour. PHI: 14-day. FRAC 7, FRAC 12.

Revus Top (SC) (mandipropamid, difenoconazole) | 5.5-7.0 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 40, FRAC 3.

Tanos (DF) (famoxadone, cymoxanil) | 6-8 oz. per acre. Disease suppression only. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 27.

Zing! (zoxamide, chlorothalonil) | 24-34 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 22, FRAC M5.

Black Leg of Potatoes - *Pectobacterium* or *Dickeya* Bacteria

Non-Pesticide

Use seed pieces certified to be free of disease. Plant in well-drained soil and avoid over-irrigation. Sanitize equipment at planting and at harvest to limit spread.

Pesticide

copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) | Several formulations of copper (Badge, Champ, Kocide) products are labelled for use and may slow the spread of bacterial blight. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

Double Nickel 55 (25WDG) (*Bacillus amyloliquefaciens* strain D-747) | 0.125-1 lbs. per acre as a soil drench or 0.25-3 lbs. per acre as a foliar application, according to disease management considerations. REI: 4-hour. PHI: 0-day. FRAC 44. *OMRI-listed.*

streptomycin products (Streptomycin sulfate) | Use 17% products at 8 oz. per 100 gals of water, or 50% products at 2.7 oz. per 100 gals. of water to maintain a concentration of 100 ppm. Soak seed pieces in solution for several minutes. REI: 12-hour. FRAC 25.

Black Scurf of Potatoes - *Rhizoctonia* Fungus

Use a fungicide when appropriate.

Non-Pesticide

Plant seed pieces certified to be free of disease.
Harvest potatoes as soon after maturity as possible.
Rotation to a non-host crop 2-3 years.

Pesticide

azoxystrobin products (azoxystrobin) | Use 2 lb. a.i. per gallon formulations (Quadris) at 0.4-0.8 fl. oz. per 1,000 row feet. Use 3.3 lb. per gallon formulations (Azteroid) at 0.24-0.48 fl. oz. per 1,000 row feet. Use 0.83 lb. per gallon formulations (Dynasty) for treating seed at 0.10-3.75 fl. oz. per 100 lbs. of seed. REI: 4-hour. FRAC 11.

Moncut (3.8) (flutolanil) | 0.7-1.1 lbs. per acre of the DF formulation or 16-25 fl. oz. per acre of the SC formulation. REI: 12-hour. FRAC 7.

Dry Rot of Potatoes - *Fusarium* Fungus

Avoid bruising at harvest. Cure potatoes in storage at 60 degrees F before lowering temperature. Provide adequate ventilation.

Non-Pesticide

Avoid bruising at harvest. Cure potatoes in storage at 60 degrees F before lowering temperature. Provide adequate ventilation.

Pesticide

mancozeb products (mancozeb) | Seed piece treatment; dip whole or cut potatoes in solution. Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 3-day in Michigan and Ohio; 14-day in all other states. FRAC M3.

Maxim 4FS (fludioxonil) | 0.08 fl. oz. per 100 lbs. of seed. Seed piece treatment. Use specific application equipment according to label. REI: 12-hour. FRAC 12.

Maxim MZ (mancozeb, fludioxonil) | 0.5 lbs. per 100 lbs. of seed. Seed piece treatment. REI: 24-hour. FRAC M3, FRAC 12.

Mertect 340-F (SC) (thiabendazole) | 0.42 oz. per 2,000 lbs. of tubers. 0.42 fl. oz. per 2,000 lbs. of tubers. Do not treat seed potatoes after cutting. *Fungicide resistance known* REI: 12-hour. FRAC 1.

Seed treatments (thiamethoxam, mefenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | Rates vary by product. Select seed treatments Cruiser Maxx Vibrance Potato (thiamethoxam, difenconazole, sedaxane, fludxonil); Cruiser Maxx Potato Extreme (thiamethoxam, difenconazole, fludioxonil); Emesto Silver (penflufen, prothioconazole). IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Stadium (FSC) (azoxystrobin, difenoconazole, fludioxonil) | 1 fl. oz. per 2,000 lbs. of tubers. Postharvest application only; no more than one application to tubers. FRAC 11, FRAC 3, FRAC 12.

Early Blight of Potatoes - *Alternaria* Fungus

This disease initially causes lesions on lower leaves of the potato plant. After field planting, begin protective fungicide applications on a 7-14 day schedule.

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

Non-Pesticide

Avoid fields with a history of nematodes, Fusarium or Verticillium wilts, droughty, wet, or compacted soils, and other conditions (such as insufficient nitrogen) that might add undue stress to the crop and increase susceptibility to early blight. Varieties with partial resistance are available. Rotate to non-host crops for 2-3 years.

Pesticide

azoxystrobin products (azoxystrobin) | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-20.0 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-12.8 fl. oz. per acre. REI: 4-hour. PHI: 14-day. FRAC 11.

chlorothalonil products (chlorothalonil) | *Michigan only -- Bravo Weather Stik (exp. 12/31/2024), Bravo ZN (exp. 12/31/2020), Echo 720 (exp. 12/31/2024), and Echo 90DF (exp. 12/31/2024) can apply up to 16 lbs. a.i. per acre per year. All other states do not exceed 11.25 lbs. a.i. per acre per year. Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See product labels. REI: 12-hour. PHI: 7-day. FRAC M5.*

Endura (WG) (boscalid) | 3.5-4.5 oz. per acre. REI: 12-hour. PHI: 10-day. FRAC 7.

Gavel 75DF (zoxamide, mancozeb) | 1.5-2 lbs. per acre. REI: 48-hour. PHI: 3-day in Michigan and Ohio; 14-day in all other states. FRAC 22, FRAC M3.

Headline (SC) (2.08) (pyraclostrobin) | 6-9 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 11.

iprodione products (iprodione) | 1-2 pts. per acre. Formulations of iprodione include Nevado and Rovral. REI: 24-hour. PHI: 14-day. FRAC 2.

Luna Tranquility (SC) (fluopyram, pyrimethanil) | 8-11.2 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 9.

mancozeb products (mancozeb) | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 14-day. FRAC M3.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) | 9.2-11.4 fl. oz. per acre. Black dot suppression only. Use high rate for potato. REI: 12-hour. PHI: 14-day. FRAC 7, FRAC 12.

Quadris Opti (SC) (azoxystrobin, chlorothalonil) | 1.6 pts. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC M5.

Revus Top (SC) (mandipropamid, difenoconazole) | 5.5-7.0 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 40, FRAC 3.

Scala (SC) (5) (pyrimethanil) | 7 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 9.

Tanos (DF) (famoxadone, cymoxanil) | 6 oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 27.

Velum Prime (4.16SC) (fluopyram) | 6.5-6.84 fl. oz. per acre. Apply through overhead chemigation. Do not exceed 13.7 fl. oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 7-day. FRAC 7.

Zing! (zoxamide, chlorothalonil) | 24-34 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 22, FRAC M5.

Late Blight of Potatoes/Tomatoes - Phytophthora Oomycete

This destructive pathogen causes quick plant death and can be identified by large spreading brown stem lesions, velvety white growth on plant surfaces, and

large brown leathery spots on green fruits. It is favored by prolonged cool and damp conditions.

