

5. Dry Edible Beans

DRY EDIBLE BEAN INSECTS

Table 5–1. Control Options for Insects in Dry Edible Beans — Seedcorn Maggot, Wireworms

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	Comments (label precautions, restricted entry intervals, etc.)
SEEDCORN MAGGOT (<i>Delia platura</i>)				
Seed Treatment				
Seedcorn maggot problems in dry beans are rare in Ontario. Risk factors include cool, wet springs when germination is delayed. In fields at high risk, including early-planted fields where large amounts of manure, green manure or residue have recently been incorporated, use insecticide seed treatment.	thiamethoxam	Cruiser 5FS	50–83 mL/ 100 kg seed	For use in commercial seed treatment facilities only. Use higher rate when expecting high insect populations. Do not graze or feed livestock on treated areas for 45 days after planting. Toxic to birds and small animals. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil and other surfaces. This product contains no colourant. An appropriate colourant must be added when this product is applied.
Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8, <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i> , on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases.	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.
WIREWORMS (<i>Limonius</i> spp. and others)				
Seed Treatment				
See OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i> , for sampling methods.	imidicloprid	Stress Shield 600	104 mL/ 100 kg seed (62.5 g ai/ 100 kg seed)	For use in commercial seed treatment facilities only. May be tank-mixed with certain fungicide. See label for registered tank-mix partners. This product contains no colourant. Seed treated with this product must be conspicuously coloured. Do not graze or feed livestock on treated areas for 4 weeks after planting. Toxic to birds and small animals. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil and other surfaces.
Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8, <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i> , on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases.				
	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.

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Table 5–2. Control Options for Insects in Dry Edible Beans — Potato Leafhopper

LEGEND: PHI = Pre-Harvest Interval (in days) N/A = not applicable					
Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
POTATO LEAFHOPPER (<i>Empoasca fabae</i>)					
Seed Treatments					
<p>Consider using insecticide seed treatment on fields with a history of leafhopper infestations, to reduce the number of foliar applications required. Insecticide seed treatments protect the seedling crop, eliminating the need for at least one foliar insecticide application.</p> <p>Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8, <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i>, on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases.</p>	imidacloprid	Stress Shield 600	104 mL/ 100 kg seed (62.5 g ai/ 100 kg seed)	N/A	For use in commercial seed treatment facilities only. May be tank-mixed with certain fungicide. See label for registered tank-mix partners. This product contains no colourant. Seed treated with this product must be conspicuously coloured. Do not graze or feed livestock on treated areas for 4 weeks after planting. Toxic to birds and small animals. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil and other surfaces.
	thiamethoxam	Cruiser 5FS	86–143 mL/ 100 kg seed	N/A	For use in commercial seed treatment facilities only. Do not graze or feed livestock on treated areas for 45 days after planting. Toxic to birds and small animals. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil and other surfaces. This product contains no colourant. An appropriate colourant must be added when this product is applied.
	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	N/A	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.
Foliar Treatment					
Some tolerant varieties are available (www.gobeans.ca). See OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i> , for action threshold charts and sampling methods.	dimethoate	Cygon 480 EC	0.7–1.0 L/ha (280–404 mL/acre)	7	<p>Ground or aerial application. Do not feed treated threshings or crop refuse to livestock. Maximum 2 applications/yr. Some residual activity is expected from this product.</p> <p>This product is toxic to bees. Restrict application to the period after dark when bees are inside the hives, or in the early morning before the bees are foraging in the fields. DO NOT apply to such crops as alfalfa when in full bloom.</p>
		Lagon 480 EC			
	flupyradifurone	Sivanto Prime	500–750 mL/ha (202–303 mL/acre)	7	<p>Ground and aerial application. Minimum of 100 L/ha of water for ground application; 20 L/ha for aerial application.</p> <p>Toxic to adult bees in laboratory studies via oral exposure, however, not toxic to bees through contact exposure, and field studies conducted with this product have shown no effects on honeybee colony development. Minimize spray drift to reduce exposure to bees in habitats close to the application site. Application during the crop blooming period, and when flowering weeds are present, may only be made in the early morning and the evening when most bees are not foraging.</p>

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Table 5–2. Control Options for Insects in Dry Edible Beans — Potato Leafhopper

Integrated Pest Management Options		Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
POTATO LEAFHOPPER (<i>Empoasca fabae</i>) (continued)						
Foliar Treatment (continued)						
(continued)	lambda-cyhalothrin	Matador 120 E	83 mL/ha (34 mL/acre)	14	Ground and aerial application. This product has no systemic activity. For best results, apply during the early morning, before temperatures rise, and during the evening. Use 100–200 L of water/ha for ground application. Use 20 L of water/ha for aerial applications. Do not graze or feed on treated forage. Maximum 3 applications/yr. 24-hr restricted entry interval. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.	
		Silencer 120 EC	83 mL/ha (34 mL/acre)	14	Ground application only. This product has no systemic activity. For best results, apply during the early morning, before temperatures rise, and during the evening. Do not graze or harvest treated forage, straw or hay for livestock feed. Maximum 3 applications/yr. 24-hr restricted entry interval. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.	
	lambda-cyhalothrin + chlorantraniliprole	Voliam Xpress	225 mL/ha (91 mL/ha)	14	Ground and aerial application. Apply in a minimum of 100–200 L of water/ha for ground applications, 40 L of water/ha for aerial applications. Maximum of 3 applications/yr by ground, 1 application/yr by air. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.	

