2020

perennia
ideas • innovation • success

GUIDE TO WEED, INSECT AND DISEASE MANAGEMENT IN CHRISTMAS TREES

Nova Scotia Guide to Pest Management in Christmas Trees 2020 [CTREE2020]

GUIDE TO WEED, INSECT AND DISEASE MANAGEMENT IN CHRISTMAS TREES

Nova Scotia Guide to Pest Management in Christmas Trees 2020 [CTREE2020]

Updated June 29, 2020 by
Jay Woodworth, M.SC, P.Ag, Christmas Tree Specialist, Perennia

IMPORTANT

This publication was compiled by representatives from Perennia using information from the Pest Management Regulatory Agency of Health Canada, and specific pesticide labels. **This information is continuously changing and therefore it can cease to be current and accurate. Pesticide labels are the best source of information and should always be consulted prior to using a product.** The label is the best source of information on; registered crop uses, rates, days to harvest, compatibility with other pesticides, toxicity and other special information on its effective and safe use.

By printing this publication, Perennia does not offer any warranty or guarantee, nor do they assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

WARNINGS

This publication is meant to be used as a reference for possible pest control options. Where there are multiple brand names of a specific active ingredient registered in Canada, Perennia has only listed a few for reference purposes and as such does not endorse one brand over another. If you have purchased a generic product not specifically in this guide but has your crop and pest on the label, always follow that product label.

If any information in this or any other publication conflicts with the information on the label, always use the label recommendation. If you have an old label, your pesticide supplier should be able to give you the newest label. You are legally responsible for the safe use of pesticides you purchase. This means the safe transport and storage of these materials, the label rates used on crops, and the safe disposal of containers.

Always check with your Processor or Buyer to see what products are allowable for their markets						
Pest	**Group**	**Active ingredient**	**Pesticide product name**	**Recommended Rate**	**Restricted entry interval (REI)**	**Remarks**
WEEDS AND GROUND COMPETITION						
Pre-Emergence Broadleaf and Grass Weeds	5	Simazine	SIMADEX SIMAZINE FLOWABLE PRINCEP NINE-T HERBICIDE	9.0-13.5 L in 300 L of water per ha of ground treatment. See label for band application rates (*dependent on tree spacing)	12 – 48 hours for stacking, topping, training, and pruning	In Christmas Trees and Woodlands, apply only on sites less than 500 hectares with trees aged 2 and older. Apply in the spring prior to weed growth or in fall prior to freeze up. To combat Quackgrass, use the higher rate.
Post-Emergence Perennial Grasses and Sedges, Perennial Broadleaf Weeds, Woody Brush and Trees, Annual Weeds	9	Glyphosate	Sold under various product names (inc. Vision, Roundup, Glyphos, Visionmax, Glyfos, Nufarm, Forza, Vantage Plus)	1-2% solution. Primarily used for suppression. Refer to label of specific product selected.	12 hours	Direct spray so that foliage of undesired vegetation is thoroughly wetted. Do not spray foliage to the point of run-off. Not recommended for over-the-top broadcast spraying. Apply to Balsam fir or Fraser fir trees exceeding 1.2 m in height, avoid branches. Applying the product to conifers during their period of active growth may cause tree injury. Do not apply after the first damaging frost. Allow 7 or more days after application before tillage or other soil disturbance. Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. DO NOT APPLY IN THE YEAR OF HARVEST.

