

Chapter 14. Potato Production¹

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Botany and Planting

Potato—*Solanum tuberosum*, Solanaceae

Table 1. Planting information for potato.

Planting Dates	
North Florida	Jan–Feb
Central Florida	Nov–Feb
South Florida	Oct–Jan
Planting Information	
Distance between rows (inch)	36–42
Distance between plants (inch)	7–10
Planting depth (inch)	3–4
Average seed piece size (oz)	2.5–3.0
Average seed per planted acre (lb)	2000–3000
Days from planting to tuber maturity	85–110

Cultivars

The University of Florida Potato Variety Evaluation Program screens new germplasm from public and private breeding programs and identifies the most promising cultivars for commercial potential, considering broad adaptability to Florida climate and conditions and market purpose: processing, fresh-market, and specialty-type

varieties. The Florida Potato Variety Trial Report is available at <https://hos.ifas.ufl.edu/extension/variety-trials/>. A summary of the most popular potato clones for Florida is presented below. Key reference: total yield: high >300 cwt/A, medium-high 250–299 cwt/A; medium 200–249 cwt/A; low-medium 150–199 cwt/A. Tuber specific gravity (SG): high >1.075, medium-high 1.070–1.074, medium 1.065–1.069, low <1.064.

1. Chipping Types

Atlantic. Mid-season, high yield, high SG. Mostly round; shallow eye depth; tan skin color; cream flesh; good appearance; susceptible to internal heat necrosis and hollow heart. <https://edis.ifas.ufl.edu/publication/HS1278>

Elkton. Mid-season, high yield, medium-high SG. Mostly oblong; shallow eye depth; white skin color; white flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1237>

Harley Blackwell. Mid-late season, high yield, high SG. Mostly round; shallow eye depth; tan skin color; white flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1298>

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The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication do not signify our approval to the exclusion of other products of suitable composition.

Use pesticides safely. Read and follow directions on the manufacturer's label.

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Lamoka. Mid-late season, medium-high yield, medium SG. Round to oblong; intermediate eye depth; tan skin color; cream flesh; fair to good appearance.

Pike. Late season; medium-high yield; medium-high SG. Round to oblong; shallow eye depth; buff skin color; white flesh; good appearance.

Snowden. Mid-season; high-yield, high SG. Round; intermediate eye depth; tan skin color; white flesh; fair to good appearance. <https://edis.ifas.ufl.edu/publication/HS1286>

Superior. Mid-season; medium-yield; medium SG. Round to oblong; intermediate eye depth; buff skin color; white flesh; fair to good appearance.

2. All-Purpose Types

LaChipper. Mid-season; high yield; medium SG. Round to oblong; intermediate eye depth; white skin and white flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1297>

Marcy. Mid-late season; high yield; low SG. Round to oblong; shallow eye depth; buff skin color; white flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1277>

Sebago. Early-mid season; high yield; medium SG. Mostly oblong; intermediate eye depth; buff skin color; white flesh; good appearance.

3. Fresh-Market/Table Types—Whites/Yellows

Almera. Early-mid season; high yield; low SG. Oblong to long; intermediate eye depth; buff skin color; light yellow flesh; good appearance.

Colomba. Mid-season; high yield; low SG. Mostly oblong; very shallow eye depth; cream skin color and light yellow flesh; excellent appearance.

Coronada. Mid-season; medium-high yield; low SG. Mostly oblong; very shallow eye depth; white skin color and light-yellow flesh; excellent appearance.

Electra. Mid-season; high yield; low SG. Round to oblong; shallow eye depth; white skin and white flesh; good appearance.

Fabula. Mid-late season. Medium-high yield; low SG. Mostly oblong; shallow eye depth; white-cream skin color;

light yellow flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1294>

Francisca. Mid-late season. Medium-high yield; low SG. Round to oblong; shallow eye depth; buff skin color; light yellow flesh; good appearance.

Jelly. Early-mid season; high yield; low SG. Round to oblong; shallow eye depth; cream skin color and dark-yellow flesh; good to excellent appearance.

Malou. Mid-late season; high yield; low SG. Round to oblong; intermediate eye depth; white skin color; medium-yellow flesh; good to excellent appearance.

Natasha. Mid-season; medium-high yield; low SG. Mostly oblong; shallow eye depth; cream skin color; light-yellow flesh; excellent appearance.

Satina. Mid-season; medium-high yield; low SG. Round to oblong; shallow eye depth; cream skin color; medium-yellow flesh; good to excellent appearance.

4. Fresh-Market/Table Types—Reds

Cerata. Early-mid season; high yield; low SG. Round to oblong; shallow eye depth; pink skin color and white flesh; good to excellent appearance.

Chieftain. Mid-late season; high yield; low SG. Round to oblong; intermediate eye depth; red skin color and white flesh; fair to good appearance

LaRouge. Early-mid season; high yield; medium SG. Round to oblong; intermediate eye depth; pink-red skin color; white flesh; fair to good appearance.

Red Lasoda. Mid-late season; medium yield; low SG. Mostly oblong; intermediate to deep eye depth; red skin color; white flesh; good appearance.

Strawberry Paw. Mid-late season; high yield; low SG. Round to oblong; shallow eye depth; red skin color; cream flesh; good appearance.

5. Fresh-Market/Table Types—Purples

Adirondack Blue. Mid-late season; medium yield; medium SG. Oblong to long; intermediate eye depth; purple skin color; purple flesh; fair to good appearance. <https://edis.ifas.ufl.edu/publication/HS1293>

All Blue. Mid-late season; medium yield; medium SG. Oblong to long; intermediate eye depth; purple skin color; purple flesh; fair to good appearance.

Michigan Purple. Mid-late season; high yield; medium SG. Mostly oblong; intermediate eye depth; purple skin color; white flesh; good appearance.

Peter Wilcox. Mid-late season; medium-high yield; medium SG. Round to oblong; intermediate eye depth; purple skin color; medium-yellow flesh; good appearance. <https://edis.ifas.ufl.edu/publication/HS1295>

The following tables list registered pesticides that should be integrated with other pest management methods. Additional information on integrated management methods can be requested from UF/IFAS Extension horticulture or agriculture agents. A list of local UF/IFAS Extension offices is available at <https://sfyl.ifas.ufl.edu/find-your-local-office/>.

Table 2. Herbicides approved for managing weeds in potato. Contact: Peter J. Dittmar, UF/IFAS Horticultural Sciences Department.

Active Ingredient lb a.i./Acre	Trade Name Product/Acre	MOA Code	Weeds Controlled/Remarks
Labels change frequently. Be sure to read a current product label before applying any chemical.			
*** PREPLANT/PREEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 2.0 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Dimethenamid-p 0.56–0.84	(Outlook) 6 L 12–18 fl oz	15	Apply after planting or drag-off. Consult label for exact rates based on soil texture. In cold, wet conditions, delayed crop emergence or stunting may occur. PHI 40 days.
EPTC 1	(Eptam) 20 G 15 lb	8	Broadleaf and grass weeds and nutsedge. Apply preplant or after drag-off. Incorporate mechanically or with irrigation 2–4 in. deep. Do not apply the emulsifiable formulation preemergence in winter and early spring potatoes.
Flumioxazin 0.05	(Chateau) 51 WDG 1.5 oz	14	Annual broadleaf weeds. Apply after hilling with a minimum of 2 in. of soil covering the vegetative portion of the potato plant. Should be tank-mixed with other herbicides, especially for grass control.
Fomesafen 0.25	(Reflex, Ringside) 2 EC 1.0 pt	14	Annual broadleaf and grass weeds. Effectiveness reduced if later cultural practices expose untreated soil. Can be applied after drag off and before crop emergence. Variety tolerance may vary; test on a small sample before application to the entire field. PHI 7 days.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult label for individual product directions.
Imazosulfuron 0.19–0.3	(League) 75 WG 4–6.4 oz	2	Broadleaf and grass weeds. Limit of 2 applications per year and no more than 6.4 oz/A per year.
Linuron 0.75–1.25	(Lorox DF) 50 DF 1.5–2.5 lb (Linex) 4 L 1–1.6 pt	7	Apply after final drag-off. If weeds are present include a NIS. Best results are obtained in moist fields at application followed by rain or irrigation within 2 weeks.
Metribuzin 0.25–1.0	(Tricor DF) 75 DF 0.3–1.3 lb	5	Annual broadleaf weeds. Apply after drag-off but before crop emergence. Do not incorporate. Use lower rates on sandy soil.
Metribuzin + S-metolachlor	(Boundry) 6.5 EC 1.5–2.0 pt	5 + 15	Broadleaf and grass weeds. Apply before potato emergence. This includes drag-off. Do not incorporate.
Paraquat 0.25–0.5	(Gramoxone) 2 SL 1.0–2.0 pt (Firestorm) 3 SL 0.7–1.3 pt	22	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Apply up to ground cracking before potatoes have emerged. Use a nonionic surfactant.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Product is a contact, nonselective, foliar-applied herbicide with no residual control. May be tank-mixed with soil residual compounds.
Pendimethalin 0.75	(Prowl H20) 3.8 1.5 pt	3	Annual broadleaf and grass weeds. Apply after planting but before potatoes and weeds emerge or after drag-off. Incorporate with rainfall or mechanically into the top 1–2 in. of soil within 7 days. Do not use on peat or muck soils.
Pyraflufen 0.001–0.003	(ET Herbicide) 0.208 EC 0.5–2.0 fl oz	14	Emerged broadleaf weeds. Apply as a preplant burndown treatment.
Pyroxasulfone 0.08–0.11	(Zidua Herbicide) 1.5–2.0 oz	15	Broadleaf and grass weeds. Apply after drag-off and before potato and weed emergence. No PHI between a preemergence application and harvest. Efficacy is decreased if the untreated soil is exposed.
Rimsulfuron 0.016–0.023	(Matrix) 25 DF 1.0–1.5 oz	2	Apply immediately after drag-off. Rainfall or sprinkler irrigation 0.3–1.0 in. required with 5 days after application. Do not exceed 2.0 oz./A per year.

