Vegetable Crop Updates

A newsletter for commercial potato and vegetable growers prepared by University of Wisconsin-Madison vegetable research and extension specialists

Extension
UNIVERSITY OF WISCONSIN–MADISON

May 31, 2026

In This Issue:

- Potato early and late blight disease modeling and risk updates
- Rhizoctonia in vegetables – updates and recommendations for management in tomato
- Seedcorn maggot updates and management
- Colorado potato beetle updates and management

Calendar of Events:

July 9, 2026 – UW Hancock Agricultural Research Station Field Day, Hancock, WI
July 16, 2026 – UW Langlade County Airport Research Station Field Day, Antigo, WI
December 1-3, 2026 – Midwest Food Products Association Annual Convention & Expo, Processing Crops Conference, Wisconsin Dells, WI
February 9-11, 2027 – WPVGA/UWEX Grower Education Conference, Stevens Point, WI

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Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations will be posted at our website and available in the weekly newsletters. Thanks to Ben Bradford, UW- Madison Entomology for supporting this effort and providing a summary reference table: https://agweather.cals.wisc.edu/thermal-models/potato. A Potato Physiological Day or P-Day value of ≥300 indicates the threshold for early blight risk in potato and triggers preventative fungicide application. A Disease Severity Value or DSV of ≥18 indicates the threshold for late blight risk and triggers preventative fungicide application in potato. Data from the modeling source: https://agweather.cals.wisc.edu/vdifn are used to generate these risk values in the table below. **I've estimated early, mid-, and late planting dates by region based on communications with stakeholders**. These are intended to help in determining optimum times for preventative fungicide applications to limit early and late blight in Wisconsin.

Location	**Planting Date** *Dates in future are anticipated or not yet listed (To Be Determined or TBD)*		**50% Emergence Date**	**Disease Severity Values (DSVs)** ***through 5/30/26***	**Potato Physiological Days (P-Days)** ***through 5/30/26***
Spring Green	Early	Apr 10	May 7	2	151
	Mid	May 5	May 20	0	79
	Late	May 16	TBD	TBD	TBD
Arlington	Early	Apr 12	May 8	0	142
	Mid	May 6	May 23	0	66
	Late	May 20	TBD	TBD	TBD
Grand Marsh	Early	Apr 13	May 9	0	128
	Mid	May 6	May 22	0	69
	Late	May 21	TBD	TBD	TBD
Hancock	Early	Apr 14	May 11	1	123
	Mid	May 10	May 30	0	8
	Late	May 23	TBD	TBD	TBD
Plover	Early	Apr 15	May 12	1	120
	Mid	May 10	May 30	0	8
	Late	May 25	TBD	TBD	TBD

Antigo	Early	May 12	TBD	TBD	TBD
	Mid	May 25	TBD	TBD	TBD
	Late	TBD	TBD	TBD	TBD
Rhinelander	Early	May 15	TBD	TBD	TBD
	Mid	May 28	TBD	TBD	TBD
	Late	TBD	TBD	TBD	TBD

Late blight of potato/tomato. The southern locations of early-planted potatoes have accumulated 1 or 2 Disease Severity Values or DSVs as of yesterday (5/30). This indicates that late blight favorable weather has occurred, since ~50% crop emergence. However, we have not yet accumulated enough late blight-favorable weather to warrant a preventative fungicide application to target this disease. With warmer weather over the past several days, we will begin reaching emerge for many more regions of the state.

Early blight of potato. Once we see potato crops at 50% emergence, P-Days will begin to accumulate to aid in anticipating early blight. P-Day values will continue to amass and develop conditions optimum for early blight disease caused by *Alternaria solani*. Fungicides can provide good control of early blight in vegetables when applied early on in infection. Multiple applications of are recommended for optimum disease control through the season to vine-kill. Earliest emerging fields are at roughly 150 P-Days.

Rhizoctonia root rot and stem canker caused by the soilborne fungus *Rhizoctonia solani* can be a significant challenge in Wisconsin tomato production, especially under cool soils, excessive moisture, compacted soils, or where tomatoes follow susceptible vegetable crops. Disease symptoms often begin shortly after transplanting and include stem constriction at the soil line, poor root development, uneven vigor, lower stem lesions, and eventual plant decline. Management is most successful when an integrated approach is used that combines cultural practices with biological or fungicidal protection.

