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Insecticide Schedule for Potatoes

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Wireworms:

Wireworms are generally more troublesome in soil that has been in sod, pasture, or Conservation Reserve Program (CRP) for several years. Crop rotations that involve frequent tillage or summer tillage may help to reduce wireworm populations. When planning chemical treatments for wireworm suppression, pesticide applications should be delayed in the spring as long as possible so that soil temperatures can increase to a point where wireworms are active in the upper soil regions. Care must be taken when applying soil-applied insecticides to minimize possible adverse environmental effects. Also, always consult the label for allowed timing of applications for specific products. Most wireworm materials need to be applied before crop emergence. Providing primary wireworm control after crop emergence can be difficult.

Flea beetles:

Potato flea beetles, which appear on potato vines as soon as the plants emerge, puncture small, round holes in leaves, causing yield reductions due to reduced plant growth. Eggs are laid soon after the beetles appear. The larvae feed on potato roots and may occasionally damage tubers. The second brood of adult beetles appears in August, causing further damage to foliage, roots, and tubers. The best control program is to kill the adult Beetles before the eggs are laid in the spring. Make the first application of insecticide when one-fourth of the plants have emerged and the economic threshold of 15 "shot" holes average per terminal leaf. A second application should follow in about ten days if needed. Growers in Maine should be aware that the red headed flea beetles are now being found in many locations. These flea beetles are larger than the potato flea beetles.

Aphids:

For aphid economic thresholds, refer to the potato IPM program guidelines. Plants should be randomly selected for inspection throughout the field. Potato aphids and green peach aphids are currently common in Maine. Buckthorn aphids may be found occasionally, while foxglove aphids are rare. The green peach aphids are the most important because they are the primary vector of potato leafroll virus and an efficient vector of Potato virus Y. Certain aphicides are not effective against all potato infesting species and thus do not provide sufficient control. Be sure to check the

remarks listed in this publication to make sure you are using a suitable product. Foliar insecticide sprays should begin when economic thresholds are reached and continued as needed. Always scout fields for the presence of aphids before beginning a foliar program. Field scouting should be part of a pest management plan even when systemics are used. Aphids build up on the underside of the leaves; therefore, good coverage and proper spray calibration are important.

Colorado potato beetles:

The economic thresholds for treatment of Colorado potato beetles are: Adult - 25/50 plants; large larvae - 75/50 plants; small larvae - 200/50 plants. Plants should be randomly selected for inspection. Spot or area treatments can be very effective and are recommended where possible. Colorado potato beetle populations in Maine have varying levels of resistance, which is now a problem for many growers throughout the state. This insect overwinters as an adult in the soil and under trash and debris in and around potato fields. Early in the season, it moves to potato plants, laying eggs on the leaves' underside. In a few days, the larvae hatch and start feeding. When rotating pesticides to cope with resistance, consider the mode of action in which the material works.

SOIL-APPLIED INSECTICIDES

Most granular soil-applied insecticides have the potential for leaching. Care should be taken to minimize both surface and groundwater contamination.

Chemical: Bifenthrin

Remarks: Insecticide Resistance Group 3A. Bifenthrin may be applied in-furrow or as a lay-by treatment for wireworms and white grub. Brigade may also be applied at lower rates as a foliar insect control material. Do not apply more than .5 pounds a. i. per season, including soil plus foliar applications. The reentry interval is 12 hours and the preharvest interval is 21 days.

Trade Name	Pest	Rate/A	Comments
Brigade 2EC	Wireworms	9.6-19.2 fl oz 3.2-9.6 fl oz.	In-furrow application rate. Ground that has been out of production for more than 5 years is likely to have wireworms.
Capture LFR	Wireworms	12.75-25.5 oz	May be applied as an at planting or lay-by treatment.

Chemical: Bifenthrin + *B. amyloliquefaciens*

Remarks: Insecticide Resistance Group 3A, mixed with fungicide group BM02. The reentry interval is 12 hours and the preharvest interval is 21 days.