	4	Clopyraild	Sold under various product names (inc. Lontrel, GF-1966, Clopi, Pyralid, MPower Clobber, CT MIX 360, Bariloche)	To control vetch (*Vicia* spp.): Apply herbicide at 0.42 L/ha in 150-200 L/ha of water (foliar application using a hydraulic sprayer).	12 hours	Can be used over top application in Balsam fir, do not apply in the first year of plantation. Annual weeds: Apply between weed emergence and 5 leaf stage or when 10-15 cm in height. Wild Buckwheat: 3-5 leaf stage, prior to vining. Canada Thistle: apply when basal leaves have emerged and are at the bud stage. Vetch: apply when vetch is 10-15 cm in height, before vetch reaches into tree crown. Some products can leave residuals in the soil for up to a year, which may affective crop growth. Avoid application directly on Christmas trees. Do not apply by air.
	5	Hexazinone	VELPAR DF VU HERBICIDE	Course texture soil: first year plantings (1490 g/ha) established trees (1490 - 1860 g/ha) Medium texture soil: first year plantings (1490 -1860 g/Ha) established trees (1860 - 2614 g/Ha). Fine texture soil: First year plantings (1860 -2241 g/Ha) established trees (2614 - 2990 g/Ha)	48 Hours	Rates are for broadcast application, apply product in the spring prior to budbreak. No more than one application a year.
Adjuvant *Increases effectiveness		Siloxylated Polyether	XIAMETER OFX-0309 FLUID	For tank mix: add at a rate of 0.25% to	Follow guidelines based on	Improves wetting, spreading and penetration of agricultural chemicals.

of agricultural chemicals				0.375% of spray solution volume	herbicide used	

Pest	Group	Active ingredient	Pesticide product name	Rate	REI	Remarks
INSECTS						
Spruce Budworm	1A	METHOMYL 90%	LANNATE INSECTICIDE	270-540 g product/ ha	0	Apply at early or late growth stage to Balsam fir and spruce in plantations. High rate to be used on trees greater than 9 m tall only. Use low rate in mist blowers (5x concentration), or air blast equipment for smaller trees. Maximum of 2 applications per year during April or May. First spray should occur at larval emergence. Follow with a second application 3-4 days after first application if needed. Use at least 4 parts water to 1 of Lannate insecticide to minimize fire hazards. Ensure buffer zones surrounding freshwater and estuarine/marine habitats are followed.
Leaf chewing larvae (caterpillars) of lepidopterous species (Gypsy moth, spruce budworm)	11	Bacillus thuringiensis subspecies kurstaki strain SA-	THURICIDE-HPC HIGH POTENCY AQUEOUS CONCENTRATE	Gypsy moth: 7.14-12 L/ha		Apply via ground application only mixing with 1,000 L of water per ha with high pressure, high gallonage hydraulic sprayers. For mist blowers, mix with 100 L of water per ha.

		12….15.0% w/w Fermentation solids, insolubles, and lepldopteran active toxins		Eastern spruce budworm: 4.80-7.14 L/ha		Wet foliage thoroughly but not to the point of runoff, use with a sticker to prevent rain wash-off. For gypsy moth, apply when leaf expansion reaches 40-50% or if re-infestation occurs, spray 14 days after first application. For budworm, apply during the 3rd-4th instar, consider the opening of the bud cap to ensure foliage exposure. If larval densities are high, repeat spray 3-5 days later.

Aphid, Armyworm (fall, beet and yellowstriped), Bagworm, Cankerworm (fall and spring), Casebearer, Fall webworm, Flower thrips, Gladiolous thrips, Greenhouse whitefly, Gypsy moth, Lace bug, Leaf beetle larvae (elm and willow), Leafminer, Meadow spittlebug, Mealybug, Nantucket pine tip moth, Oak leafshredder, Obliquebanded leafroller, Psyllid, Pear slug (pear sawfly larvae), Poplar tentmaker, Potato leafhopper, Rose midge, Scale insect (crawlers: cottony maple, hemlock, oystershell, cottony cushion, lecanium), Sawflies (open feeders: dusky birch, blakheaded ash, redheaded pine, European pine, yellowheaded spruce sawfly), Spider mites, Sunflower moth, Tent caterpillars (eastern and forest), Tobacco budworm, Tussock moth, Yellownecked caterpillar	1B	Acephate (O, S-dimethyl acetylphosphoramidothioate)	ORTHENE 75% SOLUBLE POWDER SYSTEMIC INSECTICIDE	Mist blower: 1312 g/1000 L Hydraulic sprayer: 637 g/1000 L		Mix thoroughly and spray entire tree, covering both sides of foliage. Spray when insects are present or feeding injury is first noticed. Repeat application once only, if re-infestation occurs. To control scales and spider mites (except two-spotted spider mite), spray 2 times, 7 to 10 days apart. Contact CFS for application in ornamentals and plantations.