DRY EDIBLE BEAN INSECTS

Table 5-3. Control Options for Insects in Dry Edible Beans — Bean Leaf Beetle

LEGEND: PHI = Pre-Harvest Interval (in days)

N/A = not applicable

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
BEAN LEAF BEETLE (<i>Certoma trifurcata</i>)					
Seed Treatments					
<p>Use in fields with a history of early-season infestations. If defoliation after seeding is a concern, a well-timed foliar will provide control.</p> <p>Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5-8, <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i>, on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases.</p>	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	N/A	<p>For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i>-based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.</p>

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Table 5-3. Control Options for Insects in Dry Edible Beans — Bean Leaf Beetle

LEGEND: PHI = Pre-Harvest Interval (in days)

N/A = not applicable

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
BEAN LEAF BEETLE (<i>Certoma trifurcata</i>) (continued)					
Foliar Treatment					
Use defoliation thresholds for dry beans found in OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i> . During pod stages, with higher value and stringent quality standards in dry beans, if 5%–8% of the pods inspected have feeding scars, control may be necessary. Ensure that adults are still presently active in the field before a spray is applied.	dimethoate	Cygon 480 EC	0.7–1.0 L/ha (280–404 mL/acre)	7	Ground or aerial application. Do not feed treated threshings or crop refuse to livestock. Maximum 2 applications/yr. Some residual activity is expected from this product. This product is toxic to bees. Restrict application to the period after dark when bees are inside the hives, or in the early morning before the bees are foraging in the fields. DO NOT apply to such crops as alfalfa when in full bloom.
		Lagon 480 EC			
	lambda-cyhalothrin	Matador 120 E	ground: 83–233 mL/ha (34–94 mL/acre) aerial: 83 mL/ha (34 mL/acre)	14	Ground and aerial application. For best results, apply during the early morning, before temperatures rise, and during the evening. Use 100–200 L of water/ha for ground application. Use 20 L of water/ha for aerial applications. Do not graze or feed on treated forage. Maximum 3 applications/yr. 24-hr restricted entry interval. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.
		Silencer 120 EC			
lambda-cyhalothrin + chlorantraniliprole	Voliam Xpress	225–500 mL/ha (91–202 mL/ha)	14	Ground and aerial application. Apply in a minimum of 100–200 L of water/ha for ground applications, 40 L of water/ha for aerial applications. Maximum of 3 applications/yr by ground, 1 application/yr by air. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.	
thiamethoxam + lambda-cyhalothrin	Endigo	180 mL/ha (73 mL/acre)	21	Ground and aerial application. Use a minimum of 100–200 L of water/ha for ground application and 20 L of water/ha for aerial applications. Do not exceed a total of 540 mL/ha of Endigo per season. Maximum of 3 applications/yr. Allow at least 7 days between treatments. Do not graze or harvest treated forage, straw or hay for livestock feed. Do not apply this product within 45 days of planting if seeds were treated with a neonicotinoid seed treatment (Cruiser, Cruiser Maxx or Stress Shield). Toxic to bees. To minimize exposure to bees from foliar application, DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.	

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Table 5–4. Control Options for Insects in Dry Edible Beans — Mexican Bean Beetle

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
MEXICAN BEAN BEETLE (<i>Epilachna varivestis</i>)					
Foliar Treatment					
Mexican bean beetles are less of a problem in very hot, dry summers. Early-maturing bean varieties may be grown with little or no injury. Several natural enemies help keep populations below action thresholds. Insecticides are only recommended if populations are extremely high, as they will also kill the natural enemy population. See OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i> , for more information.	dimethoate	Cygon 480 EC	0.7–1.0 L/ha (280–404 mL/acre)	7	Ground or aerial application. Do not feed treated threshings or crop refuse to livestock. Maximum 2 applications/yr. Some residual activity is expected from this product. This product is toxic to bees. Restrict application to the period after dark when bees are inside the hives, or in the early morning before the bees are foraging in the fields. DO NOT apply to such crops as alfalfa when in full bloom.
		Lagon 480 EC			

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Table 5–5. Control Options for Insects in Dry Edible Beans — Western Bean Cutworm, Tarnished Plant Bug

