Chapter Three

DISEASES OF GRASSES

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APPENDIX I. Fungicides Registered for Use on Turf Grasses .................................................................................................... 21
BENTGRASS (Agrostis spp.)

ALGAE

Green and filamentous blue-green algae.

Cultural: Aerify turf to assist water penetration and drying of soil surface. Improve air circulation and light by judicious pruning of trees and shrubs. Avoid heavy applications of organic nitrogen fertilizers.

Chemical: None.

References:

BROWN PATCH

Rhizoctonia solani

Cultural: Avoid unbalanced or excessive nitrogen application, particularly where there is a history of the disease. Switch or pole off dew. Reduce frequency of mowing. Reduce irrigation, especially late in the day (2). In seed fields, postharvest burning gives partial control (1). A. stolonifera and A. canina do not tolerate burning; residue should be removed after harvest.

Resistant Cultivars: None.

Chemical: On turf, before the disease appears and at 5 to 10 day intervals, apply - captan (COM) DU, WG, WP; chlorothalonil (COM, DOM) SG, SU, WG; iprodione (COM) GR, SU, WP, WG; thiophanate methyl (COM) GR, WP; trifloxystrobin (COM) WG; quintozone (COM) WP. Apply propiconazole (COM) EC at 14 day intervals. On golf courses or turf farms, at 14 - 28 day intervals, apply azoxystrobin (COM) WP. Limitations: As per label.

Notes: All grasses are susceptible. Hot, very humid day-time conditions with nights above 18°C favour the disease. The pathogen enters via wounds caused by mowing.

References:

COTTONY SNOW MOLD

See bluegrass, COTTONY SNOW MOLD on page 8.
DOLLAR SPOT

*Sclerotinia homoeocarpa*

**Cultural:** Disperse early morning dew by switching or poling. Avoid mowing or watering in the evening. Ensure adequate nitrogen and good ventilation.

**Resistant Cultivars:** None.

**Chemical:** Before or at first sign of disease, apply myclobutanil (COM) WP, or at first sign of disease and at intervals of 1 to 4 weeks, apply - chlorothalonil (COM, DOM) SG, SU; iprodione (COM) SU, WG, WP; propiconazole (COM) EC; thiophanate-methyl (COM) GR, WP. Limitations: As per label.

**Notes:** *S. homoeocarpa* can develop resistance to thiophanate methyl. Use this fungicide in an alternating schedule with different classes of fungicides. Dollar spot was recently confirmed on the prairies for the first time (3).

**References:**


GRAY SNOW MOLD

*Typhula* spp.

**Cultural:** Maintain grass vigour with adequate, balanced fertility in early fall. Avoid applying nitrogen within 6 weeks of turf dormancy to allow turf to harden off. Keep thatch to a minimum. Disperse heavy snow accumulations when snow begins to melt.

**Resistant Cultivars:** None.

**Chemical:** On turf in late fall apply - chloroneb (COM) GR, WP; chlorothalonil (COM, DOM) SU, SG; iprodione (COM) GR, SU, WG, WP; carbatin + oxycarboxin + thiram (COM) WP; propiconazole (COM) EC; quintozene (COM) WP. On golf courses or turf farms in fall, apply azoxystrobin (COM) WP. Limitations: As per label.

**Notes:** Timing of fungicide application is important. Apply as late in fall as possible before permanent snowfall.

**References:**


LEAF BLOTCH, RED LEAF SPOT, APICAL BLIGHT

See bluegrass, LEAF SPOT on page 10.

PINK SNOW MOLD AND FUSARIUM PATCH

*Microdochium nivale* (*Fusarium nivale*)

**Cultural:** Let turf harden off for winter. Mow into late fall and remove all leaves and debris. Use adequate and balanced, but not excessive or acid-tending fertilizer. Ensure adequate air and soil drainage.