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

Non-Pesticide

The first step to manage this disease is monitoring and destroying cull and volunteer potato emergence in the spring.

Pesticide

chlorothalonil products (chlorothalonil) | *Michigan only -- Bravo Weather Stik (exp. 12/31/2024), Bravo ZN (exp. 12/31/2020), Echo 720 (exp. 12/31/2024), and Echo 90DF (exp. 12/31/2024)* can apply up to 16 lbs. a.i. per acre per year. All other states do not exceed 11.25 lbs. a.i. per acre per year. Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See product labels. REI: 12-hour. PHI: 7-day. FRAC M5.

Curzate 60DF (cymoxanil) | 3.2 oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 27.

Gavel 75DF (zoxamide, mancozeb) | 1.5-2 lbs. per acre. REI: 48-hour. PHI: 3-day in Michigan and Ohio; 14-day in all other states. FRAC 22, FRAC M3.

mancozeb products (mancozeb) | Several formulations of mancozeb (Dithane, Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 14-day. FRAC M3.

Omega 500F (4.17) (fluazinam) | 5.5 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 29.

Orondis Opti Premix (SC) (oxathiapiprolin, chlorothalonil) | 1.75-2.5 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC 49, FRAC M5.

Orondis Ultra Premix (SC) (oxathiapiprolin, mandipropamid) | 5.5-8 fl. oz. per acre. REI: 4-hour. PHI: 14-day. FRAC 49, FRAC 40.

Previcur Flex (6) (propamocarb) | 0.7-1.2 pts. per acre. REI: 12-hour. PHI: 14-day. FRAC 28.

Ranman 400SC (34.5) (cyazofamid) | 1.4-2.75 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 21.

Revus Top (SC) (mandipropamid, difenoconazole) | 5.5-7.0 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 40, FRAC 3.

Tanos (DF) (famoxadone, cymoxanil) | 6-8 oz. per acre. Disease suppression only. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 27.

Zampro (SC) (ametoctradin, dimethomorph) | 11-14 fl. oz. per acre. REI: 12-hour. PHI: 4-day. FRAC 45, FRAC 40.

Zing! (zoxamide, chlorothalonil) | 30-34 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 22, FRAC M5.

Nematodes

Potato cyst nematodes are serious pathogens that reduce stands, yield and tuber quality. As sedentary endoparasites, the female body hardens into a cyst that protects its eggs for a decade or so in absence of a host.

Root lesion nematodes form a destructive disease complex with *Verticillium*, called Potato Early-Die. Both root lesion nematodes and *Verticillium* can be supported by multiple crops, which makes it difficult to control through rotation.

Non-Pesticide

Collect soil samples for nematodes in the fall and avoid fields with high numbers. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >3 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue and displace nematodes is an important method to prevent nematode build-up. Anaerobic soil disinfestation (ASD) is an effective sterilization method for greenhouse and high tunnel soils that contain nematodes.

Pesticide

Nimitz (4EC) (fluensulfone) | 3.5-7.0 pts. per acre. May be broadcast, banded, or drip-applied in the spring up to 7 days before planting at a depth of 8 inches. Effectiveness is reduced on muck and clay soils REI: 12-hour. IRAC UN.

Sectagon K42 (4.2L) (metam sodium) | 30-75 gals. per acre (or 37.5-75 gals. per acre for Vapam HL) according to label instructions. Use high rates on muck and lower rates on sands. In the fall, when soil temperatures are above 50 F and soil is moist, place product about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, apply through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

Sectagon K54 (5.63L) (metam potassium) | 30-63.9 gals. per acre (or 30-60 gals. per acre for K-Pam HL) according to label instructions. Use high rates on muck and lower rates on sands. In the fall, when soil temperatures at 6 inches are above 50 F and soil is moist, place product about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, apply through drip irrigation under

unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

Telone C-17 (L) (1,3-dichloropropene, chloropicrin) | *Muck soils:* 30 gals. per acre for C-17 formulation and 36 gals. per acre for C-35 formulation. *Mineral soils:* 18-27.5 gals. per acre for C-17 formulation and 21.4-33 gals. per acre for C-35 formulation. In the fall, when soil temperatures at 6 inches are above 50 F and soil is moist, place product about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing, irrigation, or plastic. Or, in the spring, InLine may be applied through drip irrigation under unperforated plastic beds at 13-20.5 gals. per acre (on mineral soils only). Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 3-5-day. IRAC UN, FRAC NC, IRAC 8B. *RUP.*

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

Velum Prime (4.16SC) (fluopyram) | 6.5-6.84 fl .oz. per acre. Apply through overhead chemigation. Do not exceed 13.7 fl. oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 7-day. FRAC 7.

Vydate C-LV (3.77WSL) (oxamyl) | 34-68 fl. oz. per acre. Apply as a banded or shank-injected at-plant in-furrow soil treatment incorporated 2-4

inches deep with at least 20 gals. water per acre, or overhead chemigate to deliver rate in 0.5 inch of irrigation water. Do not exceed 8 applications or 306 fl. oz. per acre per season. *In Kansas*, allow 14 days between applications and do not exceed 4 applications or 204 fl. oz. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1A. *RUP*.

Ring Rot of Potatoes - *Clavibacter Bacteria*

The ring rot bacterium is easily spread. Although this bacterium will not survive more than 1 year in the soil (and thus can be controlled by crop rotation), a farm with ring rot must conduct a thorough clean-up before bringing in seed for the next crop. The organism can easily survive the winter in crop debris or soil on storage walls; seed cutters, bin pilers, graders, and other handling equipment; tractors, fork lifts and other vehicles; and on burlap sacks, wooden boxes, or other containers. If clean seed potatoes contact any of these contamination sources, the problem can recur.

Non-Pesticide

Use certified disease-free seed. When cutting seed stock, the cutter should be periodically cleaned and disinfected, especially when changing seed lots. The first step is to clean all contaminated surfaces with hot soapy water under pressure or steam to remove all soil and debris. Then apply a disinfectant sanitizer. For more information about sanitation, see *Commercial Greenhouse and Nursery Production: Sanitation for Disease and Pest Management* (Purdue Extension publication HO-250-W), available from the Education Store, www.edustore.purdue.edu.

Scab of Potatoes - *Streptomyces Bacteria*

Scab is more common on potatoes grown in soils with pH over 5.2.

Non-Pesticide

Avoid fields with a history of nematodes, Fusarium or Verticillium wilts, droughty, wet, or compacted soils, and other conditions (such as insufficient nitrogen) that might add undue stress to the crop and increase susceptibility scab. Acidify soil to a pH between 5.0 and 5.2 with elemental sulfur in the fall prior to planting.

Silver Scurf of Potatoes - *Helminthosporium Fungus*

Use a fungicide when appropriate.

Non-Pesticide

Plant seed pieces certified to be free of disease. Harvest potatoes as soon after maturity as possible. Rotation to a non-host crop 2-3 years.

Pesticide

azoxystrobin products (azoxystrobin) | Use 2 lb. a.i. per gallon formulations (Quadris) at 0.4-0.8 fl. oz. per 1,000 row feet. Use 3.3 lb. per gallon formulations (Azteroid) at 0.24-0.48 fl. oz. per 1,000 row feet. Use 0.83 lb. per gallon formulations (Dynasty) for treating seed at 0.10-3.75 fl. oz. per 100 lbs. of seed. REI: 4-hour. FRAC 11.

