

Table 1. Characteristics of Codling Moth Control Products - Orchards

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. All the products except Imidan, Delegate and Entrust must be eaten by the larvae to be most effective. Always read the product labels before mixing and applying any control product.

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 (Phosmet)	1 B	3.75 kg	5 - 7	Larvae	5	10	7 days	14	The only product that has contact toxicity against larvae. Also controls any obliquebanded and threelined leafroller and bud moth larvae present. Apply after eggs have hatched.
Assail 70 WP (acetamiprid)	4	240 g	5 - 6	Eggs, larvae	4	12	12 hr	7	Apply Assail and Calypso when codling moth are laying eggs. Calypso has some contact toxicity. Assail also controls aphids and pear psylla; but not leafrollers or bud moth. Do not apply this group of products more than twice /season /tree to avoid mite problems.
Calypso 480 SC (thiacloprid)	4	290 - 440 mL	5 - 9	Eggs, larvae	4	14-21	12 hr	30	
TwinGuard (sulfoxaflur+ spinetoram)	4C, 5	500 g	5 - 9	Larvae	2	14	12 hr	7	Do not apply during bloom or when flowering plants are in treatment area. Also controls leafroller larvae, apple and rosy apple aphids; suppresses woolly apple aphid.
Delegate 25WG (spinetoram)	5	420 g	5 - 9	Larvae	3	14	12 hr	7	Apply after eggs begin hatching; very effective against larvae. Also controls all leafroller and bud moth larvae present. Some control of twospotted spider mite.
Entrust SC (spinosad)	5	364 mL	6 - 9	Larvae	3	7-10	4 hr	7	Certified for organic production systems. Only suppresses codling moth so should be avoided unless organic solution required. Also controls all leafroller and bud moth larvae.
Rimon 10 EC (novaluron)	15	2.8 – 4.2 L	5 - 9	Eggs, larvae	4	10-14	12 hr	14	An insect growth regulator that disrupts larval end egg development. Very effective against eggs so apply when codling moths are laying eggs. Do not use more than twice per season to avoid mite problems.
Confirm 240 F (tebufenozide)	18	1L	5 - 9	Larvae	4	10-14	12 hr	14	An insect growth regulator that disrupts larval development. Little activity against eggs. Also effective against obliquebanded, threelined and bud moth, but not fruittree or European leafroller. Use only under low codling moth pressure.
Intrepid 240 F (methoxyfenozide)	18	1L	5 - 9	Eggs, larvae	2	14-21	12 hr	14	An insect growth regulator that disrupts larval development. Very effective against eggs so apply when codling moths are laying eggs. Also effective against obliquebanded, threelined and bud moth larvae, but not fruittree or European leafroller. Use under moderate to high codling moth pressure by targeting the eggs.
Altacor (chlorantraniliprole)	28	145 - 215 g	5 - 9	Larvae	3	14	12 h	14	Effective against codling moth, leafroller and bud moth larvae.
Exirel (cyantraniliprole)	28	500- 750 mL	<8	Larvae	4	10-14	12 h	3	Apply before first egg hatch. Also registered against aphids, leafrollers, bud moth, tentiform leafminer, white apple leafhopper, and apple maggot.
Virosoft CP4, Cyd-X (granulovirus)	U	250 mL	5 - 8	Larvae	n/a	5-7	4 hr	0	Specific for codling moth larvae; slow acting (3-7 days).Use under low pressure and do not exceed the re-spray interval. Spray in the evening or under cloudy, dry conditions. Store in cool place.

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. Visit the Buffer Zone Calculator site (www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php) to calculate site and product specific buffer zones before spraying..

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	L	L	TOXIC TO BEES and to most beneficial insects by direct and residual contact.
Assail 70 WP (acetamiprid)	Low	Low	28.73	II	0.8 – 1.6	30	M,S	L,S	Toxic to predatory mites
Calypso 480 SC (thiacloprid)	Low	Low	31.33	III	1.4 – 2,2	20	M,S	L,S	Toxic to lacewings.
TwinGuard (sulfoxaflur+ spinetoram)	Low	Low		I		See BZ calculator			TOXIC TO BEES; dried residues less harmful. Safe for all beneficials.
Delegate WG (spinetoram)	Low	Low	27.78	III	1.0	30	H	H	Moderate to high toxicity to predatory mites and adult parasitic wasps that aid in control of aphids and leafrollers.
Entrust 80 W (spinosad)	Low	Low	14.38	III	0.4	1	H	H	Toxic to earwigs and adult parasitic wasps.
Rimon 10 EC (novaluron)	Low	Low	14.33	I	1.3 – 2.0	65	M	-	TOXIC TO BEES. Moderate to high toxicity to predatory mites.
Confirm 240 F (tebufenozide)	Low	Low	16.44	II	1.3	15	M	-	Safe to all beneficials
Intrepid 240 F (methoxyfenozide)	Low	Low	32.08	IV	2.56	4	M	-	Safe for all beneficials
Altacor (chlorantraniliprole)	Low	Low	18.34	IV	0.3 – 0.5	5	H	H	Safe for predatory mites.
Exirel (cyantraniliprole)	Low	Low		I		5			TOXIC TO BEES. Generally considered safe for beneficial insects and mites.
Cyd-X, Virosoft CP4 (granulovirus)	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 the morning or late evening when bees are not foraging; IV, can be applied any time with reasonable safety to bees. Minimize drift onto nearby areas where bees maybe foraging (areas with flowering vegetation)..

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: H = highly rainfast (about 30% residues wash-off); M = moderately rainfast (50% residues wash-off); L = hardly rainfast (70% residues wash-off); S = systemic, residues remain within fruit tissue; - = no data. (Source: Dr. John Wise (Michigan State Univ.). Rainfastness of Pesticides Varies. Good Fruit Grower, March 1, 2011