Photo Courtesy to Sam Bibby, Regional Crops Educator with UW-Extension, La Crosse, Vernon, and Crawford Counties.

Key integrated management recommendations for both conventional and organic systems

- Use vigorous, disease-free transplants with well-developed root systems.
- Avoid transplanting into cold, saturated soils (plant into >60°F when possible).
- Promote rapid root establishment through raised beds and good drainage.
- Avoid excessive soil compaction and overwatering immediately after transplanting.
- Rotate away from susceptible hosts for 2–3 years when feasible. Hosts include many vegetables such as potato, bean, pepper, lettuce, cucurbits, and brassicas.
- Minimize fresh undecomposed organic matter immediately before planting, which may favor pathogen activity.
- Use plasticulture or mulches to warm soils and reduce moisture fluctuation.
- Maintain balanced fertility; excessive ammonium nitrogen can favor disease development.

Organic Certified Rhizoctonia Management Program
Biological transplant drench at planting

The most consistent organic suppression of *Rhizoctonia* in vegetables typically comes from biological antagonists applied directly to the transplant root zone. Active organisms include: *Trichoderma harzianum*, *Trichoderma virens*, *Bacillus subtilis*, *Bacillus amyloliquefaciens*, *Streptomyces lydicus*. Common OMRI-listed examples may include chitosan formulations, RootShield PLUS+, Double Nickel, Actinovate, Regalia, and Serenade Soil. Other inputs that may be useful on the foliage to reduce disease include hydrogen peroxide and peroxyacetic acid formulations. Applications are most effective when they are applied directly in the transplant water, placed into the root zone, and followed by warm conditions favoring rapid root growth.

Soil health and organic matter management
Organic systems benefit greatly from microbial competition and improved soil structure. Recommended practices include: i) incorporate well-composted organic matter well ahead of transplanting, ii) utilize cover crops that improve soil aggregation and microbial diversity, iii) avoid excessive fresh poultry manure or unstable composts immediately before planting.

Anaerobic soil disinfestation (ASD) or soil solarization

For high-value organic tomato systems with chronic disease pressure, ASD using carbon sources and tarp sealing can reduce Rhizoctonia pathogen inoculum (and other pathogens in the soil). Soil solarization may provide partial suppression during warm Wisconsin summers. A nice summary of ASD based on their extensive work at Ohio State University can be found here from Drs. Anna Testen and Sally Miller: https://ohioline.osu.edu/factsheet/hyg-3315

Essential oil or natural product additions
Some growers have observed suppression using thyme or clove oils, mustard-derived biofumigant products, or compost extracts. These materials are generally supplemental and less reliable than biological root-zone protection.

Conventional Rhizoctonia Management Program
In-Furrow or transplant water fungicide protection
The most reliable conventional suppression comes from targeted fungicides at transplanting. The effectiveness of fungicides after transplanting is variable. The fungus infects at and below the soil line. As such, if you can direct application to the lower stem region, you can reduce disease. Once infected, only fungicides with some

systemic activity will be effective. The modification of environmental conditions to improve drainage, reduce cool/wet soil persistence, is best in addressing this disease.

SDHI fungicides (Most effective group, FRAC 7) are among the strongest tools against *Rhizoctonia*. Examples include Fontelis (penthiopyrad), Aprovia Top (benzovindiflupyr FRAC 7 + difenoconazole FRAC 3), and Priaxor Xemium (pyraclostrobin FRAC 11 + fluxapyroxd FRAC 7). These materials can suppress root rot, stem canker, and improve transplant success. Applications should target the transplant root zone through i) transplant water, ii) directed spray, iii) or in-furrow placement.

Strobilurin fungicides (Provide suppression, FRAC 11) are good tools against Rhizoctonia and other diseases. Examples include azoxystrobin (example Quadris), trifloxystrobin (example Trilex), pyraclostrobin (example Cabrio EG), and Veltyma (pyraclostrobin FRAC 11 + mefentrifluconazole FRAC 3). Strobilurin fungicides have shown activity against *Rhizoctonia* in many vegetable crops when applied in-furrow or banded at planting. Contact fungicides including chlorothalonil (example Bravo) are registered for Rhizoctonia in tomato and can protect above ground plant parts.