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

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

It is more commonly where humidity and temperatures are high. The fungus often infects flowers, which then drop off and infect the stems that they land on. But, the pathogen can also infect stem tissue around the root crown. The stems take

Potato - Insects

on a woody appearance and can split open, revealing small black pellets that are the overwintering body of the pathogen.

Non-Pesticide

Avoid fields with a history of the problem. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >6 years. Avoid excess nitrogen. Reduce overhead irrigation if disease is present. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

Pesticide

Contans WG (5) (Coniothyrium minitans strain CON/M/91-08) | 1-6 lbs. per acre. Apply immediately after harvest or 3-4 months before planting. REI: 4-hour. FRAC NC. *OMRI-listed*.

Endura (WG) (boscalid) | 5.5-10 oz. per acre. REI: 12-hour. PHI: 10-day. FRAC 7.

iprodione products (iprodione) | 2 pts. per acre. Formulations of iprodione include Nevado and Rovral. REI: 24-hour. PHI: 14-day. FRAC 2.

Luna Tranquility (SC) (fluopyram, pyrimethanil) | 11.2 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 9.

Miravis Prime (SC) (pydiflumetofen, fludioxonil) | 9.2-11.4 fl. oz. per acre. Black dot suppression only. Use high rate for potato. REI: 12-hour. PHI: 14-day. FRAC 7, FRAC 12.

Omega 500F (4.17) (fluazinam) | 5.5-8 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 29.

Topsin M WSB (70) (thiophanate-methyl) | 20-30 fl. oz. per acre. 20-30 fl. oz. per acre for Topsin 4.5FL, 21.8-32.7 fl. oz. per acre for Cercobin, or 1-1.5 lbs. per acre for Topsin M WSB. REI: 24-hour to 3-day. PHI: 21-day PHI. FRAC 1.

Velum Prime (4.16SC) (fluopyram) | 6.5-6.84 fl. oz. per acre. Apply through overhead chemigation. Do not exceed 13.7 fl. oz. per acre per season. Allow 5 days between applications. REI: 12-hour. PHI: 7-day. FRAC 7.

Wilt of Multiple Crops - Verticillium Fungus

This pathogen can interact with root lesion nematodes to create a destructive condition known as Potato Early-Die.

Non-Pesticide

Choose potato varieties that have partial resistance to Verticillium wilt. Good weed control also is important in reducing pathogen populations. Employ at least a 2-year rotation with small grains to manage fungus populations in the soil.

Potato - Insects

Reviewed by Laura Ingwell, Donald Lewis – Nov 2020

Recommended Controls

Aphids

Pesticide

Actara (25WDG) (thiamethoxam) | 3.0 oz. per acre. Apply as a foliar spray. Do not exceed 6 oz. per acre per season. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) | *Seed piece treatment:* 0.17-0.35 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application:* 5.7-8.7 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 8.7 fl. oz. per acre per season from seed or soil applications. *Foliar application:* 1.3 fl. oz. per

acre applied to foliage. Do not exceed 5.6 fl. oz. per acre per season from foliar applications. See pollinator precautions. REI: 12-hour. PHI: 7-day for foliar applications. IRAC 4A.

Asana XL (0.66EC) (esfenvalerate) | 5.8-9.6 fl. oz. per acre. Do not exceed 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP*.

Assail 30SG (acetamiprid) | Use 30SG formulations at 2.5-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.0-1.7 oz. per acre and do not exceed 7.0 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Athena (0.76EC) (bifenthrin, abamectin) | 7-17 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 3A, IRAC 6. *RUP*.

Belay (2.13SC) (clothianidin) | *Seed piece treatment*: 0.4-0.6 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application*: 9-12 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 12 fl. oz. per acre per season from seed or soil applications. *Foliar application*: 2-3 fl. oz. per acre applied to foliage. Do not exceed 12 fl. oz. per acre per season from foliar applications. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Beleaf (50SG) (flonicamid) | 2.0-2.8 oz. per acre. Do not exceed 8.4 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 29.

Dimethoate 4EC (dimethoate) | Use 2.67EC formulations at 0.75-1.5 pt. per acre and do not exceed 3.0 pts. per acre per season. Use 4EC, LV-4, and 400 formulations at 0.5-1 pt. per acre and do not exceed 2 pt. per acre per season. Allow 7 days between applications. REI: 48-hour. PHI: 0-day. IRAC 1B.

Fulfill (50WDG) (pymetrozine) | 2.75-5.5 oz. per acre. Do not exceed 11 oz. per acre per season. Allow 7-days between applications. REI: 12-hour. PHI: 14-day. IRAC 9B.

Lannate LV (2.4L) (methomyl) | 1.5-3.0 pts. per acre. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 6-day. IRAC 1A. *RUP*.

M-Pede (3.8) (potassium salts of fatty acids) | 1-2% by volume. Must contact aphids to be effective. Combine with another labeled product for best results. REI: 12-hour. PHI: 0-day. IRAC UN, FRAC NC. *OMRI-listed*.

Movento (2SC) (spirotetramat) | 4-5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. Allow 7 days between applications. REI: 24-hour. PHI: 7-day. IRAC 23.

Mustang Maxx (0.8) (zeta-cypermethrin) | 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 4 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 51.2oz. per acre per season. Use 3.2EC formulations at 4-8 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Allow 10 days between applications REI: 12-hour. PHI: 14-day. IRAC 3A. *RUP*.

Platinum 2SC (thiamethoxam) | Use 2SC formulations at 5-8 fl. oz. per acre and do not exceed 8 fl. oz. per acre per season. Use 75SG formulations at 1.66-2.67 oz. per acre and do not exceed 2.67 oz. per acre per season. Seed piece only, apply as in-furrow spray during planting. REI: 12-hour. IRAC 4A.

Scorpion 35SL (3.24) (dinotefuran) | *Soil application*: Use Scorpion 35SL at 11.5-13.25 fl. oz. per acre, or Venom 70SG at 6.5-7.5 fl. oz. per acre applied in-furrow at planting, or side-dressed to both sides of the row at ground crack. *Foliar*

Potato - Insects

application: Use Scorpion 35SL at 2.0-2.75 fl. oz. per acre, or Venom 70SG at 1.0-1.5 fl. oz. per acre applied to foliage. Allow 14 days between applications. See pollinator precautions. REI: 12-hour. PHI: 7-day. IRAC 4A.

Seed treatments (thiamethoxam, mfenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | See label. Rates vary by product. Choose seed treatments that include thiamethoxam insecticide (Cruiser 5FS, Cruiser Maxx, and Cruiser Maxx Potato). For best results, plant potatoes immediately after treatment. PHI: See label. IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Sivanto 200 (1.67SL) (flupyradifurone) | 7.0-10.5 fl. oz. per acre. Do not exceed 28.0 fl. oz. per acre per season. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 4D.