**Resistant Cultivars:** None.

**Intermediate:** Penncross, Astoria, Bardot, Emerald, Prominent

**Susceptible:** Seaside, Highland and many others.

**Chemical:** In fall, before turf growth slows down, apply - azoxystrobin (COM) WP; chlorothalonil (COM, DOM) SU, SG; iprodione (COM) SU, WP; carthathiin + oxycarboxin + thiram (COM) WP; propiconazole (COM) EC; thiophanate-methyl (COM) WP; quintozene (COM) WP. For Fusarium patch control, in early spring or fall apply trifloxystrobin (COM) WG. Limitations: As per label.

**Notes:** For fusarium patch control, two or more applications, at 3- to 6-week intervals may be needed (4). Individual snow mold pathogens almost always occur in complexes with other pathogens and fungicide application is aimed at controlling the whole complex. Also see gray snow mold, cottony snow mold, and snow scald.

**References:**


PYTHIUM BLIGHT

*Pythium* spp.

**Cultural:** Avoid overwatering new plantings. On established turf, water as infrequently and thoroughly as possible and early in the day. Do not mow when grass is moist. Avoid unbalanced fertilizer applications. Keep thatch to a minimum.

**Resistant Cultivars:** None.

**Chemical:** Apply before disease develops or at first sign of disease - azoxystrobin (COM) WP; chloroneb (COM) GR, WP; etridiazole (COM) WP; fosetyl AL (COM) WG, WP; metalaxyl-m (COM) EC. Limitations: As per label.
**BENTGRASS**

Notes: All grasses are susceptible. Can occur during cool wet weather, but most severe damage is caused during hot humid weather.

**RED THREAD**

See fescue, RED THREAD on page 16.

**SNOW SCALD**

*Sclerotinia borealis*

**Cultural:** Remove deep snow cover in early spring. Remove trees and shrubs that favour snow accumulation and retention.

**Resistant Cultivars:** None.

**Intermediate:** Seaside.

**Susceptible:** Pennicross and most other varieties.

**Chemical:** None.

Notes: Most grass species are susceptible. Bentgrasses may be severely damaged on the prairies, especially in higher snowfall areas or years.

**References:**


**TAKE-ALL PATCH**

*Gaeumannomyces graminis* var. *avenae*

**Cultural:** Use acidic fertilizers such as ammonium sulphate and/or acidic top dressing to correct high pH soils. Renovate disease patches with more resistant grasses such as fescue or bluegrass. Avoid sowing bentgrass in recently cleared land (1, 2).

**Resistant Cultivars:** None.

**Chemical:** None.

Notes: Most common in higher rainfall areas following applications of alkaline materials. Chemical soil sterilization or use of wide-spectrum fungicides may inhibit antagonistic soil organisms.

**References:**


OTHER DISEASES

The following diseases of bentgrass are currently of minor importance (MI) and/or are diseases for which no practical control measures (NC) are currently available:

Stripe Smut (*Ustilago striiformis*) MI

BLUEGRASS, KENTUCKY (*Poa pratensis*)

ALGAE

See bentgrass, ALGAE on page 3.

ANTHRACNOSE

See fescue, ANTHRACNOSE on page 16.

BLISTER SMUT

*Entyloma dactylidis*

**Cultural:** Use resistant cultivars, or resistant species. Encourage rapid spring growth by ensuring adequate nutrients and water.

**Resistant Cultivars:** Majestic, Merion, Nugget, Sydsport.

**Susceptible:** Baron, Victa and many others.

**Chemical:** None.

**Notes:** Favoured by mild winters.

**References:**

COTTONY SNOW MOLD

Low-temperature basidiomycete - LTB (syn. *Coprinus psychromorbidus*)

**Cultural:** Remove thatch. Reduce snow cover with fences, by spreading drifts, and/or by removing trees and bushes. Spread soot or fine ash on snow to accelerate melting. Maintain adequate soil fertility.

**Resistant Cultivars:** None (see Notes).

**Intermediate:** Dormie, Park.

**Susceptible:** Fylking, Nugget, Sydsport, Merion, Newport and most other varieties.

**Chemical:** To turf, in late fall apply - carbaathiin + oxycarboxin + thiram (COM) WP. Limitations: As per label.

**Notes:** Individual snow mold pathogens almost always occur in complexes with other pathogens and fungicide application is aimed at controlling the whole complex. See pink snow mold, gray snow mold and snow scald.