Trade Name	Pest	Rate/A	Comments
Ethos XB	Wireworms	12.75-25.5 fl oz	Directly mix with fertilizer.

Chemical: Ethoprop

Remarks: Insecticide Resistance Group 1B. The reentry interval is 48 hours.

Trade Name	Pest	Rate/A	Comments
Mocap EC	Wireworms	2/3-1 lb	See label for application directions. Use broadcast applications for moderate-to-heavy wireworm infestations.

Chemical: Broflanilide

Remarks: Insecticide Resistance Group 30. The reentry interval is 12 hours.

Trade Name	Pest	Rate/1000 linear ft	Comments
Nurizma	Wireworms	0.08-0.16 fl oz	Make one in-furrow application at time of planting only. Application must be done in-furrow as a 5-inch to 7-inch wide spray. Adjust nozzle height and orientation to avoid application to soil surface. The insecticide must be thoroughly incorporated and covered with soil immediately after application. DO NOT apply over the top of a closed furrow. Under high wireworm pressure, use maximum rate.

Chemical: Cyantraniliprole

Remarks: Insecticide resistance group 28. The restricted reentry internal is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Verimark	Aphids Colorado potato beetles Flea beetles	6.5-13.5 fl oz depending on the pest	Do not apply Group 28 insecticides more than 3 times within a single generation of insect pest(s) on a crop.

Chemical: Cyclaniliprole

Remarks: Insecticide resistance group 28. The restricted reentry internal is 4 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Harvanta	European corn borers Colorado potato beetles Flea beetles	10.9-16.4 fl oz	Do not apply Group 28 insecticides more than 3 times within a single generation of insect pest(s) on a crop.

Chemical: Clothianidin

Remarks: Insecticide Resistance Group 4A. Clothianidin may be applied in-furrow or as a side-dress treatment for aphids, Colorado potato beetles, flea beetles and potato leafhoppers. This product can also be applied as a foliar treatment, however, do not follow a soil application of this product with a foliar application. The reentry interval is 12 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Belay	Aphids Colorado potato beetles Flea beetles Leafhoppers	9-12 oz, in furrow or side dress	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of this or another Group 4A material has been used. Can be applied in furrow or at ground crack as a side dress.

Chemical: Fipronil

Remarks: Insecticide Group 2B. Apply at planting as a narrow spray in a 5-7 inch wide band in the seed furrow. Do not use T-banding over the top of a closed furrow. The reentry interval is 0 hours.

Trade Name	Pest	Rate/A	Comments
Regent 4SC	Wireworms	3.2 oz	Do not apply more than 3.2 oz per acre per season. Do not apply within 20 yards of a water body. Dilute Regent 45C in a minimum of 5 gallons of water per acre.

Chemical: Imidacloprid

Remarks: Insecticide Resistance Group 4A. Apply at planting as a narrow band spray on the seed piece in the seed furrow. Do not apply any foliar neonicotinoid insecticide (Insecticide Resistance Group 4A) if Admire PRO or other imidacloprid material has been used at planting. The reentry interval is 12 hours.

Trade Name	Pest	Rate/A	Comments
Admire Pro	Aphids Colorado potato beetles Flea beetles Leafhoppers	5.7-8.7 fl oz	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of imidacloprid or thiamethoxam has been used.
Widow Macho 2.0 FL		13-20 fl oz	
Alias 4F Acronyx 4F Advise Four Macho 4.0 FL Wrangler		6.5-10 fl oz	
Viloprid FC 1.7		15.1-23.3 fl oz	

Chemical: Thiamethoxam

Remarks: Insecticide Resistance Group 4A. Apply at planting as a narrow band spray on the seed piece in the seed furrow. Do not apply any foliar neonicotinoid insecticide (Insecticide Resistance Group 4A) if Cruiser, Platinum or other neonicotinoid material has been used at planting. The reentry interval is 12 hours.

