3. Forages

FORAGE CROP INSECTS

Table 3–1. Chemical Control Options for Insects in Forage Crops — Alfalfa Snout Beetle, Alfalfa Weevil

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

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, re-entry periods, etc.)
ALFALFA SNOUT BEETLE (*Otiorhynchus ligustici*)					
No chemical control options available. See OMAFRA Publication 811, *Agronomy Guide for Field Crops*, for management information.					
ALFALFA WEEVIL (*Hypera postica Gyll*)					
Foliar Treatment					
First cut: If there is 40% leaf-tip feeding, with 2 or 3 active weevils per stem, and there are more than 7–10 days to preferred harvest date, consider applying an insecticide. ("Leaf-tip feeding" refers to the percent of plant tips showing obvious signs of damage, which is not to be confused with the percent defoliation.) Less than 1 active larva per stem does not require action, but continue to monitor the situation. Two larvae per stem requires action if the alfalfa is less than 40 cm high. If there are more than 3 active larvae, immediate action is required. **Second Cut:** If damage was serious on first cut, feeding may continue. Check early regrowth carefully for damage and larvae. Natural enemies are generally highly effective at controlling this pest. For the safety of these natural enemies, chemical control should not be considered unless pest population exceeds the action threshold. See OMAFRA Publication 811, *Agronomy Guide for Field Crops*, for more information.	lambda-cyhalothrin	Matador 120 E	83 mL/ha (34 mL/acre)	livestock foraging: 3	**For use in alfalfa only.** Ground and aerial application. Allow 7 days between treatments. Alfalfa seed from treated crop is not to be used for production of alfalfa sprouts for human consumption. Maximum 3 applications/yr. Do not apply more than 1 application by air. 24-hr re-entry period. 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)	livestock foraging: 3	**For use in alfalfa only. Ground application only.** Allow 7 days between treatments. Alfalfa seed from treated crop is not to be used for production of alfalfa sprouts for human consumption. Maximum 3 applications/yr. 24-hr re-entry period. 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.
	phosmet	Imidan 50 WP	2.25 kg/ha (900 g/acre)	7	**For use in alfalfa only. Ground application only. DO NOT** apply during bloom. Maximum 3 applications/yr. Do not apply more than 1 application per cutting. 5-day re-entry period. Toxic to bees. Do not apply to flowering crops or weeds if bees are visiting the treatment area.
	chlorantraniliprole	Coragen	375–500 mL/ha (151–202 mL/acre)	0	**Provides suppression only. For use in alfalfa only. Ground application only.** Begin applications when treatment thresholds have been reached. Thorough coverage is important. Use a minimum of 100 L/ha of water by ground. Maximum 1 application per cutting. 12-hr re-entry period.

FORAGE CROP INSECTS

Table 3–2. Chemical Control Options for Insects in Forage Crops — Potato Leafhopper, European Skipper, Grasshoppers

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

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, re-entry periods, etc.)
POTATO LEAFHOPPER (*Empoasca fabae*)					
Leafhopper damage is most severe in new seedings and during regrowth after cutting, particularly when the weather is hot and dry. Resistant varieties have glandular hairs on the leaves and stems. Use chemical control only if leafhoppers exceed the threshold, as insecticides will also kill beneficial insects, the natural enemies of alfalfa weevil and lygus bug. See OMAFRA Publication 811, *Agronomy Guide for Field Crops,* for thresholds.	dimethoate	Cygon 480 EC Lagon 480 EC	425 mL/ha (170 mL/acre)	2	Ground and aerial application. Maximum 2 applications/yr. 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.
	lambda-cyhalothrin	Matador 120 E	83 mL/ha (34 mL/acre)	livestock foraging: 3	**For use in alfalfa only.** Ground and aerial application. Allow 7 days between treatments. Alfalfa seed from treated crop is not to be used for production of alfalfa sprouts for human consumption. Maximum 3 applications/yr. Do not apply more than 1 application by air. 24-hr re-entry period. 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)	livestock foraging: 3	**For use in alfalfa only. Ground application only.** Allow 7 days between treatments. Alfalfa seed from treated crop is not to be used for production of alfalfa sprouts for human consumption. Maximum 3 applications/yr. Do not apply more than 1 application by air. 24-hr re-entry period. 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.
EUROPEAN SKIPPER (*Thymelicus lineola*)					
If 6–8 larvae in a 30-cm-x-30-cm area are found, and larvae are still small, treat the field or the infested area. See OMAFRA Publication 811, *Agronomy Guide for Field Crops*, for scouting procedures.	*Bacillus thuringiensis* (Bt)	Dipel 2X DF	140–275 g/ha (60–115 g/acre)	0	**For use in timothy only.**
		Thuricide HPC	2.25 L/ha (900 mL/acre)	0	For use in timothy and other forage grasses.
GRASSHOPPERS (Various species)					
Begin scouting in late June when grasshoppers are still young. Spraying insecticides on alfalfa will also kill the natural enemies of alfalfa weevil and lygus bugs.	lambda-cyhalothrin	Matador 120 E Silencer 120 EC	63–83 mL/ha (26–34 mL/acre)	livestock foraging: 3	**For use in alfalfa only.** Ground and aerial application. Allow 7 days between treatments. Alfalfa seed from treated crop is not to be used for production of alfalfa sprouts for human consumption. Maximum 3 applications/yr. Do not apply more than 1 application by air. 24-hr re-entry period. 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.
	malathion	Malathion 500 EC	2.25–2.75 L/ha (0.9–1.1 L/acre)	7	For use in alfalfa and clover. Apply when 75% of foliage shows feeding damage. Product is less effective when temperatures are below 20°C. Toxic to bees exposed to direct treatment, drift or residues on flowering crops or weeds. **DO NOT** apply this product to flower 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.