**References:**


FAIRY RING

*Marasmius oreades, Lycoperdon* spp., *Psalliota* spp., *Clitocybe* spp.

**Cultural:** To mask symptoms on turf, apply nitrogen, aerate soil to 25 cm depth and irrigate well. Use spike and soak method (3). Divide lawn into sections with paths or borders (see Notes). Application of certain surfactants reduces symptom severity (1).

**Resistant Cultivars:** None.

**Chemical:** Treat soil with formaldehyde (COM) SN after the infested soil is disturbed and broken up. Apply azoxystrobin (COM) WP on turf farms or golf course as soon as possible after symptom development. Limitations: As per label.

**Notes:** Marasmius fairy rings will disappear when they contact artificial barriers or other fairy rings. Other types of fairy rings may generally be masked by adequate fertilizer and ample irrigation.
References:


GRAY SNOW MOLD

*Typhula incarnata, T. ishikariensis*

**Cultural:** Allow turf to harden off in the fall (2). Renovate and re-seed severely diseased areas.

**Resistant Cultivars:** None.

**Intermediate:** Park.

**Susceptible:** Merion, Nugget (1) and many other varieties.

**Chemical:** To turf in late fall apply - chloroneb (COM) GR, WP; chlorothalonil (COM DOM) SU, SG; iprodione (COM) GR, SU, WG, WP; carbathiin + oxycarboxin + thiram (COM) WP; propiconazole (COM) EC; quintozene (COM) WP. On golf courses or turf farms in fall, apply azoxystrobin (COM) WP. Limitations: As per label.

**Notes:**

1. Resistance has been evaluated to *T. incarnata* only.

2. With *T. ishikariensis*, which occurs in areas with colder winters, two or more fungicide applications may be required.

3. Individual snow mold pathogens almost always occur in complexes with other pathogens, and fungicide application is aimed at controlling the whole complex. See pink snow mold, cottony snow mold, and snow scald

References:


LEAF SPOT (Net Blotch), MELTING-OUT

Drechslera poae

Cultural: Avoid close mowing, excessive nitrogen application and excessive irrigation. Postharvest burning of crop residue in seed fields reduces leaf spot (2).

Resistant Cultivars: Bristol, Classic, Eclipse, Majestic.

Intermediate: Adelphi, America, A34, Banff, Barron, Enmundi, Fylking, Georgetown, Haga, Merion, Midnight, Nassau, Nuggett, Plush, Primo, Ram 1, Sydsport, Touchdown, Trampas, Victa.

Susceptible: Argyle, Cheri, Dormie, Geronimo, Glade, Gnome, Harmony, Mystic, Newport, Park, Prato, Welcome (1).

Chemical: Azoxystrobin (COM) WP; captan (COM) DU, WP; iprodione (COM) GR, SU, WG, WP; chlorothalonil (COM, DOM) SU, SG; propiconazole (COM) EC; trifloxystrobin (COM) WG. Limitations: As per label.

Notes: Infection of leaves is favoured by high humidity. Foot rot and melting out develop after leaf spotting. Important on west coast, rarely severe in the prairies.

References:

NECROTIC RING SPOT

Leptosphaeria korrae

Cultural: Use ammonium sulfate as the nitrogen fertilizer source. Apply 0.45 kg actual N per 1,000 sq. ft. in March, April, June, September and November. Irrigate only when necessary. Remove excess thatch and aerate turf to reduce compaction. Overseed with resistant cultivars or species.

Resistant Cultivars: Midnight, Wabash, Park, Eclipse, Adelphi and Majestic have shown resistance in Wisconsin. Perennial ryegrass and tall fescue have shown resistance in Washington.

Chemical: None.

References:
PINK SNOW MOLD
See bentgrass, PINK SNOW MOLD on page 5.