Active Ingredient lb a.i./Acre	Trade Name Product/Acre	MOA Code	Weeds Controlled/Remarks
S-metolachlor 0.95–1.9	(Dual Magnum) 7.62 EC 1.0–2.0 pt	15	Annual broadleaf and grass weeds. Apply after drag-off before crop and weed emergence. If cool, wet soil conditions occur after application, a delay in maturity and/or reduced yield may occur. PHI 60 days.
Sulfentrazone 0.09–0.14	(Willowood sulfentrazone) 4SC 3.0–4.5 fl oz	14	Broadleaf and grass weed control. Nutsedge suppression. Do not apply on sands with less than 1% organic matter. Do not apply more than 8 fl oz/A within a 12-month period. Should be trialed on a small area to find suitable rate for the soil type in your area.
Trifluralin 0.5	(Trust, Treflan TR-10) 10 G 5 lb (Trifluralin, Treflan) 4 L 1 pt	3	Broadleaf and grass weeds. Apply after drag-off or prior to crop emergence. Incorporate the herbicide into the soil profile. If applied after plant emergence, do not allow soil contact with the emerged plants.
*** POSTEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2.0 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply as hooded application to row middles only. Use a COC or NIS at recommended rates. May be tank-mixed with other herbicides. Do not exceed 6.1 fl oz per cropping season. PHI 7 days.
Clethodim 0.09–0.25 0.07–0.25	(Arrow, Select) 2 EC 6–16 fl oz (Select Max) 1 EC 9–32 fl oz	1	Perennial and annual grass weeds. In fields with heavy grass pressure or larger grass weeds, use higher rates or repeat application 14 days apart. Use a crop oil concentrate at 1% v/v in the finished spray volume. Nonionic surfactant with Select Max. PHI 30 days.
EPTC 3 3.1–7.9	(Eptam) 20 G 15 lb (Eptam) 7 E 3.5 to 9 pt	8	Annual broadleaf, grass weeds, and nutsedge. Apply at layby to a clean cultivated soil. Incorporate mechanically or with irrigation. Apply Eptam 7 E after true leaves have formed and apply as a layby treatment. Do not exceed 12.25 lb a.i. per season. PHI 45 days.
Imazosulfuron 0.19–0.3	(League) 75 WG 4–6.4 oz	2	Broadleaf and grass weeds. Limit of 2 applications per year and no more than 6.4 oz/A per year. PHI 45 days.
Metribuzin 0.23–0.5	(Tricor) 75 DF 0.3–0.6 lb	5	Broadleaf and grass weeds. Do not apply to early smooth-skinned, red-skinned, and other specified varieties on the label. Do not exceed 1.3 lb of product /A. PHI 60 days.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Direct spray to row middles. Product is a contact, nonselective, foliar-applied herbicide with no residual control. May be tank-mixed with several soil residual compounds.
Rimsulfuron 0.016–0.023	(Matrix) 25 DF 1.0–1.5 oz	2	Apply immediately after drag-off. Rainfall or sprinkler irrigation 0.3–1.0 in. required within 5 days after application. Apply as a sequential treatment 14 to 28 days after the first application. Do not exceed 2.0 oz/A per year.
Sethoxydim 0.28–0.47	(Poast) 1.5 EC 1.5–2.5 pt	1	Control growing grass weeds. A total of 5.0 pt/A applied in one season. Include a crop oil concentrate. Unsatisfactory results may occur if applied to grass under stress. PHI 30 days.

