



PROTECTION GUIDE FOR TURFGRASS

2017

Publication 384

Discard old editions of this publication. Each year the appropriate sub-committee of the Ontario Pest Management Research and Services Committee reviews the pesticides listed in this publication.

To the best knowledge of the committee, at the time of printing, the pesticide products listed in this publication were:

- **federally registered**
- **classified by the Ministry of the Environment and Climate Change (MOECC)**

The information in this publication is general information only. The Ontario Ministry of Agriculture, Food and Rural Affairs does not offer any warranty or guarantee, nor does it 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.

This publication lists a number of brand names of pesticides. It is neither an endorsement of the product nor a suggestion that similar products are ineffective.

The Pesticide Label

Consult each product label before you use a pesticide. The label provides specific information on how to use the product safely, hazards, restrictions on use, compatibility with other products, the effect of environmental conditions, etc.

**The pesticide product label is a legal document.
Follow all label directions.**

Registration of Pesticide Products

The Pest Management Regulatory Agency (PMRA) of Health Canada registers pesticide products for use in Canada following an evaluation of scientific data to ensure that the product has merit and value, and the human health and environmental risks associated with its proposed use are acceptable.

1. Full Registration

Pesticide registrations are normally granted for a period of 5 years, subject to renewal.

2. Conditional Registration

Conditional registration may be granted for a specified, limited time period, where the registrant agrees to produce additional scientific or technical information.

3. Emergency Registration

An emergency registration is a temporary, time-limited registration of no more than 1 year, approved to deal with serious pest outbreaks that have limited control options.

Maximum Residue Limits

The PMRA has established maximum residue limits (MRLs) for pesticides. Processors or retailers may demand more restrictive limits. Growers should seek advice of their intended market to determine if more restrictive limitations apply. Keep accurate and up-to-date records on pesticide use in each crop.

Supplemental Labels

You **MUST** obtain a supplemental label and follow all the label directions when PMRA approves new uses for a registered pesticide that do not appear on the current label.

Examples of when you must use a supplemental label include:

- **Emergency Use Registration**
- **Minor Use Label Expansion**

You can obtain a copy of a supplemental label from the pesticide manufacturer or pesticide vendor, the grower association that sponsored the emergency registration or minor use, from OMAFRA or PMRA's Pest Management Information Service.

For more information on the federal registration status, search Pest Management Regulatory Agency at www.canada.ca or call 1-800-267-6315.

Regulation of Pesticides in Ontario

The MOECC is responsible for regulating pesticide sale, use, transportation, storage and disposal in Ontario. Ontario regulates pesticides by placing appropriate education, licensing and/or permit requirements on their use, under the Pesticides Act and Regulation 63/09.

All pesticides must be used in accordance with requirements under the Pesticides Act and Regulation 63/09, which are available on the e-laws website at ontario.ca/e-laws or by calling the ServiceOntario Publications Toll-Free number: 1-800-668-9938 or 416-326-5300.

Classification of Pesticides

The Ontario Pesticides Advisory Committee (OPAC) is responsible for reviewing and recommending to the MOECC, the classification of pesticide products before they can be sold or used in Ontario. Once approved by the MOECC, classified products are posted on the MOECC website: ontario.ca/pesticides.

Certification and Licensing

Growers and Their Assistants

For information about certification for growers and training for assistants, check the Ontario Pesticide Education Program website: www.o pep.ca or call 1-800-652-8573.

Commercial Applicators (Exterminators) and Their Assisting Technicians

For more information about exterminator licensing and technician training, visit:

- the Ontario Pesticide Training and Certification website at www.ontariopesticide.com/index.cfm/home-page or call 1-888-620-9999 or 519-674-1575
- the Pesticide Industry Council's Pesticide Technician Program website at www.hort-trades.com or call 1-800-265-5656 or e-mail pic@hort-trades.com
- the Pesticide Industry Regulatory Council (PIRC) at www.oipma.ca

Cette publication est aussi disponible en français.

2. Crop Protection: Diseases, Insects and Other Pests

Fungicides and insecticides are only two of the many tools that can be used to control diseases and insects in turf. These products should be used as part of an integrated pest management (IPM) program. For more information on IPM, see OMAFRA Publication 845, *Integrated Pest Management for Turf*.

Diseases

Fungicides registered for use on sod farms, golf courses and other excepted uses are listed in Table 2–1.

Class 11 biopesticide or lower risk pesticide active ingredients allowed for cosmetic uses on turfgrass (fungicides, insecticides and goose repellent) are listed in Table 2–2.

Disease control products registered for use on sod farms, golf courses and other excepted uses are listed in Table 2–3.

Table 2–1. Fungicides registered for use on sod farms, golf courses and other excepted uses

LEGEND: ai = active ingredient

Trade name (alphabetically in each group)	Classification	Common name	LD ₅₀ (mg ai/kg) ¹	Chemical family ²
Banner MAXX	3	propiconazole	4,340	sterol inhibitor
Banol	4	propamocarb hydrochloride	2,000–2,900	N/A
Cadence 70 WDG	2	boscalid	>2,000	anilid
Chipco Aliette Signature	3	fosetyl-al	2,860	aluminum salt
Chipco Triton	3	triticonazole	>5,000	sterol inhibitor
Civitas	4	mineral oil	>5,000	unique
Compass 50WG	3	trifloxystrobin	>5,050	strobilurin
Concert	3	propiconazole/chlorothalonil	>5,000	sterol inhibitor/aromatic hydrocarbon
Cueva	4	copper octanoate	>2,000	inorganic
Daconil Ultrex	4	chlorothalonil	>5,000	aromatic hydrocarbon
Disarm	2	fluoaxastrobin	>5,000	strobilurin
Eagle WSP	4	myclobutanil	2,090	sterol inhibitor
Exteris Stressgard	2	fluopyram/trifloxystrobin	>5,000	succinate dehydrogenase inhibitors/strobilurin
Heritage MAXX	3	azoxystrobin	1,714	strobilurin
Honor	2	pyraclostrobin/boscalid	>500–<2,000	strobilurin/anilid
Insignia Duo	3	pyraclostrobin + triticonazole	>2,000	strobilurin + sterol inhibitor
Insignia SC	3	pyraclostrobin	200–500	strobilurin
Instrata	3	chlorothalonil/propiconazole/ fludioxonil	>1,750 and <5,000	aromatic hydrocarbon/sterol inhibitor/ phenylpyrrole
Interface Stressgard	3	iprodione/trifloxystrobin	>5,000	dicarboximide/strobilurin
Kabuto	3	isofentanil	>2,000	carboxamides
Medallion	2	fludioxonil	>5,000	phenylpyrrole
Mirage Stressgard	3	tebuconazole	3,710	sterol inhibitor

¹ The relative toxicity may be referred to as its LD₅₀ and is reported for oral LD₅₀ for laboratory rats. The higher the LD₅₀ figure, the less toxic the product is to humans. Products with low LD₅₀ ratings are highly toxic. No products registered for turf have a high acute toxicity.

² Alternate or tank-mix with another product with different fungicide classification to minimize risk of fungicide resistance developing.

Table 2–1. Fungicides registered for use on sod farms, golf courses and other excepted uses

LEGEND: ai = active ingredient

Trade name (alphabetically in each group)	Classification	Common name	LD ₅₀ (mg ai/kg) ¹	Chemical family ²
Moss-Aside Moss Killer	4	potassium salts of fatty acids	>5,000	salts of carboxylic acids
Phostrol	4	mono- and dibasic sodium, potassium, and ammonium phosphites	>5,000	phosphite
Pinpoint	3	mandestrobin	> 3,129	strobilurin
Premis 200F	3	triticonazole	>2,000	sterol inhibitor
ProTurf DSB Turf Fertilizer Plus Fungicide	4	thiophanate-methyl	>7,000	benzimidazole
ProTurf Granular Systemic Fungicide	4	thiophanate-methyl	>7,000	benzimidazole
ProTurf Granular Fungicide X	4	iprodione	3,500	dicarboximide
Quali-Pro Propiconazole 14.3 ME	3	propiconazole	3,000	sterol inhibitor
Quali-Pro Iprodione 240 SE	4	iprodione	2,000	dicarboximide
Regalia Maxx Biofungicide	3	<i>Reynoutria sachalinensis</i>	>5,000	plant extract
Renovo	4	thiophanate methyl	>2,000	methyl benzimidazole carbamates
Rhapsody ASO	4	<i>Bacillus subtilis</i> strain QST 713	>5,000	bacterium
Rovral Green GT	4	iprodione	>5,000	dicarboximide
Segway 400 SC	4	cyazofamid	>5,000	cianoimidazoles
Subdue MAXX	3	metalaxyl	2,965	phenylamide
Supra Captan 80 WDG	3	captan	>5,000	phthalimide
Tourney Fungicide	3	metconazole	1,750	sterol inhibitor
Trilogy Stressgard	3	iprodione/triticonazole/ trifloxystrobin	5,000	dicarboximide/sterol inhibitor/strobilurin
Velista	4	penthiopyrad	>5,000	pyrazole carboxamide
ZeroTol	3	hydrogen peroxide	1,410	not classified

¹ The relative toxicity may be referred to as its LD₅₀ and is reported for oral LD₅₀ for laboratory rats. The higher the LD₅₀ figure, the less toxic the product is to humans. Products with low LD₅₀ ratings are highly toxic. No products registered for turf have a high acute toxicity.

² Alternate or tank-mix with another product with different fungicide classification to minimize risk of fungicide resistance developing.

Class 11 pesticides are ingredients in products for cosmetic uses under the ban (*Pesticide Act and Regulation 63/09*). See Table 2–2. *Class 11 biopesticide or lower risk pesticide active ingredients allowed for cosmetic uses on turfgrass (fungicides, insecticides and goose repellent)* for a list of biopesticides or lower risk pesticides allowed for cosmetic uses on turfgrass. Licensed exterminators and those who perform land exterminations in non-residential areas that use Class 11 pesticides must post a green sign to notify the public of the use of these pesticides.

Check the MOECC website at ontario.ca/pesticideban for the list of pesticides for cosmetic uses.