Trade Name	Pest	Rate/A	Comments
Platinum 75 SG (Can be applied to dry bulk fertilizer)	Aphids Colorado potato beetles Flea beetles Leafhoppers	1.66-2.67 oz	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of thiamethoxam or imidacloprid has been used.
Actara		1.5-3 oz	Use full rate for aphid management.

SEED TREATMENT INSECTICIDES

Chemical: Thiamethoxam, Fludioxonil, Difenoconazole, Sedaxane

Remarks: Insecticide Resistance Group 4A, mixed with three fungicides. Reentry interval is 12 hours.

Trade Name	Pest	Rate/100 lb seed	Comments
CruiserMaxx	Aphids Colorado potato beetles Flea beetles Leafhoppers	0.5 fl oz	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of thiamethoxam or imidacloprid has been used.

FOLIAR APPLIED INSECTICIDES

Chemical: Abamectin

Remarks: Insecticide Resistance Group 6. The reentry interval is 12 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Agri-Mek Reaper	Colorado potato beetles	8-16 oz	Provides better control of larvae than adults. Do not make more than two applications per season. Limit 32 oz/a per crop per season. Make first application when approximately 50% of egg masses have hatched. If second application needed, apply 10 to 14 days later.

Chemical: Acetamiprid

Remarks: Insecticide Resistance Group 4A. This is a foliar neonicotinoid material, so for resistance management it is not recommended if a neonicotinoid material was used at planting or as a see treatment. Do not make more than 4 applications per season. The restricted reentry interval is 12 hours and there is a 7-day preharvest interval.

Trade Name	Pest	Rate/A	Comments
Assail 70WP Assail 30SG Assail 30 SC Anarchy 30 SG Anarchy 70 WP Arvida 30 SG	Aphids Colorado potato beetles Flea beetles European corn borers	Varies depending on the pest	This product is reported to provide ovicidal activity for European corn borer. Do not apply more than 0.3 lb a.i. per A per year. Maximum 4 applications per year.

Chemical: Afidopyropen

Remarks: Insecticide Resistance Group 9D. The reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Sefina Inscalis	Aphids	3.0-6.0 fl oz	For maximum knockdown and residual control, apply at first sign of infestation, according to recommended economic thresholds. Do not apply at intervals shorter than 7 days. Do not make more than 2 sequential applications. Do not apply more than 28 fl oz per A per year.

Chemical: Azadirachtin

Remarks: Insecticide Resistance Group 26. This product provides better control of larvae than adults. The reentry interval is 12 hours and the preharvest interval is 0 days. It is not particularly effective and needs to be sprayed very frequently.

Trade Name	Pest	Rate/A	Comments
Neemix 4.5	Colorado potato beetles	2-16 oz	Best control achieved with higher rates.
Ecozin 3EC		8 oz	Slower acting than Bt materials. Provides control of larvae.

Chemical: Azadirachtin plus Pyrethrins

Remarks: Insecticide Resistance Group 3A. The reentry interval is 12 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Azera	Aphids Colorado potato beetles Leafhoppers European corn borers Flea beetles	2-3.5 pt	pH should be adjusted to 5.5-7.0.

Chemical: Clothianidin

Remarks: Insecticide Resistance Group 4A. Clothianidin may be applied in-furrow or as a side-dress treatment for aphids, Colorado potato beetles, flea beetles and potato leafhoppers. This product can also be applied as a foliar treatment, however, do not follow a soil application of this product with a foliar application. The reentry interval is 12 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Belay	Aphids Colorado potato beetles Flea beetles Leafhoppers	2-3 oz (Foliar)	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of this or another Group 4A material has been used.

Chemical: Cyfluthrin

Remarks: Insecticide Resistance Group 3. Avoid use on pyrethroid resistant pest populations. The reentry interval is 12 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Baythroid XL	Colorado potato beetles European corn borers Flea beetles	1.6-2.8 oz	Limit 6 application per season or 16.8 oz/A per year. Lower rate may be used for cutworms and potato leafhoppers. Has suppressive activity against aphids at max rate. Please see label.