Table 3. Insecticides approved for management of arthropod pests of potato. Contact: Bonnie Wells, UF/IFAS Extension Brevard County.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to Chapter 19 for information on biopesticides, including materials labeled for certified organic production.						
Aphids	1A	*Lannate LV; *SP (methomyl)	LV: 1.5–3.0 pt SP: 0.5–1.0 lb	48	6	Do not make more than 10 applications per crop or apply more than 15 pt (LV) or 5 lb (SP) per acre per crop.
	1B	Dimethoate 4EC (dimethoate)	0.5–1.0 pt	48	Mechanically harvested: 0 Otherwise: 14	Highly toxic to bees. Do not apply more than 2 pt per acre per year.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–2.5 pt 8F: 1–1.5 pt	12	0	Maximum of two applications per year.
	3A	*Ambush 25W (permethrin)	3.2–12.8 oz	12	14	Do not apply more than 1.6 lb active ingredient per season (102.4 oz).
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 oz	12	1	A maximum of 24 fl oz/acre per season may be applied.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Only exposed insects can be controlled. Do not apply more than 7.68 fl oz of product per acre per season.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz of product per acre per growing season. Do not use with other Group 4A insecticides.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Toxic to bees. Do not use following soil application of other Group 4A insecticides. Maximum 6 oz/acre per season.
	4A	Admire Pro (imidacloprid)	Soil: 5.7–8.7 fl oz Seed piece treatment: 3.5–7.0 fl oz/100 lb seed Foliar: 1.3 fl oz	12	At planting: see label for options. Foliar: 7	Do not apply more than 0.31 lb a.i. per acre per season. Seed piece rate is based on seeding rate of 2000 lb/acre. Foliar: Maximum for foliar applications per year: 5.6 fl oz.
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Do not make more than 4 applications per season. Do not exceed a total of 0.3 lb a.i. (16 oz of product) per acre per season.
	4A	Belay Insecticide (clothianidin)	In-furrow or sidedress application: 9–12 fl oz Foliar: 2–3 fl oz	12	Soil: at planting, sidedress, or hilling Foliar: 14	See label for in-furrow, sidedress, and seed-piece applications. Do not apply during bloom or allow to drift to flowering plants. Toxic to bees for five days after application.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting or at plant emergence.	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. One soil application per year.
	4A	Scorpion 35SL (dinotefuran)	Foliar: 2–2.75 fl oz Soil: 11.5–13.25 fl oz	12	Foliar: 7 Soil: see label	Apply as foliar or soil application, but not both. Maximum per acre per season for foliar use: 8 fl oz. Maximum when applied to soil = 13.25 fl oz. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A	Venom Insecticide (dinotefuran)	Foliar: 1–1.5 oz Soil: 6.5–7.5 oz	12	Foliar: 7 Soil: at planting	Do not apply more than 4.5 oz per acre per season to foliage. One soil application, either preplant, preemergence, or at ground crack. Do not use with other Group 4A insecticides. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A + 3A	Leverage (imidacloprid + cyfluthrin)	3–3.75 fl oz		7	Leverage should not be used in fields treated with Admire Pro or other 4A products. There have been reports of low levels of resistance to imidacloprid. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed-piece treatments. Utilize crop rotation and insecticide rotation to minimize Colorado potato beetle resistance.
	4C	Transform WG (sulfoxaflor)	0.75–1.0 oz	24	7	Bloom and tank-mix restrictions apply. Maximum amount 8.5 oz/acre per season.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum amount per year = 28 fl oz/acre.
	9B	Fulfill (pymetrozine)	2.75–5.5 oz	12	14	Apply when aphids first appear. Do not exceed 11.0 oz per acre per season.
	9B	PQZ (pyrifluquinazon)	2.4–3.2 fl oz	12	7	7 days before reapplication. Maximum of 9.6 fl oz rate per season.
	21A	Torac (tolfenpyrad)	17–21 fl oz	12	1	Do not apply until 14 days after emergence. Maximum of 42 fl oz/acre per season.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	7	Maximum of 10 fl oz/acre per season.
	28	Exirel (cyazypyr)	13.5–20.5 fl oz	12	1	Do not apply more than 0.4 lb a.i./acre of cyazypyr- or cyantraniliprole-containing products per crop whether applications are made to foliage or soil. See label for diamondback moth resistance management.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	28	Verimark (cyazypyr)	Soil: 13.5 fl oz at planting	4	N/A—applied at planting	See label for diamondback moth resistance management.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	7	Begin applications before pest populations reach damaging levels. Do not apply more than 8.4 oz/acre per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart per acre. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.	4	0	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Compatible as a tank mix with some fungicides.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–2 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, insect growth regulator.
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart per acre. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.	4	0	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Compatible as a tank mix with some fungicides.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Insect growth regulator and antifeedant. OMRI-listed. ²
	-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2–3 qt	4	0	Treat when threshold reached.
	-	Suffoil-X (mineral oil)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed. ²
Beetles: blister beetles, flea beetles, Colorado potato beetles, cucumber beetles, white- fringed beetles	1A	*Lannate LV; *SP (methomyl)	LV: 1.5–3.0 pt SP: 0.5–1.0 lb	48	6	Do not make more than 10 applications per crop or apply more than 15 pt (LV) or 5 lb (SP) per acre per crop.
	1A	Sevin XLR, 4F; 80S (carbaryl)	XLR, 4F: 0.5–2.0 qt 80S: 0.63–2.5 lb	12	7	Do not apply more than a total of 6 qt (4F, XLR) or 7.5 lb (80S).
	1B	Imidan 70 W (phosment)	1.3 lb	5 days	7	Use only on potatoes to be harvested by machine. Do not apply where bees are foraging.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	1B	*Thimet 20 G (phorate)	See label—varies with soil type and time of application.	48	90	One application per season
	3A	*Ambush 25W (permethrin)	3.2–12.8 oz	12	14	Do not apply more than 1.6 lb active ingredient per season (102.4 oz).
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	Allow at least 5 days between applications. A maximum of 16.8 fl oz may be applied per acre per season.
	3A	*Brigade 2 EC (bifenthrin)	Soil: 9.6–19.2 oz at plant and 3.2–9.6 oz at lay-by Foliar: 2.1–6.4 oz	12	21	No more than 2 foliar applications, at least 21 days apart. Do not apply more than 0.5 lb active ingredient per acre per season, including soil applications.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 oz	12	1	A maximum of 24 fl oz/acre per season may be applied. Consult label for use rate on specific species.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Only exposed insects can be controlled. Do not apply more than 7.68 fl oz of product per acre per season.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz of product per acre per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz of product per acre per season.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Toxic to bees. Do not use following soil application of other Group 4A insecticides. Maximum 6 oz/acre per season.
	4A	Admire Pro (imidacloprid)	Soil: 5.7–8.7 fl oz Seed piece: 3.5–7.0 fl oz/100 lb seed Foliar: 1.3 fl oz	12	At planting: see label for options Foliar: 7	Do not apply more than 0.31 lb a.i. per acre per season. Seed piece rate is based on seeding rate of 2000 lb/acre. Foliar: Maximum for foliar applications per year: 5.6 fl oz.
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Do not make more than 4 applications per season. Do not exceed a total of 0.3 lb a.i. (16 oz of product) per acre per season.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	4A	Belay Insecticide (clothianidin)	In-furrow or sidedress: 9–12 fl oz Foliar: 2–3 fl oz	12	Foliar: 14 At planting or sidedress or spray: at ground crack over row at hilling	See label for in-furrow, sidedress, and seed-piece applications. Do not apply during bloom or allow to drift to flowering plants. Toxic to bees for five days after application.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	applied at planting or at plant emergence	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. One soil application per year.
	4A	Scorpion 35SL (dinotefuran)	Foliar: 2–2.75 fl oz Soil: 11.5–13.25 fl oz	12	Foliar: 7 Soil: see label	Apply as foliar or soil application, but not both. Maximum per acre per season for foliar use: 8 fl oz. Maximum when applied to soil = 13.25 fl oz. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A	Venom Insecticide (dinotefuran)	Foliar: 1–1.5 oz Soil: 6.5–7.5 oz	12	Foliar: 7 Soil: at planting	Do not apply more than 4.5 oz per acre per season to foliage. One soil application, either preplant, preemergence, or at ground crack. Do not use with other Group 4A insecticides. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	4 oz	12	14	No more than two applications.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum amount per year = 28 fl oz/acre.
	5	Entrust SC (spinosad)	3–10 fl oz	4	7	Do not apply to consecutive generations of Colorado potato beetle. Do not apply more 21 fl oz per acre per season or more than 4 times/crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	4.5–8 fl oz	4	7	No more than 4 applications per year.
	15	Rimon 0.83EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz per acre per season. Does not affect adult insects.
	17	Trigard (cyromazine)	2.66–5.32 oz	12	7	Most effective for control of 1st and 2nd instar larvae. Does not control adult CPB. Use lower rate for leafminers. Maximum per acre per season: 1.0 lb.
	21A	Torac (tolfenpyrad)	17–21 fl oz	12	1	Do not apply until 14 days after emergence. Maximum of 42 fl oz/acre per season.
	22	Avaunt eVo (indoxacarb)	2.5–6.0 oz	12	7	Do not apply more than 24 oz/acre per crop.
	28	Coragen (rynaxypyr)	3.5–5.0 fl oz	4	14	Do not apply more than 15.4 fl oz per acre per crop per season. Foliar or overhead sprinkler irrigation systems only.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	28	Verimark (cyazypyr)	6.75–13.5 fl oz	4	N/A—applied at planting	Do not apply more than 13.5 fl oz per acre at planting. pH of application solution must be between 4 and 6.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
		Kryocide (cryolite)	10–12 lb	12	0	Application to exposed tubers may result in excess residues.
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, insect growth regulator.
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Suffoil-X (mineral oil)	1%–2% v/v	4	0	OMRI-listed. ²
Caterpillars; armyworms, webworms, cutworms, loopers, corn earworms	1A	*Lannate LV; *SP (methomyl)	LV: 1.5–3.0 pt SP: 0.5–1.0 lb	48	6	Do not make more than 10 applications per crop or apply more than 15 pt (LV) or 5 lb (SP) per acre per crop.
	1A	Sevin XLR, 4F; 80 S (carbaryl)	XLR, 4F: 0.5–2.0 qt 80S: 0.63–2.5 lb	12	7	Do not apply more than a total of 6 qt (4F, XLR) or 7.5 lb (80S).
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	Allow at least 5 days between applications. A maximum of 16.8 fl oz may be applied per acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 oz	12	1	A maximum of 24 fl oz/acre per season may be applied. Consult label for use rate on specific species.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Only exposed insects can be controlled. Do not apply more than 7.68 fl oz of product per acre per season.
	5	Entrust SC (spinosad)	3–10 fl oz	4	7	Do not apply to consecutive generations of Colorado potato beetle. Do not apply more 21 fl oz per acre per season or more than 4 times/crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	4.5–8 fl oz	4	7	No more than 4 applications per year.
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. For organic production.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	15	Rimon 0.83EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz per acre per season. Does not affect adult insects.
	22	Avaunt eVo (indoxacarb)	2.5–6.0 oz/A	12	3	No more than 4 applications per year.
	22	Avaunt 30WG (indoxacarb)	2.5–6.0 oz/A	12	7	Do not apply more than 24 oz/acre per crop.
	28	Coragen (rynaxypyr)	3.5–7.5 fl oz	4	14	Do not apply more than 15.4 fl oz per acre per crop per season. Foliar or overhead sprinkler irrigation systems only.
	28	Exirel (cyazypyr)	10–17 fl oz/A	12	1	Do not apply more than 0.4 lb a.i./acre of cyazypyr- or cyantraniliprole-containing products per crop whether applications are made to foliage or soil. See label for diamondback moth resistance management.
	28 + 6	Minecto Pro (cyantraniliprole + abamectin)	5.5–10 fl oz/A	12	7	Must add an adjuvant. Check label for use requirements.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Insect growth regulator and antifeedant. OMRI-listed. ²
European corn borer	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	5	Radiant SC (spinetoram)	4.5–8 fl oz	4	7	No more than 4 applications per year.
	22	Avaunt eVo (indoxacarb)	2.5–3.5 oz/A	12	3	No more than 4 applications per year.
	22	Avaunt 30WG (indoxacarb)	2.5–6.0 oz/A	12	7	Do not apply more than 24 oz/A per crop
	28	Coragen (rynaxypyr)	3.5–7.5 fl oz	4	14	Do not apply more than 15.4 fl oz per acre per crop per season. Foliar or overhead sprinkler irrigation systems only.
	28	Exirel (cyazypyr)	5–20.5 fl oz/A CPG: 5–13.5 fl oz/A Flea beetles: 13.5–20.5 fl oz/A	12	1	Do not apply more than 0.4 b a.i./acre of cyazypyr- or cyantraniliprole-containing products per crop whether applications are made to foliage or soil. See label for diamondback moth resistance management.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
Fire ants	6	Clinch (abamectin)	1 lb	12	0	Apply when ants are actively foraging. Apply after dew or rainfall has dried for maximum effectiveness. Do not apply if rainfall is anticipated within 4–6 hours. No more than 4 applications per year.
	7A	Extinguish (S-methoprene)	1.0–1.5 lb	4	0	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after 3 weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Leaf-footed bugs, plant bugs, stink bugs, mealybugs, false chinch bugs	1A	Sevin XLR, 4F; 80S (carbaryl)	XLR, 4F: 0.5–2.0 qt 80S: 0.63–2.5 lb	12	7	Do not apply more than a total of 6 qt (4F, XLR) or 7.5 lb (80S).
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–2.5 pt 8F: 1–1.5 pt	12	0	Maximum of two applications per year.
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	Allow at least 5 days between applications. A maximum of 16.8 fl oz may be applied per acre per season.
	3A	*Mustang (zeta-cypermethrin)		12	1	A maximum of 0.3 lb a.i./acre per season may be applied.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Only exposed insects can be controlled. Do not apply more than 7.68 fl oz of product per acre per season.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz of product per acre per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz of product per acre per season.
	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Toxic to bees. Do not use following soil application of other Group 4A insecticides. Maximum 6 oz/acre per season.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	7	Begin applications before pest populations reach damaging levels. Do not apply more than 8.4 oz/acre per season.
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
Leafhoppers	1A	*Lannate LV; *SP (methomyl)	LV: 1.5–3.0 pt SP: 0.5–1.0 lb	48	6	Do not make more than 10 applications per crop or apply more than 15 pt (LV) or 5 lb (SP) per acre per crop.
	1A	Sevin XLR, 4F; 80 S (carbaryl)	XLR, 4F: 0.5–2.0 qt 80S: 0.63–2.5 lb	12	7	Do not apply more than a total of 6 qt (4F, XLR) or 7.5 lb (80S).
	1B	Dimethoate 4EC (dimethoate)	0.5–1.0 pt	48	Mechanically harvested: 0 Otherwise: 14	Highly toxic to bees. Do not apply more than 2 pt per acre per year.
	1B	Imidan 70 W (phosment)	1.3 lb	5 days	7	Use only on potatoes to be harvested by machine. Do not apply where bees are foraging.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–2.5 pt 8F: 1–1.5 pt	12	0	Maximum of two applications per year.
	1B	*Thimet 20 G (phorate)	See label—varies with soil type and time of application.	48	90	One application per season.
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	Allow at least 5 days between applications. A maximum of 16.8 fl oz may be applied per acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	1.76–4.0 oz	12	1	A maximum of 24 fl/acre per season may be applied.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A	*Warrior II (lambda-cyhalothrin)	0.96–1.92 fl oz	24	7	Only exposed insects can be controlled. Do not apply more than 7.68 fl oz of product per acre per season.
	3A + 4A	*Endigo ZC (lambda-cyhalothrin + thiamethoxam)	3.5–4.5 fl oz	24	14	Do not exceed a total of 10 fl oz of product per acre per growing season. Do not use with other Group 4A insecticides.
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz of product per acre per season.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	4A	Admire Pro (imidacloprid)	Soil: 5.7–8.7 fl oz Seed piece: 3.5–7.0 fl oz/100 lb seed Foliar: 1.3 fl oz	12	At planting: see label for options. Foliar: 7	Do not apply more than, 0.31 lb a.i. per acre per season. Seed-piece rate is based on seeding rate of 2000 lb/acre. Foliar: Maximum for foliar applications per year: 5.6 fl oz.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting or at plant emergence	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. One soil application per year.
	4A	Scorpion 35SL (dinotefuran)	Foliar: 2–2.75 fl oz Soil: 11.5–13.25 fl oz	12	Foliar: 7 Soil: see label	Apply as foliar or soil application, but not both. Maximum per acre per season for foliar use: 8 fl oz. Maximum when applied to soil = 13.25 fl oz. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A	Venom Insecticide (dinotefuran)	Foliar: 1–1.5 oz Soil: 6.5–7.5 oz	12	Foliar: 7 Soil: at planting	Do not apply more than 4.5 oz per acre per season to foliage. One soil application, either preplant, preemergence, or at ground crack. Do not use with other Group 4A insecticides. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	4 oz	12	14	No more than two applications.
	4C	Transform WG (sulfoxaflor)	0.75–1.0 oz	24	7	Bloom and tank-mix restrictions apply. Maximum amount 8.5 oz/A per season.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum amount per year = 28 fl oz/acre.
	21A	Torac (tolfenpyrad)	17–21 fl oz	12	1	Do not apply until 14 days after emergence. Maximum of 42 fl oz/ acre per season.
	28 + 6	Minecto Pro (cyantraniliprole + abamectin)	5.5–10 fl oz/A	12	7	Must add an adjuvant. Check label for use requirements.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed. ² Antifeedant, repellent, insect growth regulator.
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	JMS: 3–6 qt/100 gal	4	0	See label for tank-mix cautions. Organic Stylet-Oil is OMRI-listed. ²