Table 2–2. Class 11 biopesticide or lower risk pesticide active ingredients allowed for cosmetic uses on turfgrass (fungicides, insecticides and goose repellent)

Active Ingredient	Classification	Uses
<i>Bacillus subtilis</i> strain QST 713	4	Check label for specific uses and follow the label directions.
copper octanoate	4	
extract of <i>Reynoutria sachalinensis</i>	3	
ferric phosphate	4	
<i>Metarhizium anisopliae</i> strain F52	3	
hydrogen peroxide	3	
methyl-anthranilate	4	
mineral oil	4	
phosphite	4	
potassium salts of fatty acids	4	

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Algae Improve fertility and drainage. Alleviate compaction.			
Moss-Aside Moss Killer	Application rate diluted product: 50–100 L	14	Dilute concentrate by mixing one part concentrate with 19 parts water (50 mL/1 L water to form a 5%–10% solution). Golf Courses: For putting greens, fairways and other areas. A contact product. For best results, good coverage is essential. Avoid overlapping spray to eliminate risk of damage to turf and ornamentals. If moss is dry, thoroughly wet moss with water before treating. Rinse turf with 5 L/100 m ² of water 15–30 minutes after application. Do not irrigate at least 6 hr after treatment. Do not apply to turf if temperature will exceed 30°C.
ZeroTol	190–400 mL in 11–19 L of water	not stated	Drench the soil to saturate the root systems in areas affected. Up to 5 consecutive applications may be used.
Anthracnose (<i>Colletotrichum graminicola</i>) Occurs June to September under humid and warm conditions. Avoid nitrogen deficiency, drought stress, soil compaction, poor drainage and excessive thatch, especially on annual bluegrass.			
Chipco Triton	16–32 mL	14–21	Apply at the first signs or when conditions favour disease development. Use the higher rate when disease pressure is high. Under low disease conditions, the spray interval may be increased up to 21 days. Do not apply more than 3 times a season.
Civitas	240–460 mL	14	Apply as required but not less than 14 days between treatments.
Concert	110–225 mL	21	Apply preventively when conditions favour disease development. Use high rate under conditions of high disease pressure. Areas of compaction, poor soil drainage, excess thatch or with large amounts of <i>Poa annua</i> favour the development of anthracnose. Do not apply more than 3 applications/season.
Daconil Ultrex	103–115 mL	7–10	Apply when conditions favour disease development but before symptoms develop and repeat applications as long as conditions persist.
Medallion	60 mL	14	For best control, use as a component of an integrated disease management program. Begin applications when conditions are favourable for disease infection and prior to disease symptom expression. Under conditions of high disease pressure, use the highest label rate and the shortest interval. For optimum disease control, tank-mix or alternate with a contact fungicide such as Daconil 2787 or Daconil Ultrex. Apply in sufficient water to ensure thorough coverage. 4–8 L water/100 m ² is recommended. Use AI, XC or XR nozzles. Apply after mowing. Allow sprayed area to completely dry before irrigation. Do not apply more than 180 mL product/100 m ² /year (18.0 L product/ha/year) on turfgrass.
Phostrol	130–260 mL	14	For preventive suppression of anthracnose, begin foliar applications when conditions favouring disease development exist and continue on a 14-day interval, if needed. Use 4–20 L water/100 m ² .
Rhapsody ASO	125–250 mL	7–10	Begin when conditions favour disease development. Continue applications as needed on 7–10-day intervals. Apply in enough water to provide thorough coverage. Under moderate-to-severe disease pressure, use higher rates and minimum spray intervals, and use in a program with other registered fungicides.
Velista	9–15 g	14	Begin application at the early stage of disease development. Use high rates for high disease pressure. May be applied as a tank mix with other fungicides registered for the same disease, such as Daconil Ultrex and Heritage fungicide.
Banner MAXX	26–51 mL	21	Apply when warm, humid weather conditions occur. Do not apply more than 3 times a season.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Anthracnose (<i>Colletotrichum graminicola</i>) — continued			
Quali-Pro Propiconazole 14.3 ME	26–51 mL	21	Apply when conditions favour disease development. Do not apply more than 3 times a season.
Premis 200 F	16–32 mL	14–21	Apply at the first signs or when environmental conditions (cool and wet conditions or hot and humid conditions) favour disease development. Use the higher rate and shorter interval when pressure is high. Under low disease conditions, the spray interval may be increased up to 21 days. Do not apply more than 3 times a season.
Tourney Fungicide	8.4 g	once	Use preventively when conditions favour disease development. Apply in 8 L water/100 m ² for foliar blight.
Heritage MAXX	32–63 mL	14–28	Begin when conditions favour infection, before symptoms develop.
ZeroTol	190 mL in 11–19 L water	7	Spray diluted solution to achieve full and even coverage. Up to 5 consecutive applications may be used with a minimum 7-day spray interval between applications.
Honor	18.3–33.3 g	14–28	Apply when conditions are favourable for disease development.
Insignia SC	12.3–22.4 mL	14–28	Apply when conditions are favourable for disease development.
Anthracnose foliar blight (<i>Colletotrichum graminicola</i>)			
Compass 50WG	3.8 g	14	Apply when conditions are favourable for disease development. Rotate with different mode-of-action fungicides. Do not use more than 2 sequential applications. Do not apply more than 2.4 kg/ha/year.
Interface Stressgard	95–160 mL	14–21	Apply preventively when stressful environmental conditions favour foliar blight anthracnose disease development. Apply on a 14- or 21-day spray interval. Under severe disease pressure, use highest rate and shortest interval.
Regalia Maxx Biofungicide	0.25% v/v in 10–15 L of water	7–10	Apply preventively or when disease symptoms first appear. When environmental conditions and plant stage are conducive to rapid disease development, use in a rotational program with other registered fungicides.
Mirage Stressgard	32–64 mL	14–21	Apply preventively when stressful environmental conditions favour anthracnose disease development. Under severe disease pressure, use the highest rate and shortest interval.
Chipco Aliette Signature	120 g	14	Apply 2–4 applications 14 days apart as a preventive treatment in spring or summer to areas with a history. Begin when conditions favour disease development. Should be used with a fertility program that avoids excess yet provides adequate nitrogen through light, more-frequent applications over the entire growing season. Under extreme prolonged infection pressure, should be used as a part of a season-long spray program with other fungicides.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Anthracnose basal rot (<i>Colletotrichum graminicola</i>)			
Interface Stressgard	95–160 mL	14–21	Apply preventively when stressful environmental conditions favour basal rot and foliar blight anthracnose disease development. Apply on a 14- or 21-day spray interval. Under severe disease pressure, use highest rate and shortest interval.
Trilogy Stressgard	65 mL	14	Apply at the first sign of anthracnose disease break-out or apply preventively when stressful environmental conditions (cool and wet conditions or hot and humid conditions) favour anthracnose development. Maximum of 2 applications during basal rot anthracnose infection period. Every application must be alternated with at least 1 application of a non-strobilurin fungicide.
Mirage Stressgard	32–64 mL	14–21	Apply preventively when stressful environmental conditions favour anthracnose basal rot development. For basal rot control and/or under severe disease pressure, use the highest rate and shortest interval.
Chipco Aliette Signature	120 g	14	Apply 2–4 applications 14 days apart as a preventive treatment in spring or summer to areas with a history. Begin when conditions favour disease development. Should be used with a fertility program that avoids excess yet provides adequate nitrogen through light, more frequent applications over the entire growing season. Under extreme prolonged infection pressure, should be used as part of a season-long spray program with other fungicides.
Tourney Fungicide	8.4 g	once	Use preventively when conditions favour disease development. Apply 8–16 L water/100 m ² for basal rot.
Bentgrass dead spot (<i>Ophiosphaerella agrostis</i>) Occurs on newly seeded greens and tees in summer.			
Chipco Aliette Signature	120 g	14	Apply 2–4 times 14 days apart as a preventive in spring or summer to areas with a history of the disease. Begin when conditions favour disease development. Under extreme prolonged infection pressure, should be used as part of a season-long program with other fungicides.
Honor	16.8–33.6 g	14–28	Use preventively. Begin applications when conditions are favourable for fungal infection, prior to disease symptom development.
Brown patch, rhizoctonia blight (<i>Rhizoctonia solani</i>) Occurs under humid, warm conditions and extended periods of leaf wetness in June to September. Avoid excess nitrogen and night watering.			
ProTurf DSB with thiophanate-methyl	0.86 kg	14–21	Apply to moist or dry foliage.
ProTurf Granular Systemic Fungicide	0.66–1.32 kg	14–21	For prevention, apply to moist or dry foliage at normal rate when disease activity is noted or suspected. May require more frequent treatments under conditions that favour the disease. To arrest the disease, apply at higher rate.
Compass 50 WG	4.6–6.1 g	14–21	Apply when conditions favour disease development. Apply 4.6 g/100 m ² at 21-day intervals under low disease pressure and 6.1 g/100 m ² at a 14-day interval under high disease pressure. Do not use more than 2 sequential applications. Do not apply more than 2.4 kg/ha/year.
Chipco Triton	32 mL	14–21	Apply at the first sign of disease or when conditions favour disease development. Shorten spray interval when disease pressure is high. Under low disease conditions, the spray interval may be increased up to 21 days. Do not apply more than 3 times a season.
Civitas	270–540 mL	14	Apply as required but not less than 14 days between treatments.
Concert	100–283 mL	7–14	Apply preventively when conditions favour disease development (high surface moisture or humidity and warm night temperatures). Use the higher rates and shorter intervals under severe disease pressure. Do not apply more than 6 applications/season.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Brown patch, rhizoctonia blight (<i>Rhizoctonia solani</i>) — continued			
Daconil Ultrex	58–115 g	7–14	Preventive. Apply when conditions favour disease development and repeat as long as conditions persist.
	115–212 g	7–14	Curative. Under severe disease conditions, use the curative rates and apply on a 7-day schedule.
Exeris Stressgard	140–200 mL	14–21	Apply at the first sign of brown patch symptoms or preventively when stressful environmental conditions (surface moisture and humidity is greater than 80%, night-time temperatures >20°C) favour disease development. Under severe disease pressure, use the higher rate and shortest interval.
Interface Stressgard	95–160 mL	14–28	Apply at the first sign of brown patch symptoms or preventively when stressful environmental conditions (surface moisture and humidity are greater than 80%, night-time temperatures >20° C) favour disease development. Apply on a 14-, 21- or 28-day spray interval. Under severe disease pressure, use highest rate and shortest interval.
Medallion	60 mL	14	For best control, use as a component of an integrated disease management program. Begin applications when conditions are favourable for disease infection and prior to disease symptom expression. Under conditions of high disease pressure, use the highest label rate and the shortest interval. For optimum disease control, tank-mix or alternate with a contact fungicide such as Daconil Ultrex. Apply in sufficient water to ensure thorough coverage. 4–8 L water/100 m ² is recommended. Use AI, XC or XR nozzles. Apply after mowing. Allow sprayed area to completely dry before irrigation. Do not apply more than 180 mL product/100 m ² /year (18.0 L product/ha/year) on turfgrass.
Rhapsody ASO	125–250 mL	7–10	Begin when conditions favour disease development. Continue as needed on 7–10-day intervals. Apply in enough water to provide thorough coverage. Under moderate-to-severe disease pressure, use high rates and minimum spray intervals and use in a program with other registered fungicides.
Regalia Maxx	0.25% v/v in 10–15 L water	7–10	Suppression only. Apply preventively or when disease symptoms first appear. When environmental conditions and plant stages are conducive to rapid disease development, use in a rotational program with other registered fungicides.
Rovral Green GT	125–250 mL	14–21	Apply at the first signs of disease. Repeat applications may be used at a 14–21-day interval throughout the season, or as needed. Rotate with other fungicides.
Velista	9–15 g	14	Begin application at the early stage of disease development. Use the high rate for moderate-to-high disease pressure and/or for curative situations.
Banner MAXX	51–103 mL	14	Apply when conditions favour disease development. Use the higher rate under severe disease pressure. Do not apply if disease symptoms are present. Do not apply more than 6 times a season.
Mirage Stressgard	32–64 mL	14–21	Apply at the first sign of disease symptoms or preventively when stressful environmental conditions (surface moisture and humidity are greater than 80%, night-time temperatures >20°C) favour disease development. The highest rate is recommended to be used with the 21-day application interval.
ProTurf Granular Fungicide X	2.34–3.52 kg	14	To prevent disease, apply at the normal-to-heavy rate to moist or dry turf when disease activity is anticipated and repeat at 2-week intervals. If disease pressures are heavy, apply at the heavy rate to moist or dry foliage. To control disease, apply to moist or dry foliage at the heavy rate as soon as disease activity is noticed. Repeat bi-weekly until disease is under control, then revert to the normal or heavy rate applications bi-weekly.
Pinpoint	9.86 mL	14	Begin applications when conditions favour disease development.
Quali-Pro Propiconazole 14.3 ME	51–103 mL	14	Apply when conditions favour disease development. Use the higher rate under severe disease pressure. Do not apply if disease symptoms are present. Do not apply more than 6 times a season.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Brown patch, rhizoctonia blight (<i>Rhizoctonia solani</i>) — continued			
Eagle WSP	18 g	14	Apply a maximum of 4 times a year.
Premis 200 F	32 mL	14–21	Apply at the first sign of disease or when conditions favour disease development. Repeat every 14 days when conditions exist. Do not apply more than 3 times a season.
Renovo	42–84 mL	5–7	Apply after mowing or avoid mowing for 12 hr after application. Begin applications, using ground application equipment, when disease first appears. When disease pressure is severe, apply at the higher recommended rate. Maximum seasonal rate 8.40 kg ai/ha.
Quali-Pro Iprodione	125–250 mL	14–21	Under severe disease pressure, use the higher rate and the shorter interval. To assist in disease management, alternate this product with other fungicides with different modes of action to reduce the possible development of disease resistance.
Tourney Fungicide	8.4–11.2 g	once	Apply in 8 L water/100 m ² . Use preventively when conditions favour disease development.
Heritage MAXX	32 mL	14–28	Begin before disease is present (usually late May to June) when conditions favour disease development. During prolonged periods of favourable conditions, apply on the shorter interval.
ZeroTol	400 mL in 11–19 L clean water	7	Spray diluted solution to achieve full and even coverage. Up to 5 consecutive applications may be used with a minimum 7-day spray interval between applications.
Honor	16.7–29.8 g	14–21	Apply when conditions are favourable for disease development.
Insignia SC	11.2–20 mL	14–21	Apply when conditions are favourable for disease development.
Cool season brown patch, yellow patch (<i>Rhizoctonia cerealis</i>)			
Occurs April to May and September to November during cool, wet weather.			
Concert	335–450 mL	30	Apply 1 application in the late fall before snow cover. Do not apply on top of snow. Do not apply more than 1 application/season.
Banner MAXX	77–103 mL	once	Apply once in late fall before snow cover. Do not apply on top of snow. Do not apply more than once a season.
Quali-Pro Propiconazole 14.3 ME	77–103 mL	once	Apply once in late fall before snow cover. Do not apply on top of snow. Do not apply more than once a season.
Dollar spot (<i>Sclerotinia homoeocarpa</i>)			
Occurs June to September under humid and warm conditions. Begins when iris and peony are in full bloom. Avoid nitrogen deficiency, drought stress, soil compaction and excessive thatch, especially on annual bluegrass. Light frequent application of foliar-applied nitrogen will decrease the severity.			
ProTurf Granular Systemic Fungicide	0.66–1.32 kg	14–21	For prevention, apply to moist or dry foliage at normal rate when disease activity is noted or suspected.
Chipco Triton	16 mL	14–21	Apply at the first sign of disease or when conditions favour its development. Repeat every 14–21 days to maintain control. Do not apply more than 3 times a season.
Civitas	250–500 mL	14	Apply as a preventive treatment or when conditions are favourable for disease development. The addition of a compatible spray indicator, such as a dye, is suggested. Test this product on a small area of fairways, greens, roughs and tees prior to broad application, as short-cut turf may be more susceptible to disease and phytotoxicity.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Dollar spot (<i>Sclerotinia homoeocarpa</i>) — continued			