Biological and reduced-risk integration

Many Wisconsin growers can improve consistency by combining conventional fungicides, biological transplant drenches, and soil health management. This integrated strategy can reduce fungicide dependence, improve root vigor, and moderate environmental stress impacts.

Wisconsin-Specific Disease Risk Conditions

Rhizoctonia risk is highest in Wisconsin when transplants are set in cool spring soils, planting in soil that had previously been cropped to potatoes or snap beans, soils remain saturated after rainfall, or rapid temperature or moisture fluctuations occur which slow root establishment. Years with prolonged cool and wet May conditions often show the greatest transplant losses. Because *Rhizoctonia* is strongly influenced by environmental stress, the best outcomes generally occur when fungicides or biologicals are paired with practices that accelerate rapid transplant rooting and minimize early-season stress.

Example of an organic program:

1. Raised beds + plastic mulch
2. Well-composted organic matter incorporated weeks before planting
3. RootShield PLUS+ transplant drench
4. Avoid overwatering first 10–14 days
5. Rotate with small grains or grasses when possible

Conventional Example

1. Raised beds + plastic mulch
2. Transplant water application of Velum or Quadris
3. Supplemental biological product in transplant water
4. Balanced fertility and irrigation management
5. Crop rotation and residue decomposition management

Vegetable Insect Update – Russell L. Groves, Professor and Associate Department Chairperson, UW-Madison, Department of Entomology, 608-262-3229 (office), (608) 698-2434 (cell), e-mail: rgroves@wisc.edu

Vegetable Entomology Webpage: https://vegento.russell.wisc.edu/

Seedcorn maggot - (https://vegento.russell.wisc.edu/pests/seedcorn-maggot/)

The 2nd generation of seedcorn maggot (SCM, *Delia platura*) has advanced into the state and is across central Wisconsin at the present time. With forecast warm days and nighttime temperatures being above normal for early June, the risk will last for 10-12 days in central Wisconsin. Recall, the 1st generation moved into and across the state in early May, when few susceptible crops were in the ground.

The SCM is a perennial pest of germinating seeds and young seedlings of a wide range of vegetable and agronomic crops. In addition to corn, this insect has a large host range including numerous common vegetable crops including beet, Brussels sprouts, cabbage, cantaloupe, carrot, cauliflower, cucumber, kale, lettuce, bean (lima, snap, red), onion, pea, pumpkin, tomato, and turnip. In high numbers, SCM can decimate entire crop stands if early stands are untreated or if they do not contain seed treatments. SCM can be an increasing problem when susceptible crop crops are planted in succession. Avoidance of the 'risk interval' is a very successful and sustainable way to limit damage. If plants are up and growing well now, the risk for damage is very slight. If you are considering planting at this time, you may wish to delay planting until June10-12 to avoid the peak period for adult activity and egg laying.

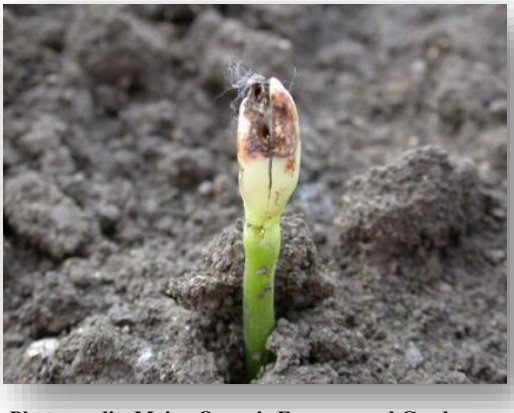
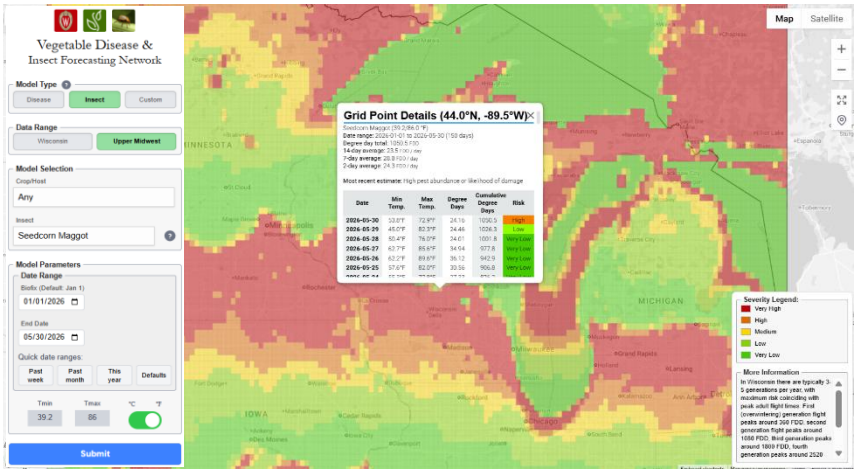