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
Leafminer	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	5	Entrust SC (spinosad)	3–10 fl oz	4	7	Do not apply to consecutive generations of Colorado potato beetle. Do not apply more 21 fl oz per acre per season or more than 4 times/crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	4.5–8 fl oz	4	7	No more than 4 applications per year.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	14	No more than 2 sequential applications. Must be applied with nonionic activator-type wetting, spreading, or penetrating adjuvant. See label for resistance management.
	17	Trigard (cyromazine)	2.66–5.32 oz	12	7	Most effective for control of 1st and 2nd instar larvae. Does not control adult CPB. Use lower rate for leafminers. Maximum per acre per season: 1.0 lb.
	21A	Torac (tolfenpyrad)	17–21 fl oz	12	1	Do not apply until 14 days after emergence. Maximum of 42 fl oz/acre per season.
	28	Coragen (rynaxypyr)	3.5–5.0 fl oz	4	14	Do not apply more than 15.4 fl oz per acre per crop per season. Foliar or overhead sprinkler irrigation systems only.
	28 + 6	Minecto Pro (cyantraniliprole + abamectin)	5.5–10 fl oz/A	12	7	Must add an adjuvant. Check label for use requirements.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	Suffoil-X (mineral oil)	1%–2% v/v	4	0	OMRI-listed. ²
	-	Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	JMS: 3–6 qt/100 gal	4	0	See label for tank-mix cautions. Organic Stylet-Oil is OMRI-listed. ²
Mites	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	14	No more than 2 sequential applications. Must be applied with nonionic activator-type wetting, spreading, or penetrating adjuvant. See label for resistance management.
	23	Oberon 2SC (spiromesifen)	8–16 fl oz	12	7	Maximum amount per crop: 32.0 fl oz/acre. Maximum applications: 2.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	JMS: 3–6 qt/100 gal	4	0	See label for tank-mix cautions. Organic Stylet-Oil is OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed. ²
Potato tuberworm	1A	*Lannate LV; *SP (methomyl)	LV: 1.5–3.0 pt SP: 0.5–1.0 lb	48	6	Do not make more than 10 applications per crop or apply more than 15 pt (LV) or 5 lb (SP) per acre per crop.
	3A	*Ambush 25W (permethrin)	3.2–12.8 oz	12	14	Do not apply more than 1.6 lb active ingredient per season (102.4 oz).
	3A	*Asana XL (0.66 EC) (esfenvalerate)	2.9–9.6 fl oz	12	7	Do not apply more than 0.35 lb a.i./acre per season (7 applications at highest rate).
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–2.8 fl oz	12	0	Allow at least 5 days between applications. A maximum of 16.8 fl oz may be applied per acre per season.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	14	Do not apply more than 0.8 lb a.i./acre per season.
	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	3A + 28	*Besiege (lambda-cyhalothrin + chlorantraniliprole)	5–9 oz	24	14	Do not apply more than 27.0 fl oz of product per acre per season.
	15	Rimon 0.83EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz per acre per season. Does not affect adult insects.
	28	Coragen (rynaxypyr)	3.5–5.0 fl oz	4	14	Do not apply more than 15.4 fl oz per acre per crop per season. Foliar or overhead sprinkler irrigation systems only.
Thrips	3A	Pyganic Crop Protection EC 5.0 (pyrethrins)	4.5–18.0 fl oz	12	0	Harmful to bees. Degrades rapidly in sunlight. Good coverage essential. OMRI-listed. ²
	5	Entrust SC (spinosad)	3–10 fl oz	4	7	Do not apply to consecutive generations of Colorado potato beetle. Do not apply more 21 fl oz per acre per season or more than 4 times/crop. OMRI-listed. ²
	5	Radiant SC (spinetoram)	4.5–8 fl oz	4	7	No more than 4 applications per year.
	21A	Torac (tolfenpyrad)	17–21 fl oz	12	1	Do not apply until 14 days after emergence. Maximum of 42 fl oz/acre per season.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart per acre. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.	4	0	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Compatible as a tank mix with some fungicides.
	-	Molt-X (azadirachtin)	10 fl oz	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	M-Pede 49% EC (soap, insecticidal)	1%–2% v/v	12	0	OMRI-listed. ²
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart per acre. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.	4	0	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Compatible as a tank mix with some fungicides.
	-	Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	JMS: 3–6 qt/100 gal	4	0	See label for tank-mix cautions. Organic Stylet-Oil is OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed. ²
Whiteflies	4A	Actara (thiamethoxam)	1.5–3.0 oz	12	14	Toxic to bees. Do not use following soil application of other Group 4A insecticides. Maximum 6 oz/acre per season.
	4A	Admire Pro (imidacloprid)	Soil: 5.7–8.7 fl oz Seed piece: 3.5–7.0 fl oz/100 lb seed Foliar: 1.3 fl oz	12	At planting: see label for options Foliar: 7	Do not apply more than 0.31 lb a.i. per acre per season. Seed piece rate is based on seeding rate of 2000 lb/acre. Foliar: Maximum for foliar applications per year: 5.6 fl oz.
	4A	Assail 30SG (acetamiprid)	1.5–4.0 oz	12	7	Do not make more than 4 applications per season. Do not exceed a total of 0.3 lb a.i. (16 oz of product) per acre per season.
	4A	Belay Insecticide (clothianidin)	In-furrow or sidedress: 9–12 fl oz Foliar: 2–3 fl oz	12	Foliar: 14, or at planting or sidedress or spray at ground crack over row at hilling	See label for in-furrow, sidedress and seed-piece applications. Do not apply during bloom or allow to drift to flowering plants. Toxic to bees for five days after application.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting or at plant emergence	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. One soil application per year.
	4A	Venom Insecticide (dinotefuran)	Foliar: 1–1.5 oz Soil: 6.5–7.5 oz	12	Foliar: 7 Soil: at planting	Do not apply more than 4.5 oz per acre per season to foliage. One soil application, either preplant, preemergence, or at ground crack. Do not use with other Group 4A insecticides. Do not apply where bees are foraging. Toxic to bees for 38 hours after application.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	4C	Transform WG (sulfoxaflor)	2.0–2.25 oz	24	7	Bloom and tank-mix restrictions apply. Maximum amount 8.5 oz/acre per season.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	7	Minimum interval between applications = 7 days. Maximum amount per year = 28 fl oz/acre.
	9B	Fulfill (pymetrozine)	2.75–5.5 oz	12	14	Apply when whiteflies first appear. Do not exceed 11.0 oz per acre per season.
	9B	PQZ (pyrifluquinazon)	2.4–3.2 fl oz	12	14	Maximum dosage per acre per year: 4.8 fl oz (0.070 lb a.i.). Maximum applications per year: 2
	15	Rimon 0.83EC (novaluron)	6–12 fl oz	12	14	Do not apply more than 24 oz per acre per season. Does not affect adult insects.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	7	Maximum of 10 fl oz/acre per season.
	23	Oberon 2SC (spiromesifen)	8–16 fl oz	12	7	Maximum amount per crop: 32.0 fl oz/acre. Maximum applications: 2.
	28 + 6	Minecto Pro (cyantraniliprole + abamectin)	10 fl oz/A	12	7	Must add an adjuvant. Check label for use requirements.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed. ²
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	OMRI-listed. ²
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	Insect growth regulator and antifeedant. OMRI-listed. ²
	-	Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	JMS: 3–6 qt/100 gal	4	0	See label for tank-mix cautions. Organic Stylet-Oil is OMRI-listed. ²
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed. ²
Wireworms	1B	*Mocap 15 G, *EC (ethoprop)	See labels.	48	Preplant or at planting	Use broadcast application for moderate to heavy infestations of wireworms.
	1B	*Thimet 20 G (phorate)	See label—varies with soil type and time of application.	48	90	One application per season.
	2B	*Regent 4SC (fipronil)	3.2 fl oz	0	90	Many plant-back restrictions. One in-furrow application at time of planting only. Must be incorporated and covered with soil.