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
WESTERN BEAN CUTWORM (<i>Striacosta albicosta</i>)					
Foliar Treatment					
<p>Larvae mine into the pod, feeding directly on the seed. Their entry holes also allow for the introduction of pod diseases. All these activities have a negative impact on yield, seed quality and increase pick. It is difficult to scout for WBC eggs or larvae in dry beans. Use pheromone traps to monitor for presence and peak flight. If pod feeding is easily found, spray is necessary. Apply insecticide 10–20 days after peak moth flight when larval feeding is expected.</p> <p>Additional information on pest status and management recommendations are provided at the Ontario WBC Trap Network: www.cornpest.ca.</p>	chlorantraniliprole	Coragen	250–375 mL/ha (101–151 mL/acre)	1	Ground or aerial application. For ground application, use a minimum water volume of 100 L/ha and 50 L/ha for aerial. Use high rate of Coragen under heavy pest pressure. Apply when rain is not expected in the next 24 hr. Minimum of 3 days between applications. Maximum 4 applications/yr. Do not exceed a total of 1.125 L of Coragen/ha/season. 12-hr restricted entry interval.
	lambda-cyhalothrin	Matador 120 EC	83–187 mL/ha (34–76 mL/acre)	21	<p>Ground or aerial application. For best results, apply in the early morning, before temperatures rise, or during the evening. Use 100–200 L water/ha for ground application, 20 L water/ha for aerial application. Spray no later than 10 days after egg hatch. Maximum 3 applications/yr. Do not make more than 2 applications of 83 mL/ha by air. 24-hr restricted entry interval.</p> <p>This product is toxic to bees when exposed to direct treatment, drift, or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.</p>
		Silencer 120 EC	83–187 mL/ha (33.6–75.7 mL/acre)		
lambda-cyhalothrin + chlorantraniliprole	Voliam Xpress	500 mL/ha (202 mL/ha)	14	<p>Ground or aerial application. Maximum of 3 applications/yr by ground, 1 application/yr by air. Apply in a minimum of 100–200 L of water/ha for ground applications, 40 L of water/ha for aerial applications.</p> <p>This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.</p>	

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Table 5–5. Control Options for Insects in Dry Edible Beans — Western Bean Cutworm, Tarnished Plant Bug

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
TARNISHED PLANT BUG (<i>Lygus lineolaris</i>) and <i>LYGUS</i> spp.					
Foliar Treatment					
<i>Lygus</i> spp. can sting the developing pods, resulting in damaged seeds. Monitor beans during the early pod-filling stages. A treatment may be required when there are 1–2 bugs per sweep later in the season.	dimethoate	Cygon 480 EC	0.7–1 L/ha (280–404 mL/acre)	7	Ground or aerial application. Do not feed treated threshings or crop refuse to livestock. Maximum 2 applications/yr. Some residual activity is expected from this product. This product is toxic to bees. Restrict application to the period after dark when bees are inside the hives, or in the early morning before the bees are foraging in the fields. DO NOT apply to such crops as alfalfa when in full bloom.
		Lagon 480 E			
	lambda-cyhalothrin	Matador 120 E	83 mL/ha (34 mL/acre)	21	Ground and aerial application. This product has no systemic activity. For best results, apply during the early morning, before temperatures rise, and during the evening. Use 100–200 L of water/ha for ground application. Use 20 L of water/ha for aerial applications. Do not graze or feed on treated forage. Maximum 3 applications/yr. 24-hr restricted entry interval. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.
		Silencer 120 EC	83 mL/ha (34 mL/acre)	14	Ground application only. This product has no systemic activity. For best results, apply during the early morning, before temperatures rise, and during the evening. Do not graze or harvest treated forage, straw or hay for livestock feed. Maximum 3 applications/yr. 24-hr restricted entry interval. This product is toxic to bees when exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.

DRY EDIBLE BEAN DISEASES

Table 5–6. Control Options for Seed and Seedling Diseases in Dry Edible Beans — Seedling Diseases, Pythium Damping-Off

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	Comments (label precautions, restricted entry intervals, etc.)
PYTHIUM DAMPING-OFF (<i>Pythium</i> spp.)				
Seed Treatment				
<p>This disease can occur on all soil types but losses are greatest on wet, clay soils. Minimize soil compaction and remove excess moisture through increased drainage. Treat seed with metalaxyl or metalaxyl-M, and plant into warm soils (16°C). Rotate 3–4 yr between bean crops.</p> <p>Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8. <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i>, on page 171, for more details.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	ethaboxam	INTEGO Solo	19.6 mL/ 100 kg seed	<p>For commercial and on-farm treating. Regulations under the Seeds Act require that an appropriate colourant be added when this product is applied to seed.</p> <p>For best results, use INTEGO Solo fungicide combined with other oomycete-active seed treatment fungicides, such as metalaxyl, to broaden the spectrum of activity. INTEGO Solo fungicide can also be used in combination with a broad-spectrum registered seed treatment fungicide having activity against <i>Rhizoctonia solani</i> and other fungal pathogens inciting seed and seedling disease.</p>
	fludioxonil + metalaxyl-M	Apron Maxx RFC	100 mL + 230 mL of water/ 100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. For anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
		Apron Maxx RTA	325 mL/ 100 kg seed	For both commercial seed treatment plants and on-farm treatment using standard gravity- or mist-type seed treatment equipment. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers prior to use. Ensure uniform coverage.
	metalaxyl	Allegiance FL	46–110 mL/ 100 kg seed	For use in commercial seed treatment facilities only. Do not graze or feed livestock on seeded area for 4 weeks after planting.
		Apron FL		
	metalaxyl-M	Apron XL LS	20–40 mL/ 100 kg seed	For use in commercial seed treatment facilities only. Do not use in hopper-box, planter-box, slurry-box or other non-commercial seed treatment applications at or immediately before planting. Do not graze or feed livestock on seeded area for 4 weeks after planting. Read label for information regarding resistant strains of fungus.
	metalaxyl-M + fludioxonil + sedaxane	Vibrance Maxx RFC	100 mL/ 100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. For anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
	penflufen + prothioconazole + metalaxyl	EverGol Energy	65 mL/ 100 kg seed	For commercial and on-farm treating. Uniform application is necessary for optimum product performance. This product contains no dye. An appropriate seed colourant must be applied. May be tank-mixed but see the label of the tank-mix partner for application rates, precautions and directions.
thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.	