Photo credit: Maine Organic Farmers and Gardeners

Injury to plants is caused exclusively by the larval stages of SCM. Larvae will feed in the cotyledons and below-ground hypocotyl (stem) tissue of seedling plants, resulting in a variety of damage symptoms. Feeding damage in germinating seeds will often kill seedlings before they emerge. Poor germination or poor stands of susceptible crops may indicate a SCM problem. Often seedlings will survive below ground feeding but emerge with damage to the first true leaves or have no leaves at all (often called "snakehead" seedlings).

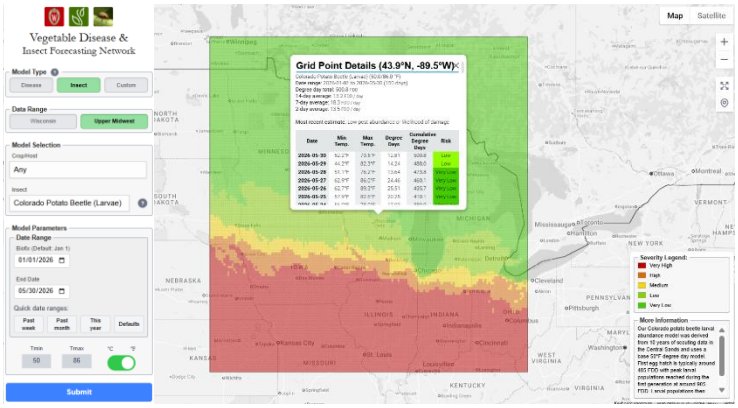


Colorado potato beetle – (**https://vegento.russell.wisc.edu/pests/colorado-potato-beetle/**)

Potato producers and scouts need to continue checking newly planted fields for colonizing Colorado potato beetle (CPB) adults in outside rows. Where producers have no at-plant, systemic insecticide incorporated at the time of planting, it is very likely to observe many egg masses being laid in the outer rows of fields. If producers did use a systemic insecticide (e.g. AdmirePro®, Belay Insecticide®, Platinum®/Cruiser® 5FS or Verimark® 1.67SC), and adults remain susceptible to these active ingredients, scouts may find few egg masses. If, however, the adult CPB have developed some level of insensitivity, then scouts may find egg masses accumulating on the undersurfaces of lower canopy leaves.

Mentioned last week, early detection of these initial infestations can be especially critical to implement perimeter sprays. The decision to apply a set of perimeter sprays should be based upon an understanding of the distribution of colonizing adults within a field and position of the current field to prior year's potato production. The application of a contact adulticide (e.g., indoxacarb (Avaunt® eVo), phosmet (Imidan 70-W)) will be most effective when large aggregations of adults are still colonizing the outer rows of current season potato. If adults have already moved past the outer rows (e.g., 25-20 rows) and are distributed all around a field, then a perimeter spray at the current time may not be as advantageous. If adult CPB are still aggregated in these regions and scouts suggest large numbers of egg masses are accumulating in these same areas, then it may be advantageous to add novaluron (Rimon® 0.83EC) to the tank mix to be applied to perimeters.

Colorado Potato Beetle (Larval model)



In very southern portions of Wisconsin (south of the Wisconsin River), producers should be considering initial applications of larvicides since 10% egg hatch may be approaching this week. There are several 1st generation larvicides that can be very effective in controlling this 1st generation of developing CPB, and suggested materials are listed in the attached supplement to this week's newsletter. In central Wisconsin, it is a bit early to begin larvicide treatments, and most populations will be ready for initial applications by the beginning of the following week (e.g., June 7). With the forecast warm temperatures forecast for the coming week, do pay attention to the developing population as initial applications of novaluron (Rimon® 0.83EC) or ledprona (Calantha®) may be warranted by the end of the week when 10% egg hatch has been reached in southern portions of the Central Sands.

