

GUIDE TO WEED MANAGEMENT IN STRAWBERRY

Nova Scotia Guide to Pest Management in Strawberry 2017
[Straw1-17]

Updated February 23, 2017 by
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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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
PLANTING YEAR							
Soil Applied: <i>Before Planting</i>	15	s-metolachlor / benoxacor	Dual II Magnum	1.25-1.75 L/ha	12 hours	-	Apply only once per year. Apply and incorporate or apply post-transplant, after weeds emerge. Do not apply to variety Joliette. Do not apply if varieties are being harvested in the planting year.
	3	trifluralin	Treflan EC	1.25-2.4 L/ha	12 hours	-	Apply and incorporate in two directions 1-3 weeks before transplanting. May delay establishment in stressful conditions.
Rival EC			1.2-2.2 L/ha				
Soil Applied: <i>2-4 Weeks After Planting</i>	3	chlorthal dimethyl	Dacthal W-75	13.5 kg/ha	-	-	Apply before weed emergence. Shallow cultivation may improve weed control.
	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once per season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Inhibition of daughter plant rooting can occur when soil moisture is low.
Soil Applied: <i>4-6 weeks after planting</i>	5	terbacil	Sinbar WDG	0.28-0.55 kg/ha	12 hours	-	Apply when mother plants are well established but before weeds have emerged or are very small. Apply in a minimum of 300 L of

							water/ha. Use lower rate on sandy soils and on varieties Kent, Bounty, Micmac, Annapolis, Glooscap and Cavendish. Do not apply to weak or stressed plants.
	5	simazine	Princep Nine-T	0.56 kg/ha	12 hours	-	Use only on soils with a pH of 5.6 or lower and more than 2% organic matter. Make this application after transplanting, following cultivation. Two applications can be made during the planting year.
Post Emergence: <i>Grasses</i> <i>2-4 Weeks After Planting</i>	1	fluazifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence: <i>Broadleaf weeds</i> <i>2-4 Weeks After Planting</i>	4	2,4-D	2,4-D (470 g/L)	1.17 L/ha	12 hours	-	Use the amine formulation and do not use when runners are rooting or between mid-August and fall dormancy.
	5	phenmedipham and desmedipham	Betamix β EC	1.15 to 1.75 L/ha	24 hours	See remarks	Apply as broadcast spray in 100-200 L of water. Apply when earliest weeds have reached cotyledon stage. Repeat applications at 5-7 day intervals after 1 st application or

							when next flush of weeds germinates. Max 3 applications per season. Do not spray in excess of 5.25L/ha of Betamix per season. Do not apply to strawberries that bear fruit during the planting year. Do not harvest berries that may develop in the year of planting.
Post Emergence: <i>Non-selective</i>	14	carfentrazone-ethyl	Aim EC plus Agral 90	37-117 ml/ha plus 0.25% v/v	12 hours	1	Do not apply to strawberry foliage. Shielded inter-row or hooded sprayer applications only. Apply only once/year.
<i>2-4 Weeks After Planting</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyfos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with strawberry plants.
Late Summer/ Early Fall (Labour Day)	3	chlorthal dimethyl	Dacthal W-75	13.5 kg/ha	12 hours	-	Apply before weed emergence. Shallow cultivation may improve weed control.
Soil Applied: <i>Broadleaf and grass weeds</i>	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once pre-season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Inhibition of daughter plant rooting can occur when soil moisture is low.

	5	terbacil	Sinbar WDG	0.18-0.28 kg/ha	12 hours	-	Apply before weeds have emerged or when they are very small. Apply in a minimum of 300 L of water/ha Use lower rate on sandy soils and on varieties Kent, Bounty, Micmac, Annapolis, Glooscap and Cavendish. Do not apply to weak or stressed plants.
	5	simazine	Princep Nine-T	0.56 kg/ha	12 hours	-	Use only on soils with a pH of 5.6 or lower and more than 2% organic matter. Make this application after following cultivation. Two applications can be made during the planting year.
Post Emergence: <i>Grasses</i>	1	fluazifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Late Fall Soil Applied: <i>Broadleaf and grass weeds</i>	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once per season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Inhibition of daughter plant rooting can occur when soil moisture is low.

	14	oxyflyorfen	Goal 2XL	1.0 L/ha	24 hours	150	Apply in 500 L of water /ha. Apply to dormant plants before applying mulch in fall. Apply before weeds emerge.
	5	terbacil	Sinbar WDG	0.7-0.85 kg/ha kg/ha	12 hours	-	Apply before weeds have emerged or when they are very small. Apply in a minimum of 300 L of water /ha. Use lower rate on sandy soils and on varieties Kent, Bounty, Micmac, Annapolis, Glooscap and Cavendish. Do not apply to weak or stressed plants.
Post Emergence: <i>Grasses</i>	1	fluzifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence: <i>Non-selective</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyfos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with the strawberry plants.
	14	carfentrazone-ethyl	Aim plus	37-117 ml/ha	12 hours	1	Must be applied with a hooded sprayer to control

