

Hello Growers and Orchard Owners,

We hope this email finds you and your loved ones well, and that you are looking forward to a great 2023 season. The team at SIR certainly is.

In 2022 the SIR Program worked with growers and residents to keep codling moth populations at extremely low levels. Over half the orchards had no detected codling moths and 88% had extremely low ($\leq 0.2\%$) levels of infested fruit. We estimate that 84% of the orchards would not need to apply any pesticides to control the codling moth.

While codling moths are not a problem in most orchards, problem populations exist in 10-15% of the Program area. A small number of infested orchards account for the majority of wild moths and infested fruit. In 2023, the program will continue to work with fruit producers to identify, contain, and stamp out codling moth hot spots.

Please use and access these important grower resources provided by SIR below.

Orchard Maps:

Codling moth orchard maps can be found on our website:

<https://www.oksir.org/orchard-information/codling-moth-maps/>.

Use these maps to understand the codling moth pressure in your area. For all orchards coloured **RED**, OKSIR recommended at least one pesticide application in 2022.

A spray could have been recommended because:

- An orchard had a significant amount of codling moth damage during the previous 2021 season.
- Wild codling moths were caught, and the spray threshold was reached during 2022.
- A neighboring property had a codling moth population of concern.

Traps:

Codling moth trap checking begins this week for 2023. You should be receiving wild codling moth captures by e-mail (or the agreed upon method.)

If you are **not** receiving weekly wild counts for a property, please contact us (250) 469 6187 or sirinfo@oksir.org

Wild codling moth captures for all orchards in the program area can be found on our website:

<https://rdco.maps.arcgis.com/apps/webappviewer/index.html?id=269378bd884f4925b1bc5cd87865409f>

Spray Timing:

The correct product, timing and coverage are the keys to using insecticides to control pests.

Please refer to the attached documents for codling moth spray information for 2023

- Characteristics of Codling Moth Control Products
- Organic Codling Moth Management Toolbox
- Codling Moth Spray Selection and Timing

If you have any questions about codling moth spray timing, please contact your SIR Supervisor (listed below) or our Entomologist, Evan Esch, evan.esch@oksir.org .

BCDAS (info below) offers a *free service* to evaluate spray records for insect pests, including the codling moth.

BCDAS - BC Decision Aid System:

Information regarding pests, pest management, degree days for your area, and links to the product guide can be found online on BCDAS. <https://ca.decisionaid.systems/>

BCDAS is a *free service* for Okanagan apple and cherry growers that also provides real-time model predictions for scab, fire blight, cherry mildew and more. If you need help getting DAS set up for your property, please contact Molly Thurston, P.Ag: mollyadairthurston@gmail.com

Spring Tailgate Meetings – BCDAS Spring Pest Management Tailgates:

Open Invitation, Hosted by Molly Thurston, P.Ag, BCDAS Coordinator

Join Molly for a timely discussion on scab, fireblight, mildew, and leaf rollers! PAC points available.

Area	Date & Time	Location	Address
Creston	May 5, 8:00 am	Wloka Fruit Stand	3524 Highway 3
Summerland	May 9, 10:00 am	Steve Brown’s Orchard	7603 Happy Valley Rd
Kelowna	May 12, 9:00 am	Brian Meyer’s Orchard	2947 East Kelowna Rd
Vernon/Bella Vista	May 11, 9:30 am	Ron Patterman’s Orchard	6040 Bella Vista Rd
Oliver/South	To be held later in the season with focus on soft fruit models. Contact Molly for more info mollyadairthurston@gmail.com		

For all concerns and questions about codling moth on your property this season, please contact your area supervisor:

Nicole McCann	Coldstream, Vernon, Spallumcheen, Salmon Arm	(250) 309 4952
Kelly Carmichael	Peachland, West Kelowna, Glenmore, Rutland, Ellison, Lake Country	(250) 308 7609
Shawn Fennell	Kelowna (S & E), Mission, Belgo & Benvoulin	(250) 215 1917
Bruce Garska Evan Esch	Summerland, Penticton, Naramata, Kaleden, OK Falls	(250) 485 7263 (250) 718 9241
Warren Blatz	Oliver, Osoyoos, Keremeos, Cawston	(250) 488 0380

Sincerely,

The Team at SIR

CODLING MOTH SPRAY SELECTION & TIMING

COVER SPRAYS

A cover spray is recommended if:

codling moth traps in an orchard average 2 moths/trap/week for 2 consecutive weeks;
for more valuable fruit varieties, consider using 1 moth/trap/week for 2 consecutive weeks.
Do not rely on traps alone. It is important to scout for codling moth damage, especially near orchard edges and wood piles. Call your area supervisor if you find unexpected damage.