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Table 5–7. Control Options for Seed and Seedling Diseases in Dry Edible Beans — Fusarium Seed and Root Rot

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	Comments (label precautions, restricted entry intervals, etc.)
SEED and SEEDLING DISEASES				
FUSARIUM SEED and ROOT ROT (<i>Fusarium solani</i> f. sp. <i>phaseoli</i>)				
Seed Treatment				
<p>Fusarium begins as small, reddish-brown lesions on the taproot that join to form larger lesions, or streaks, as the plant ages. The lesion can extend up to the soil line. The splitting of the tap root, crown and lower stem often reveals a brown-reddish internal discolouration of the water-conducting tissue.</p> <p>Longitudinal cracks and adventitious roots may develop on damaged plants. These adventitious roots are formed above the damaged area. Late infection seldom results in dead plants but rather in stunted, unthrifty-looking ones. Disease development is promoted by soil compaction, short crop rotations and moisture stress.</p> <p>Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8. <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i>, on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases. For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	carbathiin + thiram	Vitaflo 280	260 mL/100 kg seed	For commercial and on-farm treating. Ensure good seed coverage. This product will not control anthracnose if seed is severely infected.
	fludioxonil + metalaxyl-M	Apron Maxx RFC	100 mL + 230 mL of water/100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. For anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
		Apron Maxx RTA	325 mL/100 kg seed	For both commercial seed treatment plants and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers prior to use. Ensure uniform coverage.
	mandestrobin	S-2200 3.2FS	26 mL/100 kg seed	For commercial and on-farm treating. Regulations under the <i>Seeds Act</i> require that an appropriate colourant be added when this product is applied to seed. Ensure uniform seed coverage and do not apply this product in a hopper-box or planter-box at planting time. For resistance management, please note that S-2200 3.2 FS fungicide is a Group 11 fungicide. Any fungal population may contain individuals naturally resistant to S-2200 3.2 FS fungicide and other Group 11 fungicides.
	metalaxyl-M + fludioxonil + sedaxane	Vibrance Maxx RFC	100 mL/100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. For anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
	penflufen + prothioconazole + metalaxyl	EverGol Energy	65 mL/100 kg seed	For commercial and on-farm treating. Uniform application is necessary for optimum product performance. This product contains no dye. An appropriate seed colourant must be applied. May be tank-mixed but see the label of the tank-mix partner for application rates, precautions and directions.
	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/100 kg seed (2.5–5 g ai/100 kg seed)	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied. For additional anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
	trifloxystrobin	Trilex FS	21 mL/100 kg seed	For use in commercial seed treatment facilities only. Apply using standard commercial seed treatment equipment. Not for use in hopper-box, planter-box, slurry-box or similar seed treatment applications. Uniform application on seed is necessary to ensure seed safety and best disease protection.

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Table 5–8. Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, *Phytophthora* spp.