Producers should develop an annual plan of control for the CPB and make efforts to try to limit consecutive exposures of similar mode of action (MoA) insecticide classes across generations as defined by IRAC (iraconline.org). Specifically, pest management practitioners should consider the specific MoA of each insecticide used at different points throughout the production season (**Fig. 1**). In the attached example, be certain that the compound used for each of the following time points, i) at-plant systemic, ii) perimeter, contact adulticide, iii) 1st generation, foliar larvicide(s), iv) 1st generation rescue, v) 2nd generation, foliar insecticide, are classified as unique MoA to implement the best overall insecticide resistance management plan.

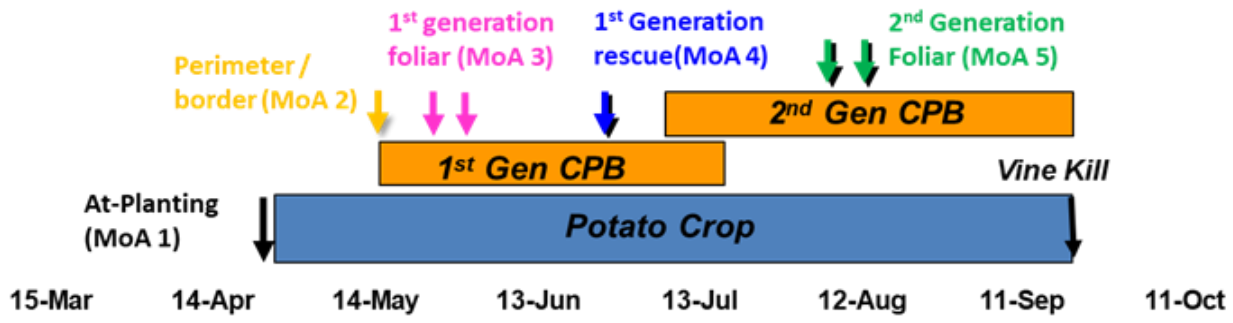
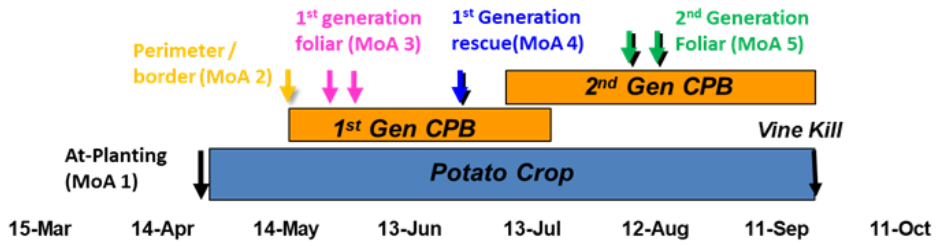


Figure 1. Hypothetical sequence of insecticide Modes of Action (MoA) used over the course of a production season targeting the Colorado potato beetle (CPB).

Insecticide options for controlling Colorado potato beetle in Wisconsin



For most CPB chemical management tools, timing application occurs with the appearance of first instar larvae in the field. Early instar larvae are the most susceptible life stage for chemical management, and applications should be timed with the midpoint of egg hatch. The first application should be followed up in 7-10 days later with a second application of the same compound depending on the formulation and label restrictions. Refer to the UW-Extension publication Commercial Vegetable Production in Wisconsin (A3422) for a list of registered insecticides and management recommendations.

Initial applications of ledprona (Calantha) and novaluron (Rimon) should be applied when 10% egg hatch has occurred. Foliar applications of compounds including, tolfenpyrad (Torac), spinosad (Falcondor, Blackhawk, generics) spinetoram (Radiant, Delegate), or abamectin (Agri-Mek, generics) should be applied when nearly 50% of egg masses have hatched, and a only a few 2nd instar larvae are present from the earliest hatched egg masses. These 1st generation larvicides often require 2-3 subsequent re-applications spaced on a 7-10 day interval to achieve sufficient control.

