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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:

1. Escritt, J.R. 1978. ABC of Turf Culture. Kaye and Ward, London. pg. 8.
2. Musser, H.B. 1962. Turf Management. McGraw-Hill Book Co. Inc. pg. 235.

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; quinterozone (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:

1. Bloom, J.R. and Couch, H.B. 1960. Influence of environment on diseases of turfgrass. I. Effect of nutrition, pH and soil moisture on rhizoctonia brown patch. *Phytopathology* 50: 532-535.
2. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. *Plant Dis.* 64: 641-645.
3. Kelly, A.F. 1988. Seed production of agricultural crops. Longman Scientific, page 115.

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:

1. Fenstermacher, J.M. 1980. Certain features of dollar spot disease and its causal organism *Sclerotinia homoeocarpa*. Pages 49-53 in *Advances in Turfgrass Pathology*. Larsen and Joyner, eds. Harcourt Brace Jovanovich Inc., Duluth.
2. Smith, J.D. *et al.* 1989. *Fungal Diseases of Amenity Turf Grasses* (3rd ed.), E & F.N. Spon, N.Y., N.Y. 401 pp.
3. Smith, J.D., Gossen, B.D., and Hsiang, T. 2001. First report of dollar spot, caused by *Sclerotinia homoeocarpa*, on turfgrass in Saskatchewan, Canada. *Plant Dis.* 85: 803.

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; carbathiin + oxycarboxin + thiram (COM) WP; propiconazole (COM) EC; quintozone (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:

1. Fushtey, S.G. 1975. The nature and control of snow mold of fine turfgrass in southern Ontario. *Can. Plant Dis. Surv.* 55: 87-90.
2. Gossen, B.D., Hsiang, T. and Murray, T.D. 2001. Managing snow mold diseases of winter cereals and turf. *in* Iriki, N. *et al.* (eds.) *Low Temperature Plant-Microbe Interactions Under Snow*. Hokkaido National Agriculture Research Station, Sapporo, Japan. pp. 181-192.
3. Hsiang, T., Matsumoto, N., and Millett, S.M. 1999. Biology and management of *Typhula* snow molds of turfgrass. *Plant Dis.* 83: 788-798.

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; carbathiin + oxycarboxin + thiram (COM) WP; propiconazole (COM) EC; thiophanate-methyl (COM) WP; quinterozone (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:

1. Fushtey, S.G. 1985. Chemical control of Fusarium Patch Disease in fine turfgrass. Proc. 22nd Ann. Conf. W.C.T.A. Feb. 1985.
2. Gossen, B.D., Hsiang, T. and Murray, T.D. 2001. Managing snow mold diseases of winter cereals and turf. *in* Iriki, N. *et al.* (eds.) Low Temperature Plant-Microbe Interactions Under Snow. Hokkaido National Agriculture Research Station, Sapporo, Japan. pp. 181-192.
3. Gaudet, D., and Gossen, B.D. 2003. Overwintering diseases. Pg. 214-222 *in* Diseases of Field Crops in Canada. K.L. Bailey, *et al.* (eds.), Canadian Phytopathological Society, Saskatoon, SK. 290 pp.
4. Smith, J.D. 1981. Some turfgrass disease problems in Saskatchewan. *Greenmaster* 17: 5-7.

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.

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: Penncross 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:

1. Smith, J.D. 1981. Some turfgrass disease problems in Saskatchewan. *Greenmaster* 17: 5-7.

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:

1. Davidson, R.M. and Goss, R.L. 1972. Effects of P, S, N, lime, chlordane, and fungicides on ophiobolus patch disease of turf. *Plant Dis. Rep.* 56: 565-567.
2. Gould, C.J. 1973. Ophiobolus patch: Bane to bentgrass. *Golf Supt.* 41(3).

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:

1. Fushtey, S.G. and Taylor, D.K. 1977. Blister smut in Kentucky bluegrass at Agassiz, B.C. Can. Plant Dis. Surv. 57: 29-30.

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 - carbathiin + 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:

1. Gossen, B.D. 1997. Development of snow mold resistance in alfalfa, Kentucky bluegrass and fall rye for western Canada. Pg. 53-62 in Proc. Int. Workshop on Plant-Microbe Interactions at Low-Temperature under Snow, Sapporo, Japan, November 25-28, 1997. 280 pp.
2. Gossen, B.D., Hsiang, T. and Murray, T.D. 2001. Managing snow mold diseases of winter cereals and turf. in Iriki, N. *et al.* (eds.) Low Temperature Plant-Microbe Interactions Under Snow. Hokkaido National Agriculture Research Station, Sapporo, Japan. pg. 181-192.
3. Smith, J.D. 1975. Resistance of turf grasses to low-temperature basidiomycete snow mold and recovery from damage. Can. Plant Dis. Surv. 55: 147-174.