Concert	50–100 mL	7–14	Do not use less than the 100-mL rate if the desired duration of control is up to 14 days. Best used preventively. Apply during periods of humid, warm days and cool nights that result in heavy dew formation. Nitrogen deficiency and drought stress also promote the disease. Do not apply more than 6 applications/season.
	100–200 mL	14–21	
	200–225 mL	21–28	
Daconil Ultrex	29–58 g	7–14	Preventive: fairways. Apply preventive rates when conditions favour disease development and repeat as long as conditions persist.
	58–115 g	7–14	Preventive: greens, tees, ornamental. Apply preventive rates when conditions favour disease development and repeat as long as conditions persist.
	115–212 g	7–14	Curative: greens, tees, ornamental. Under severe conditions, use the curative rates and spray on a 7-day schedule. Daconil Ultrex can be tank-mixed at 115 g/100 m ² with Banner MAXX at a rate of 300 mL/100 m ² .
Disarm	5.0–11.5 mL	14–21	Provides control of light-to-moderate dollar spot pressure. Under heavy dollar spot pressure, use a Group 3 (DMI) fungicide labelled for control of dollar spot with this fungicide.
Exteris Stressgard	140–200 mL	14–28	Apply at the first sign of dollar spot symptoms or preventively when stressful environmental conditions (extended periods of dew >8 hr at temperatures between 13°C–27°C) favour dollar spot development. Under severe disease pressure, use the higher rate and shortest interval. Is intended to broaden the disease spectrum. Should be used to control dollar spot on golf course and concurrently prevent brown patch and leaf spot diseases.
Interface Stressgard	95–160 mL	14–28	Apply at the first sign of dollar spot symptoms or preventively when stressful environmental conditions (extended periods of dew >8 hr at temperatures between 13°C–27°C) favour dollar spot development. Apply on a 14-, 21- or 28-day spray interval. Under severe disease pressure, use highest rate and shortest interval.
Rhapsody ASO	125–250 mL	7–10	Begin when conditions favour disease development. Continue as necessary on 7–10-day Intervals. Apply in enough water to provide thorough coverage. Under moderate-to-severe disease pressure, use higher rates and minimum spray intervals and use in a program with other registered fungicides.
Regalia Maxx Biofungicide	0.25% v/v in 10–15 L water	7–10	Partial suppression. Apply preventively or when disease symptoms first appear. When environmental conditions and plant stage are conducive to rapid disease development, use in a rotational program with other registered fungicides.
Rovral Green GT	62 mL	21	Apply at the first signs. Repeat as required. Alternate with other fungicides.
Velista	9–15 g	14–21	Begin application at the early stage of disease development. Use the high rate for moderate-to-high disease pressure and/or for curative situations. The interval for golf greens and tees is 14 days. The interval for golf fairways and other turf is 14–21 days.
Trilogy Stressgard	65 mL	21	Apply at the first sign of dollar spot or when environmental conditions favour dollar spot development. Maximum of 2 applications during dollar spot infection period. Do not apply more than 2 sequential applications of Trilogy or other strobilurin (Group 11) fungicides before alternating to a non-strobilurin fungicide for at least 2 applications.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Dollar spot (<i>Sclerotinia homoeocarpa</i>) — continued			
Banner MAXX	26–51 mL	21–28	Apply when conditions favour disease development. Rotate with fungicides that have a different mode of action. Banner MAXX fungicide can be tank-mixed with Daconil 2787 Flowable fungicide or Heritage fungicide. Do not apply more than 6 times a season.
Mirage Stressgard	32–64 mL	14–21	Apply at the first sign of dollar spot symptoms or preventively when stressful environmental conditions (extended periods of dew >8 hr at temperatures between 13°C–27°C) favour dollar spot development. The highest rate is recommended to be used with the 21-day application interval.
ProTurf Granular Fungicide X	2.34–3.52 kg	14	To prevent disease, apply at the normal-to-heavy rate to moist or dry turf when disease activity is anticipated and repeat at 2-week intervals. If disease pressure is heavy, apply at the heavy rate to moist or dry foliage. When disease is under control, revert to bi-weekly normal rate applications. To control disease, apply to moist or dry foliage at the heavy rate as soon as disease activity is noticed. Repeat bi-weekly until disease is under control, then revert to the normal or heavy-rate applications bi-weekly.
Pinpoint	5.4–9.86 mL	14–21	Use preventively. Begin application when conditions favour disease development.
	9.86 mL	21–28	
Quali-Pro Propiconazole 14.3 ME	26–51 mL	21–28	Apply when conditions favour disease development. Can be tank-mixed (see Daconil 2787 or Heritage fungicide). Rotate with fungicides that have a different mode of action. Do not apply more than 6 times a season.
Eagle 40 WSP	15–20 g	14–21	Start applications before or immediately after the first signs of disease. Do not apply more than 4 times a year. Under conditions optimum for severe disease development, use the shortest interval and highest rate.
Cadence 70 WDG	3.2–4.0 g	14	Should be applied prior to or in the early stages of disease development. Apply in 5–15 L of water/100 m ² . Do not exceed 2 consecutive applications before using another mode of action fungicide for at least 1 application. Do not apply more than 6 times a season. Do not apply more than 24 g/100 m ² a year.
	5.6 g	28	
Kabuto	12.7–15.9 mL	14	Apply as a preventive treatment prior to or in the very early stage of development. Apply in at least 8 L of water/100 m ² . Do not apply more than 8 applications/year. Do not apply through any type of irrigation system. Do not apply more than 2 consecutive applications. Subsequent applications should be alternated with another registered fungicide with a different mode of action.
Premis 200 F	16 mL	14–21	Apply at the first sign of disease or when conditions favour its development. Repeat every 14–21 days to maintain control. Do not apply more than 3 times a season.
Renovo	35–42 mL	10–14	Apply after mowing or avoid mowing for 12 hr after application. Begin applications, using ground application equipment, when diseases first appear. When disease pressure is severe, apply at the higher recommended rate. Maximum seasonal rate: 4.20 kg ai/ha.
Quali-Pro Iprodione	62 mL	Repeat applications as required	The minimum control period is 21 days. Alternate with other fungicides with different modes of action in a dollar spot control program to reduce the possible development of disease resistance.
Tourney Fungicide	8.4–11.2 g	once	Use higher rates when the turf is under high dollar spot pressure. Apply in 8 L water/100 m ² .
Honor	20–25 g	14	Begin applications prior to or in the early stages of disease development. Use the higher specified rate when prolonged favourable disease conditions exist.
	35 g	28	
Insignia SC	12.3–22.4 mL	14–28	Suppression only. Will provide suppression of dollar spot.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Fairy ring			
Mirage Stressgard	32–64 mL	14–21	Apply in the spring when average soil temperatures at 5-cm depth are between 13°C–18°C. Subsequent applications should be made 14–21 days later, and applications should be made in high water volumes (8 L/100 m ²). In addition, applications should be watered in with 3–6 mm of irrigation applied immediately after application. Use the highest rate and shortest interval under severe disease pressure and where there is a prior history of disease.
Pinpoint	9.86 mL	14	Begin applications when conditions favour disease development or for fairy ring, when the disease first appears.
Heritage MAXX	63 mL	28	Apply as soon as symptoms develop. May take 2–3 weeks to disappear. Severely damaged turf may need reseeding.
Honor	33.6 g	28	Apply as soon as possible after symptoms development. Symptoms may take 2–3 weeks to disappear following application. Use 8–15 L spray volume/100 m ² . Re-application after 28 days may be required. Provide short irrigation cycle directly following treatment to move fungicide through thatch.
Grey snow mould, Typhula blight (<i>Typhula</i> spp.)			
Avoid succulent turf growth in late fall. Keep turf mowed until leaf growth ceases. Use snow fencing or other methods to prevent excessive snow accumulation. Minimize thatch as this is a perfect environment for dormant sclerotia.			
Control with a single application late in fall before permanent snow cover, early-to-late November in southern Ontario, mid-to-late October in northern Ontario.			
Compass 50 WG	6.1 g tank-mixed with 271–345 mL of Rovral Green GT	once	Apply preventive tank mix in a minimum of 5 L spray solution (6.1–7.0 L/100 m ² recommended) before permanent snow cover or tarping. A lower rate of Rovral Green GT (minimum 271 mL/100 m ²) mixed with 6.1 g/100 m ² should be used in regions that do not experience high disease pressure and a higher rate of Rovral Green GT (maximum of 345 mL/100 m ²) with 6.1 g/100 m ² of Compass 50 WG Fungicide in regions that typically show high disease pressure. If area has a history of heavy pressure or a heavy or long snow cover, use a mid-to-later application of a DMI product or other fungicide as part of an overall strategy.
Chipco Triton	32 mL	21	When conditions favour heavy disease pressure or if there is history of the disease, apply at 21-day intervals in late fall or early winter before snow fall. Do not apply more than 3 times a season. To increase control, mix with 375 mL/100 m ² of Rovral Green for the last application.
Civitas	Single application rate: 600–930 mL	once	May reduce symptoms of grey snow mould. Make a single high rate or 2 or more applications at the low rate, spaced 14 days apart, in late fall before snow cover.
	Multiple application rate: 330–460 mL	14	Test this product on a small area of fairways, greens, roughs and tees prior to broad application, because short-cut turf may be more susceptible to disease and phytotoxicity.
Daconil Ultrex	145–303 g	once	Apply in late fall before snow cover.
Disarm	11.5 mL	once	Apply 1 application prior to permanent snow cover and before turf dormancy. Tank-mix with Banner 130 EC Fungicide or Daconil 2787 Flowable fungicide at labelled rates to improve efficacy against grey snow mould caused by <i>Typhula ishikariensis</i> .
Interface Stressgard	95–160 mL	once	Suppression only. Apply in late fall before permanent snow cover. In regions with a history of heavy snow mould disease pressure, use the highest label rate. When applied as a solo product, will suppress grey snow mould. To increase the level of control, apply in a tank mix with Chipco Triton fungicide or Daconil Ultrex fungicide or Daconil 2787 fungicide at label rates in late fall before permanent snow cover. In regions with a history of heavy snow mould disease pressure, use the highest labelled rate.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other exempted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Grey snow mould, Typhula blight (<i>Typhula</i> spp.) — continued			
Rovral Green GT	375 g	once	Apply as a preventive just before ground freezes or before the first snow fall.
Trilogy Stressgard	100–177 mL	once	Apply in late fall before permanent snow cover. In regions with a history of heavy snow mould disease pressure, use the highest labelled rate. Do not apply on top of snow or when temperature is below 0°C.
Banner MAXX	206 mL	once	Apply before snow cover. Do not apply on top of snow or when the temperature is below 0°C.
Mirage Stressgard	30–60 mL	once	Apply before permanent snow cover. Use the highest rate under severe disease pressure and where there is a prior history of disease. For optimal grey snow mould control, it may be tank-mixed with at least one of the following partners: Compass 50 WG at 6.1 g/100 m ² , Compass 50 WG + Daconil Ultrex Fungicide at 6.1 g + 145 g/100 m ² .
ProTurf Granular Fungicide X	1.17–2.34 kg	14–21	Preventive. To prevent the disease, apply the prevention rate to dry foliage when disease activity is anticipated. Repeat at 2–3-week intervals.
	2.34–3.52 kg		Curative. To control the disease, apply to dry foliage at the higher rate. Repeat in mid-winter when turf is free of snow and again immediately after the final snow melt in the spring.
Quali-Pro Propiconazole 14.3 ME	206 mL	once	Apply before snow cover. Do not apply on top of snow or when the temperature is below 0°C.
Eagle WSP	30 g	once	Apply in late fall before snow cover.
Premis 200 F	32 mL	21	When conditions favour heavy disease pressure or if there is history of the disease, apply at 21-day intervals in late fall or early winter before snow fall. Do not apply more than 3 times a season. To increase control, mix with 375 mL/100 m ² of Rovral Green for the last application.
Insignia Duo	136–200 mL/32 mL (1 case treats 1 ha)	once	Make a single application in late fall just prior to snow cover.
Quali-Pro Iprodione	375 mL	once	Apply as a preventive in late fall or early winter just before the ground freezes or before first snowfall.
Instrata	300 mL	once	Make 1 application in the late fall before snow cover. Do not apply on top of snow or when the temperature is below 0°C. Do not apply more than 1 application/season.
Tourney Fungicide	11.2 g + 250 g a.i. of Daconil 2787 Flowable or Daconil Ultrex	once	Apply in late fall before snow cover. Make the application before the turfgrass enters dormancy (usually after the last mowing of the season) and before the first snowfall. Apply in 8 L water/100 m ² .
Heritage MAXX	95–126 mL	once	<i>Typhula incarnata</i> control only. Apply in late fall before snow cover. Do not apply on top of snow. Use the higher rate if there is a history of severe infection.
Honor	20.2 g	once	Make applications just prior to snow cover.
	10.1 g	14–28	
Insignia SC	13.6 mL	once	Make a single application in late fall just prior to snow cover. Tank-mix with Premis 200F fungicide at 32 mL/100 m ² for improved control.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Helminthosporium, leaf spot, melting out (<i>Drechslera</i> spp.)			
Occurs in spring under cold wet conditions. If leaf spot is severe, with warm weather infection spreads to the crown, causing the melting out phase.			
Avoid early spring applications of nitrogen. Raise mowing height.			
Compass 50 WG	3.1 g	14–21	Apply when conditions favour disease development. Use short interval under high disease pressure. Do not apply more than twice in a row. Do not apply more than 25 g/100 m ² /year.
Civitas	250–500 mL	14	Suppression only. Apply as preventive treatment or when conditions are favourable for disease development. The addition of a compatible spray indicator such as a dye is suggested. Test this product on a small area of fairways, greens, roughs and tees prior to broad application, because short-cut turf may be more susceptible to disease and phytotoxicity.
Concert	100–360 mL	7–14	Apply when conditions are favourable for disease development. Do not apply more than 3 applications/season.
Daconil Ultrex	58–115 g	7–14	Preventive: greens, tees. Apply when conditions favour disease and repeat as long as the conditions persist.
	115–212 g	7–14	Curative: greens, tees. Under severe disease conditions, use the curative rates and spray on a 7-day schedule.
Disarm	5.8–11.5 mL	14 – 21	Apply when conditions are favourable for disease development. Applications should be made preventively. The high rate should be used for curative applications, when disease pressure is high and/or when environmental conditions are favourable for disease development.
Exteris Stressgard	140–200 mL	14–21	Apply at the first sign of leaf spot symptoms or preventively when stressful environmental conditions favour disease development. Under severe disease pressure, use the higher rate and shortest interval.
Medallion	60 mL	14	For best control, use as a component of an integrated disease management program. Begin applications when conditions are favourable for disease infection and prior to disease symptom expression. Under conditions of high disease pressure, use the highest label rate and the shortest interval. For optimum disease control, tank-mix or alternate with a contact fungicide such as Daconil 2787 or Daconil Ultrex. Apply in sufficient water to ensure thorough coverage. 4–8 L water/100 m ² is recommended. Use AI, XC or XR nozzles. Apply after mowing. Allow sprayed area to completely dry before irrigation. Do not apply more than 180 mL product/100 m ² /year on turfgrass.
Rovral Green GT	125 mL	14–21	Apply at the first sign of leaf spot. Repeat 2–3 times in early spring. Under severe disease pressure, use the shorter spray interval. Alternate with other fungicides.
Banner MAXX	51–103 mL	14	Under light-to-moderate disease pressure, apply to reduce severity. Do not apply more than 3 times a season.
ProTurf Granular Fungicide X	Low rate: 1.17 kg	28	Apply to moist or dry turf at the light rate to prevent disease. Repeat if needed. Apply to moist or dry foliage at the higher rate when disease activity is first noticed. Repeat as needed at intervals not closer than 2 weeks.
	High rate: 2.34–3.52 kg	14	
Quali-Pro Iprodione	125 mL	14–21	Apply at the first sign of leaf spot, melting out. Repeat applications 2 or 3 times in the early spring at a 14–21-day spray interval or as needed. Under severe disease pressure, use the shorter spray interval. To assist in disease management, it is recommended that this product be alternated with other fungicides with different modes of action in a leaf spot control program to reduce the possibility of the development of disease resistance.
Quali-Pro Propiconazole 14.3 ME	51–103 mL	14	Under light-to-moderate disease pressure, apply to reduce severity. Do not apply more than 3 times a season.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