Chemical: Cyfluthrin combined with Imidacloprid

Remarks: Insecticide Resistance Group 3 and 4A. The reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Leverage 360	Aphids European corn borers Flea beetles Potato leafhoppers	2.4-2.8 fl oz	Minimum interval between applications is 5 days. Maximum Leverage 360 allowed per crop season: 8.3 fl oz/A. Please see label for cyfluthrin limitations per season. Not suitable for use on seed potatoes.

Chemical: Dinotefuran

Remarks: Insecticide Resistance Group 4A. Dinotefuran may be applied in-furrow or as a side-dress treatment for Colorado potato beetles, Flea beetles and potato leafhoppers. This product can also be applied as a foliar treatment, however, do not follow a soil application of this product with a foliar application. The reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Venom	Colorado potato beetles Flea beetles Potato leafhoppers	1-1.5 oz (foliar)	For resistance management, do not use a foliar neonicotinoid in the same season if an in-furrow or seed treatment formulation of this or another group 4A material has been used. Limit 4.5 oz per season.
Scorpion 35SL	Colorado potato beetles Flea beetles Aphids (suppression) Leafhoppers	2-2.75 fl oz (foliar)	

Chemical: Esfenvalerate

Remarks: Insecticide Resistance Group 3. Do not exceed 0.35 pounds a.i. per acre per season. This product may not be compatible with Tin-based fungicides. Not recommended for green peach aphid control. Performance against Colorado potato beetles may be enhanced with piperonylbutoxide (PBO). The reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Asana XL	Aphids Colorado potato beetles European corn borers Flea beetles Leafhoppers	5.8-9.6 fl oz	

Chemical: Flonicamid

Remarks: Insecticide resistance group 9C. This is a foliar product for the control of aphids and plant bugs; feeding will stop shortly after application; however, the insects may take several days to die. Do not apply more than 8.4 oz. of product per season. The restricted reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Beleaf 50SG Carbine 50WG	Aphids	2-2.8 oz	Do not apply more than 8.4 oz/ acre per season or more than three applications at the 2.8 oz rate.

Chemical: Flupyradifurone

Remarks: Insecticide resistance group 4D. The restricted reentry interval is 4 hours and preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Sivanto Prime Sivanto 200SL	Aphids Leafhoppers Colorado potato beetles	7-14 fl oz	The maximum interval between applications is 7 days. Do not apply more than 28 fl oz per year. Use 10.5-14 fl oz/A for controlling Colorado potato beetles and green peach aphids.

Chemical: Indoxacarb

Remarks: Insecticide Resistance Group 22. Do not apply more than 24 ounces per season. Performance against Colorado potato beetles may be enhanced with piperonylbutoxide (PBO). The reentry interval is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Avaunt EVO	Colorado potato beetles European corn borers	3.5-6 oz	Be aware that this product may be somewhat slow in its activity against Beetles larvae.

Chemical: Lambda-cyhalothrin

Remarks: Insecticide Resistance Group 3. The rentry interval is 24 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Warrior II Lamcap II Cavalry II Kendo 22.8	Aphids Colorado potato beetles Potato leafhoppers European corn borers Flea beetles (adults)	0.96-1.92 fl oz depending on the pest	When applying by ground equipment a minimum of 10 gallons of mixture is recommended. Do not apply more than 15.36 oz per acre per season.

Chemical: RynaXypyr

Remarks: Insecticide resistance group 28. The minimum interval between applications is 5 days. The reentry interval is 4 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Altacor Coragen	Colorado potato beetles European corn borers	See label	Do not apply more than 9 oz. of Altacor per crop. Do not apply more than 15.4 oz of Coragen per crop.

