

Table 1. Characteristics of Codling Moth Control Products – Orchards-Current to March 2020 – 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. All the products except Imidan must be eaten by the larvae to be most effective. **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.**

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 – 6	Larvae	5	14-21	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. Check water pH and buffer if needed.
Assail 70 WP (acetamiprid)	4	120-240 g	5 - 6	Eggs, larvae	2 or 960 g	12-14	2-6 days	7	Apply Assail and Calypso when codling moth are laying eggs. Larval toxicity of Assail and Calypso are equal to azinphos-methyl products. Calypso has some contact toxicity. Both products also control aphids, leafhoppers, leafminer, and pear psylla; they do not control leafrollers or bud moth. Do not apply this group of products more than twice/ season to avoid mite problems (REI 2 days for scouting, 6 days for hand thinning).
Calypso 480 SC (thiacloprid)	4	290 - 440 mL	5 - 9	Eggs, larvae	2(high rate) 3 (low rate)	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. Will also control aphids, leafminer, leafrollers, and San Jose scale.
Delegate WG (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 (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	0.9 – 1.4 L	5 - 9	Eggs, larvae	4 or 11.0 L	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.
Altacor (chlorantraniliprole)	28	145 - 215 g	5 - 9	Eggs, larvae	3	10-14	12 hr	5	Apply just prior to and during egg-laying. Also controls leafroller, fruitworm and bud moth larvae.
Exirel (cyantraniliprole)	28	500-750 mL	5-9	Larvae	4	10-14	12 hr	3	Apply just prior to and during egg-laying. Also controls leafroller and bud moth larvae, rosy apple aphid, and leafhopper.
Harvanta 50SL (cyclaniliprole)	28	1.2-1.6 L	5-9	Larvae	3	10-14	12 h	7	Toxic to bees. Rotate with products from different groups. Do not use more than 2 times/generation.
Virosoft CP4 (granulovirus)	U	250 mL	5 - 8	Larvae	n/a	5-7	4 hr	0	No leafroller control; slow acting. Use under low pressure Spray in the evening or under cloudy, dry conditions. Organic certified.

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	-	I	-	3	S	S	Toxic to certain beneficial insects.
Harvanta 50SL (cyclaniliprole)	Low	Low	-	I	-	3	-	-	Toxic to certain beneficial insects.
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 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.).