

Pest Control Products Registered for Use on Hops in Ontario - 2016

This table lists pest control products registered on hops in Ontario as of June 22, 2016. This list is intended as a guide and does not replace current product labels. Labels and product registrations status can change. **Always read the label thoroughly before applying a pest control product and follow all label instructions.** Various federal and provincial regulations govern the use of pesticides on all crops in Ontario. It is the grower's responsibility to be aware of these regulations. More information on the use of pesticides in Ontario can be found on the OMAFRA website at www.ontario.ca/usingpesticides

TABLE 1 - INSECT CONTROL FOR HOPS IN ONTARIO

LEGEND

Group: Chemical group number for a pest control product established by the Insecticide Resistance Action Committee (insecticides), Fungicide Resistance Action Committee (fungicides) or Weed Science Society of America (herbicides) based on mode of action for resistance management planning.

REI: Restricted Entry Interval. Do not enter treated fields unprotected until after the REI has passed. For some hop products, the REI varies with the activity. If the REI is not specified, assume a 12-hr REI.

NS: Not specified on label.

PHI: Pre-Harvest Interval. The required time period between the last spray and the first harvest.

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
HOP APHID						
4	imidacloprid	Admire 240 DF	230 mL/ha	24 hrs	28 days	Allow at least 21 days between applications. No more than 2 foliar applications per season.
4D	flupyradifurone	Sivanto Prime	500-750 mL/ha	12 hrs	21 days	Apply as a directed foliar spray ensuring good coverage. Use a minimum application volume of 100 L/ha. No more than 750 mL/ha Sivanto Prime permitted per season.
9C	flonicamid	Beleaf 50 SG	0.12 – 0.16 kg/ha	31 days (stripping and training) 12-hrs (all other activities)	31 days	Apply as populations begin to increase and before damaging levels become established. Apply in sufficient water to ensure good coverage (minimum 94 L/ha). Increase spray volume when foliage is dense. Allow at least 7 days between applications. No more than 3 applications per year.
23	spirotetramat	Movento 240 SC	365-435 mL	12 hrs	7 days	Apply early in infestation as populations begin to develop. Use a minimum application volume of 500 L water/ha. Apply with an adjuvant as specified on product label. Allow at least 14 days between applications. No more than 920 mL/ha Movento 240 SC permitted per season.

TABLE 1 continued - INSECT CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
HOP APHID (continued)						
NC	mineral oil	Purespray Green Spray Oil 13 E	10 L/ha	12 hours	N/A – discontinue at burr development	Feeding deterrent only. Apply in at least 1000 L water/ha (1% solution) to avoid phytotoxicity. Do not take mix with copper. Discontinue use at burr development. Tolerance has not been determined for all varieties—test a small area of each variety prior to spraying the whole block. Do not apply to crops under moisture stress or just prior to or during freezing weather. No more than 8 applications permitted per year.
	Potassium salts of fatty acids	Neudosan Commercial	Mix 8L product with 400 L water and apply at 700-1900 L/ha	12 hrs	0 days	Repeat every 1-2 weeks as needed. Apply to a maximum of 3 consecutive applications to ensure plant injury does not occur. Additional applications may be possible – see label for details
		Opal Insecticidal Soap				
Kopa Insecticidal Soap						
TWO SPOTTED SPIDER MITE						
6	abamectin	Agri-Mek SC	125-250 mL/ha	12 hrs	28 days	For applications at 1/2 trellis growth, apply 125-250 ml product in at least 400 L water/ha. For applications beyond 1/2 trellis growth, do not use less than 225 mL product/ha in at least 950 L water/ha. Allow at least 21 days between applications. Apply with a non-ionic surfactant as specified on label. Do not graze treated crop. No more than 2 applications (500 mL/ha) permitted per year.
23	spirodiclofen	Envidor 240 SC	0.75 L/ha	2 days (stripping, training) 12 hrs (all other activities)	21 days	Thorough coverage required for effective control. Apply in 500-1000 L water/ha. No more than 1 application (0.75 L/ha) permitted per year.
UN	bifenazate	Acramite 50 WS	851 g/ha	5 days (stripping , training) 12 hrs (all other activities)	14 days	Apply in at least 1000 L/ha. This product is primarily active on motile stages of mites. No more than 1 application per year.
NC	mineral oil	Purespray Green Spray Oil 13 E	10 L/ha	12 hrs	N/A - stop use at burr development)	Suppression only. See comments under hop aphid