Check the SIR web site: www.oksir.org for your trap captures and the Degree Day (DD) total for your area.

TIMING & SELECTION OF COVER SPRAYS

- 🍎 The following table lists the accumulated degree day totals at which codling moth development stages will appear in your orchard.
- 🍎 After 100 DD, watch your trap captures but do not spray yet. If a spray threshold is reached apply a cover spray at *220 DD.
 - 🍎 After *220 DD apply a cover spray if/when trap threshold is reached - only spray if weather is favourable.
 - 🍎 A properly calibrated sprayer and well-pruned trees improve spray coverage.
- 🍎 Most common reasons for continued codling moth pressure are: Poor spray timing and/or coverage of trees in yards, on fence lines, slopes, edges or where other obstacles prevent proper spray application.

Over the past 2 years, the critical control period to be covered for codling moth was late June to end of July.

Well-timed sprays keep *your* money in *your* pocket - Questions on timing?

Give us a call. 1-800-363-6684

DEGREE DAYS	CODLING MOTH STAGE	RECOMMENDED PRODUCTS & PRACTICES
100	Flight of overwintering moths starts (1 st generation begins)	Follow trap counts with the online trap-viewer (oksir.org) and follow codling moth model predictions on DAS (ca.decisionaid.systems).
150	Egg laying of 1 st generation starts	Apply an ovicide (Assail, Calypso, Intrepid, or Rimon) only if high damage the previous year and weather looks hot and dry.
* 220	Eggs from 1st generation start to hatch (larvae appear, risk of fruit damage begins)	After eggs begin to hatch apply any of these products when trap threshold is reached or if you had significant damage last year: Altacor, Assail, Calypso, Confirm, Cyd-X*, Delegate, Entrust*, Exirel, Harvanta Intrepid, Rimon, TwinGuard, Virosoft* (*certified for organic production)
500	Emergence of overwinter moths ends (flight of 1 st generation should decline)	NOTE: To kill codling moth larvae, the recommended products must be eaten. Remove and destroy infested fruit throughout the season.
575	Flight of 2 nd generation moths starts (larvae from 1 st generation are now adults)	
650	No more new eggs from 1 st generation will hatch	
700	Egg hatch of 2 nd generation starts (1 st generation damage, if present, will be apparent)	Apply any of these products when 2 nd brood thresholds are reached after eggs begin to hatch: Thorough coverage is essential.
1140	End of emergence of 2 nd generation adult moths (flight should decline)	Altacor, Assail, Calypso, Confirm, Cyd-X*, Delegate, Entrust*, Exirel, Harvanta, Intrepid, Rimon, TwinGuard, Virosoft* (*certified for organic production)
1160	3 rd generation moth emergence starts	
1275	No more new eggs from 2 nd generation will hatch	Remove and destroy infested fruit throughout the season.
1300	Eggs from 3 rd generation start to hatch	See above recommendations; read label for pre-harvest interval limits

Table 1. Characteristics of Codling Moth Control Products – Orchards-Current to March 2023 – Always Refer to Label

This table presents information on control products recommended for the control of codling moth using air-blast sprayer application to commercial pome fruit plantings. Applicators are encouraged to only apply control products when codling moth adults reach recommended action thresholds. **Always read the product labels before mixing and applying any control product. Avoid use of products from the same Group against consecutive codling moth generations. Check organic status with your certifying body.**