Thimet 20G (phorate) | *Light or sandy soils:* 8.5-11.3 oz. per 1,000 ft. of row for any row spacing larger than 32-inches. Use at planting or postemergence. *Heavy or clay soils:* 13.0-17.3 oz. per 1,000 ft. of row. Do not use post emergence. Apply as a band application on each side of row and beneath soil surfaces, or in the seed furrow. REI: 48-hour. PHI: 90-day. IRAC 1B. *RUP.*

Torac (1.29SC) (tolfenpyrad) | 17-21 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season, or 2 applications. Allow 14 days between applications. See pollination precautions. REI: 12-hour. PHI: 14-day. IRAC 21A, FRAC 39.

Transform WG (50) (sulfoxaflor) | 0.75-1.5 oz. per acre. Do not exceed 8.5 oz. per acre per season. Allow 14 days between applications. REI: 24-hour. PHI: 7-day. IRAC 4C.

Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole) | 4 oz. per acre. Do not exceed 8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 4A, IRAC 28.

Vydate C-LV (3.77WSL) (oxamyl) | 17-34 fl. oz. per acre. Do not exceed 8 applications or 306 fl. oz. per acre per season. *In Kansas*, allow 14 days between applications. Do not exceed 4 applications or 204 fl. oz. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1A. *RUP.*

Warrior II (2.08CS) (lambda-cyhalothrin) | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. REI: 24-hour. PHI: 7-day. IRAC 3A. *RUP.*

Caterpillars

Pesticide

Asana XL (0.66EC) (esfenvalerate) | 5.8-9.6 fl. oz. per acre. For corn borers, and cutworms. Do not exceed 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP.*

Assail 30SG (acetamiprid) | For corn borers as an ovicide. Use 30SG formulations at 2.5-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.1-1.7 oz. per acre and do not exceed 7.0 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Athena (0.76EC) (bifenthrin, abamectin) | 7-17 fl. oz. per acre. For corn borers, and cutworms. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 3A, IRAC 6. *RUP.*

Avaunt (30WDG) (indoxacarb) | 3.5-6.0 oz. per acre. For corn borers. Do not exceed 24 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 22.

Baythroid XL (1EC) (beta-cyfluthrin) | 0.8-2.8 fl. oz. per acre. For corn borers, and cutworms. Do not exceed 16.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP.*

Blackhawk (36G) (spinosad) | 1.7-3.3 oz. per acre. Do not exceed 14.4 oz. per acre per season. REI: 4-hour. PHI: 7-day. IRAC 5.

Coragen (1.67SC) (chlorantraniliprole) | 3.5-7.5 fl. oz. per acre. For corn borers. Do not exceed 15.4 fl. oz. per acre per season. Allow 5 days between applications. REI: 4-hour. PHI: 14-day. IRAC 28.

Diazinon AG500 (4ES) (diazinon) | 3-4 qts. per acre. For cutworms in *Ohio only. (OH 24c exp. 12/31/25)*. Use as a pre-plant incorporation and do not exceed 1 application per season. REI: 2 to 4-day. IRAC 1B. *RUP*.

Endigo ZC (thiamethoxam, lambda-cyhalothrin) | 3.5-4.5 fl. oz. per acre. For corn borers, and cutworms. Do not exceed 10 fl. oz. per acre per season. Allow 7 days between applications. REI: 24-hour. PHI: 14-day. IRAC 4A, IRAC 3A. *RUP*.

Entrust SC (2) (spinosad) | For corn borers. Use 2SC formulations at 3.0-10.0 fl. oz. per acre and do not exceed 21 fl. oz. per acre per season. Use 80WP formulations at 1.0-3.0 oz. per acre and do not exceed 9 oz. per acre per season. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 5. *OMRI-listed*.

Lannate LV (2.4L) (methomyl) | 1.5 pts. per acre. For cutworms. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 6-day. IRAC 1A. *RUP*.

Mustang Maxx (0.8) (zeta-cypermethrin) | 1.28-4.0 fl. oz. per acre. For corn borers, and cutworms. Do not exceed 24 fl. oz. per acre per season. Allow 4 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Perm-Up 25DF (permethrin) | For corn borers, and cutworms. Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 51.2oz. per acre per season. Use 3.2EC formulations at 4-8 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Allow 10 days

between applications REI: 12-hour. PHI: 14-day. IRAC 3A. *RUP*.

Radiant 1SC (spinetoram) | 6-8 fl. oz. per acre. For corn borers. Do not exceed 32 fl. oz. per acre. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 5.

Rimon 0.83EC (novaluron) | 6-12 fl. oz. per acre. For corn borers. Do not exceed 24 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 15.

Sevin XLR Plus (4SC) (carbaryl) | 1-2 qts. per acre. For corn borers, and cutworms. Do not exceed 6 qts. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 1A.

Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole) | 4 oz. per acre. For corn borers. Do not exceed 8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 4A, IRAC 28.

Warrior II (2.08CS) (lambda-cyhalothrin) | 0.96-1.92 For corn borers, and cutworms. Do not exceed 7.68 fl. oz. per acre per season. REI: 24-hour. PHI: 7-day. IRAC 3A. *RUP*.

Colorado Potato Beetle

Pesticide

Actara (25WDG) (thiamethoxam) | 3.0 oz. per acre. Apply as a foliar spray. Do not exceed 6 oz. per acre per season. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) | *Seed piece treatment:* 0.17-0.35 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application:* 5.7-8.7 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 8.7 fl. oz. per acre per season from seed or soil applications. *Foliar application:* 1.3 fl. oz. per

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acre applied to foliage. Do not exceed 5.6 fl. oz. per acre per season from foliar applications. See pollinator precautions. REI: 12-hour. PHI: 7-day for foliar applications. IRAC 4A.

Agri-Mek SC (0.7) (abamectin) | 1.7-3.5 fl. oz. per acre. Do not exceed 10.25 fl. oz. per acre per season. REI: 12-hour. PHI: 14-day. IRAC 6. *RUP.*

Asana XL (0.66EC) (esfenvalerate) | 5.8-9.6 fl. oz. per acre. Do not exceed 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP.*

Assail 30SG (acetamiprid) | Use 30SG formulations at 1.5-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 0.6-1.7 oz. per acre and do not exceed 7.0 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Athena (0.76EC) (bifenthrin, abamectin) | 7-17 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 3A, IRAC 6. *RUP.*

Avaunt (30WDG) (indoxacarb) | 3.5-6.0 oz. per acre. Do not exceed 24 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 22.

Baythroid XL (1EC) (beta-cyfluthrin) | 1.6-2.8 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP.*

Belay (2.13SC) (clothianidin) | *Seed piece treatment:* 0.4-0.6 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application:* 9-12 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 12 fl. oz. per acre per season from seed or soil applications. *Foliar application:* 2-3 fl. oz. per acre applied to foliage. Do not exceed 12 fl. oz. per acre per season from foliar applications. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Blackhawk (36G) (spinosad) | 1.7-3.3 oz. per acre. Do not exceed 14.4 oz. per acre per season. REI: 4-hour. PHI: 7-day. IRAC 5.

Coragen (1.67SC) (chlorantraniliprole) | 3.5-7.5 fl. oz. per acre. Do not exceed 15.4 fl. oz. per acre per season. Allow 5 days between applications. REI: 4-hour. PHI: 14-day. IRAC 28.