TABLE 1 continued - INSECT CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
TWO SPOTTED SPIDER MITE (continued)						
NC	Potassium salts of fatty acids	Neusodan Commercial	Mix 8L product with 400 L water and apply at 700-1900 L/ha	12 hrs	0 days	See comments under hop aphid.
		Opal Insecticidal Soap				
		Kopa Insecticidal Soap				
CATERPILLARS						
11	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> strain ABTS-351	Dipel 2X DF	Hop looper 275-550 g/ha Corn borer 560-1120 g/ha	12 hrs	0 days	Apply at first sign of infestation when larvae are small. Repeat if necessary at 5-10 day (Bioprotec) or 3-14 day (Dipel) intervals. Apply Bioprotec in a minimum of 300 L water/ha. For corn borer, no more than 3 applications of Bioprotec per generation (max 6 Bioprotec applications per year).
	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> strain EVG 113-19	Bioprotec CAF	Hop looper 1.4-2.8 L/ha Corn borer 2.8-4.0 L/ha			

TABLE 2 - DISEASE CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
DOWNY MILDEW						
4	metalaxy-m and s-isomer	Ridomil Gold 480 SL	570 mL/ha	12 hrs	135 days	Apply in early April as a soil drench at the root site. Apply in 200 L water/ha. No more than 1 application per season.
21	cyazofamid	Torrent 400 SC	0.15-0.2 L/ha	12 hrs	3 days	Apply preventatively when disease is first seen or conditions are conducive to disease development. Allow at least 7-14 days between applications. Alternate foliar sprays of Torrent with a fungicide with a different mode of action. Use low rate and long intervals for preventative applications or low disease pressure, increasing rate and shortening intervals as disease pressure increases. Apply with a non-ionic surfactant as specified on product label. Apply in at least 935 L water/ha. No more than 6 applications (1.2 L/ha) per crop growing season.

TABLE 2 continued - DISEASE CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
DOWNY MILDEW (continued)						
40	dimethomorph	Acrobat 50 WP	450 g/ha	18 days (hand harvest, stripping, training)	7 days	Suppression only. Apply preventatively when conditions are favorable to disease development. Acrobat must be tank mixed with a fungicide from another group active against downy mildew. Allow at least 10 days between applications. Do not use less than 200 L water/ha. No more than 3 applications per season.
		Forum	450 mL/ha	12 hrs (all other)		
	mandipropamid	Revus	600 mL/ha	12 hrs	7 days	Apply preventatively when conditions are favorable to disease development. Allow at least 7-10 days between applications. Label directions suggest use with a non-ionic adjuvant. Do not make more than 2 consecutive applications of Revus before rotating to a fungicide that is not in Group 40. No more than 3 applications (1.8 L product) per year.
40/45	ametoctradin + dimethomorph	Zampro	0.8-1.0 L/ha	18 days (hand harvest, training, stripping) 12 hrs (all other activities)	7 days	Begin applications prior to disease development. Allow at least 10 days between applications. Label directions suggest use with an adjuvant. Apply in a minimum of 200 L water/ha. Do not make more than 2 sequential applications of Zampro before rotating to another fungicide that is not in Group 40 or 45. No more than 3 applications per season.
M	copper sulphate	Copper 53W	4-5 kg/1000 L	48 hrs	2 days	Apply when conditions are favorable to disease development. Allow at least 10 days between applications. No more than 4 applications per year.
P5	Extract of <i>Reynoutria sachalinensis</i>	Regalia Maxx	0.25-0.50% v/v (2.50-5.0 mL/L or 1.875-3.75 L product/750 L water)	when dry	0 days	Partial suppression only. Apply preventatively when environmental conditions are conducive for disease development. Allow at least 7 days between applications. Adjust spray equipment to achieve thorough coverage as the crop grows. Apply a maximum of 750 L spray solution/ha. No more than 8 applications per season.