Douglas-Fir Tussock Moth, Whitemarked Tussock Moth, Spruce Budworm, Spruce Coneworm, and Open Feeding Sawflies	3	Permethrin	AMBUSH 500EC INSECTICIDE	35-70 mL/ha		RESTRICTED USE - COMMERCIAL WOODLAND USE: Apply by ground application only. Use in Christmas tree plantations, high valued stands used for seed production and other high valued woodland areas that are extensively managed. Contact provincial or federal forestry and/or fisheries officials for advice before local spraying of woodlands. **This product must be used in woodlands under supervision of Provincial or Federal forestry officials.** Make one application per season. Applications should be calculated and made on the basis of volume per tree to ensure proper coverage while limiting off-target spray. In nursery, for Strawberry Root Weevil control, apply 65 ml/100 L of water to runoff when adults emerge and before laying begins. One application should control; however, a second application 21 days later can be made if adults are still present.
			POUNCE 384 EC INSECTICIDE	45-90 mL/ha		
			PERM-UP EMULSIFIABLE CONCENTRATE INSECTICIDE	45-90 mL/ha		
Western and Eastern Spruce Budworm, Jack Pine Budworm, Hemlock Looper, Douglas Fir Tussock Moth, White Marked Tussock Moth, and Forest Tent Caterpillar in forests and woodlands		Tebufenozide	LIMIT 240 FORESTRY INSECTICIDE	290 mL/ha		NON-RESTRICTED USE: Woodlands Management: Ground application for sites 500 ha or less. Apply one application per ha per year. Ensure uniform coverage. For Eastern Spruce Budworm: Apply when the insect larvae are between the 3rd and 6th instar (at bud flush for spruce and balsam fir).

						For Western Spruce Budworm: Apply when insect larvae are between 3rd and 6th instar, when larvae are actively feeding. For Jack Pine Budworm: Apply to early instars, when the shoots or candles have elongated, and the needles have started to separate. For Hemlock Looper: Apply to early instars, when the majority of buds have flushes and the bud caps have been shed. Wait until egg hatch has completed. Douglas-fir Tussock Moth and Whitemarked Tussock Moth: Apply at late egg hatch when larvae are starting to feed. Forest Tent Caterpillar: Apply when the insect larvae are in their early instars, 1 to 2 cm in legin, and actively feeding.
Douglas Fir, Needle Midge	1	ACEPHATE (O, S-dimethyl acetylphospho ramidothioate)	ORTHENE 97% SOLUBLE GRANULE SYSTEMIC INSECTICIDE	560 g/Ha in no less than 18.7 L in air applicati on or 935 L/ha by ground applicati on		Application should be made no more than 2 weeks prior to bud burst. Do not apply by low pressure handwand. Do not apply more than once per season.

Bagworm, European Pine Shoot Moth, Gypsy Moth, Jack Pine Budworm, Pine Tussock Moth, Spruce Budworm	18	Tebufenozide	LIMIT 240 FORESTRY INSECTICIDE	Could not find application rates for Christmas Trees, or the specific product label for LIMIT 240F		
Aphids	4D	Flupyradifurone	ALTUS INSECTICIDE and others	500-750 mL/ha in a minimum application volume of 100 L/ha of water		Apply as foliar spray, cover thoroughly. Wait a minimum of 7 days between spray intervals. Maximum total insecticide application per season: 2000 ml/ha (400 g ai/ha). Boom height must be 60 cm or less above the crop or ground (field sprayer application). Airblast application: do not direct spray above the plants
Worms and caterpillars on fruits and vegetable crops and Christmas tree plantations. (Controls forest tent caterpillar, eastern spruce budworm and western spruce budworm in Christmas Trees)	11	Bacillus Thuringiensis Subspecies Kurstaki (All Strains)	REVOKBTK	Forest tent caterpillar: 2.90-4.80 L/ha, Eastern Spruce Budworm: 4.80-7.14		