			Agral 90	plus 0.25% v/v			weeds between rows. Apply only once per year. Must be applied in a minimum of 100 L of water/ha. Crop injury will occur if spray is allowed to come in contact with the any part of the crop.
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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
FRUITING YEAR							
Spring after Mulch Removal	3	chlorthal dimethyl	Dacthal W-75	13.5 kg/ha	12 hours	-	Apply before weed emergence. Shallow cultivation may improve weed control. Do not apply from first bloom to harvest.
Soil Applied: <i>Broadleaf and grass weeds</i>	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once per season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Do not apply from bloom to harvest.
	5	terbacil	Sinbar WDG	0.28-0.55 kg/ha	12 hours	-	Apply when mother plants are well established but before weeds have emerged or when they are very small. Use low rate when Sinbar was used in the fall. Apply in a minimum of 300 L of water/ha. Use lower rate on sandy soils and on varieties Kent, Bounty, Micmac, Annapolis, Glooscap and Cavendish. Do not apply to weak or stressed plants.
	14	flumioxazin	Chateau	210 g/ha	12 hours	-	Apply to dormant plants only, immediately after mulch removal. If plants are actively growing crop damage may occur. Otherwise use with a

							shielded sprayer between rows. Make only one application per growing season. (Pigweeds, ragweed, Lamb's quarters, and dandelion).
	15	s-metolachlor	Dual II Magnum	1.25-1.75 L/ha	12 hours	30	Apply in 150 L/ha of water Strawberry cultivars may vary in their tolerance to Dual II Magnum. One application per season after mulch removal but before weed emergence.
Post Emergence: <i>Grasses</i>	1	fluazifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence: <i>Non-selective</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyphos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with the strawberry plants.
	14	carfentrazone-ethyl	Aim plus Agral 90	37-117 ml/ha plus 0.25% v/v	12 hours	1	Must be applied with a hooded sprayer to control weeds between rows. Apply only once per year. Must be applied in a minimum of 100 L of water/ha.

							Crop injury will occur if spray is allowed to come in contact with the any part of the crop.
At Renovation	1	fluazifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
<i>Grasses</i>	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence:	4	2,4-D	2,4-D (470 g/L)	2.2 L/ha	12 hours	-	Use amine formulation. Apply after harvest but before mowing. Delay mowing for a few days after application. Do not use between mid-August and fall dormancy.
<i>Broadleaf weeds</i>	4	clopyralid	Lontrel 360	0.56-0.83 L/ha	12 hours	200	Apply immediately after harvest and wait 7-10 days before mowing. Apply once per year as a single treatment. (Vetch, Canada Thistle, sheep sorrel, groundsel)
	4	Clopyralid <i>NEW 2017</i>	Pyralid	0.672 L/ha (vetch) 0.996 L/ha (sheep sorrel & ox-eye daisy)	12 hours	-	For control of tufted vetch and Canada thistle and suppression of sheep sorrel and ox-eye daisy. Apply as a broadcast application with a boom sprayer calibrated to deliver a total volume of 150 to 200 L/ha. Summer renovation treatment. Wait 7-10 days after application before mowing.

Post Emergence: <i>Non-selective</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyfos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with the strawberry plants.
	22	paraquat	Gramoxone	5.5 L/ha	24 hours	-	To be used in late summer to narrow rows and kill weeds between rows. Only emerged weeds will be controlled.
	14	carfentrazone-ethyl	Aim plus Agral 90	37-117 ml/ha plus 0.25% v/v	12 hours	1	Must be applied with a hooded sprayer to control weeds between rows. Apply only once per year. Must be applied in a minimum of 100 L of water/ha. Crop injury will occur if spray is allowed to come in contact with the any part of the crop.
Late Summer/ Early Fall (Labour Day) Soil Applied: <i>Broadleaf and grass weeds</i>	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once per season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Inhibition of daughter plant rooting can occur when soil moisture is low.
	5	terbacil	Sinbar WDG	0.65-0.85 kg/ha	12 hours	-	Apply following renovation, before weeds have emerged or when they are very small. Apply in a minimum of 300 L of water/ha. Use lower rate on sandy soils and on varieties Kent, Bounty, Micmac, Annapolis,

							Glooscap and Cavendish. Do not apply to weak or stressed plants.
	5	simazine	Princep Nine-T	0.89-1.78 kg/ha	12 hours	-	Use only on soils with a pH of 5.6 or lower and more than 2% organic matter. Make this application after renovation, following cultivation. Use higher rate on heavy weed problems.
Post Emergence: <i>Grasses</i>	1	fluazifop-p-butyl	Venture L	0.6-2.0 L/ha	12 hours	30	Use one application per season. Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar.
	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence: <i>Non-selective</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyfos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with the strawberry plants.
	22	paraquat	Gramoxone	5.5 L/ha	24 hours	-	To be used in late summer to narrow rows and kill weeds between rows. Only emerged weeds will be controlled.
	14	carfentrazone-ethyl	Aim plus Agral 90	37-117 ml/ha plus 0.25% v/v	12 hours	1	Must be applied with a hooded sprayer to control weeds between rows. Apply only once per year. Must be applied in a