Endigo ZC (thiamethoxam, lambda-cyhalothrin) | 3.5-4.5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. Allow 7 days between applications. REI: 24-hour. PHI: 14-day. IRAC 4A, IRAC 3A. *RUP.*

Entrust SC (2) (spinosad) | Use 2SC formulations at 3.0-10.0 fl. oz. per acre and do not exceed 21 fl. oz. per acre per season. Use 80WP formulations at 1.0-2.0 oz. per acre and do not exceed 9 oz. per acre per season. Allow 7 days between applications. Tolerance/resistance has been observed in Minnesota. Observe resistance management restrictions. REI: 4-hour. PHI: 7-day. IRAC 5. *OMRI-listed.*

Exirel (0.83SE) (cyantraniliprole) | 5.0-13.5 fl. oz. per acre. Do not apply more than twice per generation. Allow 5 days between applications. REI: 12-hour. PHI: 7-day. IRAC 28.

Mustang Maxx (0.8) (zeta-cypermethrin) | 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 4 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

Neemix (0.39) (azadirachtin) | 4-16 fl. oz. per acre. Use on larvae. REI: 4-hour. PHI: 0-day. IRAC UN. *OMRI-listed.*

Novodor FC (10) (Bacillus thuringiensis tenebrionis strain NB-176) | 1-3 qts. per acre. Effective on small (up to 1/4 inch) larvae only. Use higher rate for mixed sizes or heavier infestations. REI: 4-hour. PHI: 0-day. IRAC 11A.

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 51.2oz. per acre per season. Use 3.2EC formulations at 4-8 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Allow 10 days between applications REI: 12-hour. PHI: 14-day. IRAC 3A. *RUP*.

Platinum 2SC (thiamethoxam) | Use 2SC formulations at 5-8 fl. oz. per acre and do not exceed 8 fl. oz. per acre per season. Use 75SG formulations at 1.66-2.67 oz. per acre and do not exceed 2.67 oz. per acre per season. Seed piece only, apply as in-furrow spray during planting. REI: 12-hour. IRAC 4A.

Radiant 1SC (spinetoram) | 4.5-8 fl. oz. per acre. Do not exceed 32 fl. oz. per acre. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 5.

Rimon 0.83EC (novaluron) | 6-12 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 15.

Scorpion 35SL (3.24) (dinotefuran) | *Soil application:* Use Scorpion 35SL at 11.5-13.25 fl. oz. per acre, or Venom 70SG at 6.5-7.5 fl. oz. per acre applied in-furrow at planting, or side-dressed to both sides of the row at ground crack. *Foliar application:* Use Scorpion 35SL at 2.0-2.75 fl. oz. per acre, or Venom 70SG at 1.0-1.5 fl. oz. per acre applied to foliage. Allow 14 days between applications. See pollinator precautions. REI: 12-hour. PHI: 7-day. IRAC 4A.

Seed treatments (thiamethoxam, mfenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | See label. Rates vary by product. Choose seed treatments that include thiamethoxam insecticide (Cruiser 5FS, Cruiser Maxx, and Cruiser Maxx Potato). For best results, plant potatoes immediately after treatment. PHI: See label. IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Sevin XLR Plus (4SC) (carbaryl) | 1.0-2.0 qts. per acre. Some Colorado Potato Beetle populations are resistant to carbaryl, so results may vary. Do not exceed 6 qts. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 1A.

Sivanto 200 (1.67SL) (flupyradifurone) | 10.5-14.0 fl. oz. per acre. Do not exceed 28.0 fl. oz. per acre per season. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 4D.

Thimet 20G (phorate) | *Light or sandy soils:* 8.5-11.3 oz. per 1,000 ft. of row for any row spacing larger than 32-inches. Use at planting or postemergence. *Heavy or clay soils:* 13.0-17.3 oz. per 1,000 ft. of row. Do not use post emergence. Apply as a band application on each side of row and beneath soil surfaces, or in the seed furrow. REI: 48-hour. PHI: 90-day. IRAC 1B. *RUP*.

Torac (1.29SC) (tolfenpyrad) | 14-21 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season, or 2 applications. Allow 14 days between applications. See pollination precautions. REI: 12-hour. PHI: 14-day. IRAC 21A, FRAC 39.

Trident (14.32) (Bacillus thuringiensis tenebrionis strain SA-10) | 3-6 qts. per acre.p Effective on small (up to 1/4 inch) larvae only. Use higher rate for mixed sizes or heavier infestations. REI: 4-hour. PHI: 0-day. IRAC 11A. *OMRI-listed*.

Trigard (75WP) (cyromazine) | 2.66-5.32 oz. per acre. Do not exceed 1 lb. per acre per season. Allow 14 days between applications. REI: 12-hour. PHI: 17-day. IRAC 17.

Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole) | 4 oz. per acre. Do not exceed 8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 4A, IRAC 28.

Warrior II (2.08CS) (lambda-cyhalothrin) | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. REI: 24-hour. PHI: 7-day. IRAC 3A. *RUP.*

Flea Beetles

Pesticide

Actara (25WDG) (thiamethoxam) | 3.0 oz. per acre. Apply as a foliar spray. Do not exceed 6 oz. per acre per season. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) | *Seed piece treatment:* 0.17-0.35 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application:* 5.7-8.7 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 8.7 fl. oz. per acre per season from seed or soil applications. *Foliar application:* 1.3 fl. oz. per acre applied to foliage. Do not exceed 5.6 fl. oz. per acre per season from foliar applications. See pollinator precautions. REI: 12-hour. PHI: 7-day for foliar applications. IRAC 4A.

Asana XL (0.66EC) (esfenvalerate) | 5.8-9.6 fl. oz. per acre. Do not exceed 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP.*

Assail 30SG (acetamiprid) | Use 30SG formulations at 1.5-2.5 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 0.6-1.1 oz. per acre and do not exceed 7.0 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Athena (0.76EC) (bifenthrin, abamectin) | 7-17 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 3A, IRAC 6. *RUP.*

Baythroid XL (1EC) (beta-cyfluthrin) | 1.6-2.8 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP.*

Belay (2.13SC) (clothianidin) | *Seed piece treatment:* 0.4-0.6 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application:* 9-12 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 12 fl. oz. per acre per season from seed or soil applications. *Foliar application:* 2-3 fl. oz. per acre applied to foliage. Do not exceed 12 fl. oz. per acre per season from foliar applications. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Endigo ZC (thiamethoxam, lambda-cyhalothrin) | 3.5-4.5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. Allow 7 days between applications. REI: 24-hour. PHI: 14-day. IRAC 4A, IRAC 3A. *RUP.*

Lannate LV (2.4L) (methomyl) | 1.5 pts. per acre. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 6-day. IRAC 1A. *RUP.*

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 51.2oz. per acre per season. Use 3.2EC formulations at 4-8 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Allow 10 days between applications REI: 12-hour. PHI: 14-day. IRAC 3A. *RUP.*

Platinum 2SC (thiamethoxam) | Use 2SC formulations at 5-8 fl. oz. per acre and do not exceed 8 fl. oz. per acre per season. Use 75SG formulations at 1.66-2.67 oz. per acre and do not exceed 2.67 oz. per acre per season. Seed piece only, apply as in-furrow spray during planting. REI: 12-hour. IRAC 4A.