Integrated Pest Management Options		Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
LEGEND: PHI = Pre-Harvest Interval (in days) N/A = not applicable						
ANTHRACNOSE (<i>Colletotrichum lindemuthianum</i>)						
Seed Treatment						
Anthracnose is best controlled by planting disease-free seed and using a seed treatment containing Dynasty 100FS. Should disease still appear, use a foliar fungicide as a rescue treatment.	azoxystrobin	Dynasty 100FS	10 mL/ 100 kg seed	N/A	Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS . For additional disease control, use in combination with other fungicide seed treatments.	
	carbathiin + thiram	Vitaflo 280	260 mL/ 100 kg seed	N/A	Will not protect from wind-borne spores. This product will not control anthracnose if seed is severely infected. For commercial and on-farm treating. Do not graze or feed livestock on treated areas for 42 days after planting. Read label for information regarding resistant strains of fungus.	
Foliar Treatment						
Rainy weather favours this disease, as spores are splashed from diseased areas and carried in wind-borne water droplets or by surface water throughout the field. Take note of weather forecasts, as wet conditions over a prolonged period of time can result in epidemics. Timing of foliar fungicides is important. Apply treatment when disease first appears.	azoxystrobin	Quadris	500 mL/ha (200 mL/acre)	15	Ground and aerial application. Apply 1st application at early flower or when disease first appears. If necessary, re-apply 10–14 days later if disease persists. Maximum 2 applications/yr.	
	fluopyram + prothioconazole	Propulse	500–750 mL/ha (202–303 mL/acre)	14	Ground application only. Begin application preventively. When disease pressure is high, or when agronomic or weather conditions are conducive to disease development, continue applications as needed on a 7–14-day interval. Use shorter intervals in this range for best protection. When conditions for heavy infestation exist or when growing a less resistant cultivar, use the higher rate. Ensure good canopy penetration for optimum results. Do not exceed 1.5 L/ha/season (2 applications). Do not graze treated area and do not harvest for forage or hay.	
	picoxystrobin	Acapela	0.6–0.88 L/ha (1.48–2.17 mL/acre)	15	Begin applications prior to disease development and continue on a 7–14-day interval. Use higher rate and shorter interval when disease pressure is high.	
	pyraclostrobin	Headline EC	400 mL/ha (160 mL/acre)	30	Ground and aerial application. Apply when disease first appears. If necessary, re-apply 10–14 days later if disease persists. This product should not be tank-mixed with Lance, as precipitates can develop. To minimize risk of precipitates forming, use water >10°C and spray solution promptly. Maximum 2 applications per season.	
	pyraclostrobin + fluxapyroxad	Priaxor	0.3 L/ha (120 mL/acre)	30	Ground and aerial application. For optimal disease control, begin applications prior to disease development. Use a minimum water volume of 100 L/ha for ground application. Maximum 2 applications/yr. 12-hr restricted entry interval.	

DRY EDIBLE BEAN DISEASES

Table 5–8. Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, *Phytophthora* spp.

LEGEND: PHI = Pre-Harvest Interval (in days)

N/A = not applicable

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
PHYTOPHTHORA spp. — Suppression only					
Seed Treatment					
See Table 2–9. <i>Control Options for Diseases in Soybeans</i> — <i>Phytophthora Root Rot</i> , on page 53.	ethaboxam	INTEGO Solo	19.6 mL/ 100 kg seed	N/A	For commercial and on-farm treating. Regulations under the <i>Seeds Act</i> require that an appropriate colourant be added when this product is applied to seed. For best results, use INTEGO Solo fungicide combined with other oomycete-active seed treatment fungicides, such as metalaxyl, to broaden the spectrum of activity. INTEGO Solo fungicide can also be used in combination with a broad-spectrum registered seed treatment fungicide having activity against <i>Rhizoctonia solani</i> and other fungal pathogens inciting seed and seedling disease.

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Table 5–9. Control Options for Seed and Seedling Diseases in Dry Edible Beans — Rhizoctonia

Integrate Pest Management Options	Active Ingredient	Trade Name	Rate	Comments (label precautions, restricted entry intervals, etc.)
RHIZOCTONIA (<i>Rhizoctonia solani</i>)				
Seed Treatment				
<p>This disease occurs when conditions are cool and wet during planting or when these conditions result in a delay in seedling emergence or development. Mid-to-late-season moisture stress (dry conditions) can increase the disease incidence. Management practices include: (1) selecting varieties with good general tolerance to root rots, (2) promoting root growth through a good fertility program, (3) rotating crop (3 yr between bean crops), (4) not overworking the soil and avoiding working it when it is wet, (5) removing excessive water through increased tile drainage and minimizing compaction and (6) applying seed treatments that protect the plant during germination and early growth. Consult your seed company for variety information.</p> <p>Due to the threat of anthracnose infection to this crop, ALL edible bean seed should be treated with Dynasty 100FS. See Table 5–8, <i>Control Options for Seed and Seedling Diseases in Dry Edible Beans — Anthracnose, Phytophthora spp.</i>, on page 171, for more details. Other seed treatment products may be needed to protect against other edible bean diseases.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	azoxystrobin	Dynasty 100FS	10 mL/ 100 kg seed	One application as a seed treatment. For additional disease control, use in combination with Apron Maxx RFC or Cruiser Maxx Beans.
	carbathiin + thiram	Vitaflo 280	260 mL/ 100 kg seed	For commercial and on-farm treating. Ensure good seed coverage. Do not graze or feed livestock on treated areas for 42 days after planting. Read label for information regarding resistant strains of fungus.
	fludioxonil + metalaxyl-M	Apron Maxx RFC	100 mL + 230 mL of water/ 100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting.
		Apron Maxx RTA	325 mL/ 100 kg seed	For both commercial seed treatment plants and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers prior to use. Ensure uniform coverage.
	mandestrobin	S-2200 3.2FS	26 mL/ 100 kg seed	For commercial and on-farm treating. Regulations under the <i>Seeds Act</i> require that an appropriate colourant be added when this product is applied to seed. Ensure uniform seed coverage and do not apply this product in a hopper-box or planter-box at planting time. For resistance management, please note that S-2200 3.2 FS fungicide is a Group 11 fungicide. Any fungal population may contain individuals naturally resistant to S-2200 3.2 FS fungicide and other Group 11 fungicides.
	metalaxyl-M + fludioxonil + sedaxane	Vibrance Maxx RFC	100 mL/ 100 kg seed	For commercial and on-farm treating. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. For anthracnose control, tank-mix with 10 mL of Dynasty 100FS/100 kg seed.
	penflufen + prothioconazole + metalaxyl	EverGol Energy	65 mL/ 100 kg seed	For commercial and on-farm treating. Uniform application is necessary for optimum product performance. This product contains no dye. An appropriate seed colourant must be applied. May be tank-mixed but see the label of the tank-mix partner for application rates, precautions and directions.
	thiamethoxam + metalaxyl-M + fludioxonil + sedaxane	Cruiser Maxx Beans + Vibrance 500 FS (sold as a co-pack: Cruiser Maxx Vibrance Beans)	195 mL + 5–10 mL/ 100 kg seed (2.5–5 g ai/ 100 kg seed)	For use in commercial seed treatment facilities only. Compatible with <i>Rhizobium</i> -based inoculants. Check with inoculant manufacturers for details prior to use. Do not graze or feed livestock on treated areas for 45 days after planting. This product contains no colourant. An appropriate colourant must be added when this product is applied.
	trifloxystrobin	Trilex FS	21 mL/ 100 kg seed	For use in commercial seed treatment facilities only. Apply using standard commercial seed treatment equipment. Not for use in hopper-box, planter-box, slurry-box or similar seed treatment applications. Uniform application on seed is necessary to ensure seed safety and best disease protection.