				L/ha, Western Spruce Budworm: 7.14-9.50 L/ha, ground application only 1000 L of water per hectare in high pressure, high gallonage hydraulic sprayer, for mistblowers use recommended amount in 100 L of water per ha.		

For more detailed information on pest management request information from the Christmas Tree Pest Management spreadsheet by contacting the Christmas Tree Specialist.

Use the following web link to search for any pesticide label mentioned in this guide, or any other pesticide registered in Canada:
http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php

Product Toxicity				
COMMON NAME	TRADE NAMES	TOXICITY		
		TO BEES	TO APPLICATOR	
			ORAL	DERMAL
Herbicides				
clopyralid	Lontrel	**low**	**low**	**low**
glyphosate	Roundup, various	**low**	**low**	**low**
hexazinone	Pronone, Velpar	**low**	**low**	**low**
simazine	Simazine/Prince-Nine-T	**low**	**low**	**low**
Insecticides and Fungicides				
acephate	Orthene	**mod**	**high**	**low**
Bacillus thuringiensis	various	**low**	**low**	**low**
Flupyradifurone	Sivanto Prime	**low**	**mod**	**mod**
methomyl	Lannate	**high**	**high**	**slightly**
permethrin	Pounce and others	**high**	**mod**	**low**
tebufenozide	Limit	**low**	**mod**	**low**

References: EXTOXNET (http://extoxnet.orst.edu/pips/ghindex.html) and Individual Product MSDS sheet.

PESTICIDE EMERGENCY CONTACT INFORMATION

Poison Control Centres		
Nova Scotia	800.565.8161 **or** 902.428.8161	IWK, Halifax, NS
New Brunswick	911	Ask for Poison Information
Prince Edward Island	800.565.8161 **or** 902.428.8161	IWK, Halifax, NS
Newfoundland	709.722.1110	Dr. Charles A. Janeway Child Health Care Centre, St. John's, NF

Environmental Emergencies (Pesticide Spills)	
Transport Canada Regional Operations Centre (24 hours)	
Nova Scotia	800.565.1633
New Brunswick	800.565.1633
Prince Edward Island	800.565.1633
Newfoundland	800.563.9089

ABBREVIATIONS & CONVERSIONS

Formulation and Measurement Abbreviations			
FORMULATIONS		MEASUREMENTS	
DF	Dry flowable	mL	millilitre
EC,E	Emulsifiable concentrate	kPa	kilopascal
F	Flowable	kg	kilogram
G	Granular	g	gram
L	Liquid	L	litre
WDG	Wettable dry granule	BIU	Billions of International Units
WP,W	Wettable powder	ppm	parts per million
SC	Suspension concentrate		
Sn	Solution		
SP	Soluble powder		

Helpful Conversions*	
kPa X 0.14 = pounds per square inch (psi)	millilitres X 0.035 = fluid ounces
hectares X 2.47 = acres	litres X 35 = fluid ounces
kilograms X 2.2 = pounds	litres X 0.22 = imperial gallons
kilograms per hectare X 0.89 = pounds per acre	litres per hectare X 14.17 = fluid ounces per acre
kilograms per hectare X 0.40 = kilograms per acre	litres per hectare X 0.40 = litres per acre
	degree-days C X 1.8 = degree-days F

* Pesticide Units of Measurement

It is not recommended to convert label rates to imperial units because there is a high probability of mathematical and rounding errors. Present day pesticides are formulated to have greater toxic effects in smaller amounts. Therefore, even small conversion errors can lead to the use of incorrect dosages (either too high or too low). Use metric – you will be glad you did!