Product	Group No.	Rate/ha	Stable pH	Target life stage	Max. appl'ns/year	Spray Interval (days)	Label REI	PHI (days)	General Notes
Imidan 50-WP Instapak (Phosmet)	1 B	3.75 kg	5 – 6	Larvae	2	14-21	12 hrs to 9 days	22	Strong, long-lasting larvacide. Apply when egg hatch begins. Adjust tank pH to 5.5. (with an additive such as Li 700). Suitable when spray coverage is challeing and pressure is high. Also controls obliquebanded/threelined leafroller, bud moth, apple aphid, San Jose scale.
Assail 70 WP (acetamiprid)	4	120-240 g	5 - 6	Eggs, larvae	2 or 960 g	12-14	2-6 days	7	Strong larvacide, with some ovicide activity when applied over eggs. Apply Assail or Calypso when egg hatch begins. Assail provides better fruit protection while Calypso is more economical. Choose Assail when pest pressure is high. Also control aphids, leafhoppers, leafminer, and psylla.
Calypso 480 SC (thiacloprid)	4	290 - 440 mL	5 - 9	Eggs, larvae	3 or 875 mL	14-21	12 hr	30	Larvacide, apply after eggs begin hatching. Also controls all leafroller and bud moth larvae when present. Some control of twospotted spider mite.
Delegate WG (spinetoram)	5	420 g	5 - 9	Larvae	3	14	12 hr	7	Will supress codling moth, but not necessarily control it to economically acceptable levels. Controls leafrollers and bud moth. Organic certified.
Entrust (spinosad)	5	364 mL	6 - 9	Larvae	3	7-10	4 hr	7	Very effective against eggs and larvae. Apply before and during egg laying. Do not apply more than 2x times/season to avoid mite problems.
Rimon 10 EC (novaluron)	15	0.9 – 1.4 L	5 - 9	Eggs, larvae	4 or 11.0 L	10-14	12 hr	14	Larvacide with little activity against eggs. Also effective against obliquebanded, threelined leafrollers and bud moth, but not fruittree or European leafrollers. Use only under low codling moth pressure.
Confirm 240 F (tebufenozide)	18	1L	5 - 9	Larvae	4	10-14	12 hr	14	Very effective against eggs and larvae. Apply at same timing as Group 15. Also effective against obliquebanded, threelined and bud moth larvae, but not fruittree or European leafroller. Use for high codling moth pressure.
Intrepid 240 F (methoxyfenozide)	18	1L	5 - 9	Eggs, larvae	2	14-21	12 hr	14	Apply just prior to egg hatch and reapply as needed. Also controls leafroller, fruitworm and bud moth larvae.
Altacor (chlorantriliprole)	28	145 - 215 g	5 - 9	Eggs, larvae	3	10-14	12 hr	5	Apply just prior to egg hatch and reapply as needed. Also controls leafroller and bud moth larvae, rosy apple aphid, and leafhopper.
Exirel (cyantraniliprole)	28	500-750 mL	5-9	Larvae	4	10-14	12 hr	3	Apply just prior to egg hatch and reapply as needed . Also controls Obliquebanded leafroller.
Vayego 200 SC (Tetraniliprole)	28	225 mL	5-9	Larvae	3	10-14	12 hr	7	Apply just prior to egg hatch reapply as needed. Toxic to bees. Do not use more than 2 times/generation. Also controls obliquebanded leafroller.
Harvanta 50SL (cyclaniliprole)	28	1.2-1.6 L	5-9	Larvae	3	14	12 h	7	Apply at 200 DD and delay first larvacide to 290 DD. Controls Rosey aphids, European red might and powdery mildey. Do not apply withing 14 days of Sulphur). Suitable for organic or conventional orchards.
Purespray Green (Spray Oil 13E)	U	1%		Eggs	8	10-14 (100 DD)	12 h	0	Virus specific to codling moth, will not affect other insects. Takes 3-7 days to kill larvae, turning them white (i.e. stings may still occur). Virus residue degrades rapidly in sunlight, lasting only 5-8 days. Apply in evenings if possible. Do not mix with copper. 6-7 applications/generation at full rate required under high codling moth pressure. Rotate virus brands between generations to manage resistance. Store below 5°C. Organic status varies.
Virosoft (CpGv-4)	U	250 mL	5 - 8	Larvae	NA	5-7	4 hr	0	
CYD-X (CpGv-M)	U	100-250 mL	7-8.5	Larvae	NA	7-8	4 hr	0	
Madex HP (CpGv-22)	U	50-100 mL	5-8.5	Larvae	NA	6-8	4 hr	0	

Table 2. Summary of Risks to Human and Environmental Health by Codling Moth Control Products

This table summarizes the toxicity and safety of the recommended codling moth control products. Applicators should consult this table when selecting control products in order not to disrupt or interfere with observed beneficial insects (bees, ladybugs, lacewings, etc.) or nearby water courses. All the products except Imidan are generally accepted as reduced risk to humans and the environment; however personal protective equipment should still be worn when making applications as stated on product labels.