TABLE 2 continued - DISEASE CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
POWDERY MILDEW						
13	Quinoxifen	Quintec	300-500 mL/ha	12 hrs	21 days	Suppression only. Apply preventatively when conditions are favorable to disease development. Allow at least 14 days between applications. No more than 2 applications per year.
7/11	boscalid + pyraclostrobin	Pristine WG	0.105 kg/ 100 L dilute spray	8 days (hand set irrigation) 46 days (harvesting) 12 hrs (all other activities)	46 days	Also provides suppression of downy mildew. Begin applications prior to disease development. Allow at least 10-14 days between applications. Use 234 to 468 L dilute spray/ha (0.25-0.49 kg/ha) prior to trellising and 935-1524 L dilute spray/ha (0.98-1.6 kg/ha) after. Do not apply more than 1524 L dilute spray/ha. No more than 3 applications per season
U8	metrafenone	Vivando SC	0.750 - 1.12 L/ha	12 hrs	14 days	Suppression only. Begin applications prior to onset of disease. Allow at least 14 days between applications. A non-ionic surfactant may improve performance. No more than 2 applications or 2.24 L product/ha per season.
NC	mineral oil	Purespray Green Spray Oil 13 E	10 L/ha	12 hrs	N/A - discontinue at burr development	Suppression only. Apply in at least 1000 L water/ha (1% solution) to avoid phytotoxicity. Do not take mix with copper. Discontinue use at burr development. Tolerance has not been determined for all varieties—test a small area of each variety prior to spraying the whole block. Do not apply to crops under moisture stress or just prior to or during freezing weather. No more than 8 applications permitted per year.
	potassium bicarbonate	MilStop Sirocco	2.8-5.6 kg/ha	4 hrs	0 days	Suppression only. Begin application at the first sign of disease. Repeat at 7-14 day intervals until conditions are no longer favorable for disease development. Apply in 500-1000 L water/ha. May be acceptable for organic production – check with CB before applying. No more than 10 applications per season.

TABLE 2 continued - DISEASE CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
CROWN GALL						
ns	<i>Agrobacterium radiobacter</i>	Dygal	Nursery product only - see label for details	12 hrs	n/s	For use only on nursery plants, by trained nursery personnel.
FUSARIUM CANKER						
NC	<i>Trichoderma harzianum</i>	RootShield WP	3-4 kg/ha	12 hrs	n/s	Suppression only of root rots caused by <i>Fusarium</i>, as well as <i>Pythium</i> and <i>Rhizoctonia</i>. Suspend in at least 1000 L water and apply to soil surface immediately around plants. Use higher rates when conditions favour disease. Irrigation or rainfall of at least 5 mm should occur within 24 hours of application to move active ingredient to the root zone.

TABLE 3 - WEED CONTROL FOR HOPS IN ONTARIO

Group	Active Ingredient	Trade Name	Rate	REI	PHI	Notes
ANNUAL GRASSES						
1	sethoxydim	Poast Ultra	1.1 L/ha	12 hrs	180 days	For post emergence control of annual grasses and quackgrass. Merge Adjuvant must be applied to all applications of Poast Ultra. For more details on application, refer to product label or OMAFRA Publication 75, <i>Guide to Weed Control</i> .
BROADLEAF WEEDS, SUCKERS						
14	carfentrazone-ethyl	Aim EC	150 ml/ha (sucker management) 36.5 - 117 mL/ha (post-emergent weed control)	12 hrs	7 days	For management of sucker growth, apply as a directed spray to basal portion (approximately lower 45 cm) of plant and sucker mat extending away from plant to approximately 45-60 cm into row. in at least 200 L/ha spray solution using boom type. For postemergent control of broad-leaf weeds, apply with shielded sprayer and refer to product label for rates and weeds controlled. Apply with an aduvalt as specified on product label. Do not apply until trained vines have sufficient barking to avoid stem damage and are high enough that there is no contact with apical bud. Do not allow upward drift of spray solution or contact with new growth. Do not apply AIM using airblast or air assisted sprayers or through an irrigation system. No more than 2 applications/year, at least 14 days apart, for sucker management and no more than 1 application/year for weed control.