Scorpion 35SL (3.24) (dinotefuran) | *Soil application:* Use Scorpion 35SL at 11.5-13.25 fl. oz. per acre, or Venom 70SG at 6.5-7.5 fl. oz. per acre applied in-furrow at planting, or side-dressed to

both sides of the row at ground crack. *Foliar application*: Use Scorpion 35SL at 2.0-2.75 fl. oz. per acre, or Venom 70SG at 1.0-1.5 fl. oz. per acre applied to foliage. Allow 14 days between applications. See pollinator precautions. REI: 12-hour. PHI: 7-day. IRAC 4A.

Seed treatments (thiamethoxam, mfenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | See label. Rates vary by product. Choose seed treatments that include thiamethoxam insecticide (Cruiser 5FS, Cruiser Maxx, and Cruiser Maxx Potato). For best results, plant potatoes immediately after treatment. PHI: See label. IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Sevin XLR Plus (4SC) (carbaryl) | 0.5-1.0 qts. per acre. Do not exceed 6 qts. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 1A.

Thimet 20G (phorate) | *Light or sandy soils*: 8.5-11.3 oz. per 1,000 ft. of row for any row spacing larger than 32-inches. Use at planting or postemergence. *Heavy or clay soils*: 13.0-17.3 oz. per 1,000 ft. of row. Do not use post emergence. Apply as a band application on each side of row and beneath soil surfaces, or in the seed furrow. REI: 48-hour. PHI: 90-day. IRAC 1B. *RUP*.

Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole) | 4 oz. per acre. Do not exceed 8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 4A, IRAC 28.

Warrior II (2.08CS) (lambda-cyhalothrin) | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. REI: 24-hour. PHI: 7-day. IRAC 3A. *RUP*.

Leafhoppers

Pesticide

Actara (25WDG) (thiamethoxam) | 3.0 oz. per acre. Apply as a foliar spray. Do not exceed 6 oz. per acre per season. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Admire Pro (4.6SC) (imidacloprid) | *Seed piece treatment*: 0.17-0.35 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application*: 5.7-8.7 fl. oz. per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 8.7 fl. oz. per acre per season from seed or soil applications. *Foliar application*: 1.3 fl. oz. per acre applied to foliage. Do not exceed 5.6 fl. oz. per acre per season from foliar applications. See pollinator precautions. REI: 12-hour. PHI: 7-day for foliar applications. IRAC 4A.

Asana XL (0.66EC) (esfenvalerate) | 5.8-9.6 fl. oz. per acre. Do not exceed 67.2 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP*.

Assail 30SG (acetamiprid) | Use 30SG formulations at 1.5-4.0 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 0.6-1.7 oz. per acre and do not exceed 7.0 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

Athena (0.76EC) (bifenthrin, abamectin) | 7-17 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day. IRAC 3A, IRAC 6. *RUP*.

Baythroid XL (1EC) (beta-cyfluthrin) | 0.8-1.6 fl. oz. per acre. Do not exceed 16.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP*.

Belay (2.13SC) (clothianidin) | *Seed piece treatment*: 0.4-0.6 fl. oz. per 100 lbs of seed applied directly to seed pieces. *Soil application*: 9-12 fl. oz.

Potato - Insects

per acre applied in-furrow, side-dressed, or below seed piece at planting. Do not exceed 12 fl. oz. per acre per season from seed or soil applications.

Foliar application: 2-3 fl. oz. per acre applied to foliage. Do not exceed 12 fl. oz. per acre per season from foliar applications. Allow 7 days between applications. See pollinator precautions. REI: 12-hour. PHI: 14-day. IRAC 4A.

Dimethoate 4EC (dimethoate) | Use 2.67EC formulations at 0.75-1.5 pt. per acre and do not exceed 3.0 pts. per acre per season. Use 4EC, LV-4, and 400 formulations at 0.5-1 pt. per acre and do not exceed 2 pt. per acre per season. Allow 7 days between applications. REI: 48-hour. PHI: 0-day. IRAC 1B.

Endigo ZC (thiamethoxam, lambda-cyhalothrin) | 3.5-4.5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. Allow 7 days between applications. REI: 24-hour. PHI: 14-day. IRAC 4A, IRAC 3A. *RUP.*

Lannate LV (2.4L) (methomyl) | 1.5-3.0 pts. per acre. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 6-day. IRAC 1A. *RUP.*

Malathion 5EC (malathion) | Use 5EC formulations at 2.0 pts. per acre. Use 57EC formulations at 1.0-1.5 pts. per acre. Do not exceed 2 applications per season. Allow 7 days between applications. REI: 12 to 24-hour. PHI: 0-day. IRAC 1B.

Mustang Maxx (0.8) (zeta-cypermethrin) | 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. Allow 4 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 51.2oz. per acre per season. Use 3.2EC formulations at 4-8 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Allow 10 days between applications REI: 12-hour. PHI: 14-day. IRAC 3A. *RUP.*

Platinum 2SC (thiamethoxam) | Use 2SC formulations at 5-8 fl. oz. per acre and do not exceed 8 fl. oz. per acre per season. Use 75SG formulations at 1.66-2.67 oz. per acre and do not exceed 2.67 oz. per acre per season. Seed piece only, apply as in-furrow spray during planting. REI: 12-hour. IRAC 4A.

Scorpion 35SL (3.24) (dinotefuran) | *Soil application:* Use Scorpion 35SL at 11.5-13.25 fl. oz. per acre, or Venom 70SG at 6.5-7.5 fl. oz. per acre applied in-furrow at planting, or side-dressed to both sides of the row at ground crack. *Foliar application:* Use Scorpion 35SL at 2.0-2.75 fl. oz. per acre, or Venom 70SG at 1.0-1.5 fl. oz. per acre applied to foliage. Allow 14 days between applications. See pollinator precautions. REI: 12-hour. PHI: 7-day. IRAC 4A.

Seed treatments (thiamethoxam, mfenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | See label. Rates vary by product. Choose seed treatments that include thiamethoxam insecticide (Cruiser 5FS, Cruiser Maxx, and Cruiser Maxx Potato). For best results, plant potatoes immediately after treatment. PHI: See label. IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Sevin XLR Plus (4SC) (carbaryl) | 0.5-1.0 qts. per acre. Do not exceed 6 qts. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 1A.

Sivanto 200 (1.67SL) (flupyradifurone) | 7.0-10.5 fl. oz. per acre. Do not exceed 28.0 fl. oz. per acre per season. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 4D.

Thimet 20G (phorate) | *Light or sandy soils:* 8.5-11.3 oz. per 1,000 ft. of row for any row spacing larger than 32-inches. Use at planting or postemergence. *Heavy or clay soils:* 13.0-17.3 oz. per 1,000 ft. of row. Do not use post emergence. Apply as a band application on each side of row and

beneath soil surfaces, or in the seed furrow. REI: 48-hour. PHI: 90-day. IRAC 1B. *RUP*.

Torac (1.29SC) (tolfenpyrad) | 14-21 fl. oz. per acre. Do not exceed 42 fl. oz. per acre per season, or 2 applications. Allow 14 days between applications. See pollination precautions. REI: 12-hour. PHI: 14-day. IRAC 21A, FRAC 39.