Product	Oral Toxicity (LD ₅₀)	Dermal Toxicity (LD ₅₀)	EIQ ¹	Bee Toxicity ²	EIQ Field Use Rating ³	Label buffers ⁴ (m)	Rainfastness on fruit ⁵		General Notes
							12.5 mm	25 mm	
Imidan 50 WP (Phosmet)	Moderate	Low	32.82	I	61.54	25	S	S	Toxic to most beneficial insects by direct and residual contact.
Assail 70 WP (acetamiprid)	Low	Low	28.73	III	0.8 – 1.6	30	S	I	Toxic to predatory mites
Calypso 480 SC (thiacloprid)	Low	Low	31.33	IV	1.4 – 2.2	20	S	I	Toxic to lacewings.
TwinGuard (sulfoxaflur+ spinetoram)	Low	Low		I		See BZ calculator	-	-	TOXIC TO BEES. Safe for most beneficial insects and mites.
Delegate WG (spinetoram)	Low	Low	27.78	III	1.0	30	S	S	Moderate to high toxicity to predatory mites.
Entrust (spinosad)	Low	Low	14.38	III	0.4	1	S	S	Toxic to earwigs and adult parasitic wasps.
Rimon 10 EC (novaluron)	Low	Low	14.33	I	1.3 – 2.0	65	S	I	Moderate to high toxicity to predatory mites.
Confirm 240 F (tebufenozide)	Low	Low	16.44	IV	1.3	15	I	-	Safe to all beneficials
Intrepid 240 F (methoxyfenozide)	Low	Low	32.08	IV	2.56	4	S	-	Safe for all beneficials
Altacor (chlorantraniliprole)	Low	Low	18.34	IV	0.3 – 0.5	5	S	S	Toxic to certain beneficial insects.
Exirel (cyantraniliprole)	Low	Low	14.67	I	0.7– 1.1	3	S	S	Toxic to certain beneficial insects.
Harvanta 50SL (cyclaniliprole)	Low	Low	-	I	-	3	-	-	Toxic to certain beneficial insects.
Vayego (Tetraniliprole)	Low	Low	-	I	-	25-35	-	-	Good Rainfastness.
Virosoft/CYD-X/Madex HP (virus)	Low	Low	0	IV	0	0	-	-	Extremely safe; specific for codling moth larvae.

¹ The EIQ measures a number of factors that affect how an active ingredient can impact human health and the environment. For more information on how the EIQ is calculated, go to www.nysipm.cornell.edu/publications/eiq

² Bee toxicity ratings: I, do NOT apply on any blooming crops or plants; II, apply in evening after bees have stopped foraging; III, apply in late evening after bees have stopped foraging until early morning before they start foraging; IV, can be applied any time with reasonable safety to bees.

³ EIQ Field Use Rating: EIQ x % ai of product x rate (kg or L)/1000 L

⁴ Buffer distances recommended on product labels for late-growth stage application by air-blast sprayers near freshwater habitats less than 1 metre deep.

⁵ Rainfastness on fruit 1 day after application: S = Sufficient residue to kill larvae; I = insufficient residue to kill larvae; - = no data. (Source: Dr. John Wise (Michigan State Univ.).)

Organic Codling Moth Management Toolbox

Sterile Insect Release: Controls low to moderate populations, but won't protect your orchard from a wild population coming from outside your orchard

If you are catching wilds or finding infested fruit in your orchard, contact the SIR program and we will increase the number of sterile insects we release in your orchard if needed. If wild moths are coming from a source outside your orchard, the sterile moths released will not prevent damage from happening. The source of wild moths needs to be identified and addressed ASAP.

Organic Pesticides: Controls larger populations, from outside and inside your orchard

Codling moths have 2-3 generations per season, lasting about 6 weeks each. During this 6 week period, new eggs are laid every day. Multiple applications of pesticide are required to *cover* a generation. There are 3 types of organic pesticides that kill codling moths, **Summer Oil**, **Viruses** and **Entrust™**. See reverse for **Spray Schedules**. Shorten time between reapplications under higher pressure.

1. Virus sprays

Virus sprays, **Virosoft**, **Cyd-X**, and **Madex HP**, are very effective against codling moth larvae but will not kill ANY beneficial insects or pollinators. However, spray residue breaks down rapidly in sunlight, lasting only 5-7 days. Multiple applications are needed (every 5-7 days) to cover one generation, making spray programs with this pesticide more costly. Rotate virus brands between generations (or seasons) to slow pesticide resistance development. Products need to be stored at or below 5°C for the season and frozen for storage greater than 6 months. Apply sprays late in the day for best results.