Chemical: Cyantraniliprole

Remarks: Insecticide resistance group 28. The restricted reentry internal is 12 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Exirel	Aphids Colorado potato beetles European corn borers Flea beetles	5-20.5 fl oz depending on the pest	

Chemical: Cyantraniliprole plus Abamectin

Remarks: Insecticide resistance groups 28 and 6. The restricted reentry internal is 12 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Minecto Pro	Colorado potato beetles European corn borers	5.5-10 fl oz	Do not make more than 2 sequential applications of Minecto Pro or any other foliar applied abamectin-containing product. Do not apply Minecto Pro or other Group 28 insecticides more than twice to a generation of Colorado potato beetles or within any 30-day "treatment window". To avoid illegal residues, Minecto Pro must be mixed with a non-ionic activator type wetting, spreading, and/or penetrating spray adjuvant.
	Green peach aphids *Suppression:* Potato aphids Potato flea beetles	10 fl oz	

Chemical: Chlorantraniliprole plus Lambda-cyhalothrin*

Remarks: Insecticide resistance groups 28 and 3. The restricted reentry internal is 24 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Besiege	Leafhoppers	5-8 fl oz	Do not exceed a total of 27.0 fl oz of Besiege Insecticide or 0.12 lb ai of lambda-cyhalothrin-containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year. Do not use less than 10 GPA for ground applications or 5 GPA for aerial applications. Make no more than 4 applications per acre per crop.
	Aphids Colorado potato beetles European corn borers	6-9 fl oz	

Chemical: Permethrin

Remarks: Resistance group 3. The restricted reentry internal is 12 hours and the preharvest interval is 14 days. Is not particularly effective against green peach aphids and Colorado potato beetles. Can flare up aphid populations by killing their natural enemies.

Trade Name	Pest	Rate/A	Comments
PermaStar AG Permethrin Perm-up 3.2 EC	Colorado potato beetles European corn borers Potato aphids	4-8 oz	Do not apply more than a total of 0.8 lb a.i.per acre per year. Minimum interval between applications is 10 days.
Pounce 25WP	Flea beetles Leafhoppers	6.4-12.8 oz	

Chemical: Spinetoram

Remarks: Resistance Group 5. The restricted reentry internal is 4 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Radiant SC Delegate WG	Colorado potato beetles European corn borers Flea beetles (suppression)	See label	

Chemical: Spinosad

Remarks: Insecticide Resistance Group 5. The reentry interval for these products is 4 hours, and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Entrust SC	Colorado potato beetles European corn borers	3-10 oz	Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). Do not apply Entrust SC to consecutive generations of Colorado potato beetles and do not make more than two applications per single generation of Colorado potato beetles. Do not apply more than a total of 21 fl oz per year.

Chemical: Spirotetramat

Remarks: Insecticide Resistance Group 23. The reentry interval for this product is 24 hours and the preharvest interval is 7 days. This material is a foliar applied material with systemic properties.

Trade Name	Pest	Rate/A	Comments
Movento	Aphids	4-5 fl oz	Maximum Movento allowed per crop season: 10 fl oz/A. Minimum 7 days interval between applications. Have suppressive effects on nematodes and wireworms.
Movento HL	Aphids	2-2.5 fl oz	Maximum Movento HL allowed per crop season: 5 fl oz/A. Minimum 7 days interval between applications. Have suppressive effects on nematodes and wireworms.

Chemical: Pyriproxyfen plus Spirotetramat

Remarks: Insecticide Resistance Group 7C and 23. The reentry interval is 24 hours, and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Senstar	Aphids	8-10 fl oz	Do not make more than 2 applications per season.