POWDERY MILDEW

_Erysiphe graminis_

**Cultural:** Avoid close mowing and excessive nitrogen application. Use creeping red fescue in shaded locations (3). Postharvest burning in seed fields gives partial control (2).

**Resistant Cultivars:** Bristol, Dormie, Harmony, Mystic, Ram 1, Welcome (1) and most of the new elite varieties.

**Intermediate:** America, A 34, Eclipse, Enmundi, Georgetown, Glade, Newport, Nuggett, Sydsport, Touchdown, Trampas.

**Susceptible:** Adelphi, Argyle, Banff, Cheri, Classic, Flyking, Geronimo, Gnome, Haga, Majestic, Merion, Midnight, Nassau, Plush, Prato, Primo, Victa, all _P. annua_.

**Chemical:** To turf, at 14-day intervals, apply - thiophanate-methyl (COM) WP. Propiconazole (COM) EC or pyraclostrobin (COM) EC may be used on Kentucky bluegrass grown for seed production. Limitations: As per label.

**References:**

RUST

_Puccinia poae-nemoralis, P. recondita, P. graminis_

**Cultural:** Maintain vigorous grass growth in summer. Postharvest burning gives partial control in seed crops (2).

**Resistant Cultivars:** None.

**Intermediate:** Most cultivars.

**Susceptible:** Dormie, Merion (1).

**Chemical:** Pyraclostrobin (COM) EC may be used on bluegrass grown for seed production. Limitations: As per label.
References:


SILVERTOP

Insects (*Leptoterna dolabrata*, *Capsus simulans*, mites, thrips), *Fusarium poae*

**Cultural:**
Postharvest burning in seed fields can be effective (2, 5).

**Resistant Cultivars:**
None

**Chemical:**
Insecticide application of Decis EC at the boot stage may reduce silvertop incidence (4).

References:


SLIME MOLDS

*Physarum* spp. and others.

**Cultural:**
Break up unsightly spore masses by vigorous raking, brushing, or hosing down with a strong stream of water.

**Chemical:**
None.
STRIPE SMUT

_Ustilago striiformis_

**Cultural:** Use minimum nitrogen during warmest summer months. Postharvest burning of seed fields gives partial control (1).

**Resistant Cultivars:** Adelphi, Majestic, Park, Touchdown.

**Susceptible:** Merion, Windsor.

**Chemical:** None.

**Notes:** Seed may be infested.

**References**


BROMEGRASS, MEADOW (*Bromus riparius*)

HEAD SMUT OF GRASSES

_Ustilago bullata_

**Cultural:** Use seed that is free of the pathogen. Rogue seed fields.

**Resistant Cultivars:** None.

**Chemical:** Treat seed with carbathiin + thiram (COM) WP (Vita vax Powder PCP# 27595). Limitations: As per label.

**Notes:** Races of this pathogen attack many native and introduced grass species. However, meadow bromegrass and slender wheatgrass are the only economically important species for which significant damage has been reported in Western Canada.

**References**


BROMEGRASS, SMOOTH (Bromus inermis)

BROWN LEAF SPOT (LEAF BLOTCH)

Pyrenophora bromi (imperfect state Drechslera bromi)

Cultural: Grazing pastures clean, cut stubble short, and remove hay and straw to reduce carry-over in crop debris. Stubble burning in seed crops will reduce incidence but occasionally lowers yields. Since the disease is most severe when soil fertility is low, apply recommended N fertilizer and P after soil test (3).

Resistant Cultivars: None (see Notes).

Intermediate: Baylor, Magna.

Susceptible: Carlton, Manchar, and many others.

Chemical: None.

Notes: Cultivars of southern and southern × northern breeding are less susceptible than northern ones (4). Meadow brome is resistant to brown leaf spot (1).

References:

1. Gossen, B.D. 2007. Personal communication. Agriculture & Agri-Food Canada Research Centre, Saskatoon, SK.


SELENOPHOMA LEAF SPOT

Selenophoma bromigena

Cultural: Grazing pastures clean, cut stubble short and pick up all hay and straw to reduce carry-over in crop debris. Stubble burning in seed crops will reduce disease incidence but occasionally lowers seed yield (4).