DRY EDIBLE BEAN DISEASES

Table 5–10. Control Options for Foliar, Stem and Pod Diseases in Dry Edible Beans — Asian Soybean Rust

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
ASIAN SOYBEAN RUST (<i>Phakopsora pachyrhizi</i>)					
Foliar Treatment					
Edible beans are a host for Asian soybean rust. The extent to which these crops are impacted has yet to be determined. See Table 2–16. <i>Control Options for Diseases in Soybeans — Asian Soybean Rust</i> , on page 64, for more details on this disease.	azoxystrobin	Quadris	500 mL/ha (200 mL/acre)	15	Ground and aerial application. Apply 1st application at early flower or when disease first appears. If necessary, re-apply 10–14 days later if disease persists. Maximum 2 applications/yr.
	azoxystrobin + propiconazole	Quilt	1.0–1.5 L/ha (404–600 mL/acre)	30	Ground and aerial application. Make the first application at the first sign of disease. Apply the high rate only under conditions of high disease pressures. A second application at a 14-day interval may be needed if disease persists. Good spray coverage and canopy penetration are important for best results. Apply in a minimum of 45 L of water/ha for ground application. See label for resistance management strategy. Maximum 2 applications/yr.
	fluopyram + prothioconazole	Propulse	500–750 mL/ha (202–303 mL/acre)	14	Ground application only. Begin application preventively. When disease pressure is high, or when agronomic or weather conditions are conducive to disease development, continue applications as needed on a 7–14-day interval. Use shorter intervals in this range for best protection. When conditions for heavy infestation exist or when growing a less resistant cultivar, use the higher rate. Ensure good canopy penetration for optimum results. Do not exceed 1.5 L/ha/season (2 applications). Do not graze treated area and do not harvest for forage or hay.
	penthiopyrad	Vertisan	1–1.75 L/ha (0.4–0.7 L/acre)	21	Ground and aerial application. Begin applications prior to disease development and continue on a 7–14-day interval. Use higher rate and shorter interval when disease pressure is high. Do not apply more than 2 sequential applications before switching to a fungicide with a different mode of action. Maximum 3 L/ha/yr. 12-hr restricted entry interval.
	picoxystrobin	Acapela	0.6–0.88 L/ha (240–350 mL/acre)	14	Ground and aerial application. Apply prior to disease development and continue on a 7–14-day interval. Use high rate and shorter interval when disease pressure is high. Apply no more than 1 application before switching to a fungicide with a different mode of action. Maximum 1.75 L/ha/season. 12-hr restricted entry interval.
	propiconazole	Tilt 250 E	500–750 mL/ha (200–300 mL/acre)	30	Ground and aerial application. Make first application at the first sign of disease followed by a second application 14 days after the first application, if environmental conditions continue to be favourable for disease development. See label for resistance management strategy. Maximum 2 applications/yr.
	pyraclostrobin	Headline EC	400–600 mL/ha (160–240 mL/acre)	30	Ground and aerial application. Classified as a strobilurin fungicide; use in a preventive fungicide program (pre-infection). See label for resistance management strategy. Maximum 2 applications/yr.
	pyraclostrobin + fluxapyroxad	Priaxor	0.3–0.45 L/ha (120–160 mL/acre)	30	Ground and aerial application. For optimal disease control, begin applications prior to disease development. Use a minimum water volume of 100 L/ha for ground application. Maximum 2 applications/yr. 12-hr restricted entry interval.