FORAGE CROP INSECTS

Table 3–3. Chemical Control Options for Insects in Forage Crops — Alfalfa Blotch Leafminer, Armyworm

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

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, re-entry periods, etc.)
ALFALFA BLOTCH LEAFMINER (*Agromyza frontella*)					
Foliar Treatment					
Natural enemies are highly effective at controlling this pest. For the safety of these natural enemies, chemical control is not recommended unless pest population exceeds the action threshold. See OMAFRA Publication 811, *Agronomy Guide for Field Crops*, for more information.	dimethoate	Cygon 480 E Lagon 480 E	550 mL/ha (220 mL/acre)	2	Ground and aerial application. Maximum 2 applications/yr. 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.
	phosmet	Imidan 50 WP	2.25 kg/ha (900 g/acre)	7	**For use in alfalfa only. Ground application only.** Maximum 3 applications/yr. **DO NOT** apply more than 1 application per cutting. 5-day re-entry period. Toxic to bees. **DO NOT** apply to flowering crops or weeds if bees are visiting the treatment area.
ARMYWORM (TRUE — *Pseudaletia unipuncta*, FALL — *Spodoptera frugiperda*)					
Control is warranted when 5 or more larvae (smaller than 2.5 cm) per 30 cm x 30 cm (1 ft^2) are found. Avoid treating with insecticides when large numbers of parasitized larvae are present. In seedling crops, 2–3 larvae (smaller than 2.5 cm) per 30 cm x 30 cm may warrant control. If larvae have white eggs attached to them, they are parasitized and may not need treatment. If the larvae are almost full grown (2.5 cm or larger), there is no benefit in applying insecticide since most of the feeding damage has already been done.	carbaryl	Sevin XLR Plus	2.5–5.25 L/ha (1.0–2.1 L/acre)	2	For use in alfalfa, clover and forage grasses. 1-day re-entry period for beef cattle. 2-day re-entry period for dairy cattle. This product is highly toxic to honeybees exposed to direct treatment on blooming crops or weeds. Apply SEVIN XLR PLUS from late evening to early morning or when bees are not foraging.
	chlorantraniliprole	Coragen	250–375 mL/ha (101–151 mL/acre)	0	**For use in grass forages for seed production only. Ground application only.** Begin applications when treatment thresholds have been reached. Thorough coverage is important. Use a minimum of 100 L/ha of water by ground. Do not feed treated crop to livestock. Maximum 1 application/cutting. Maximum 4 applications/yr. 12-hr re-entry period.

FORAGE CROP DISEASES

Table 3–4. Chemical Control Options for Seed and Root Rot Diseases in Forage Crops — Phythophthora Root Rot, Pythium Damping-Off

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	Comments (label precautions, re-entry periods, etc.)
PHYTOPHTHORA ROOT ROT (*Phytophthora medicaginis*)				
Seed Treatment				
Plant resistant varieties that are treated with metalaxyl or metalaxyl-M. Consult with your seed company and the Ontario Forage Crops Committee Variety Trial Results at GoForages.ca for variety profiles. Drain excess moisture from soil and avoid compaction. Avoid other stresses such as insects, weeds and untimely cuttings that may stress the plants and make them more susceptible to phytophthora. Do not cut during wet conditions. Crop rotation has little effect on the disease. Promote lateral root growth by following a good fertility program.	metalaxyl-M	Apron XL LS	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	Allegiance FL Apron FL	46–110 mL/ 100 kg seed	For commercial and on-farm treating. Do not graze or feed livestock on seeded area for 4 weeks after planting.
PYTHIUM DAMPING-OFF (*Pythium* spp.)				
Seed Treatment				
Drain excess moisture from the soil and avoid compaction. Plant seed when soil and weather conditions favour rapid emergence and early growth of seedlings. Increase plant populations to compensate for any plant losses.	metalaxyl-M	Apron XL LS	forage grasses: 20–40 mL/ 100 kg seed alfalfa, clover, trefoil, vetch: 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 on resistant strains of fungus.
	metalaxyl	Allegiance FL Apron FL	46–110 mL/ 100 kg seed	For commercial and on-farm treating. Do not graze or feed livestock on seeded area for 4 weeks after planting.