TABLE 4 - POTENTIAL ORGANIC PRODUCTS FOR HOPS IN ONTARIO

Products listed in this table **may** be acceptable for organic production. However, they may not be accepted by all certification bodies. Always check with your organic certification body before applying any product. For rates and other application instructions, refer to the entry for each product in Tables 1 to 3.

Product	Active Ingredient	Labelled Pests
INSECTICIDES		
<i>Bacillus thuringiensis</i>	Dipel 2X DF	Hop looper, European corn borer
	Bioprotec CAF	
mineral oil	Purespray Green Spray Oil 13 E	Aphids, spider mites
potassium salts of fatty acids	Kopa Insecticidal Soap	Aphids, spider mites
	Opal Insecticidal Soap	
	Neusodan Commercial	
FUNGICIDES		
copper sulphate	Copper 53 W	Downy mildew
mineral oil	Purespray Green Spray Oil 13 E	Powdery mildew
potassium bicarbonate	MilStop	Powdery mildew
	Sirocco	
<i>Reynoutria sachalinensis</i> extract	Regalia Maxx	Downy mildew
<i>Trichoderma harzianum</i>	RootShield WP	Downy mildew
HERBICIDES		
None currently registered on hops.		

APPENDIX A - Registrants and Ontario Classification for Hops Pesticides

This information is provided as a guideline only. Consult each product label before use for most up-to-date information. Pesticide labels are also available at the Pest Management Regulatory Agency (PMRA) website at www.pmr-arla.gc.ca. Click on "Search Pesticide Labels." **Users of Ontario Class 2 and 3 pesticides must be certified by the Grower Pesticide Safety Course.**

Registration No. ¹	Trade Name	Active Ingredient	Guaranteed Active	Ontario Class ²	Registrant or Agent's Code ³
27925	Acramite 50 WS	bifenazate	50%	4	MCD
27700	Acrobat 50 WP	dimethomorph	50%	3	BAZ
24094	Admire 240	imidacloprid	240 g/L	4	BCZ
31607	Agri-mek SC	abamectin	84 g/L	3	SYZ
28573	Aim EC	carfentrazone-ethyl	240 g/L	3	FMC/NUA
29796	Beleaf 50SG	flonicamid	50%	4	ISK/UAG
26854	Bioprotec CAF	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> strain EVG113-19	8.12%	3	AEF
9934	Copper 53W	copper sulphate	53.4%	3	LVP/UAG
26508	DiPel 2X DF	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> strain ABTS-351	57%	4	VAA/VAJ
21106	Dygall	<i>Agrobacterium radio-</i> <i>bacter</i> strain K84	5 x 10 ⁹ colony form- ing units/g	3	MOR
28051	Envidor	spirodiclofen	240 g/L	4	BCZ
32026	Forum Fungicide	Dimethomorph	500 g/L	3	BAZ
31433	Kopa Insecticidal Soap	Potassium salts of fatty acids	47%	4	WNG/NEU/PRI
28095	MilStop Foliar	potassium bicarbonate	85%	4	BWI
28953	Movento 240 SC	spirotetramat	240 g/L	4	BCZ
27886	Neudosan Commer- cial	potassium salts of fatty acids	47%	4	WNG/NEU
28146	Opal Insecticidal Soap	potassium salts of fatty acids	47%	4	OMA
24835	Poast Ultra	sethoxydim	450 g/L	4	BAZ
27985	Pristine WG	boscalid pyraclostrobin	25.2% 12.8%	2	BAZ

APPENDIX A (cont) - Registrants and Ontario Classification for Hops Pesticides

This information is provided as a guideline only. Consult each product label before use for most up-to-date information. Pesticide labels are also available at the Pest Management Regulatory Agency (PMRA) website at www.pmr-arla.gc.ca. Click on "Search Pesticide Labels." **Users of Ontario Class 2 and 3 pesticides must be certified by the Grower Pesticide Safety Course.**