Chemical: Thiamethoxam plus chlorantraniliprole

Remarks: Resistance Insecticide Group 4A and 28. This material contains a neonicotinoid group 4A material and for resistance management reasons should not be used if a neonicotinoid material was used at planting or lay-by. Do not exceed a total of 8 oz. of Voliam Flexi or 0.094 pounds a.i. of thiamethoxam containing foliar products or 0.2 pounds a.i. of chlorantraniliprole per acre per season. The restricted reentry interval is 12 hours and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Voliam flexi	Aphids Colorado potato beetles European corn borers Flea beetles Leafhoppers	4 oz	

Chemical: Thiamethoxam plus Lambda – cyhalothrin

Remarks: Resistance insecticide Group 4A and Group 3. This product is a combination of a neonicotinoid and a pyrethroid. The restricted reentry interval is 24 hours, and the preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Endigo ZC	Aphids Colorado potato beetles Flea beetles (adults) Leafhoppers European corn borers	2.5-4.5 fl oz depending on the pest	For resistance management, do not use if a neonicotinoid was used at planting. Do not exceed a total of 0.12 lb ai of lambda-cyhalothrin-containing products or 0.094 lb ai of foliar applied thiamethoxam-containing products per acre per year. Minimum 7 days between applications is required. Use maximum rate for aphid control.
Endigo ZCX		3-3.5 fl oz	

Chemical: Gamma-Cyhalothrin

Remarks: Insecticide resistance Group 3. The restricted reentry interval is 24 hours and the preharvest interval is 7 days.

Trade Name	Pest	Rate/A	Comments
Declare	Aphids Colorado potato beetles European corn borer Flea beetles	1.02-1.54 fl oz	Do not apply more than 6.15 fl oz/A in a year.

Chemical: Zeta-cypermethrin

Remarks: Resistance Insecticide Group 3. Do not make applications less than 4 days apart. The restricted reentry interval is 12 hours and the preharvest interval is 1 day.

Trade Name	Pest	Rate/A	Comments
Mustang Maxx	European corn borers Flea beetles Leafhoppers	1.28-4 oz	

Chemical: Zeta-cypermethrin plus bifenthrin

Remarks: Resistance Insecticide Group 3. This product is a combination of two different pyrethoid materials. Do not make more than 2 foliar applications of this product per season. The restricted reentry interval is 12 hours and the preharvest interval is 21 days.

Trade Name	Pest	Rate/A	Comments
Hero	Aphids Colorado potato beetles Flea beetles European corn borers Leafhoppers	2.6-10.3 oz depending on the pest.	
Steed		2.5-4.7 fl oz depending on the pest.	

Chemical: Dimethoate

Remarks: Resistance Insecticide Group 1B. The restricted reentry interval is 48 hours and preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Dimethoate 400 Dimethoate 4EC	Aphids Leafhoppers	0.5-1 pt	Maximum application rate: 0.5 pound active ingredient per acre, 7-day reapplication interval. Maximum total rate per year: 1.0 pound active ingredient per acre.

Chemical: Malathion

Remarks: Resistance Insecticide Group 1B. The restricted reentry interval is 12 hours and preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Fyfanon 57% Malathion 57EC Malathion 8 Flowable	Aphids Leafhoppers	See label	Maximum 2 applications per year. Minimum 7-day intervals between applications.

Chemical: Methomyl

Remarks: Resistance Insecticide Group 1A . The restricted reentry interval is 48 hours and preharvest interval is 6 days.

Trade Name	Pest	Rate/A	Comments
Nudrin Lannate	Aphids Leafhoppers Flea beetles	1.5-3 pt	Do not make more than 10 applications and 15 pt per A per year.

Chemical: Piperonyl butoxide plus pyrethrins

Remarks: Insecticide Resistance Group 3A. The restricted reentry interval is 12 hours. Harvest should not start before spray has dried.

Trade Name	Pest	Rate/A	Comments
Evergreen	Aphids Colorado potato beetles European corn borers Leafhoppers Flea beetles	2-12.6 fl oz	Final spray mix should be buffered to a pH of 5.5-7.0.

Chemical: Pyrethrins

Remarks: Insecticide Resistance Group 3A. The restricted reentry interval is 12 hours. Preharvest interval is 0 days. Is not particularly effective against green peach aphids and Colorado potato beetles. Can flare up aphid populations by killing their natural enemies.