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Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Helminthosporium, leaf spot, melting out (<i>Drechslera</i> spp.) — continued			
Heritage MAXX	32–63 mL	14–28	Apply when conditions favour disease development. Apply lower rate at 14-day intervals or higher rates at 28-day intervals.
Honor	18.3 g	14	Leaf spot. Apply when conditions are favourable for disease development.
	16.8–33.6 g	14–28	Melting out. Apply when conditions are favourable for disease development.
Insignia SC	12.3 mL	14	Apply when conditions are favourable for disease development.
Microdochium patch (<i>Microdochium nivale</i>)			
Occurs in cool, wet conditions in spring, fall and early winter. Avoid excess nitrogen and remove dew.			
Compass 50 WG	3.8 g	14	Apply when conditions favour disease development or when disease is present after snow melt. For curative applications, apply on a 14-day interval, 2–3 times. Do not apply more than twice in a row. Do not apply more than 25 g/100 m ² /year.
Chipco Triton	32 mL	21	Apply in the fall or early winter when conditions favour disease development. Repeat when disease pressure persists. Can be tank-mixed with 185 mL of Rovral Green GT. Do not apply more than 3 times a season.
Concert	225–450 mL	30	Apply in the fall or early spring during cool, wet weather. Use the high rate only under high disease pressure. Do not apply more than 2 applications/season.
Interface Stressgard	128–160 mL	14–28	Apply when conditions favour disease development (cool and wet with little or no snow cover for prolonged periods).
Medallion	30–60 mL	14	Use low rates on fairways only under conditions of low-to-moderate pressure.
Rovral Green GT	185 mL	21–28	Apply in spring and fall for prevention when conditions favour disease development.
Banner MAXX	51–103 mL	30	Apply in the fall or early spring during cool, wet weather. Use the high rate only under high disease pressure. Do not apply more than twice a season.
Quali-Pro Propiconazole 14.3 ME	51–103 mL	30	Apply in the fall or early spring during cool, wet weather. Use the high rate only under high disease pressure. Do not apply more than twice a season.
Trilogy Stressgard	100–177 mL	21–28	Apply when conditions favour disease development (cool and wet with little or no snow cover for prolonged periods <14°C). Apply the required amount of fungicide in 6–10 L water/100 m ² . Maximum of 2 applications during microdochium patch infection period.
Insignia Duo	136–200 mL/32 mL (1 case treats 1 ha)	once	Make a single application in late fall just prior to snow cover.
Premis 200 F	32 mL	21	Apply in fall or early winter for suppression. If disease persists, apply again. Mix Premis with 185 mL of Rovral Green GT. If high disease pressure is anticipated in the spring, apply fungicide twice before snow fall.
Quali-Pro Iprodione	185 mL	21–28	Apply in the fall or spring on a preventive basis when cool and wet conditions are favourable for disease development.
Heritage MAXX	32–63 mL	14–28	Greens. Apply when conditions are favourable for disease development, i.e., extended period of cool (<15.5°C) and wet weather in spring and fall.
	16 mL	14	Fairways: suppression only. Apply preventively and only under conditions of low disease pressure.
Honor	29.8 g	once	Make an application in the late fall just prior to snow cover. Tank-mix with another effective fungicide from a different target site group, such as Premis 200 F. When used in a tank mix, follow all use directions and the most restrictive precautions on the individual product labels.
Insignia SC	20 mL	once	Make a single application in late fall prior to snow cover. Tank-mix with Premis 200F fungicide at 32 mL/100 m ² for improved control if severe disease pressure is anticipated.