Resistant Cultivars: None (see Notes).

Intermediate: Magna.

Susceptible: Carlton and many other cultivars.

Chemical: None.

Notes: Those cultivars of southern and southern × northern breeding are less susceptible than northern ones (3). Meadow brome is resistant to selenophoma leaf spot (1).
References:

1. Gossen, B.D. 2007. Personal communication. Agriculture & Agri-Food Canada Research Centre, Saskatoon, SK.


SILVERTOP

See bluegrass, SILVERTOP on page 12.

OTHER DISEASES

The following diseases of bromegrass are currently of minor importance (MI) and/or are diseases for which no practical control measures (NC) are currently recommended:

**Bacterial Blight** (*Xanthomonas translucens*) MI

**Black Node** (*Alternaria* sp.) MI

**Ergot** (*Claviceps purpurea*) NC

**Halo Blight (Chocolate Spot)** (*Pseudomonas coronafaciens*) MI

**Powdery Mildew** (*Erysiphe graminis*) MI

**Root Rot** (*Fusarium* spp.) NC

**Scald** (*Rhynchosporium secalis*) NC

**Septoria Leaf Spot** (*Septoria bromi*) NC

**Snow Scald** (*Sclerotinia borealis*) MI
FESCUE, RED (*Festuca rubra*)

ANTHRACNOSE

*Colletotrichum graminicola*

**Cultural:** Aerate or spike turf to relieve compaction. Ensure good fertility and adequate moisture.

**Resistant Cultivars:** None.

**Intermediate:** Belmonte, Bolero, Diamond, Ensylva, Highlight, Jade, Pennlawn.

**Susceptible:** Bergond, Dawson, Engina, Paramir.

**Chemical:** Azoxystrobin (COM) WP - apply on golf course or turf farm as a preventative; chlorothalonil (COM) SU, SG - apply to turf before the disease appears and at 7-10 day intervals; fosetyl AL (COM) WG; propiconazole (COM) EC - apply at 21 day intervals. Limitations: For turf only. As per label.

**Notes:** Primarily a disease of turf. Favoured by high temperatures with high humidity.

COTTONY SNOW MOLD

See bluegrass, COTTONY SNOW MOLD on page 8.

GRAY SNOW MOLD

See bluegrass, GRAY SNOW MOLD on page 9.

PINK SNOW MOLD

See bentgrass, PINK SNOW MOLD on page 5.

RED THREAD

*Laetisaria fuciformis*

**Cultural:** Improve soil nitrogen and ensure overall good nutrition. Sow mixtures containing less susceptible species such as Kentucky bluegrass. Postharvest burning of seed fields gives partial control (1).

**Resistant Cultivars:** None.

**Chemical:** Apply propiconazole (COM) SU at 14-day intervals, when cool moist conditions occur.

**Notes:** Favoured by moist, cool conditions, although warmer than for pink snow mold. Common on the West Coast, especially under low nitrogen levels. Only occasionally serious in the prairies.
References:


SILVER TOP

See bluegrass, SILVER TOP on page 12.

STEM EYESPOT

*Didymella festucae* (imperfect state, *Phleospora idahoensis*)

**Cultural:** To avoid major losses, apply nitrogen to bring total N up to 50-70 kg ha in late fall to maximize seed production in the first crop year (1, 3) (see Note 1). Use a hot burn to remove all debris and stubble immediately after harvest (2) (See Note 2).

**Resistant Cultivars:** None.

**Chemical:** None.

**Notes:**

1. Stem eyespot affects seed production only, not turf or forage (2).

2. Burning after harvest may prevent seed production the following season in fields in the Peace River region. It is therefore only practical as part of rejuvenation in this region. In more southern areas, burning increases yield the following year (1).