Transform WG (50) (sulfoxaflor) | 1.5-2.25 oz. per acre. Do not exceed 8.5 oz. per acre per season. Allow 14 days between applications. REI: 24-hour. PHI: 7-day. IRAC 4C.

Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole) | 4 oz. per acre. Do not exceed 8 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 14-day. IRAC 4A, IRAC 28.

Vydate C-LV (3.77WSL) (oxamyl) | 17-34 fl. oz. per acre. Do not exceed 8 applications or 306 fl. oz. per acre per season. *In Kansas*, allow 14 days between applications. Do not exceed 4 applications or 204 fl. oz. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1A. *RUP*.

Warrior II (2.08CS) (lambda-cyhalothrin) | 0.96-1.60 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. REI: 24-hour. PHI: 7-day. IRAC 3A. *RUP*.

Wireworms

Pesticide

Admire Pro (4.6SC) (imidacloprid) | 0.17-0.35 fl. oz. per 100 lbs of seed Apply directly to seed pieces. Do not exceed 8.7 fl. oz. per acre per season. See pollinator precautions. REI: 12-hour. IRAC 4A.

Brigade 2EC (bifenthrin) | 9.6-19.2 fl. oz. per acre. Use 2EC formulations at 9.6-19.2 fl. oz. per acre as preplant broadcast and incorporate, at planting as a banded spray into furrow, or at lay-by as a soil-directed and incorporated spray through

cultivation. Do not exceed 32 fl. oz. per acre per season Do not use 10DF, 10WP, or 10WSB formulations as they are not labeled for potatoes. Allow 21 days between applications. REI: 12-hour. PHI: 21-day. IRAC 3A. *RUP*.

Capture LFR (1.5) (bifenthrin) | 12.75-25.5 fl. oz. per acre. Apply as preplant broadcast and incorporate, at planting as a banded spray into furrow, or at lay-by as a soil-directed and incorporated spray through cultivation. REI: 12-hour. PHI: 21-day. IRAC 3A. *RUP*.

Platinum 2SC (thiamethoxam) | Use 2SC formulations at 5-8 fl. oz. per acre and do not exceed 8 fl. oz. per acre per season. Use 75SG formulations at 1.66-2.67 oz. per acre and do not exceed 2.67 oz. per acre per season. Seed piece only, apply as in-furrow spray during planting. REI: 12-hour. IRAC 4A.

Regent 4SC (fipronil) | 0.184-0.220 fl. oz. per 1,000 ft. of row. Do not apply in row spacing less than 30 inches. On any row spacing greater than 36 inches, apply no more than 0.220 fl. oz. REI: 0-hour. PHI: 90-day. IRAC 2B. *RUP*.

Seed treatments (thiamethoxam, mfenoxam, fludioxonil, azoxystrobin, thiabendazole, spinosad, abamectin) | See label. Rates vary by product. Choose seed treatments that include thiamethoxam insecticide (Cruiser 5FS, Cruiser Maxx, and Cruiser Maxx Potato). For best results, plant potatoes immediately after treatment. PHI: See label. IRAC 4A, FRAC 4, FRAC 12, FRAC 11, FRAC 1, IRAC 5, IRAC 6.

Thimet 20G (phorate) | *Light or sandy soils*: 8.5-11.3 oz. per 1,000 ft. of row for any row spacing larger than 32-inches. Use at planting or postemergence. *Heavy or clay soils*: 13.0-17.3 oz. per 1,000 ft. of row. Do not use post emergence. Apply as a band application on each side of row and beneath soil surfaces, or in the seed furrow. REI: 48-hour. PHI: 90-day. IRAC 1B. *RUP*.

Potato - Weeds

Reviewed by Stephen Meyers, Ben Phillips – Nov 2020

Recommended Controls

All Weeds

A relatively large number of herbicides are labeled for use on potatoes, and there are many opportunities to apply them because the hilling process recreates a preemergent crop situation by burying crop leaves and protecting them from soil surface sprays.

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

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

Non-Pesticide

Potato cultural practices offer several good opportunities to control weeds, beginning with the period between planting and emergence (when early-emerging weeds can be killed by flaming), and continuing through the hilling process (when weeds can be buried or cultivated out). Some organic farmers also use flaming after potatoes emerge because some injury to the potato foliage early in the season can be tolerated. Rolling cultivators on wide tool-bars offer effective high-speed cultivation between rows and can also hill.

Broadleaf and Grass Weeds - Postemergence

Pesticide

glyphosate products (glyphosate) | 0.75-3.75 lbs. acid equivalent (ae) per acre. Use formulations

containing 3 lbs. ae per gal. (4 lbs. isopropylamine salt per gal.) at 1-5 qts. per acre, or formulations containing 4.5 lbs. ae per gal. (5 lbs. potassium salt per gal.) at 0.66-3.3 qts. per acre. Broadcast before planting, after planting before ground cracks, or apply between crop rows with wipers or hooded or shielded sprayers. Use low rate for annuals and higher rates for perennials. See label for suggested application volume and adjuvants. REI: 4 to 12-hour. PHI: 14-day. WSSA 9.

Lorox DF (50) (linuron) | Use 50DF formulations at 1.5-3 lbs. per acre. Use 4L formulations at 1.5-4 pts. per acre. Also controls small, emerged weeds. Apply after planting but before crop emergence, when weeds are less than 2 inches tall. Seed pieces must be planted at least 2 inches deep. Do not use on sand, loamy sand, or soils with less than 1 percent organic matter. REI: 24-hour to 8-day. WSSA 7.

Matrix SG (25WSG) (rimsulfuron) | 1-1.5 oz. per acre. Typically combined with full-labeled rates of metribuzin to improve spectrum of broadleaf control. Use 0.5 pt. of NIS per 25 gals. of spray solution if emerged weeds are present. Apply after planting before crop emerges, at hilling, drag-off, or reservoir tillage, to a clean, newly prepared seedbed. Apply post when weeds are less than 1 inch tall. Avoid using adjuvants when potatoes are under heat stress. Do not exceed 2.5 oz. per acre per year. REI: 4-hour. PHI: 30-day. WSSA 2.

paraquat products (paraquat) | 1-2 pts. per acre. Use 1 qt. of COC, or 4-8 fl. oz. of NIS per 25 gals. of spray solution. Apply before planting, or after planting but before ground cracks. REI: 12 to 24-hour. WSSA 22. *RUP*.

Broadleaf and Grass Weeds - Preemergence

Pesticide

Dual Magnum (7.62EC) (s-metolachlor) | 1-2 pts. per acre. Dual Magnum or Dual II Magnum at 1-2

pts. per acre. Use lower rates on coarse soils. Apply and incorporate before planting, or apply after planting before weeds emerge. May also be applied at 1.67 pts. per acre after hilling. Dual Magnum might delay maturity and/or reduce yield of Superior and other early maturing varieties if cold, wet soil conditions occur after treatment. Dual Magnum can be tank-mixed with Lorox, Sencor, Prowl or Eptam. See labels. Do not exceed 3.6 pts. per acre. REI: 24-hour. PHI: 60-day if applied before drag-off, or 40-day if applied at lay-by. WSSA 15.