Insects	MOA Code	Trade Name Active Ingredient	Rate Product/Acre	REI (Hours)	Days to Harvest	Notes
	3A	*Brigade 2 EC (bifenthrin)	Soil at plant: 9.6–19.2 oz Soil at lay-by: 3.2–9.6 oz	12	21	Do not apply more than 0.5 lb active ingredient per acre per season, including soil applications.
	3A	Capture LFR (bifenthrin)	25.5 fl oz			In furrow at planting
	4A	Admire Pro (imidacloprid)	Soil treatment: 5.7–8.7 fl oz Seed-piece treatment: 3.5–7.0 fl oz/100 lb seed Foliar: 1.3 fl oz	12	At planting: see label for options Foliar: 7	Do not apply more than 0.31 lb a.i. per acre per season. Seed-piece rate is based on seeding rate of 2000 lb/acre. Foliar: Maximum for foliar applications per year: 5.6 fl oz.
	4A	Belay Insecticide (clothianidin)	In-furrow or sidedress application: 9–12 fl oz	12	Foliar: 14, or at planting or sidedress or spray at ground crack over row at hilling	See label for in-furrow, sidedress, and seed-piece applications.
	4A	Platinum 75SG (thiamethoxam)	1.66–2.67 oz	12	Applied at planting or at plant emergence	To manage resistance, avoid using other Group 4A insecticides in conjunction with Platinum. One soil application per year. For wireworms: seed-piece only.