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Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Pink snow mould (<i>Microdochium nivale</i>) Avoid succulent turf growth in late fall. Keep turf mowed until leaf growth ceases. Use snow fencing or other methods to prevent excessive snow accumulation. Minimize thatch.			
ProTurf DSB with thiophanate-methyl	860 g	once	Apply in late fall after ground has frozen but before snowfall.
Compass 50 WG	6.1 g tank-mixed with 271–354 mL of Rovral Green GT	once	Apply preventive tank-mix in a minimum of 5 L spray solution (6.1–7.0 L/100 m ² recommended) in late fall before permanent snow cover or tarping. A lower rate of Rovral Green GT (minimum 271 mL/100 m ²) mixed with 6.1 g/100 m ² should be used in regions that do not have high disease pressure, and a higher rate of Rovral Green GT (maximum 354 mL/100 m ²) with 6.1 g/100 m ² in regions that typically show high disease pressure.
Chipco Triton	32 mL	21	Apply in a tank-mix with Rovral Green GT at a rate of 250 mL and apply once in late fall or early winter before snowfall. If high disease pressure is anticipated in the spring, apply twice before snowfall at a 21-day interval. Do not apply more than 3 times a season.
Civitas	Single application rate: 660–930 mL	once	May reduce symptoms of pink snow mould. Make a single high rate, or 2 or more applications at the low rate, spaced 14 days apart, in late fall before snow cover.
	Multiple application rate: 330–460 mL	14	Test this product on a small area of fairways, greens, roughs and tees prior to broad application, because short-cut turf may be more susceptible to disease and phytotoxicity.
Daconil Ultrex	145–303 g	once	Apply in late fall after ground has frozen but before snowfall.
Disarm	11.5 mL	once	Apply 1 application prior to permanent snow cover and before turf dormancy.
Interface Stressgard	128–160 mL	once	Apply in late fall before permanent snow cover. In regions with a history of heavy snow mould disease pressure, use the highest labelled rate. Apply the required amount of product in 6–8 L water/100 m ² . (Do not apply on top of snow or when temperature is below 0°C.)
Rovral Green GT	250–375 mL	once	Apply as a preventive in late fall or early winter just before the ground freezes or before first snowfall. Use higher rates where severe disease pressure is anticipated or if disease is present at the time of application.
Trilogy Stressgard	100–177 mL	once	Apply in late fall before permanent snow cover, in regions with a history of heavy snow or when the temperature is below 0°C. Do not apply more than 1 application/season.
Banner MAXX	206 mL	once	Apply once in late fall before snow cover. Do not apply on top of snow or when the temperature is below 0°C.
Mirage Stressgard	30–60 mL	once	Suppression only. Apply before permanent snow cover. Use the highest rate under severe disease pressure and where there is a prior history of disease. Applied as a solo product, it is recommended where a lower level of control is acceptable. For optimal pink snow mould control, it is recommended to tank-mix with at least one of the following partners: Compass 50 WG at 6.1 g/100 m ² , Compass 50 WG + Daconil Ultrex Fungicide at 6.1 g + 145 g/100 m ² .
ProTurf Granular Fungicide X	1.17–2.34 kg	14–21	Preventive. To prevent disease, apply prevention rate to dry foliage when disease activity is anticipated. Repeat at 2–3-week intervals.
	2.34–3.52 kg		Curative. For control, apply to dry foliage at the higher rate. Repeat in mid-winter when turf is free of snow and immediately after the final snow melt.
Quali-Pro Propiconazole 14.3 ME	206 mL	once	Apply once before snow cover. Do not apply on top of snow or when the temperature is below 0°C.
Insignia Duo	136–200 mL/32 mL (1 case treats 1 ha)	once	Make a single application in late fall just prior to snow cover.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