							minimum of 100 L of water/ha. Crop injury will occur if spray is allowed to come in contact with the any part of the crop.
Late Fall Soil Applied: <i>Broadleaf and grass weeds</i>	15	napropamide	Devrinol DF	9 kg/ha	12 hours	-	Apply once per season before weeds emerge or following cultivation. Incorporation by rainfall, irrigation or cultivation is essential. Inhibition of daughter plant rooting can occur when soil moisture is low.
	14	oxyflyorfen	Goal 2XL	1.0 L/ha	24 hours	150	Apply in 500 L of water /ha. Apply to dormant plants before applying mulch in fall. Apply before weeds emerge.
	5	terbacil	Sinbar WDG	0.7-0.85 kg/ha kg/ha	12 hours	-	Apply before weeds have emerged or when they are very small. Apply in a minimum of 300 L of water /ha. Use lower rate on sandy soils and on varieties Kent, Annapolis, Glooscap, Bounty, Micmac, and Cavendish. Do not apply to weak or stressed plants.
	5	simazine	Princep Nine-T	0.89-1.78 kg/ha	12 hours	-	Use only on soils with a pH of 5.6 or lower and more than 2% organic matter. Make this application following cultivation.
	3	chlorthal dimethyl	Dacthal W-75	13.5 kg/ha	12 hours	-	Apply before weed emergence. Shallow cultivation may improve weed control. Rainfall or irrigation after application is important.

	15	propyzamide	Kerb 50 WP	2.25 kg/ha	24 hours	-	Apply Kerb in 300-500 L of water/ha. Apply in late fall prior to mulching and freeze-up. (buttercup, chickweed, stitchwort and sheep sorrel)
	14	flumioxazin	Chateau	210 g/ha	12 hours	-	Apply to dormant plants only, just prior to mulching. Otherwise use with a shielded sprayer between rows. Make only one application per growing season. (Pigweeds, ragweed, Lamb's quarters, and dandelion).
Post Emergence: <i>Grasses</i>	1	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha plus 1-2 L/ha	-	25	Apply to actively growing grasses before tillering. Wait at least 14 days after application before applying Sinbar. Apply in 100-200 L of water /ha.
Post Emergence: <i>Non-selective</i>	9	glyphosate	Roundup Original, Roundup Transorb, Glyfos, Touchdown etc.	Spot: 1-2% solution Wick wiping: 33% solution (1 part product to 2 parts water)	12 hours	30	Avoid contact with the strawberry plants.
	14	carfentrazone-ethyl	Aim plus Agral 90	37-117 ml/ha plus 0.25% v/v	12 hours	1	Must be applied with a hooded sprayer to control weeds between rows. Apply only once per year. Must be applied in a minimum of 100 L of water/ha. Crop injury will occur if spray is allowed to come in contact with the any part of the crop.

<u>Runner suppression</u>	Plant Growth Regulator	Prohexadione calcium	Apogee	135 g/ha	12 hours	21 days	Apply prior to the beginning of runner initiation for June-bearing and Day-neutral strawberries. The use of a non-ionic surfactant and ammonium sulphate conditioner is recommended. Make subsequent applications at 14-21 day intervals, to a maximum of 3 applications/season, if required. <i>Apogee has been evaluated for phytotoxicity on a wide range of conditions; however, it has not been possible to evaluate all commercially important varieties under every possible condition. Apply Apogee to a small area and evaluate crop safety for 3–5 days before attempting a large-scale spray to make certain that no phytotoxicity occurs.</i>
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For more detailed information on weed management refer to the “Strawberry IPM Weed Management Guide” from the New Brunswick Department of Agriculture, Fisheries and Aquaculture:

<https://www.gnb.ca/0171/20/StrawberryIPM.pdf>

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/lr-re/index-eng.php>

Product Toxicity

COMMON NAME	TRADE NAMES	TOXICITY		
		TO BEES	TO APPLICATOR	
			ORAL	DERMAL
2,4-D	2,4-D Amine 500	low	mod	mod
carfentrazone-ethyl	Aim EC	low	low	low
clopyralid	Lontrel	low	low	low
chlorthal dimethyl	Dacthal W-75			
fluazifop-p-butyl	Venture	low	low	low
flumioxazin	Chateau	low	low	low
glyphosate	Roundup, Touchdown, Glyfos	low	low	low
napropamide	Devrinol DF	low	low	low
oxyflyorfen	Goal 2XL	low	low	low
paraquat	Gramoxone	low	high	mod
prohexadione calcium	Apogee	low	low	low
propyzamide	Kerb	low	low	low
simazine	Simazine	low	low	low
sethoxydim	Poast Ultra	low	low	low
s-metolachlor / benoxacor	Dual II Magnum	low	low	low
terbacil	Sinbar	low	low	low
trifluralin	Treflan EC, Rival	low	low	low

References: EXTTOXNET (<http://exttoxnet.orst.edu/pips/ghindex.html>) and Individual Product MSDS sheets

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!