Table 4. Potato fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Pamela D. Roberts, UF/IFAS Southwest Florida Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
Botrytis gray mold	M3	(mancozeb) Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS		3	1	
	M3 + M5	Elixir (mancozeb + chlorothalonil)	2 lb	18 lb	7	1	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo ZN, Bravo Weather Stik 6L, Chloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90DF, Echo ZN, Equus DF, Equus 500 ZN, Equus 720SST, Initiate 720, Initiate ZN, Orondis Opti B	SEE INDIVIDUAL LABELS		7	0.5	
	M5 + 49	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/A per year	7	0.5	See label.
	3	Quash (metconazole)	2.5 oz	7.5 oz	1	0.5	Follow resistance management recommendations on label.
(suppression)	7	Endura 70WP (boscalid)	10 oz	20 oz	10	0.5	Do not make more than 4 applications at low rate or 2 applications at high rate.
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz	7	0.5	Do not make more than 2 sequential applications.
	7 + 9	Luna Tranquility (flupyram + pyrimethanil)	11.2 fl oz	43.6 fl oz	7	0.5	Do not make more than 2 sequential applications.
	7 + 11	Priaxor (fluxapyroxad)	8 fl oz	24 fl oz	7	0.5	Do not make more than 2 sequential applications.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	7	0.5	Use only in a tank mix with labeled fungicide for early blight.
	9 + 12	Alerity 62.5 WG (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	
	11 + 4	Quadris Ridomil Gold (azoxystrobin + mefenoxam)	0.82 fl oz/1000 ft of row	See label		0	Apply at planting.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	12 + 7	Miravis Prime (fludioxonil + pydiflumetofen) (copper compounds) Many brands available: Americop, Badge SC, Badge X2, Basic Copper 53, COC DF, COCS WDG, COC WP, Champ DP Dry Prill, Champ 2 FL, Champion WP, Champ WG, Copper-Count-N, Copper sulfate crystals, Copper-Z 4/4, Cueva, Cuprofix MZ Dispers, Cuprofix Ultra 40 Dispers, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Nordox 75WG, Nu-Cop 3L, Nu-Cop 50DF, Nu Cop 50WP, Nu-Cop HB, Quimag Copper Sulfate Crystal	11.4 fl oz/A	34.2 fl oz/year	14	0.5	
Early blight (<i>Alternaria solani</i>)	M1		SEE INDIVIDUAL LABELS				
	M1 + M3	ManKocide 61.1 DF (copper hydroxide + mancozeb)	5 lb	74.66 lb	3	2	
	M3	(mancozeb) Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS				
	M3	Polyram 80DF (metiram)	2 lb	14 lb	3	1	Limit is 11.2 lb of active ingredient per a crop.
	M3 + M5	Elixir (mancozeb + chlorothalonil)	2 lb	18 lb	7	1	Limit is 7 applications/season.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik 6L, Bravo ZN, Chloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720ST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B	SEE INDIVIDUAL LABELS				
	M5 + 49	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/A per year	7	0.5	See label.
	2	Enclosure 4 Iprodione 4L Nevado 4F Rovral 4F (iprodione)	2 pt	8 pt	14	1	Limit is 4 applications/crop. See individual label for additional information.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	3	Proyisol (mefentrifluconazole)	5 fl oz	15 fl oz	7	0.5	
	3	Quash (metconazole)	2.5 oz	7.5 oz	1	0.5	Follow resistance management recommendations on label.
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	4 + M3	Ridomil Gold MZ (mancozeb + mefenoxam)	2.5 lb	See label.	3	2	Also labeled for storage rots (Pink Rot and Leak).
	4 + M5	Ridomil Gold Bravo SC (chlorothalonil + mefenoxam)	2.5 pt	See label.	14	2	Limit is 4 applications/crop. Also labeled for storage rots (Pink Rot and Leak).
	7	Endura 70WP (boscalid)	10 oz	20 oz	10	0.5	Do not make more than 4 applications at low rate or 2 applications at high rate.
	7	Velum Prime (fluopyram)	See label for ground or aerial application rates.	See label for ground or aerial application rates.	7	0.5	Do not make more than 2 sequential applications.
	7	Vertisan (penthopyrad)	24 fl oz	72 fl oz	7	0.5	Do not make more than 2 sequential applications.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	43.6 fl oz	7	0.5	Do not make more than 2 sequential applications.
	7 + 11	Priaxor (fluxapyroxad)	8 fl oz	24 fl oz	7	0.5	Do not make more than 2 sequential applications.
	9	Scala SC (pyrimethanil)	7 fl oz	35 fl oz	7	0.5	Use only in a tank mix with labeled fungicide for early blight.
	9	Vango WG (cyprodinil)	7 oz	28 oz	0	0.5	
	9 + 12	Alerity 62.5 WG (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	
	11	Aframe, Azoxystar, Azoxyzone, Equation, Satoria, Trevo, Quadris, Willowood Azoxy (azoxystrobin)	See individual labels.				Alternate with non-group 11 chemistry. See label for soilborne disease applications.
	11	Approach (picoxystrobin)	12 fl oz	36 fl oz	3	0.5	Alternate with non-group 11 chemistry.
	11	Evito 480SC Aftershock (fluoxastrobin)	3.8 fl oz	22.8 fl oz	7	0.5	Limit is 6 applications per crop and alternate with non-group 11 chemistry.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	11	Gem 500SC Flint Extra (trifloxystrobin)	3.8 fl oz	23 fl oz	7	0.5	Limit is 6 applications per crop and alternate with non-group 11 chemistry.
	11	Headline 2.09F (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	Alternate with non-group 11 chemistry.
	11	Reason 500SC (fenamidone)	8.2 fl oz	24.6 fl oz	14	0.5	Alternate with non-group 11 chemistry.
	11 + M3	Cabrio Plus (pyraclostrobin + metiram)	2.9 lb	17.4 lb	3	1	Do not make more than 2 sequential applications.
	11 + M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	See label.	14	0.5	Alternate with non-group 11 chemistry.
	11 + 3	Amistar Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	
	11 + 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	14	0.5	Do not make more than 2 consecutive applications before switching to another effective fungicide with a different mode of action.
	12 + 7	Miravis Prime (fludioxonil + pydiflumetofen)	11.4 fl oz	34.2 fl oz/year	14	0.5	
	19	OSO 5%SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	
	19	Ph-D (polyoxin D zinc salt)	6.2 oz	31 oz	0	0	Limit is 5 applications/season. Use in alternation with fungicides that have different modes of action.
	22 + M3	Gavel 75DF (zoxamide + mancozeb)	2.0 lb	12 lb	3	2	This product contains 66.7% mancozeb, so do not exceed maximum allowed for mancozeb considering this and other mancozeb-containing products.
	22 + M5	Zing! (zoxamide + chlorothalonil)	34 fl oz/A	1.52 lb zoxamide and 8.8 lb chlorothalonil	7	0.5	Do not make more than 2 consecutive applications before switching to another effective fungicide with a different mode of action.
	27 + M5	Ariston (cymoxanil + chlorothalonil)	2 pt	17.5 pt cymoxanil and 11.25 lb a.i. chlorothalonil	14	0.5	
	27 + 11	Tanos (cymoxanil + famoxadone)	8 oz	48 oz	14	0.5	Do not make consecutive applications. Rotate to material with different mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	28	Previcur Flex (propamocarb hydrochloride)	1.2 pt	6.0 pt	14	0.5	Use with a tank mix. See label for seed-piece treatment.
	30	Agri Tin (triphenyltin hydroxide)	3.75 oz	11.5 oz	7	2	
	30	Super-Tin 4L (triphenyltin hydroxide)	6 fl oz	18 fl oz	7	2	For use with closed tractor cabs only. Super Tin should be tank-mixed with another fungicide.
	30	Super-Tin 80WP (triphenyltin hydroxide)	3.75 oz	11.25 oz	7	2	For use with closed tractor cabs only. Super Tin should be tank-mixed with another fungicide.
	40 + 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	14	0.5	Do not make more than 2 consecutive applications.
Fusarium tuber rot	M3	(mancozeb) Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS		3	1	See label for seed-piece treatment.
	M3 + 25	Nubark Mancozeb AS (mancozeb + streptomycin)	1 lb/100 seed pieces			1	Seed treatment.
	1	Mertect 340-F (thiabendazole)	0.42 fl oz per 2,000 lb of tuber			0.5	
	7 + 3	Emesto Silver (penflufen + prothioconazole)	0.31 fl oz per 100 lb seed pieces				See label for seed-piece treatment.
	12	Dyna-Shield Fludioxonil Maxim (fludioxonil)	See label.				See label for equipment requirements.
	27 + M3 + 1	Evolve (cymoxanil + mancozeb + thiophanate-methyl)	0.75 lb/100 lb cut seed pieces			1	Potato seed-piece treatment.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
Late blight (<i>Phytophthora infestans</i>)	M1	(copper compounds) Many brands available: Americop, Badge SC, Badge X2, Basic Copper 53, COC DF, COCS WDG, COC WP, Champ 2 FL, Champ DP Dry Prill, Champion WP, Champ WG, Copper-Count-N, Copper sulfate crystals, Copper-Z 4/4, Cueva, Cuprofix MZ Dispers, Cuprofix Ultra 40 Dispers, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Nordox 75WG, Nu-Cop 3L, Nu-Cop 50DF, Nu Cop 50WP, Nu-Cop HB, Quimag Copper Sulfate Crystal	SEE INDIVIDUAL LABELS	Varies by product from 0 to 1 day	Varies by product from 4 hr to 2 days		
	M1 + M3	ManKocide 61.1DF (copper hydroxide + mancozeb)	5 lb	74.66 lb	3	2	
	M3	(mancozeb) Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS		3	1	Limit is 11.2 lb of active ingredient per a crop.
	M3	Polyram 80DF (metiram)	2 lb	14 lb	3	1	Limit is 7 applications/season.
	M3 + M5	Elixir (mancozeb + chlorothalonil)	2 lb	18 lb	7	1	
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Strik 6L, Bravo ZN, Chloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720ST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B	SEE INDIVIDUAL LABELS		7	0.5	Read label for application directions.
	M5 + 49	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/A per year	7	0.5	See label.
	3 + 11	Veltyma (mefentrifluconazole + pyraclostrobin)	10 fl oz	30 fl oz	7	0.5	
	4 + M1	Ridomil Gold Copper 64.8W (mefenoxam + copper hydroxide)	SEE INDIVIDUAL LABELS		14	2	Limit is 3 applications/crop of this product + other Ridomil products. Add protectant fungicide; see label. Also for storage rots (Pythium leak, Pink Rot)

