

Dry Bean Management Schedule

*A guide to weed, insect and
disease management in dry
beans in Nova Scotia*



2018



GUIDE TO PEST MANAGEMENT IN BEANS (DRY)



Nova Scotia Vegetable Crop Guide to Pest Management 2018
[DRY1-18]

Revised March 15, 2018 by
Peter Burgess, Horticulture Specialist, Perennia
Mélanie Leclerc, Research Associate, Perennia

IMPORTANT

This publication was compiled by representatives from Perennia using information from the Pest Management Regulatory Agency of Health Canada, specific pesticide labels, previous Atlantic Provinces Vegetable Pest Guides and manufacturer's information. **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.**

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 couple 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. 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
WEEDS:							
Preplant <i>Perennial weeds including quackgrass</i>	9	Glyphosate	Roundup Original	2.5-7.0 L/ha	12 hours	7	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control, apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha of water. If higher water volumes are used, add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			Touchdown® 480	2.5-7.0 L/ha			
	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	-	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.
Preplant Incorporated Treatments <i>Germinating annual grasses and some broadleaf weeds</i> <i>Note allowable tank-mixes in comments section</i>	15	Dimethenamid-P	Frontier Max	860-963 ml/ha	24 hours	-	Use higher label rate on fine textured or high organic soils and for heavier weed problems. (<i>Phaseolus vulgaris</i> only)
	2	Imazethapyr	Pursuit	312 ml/ha	-	100	Apply one application per year to white or kidney beans only. Rotational cropping restrictions apply. Also can be tank mixed with Treflan or Dual II Magnum. (Check label for allowable varieties)
	15-2	Dimethenamid-P and Imazethapyr	Frontier Max and Pursuit	860-963 ml/ha and 312 ml/ha	-	-	Incorporate into the top 5 cm of soil within 7 days of planting.
	8	Eptc	EPTAM 8-E	4.25-5.5 L/ha	24 hours	-	Must be applied to a dry clod-free soil surface and incorporated shortly after application. Can be tank mixed with

							Treflan (Check label for allowable varieties).
	15	S-Metolachlor	Dual II Magnum	1.15-1.75 L/ha	12 hours	-	Do not use on very sandy soils, or on soils high in organic matter. Use in conjunction with preemergence or postemergence herbicide for control of broadleaf weeds. Beans should be seeded 4 cm deep or crop injury may occur. Maximum 1 application per year. Can be tank mixed with Pursuit (Check label for allowable varieties).
	3	Trifluralin	Bonanza 400 EC	1.5-2.75 L/ha	-	-	Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Can be tank mixed with Pursuit or EPTAM (Check label for allowable varieties).
			Rival EC	1.2-2.3 L/ha	12 hours	-	
			Treflan EC	1.2-2.4 L/ha	12 hours	-	
	3	Pendimethalin	Prowl H₂O	2.37 L/ha	24 hours	90 (adzuki) 80 (lima)	Controls certain annual grass and broadleaf weeds as they germinate, but will not control established weeds. Must be soil applied and incorporated into the soil prior to planting. Adequate soil moisture is required for optimum activity. Maximum 1 application/season.
Preemergence Treatments	15	Dimethenamid-P	Frontier Max	756-963 ml/ha	-	-	* Rate depends on soil texture. Read product label for soil texture chart.
<i>Grasses (annual)</i>							
<i>Annual grasses and broadleaf weeds</i>	2	Imazethapyr	Pursuit	312 ml/ha	-	100	Apply one application per year to white or kidney beans only. Rotational cropping restrictions apply. Also can be tank mixed with Treflan.
	15-2	Dimethenamid-P and Imazethapyr	Frontier Max and Pursuit	756-963 ml/ha and 312 ml/ha	-	100	* Rate depends on soil texture. Read product label for soil texture chart