2. Summer Oil Purespray Green Spray Oil 13E

Summer oil (different application rate and purity than dormant oil) kills codling moth eggs by smothering them. It is moderately effective against codling moths and soft on most beneficials. It also controls European red mite, rosey apple aphid, and suppresses powdery mildew. Start your spray program with this product at 200 DD and reapply every 80-100 DD (10-14 days weather depending) if needed. *Cannot be applied withing 14days of Sulphur containing products (Captan).

3. Entrust

Entrust is not as toxic to codling moth larvae as virus products are (rated for suppression rather than control) and it is more toxic to beneficial insects. However, residues last longer on the fruit, 7-10 days making it a cheaper alternative to Virus. Entrust can be used a maximum of 3 times per season.

Removing Infested Fruit: Get moths missed by sprays and can target hot spots

Remove infested fruit late in mid-late July, before the codling moth have a chance to leave the fruit. This will capture larvae missed by a spray program and can reduce the time and money required to clean up a codling moth infestation in the long run. Infested fruit is concentrated on the top 1/3 of the canopy. Infested fruit must be bagged and removed from the orchard or submerged in water for 1 week, before composting.

Mating Disruption: Additional layer of control. Will not stop moth from external sources

Isomate CM-FLEX uses pheromones to disrupt moth mating. Hang 200-400 dispensers per acre, in the top 1/3 of the canopy before 100 DD. Mating disruption can aid organic management. It will not protect you from moths coming from yours outside your orchard.

BC Decision Aid System: Spray on time for better results

Use the local weather stations and BC DAS to spray on time (<https://ca.decisionaid.systems/>).

Management Tips

Attack Codling moth problems aggressively. Preventing small problems from growing will cost you much less money in the long run than trying to solve a big problem later. Spraying enough and spraying on-time is critical for success. When problems are severe (>2% infested fruit) combine multiple tactics (e.g. virus, summer oil, and fruit removal), use full product rates, and shorten spray reapplication intervals. Because codling moths larvae feed inside the fruit, excellent spray coverage is needed to kill eggs or larvae before they get in.

Spray Timing	Best Spray Program
100 DD	Start catching wilds, but it is not time to spray yet.
210 DD (750 DD for 2 nd Generation)	1 st Spray: Purespray Oil 1%
280-300 DD (850 DD for 2 nd Generation)	2 nd Spray: Purespray Oil 1% + Virus
+ 5-7 Days	3 rd Spray: Virus
+ 5-7 Days	4 th Spray: Purespray Oil 1% +Virus
+ 5-7 Days	5 th Spray: Virus
+ 5-7 Days	6 th Spray: Purespray Oil 1%+ Virus
550 DD is when the 1 st generation ends.	Contact SIR or check BC DAS to determine if the generation has ended. Evaluate damage and spray program.

Spray Timing	Budget Spray Program*
100 DD	Start catching wilds, but it is not time to spray yet.
280 DD	1 st Spray: Entrust
+ 10 Days	2 nd Spray: Entrust
+ 10 Days	3 rd Spray: Entrust

*Entrust is only rated to “suppress” codling moth, Meaning it kills between 80-90% of the larvae that eat it (where virus and oil kill >90% of the target life stage).

Product Details: Always check product labels and your organic certification body for most up to date information.

Product	Rate	Target	REI	PHI	Max Applications	Comments
Purespray Green Spray Oil 13E	10 L oil / 1000 L water (1% vol:vol)	Eggs	12 H	0	8 per season	Do not exceed rate or apply within 2 weeks of sulphur or captain. Use a 1% solution of oil to water in spray tank.
Virosoft (CpGv-4)	250 mL/ha	Larvae	4 H	0	No Max	Virus brands have similar properties. Store at 4°C for up to 6 months or freeze for longer storage. Virus particles must be eaten to kill larvae, so excellent spray coverage is necessary.
Cyd-X (CpGv-M)	100-250 mL/ha	Larvae	4 H	0	No Max	
Madey HP (CpGv-V22)	50-100 mL/ha	Larvae	4 H	0	No Max	
Entrust (Suppression Only)	364 mL/ha	Larvae	12 H	7 Days	3 per season	Not as strong against codling moth as virus products, and harder on beneficial insects.