DRY EDIBLE BEAN DISEASES

Table 5-11. Control Options for Foliar, Stem and Pod Diseases in Dry Edible Beans — Bean Rust

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)	
BEAN RUST (<i>Uromyces appendiculatus</i>)						
Foliar Treatment						
<p>This disease is extremely rare in Ontario, arriving late in the season. Some dry bean market classes (e.g., pinto beans) can be very susceptible to rust. Consult your seed company for variety information or www.gobeans.ca for more information.</p> <p>If rust arrives during flowering and early pod set, a treatment may be necessary.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	copper octanoate	Cueva	0.5%–2% solution, applied at 470–940 L/ha	1	Ground application only. For best control, begin treatment 2 weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears and repeat at 5–10-day intervals. Maximum 15 applications/yr. 4-hr restricted entry interval.	
	propiconazole	Bumper 432 EC	300 mL/ha (121 mL/acre)	30	Ground and aerial application. Apply when disease is first detected. Maximum 2 applications/yr.	
		Nufarm Propiconazole				
			Tilt 250 E	500 mL/ha (200 mL/acre)	30	Ground and aerial application. Apply when disease is first detected. Maximum 2 applications/yr.
	pyraclostrobin		Headline EC	400–600 mL/ha (160–240 mL/acre)	30	Ground and aerial application. Apply when disease first appears. If necessary, re-apply 10–14 days later if disease persists. Do not tank-mix with Lance, as precipitates can develop. Maximum 2 applications/yr.
pyraclostrobin + fluxapyroxad		Priaxor	0.3 L/ha (120 mL/acre)	30	Ground and aerial application. For optimal disease control, begin applications prior to disease development. Use a minimum water volume of 100 L/ha for ground application. Maximum 2 applications/yr. 12-hr restricted entry interval.	

DRY EDIBLE BEAN DISEASES

Table 5–12. Control Options for Foliar, Stem and Pod Diseases in Dry Edible Beans — White Mould

LEGEND: PHI = Pre-Harvest Interval (in days)

— = no information on label

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
WHITE MOULD (<i>Sclerotinia sclerotiorum</i>)					
<p>Avoid soybeans, canola and other hosts in a 3-yr rotation, since these crops are susceptible to white mould. Rotate with non-host crops such as wheat, corn and barley. In fields with a history of the disease, select varieties with an upright structure. Lower plant populations and increased row width promote rapid drying of the plants and soil surface and therefore reduce potential for infection. Avoid excess fertilization. Those fields at risk have a past history of white mould and above-average foliage growth. All products must be used as a preventive measure, as they will not be effective once the disease is present.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	<i>Bacillus subtilis</i> QST 713 strain	Serenade OPTI	1.7–3.3 kg/ha (0.69–1.34 kg/acre)	0	Provides suppression only. Good option for organically grown beans. Ground and aerial application. Make the first application at planting (or immediately following planting but prior to crop emergence). Make a second 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 at 7–10-day intervals if conditions for disease development persist.
	boscalid	Lance	560–770 g/ha (227–312 g/acre)	21	Ground and aerial application. Best used as a preventive measure. Apply at 20%–50% flowering. Apply a second time 7–10 days later, up to 50% flowering, if disease persists or weather conditions are favourable for disease development. Do not tank-mix with Headline, as precipitates can develop. Plant-back interval of 14 days for crops not on label. 4-hr restricted entry interval.
	boscalid + prothioconazole	Cotegra	0.7 L/ha (280 mL/acre)	21	Provides suppression only. Ground and aerial application. For optimal disease control, begin applications prior to disease development. Use a minimum water volume of 100–200 L/ha for ground application. Ensure thorough coverage of foliage. Apply a second time 7–14 days later if disease persists, or weather conditions are favourable for disease development. Use shorter interval when disease pressure is high. Maximum 2 applications/yr.
	<i>Coniothyrium minitans</i>	Contans WG	0.5–4 kg/ha (0.20–1.6 kg/acre)	0	Provides suppression only. Good option for organically grown beans. Ground application only. This product should be applied at least 3 months prior to anticipated outbreak (e.g., prior to planting). Product should be incorporated as thoroughly as possible to a depth of 5–20 cm. Rate should be increased to 2–4 kg/ha (0.8–1.6 kg/acre) if incorporated to a depth greater than 5 cm. A post-harvest application may be applied in the fall to treat the soil prior to spring planting of a susceptible crop. Treated soils in the fall should not be disturbed to avoid bringing untreated sclerotia from lower soil layers to the top soil layer. Maximum 2 applications/yr.
	dicloran	Botran 75 WP	3.25 kg/ha (1.3 kg/acre)	2	Begin application when disease is anticipated, usually close to full bloom. Do not feed treated bean refuse to livestock.
	fluazinam	Allegra 500F	0.6–1.0 L/ha (243–404 mL/acre)	14	Ground and aerial application. Best used as a preventive measure. Apply when plants are at early to mid-bloom (10%–30% bloom) and with repeat application, if necessary, 7–10 days later. Use sufficient water to ensure thorough coverage of foliage. Maximum 2 applications/yr and maximum of 2 L of product per season. 24-hr restricted entry interval.