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	4 + M3	Ridomil Gold MZ (mancozeb + mefenoxam)	2.5 lb	See label.	3	2	Also labeled for storage rots (Pink Rot and Leak)
	4 + M5	Ridomil Gold Bravo SC (chlorothalonil + mefenoxam)	2.5 pt	See label.	14	2	Limit is 4 applications/crop. Also labeled for storage rots (Pink Rot and Leak)
	7 + 11	Priaxor (fluxapyroxad + pyraclostrobin)	8 fl oz	24 fl oz	7	0.5	Do not make more than 2 sequential applications.
	11	Aframe, Azoxystar, Azoxyzone, Equaton, Quadris Satoria, Willowood Azoxy (azoxystrobin)	See individual labels				Alternate with non-group 11 chemistry between applications. See label for soilborne disease applications.
	11	Evito 480SC Aftershock (fluoxastrobin)	3.8 fl oz	22.8 fl oz	7	0.5	Limit is 6 applications per crop; alternate with non-group 11 chemistry.
	11	Gem 500SC Flint Extra (trifloxystrobin)	3.8 fl oz	23 fl oz	7	0.5	Limit is 6 applications per crop; alternate with non-group 11 chemistry.
	11	Headline (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	Alternate with non-group 11 chemistry between applications.
	11	Reason 500SC (fenamidone)	8.2 fl oz	24.6 fl oz	14	0.5	Alternate with non-group 11 chemistry between applications.
	11 + M3	Cabrio Plus (pyraclostrobin + metiram)	2.9 lb	17.4 lb	3	1	Do not make more than 2 sequential applications.
	11 + M5	Quadris Opti (azoxystrobin + chlorothalonil)	1.6 pt	See label	14	0.5	Alternate with non-group 11 chemistry between applications.
(suppression only)	19	OSO 5%SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	
	21	Ranman (cyazofamid)	2.75 fl oz	27.5 fl oz	7	0.5	
	22 + M3	Gavel 75DF (zoxamide + mancozeb)	2.0 lb	12 lb	3	2	This product contains 66.7% mancozeb, so do not exceed maximum allowed for mancozeb considering this and other mancozeb-containing products.
	22 + M5	Zing! (zoxamide + chlorothalonil)	34 fl oz/A	1.52 lb zoxamide and 8.8 lb chlorothalonil	7	0.5	Do not make more than 2 consecutive applications before switching to another effective fungicide with a different mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	27	Curzate 60DF (cymoxanil)	3.2 oz	22.4 oz	14	0.5	Limit is 7 applications/year. Use in combination with a protectant fungicide. It is best to alternate Curzate with other fungicides, such as mancozeb or chlorothalonil. Also labeled for seed treatment.
	27 + M3 + 1	Evolve (cymoxanil + mancozeb + thiophanate-methyl)	0.75 lb/100 lb cut seed pieces			1	Potato seed-piece treatment.
	27 + M5	Ariston (cymoxanil + chlorothalonil)	2 pt	17.5 pt cymoxanil and 11.25 lb a.i. chlorothalonil	14	0.5	
	27 + 11	Tanos (cymoxanil + famoxadone)	8 oz	48 oz	14	0.5	Do not make consecutive applications. Rotate to material with different mode of action.
	28	Previcur Flex (propamocarb hydrochloride)	1.2 pt	6.0 pt	14	0.5	Use with a tank mix. See label for seed-piece treatment.
	29	Omega 500F (fluzinam)	5.5 fl oz	3.5 pt	14	2	Rate is higher for white mold.
	30	Agri Tin Super-Tin (triphenyltin hydroxide)	See individual label		7	2	
	30	Super-Tin 80WP (triphenyltin hydroxide)	6 fl oz	18 fl oz	7	2	For use with closed tractor cabs only. Super Tin should be tank-mixed with another fungicide.
	33	Alude, Confine Extra, K-Phite, Fosphite, Fungi-Phite, Phiticide, Phostrol, ProPhyt, Rampart, Reveille (mono- and dipotassium salts of phosphorous acid)	See individual label				
	40	Forum (dimethomorph)	6 oz	30 oz	4	0.5	Tank-mix with another chemistry. Do not make more than two sequential applications before alternating to a non-group 40 fungicide.
	40	Revus (mandipropamid)	8 fl oz	32 fl oz	14	4 hr	Do not make more than 2 consecutive applications.
	40 + 3	Revus Top (mandipropamid + difenoconazole)	7 fl oz	28 fl oz	14	0.5	Do not make more than 2 consecutive applications.
	45 + 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	4	0.5	Do not make more than 2 consecutive applications.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
	49 + 40	Orodis Ultra (oxathiapiprolin + mandipropamid)	8 fl oz	32 fl oz/A per year	7		See label.
Pythium, Pink rot, and Phytophthora seed decays	4	MetaStar 2E AG (metalaxy)	8 pt			2	See label for banding applications; for use at planting.
	4	Ridomil Gold SL Orodis Gold B Ultra Flourish (mefenoxam)	SEE INDIVIDUAL LABELS				2
	4 + M1	Ridomil Gold Copper 64.8W (mefenoxam + copper hydroxide)	2 lb	6 lb	14	2	Limit is 3 applications/crop of this product + other Ridomil products. Add protectant fungicide; see label. Also for storage rots (Pythium leak, Pink Rot).
	4 + M3	Ridomil Gold MZ (mefenoxam + mancozeb)	2.5 lb	See label	3	2	Also labeled for storage rots (Pink Rot and Leak).
	4 + M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	2.5 pt	See label	14	2	Limit is 4 applications/crop. Also labeled for storage rots (Pink Rot and Leak).
	14	Botran 75W (DCNA dicloran)	6 lb	10 lb	20	0.5	Subsequent applications are made at 2 lb/A.
	14	Terraclor F (PCNB)	10.4 fl oz per 1,000 linear ft	15 pt	45	0.5	At planting or see label for white mold.
	21	Ranman (cyazofamid)	2.75 fl oz	27.5 fl oz	7	0.5	Alternate with non-group 11 chemistry between applications.
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz	NA	0.5	At planting or side-dress between hilling and tuber initiation at least 25 days apart
	27	Curzate 60DF (cymoxanil)	3.2 oz	22.4 oz	14	0.5	Limit is 7 applications/year. Use in combination with a protectant fungicide. It is best to alternate Curzate with other fungicides such as mancozeb or chlorothalonil. Also labeled for seed treatment.
	33	Alude, Confine Extra, Fosphite, Fungi-Phite, K-Phite, Phiticide, ProPhyt, Phostrol, Rampart, Reveille (mono- and dipotassium salts of phosphorous acid)	See individual label				
	49 + M5	Orodis Opti (oxathiapiprolin + chlorothalonil)	2.5 pt	10 pt/A per year	7	0.5	See label.
	49 + 4	Orodis Gold (oxathiapiprolin + mefenoxam)	27.8				At planting. See label.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
Rhizoctonia, black scurf & stem canker (<i>Rhizoctonia solani</i>)	M3	(mancozeb) Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS		3	1	See label for seed-piece treatment.
	7	Moncut 70DF (flutolanil)	1.1 lb			0.5	In-furrow use only.
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz	7	0.5	Do not make more than 2 sequential applications.
	7 + M3	Moncoat MZ (flutolanil + mancozeb)	1.0 lb/100 lb seed			1	Seed treatment.
	7 + 3	Ernesto Silver (penflufen + prothioconazole)	0.31 fl oz/100 lb seed pieces	0.93 fl oz		0.5	See label for seed treatment details.
	7 + 11	Elatus (azoxystrobin + benzovindiflupyr)	5 oz/1000 linear feet		14		In-furrow use only.
	11	Azoxystrobin 100ST Azoyzone Dynasty (azoxystrobin)	See label.			4 hr	Seed treatment.
	11	Headline (pyraclostrobin)	0.8 fl oz/1000 linear ft			0.5	In-furrow use only.
	12	Dyna-Shield Maxim Spirato (fludioxonil)	0.8 fl oz/100 lb seed			0.5	Seed treatment.
	12 + M3	Maxim MZ (fludioxonil + mancozeb)	0.5 lb/100 lb seed			1	Seed treatment.
	14	Blocker 10G Blocker 4F Terraclor 75WP (PCNB)	See label.				At planting
14	Terraclor F (PCNB)	10.4 fl oz per 1,000 linear ft	15 pt	45	0.5	At planting or see label for white mold.	
27 + M3 + 1	Evolve (cymoxanil + mancozeb + thiophanate-methyl)	0.75 lb/100 lb cut seed pieces			1	Potato seed-piece treatment.	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks	
			Appl.	Season	Harvest	Reentry		
Soft rot	25	Agri-Mycin 17 Harbour (streptomycin)	100 ppm			0.5	Seed treatment. Check individual labels for specific rates and instructions.	
Soilborne pathogens (see specific pathogens)	M2	Many brands available: Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Mancozeb Flowable, Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield	SEE INDIVIDUAL LABELS					See label for seed-piece treatment.
			3.75 fl oz/100 lb seed		3	1	4 hr	For suppression of black scurf and stem canker and seed-borne black dot and for protection against silver scurf.
	11	Dynasty (azoxystrobin)					Seed treatment. Must be made using specific equipment.	
	12	Maxim 4FS Spirato (fludioxonil)	0.16 oz/100 lb seed			0.5	Seed treatment.	
	12	Maxim Potato Seed Protectant Maxim PSP (fludioxonil)	0.5 lb/100 lb seed			0.5	Seed treatment.	
	12 + M3	Maxim MZ (fludioxonil + mancozeb)	0.5 lb/100 lb seed			1	Seed treatment.	
White mold (<i>Sclerotinia sclerotiorum</i>)	1	Cercoban, Incognito 4.5F , T-Methyl, Thiophanate Methyl, Topsin M WSB (thiophanate-methyl)	SEE INDIVIDUAL LABELS					
	2	Enclosure 4, Iprodione 4L, Meteor, Nevado 4F, Rovral 4F (iprodione)	See label.	See label.		14	Limit is 4 applications/crop. See individual label for additional information.	
	3	Quash (metconazole)	4.0 oz	7.5 oz		0.5	Follow resistance management recommendations on label.	
(suppression)	7	Endura 70WP (boscalid)	10 oz	20 oz		10	Do not make more than 4 applications at low rate or 2 applications at high rate.	
	7	Velum Prime (fluopyram)	See label for ground or aerial application rates.	See label for ground or aerial application rates.		7	Do not make more than 2 sequential applications.	
	7	Vertisan (penthiopyrad)	24 fl oz	72 fl oz		7	Do not make more than 2 sequential applications.	
(suppression)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	11.2 fl oz	43.6 fl oz		7	Do not make more than 2 sequential applications.	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks
			Appl.	Season	Harvest	Reentry	
(suppression)	7 + 11	Priaxor (fluxapyroxad + pyraclostrobin)	8 fl oz	24 fl oz	7	0.5	Do not make more than 2 sequential applications.
	11	Aproach (picoxystrobin)	12 fl oz	36 fl oz	3	0.5	Alternate with non-group 11 chemistry
	11	Headline (pyraclostrobin)	12 fl oz	72 fl oz	3	0.5	Alternate with non-group 11 chemistry between applications.
(suppression)	11 + M3	Cabrio Plus (pyraclostrobin + metiram)	2.9 lb	17.4 lb	3	1	Do not make more than two sequential applications.
	12 + 7	Miravis Prime (fludioxonil + pydiflumetofen)	11.4 fl oz/A	34.2 fl oz/year	14	0.5	
	19	OSO 5%SC (polyoxin D zinc salt)	13 fl oz	78 fl oz	0	4 hr	
	29	Omega 500F (fluzinam)	5.5 fl oz	3.5 pt	14	2	