	15	S-Metolachlor	Dual II Magnum	1.15-1.75 L/ha	12 hours	-	Do not use on very sandy soils, or on soils high in organic matter. Use in conjunction with preemergence or postemergence herbicide for control of broadleaf weeds. Beans should be seeded 4 cm deep or crop injury may occur. Maximum 1 application per year.
Postemergence Treatments <i>Broadleaf weeds</i>	6	Bentazon	Basagran plus Assist Oil Conc.	1.75-2.25 L/ha 1-2 L/ha	12 hours	-	Apply when beans area at the 4 trifoliolate stage. Do not apply when rain is expected within 6-8 hours. Does not control grasses.
			Basagran Forte	1.75-2.25 L/ha			
	14	Fomesafen	Reflex plus Agral 90	1 L/ha 2.5 L / 1000 L	-	84	Do not apply to a field more often than once every two years. Do not apply to a crop under stress. Apply when beans are in the 1-2 trifoliolate stage and weeds are small and actively growing.
<i>Grasses</i>	1	Clethodim	Select plus Amigo	0.19 L/ha 0.5% v/v	-	60	Apply a maximum of one application per year when grassy weeds are in the 2-6 leaf stage.
		Fenoxaprop-P-ethyl	Excel Super	670 ml/ha	-	60	Apply when annual grasses are in the 1 to 6 leaf stage and are actively growing. May be tank mixed with Basagran for control of several broadleaf weeds. Use a minimum of 200 L of water per hectare with the mixture.
		Sethoxydim	Poast Ultra plus Merge	1.1 L/ha 1 to 2 L/ha	12 hours	80	Treat at the 1 to 6 leaf stage of annual grasses. Use the higher rate for control of volunteer cereals and quackgrass. Apply in 50 to 200 L/ha of water. Merge should be used at 1% of water volume used.
<i>Annual grasses and broadleaf weeds</i>	1-6	Fenoxaprop-P-ethyl Bentazon	Excel Super plus Basagran plus Assist Oil Conc.	670 ml/ha 1.75-2.25 L/ha 2.0 L/ha	-	60	When mixing, add Basagran followed by Excel Super followed by Assist to a tank one-half full of water and then complete filling. Do not use excessive agitation. Temporary crop injury possible during hot, humid conditions. When these conditions occur reduce oil concentrate (Assist) to 1 L/ha.

	6-14	Bentazon Fomesafen	Basagran plus Reflex plus Assist Oil Conc.	1.75 L/ha 0.58 L/ha 2 L/ha	-	84	Refer to Basagran and Reflex labels on specific weed usage and height.
Preharvest	22	Diquat	Reglone plus Agral 90	1.25-1.7 L/ha	24 hours	-	Apply Reglone or Dessicash when 80% of pods have turned yellow. Do not apply Ignite to dry beans grown for seed. Apply Ignite when 50 to 75% of the pods are yellow-brown. Apply Roundup or Roundup FastForward Preharvest 7 to 14 days before harvest and when grain moisture is less than 30%.
			Dessicash	1 L/1000 L			
	10	Glufosinate ammonium	Ignite 15 SN	2.5-3.0 L/ha	-	-	
	9	Glyphosate	Roundup Original	2.5 L/ha	12 hours	-	
	9-10	Glyphosate and Glufosinate ammonium	Roundup FastForward Preharvest	3.0 L/ha	-	-	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Seed corn Maggot, Potato leafhopper, Wireworm	4	Thiamethoxam	Cruiser 350FS	86-143 ml/100 kg seed	-	-	Seed treatment for commercial seed treatment facilities only. Use high rate for wireworm and to replace one foliar application for potato leafhopper.
Aphids	3	Lambda-cyhalothrin	Warrior	83-233 ml/ha	24 hours	21	Do not use more than 3 applications per season. Apply when the presence of vulnerable pest developmental stages and significant populations occur. Apply in 100-200 L of water / ha.
	1B	Malathion	Malathion 500 E	1.4-3 L/ha	1 day	1	Apply with enough spray volume to ensure adequate spray coverage.
	4	Acetamiprid	Assail 70 WP	56-86 g/ha	12 hours	7	Apply in a minimum finished spray volume of 200 L/ha. Do not apply more than 3 times per season. Do not apply more than once every 7 days. Do not use on crops after a soil, in-furrow or seed treatment application of a group 4 insecticide.
	29	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	12 hours	7	Apply before aphid populations reach economic thresholds or as populations begin to increase but before damaging populations become established. Scout fields and reapply if necessary. Use higher rates for greater pest populations and/or dense foliage. Maximum 3 applications/season.
Two Spotted Spider Mite	20B	Acequinocyl <i>NEW 2018</i>	Kanemite 15SC	2.07 L/ha	12 hours	7	Two-Spotted Spider and Broad Mite. Apply as a full coverage spray to the foliage to drip. Application should be made as soon as the mite population reaches economic infestation levels. Allow a minimum of 14 days between applications.