Eptam 7E (EPTC) | Eptam 7E at 3.5-7 pts. per acre, or Eptam 20G at 15-20 lbs. per acre. Apply before planting, after drag-off, or as directed spray at lay-by. Incorporate immediately. On muck soils, supplement with linuron or metribuzin products applied before crop emerges and after drag-off. The Superior variety may be sensitive. Suppresses nutsedge. REI: 12-hour. PHI: 45-day. WSSA 8.

Lorox DF (50) (linuron) | Use 50DF formulations at 1.5-3 lbs. per acre. Use 4L formulations at 1.5-4 pts. per acre. Also controls small, emerged weeds. Apply after planting but before crop emergence, when weeds are less than 2 inches tall. Seed pieces must be planted at least 2 inches deep. Do not use on sand, loamy sand, or soils with less than 1 percent organic matter. REI: 24-hour to 8-day. WSSA 7.

Matrix SG (25WSG) (rimsulfuron) | 1-1.5 oz. per acre. Typically combined with full-labeled rates of metribuzin to improve spectrum of broadleaf control. Use 0.5 pt. of NIS per 25 gals. of spray solution if emerged weeds are present. Apply after planting before crop emerges, at hilling, drag-off, or reservoir tillage, to a clean, newly prepared seedbed. Apply post when weeds are less than 1 inch tall. Avoid using adjuvants when potatoes are under heat stress. Do not exceed 2.5 oz. per acre per year. REI: 4-hour. PHI: 30-day. WSSA 2.

metribuzin products (metribuzin) | Use 4F formulations at 0.5-2 pts. per acre, or 75DF

formulations at 0.33-1.32 lbs. per acre. Not for early-maturing or red-skinned varieties. Apply after planting before crop emerges, or apply up to 1 pt. of metribuzin 4F (1.32 lbs. of 75DF formulations) after emergence. Check label for sensitive varieties. Avoid spraying when potatoes are 12-15 inches tall. Do not apply within 3 days of cool, wet, or cloudy weather, or crop injury may occur. Do not apply within 1 day of other pesticide applications. Do not exceed 2 pts. of 4F formulations or 1.32 lbs. of 75DF formulations per acre per year. REI: 12-hour. PHI: 60-day. WSSA 5.

Outlook (6) (dimethenamid-p) | 12-21 fl. oz. per acre. Apply after planting or drag-off and before weeds emerge. In cold and wet conditions potatoes may emerge slowly or be stunted. May be tank-mixed with a number of other potato herbicides. REI: 12-hour. PHI: 40-day. WSSA 15.

pendimethalin products (pendimethalin) | Use 3.8 formulations at 1.5-3 pts. per acre. Use 3.3EC formulations at 1.2-3.6 pts. per acre. Use low rates on coarse soils. Broadcast after planting but before emergence or drag-off, or after potatoes have fully emerged before potatoes are 6 inches tall. May be incorporated. Not effective on muck soils. Do not apply postemergence to stressed potatoes. REI: 24-hour. WSSA 3.

trifluralin products (trifluralin) | 0.5-1 lb. a.i. per acre. Use 4EC formulations at 1-2 pts. per acre. Use 10G formulations at 5-10 lbs. per acre. Broadcast and incorporate 1-2 inches after planting but before emergence, immediately after drag-off, or after potatoes have fully emerged. Use low rate on coarse soils with less than 2% organic matter. Not effective on muck or high organic matter soils. REI: 12-hour. WSSA 3.

Zidua (85WDG) (pyroxasulfone) | 2.5-3.25 fl. oz. per acre of SC formulation. 1.5-2.0 oz. per acre of WG formulation. Apply after planting and before potatoes emerge. Use with another herbicide. Some varieties may be sensitive to Zidua. REI: 12-hour. WSSA 15.

Broadleaf Weeds Only - Postemergence

Pesticide

Aim EC (2) (carfentrazone) | 0.5-2 fl. oz. per acre. Apply prior to or within 24 hours of planting, or apply between crop rows with hooded sprayer. Do not allow spray to contact crop. Use COC or NIS. Weeds must be actively growing and less than 4 inches tall. Do not exceed 6.1 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. WSSA 14.

League (75WDG) (imazosulfuron) | 4.0-6.4 oz. per acre. Apply after planting crop and before crop emerges, or immediately after hilling. Or use 3.2 oz. per acre and after at least 21 days make a second application of 3.2 oz. per acre to control emerged weeds less than 3 inches tall. Or use 3.2-4 oz. per acre after crop emerges and before weeds are 3 inches tall; combine this with other measures to achieve satisfactory control. When emerged weeds are present use a Valent-recommended surfactant. Use the high rate in fields with a known history of nutsedge. Do not exceed two applications and 6.4 oz. per acre per year. REI: 12-hour. PHI: 45-day. WSSA 2.

Broadleaf Weeds Only - Preemergence

Pesticide

Chateau SW (51WDG) (flumioxazin) | 1.5 oz. per acre. *Minnesota only -- supplemental label.* Apply to potatoes after hilling. A minimum of 2 inches of soil must cover vegetative plant parts when applied to avoid injury. Provides suppression of lambsquarters, nightshades, pigweeds, wild mustard, and wild radish. Tank-mixes recommended to improve efficacy. REI: 12-hour. WSSA 14.

League (75WDG) (imazosulfuron) | 4.0-6.4 oz. per acre. Apply after planting crop and before crop emerges, or immediately after hilling. Or use 3.2 oz. per acre and after at least 21 days make a second application of 3.2 oz. per acre to control emerged

weeds less than 3 inches tall. Or use 3.2-4 oz. per acre after crop emerges and before weeds are 3 inches tall; combine this with other measures to achieve satisfactory control. When emerged weeds are present use a Valent-recommended surfactant. Use the high rate in fields with a known history of nutsedge. Do not exceed two applications and 6.4 oz. per acre per year. REI: 12-hour. PHI: 45-day. WSSA 2.

Reflex (2L) (fomesafen) | 1 pt. per acre. Broadcast after planting and before potatoes emerge. When using on any variety for the first time, first determine whether the variety is tolerant to this herbicide. May be tank-mixed with other preemergence herbicides. May not be used on the same land the following year. Alfalfa and most vegetables should not be planted for 18 months. REI: 24-hour. PHI: 70-day. WSSA 14.

Grass Weeds Only - Postemergence

Pesticide

clethodim products (clethodim) | Use 2EC formulations at 6-16 fl. oz. per acre with 1 qt. of COC per 25 gals. of spray solution (1% v/v). Use Select Max at 9-32 fl. oz. per acre with 8 fl. oz. of NIS per 25 gals. of spray solution (0.25% v/v). Use low rates for annual grasses, the high rates for perennial grasses. Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 32 fl. oz. of 2EC formulations or 64 fl. oz. of Select Max per acre per season. REI: 24-hour. PHI: 30-day. WSSA 1.

Poast (1.5EC) (sethoxydim) | 1.0-2.5 pts. per acre. Use 1 qt. of COC per acre. Spray on actively growing grass. Use high rate on quackgrass. Do not exceed 5 pts. per acre per season. REI: 12-hour. PHI: 30-day. WSSA 1.