¹FRAC code (fungicide group): Number (1 through 46) and letters (U and P) are used to distinguish the fungicide mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 2022; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

Table 5. Nonfumigant nematicides for potatoes in Florida. Contact: Johan Desaegeer, UF/IFAS Gulf Coast Research and Education Center.

Product	Broadcast or overall rates		Row rates	
	Per acre	Per 1000 sq ft	Per acre, 36" row spacing	Per 1000 ft of row, any row spacing
Mocap 15G (a.i. ethoprop)	40 to 60 lb	0.9 to 1.4 lb	20 lb	1.4 lb
Mocap EC* (a.i. ethoprop)	1 to 1.5 gal	2.9 to 4.4 fl oz	2 qt	4.4 fl oz
Vydate C-LV** (a.i. oxamyl)	---	---	1 to 2 gal	9.8 to 19.5 oz
Nimitz (a.i. fluensulfone)	All applications must be incorporated either physically or via drip or overhead irrigation. Make preplant applications at a rate of 3.5 to 7 pints (56.0 to 80.0 fl oz) per acre, a minimum of seven days before planting. Do not plant any unlisted crops into treated land for 365 days after application of the product. Do not apply more than one application per crop and no more than 112 fl oz of product per acre per year (365 days). Provides control only for nematodes. Growers applying Nimitz must consult the product label to observe the plant-back (recropping) intervals for a variety of leafy vegetables and brassica crops, onions, bananas, sugarcane, and other crops.			
Velum (a.i. fluopyram)	Apply max 6.84 fl oz/acre using overhead chemigation equipment. Do not apply more than 13.7 fl oz of Velum (0.446 lb fluopyram) per acre per year regardless of formulation (Velum or Luna) or method of application (soil or foliar). Do not apply within 7 days of harvest. For soil application, to limit the potential for development of disease resistance to this chemical class, the first foliar fungicide application after Velum should be a product from a different FRAC group.			
*Do not apply Mocap in furrow, because it can cause crop injury when in contact with the seed piece. Do not apply Mocap where sorghum will be grown during the same year, because its residual activity may cause serious injury to sorghum. Mix into the top 2 to 4 inches of soil. Do not exceed 9 lb a.i./A Mocap 15G and 12 lb a.i./A for Mocap EC.				
**Vydate C-LV has registration for nematode suppression in potatoes as an in-furrow and foliar treatment program only. Each application of Vydate C-LV should be applied in a minimum of 20 gals of water per acre, the spray solution water always buffered to a pH of 5.0 or lower. Do not apply more than 2.4 gallons (9 lb a.i.) per acre per season or make more than 8 applications of Vydate C-LV per crop; the last application should be made at least 7 days prior to harvest.				
Mocap and Vydate are insecticide-nematicides; Velum is a fungicide-nematicide; Nimitz is a true nematicide. Unlike fumigants, these products are not volatile and will move through the soil via water; depending on the water solubility, these products will have different recommendations as for how to best apply them (see specific label recommendations); when nematode pressure is high, they may not be as consistently effective against root nematodes as the fumigants.				

Table 6. Fumigant nematicides for potatoes in Florida. Contact: Johan Desaegeer, UF/IFAS Gulf Coast Research and Education Center.

Nematicide	Broadcast Application ¹		In-the-Row Applications
	Gallons or lb per Acre	fl oz/1000 ft/ chisel-spaced 12" apart	
Telone II ^{2,3}	9 to 12 gal	26 to 35	For any row spacing, application rates given may be concentrated in the row but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-17 ^{2,3}	10.8 to 17.1 gal	31.8 to 50.2	For any row spacing, application rates given may be concentrated in the row but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-35 ^{2,3}	13 to 20.5 gal	38.2 to 60.2	For any row spacing, application rates given may be concentrated in the row but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Pic-Clor 60	19 to 31.5 gal	57 to 90	For any row spacing, application rates should never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Chloropicrin 99%	150–350 lb	-	For any row spacing, application rates should never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Vapam HL	75 gal	-	For drip or in-row chisel fumigation, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions and procedures.
KPam HL	60 gal	-	For drip or in-row chisel fumigation, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions.
Allyl isothiocyanate (AITC) Dominus	40 gal	-	For drip or in-row fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions

¹ Gallons/acre and fl oz/1,000 feet provided only for mineral soils. Higher rates may be possible for heavier-textured (loam, silt, clay) or highly organic soils.

² All the fumigants mentioned are for retail sale and use only by state certified applicators or persons under their direct supervision. New supplemental labeling for the Telone products must be in the hands of the user at the time of application. See new label details for additional use restrictions based on soil characteristics, buffer zones, requirements for Personal Protective Equipment (PPE), mandatory good agricultural practices (GAPs), applicator training certification, and other new rate modifying recommendations.

³ Higher application rates are possible in the presence of cyst-forming nematodes.

Rates are believed to be correct for products named, and similar products of other brand names, when applied to mineral soils. Higher rates are required for muck (organic) soils. However, the **grower** has the final responsibility to see that each product is used legally; **read the label** of the product to be sure that you are using it properly.