European Corn Borer	11	<i>Bacillus thuringiensis</i>	Bioprotec CAF	2.8-4.0 L/ha	-	1	Maximum 4 applications per season. Allow 5-10 days between applications.
	3	Lambda-cyhalothrin	Matador 120 EC	83 mL/ha	24 hours	14	Apply with 100-200 L/ha of spray volume. Apply before larvae tunnel into stalk. Max 3 applications per season.
	18	Methoxyfenozide	Intrepid 240F	0.3 – 0.6 L/ha	12 hours	7	Apply at the first signs of feeding damage before the insect enters the pods. Repeat applications after 7-14 days if required based on population monitoring. Use the higher rate for heavy infestations or advanced growth stages of the target pest. (Also for Cabbage looper).
Tarnished Plant Bug	3	Lambda-cyhalothrin	Matador 120 EC	83 ml/ha	24 hours	14	Apply with 100-200 L/ha of spray volume. The need and timing of application should be based on the presence of vulnerable pest development stages.
	29	Flonicamid	Beleaf 50SG	0.20 kg/ha	12 hours	7	Apply when lygus bugs first appear in the field and before populations reach high levels. Beleaf™ 50SG Insecticide will stop lygus bug feeding rapidly but it may take several days to see a reduction in lygus bug numbers. Reapply when new insects are detected.
Cutworms & Army worms	3	Lambda-cyhalothrin	Matador 120 EC	83 mL/ha	24 hours	14	Apply with 100-200 L/ha of spray volume. The need and timing of application should be based on the presence of vulnerable pest development stages. Applications should be made as close to cutworm feedings as possible (ie. night).
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	XenTari WG	500-1000 g/ha	-	0	Beet Armyworm, Corn Earworm. Use sufficient spray volume to ensure thorough coverage but not to the point of run off.
Western Bean Cutworm	3	Lambda-cyhalothrin	Matador 120 EC	83-187 ml/ha	24 hours	14 days	Repeat sprays at 4-7 day intervals. Do not use more than 3 applications per season.
			Warrior				

Potato Leafhopper	-	Kaolin	Surround WP	6.25-12.5 kg/ha	-	-	This is an OMRI listed control product and is suitable for organic production. Apply in 250 L of water. Apply at 7-14 day intervals once initial infestation is detected. Use high rate for early applications. Do not exceed 12.5 kg/ha per application.
	3	Lambda-cyhalothrin	Matador 120 EC	83 ml/ha	24 hours	14	Apply with 100-200 L/ha of spray volume. The need and timing of application should be based on the presence of vulnerable pest development stages.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
Botrytis (Grey Mold) and Sclerotinia (White Mold)	-	<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	-	0	This is a biopesticide that will only suppress the indicated diseases. Sclerotinia: Make the 1 st application at planting and prior to crop emergence. Make a 2 nd application as a directed spray with multiple nozzles per seed line in sufficient water to ensure thorough coverage of lower plant leaves and surrounding soil surface within 7 days of thinning. Repeat applications on a 7-14 day intervals if conditions for disease development persist. Botrytis Pod Rot: Begin applications at the first sign of disease, or when conditions become conducive for disease development. Repeat as necessary on a 7-10 day interval.
	7	Boscalid	Lance WDG	560-770 g/ha (white mold)	12 hours	7	Apply at 20-50% flowering to control white mold . Apply a second time 7-14 days later if disease persists, or weather conditions are favourable for disease development. Maximum 2 applications/season. Use a rate of 460 g/ha for botrytis .
	9-12	Cyprodinil and Fludioxonil	Switch 62.5 WG	775-975 g/ha	12 hours	7	Begin applications prior to or at the onset of disease & repeat applications at 7 day intervals if conditions remain favourable for disease development. For white mold control, make the first application at 10-20% bloom. In some locations, a single application at this timing will provide adequate disease control. Apply higher rate under conditions of high disease pressure. Apply in sufficient water to ensure thorough coverage Ground: 175–225 L water /ha. Do not apply more than 2.9 kg/ha per crop.

	2	Iprodione	Rovral WDG	1.0-1.5 Kg/ha	-	Do not apply after bloom	Where white mold has been a serious problem in the past, apply Senator in early bloom prior to the rows closing in. Repeat if necessary. Apply Rovral as a preventative treatment when 25-75% of bloom is open. Effective control can only be achieved by using drop nozzles and high pressure so that spray contacts blossoms. When conditions are dry before and during bloom, no fungicide is required.
	1	Thiophanate-methyl	Senator 70 WP	1.75-2.25 Kg/ha	-	-	
	7	Penthiopyrad	Fontelis	1.0-2.25 L/ha	4 hours	0	
White Mold (<i>Sclerotinia sclerotiorum</i>)	29	Fluazinam	Allegro 500F	0.6-1.0 L/ha	24 hours	30	Maximum of two applications per year. Apply in a water volume of 200-600 L/ha. Begin application when plants are at early to mid-bloom (10-50% bloom) and make one more application 7-10 days later.
	3	Metconazole	Quash	280 g/ha	6 (hand irrigation) 1 (scouting)	21	Suppression. Apply prior to disease development. Make first application at 20-50% bloom stage, before disease symptoms are visible. Make a second application at full bloom. Do not make the second application before 9 days following the first application. Do not make more than 2 applications per season.
Bacterial Blights	M1	Copper hydroxide	Parasol F	2.3-3.12 L/ha	48 hours	2	Apply at the first sign of disease and at 7 day intervals.
	M		Kocide 2000	1.6-2.3 kg/ha	48 hours	2	For protective sprays, apply first application when plants are 15 cm high. Apply on a 7 to 14 day schedule depending on local conditions. Use high rate under high disease pressure and low rate under low disease pressure.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	Re-apply using 5-10 day intervals.