FORAGE CROP DISEASES

Table 3–5. Chemical Control Options for Foliar and Stem Diseases in Forage Crops — Verticillium Wilt, White Mould/Blossom Blight

LEGEND: PHI = Pre-Harvest Interval (in days) N/A = not applicable

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, re-entry periods, etc.)
VERTICILLIUM WILT (*Verticillium albo-atrum*)					
Seed Treatment					
Planting resistant or highly resistant varieties is the best means of control for this disease. Consult with your seed company and the Ontario Forage Crops Committee Variety Trial Results at www.uoguelph.ca/plant/performance_recommendations/ofcc/ofcc.htm for variety profiles. The fungus is spread primarily on the cutting bar of forage harvesting equipment. Before harvesting, clean the cutting bar with a 1% solution of bleach followed by a clean water rinse and oil spray. Cut the youngest fields first, working towards the oldest fields. Wait 2–3 yr between alfalfa crops. Maintain a good weed control program, since some weeds can be alternate hosts.	thiram	Thiram 75 WP	360 g/ 100 kg seed	N/A	**For use on alfalfa only.** Do not graze treated areas or feed clippings from treated areas to livestock.
WHITE MOULD/BLOSSOM BLIGHT (*Sclerotinia sclerotiorum/Botrytis cinerea*)					
Foliar Treatment					
There are some differences in white mould susceptibility between cultivars. Check with your seed company for disease ratings. Fields established under minimum tillage may have more disease incidence. Spring planting may reduce disease incidence.	boscalid	Lance	420 g/ha (170 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at 20%–50% flowering. Apply every 7–14 days if disease persists or weather conditions are favourable for disease development. Do not graze or feed treated hay to livestock. Maximum 3 applications/yr. 12-hr re-entry period.
	penthiopyrad	Fontelis	1.25–1.75 L/ha (500–700 mL/acre)	N/A	Ground and aerial application. Make initial application prior to disease development and continue on a 7–14-day interval. Use higher rate and shorter interval when disease pressure is high. Make no more than 2 sequential applications of Fontelis before switching to a fungicide with a different mode of action. Maximum 3.5 L/ha/yr. 12-hr re-entry period.
	pyraclostrobin + fluxapyroxad	Priaxor	0.45 L/ha (180 mL/acre)	21	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at the beginning of flowering (10%–30% bloom) or at the onset of disease. Maximum 1 applications/yr. 12-hr re-entry period.

FORAGE CROP DISEASES

Table 3–6. Chemical Control Options for Foliar and Stem Diseases in Forage Crops — Common Leaf Spot, Leaf Spot, Spring Black Stem

LEGEND: PHI = Pre-Harvest Interval (in days) N/A = not applicable

Integrated Pest Management Options	Active Ingredient	Trade Name	Rate	PHI	Comments (label precautions, re-entry periods, etc.)
COMMON LEAF SPOT (*Pseudopeziza medicaginis*)					
Foliar Treatment					
Timely harvesting of forages is important to reduce leaf loss and minimize disease in the re-growth. There are no practical control strategies available for leaf spot diseases in forages. Balance the time of harvest between the optimum stage for highest protein (bud stage in alfalfa) and the level of leaf spot disease, as leaf spot can reduce the protein level in legume leaves.	boscalid	Lance	420 g/ha (170 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at 20%–50% flowering. Apply every 7–14 days if disease persists or weather conditions are favourable for disease development. Do not graze or feed treated hay to livestock. Maximum 3 applications/yr. 12-hr re-entry period.
	mancozeb	Dithane DG Rainshield NT	1.46 kg/ha (584 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply prior to 50% bloom. Repeat 7–10 days after 1st application and 10 days after second application. Do not graze treated crop or cut for hay. Maximum 3 applications/yr.
	pyraclostrobin + fluxapyroxad	Priaxor	0.3 L/ha (120 mL/acre)	21	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at the beginning of flowering (10%–30% bloom) or at the onset of disease. Maximum 1 applications/yr. 12-hr re-entry period.
LEAF SPOT (*Leptosphaerulina trifolii*)					
Foliar Treatment					
Timely harvesting of forages is important to reduce leaf loss and minimize disease in the re-growth. There are no practical control strategies available for leaf spot diseases in forages. Balance the time of harvest between the optimum stage for highest protein (bud stage in alfalfa) and the level of leaf spot disease, as leaf spot can reduce the protein level in legume leaves.	boscalid	Lance	420 g/ha (170 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at 20%–50% flowering. Apply every 7–14 days if disease persists or weather conditions are favourable for disease development. Do not graze or feed treated hay to livestock. Maximum 3 applications/yr. 12-hr re-entry period.
	mancozeb	Dithane DG Rainshield NT	1.46 kg/ha (584 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply prior to 50% bloom. Repeat 7–10 days after 1st application and 10 days after second application. Do not graze treated crop or cut for hay. Maximum 3 applications/yr.
SPRING BLACK STEM (*Phoma medicaginis*)					
Foliar Treatment					
This disease is favoured by cool, wet weather conditions.	boscalid	Lance	420 g/ha (170 g/acre)	N/A	**For use in alfalfa for seed production only.** Ground and aerial application. Apply at 20%–50% flowering. Apply every 7–14 days if disease persists or weather conditions are favourable for disease development. Do not graze or feed treated hay to livestock. Maximum 3 applications/yr. 12-hr re-entry period.