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Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Pink snow mould (<i>Microdochium nivale</i>) — continued			
Premis 200 F	32 mL	21	Mix with 250 mL/100 m ² of Rovral Green. If high disease pressure is anticipated in the spring, apply fungicide twice before snow fall at 21-day intervals. Do not apply more than 3 times a season.
Renovo	175–245 mL	when required	Apply after mowing or avoid mowing for 12 hr after application. Begin applications, using ground application equipment, when diseases first appear. When disease pressure is severe, apply at the higher recommended rate. Maximum seasonal rate 122.5 g ai/100 m ² .
Quali-Pro Iprodione	250–375 mL	once	Use the higher rate where severe disease pressure is anticipated or if disease is present at the time of application.
Tourney fungicide	11.2 g + 250 g a.i. of Daconil 2787 Flowable or Daconil Ultrex	once	Apply in late fall before snow cover. Make the application before the turfgrass enters dormancy (usually after the last mowing of the season) and before the first snowfall. Apply in 8 L water/100 m ² .
Heritage MAXX	95–126 mL	once	Apply in late fall before snow cover. Do not apply on top of snow. Use higher rate if there is a history of severe Infection.
Insignia SC	13.6 mL	once	Apply in the late fall just prior to snow cover. Tank-mix with Premis 200F fungicide at 32 mL/100 m ² for improved control.
Honor	29.8 g	once	Make an application in the late fall just prior to snow cover. Tank-mix with another effective fungicide from a different target site group, such as Premis 200 F. When used in a tank mix, follow all use directions and the most restrictive precautions on the individual product labels.
Powdery mildew (<i>Erysiphe graminis</i>)			
Avoid excess nitrogen and shade. Increase air circulation.			
Cueva	0.5%–2.0% solution applied at 4.7–9.4 L spray	7–10	Apply when disease first appears, and repeat at 7–10-day intervals for a maximum of 15 applications. In frequently diseased areas, prune adjacent trees and shrubs to reduce turf shading and to improve air movement.
Renovo	175–350 mL	14–21	Apply after mowing or avoid mowing for 12 hr after application. Begin applications, using ground application equipment, when diseases first appear. When disease pressure is severe, apply at the higher recommended rate. Maximum seasonal rate 350 g ai/100 m ² .
Honor	16.8–33.6 g	14–28	Use preventively. Begin applications when conditions are favourable for disease development.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Pythium blight, cottony blight, greasy spot (<i>Pythium aphanidermatum</i>) Avoid excess nitrogen and watering. Occurs when humidity is greater than 90% for at least 9 hr, maximum daily temperature is 27.7°C and low temperature is 20°C.			
Disarm	11.5 mL	7–14	Use preventively. Begin applications when conditions are favourable for disease infection, prior to disease symptom development. During periods of prolonged favourable conditions, treat on the 14-day application interval. Maximum 3 applications/season.
Phostrol	130–260 mL	14	Suppression only. For preventive suppression of pythium blight, begin foliar applications when conditions favouring disease development exist and continue on a 14-day interval, if needed. Use 4–20 L water/100 m ² . Do not mow or water the treated area until sprays have dried. Under moderate-to-heavy disease pressure, use the higher rate. Do not make more than 4 applications during the growing season.
Subdue MAXX	16–32 mL	7–21	Apply as a preventive treatment at a rate of 16–32 mL in 10–20 L water/100 m ² . Re-treat at 10–21-day intervals if required. During periods of prolonged conditions favourable for disease development, use 16–32 mL on a 7–14-day schedule.
Chipco Aliette Signature	200 g	once	Apply only once when symptoms appear. Use as part of a season-long spray program.
Banol	64 mL	7–21	Preventive. Apply as a preventive treatment to established turf during high temperature or humidity favourable to the development of the disease. Repeat if conditions remain favourable. Do not apply more than 2 applications before alternating with a fungicide of a different group with a different mode of action. Do not apply more than 3 applications/growing season. Curative. For a curative treatment on established turf, apply immediately after pythium blight outbreak has occurred. Curative control will only be achieved if a preventive application has previously been made. Repeat if conditions remain favourable for disease. Do not apply more than 2 applications before alternating with a fungicide of a different group with a different mode of action. Do not apply more than 3 applications/growing season.
Heritage MAXX	63 mL	10–14	Begin before disease is present (usually late May or June) when conditions favour disease development.
Honor	26.8 g	14	Begin preventive application when conditions are favourable for disease development.
Insignia SC	18 mL	14	Begin preventive application when conditions are favourable for disease development.
Segway	14.3–26.6 mL	14–21	On established turf, make preventive applications on a 14–21-day schedule, beginning when conditions are favorable for disease development, or when first visible disease symptoms appear. Apply in 7.5–15 L water/100 m ² . Use the lower rate for the shortest interval and higher rate for the longest interval. Under severe disease conditions, use the highest rate and shortest interval. Do not tank-mix with a surfactant for use on turf. Do not apply more than 3 applications at the high rate/calendar year. Do not make sequential applications or apply other fungicides in the same group. After 1 application, alternate with at least 1 application of fungicide having a different mode of action for control of pythium diseases affecting turf. Do not apply more than 80 mL/100 m ² /calendar year.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Pythium crown and root rot (many <i>Pythium</i> spp.)			
Wet soil favours the disease. Little is known about weather conditions that favour the disease.			
Supra Captan WDG 80	60 g	not stated	Use as a preventive. Do not apply more than 120 g/100 m ² /year. Apply in enough water for thorough coverage.
ProTurf Fungicide X	1.49 kg	7–10	Apply at first sign of disease. Apply to moist foliage of newly seeded grass and repeat if disease persists.
Subdue MAXX	16–32 mL	once	Apply as a drench when disease symptoms first occur.
Chipco Aliette Signature	200 g	once	Apply when symptoms appear. Use as part of season-long spray program with other registered pesticides.
Honor	33.3 g	14–28	Apply preventively for control. Irrigate immediately following application. After each application, rotate with at least 1 application of a non-Group 11 fungicide registered for this disease.
Insignia SC	22.4 mL	14–28	Apply preventively for control. Irrigate immediately following application. After each application, rotate with at least 1 application of a non-Group 11 fungicide registered for this disease prior to additional Insignia application.
Segway	14.3–26.6 mL	14–21	On established turf, make preventive applications on a 14–21-day schedule beginning when conditions are favorable for disease development, or when first visible disease symptoms appear. Apply in 7.5–15 L water/100 m ² . Use the lower rate for the shortest interval and higher rate for the longest interval. Under severe disease conditions, use the highest rate and shortest interval. Do not tank-mix with a surfactant for use on turf. Do not apply more than 3 applications at the high rate/calendar year. Do not make sequential applications or apply other fungicides in the same group. After 1 application, alternate with at least 1 application of fungicide having a different mode of action for control of pythium diseases affecting turf. Do not apply more than 80 mL/100 m ² /calendar year.
Pythium damping off (<i>Pythium</i> spp.)			
Segway	14.3–26.6 mL	14–21	For newly seeded areas, use 14.3 mL in 7.5–15 L water/100 m ² immediately after seeding. If disease continues to increase in severity, use the higher rate and shorter interval. Do not tank-mix with a surfactant for use on turf. Do not apply more than 3 applications at the high rate/calendar year. Do not make sequential applications or apply other fungicides in the same group. After 1 application, alternate with at least 1 application of fungicide having a different mode of action for control of pythium diseases affecting turf. Do not apply more than 80 mL/100 m ² /calendar year.
Banol	64 mL	7–21	Preventive on overseeded turf for the control of pythium damping-off. For overseeded areas, apply immediately after germination to control pythium damping-off. Repeat if conditions remain cool and wet.
Necrotic ring spot (<i>Leptosphaeria korrae</i>)			
“Frog-eye” symptoms all year. Reduce excess thatch. Attacks Kentucky bluegrass and fine fescues. Turf-type perennial ryegrasses and some Kentucky bluegrass varieties are resistant. Provide balanced fertility. Avoid drought stress.			
no chemical control available			
Red thread (<i>Laetisaria fuciformis</i>)			
Avoid nitrogen deficiency, especially on perennial ryegrass and fine fescues.			
Concert	225 mL	14	Apply when cool, wet conditions occur. Prolonged periods of high humidity favour the development of the disease. Do not apply more than 3 applications/season.
Banner MAXX	51 mL	14	Apply when cool, wet conditions occur. Prolonged periods of high humidity favour disease development. Do not apply more than 3 times/season.
Quali-Pro Propiconazole 14.3 ME	51 mL	14	Apply when cool, wet conditions occur. Prolonged periods of high humidity favour disease development. Do not apply more than 3 times/season.
Honor	16.8–33.6 g	14–28	Apply when conditions are favourable for disease development.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Rust (<i>Puccinia</i> spp.)			
Use resistant varieties of Kentucky bluegrass and perennial ryegrass. Provide adequate levels of fertility. Mow frequently.			
Pinpoint	9.86 mL	14	Begin applications when conditions favour disease development.
Honor	14.9 g	14	Apply when conditions are favourable for disease development.
Insignia SC	10 mL	14	Apply when conditions are favourable for disease development.
Slime moulds			
Remove spore masses by raking or hosing off the turf.			
no chemical control available			
Summer patch (<i>Magnaporthe poae</i>)			
Symptoms usually occur during July to August. Attacks annual bluegrass and Kentucky bluegrass. Avoid nitrogen deficiency. Apply light frequent watering during dry periods to reduce heat stress.			
Disarm	5.8–11.5 mL	14–28	Start applications in the spring when the soil temperatures at 5-cm depth reach 15.5°C–18°C or as prescribed by local turf specialists.
Banner MAXX	103 mL	30	Apply as a preventive when soil temperature is greater than 16°C at a 5-cm depth for 4 consecutive days, with a second application 30 days later. A third application may be required if hot, humid weather occurs. Apply with 13–21 L water/100 m ² . Do not apply more than 3 times a season.
Mirage Stressgard	32–64 mL	14–28	Begin applications preventively when soil temperatures reach 15°C–18°C at a 5-cm soil depth in areas previously affected by summer patch. Continue as needed on a 14–28-day interval. Use the highest rate and shortest interval under severe disease pressure and where there is a prior history of disease.
Quali-Pro Propiconazole 14.3 ME	103 mL	30	Apply as a preventive when soil temperature is greater than 16°C at a 5-cm depth for 4 consecutive days, with a second application 30 days later. A third application may be required if hot, humid weather occurs. Apply with 13–21 L water/100 m ² . Do not apply more than 3 times a season.
Eagle WSP	18 g	30	Will control only low-to-moderate disease severity.
Tourney Fungicide	11.2 g	once	Use preventively when conditions favour disease development in the spring and fall. Apply in 16 L water/100 m ² .
Heritage MAXX	32–63 mL	14–28	Apply when conditions favour disease development. Apply the lower rate at 14-day intervals or higher rate at 28-day intervals.
Honor	16.8–33.6 g	14–28	Initiate applications in the spring when soil temperatures reach 15.6°C–18.3°C at a 5.1-cm soil depth, or as dictated by local recommendations.
Take-all patch (<i>Gaeumannomyces graminis</i>)			
Attacks bentgrasses. Use acidifying (ammonium) fertilizers to reduce thatch pH. Avoid drought stress.			
Disarm	11.5 mL	28	Begin applications before disease is present and continue applications while conditions are favourable for disease development. Make up to 2 applications in the spring and/or fall. Maximum 3 applications/season.
Heritage MAXX	63 mL	28	Apply 2 applications in the spring and 2 applications in the fall.
Banner MAXX	32–63 mL	14–28	Make 1–2 fall applications in September and October or when night temperatures drop to 13°C, and 1–2 spring applications in April and May. Apply preventively when conditions favour disease development (high surface moisture or humidity and warm night temperatures). DO NOT exceed more than 4 applications/year. DO NOT add surfactants or wetting agents, as this may result in phytotoxicity.
Pinpoint	9.86 mL	14	Begin applications when conditions favour disease development.
Honor	33.3 g	28	Suppression only. Make 1 application in the fall and 1 application in the spring.
Insignia SC	22.4 mL	28	Make 1 application in the fall and 1 application in the spring.