Definitions:

- PHI: Post-harvest interval (time that must elapse after last application and before any harvesting of the crop, given in hours)
- Activity icons: (-) no activity, (+) very little activity, (++) moderate activity, (+++) excellent activity

At-plant systemic options

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar)	Late Larvae (3rd-4th instar)
Belay	clothianadin	4A	pH < 7	none (see notes)	0	12 fl oz	+	-	+++	++
Consider soil surfactant to increase uniform movement in soil profile. Season total maximum is only 0.2 lb a.i./ac for both soil-applied and foliar. Do not apply any Group 4A insecticides over the top of an at-plant application of Belay. Considerable resistance with CPB, very effective for potato leafhopper and colonizing aphids.										
Platinum 75SG	thiamethoxam	4A	pH < 7	none (see notes)	0	2.67 oz	+	-	+++	++
Consider soil surfactant to increase uniform movement in soil profile. Season total maximum varies by use pattern (soil-applied vs foliar). Can apply additional foliar applications of a Group 4A on an at-plant application. Considerable resistance with CPB, very effective for potato leafhopper and colonizing aphids.										
Admire Pro (generics)	imidacloprid	4A	pH < 7	none (see notes)	0	8.7 fl oz	+	-	+++	++
Consider soil surfactant to increase uniform movement in soil profile. Season total maximum varies by use pattern (soil-applied vs foliar). Can apply additional foliar applications of a Group 28 on an at-plant application. Considerable resistance with CPB, very effective for potato leafhopper and colonizing aphids.										
Verimark SC	cyantraniliprole	28	pH < 6.5	none (see notes)	0	13.5 fl oz	+	-	+++	++
Consider soil surfactant to increase uniform movement in soil profile. Season total maximum varies by use pattern (soil-applied vs foliar). Can apply additional foliar applications of a Group 28 on an at-plant application (not advisable!). Will provide only 45-60 days of control of CPB. Ineffective for potato leafhopper and mildly effective for aphids.										
Regent 4SC	fipronil	2B		none (see notes)	90	3.2 fl oz	-	-	-	-
For use as an at-plant, distributed in-furrow application for the control of Asiatic garden beetle, other white grubs and wireworms.										

1st generation Colorado potato beetle materials

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar)	Late Larvae (3rd-4th instar)
Rimon 0.83EC	novaluron	15	pH < 6.5	NIS (0.25-0.5% V:V)	14	9,8,7 fl oz 10,8,8 fl oz	-	+++	++	++
Initiate applications when egg deposition first appears in outer rows (0-48rows) of the field. Initial foliar application (9.0 fl oz/ac) can be applied as a 'ring' application, treating only the outer-most rows of the field. Subsequently, apply 2nd foliar application (8.0 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application (7.0 fl oz/ac) 7 days after prior application. Continue to scout the field, if an additional application is necessary, apply a final application (8.0 fl oz) to the interior of the field, not initially treated during the ring application. Must be applied with an adjuvant (NIS), and consider application outside of mid-day hours (10:00 - 16:00 h). Slightly acidify tank mix prior to application (pH < 6.5). Caution when tank-mixing this product with fungicides containing proprietary stickers (e.g., WeatherStik). Both ground and aerial application are appropriate.										
Agri-Mek SC	abamectin	6	pH < 6.5	NIS (0.5% V:V)	14	3.0-3.25 fl oz	+	-	+++	++