**References:**


SNOW SCALD

*Sclerotinia borealis*

**Cultural:** *Hay and seed crops* - apply nitrogen fertilizer in the late fall to raise total N to 50-70 kg/ha for first crops and 70-100 kg/ha for subsequent and rejuvenated crops. Remove debris of previous crops.  
*Turf* - Remove deep snow cover in early spring. Remove trees and shrubs that favour snow accumulation and retention.

**Resistant Cultivars:** None.

**Chemical:** None.
References:


OTHER DISEASES

The following diseases of fescue are currently of minor importance (MI) and/or are diseases for which no practical control measures (NC) are currently recommended:

- **Blister Smut** (*Entyloma dactylidis*) MI
- **Brown Stripe** (*Passalora graminis*) NC
- **Net Blotch** (*Drechslera dictyoides*) NC
- **Powdery Mildew** (*Erysiphe graminis*) MI
- **Rust** (*Puccinia graminis, P. recondita*) MI
- **Stripe Smut** (*Ustilago striiformis*) MI

MEADOW FOXTAIL (*Alopecurus pratensis*)

**LEAF SCALD**

*Rhynchosporium* spp.

**Cultural:** In seed fields, cut stubble short following harvest or graze fields clean and remove all crop debris.

**Resistant Cultivars:** None (see Notes).

**Chemical:** None.

**Notes:**

1. Most cultivars are intermediate in susceptibility. No resistant cultivars have been released in Canada as of 2006.

2. The disease tends to increase with age of the stand.

OTHER DISEASES

The following diseases of meadow foxtail are currently of minor importance (MI) and/or are diseases for which no practical control measures (NC) are currently recommended:

- **Leaf Streak** (*Drechslera* sp.) NC
- **Snow Scald** (*Sclerotinia borealis*) NC
- **Stem Rust** (*Puccinia graminis*) NC
TIMOTHY (Phleum pratense and P. bertolonii)

PURPLE SPOT

Heterosporium phlei (= Cladosporium phlei)

Cultural: Apply recommended rates of N and P fertilizer. Although burning of stubble will partially control disease in seed crops, severe damage to stand may result (1).

Resistant Cultivars: None (see Notes).

Intermediate: Climax, Bounty.

Susceptible: Champ.

Chemical: None.

Notes: North American cultivars are generally more resistant than those from elsewhere.

References:


OTHER DISEASES

The following diseases of timothy are currently of minor importance (MI) and/or are diseases for which no practical control measures (NC) are currently recommended:

Apical Blight (Drechslera phlei) NC

Browning Root Rot (Pythium spp.) MI

Cottony Snow Mold (Low-temperature basidiomycete) MI

Ergot (Claviceps purpurea) NC

Snow Scald (Sclerotinia borealis) MI
GENERAL REFERENCES


### APPENDIX I. Fungicides Registered for Use on Turf Grasses in Canada

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Trade Name</th>
<th>Formulation</th>
<th>PCP#</th>
<th>C or D</th>
<th>GSM</th>
<th>PSM</th>
<th>BP</th>
<th>DS</th>
<th>P</th>
<th>MO</th>
<th>RR</th>
<th>DO</th>
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*a Preventive treatment  
C or D = Commercial or Domestic

GSM = grey snow mold  
PSM = pink snow mold  
BP = brown patch  
DS = dollar spot  
DO = damping off  
P = Pythium spp.  
MO = melting out  
RR = root rot  
RT = red thread  
FP = fusarium patch  
AN = anthracnose  
CSM = cottony snow mold  
PM = powdery mildew  
R = rust  
FR = fairy ring
### APPENDIX I. Fungicides Registered for Use on Turf Grasses (continued)

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<tr>
<th>Active Ingredient</th>
<th>Trade Name</th>
<th>Formulation</th>
<th>PCP#</th>
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<th>GSM</th>
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<th>MO</th>
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*preventive treatment

1 for use on bluegrass grown for seed only.
2 for use on bluegrasses, fescues and ryegrasses grown for seed only.

C or D = Commercial or Domestic

GSM = grey snow mold  
P = Pythium spp.  
PSM = pink snow mold  
MO = melting out  
BP = brown patch  
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3-22