Table 2-3. Disease control products registered for use on sod farms, golf courses and other excepted uses

LEGEND: ASO: aqueous suspension organic F: flowable FF: flowable fungicide ME: microemulsion SC: suspension concentrate SP: soluble pack W: wettable WDG: water dispersible granule WG: wettable granule WP WSB: wettable powder water soluble bag WSP: water soluble pouch			
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m²	Interval (days)	Comments from the product label. See label for complete information.
Waitea patch or brown ring patch (<i>Waitea circinata</i> var. <i>circinata</i>)			
Disarm	5.8–11.5 mL	14–21	Use preventively. Begin applications when conditions are favourable for disease infection, prior to disease symptom development. Use the higher rate under high disease pressure.
Medallion	30–60 mL	7–14	Begin applications when conditions are favourable for disease infection and prior to disease symptom expression. Under conditions of high disease pressure, use the highest label rate and the shortest interval. For optimum disease control, tank-mix or alternate with a contact fungicide such as Daconil 2787 or Daconil Ultrex. Apply in sufficient water to ensure thorough coverage. Water volume of 4–8 L water/100 m ² is recommended.
Tourney Fungicide	11.2 g	once	Use preventively when conditions favour disease development. Apply in 8 L water/100 m ² .
Heritage MAXX	32–63 mL	14–28	Apply when conditions are favourable for disease development, i.e., warmer temperatures between 20°C and 30°C and during periods of high humidity and extended leaf wetness. During prolonged periods of favourable conditions, apply on the shorter application interval. DO NOT apply more than 2 sequential applications of Heritage MAXX before alternating with a fungicide of a different group with a different mode of action.
Honor	33.6 g	14–28	Begin applications preventively or when early ring development is evident. Late curative applications will not be effective. Use 8–15 L spray volume/100 m ² . Provide short irrigation cycle directly following treatment to move fungicide through thatch. Brown ring patch symptoms may take 2–3 weeks to disappear following application.

Insects

Insecticides registered for use on sod farms, golf courses and other excepted uses are listed in Table 2–4.

Insect control products are listed in Table 2–5.

Insect parasitic nematode species are listed in Table 2–6.

Table 2–4. Insecticides registered for use on sod farms, golf courses and other excepted uses

LEGEND: ai: active ingredient CS: capsule suspension E: emulsion EC: emulsifiable concentrate F: flowable G: granules T: turf SC: suspension concentrate T&O: turf and ornamental WG or WDG: water dispersible granule WP WSB: wettable powder water soluble bag				
Trade name (alphabetically in each group)	Classification	Common name	LD ₅₀ (mg ai/kg) ¹	Chemical family
Acelepryn Suspension	2	chlorantraniliprole	>5,000	anthranilic diamide
Arena	2	clothianidin	>5,000	neonicotinoids
Chipco Sevin T&O	3	carbaryl	400–850	carbamate
Deltagard SC	3	deltamethrin	700	synthetic pyrethroid
Dursban, Pyrate	3	chlorpyrifos	135	organophosphate
Merit 0.5G, Merit Solupak	4	imidacloprid	424–475	chloronicotinyl
MET52 EC BioInsecticide	3, 11	<i>Metarhizium anisopliae</i> strain F52	>5,000	biological
Quali-Pro Imidacloprid 75 WSP, Quali-Pro Imidacloprid 0.5 Granular	4	imidacloprid	424–475	chloronicotinyl
Scimitar CS	3	lambda-cyhalothrin	632–696	synthetic pyrethroid
Success 480SC	4	spinosad	75,000	naturalyte

¹ The relative toxicity may be referred to as its LD₅₀. The higher the LD₅₀ figure, the less toxic the product is to humans. Products with low LD₅₀ ratings are highly toxic. No products registered for turf have a high acute toxicity.

Table 2-5. Insect control products

LEGEND: CS: capsule suspension E: emulsion EC: emulsifiable concentrate F: flowable G: granules T: turf SC: suspension concentrate T&O: turf and ornamental WG or WDG: water dispersible granule WP WSB: wettable powder water soluble bag		
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m² (unless otherwise stated)	Comments from the product label. See label for complete information.
Annual bluegrass weevil (<i>Listronotus maculicollis</i>)		
A problem on closely mowed turf composed mainly of annual bluegrass. Monitor for adults returning to turf when forsythia are in full bloom.		
Acelepryn	8.8–11.25 mL	Apply when over-wintered adult annual bluegrass weevils are observed in late April or early May to prevent damage from larvae in late-May and June. Higher rate may be required for applications made after mid-May.
Arena	5.5–7.0 g	Apply when populations reach damaging thresholds. For optimal control, target 2nd- and 3rd-instar larvae. Early-season-to-overwintered adults may provide suppression only. Do not make more than 1 application/season. Avoid mowing grass until after irrigation or rainfall has occurred.
Dursban 2E	45 mL	Spray suspected problem areas in mid-April and again in mid-May.
Dursban T	22.5 mL	
Pyrate 480 EC	22.5 mL	Spray suspected problem areas in mid-April and again in mid-May, or as recommended by your local Agricultural Representative.
Ant (<i>Lasius neoniger</i>)		
Chipco Sevin T&O	210–290 mL	Mow turf and apply spray. Do not water for 2 days after treatment. Repeat in 2–3 weeks if needed.
Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. A second application may be necessary in 2–3 weeks where heavy infestations occur. For dense turfgrass canopies or turf maintained under high mowing heights, minimum water volumes of 10 L/100 m ² are recommended. Delay irrigation or mowing for 24 hr after application. Do not apply more than 2 times a year.
Scimitar CS	3.7 mL	Apply in 8–10 L/100 m ² of water in spring and late summer. Re-apply after a minimum of 7 days if needed. Do not apply more than 4 times a year.
Dursban 2E	45 mL	Spray when pests first appear; repeat as needed.
Dursban T	22.5 mL	
Pyrate 480 EC	22.5 mL	Spray when pests first appear; repeat as needed. Maximum applications are 2/season.
Black turfgrass ataenius (<i>Ataenius spretulus</i>)		
Monitor for adults in clipping baskets or with a soap flush when Van Houtte spirea and horse chestnut are in bloom.		
Merit Solupak	1 packet/1,200 m ²	Apply prior to egg hatch. Irrigation or rainfall should occur within 24 hr to move the active ingredient through the thatch. On golf courses, irrigate treated areas following application. Avoid mowing until after irrigation or rainfall. Apply only once a year.
Merit 0.5 G	560 g	
Quali-Pro Imidacloprid 75 WSP	1 packet/1,200 m ²	Apply prior to egg hatch. Irrigation or rainfall should occur within 24 hr. On golf courses, irrigate treated areas following application. Avoid mowing until after irrigation or rainfall has occurred. Apply only once a year.
Quali-Pro Imidacloprid 0.5 G	560 g	
Bluegrass billbug (<i>Sphenophorus parvulus</i>)		
Arena	4.5 g	When adults are first identified in the spring. Do not make more than 1 application/season. Avoid mowing grass until after irrigation or rainfall has occurred.

Table 2-5. Insect control products

LEGEND: CS: capsule suspension E: emulsion EC: emulsifiable concentrate F: flowable G: granules T: turf SC: suspension concentrate T&O: turf and ornamental WG or WDG: water dispersible granule WP WSB: wettable powder water soluble bag		
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m² (unless otherwise stated)	Comments from the product label. See label for complete information.
Cutworm (various species) Monitor using a soap flush.		
Acelepryn	1.45–2.9 mL	Delay watering or mowing for 24 hr after application. If the area being treated is maintained at a mowing height of greater than 2.5 cm, then the higher rate may be required during periods of high pest pressure.
Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. A second application may be necessary in 2–3 weeks where heavy infestations occur. For dense turfgrass canopies or turf maintained under high mowing heights, minimum water volumes of 10 L/100 m ² are recommended. Delay irrigation or mowing for 24 hr following application. Do not apply more than 2 times/year.
Chipco Sevin T&O	210–290 mL	Mow and apply spray. Do not water for 2 days after treatment. Repeat in 2–3 weeks if needed.
Dursban 2E	45 mL	Spray when pests first appear. Repeat as needed.
Dursban T	22.5 mL	
Pyrate 480 EC	22.5 mL	Spray when pests first appear. Repeat as needed. Maximum applications are 2/season.
European chafer/Japanese beetle (<i>Rhizotrogus majalis</i>)/(<i>Popillia japonica</i>)		
Acelepryn	5.6–8.8 mL	Apply from early April to late August for preventive and early curative control. Base need on historical monitoring, previous records or experiences, current season adult trapping or other methods. The higher rates may be required for early season (April and May) applications where a long residual is required, or in late August when less sensitive mid-instar grubs are present. Do not apply when the soil is saturated with water. Irrigate immediately after application.
Arena	2.5–5.0 g	Preventive applications — Make applications through peak egg hatch of target species, beginning as early as the first adults appear. Curative applications — Curative applications are considered applications after egg hatch of the target species of when obvious turf damage from current generation has occurred. Use the upper end of the rate range when making applications post egg hatch. Late-season applications (late summer or early fall) may provide suppression only. Ensure each application is followed by sufficient irrigation or rainfall to move active ingredient through the thatch. The need for an application can be determined by a number of methods, including historical monitoring of the site, previous records or experiences, and current season adult trapping. Do not make more than 1 application/season. Avoid mowing grass until after irrigation or rainfall has occurred.
Merit Solupak	1 packet/1,200 m ²	Apply prior to egg hatch. Irrigation or rainfall should occur within 24 hr. On golf courses, irrigate treated areas following application. Avoid mowing turf areas until after irrigation or rainfall has occurred. Apply only once a year.
Merit 0.5 G	560 g	
Quali-Pro Imidacloprid 75 WSP	1 packet/1,200 m ²	Apply prior to egg hatch. Irrigation or rainfall should occur within 24 hr. On golf courses, irrigate treated areas following application. Avoid mowing turf areas until after irrigation or rainfall has occurred. Apply only once a year.
Quali-Pro Imidacloprid 0.5 G	560 g	
Chipco Sevin T&O	210–290 mL	Apply to the early instar stage. Irrigate after application. If soil is dry, remove excessive thatch and irrigate 24 hr before treatment.
June beetle grubs (<i>Phyllophaga</i> spp.) no insecticides registered		