DRY EDIBLE BEAN DISEASES

Table 5–12. Control Options for Foliar, Stem and Pod Diseases in Dry Edible Beans — White Mould

LEGEND: PHI = Pre-Harvest Interval (in days) — = no information on label

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
WHITE MOULD (<i>Sclerotinia sclerotiorum</i>) (continued)					
(continued)	fluopyram + prothioconazole	Propulse	750 mL/ha (303 mL/acre)	14	Ground application only. Begin applications preventively. When disease pressure is high, or when agronomic or weather conditions are conducive to disease development, continue applications as needed on a 7–14-day interval. Use shorter intervals for best protection. Ensure good penetration for optimum results. Do not exceed 1.5 L/ha/season (2 applications). Do not graze treated area and do not harvest for forage or hay.
	iprodione	Rovral WP	1.0–1.5 kg/ha (0.4–0.6 kg/acre)	14	Apply at 25%–75% bloom. Do not feed treated bean refuse to livestock. 12-hr restricted entry interval.
	metconazole	Quash	280 g/ha (113.3 g/acre)	21	Ground and aerial application. 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 (minimum 7-day interval). Do not make more than 2 applications or apply more than 560 g/ha per season.
	picoxystrobin	Acapela	0.88 L/ha (350 mL/acre)	14	Ground and aerial application. Make preventive application at 100% bloom (1 flower blooming on all plants) and follow with second application 7–10 days later at full bloom. Apply no more than 1 application before switching to a fungicide with a different mode of action. Maximum 1.75 L/ha/season. 12-hr restricted entry interval.
	thiophanate-methyl	Senator 70 WP	1.75–2.25 kg/ha (700–900 g/acre)	14	Apply when conditions favouring development of disease exist (warm, humid weather combined with heavy, dense crop foliage). Do not feed treated bean refuse to livestock.

DRY EDIBLE BEAN DISEASES

Table 5–13. Control Options for Halo Blight, Common Blight, Brown Spot and Powdery Mildew

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
HALO BLIGHT (<i>Pseudomonas syringae</i> pv. <i>phaseolicola</i>)					
Foliar Treatment					
<p>Check with your seed supplier for dry bean varieties resistant to common bacterial blight or halo blight. The bacteria usually do not overwinter in the field. However, to be safe, allow 1 year between susceptible crops. Do not plant seed that has been harvested from infected fields or plant crop next to a field that had significant blight in the previous year. Incorporate infected bean debris into the soil after harvest. Bacterial blights spread easily when plants are wet from rain or dew. Stay out of wet fields with equipment and workers. Clean cultivators when moving from field to field.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	copper octanoate	Cueva	0.5%–2% solution, applied at 470–940 L/ha	1	Ground application only. For best control, begin treatment 2 weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears and repeat at 5–10-day intervals. Maximum 15 applications/yr. 4-hr restricted entry interval.
COMMON BLIGHT (<i>Xanthomonas campestris</i> pv. <i>phaseoli</i>)					
<p>Check with your seed supplier for dry bean varieties resistant to common bacterial blight or halo blight. The bacteria usually do not overwinter in the field. However, to be safe, allow 1 year between susceptible crops. Do not plant seed that has been harvested from infected fields or plant crop next to a field that had significant blight in the previous year. Incorporate infected bean debris into the soil after harvest. Bacterial blights spread easily when plants are wet from rain or dew. Stay out of wet fields with equipment and workers. Clean cultivators when moving from field to field.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	copper octanoate	Cueva	0.5%–2% solution, applied at 470–940 L/ha	1	Ground application only. For best control, begin treatment 2 weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears and repeat at 5–10-day intervals. Maximum 15 applications/yr. 4-hr restricted entry interval.
BROWN SPOT (<i>Pseudomonas syringae</i> pv. <i>syringae</i>)					
<p>This disease has been increasing, especially in specialty bean types.</p> <p>Leaf lesions often don't appear water soaked and are much smaller than common bacterial blight and halo blight. When the disease becomes systemic, tan and sunken lesions with reddish-brown borders develop on stems and petioles. Pods may appear bent or have water-soaked lesions with a reddish-brown margin.</p> <p>For more information, see OMAFRA Publication 811, <i>Agronomy Guide for Field Crops</i>.</p>	copper octanoate	Cueva	0.5%–2% solution, applied at 470–940 L/ha	1	Ground application only. For best control, begin treatment 2 weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears and repeat at 5–10-day intervals. Maximum 15 applications/yr. 4-hr restricted entry interval.

DRY EDIBLE BEAN DISEASES

Table 5–13. Control Options for Halo Blight, Common Blight, Brown Spot and Powdery Mildew

LEGEND: PHI = Pre-Harvest Interval (in days)

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, restricted entry intervals, etc.)
POWDERY MILDEW (<i>Erysiphe</i> spp.)					
See Table 2–15. <i>Control Options for Diseases in Soybeans</i> — <i>Powdery Mildew</i> , on page 63, for information.	copper octanoate	Cueva	0.5%–2% solution, applied at 470–940 L/ha	1	Ground application only. For best control, begin treatment 2 weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears and repeat at 5–10-day intervals. Maximum 15 applications/yr. 4-hr restricted entry interval.