<i>Seed treatment</i>	M	Copper hydroxide	Kocide 2000	113g in 200ml water for 100kg of seed	-	-	For every 100 kg seed to be treated, add 113 g Kocide® 2000 to 200 ml of warm water and stir until dissolved. Additional warm water can be added as required to create a slurry of suitable consistency for use with commercial seed treatment equipment. Add this mixture to the bean seed as it is being gently tumbled to ensure even coverage. Allow treated seed to dry before planting. Label Seed: “ This seed has been treated with Kocide® 2000; do not use treated seed for food, feed or oil processing ”. <i>Kocide 2000 used as a seed treatment may cause some delay in seed germination. Treat a small quantity of seed using equipment similar to that planned for treating the total seed lot. Conduct germination tests on a small portion of seed before committing the total seed lot to a selected seed treatment. See label for further precautions.</i>
Rust (Asian Soybean)	11	Azoxystrobin	Quadris	0.5 L/ha	-	15	Apply at onset of disease no later than flowering and apply second application 14 days later.
			Azoshy 250SC	500 ml/ha	12 hours	15	Make first application at the R1 to R3 developmental stage, or when there is 5% disease level in the field, followed by a second application 14 days after the first, if environmental conditions are favourable for disease development.
	3	Propiconazole	Tilt 250E	500-756 ml/ha	-	30	Apply at first sign and at 14 to 21 days later. Two applications per season.
	3	Propiconazole	Propi Super 25EC	500-7560 ml/ha	12 hours	28	Make first application at the R2 to R3 developmental stage, or when there is 5% disease level in the field, followed by a second application 14 days after the first, if environmental conditions are favourable for disease development. Max 2 applications/season.
	11	Pyraclostrobin	Headline EC	0.4-0.6 L/ha	12 hours	30	<i>Phaseolus, Vigna, Lupinus</i> species only. Apply at the beginning of infection and 10-14 days later.

	7	Penthiopyrad	Fontelis	1.0-2.25 L/ha	4 hours	0	Begin applications prior to disease development, continue on a 7-14 day interval. Use higher rate and shorter interval when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	3	myclobutanil	Nova	340 g/ha	2 days for scouting 12 hours all other activities	30	Max 3 applications per season with a 7-10 day re-treatment interval. Apply as soon as weather conditions are favourable for rust. Apply as a foliar spray in 300 l of water/ha.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	Re-apply using 5-10 day intervals.
Anthracnose, Powdery Mildew	11	Pyraclostrobin	Headline EC	0.4 L/ha	12 hours	30	<i>Phaseolus, Vigna, Lupinus</i> species only. Apply at beginning of infection and 10-14 days later.
	3	Propiconazole	Tilt 250E	500 ml/ha	-	30	<i>Powdery Mildew:</i> Make first application at the R2 to R3 developmental stage, or when there is 5% disease level in the field, followed by a second application 14 days after the first, if environmental conditions are favourable for disease development. Two applications per season.
	3	Propiconazole	Propi Super 25EC	500 ml/ha	12 hours	30	<i>Powdery Mildew:</i> Make first application at the R2 to R3 developmental stage, or when there is 5% disease level in the field, followed by a second application 14 days after the first, if environmental conditions are favourable for disease development. Two applications per season.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	<i>Powdery Mildew:</i> Re-apply using 5-10 day intervals.
Anthracnose, Ascochyta, Mycosphaerella	11	Azoxystrobin	Quadris	0.5 L/ha	-	15	Apply at onset of disease no later than flowering and apply second application 10-14 days later.

			Azoshy 250SC	500 ml/ha	12 hours	15	The first application must be applied before disease is established and no later than the onset of flowering. A second application can be made 10-14 days after the first application, when disease pressure is severe or when agronomic or weather conditions are conducive to disease development or movement.
	7	Penthiopyrad	Fontelis	1.0-2.25 L/ha	4 hours	0	Begin applications prior to disease development, continue on a 7-14 day interval. Use higher rate and shorter interval when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	<i>Ascochyta</i> . Re-apply using 5-10 day intervals.

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>

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
DC	Dispersible Concentrate	kPa	kilopascal
EC, E	Emulsifiable concentrate	kg	kilogram
EW	Water-based concentrate	g	gram
EG	Water dispersible granule	L	litre
L	Liquid	BIU	Billions of International Units
WDG	Wettable dry granule	ppm	parts per million (1000 ppb)
WP, W	Wettable powder	ppb	parts per billion (1/1000 ppm)
Sn	Solution		
SC	Suspension concentrate		

Helpful Conversions¹	
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

¹ **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 be more effective in smaller amounts. Therefore, even small conversion errors can lead to the use of incorrect rates (either too high or too low). Use metric – you will be glad you did!