Table 2-5. Insect control products

LEGEND: CS: capsule suspension E: emulsion EC: emulsifiable concentrate F: flowable G: granules T: turf SC: suspension concentrate T&O: turf and ornamental WG or WDG: water dispersible granule WP WSB: wettable powder water soluble bag		
Control (in order by highest LD₅₀, i.e., least toxic)	Rate/100 m² (unless otherwise stated)	Comments from the product label. See label for complete information.
Hairy chinch bug (<i>Blissus leucopterus hirtus</i>) The smaller stages of chinch bug nymphs are easiest to control.		
MET52 BioInsecticide	64–96 mL	Suppression only. Use the higher application rate when pest pressure is high. Re-apply as required. The need for and timing of re-application should be determined by monitoring. The application interval is 4 weeks for hairy chinch bug.
Arena	3.5–5.0 g	Apply when insect populations reach damaging thresholds. Use the upper end of the rate range when pest pressure is high or when treating areas with very low damage thresholds (e.g., golf greens, sod farms). Do not make more than 1 application/season. Avoid mowing grass until after irrigation or rainfall has occurred.
Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. A second application may be necessary in 2–3 weeks where heavy infestations occur. For dense turfgrass canopies or turf maintained under high mowing heights, minimum water volumes of 10 L/100 m ² are recommended. Delay irrigation or mowing for 24 hr following application. Do not apply more than 2 times/year.
Chipco Sevin T&O	210–290 mL	Mow turf and apply spray. Do not water for 2 days after treatment. Repeat in 2–3 weeks if needed.
Dursban 2E	45 mL	Spray when pests first appear. Repeat as needed.
Dursban Turf	22.5 mL	
Pyrate 480 EC	22.5 mL	Spray when pests first appear. Repeat as needed. Do not apply more than 2 times a season.
Leatherjackets (larvae of European crane fly <i>Tipula paludosa</i>)		
Arena	5.5 g	Apply in the spring, when larvae are mature but prior to pupation. In the fall, apply prior to egg hatch. Only apply when populations of leather jackets (European crane fly) reach damaging thresholds. Do not make more than 1 application/season. Avoid mowing grass until after irrigation or rainfall has occurred.
Merit Solupak	1 packet/1,200 m ²	Suppression only. Apply when adult crane flies take flight in August and September and begin laying eggs.
Merit 0.5 G	560 g	
Chipco Sevin T & O	200 mL	Apply in 150–200 L/100 m ² or for small areas 1.5–3 L/100 m ² and irrigate. Apply only once a year. Consider treatment at or above 270 larvae/m ² .
Dursban T	20–25 mL	Apply as drenching spray in water in late fall after the flight of adult crane flies has ceased.
Pyrate 480 EC	20–25 mL	Apply as drenching spray in water in late fall after the flight of adult crane flies has ceased.
Sod webworm, cranberry girdler and lawn moths (various species)		
Success 480 S	0.5–1.0 mL	Treat in early morning or early evening. Do not re-apply within less than 7 days. Do not water for 2 days after application. Do not mow turf for 1–3 days after treatment. Do not exceed 4 applications a year.
Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. A second application may be necessary in 2–3 weeks where heavy infestations occur. For dense turfgrass canopies or turf maintained under high mowing heights, minimum water volumes of 10 L/100 m ² should be used. Delay irrigation or mowing for 24 hr. Do not apply more than 2 times a year.
Chipco Sevin T&O	210–290 mL	Mow turf and apply spray. Do not water for 2 days after treatment. Repeat in 2–3 weeks if needed.
Dursban 2E	45 mL	Delay watering or mowing the treated area for 12–24 hr after treatment.
Dursban Turf	22.5 mL	Delay watering or mowing the treated area for 12–24 hr after treatment.
Pyrate 480 EC	22.5 mL	Delay watering or mowing the treated area for 12–24 hr after treatment.

Insect Parasitic Nematodes

Insect parasitic nematodes are microscopic worm-like creatures that move through the soil and attack insects. There are two types of behaviour exhibited by nematodes: “sit and wait, or ambusher” and “cruiser.”

The sit-and-wait or ambusher nematodes stand on their tails in an upright position near the soil surface and attach to passing hosts. The cruiser does not attach well to passing hosts but is highly mobile, can travel a fair distance and is able to seek out its host. One nematode species exhibits a behaviour that is intermediate to the “sit and wait” and “the cruiser.”

Each nematode species has a preferred host. Depending on the species of nematode, they may be used to control leatherjackets, white grub species and caterpillars (cutworms and sod webworm). Nematodes are sold in a dormant stage, which are mixed with water then applied to the soil. They can also be applied through irrigation systems or conventional sprayers. Nematodes are living organisms and as such are not regulated by the *Pesticides Act* and Reg. 63/09.

Table 2–6 lists the insect parasitic nematode species. Many different products are available. For specific rates of application, consult the product label. For more information on nematodes, see OMAFRA Publication 845, *Integrated Pest Management for Turf*.

Table 2–6. Insect parasitic nematode species

Target pest	Insect parasitic nematode species	Optimum temperature range
Caterpillars (cutworm, sod webworm), hairy chinch bug and leatherjackets (European crane fly larvae)	<i>Steinernema carpocapse</i>	Work best when temperatures range from 22°C–28°C.
White grub species	<i>Steinernema glaseri</i>	Especially effective against grubs. Largest nematode species.
Fly larvae and leatherjackets	<i>Steinernema feltiae</i>	Continue to work when soil temperatures are as low as 10°C.
White grub species	<i>Steinernema scarabaei</i>	Can survive at cooler temperatures than <i>Steinernema carpocapse</i> , <i>Steinernema glaseri</i> and <i>Heterorhabditis bacteriophora</i> .
White grub species and leatherjackets (European crane fly larvae)	<i>Heterorhabditis bacteriophora</i>	Work best when soil temperatures are above 20°C.

Best Management Practices for Nematodes Use

- Keep nematodes refrigerated until used.
- Keep out of direct sunlight — they are sensitive to sunlight, drying out and extremes in temperature.
- Water the turf until moist and then apply nematodes.
- Water immediately after nematode application.
- Keep turf wet for 2 days after application.
- Apply when soil temperature is greater than 12°C and less than 30°C.
- Remove any screens or filters from sprayer applicator.
- Keep agitated and do not store diluted mixture for more than 6 hr.

Other Pests

Slug control and snail bait registered for use on sod farms, golf courses, other excepted uses and cosmetic uses are listed in Table 2–7.

Snail and slug control products are listed in Table 2–8.

Goose repellent registered for use on sod farms, golf courses, other excepted uses and cosmetic use are listed in Table 2–9.

Slugs

Table 2–7. Slug control and snail bait registered for use on sod farms, golf courses, other excepted uses and cosmetic uses

Trade name	Classification	Common name	LD ₅₀ (mg ai/kg) ¹	Chemical family
Sluggo Slug and Snail Bait for Gardens	6	ferric phosphate	>5,000	inorganic
Sluggo Professional Slug and Snail Bait	4	ferric phosphate	>5,000	inorganic

¹ The relative toxicity may be referred to as its LD₅₀. The higher the LD₅₀ figure, the less toxic the product is to humans. Products with low LD₅₀ ratings are highly toxic. No products registered for turf have a high acute toxicity.

Table 2–8. Snail and slug control products

Product	Control	Rate	Interval	Comments
Sluggo	Snails and slugs on lawns and grass grown for seed production	2.5–5 g/m ²	14 days	Apply at higher rate if infestation is severe, if the area is heavily watered or after long periods of heavy rain. When slugs or snails are detected, scatter product by hand or with a granular spreader where the slugs or snails are observed. Do not place in piles. If the ground is dry, wet it before applying bait. The soil should be moist but with little or no standing water.
Sluggo Professional Slug and Snail Bait				

Canada Geese

Table 2–9. Goose repellent registered for use on sod farms, golf courses, other excepted uses and cosmetic use

Trade Name	Classification	Common name	LD ₅₀ (mg ai/kg) ¹	Chemical family
Avigon 14.5	4	methyl-anthranilate	10,000	n/a

¹ The relative toxicity may be referred to as its LD₅₀. The higher the LD₅₀ figure, the less toxic the product is to humans. Products with low LD₅₀ ratings are highly toxic. No products registered for turf have a high acute toxicity.

Avigon 14.5 can be used as a repellent for Canada geese. For turfgrass of about 2.5 cm in height, apply 13 L/ha of undiluted Avigon 14.5. Dilute Avigon 14.5 according to the directions before application to turf. Spray evenly on area to be protected to provide thorough coverage and allow material to dry before permitting human activity. Do not mow treated area for as long as possible after treatment. Repeat after 3 days if needed.

Dilution instructions

Make sure spray equipment is clean before mixing. Shake or stir Avigon 14.5 container well. Mix Avigon 14.5 with water at a ratio of 1 part product to 19 parts water. For example, mix 1 L of product with 19 L of water to make 20 L of spray mixture. Mix product outside or in a ventilated area.

Use restrictions

This product may be used to repel Canada geese from golf courses and municipal parks. Do not apply to residential lawns or recreational areas of parks. Do not apply when grass is wet or rain is expected or when temperatures are below freezing. Avoid direct exposure to honey bees. Do not apply in the vicinity of hives.