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar)	Late Larvae (3rd-4th instar)
Initiate applications when 50-75% egg hatch has occurred, and 1st instar larvae are present on outer-most field rows. Initial foliar application (3.25 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (3.0 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7 days after previous application with another larvicide that is effective on later stage larvae (e.g., Radiant @ 8 fl oz/ac). Must be applied with an adjuvant (NIS), and consider application outside of mid-day hours (10:00 - 16:00 h). Slightly acidify tank mix prior to application (pH < 6.5). Caution when tank-mixing this product with fungicides containing proprietary stickers (e.g., WeatherStik). Both ground and aerial application are appropriate. Only two successive applications of Agri-Mek SC allowed per crop season.										
Torac	tolfenpyrad	21A	pH = 6.5	NIS (0.5% V: V)	14	14-21 fl oz	++	++	+++	++
Initiate applications when 50-75% egg hatch has occurred, and 1st instar larvae are present on outer-most field rows. Initial foliar application (21.0 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (21.0 fl oz/ac) over entire field two weeks later. Continue to scout field and consider a 3rd foliar application with another larvicide that is effective on later stage larvae as needed. Must be applied with an adjuvant (NIS), and consider application outside of mid-day hours (10:00 - 16:00 h). Slightly acidify tank mix prior to application (pH < 6.5). Both ground and aerial application are appropriate. Only two successive applications of Torac allowed per crop season.										
Blackhawk 36WDG	spinosad	5	pH = 7	NIS (0.125 - 0.25% V:V)	7	3.0-3.3 oz	+	-	+++	+++
Initiate applications when 50-75% egg hatch has occurred, and 1st instar larvae are present on outer-most field rows. Initial foliar application (3.3 oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (3.0 oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7 days after previous application with another larvicide that is effective on later stage larvae (e.g., Agri-Mek SC @ 3.25 fl oz/ac). Can be applied with an adjuvant (NIS), and consider application outside of mid-day hours (10:00 - 16:00 h). Neutral tank pH is appropriate for this application (pH = 7.0). Both ground and aerial application are appropriate. Only two successive applications of Blackhawk allowed in succession per crop season.										
Radiant SC / Delegate WG	spinetoram	5	pH = 7	NIS (0.125 - 0.25% V:V)	7	Radiant 6.5-8.0 fl oz/A, Delegate 2.5 – 4.0 oz/A	++	-	+++	+++
Initiate applications when 50-75% egg hatch has occurred, and 1st instar larvae are present on outer-most field rows. Initial foliar application (8.0 oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (6.5 oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7 days after previous application with another larvicide that is effective on later stage larvae (e.g., Agri-Mek SC @ 3.25 fl oz/ac). Can be applied with an adjuvant (NIS) and consider application outside of mid-day hours (10:00 - 16:00 h). Neutral tank pH is appropriate for this application (pH = 7.0). Both ground and aerial application are appropriate. Only two successive applications of Radiant or Delegate allowed in succession per crop season.										
Calantha	ledprona	35	pH < 6.5	NIS (0.125 - 0.25% V:V)	0	16.0 fl oz	++	-	+++	++
Initiate applications when 50-75% egg hatch has occurred, and 1st instar larvae are present on outer-most field rows. Initial foliar application (16.0 fl oz/ac) can be applied to the field perimeter and all subsequent applications (16.0 fl oz/ac) can occur over the entire field one week later. Continue to scout field and consider a 3rd or 4th foliar application 7 days after previous application as needed through only the 1st generation of CPB. Do not use Calantha on 2nd generation if used earlier in the same year. Can be applied with an adjuvant (NIS). Both ground and aerial application are appropriate. No more than four successive applications of Calantha are allowed in succession per crop season.										

2nd generation Colorado potato beetle materials

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar)	Late Larvae (3rd-4th instar)
Coragen 1.67SC / Vantacor 5SC	chlorantraniliprole	28	pH < 6.5	MSO (0.25-0.5 % V:V)	14	variable and formulation dependent (fl oz/A)	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (7.5 fl oz/ac, Coragen) can be applied to the entire field. Subsequently, apply 2nd foliar application (5.5 fl oz/ac, Coragen) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Up to 4 successive applications of Coragen allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Exirel 0.83SC	cyantraniliprole	28	pH < 6.5	MSO (0.25-0.5 % V:V)	7	5.0-13.5 fl oz	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (13.5 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (10 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Only two successive applications of Exirel allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Minecto Pro	abamectin + cyantraniliprole	6 + 28	pH < 6.5	MSO (0.25-0.5 % V:V)	14	5.5-10 fl oz	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (10 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (7.5 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Only two successive applications of Minecto Pro allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Besiege	chlorantraniliprole + lambda-cyhalothrin	28 + 3	pH < 6.5	MSO (0.25-0.5 % V:V)	14	6.0-9.0 fl oz	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (9.0 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (7.0 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Three successive applications of Besiege are allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Harvanta	cyclaniliprole	28	pH < 6.5	MSO (0.25-0.5% V:V)	7	10.9-16.4 fl oz	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (16.4 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (14.0 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-14 days later only if										