Trade Name	Pest	Rate/A	Comments
Tersus	Aphids Colorado potato beetles Leafhoppers Flea beetles	4.5-16.35 fl oz	
Pyganic		4.5-15.61 fl oz	

Chemical: Sodium tetraborohydrate decahydrate

Remarks: Insecticide Resistance Group 8D. The restricted reentry interval is 24 hours.

Trade Name	Pest	Rate/100 gal	Comments
Prev-Am	Aphids Leafhoppers	100 fl oz	Apply in a minimum of 20 gallons per acre. Do not spray more frequently than every 7 days.

Chemical: Tolfenpyrad

Remarks: Insecticide Resistance Group 21A and 39. The restricted reentry interval is 12 hours. Preharvest interval is 14 days.

Trade Name	Pest	Rate/A	Comments
Torac	Aphids Colorado potato beetles Leafhoppers	14-21 fl oz	Apply in a minimum of 20 gallons per acre. Use minimum 17 fl oz/A for Aphids. Do not make more than 2 applications per year.

Biological: *Isaria fumosorosea Apopka Strain 97 (formerly Paecilomyces fumosoroseus)*

Remarks: Formerly known as *Paecilomyces fumosoroseus*. Insecticide Resistance Group UNF. The reentry interval is 4 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
PFR-97	Aphids	1-2 lb/A	Applications should start before pest numbers have reached crisis levels. This product is most effective when application is initiated just before or at the first signs that target pests are present.

Biological: *Beauveria bassiana* strain GHA

Remarks: Insecticide Resistance Group UNF. The reentry interval is 0 hours and the preharvest interval is 0 days. They are more effective when applied early, before high pest populations develop.

Trade Name	Pest	Rate/A	Comments
BoteGHA ES BotaniGard 22WP	Aphids Colorado potato beetles Flea beetles Leafhoppers European corn borers	0.25-1qt (Up to 3 qt at high pest pressure)	Can be tank mixed with Bt insecticides for additional Colorado potato beetle control.

Biological: *Beauveria bassiana* strain ANT-03

Remarks: Insecticide Resistance Group UNF. The reentry interval is 0 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
BioCeres EC	Aphids	0.25-1.5 qt	Can be tank mixed with Bt insecticides for additional Colorado potato beetle control.

Biological: *Chromobacterium subtsugae* strain PRAA4-1t and spent fermentation media

Remarks: Remarks: Insecticide Resistance Group UNB. The reentry interval is 4 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Grandevo WDG	Aphids Colorado potato beetles (larvae suppression) European corn borers Leafhoppers	1-3 lb depending on pest	

Biological: Cinnamaldehyde

Remarks: Remarks: Insecticide Resistance Group UNE. The reentry interval is 4 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Seican	Aphids Leafhoppers	1-3.5 pt, see label.	

Biological: RNAi

Remarks: The reentry interval is 4 hours and the preharvest interval is 0 days.

Trade Name	Pest	Rate/A	Comments
Calantha	Colorado potato beetles	16 fl oz	Recommended interval between applications is 7-10 days. Most effective on young larvae. Do not make more than 4 applications per year.

Comparison of Insecticides *According to Labels*

Product	Aphids	Colorado potato beetles	Leafhoppers	Flea beetles	European corn borers	Wireworms
Brigade 2EC	-	-	-	-	-	+
Capture LFR	-	-	-	-	-	+
Ethos XB	-	-	-	-	-	+
Mocap EC	-	-	-	-	-	+
Nurizma	-	-	-	-	-	+
Verimark	+	+	-	+	-	-
Harvanta	-	+	-	+	+	-
Belay	+	+	+	+	-	-
Regent 4SC	-	-	-	-	-	+
Admire Pro	+	+	+	+	-	-
Widow	+	+	+	+	-	-
Macho 2.0 FL	+	+	+	+	-	-
Alias 4F	+	+	+	+	-	-
Acronyx 4F	+	+	+	+	-	-
Advise Four	+	+	+	+	-	-
Macho 4.0 FL	+	+	+	+	-	-
Wrangler	+	+	+	+	-	-
Viloprid FC 1.7	+	+	+	+	-	-
Platinum 75 SG	+	+	+	+	-	-
Actara	+	+	+	+	-	-
CruiserMaxx	+	+	+	+	-	-