Registration No. ¹	Trade Name	Active Ingredient	Guaranteed Active	Ontario Class ²	Registrant or Agent's Code ³
27666	Purespray Green Spray Oil 13 E	mineral oil	99%	4	PCU
29755	Quintec	quinoxifen	250 g/L	3	DWE
30199	Regalia Maxx	<i>Reynoutria sachalinensis</i> extract	20%	3	MBI
29074	Revus	mandipropamid	23.3%	3	SYZ
28474	Ridomil Gold 480 SL	metalaxyl-m and s-isomer	480 g/L	3	SYZ
29890	RootsShield WP	<i>Trichoderma harzianum</i>	1 x 10 ⁷ CFU/g	3	BWI
31091	Sirocco	potassium bicarbonate	85%	4	AEF
31452	Sivanto Prime	Flupyradifurone	200 g/L	3	BCZ
30392	Torrent 400SC	cyazofamid	34.5%	4	ISK/ENG
29765	Vivando SC	Metrafenone	300 g/L	2	BAZ
30321	Zampro	ametoctradin dimethomorph	300 g/L 225 g/L	3	BAZ

¹ See the pesticide label to confirm the current product registration number (PCP#).

² The Ontario Pesticides Advisory Committee (OPAC) is responsible for reviewing and recommending to the MOE the classification of pesticide products before they can be sold or used in Ontario. Users of Class 2 and 3 products must be certified through the Grower Pesticide Safety Course.

Class 3 = Restricted or commercial use only; moderately hazardous and/or moderately persistent

Class 4 = Restricted or commercial use only; less or least hazard and/or low persistence

³ See Appendix D, *Pest Control Companies and Agents* for registrant or agent information.

APPENDIX B - Registrants and Ontario Classification for Hops Pesticides

Code	Company/Agent	Website	Contact Number
AEF	AEF Global Inc	www.aefglobal.com/en/	418-838-4441
BAZ	BASF Canada Inc.	www.agsolutions.ca	1-877-371-2273
BCZ	Bayer Crop Science	www.bayercropscience.ca	1-888-283-6847
BWI	Bioworks Inc.	www.bioworksinc.com (US website)	1-800-877-9443
DWE	Dow Agrosciences Canada Inc.	www.dowagro.com/ca	1-800-667-3852
ECT	Eco-Care Technologies Inc.		250-652-5510
ENG	Engage Agro Corp.	www.engageagro.com	1-866-613-3336
FMC	FMC Corporation	www.fmc.com	800-331-3148
ISK	ISK Biosciences Corporation	www.iskbc.com (US website)	1-877-706-4640
LVP	Loveland Products Canada Inc.	www.lovelandproducts.com (U.S. website)	1-800-328-4678
MBI	Marrone Bio Innovations	www.marronebioinnovations.com (US)	1-877-664-4476
MCD	MacDermid Agricultural Solutions Canada Co.	www.macdermid.com	519-822-3790
MOR	Mori Nurseries Ltd.		905-468-3217
NEU	Neudorff North America	http://www.neudorffpro.com/	250-652-5888
NUA	Nufarm Agriculture Inc.	www.nufarm.ca	800-868-5444
OMA	Omex Agriculture Inc.	www.omexcanada.com	866-860-9660
PCU	Petro-Canada Lubricants	www.purespraygreen.com	1-866-335-3369
PRI	Plant Products Inc.	www.plantproducts.com	1-800-387-2449
SYZ	Syngenta Canada, Inc.	www.syngenta.ca	1-877-964-3682
UAG	United Agri-Products Canada Inc.	www.uap.ca	1-800-265-4624
VAA	Valent BioSciences Corporation	www.valent.ca	1-800-682-5368
VAJ	Valent Canada Inc.	www.valent.ca	519-767-9262
WNG	W. Neudorff GmbH KG	www.neudorff.com (US website)	011-49-5155-624-127