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar)	Late Larvae (3rd-4th instar)
populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Three successive applications of Harvanta are allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Elevest	chlorantraniliprole + bifenthrin	28 + 3	pH < 6.5	MSO (0.125 – 0.25% V:V)	21	5.6-9.6 fl oz/A	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (9.6 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (7.5 fl oz/ac) over entire field one week later. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Two successive applications of Elevest are allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Voliam Flexi	chlorantranilprole + thiamethoxam	28+4A	pH < 6.5	MSO (0.25-0.5 % V:V)	14	4.0 fl oz	++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (4.0 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (3.5 fl oz/ac) over entire field one week later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. Should be applied with an adjuvant (MSO) and acidify tank pH (pH < 6.5). Ground-application advised. Only two successive applications of Voliam Flexi are allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 28 material if a Group 28 material was applied in 1st generation, or as an at-plant systemic (e.g., Verimark).										
Zivalgo	isocycloseram (Plinazolin-technology)	30	pH < 6.5	MSO (0.25-0.5 % V:V)	14	1.0 fl oz	+++	++	+++	+++
Initiate applications after the emergence of the 2nd generation of CPB, and when defoliation estimates have reached or exceeded 5-10%. Initial foliar application (1.0 fl oz/ac) can be applied to the entire field. Subsequently, apply 2nd foliar application (1.0 fl oz/ac) over entire field one to two weeks later. Continue to scout field and consider a 3rd foliar application 7-10 days later only if populations continue to defoliate. For best control, apply Zivalgo with ground application equipment. With aerial application, the resulting level and duration of control could be less than with ground application. Zivalgo may be applied via overhead chemigation in a volume of up to 0.25 inches of water per acre, however the resulting level and duration of control could be less than with ground application. Only three successive applications of Zivalgo are allowed in succession per crop season for control of the Colorado potato beetle. Do not apply a Group 30 material if a Group 30 material was applied earlier in the production season.										

Other options

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar	Late Larvae (3rd-4th instar)
Admire Pro (foliar)	imidacloprid	4A	pH < 7	none (see notes)	7	1.3 fl oz	+	-	++	+
Apply Admire Pro as a foliar insecticide for control of late-season potato leafhopper and aphids where no Group 4A insecticide was used as an at-plant insecticide starter.										

Trade name	Active ingredient	IRAC MoA Code	Spray pH<	Adjuvant	PHI	Rate	Adult	Egg Mass	Early Larvae (1st-2nd instar	Late Larvae (3rd-4th instar)
Actara 25WG (foliar)	thiamethoxam	4A	pH < 7	none (see notes)	14	1.5-3.0 oz	+	-	++	+
Apply Actara 25WG as a foliar insecticide for control of late-season potato leafhopper and aphids where no Group 4A insecticide was used as an at-plant insecticide starter.										
Assail 30SG (foliar)	acetamiprid	4A	pH < 7	NIS (0.25-0.5 % V:V)	7	1.5-4.0 oz	+	-	++	+
Apply Assail 30SG as a foliar insecticide for control of late-season potato leafhopper and aphids where no Group 4A insecticide was used as an at-plant insecticide starter.										
Venom	dinotefuran	4A	pH < 7	none (see notes)	7	1.0-1.5 oz	+	-	++	+
Apply Venom as a foliar insecticide for control of late-season potato leafhopper and aphids where no Group 4A insecticide was used as an at-plant insecticide starter.										
Avaunt eVo	indoxacarb	22	pH < 7	NIS (0.25% V:V)	7	3.5-6.0 fl oz	+++	-	-	-
Apply Avaunt insecticide targeting only adult Colorado potato beetle. Applications can be tank mixed with Rimon 0.83EC during early season applications to kill adults, alternatively a tank mix application can be applied during later 2nd generations to target adults only. The addition of piperonyl butoxide (PBO) is necessary to increase the efficiency of adult control. Use a formulation of PBO that contains > 90% active ingredient. Apply only two successive applications, spaced 5-7 days apart.										
Brigade 2EC	bifenthrin	3A	N/A	N/A	21	2.1-6.4 fl oz	+	-	-	-
Apply Brigade insecticide targeting only adult Colorado potato beetle. Applications can be applied during later 2nd generations to target adults only. The addition of piperonyl butoxide may increase the efficiency of adult control. Apply only two successive applications, spaced 5-7 days apart.										
Imidan 70W	phosmet	1B	pH < 6.5	N/A	7	1.33	+	-	+	-
DO NOT Re-enter fields within 5 days (5-day REI)! Apply Imidan insecticide targeting only adult Colorado potato beetle. Applications can be applied during later 2nd generations to target adults only. Apply successive applications spaced no less than 10 days apart.										