Product	Aphids	Colorado potato beetles	Leafhoppers	Flea beetles	European corn borers	Wireworms
Agri-Mek Reaper	-	+	-	-	-	-
Assail	+	+	-	+	+	-
Anarchy	+	+	-	+	+	-
Sefina Inscalis	+	-	-	-	-	-
Neemix 4.5	-	+	-	-	-	-
Ecozin 3EC	-	+	-	-	-	-
Azera	+	+	+	+	+	-
Belay	+	+	+	+	-	-
Baythroid XL	-	+	-	+	+	-
Leverage 360	+	-	+	+	+	-
Venom	-	+	-	+	-	-
Scorpion 35SL	+ (S)	+	+	+	-	-
Asana XL	+	+	+	+	+	-
Beleaf 50SG	+	-	-	-	-	-
Carbine 50WG	+	-	-	-	-	-
Sivanto Prime	+	+	+	-	-	-
Sivanto 200L	+	+	+	-	-	-
Avaunt EVO	-	+	-	-	+	-
Warrior II	+	+	+	+	+	-
Lamcap II	+	+	+	+	+	-
Cavalry II	+	+	+	+	+	-
Kendo 22.8	+	+	+	+	+	-
Altacor	-	+	-	-	+	-

Product	Aphids	Colorado potato beetles	Leafhoppers	Flea beetles	European corn borers	Wireworms
Coragen	-	+	-	-	+	-
Exirel	+	+	-	+	+	-
Minecto Pro	+	+	-	+ (S)	+	-
Besiege	+	+	+	-	+	-
PermaStar AG	+ (potato only)	+	+	+	+	-
Permethrin	+ (potato only)	+	+	+	+	-
Perm-up 3.2 EC	+ (potato only)	+	+	+	+	-
Pounce 25WP	+ (potato only)	+	+	+	+	-
Radiant SC	-	+	-	+	+	-
Delegate WG	-	+	-	+	+	-
Entrust SC	-	+	-	-	+	-
Movento	+	-	-	-	-	-
Movento HL	+	-	-	-	-	-
Senstar	+	-	-	-	-	-
Voliam flexi	+	+	+	+	+	-
Endigo ZC	+	+	+	+	+	-
Endigo ZCX	+	+	+	+	+	-
Declare	+	+	-	+	+	-
Mustang Maxx	-	-	+	+	+	-
Hero	+	+	+	+	+	-
Steed	+	+	+	+	+	-
Dimethoate 400	+	-	+	-	-	-
Dimethoate 4EC	+	-	+	-	-	-

Product	Aphids	Colorado potato beetles	Leafhoppers	Flea beetles	European corn borers	Wireworms
Fyfanon 57%	+	-	+	-	-	-
Malathion 57%	+	-	+	-	-	-
Malathion 8 Flowable	+	-	+	-	-	-
Nudrin	+	-	+	+	-	-
Lannate	+	-	+	+	-	-
Evergreen	+	+	+	+	+	-
Tersus	+	+	+	+	-	-
Pyganic	+	+	+	+	-	-
Prev-Am	+	-	+	-	-	-
Torac	+	+	+	-	-	-
PFR-97	+	-	-	-	-	-
BoteGHA ES	+	+	+	+	+	-
BotaniGard 22WP	+	+	+	+	+	-
Grandevo WDG	+	+ (S)	+	-	+	-
Seican	+	-	+	-	-	-
Calantha	-	+	-	-	-	-

S: Suppression only

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