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:

1. Nadeau, L.B., Blenis, P.V. and Knowles, N.R. 1993. Potential of an organosilicone surfactant to improve soil wettability and ameliorate fairy ring symptoms caused by *Marasmius oreades*. Can. J. Plant Sci. 73: 1189-1197.
2. Smith, J.D. 1980. Is biologic control of *Marasmius oreades* fairy rings possible? Plant Dis. 64: 348-354.
3. Smith, J.D. 1978. Fairy ring biology and control. Canadex 273.630, 3 pp.

GRAY SNOW MOLD

Typhula incarnata, *T. ishkariensis*

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. ishkariensis*, 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:

1. Gossen, B.D., Hsiang, T. and Murray, T.D. 2001. Managing snow mold diseases of winter cereals and turf. *in* Iriki, N. *et al.* (eds.) Low Temperature Plant-Microbe Interactions Under Snow. Hokkaido National Agriculture Research Station, Sapporo, Japan. pp. 181-192.
2. Hsiang, T., Matsumoto, N. and Millett, S.M. 1999. Biology and management of *Typhula* snow molds of turfgrass. Plant Dis. 83: 788-798.
3. Smith, J.D. 1981. Some turfgrass disease problems in Saskatchewan. Greenmaster 17(2): 5-7.

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:

1. Fushtey, S.G. 1987. Update on disease reaction of Kentucky bluegrass licensed for sale in Canada. Canadex 636, 2 pp.
2. Gray, P.M. and Guthrie, J.W. 1977. Burning and other cultural practices relative to populations of seed-borne pathogens of *Poa pratensis* L. Seed Technol. 5: 545-553.

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:

1. Worf, G.L. *et al.* 1986. Necrotic ring spot disease of turfgrass in Wisconsin. Plant Dis. 70: 453-458.
2. Clarke, B.B. and Gould A.B. 1993. Turfgrass patch diseases caused by ectotrophic root infecting fungi. APS Press, St. Paul, Minn. 161 pp.

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:

1. Fushtey, S.G. 1987. Update on disease reaction of Kentucky bluegrass licensed for sale in Canada. Canadex 636, 2pp.
2. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. Plant Dis. 64: 641-645.
3. Smith, J.D. 1978. Powdery mildew on *Poa pratensis* cultivars and selections. J. Sports Turf Res. 54: 45-52.

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:

1. Fushtey, S.G. 1982. Relative susceptibility of Kentucky bluegrass cultivars to damage by rust. Proc. West. Can. Turf Assoc. 19: 33.
2. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. Plant Dis. 64: 641-645.

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:

1. Berkenkamp, B. and Meares, J. 1975. Observations on silvertop of grasses in Alberta. Can. Plant Dis. Surv. 55: 83-84.
2. Gagne S., Richard, C. and Gagnon, C. 1984. La coulure des gramine: Etat des connaissances. Phytoprotection 65: 45-52.
3. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. Plant Dis. 64: 641-642.
4. Okuda, M.S. 1988. Evaluation of Decis EC for control of silvertop and *Capsus simulans* in creeping red fescue. Pest. Res. Rep. 1988, p. 134.
5. Soroka, J.J., and Gossen, B.D. 2005. Phytophagous arthropods and silvertop levels associated with post-harvest residue treatments in three turfgrass species grown for seed. Can. J. Plant Sci. 85: 213-224.

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

1. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. *Plant Dis.* 64: 641-645.

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 (Vitavax Powder PCP# 27595). Limitations: As per label.

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

References:

1. Falloon, R.E. 1979. Seedling and shoot infection of *Bromus catharticus* by *Ustilago bullata*. *Trans. Br. Mycol. Soc.* 73: 49-56.
2. Gossen, B.D. and Turnbull, G.D. 1995. Head smut of grasses on the Canadian Prairies: distribution, impact and control. *Can. J. Plant Pathol.* 19: 56-59.
3. Turnbull, G.D. and Gossen, B.D. 1996. Head smut of grasses on the Canadian prairies: II. Host range and variability. *Can. J. Plant Pathol.* 18: 255-260.

BROMEGRASS, SMOOTH (*Bromus inermis*)

BROWN LEAF SPOT (LEAF BLOTCH)

Pyrenophora bromi (imperfect state *Drechslera bromi*)

Cultural: Graze 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.
2. Hsiang, T., and Gossen, B.D. 2003. Diseases of grasses. Pg. 246-258 in Diseases of Field Crops in Canada. K.L. Bailey *et al.* (eds.), Canadian Phytopathological Society, Saskatoon, SK. 290 pp.
3. Smith, J.D. 1968. Control of *Pyrenophora bromi* in *Bromus inermis* by burning crop residues. Can. J. Plant Sci. 48: 329-331.
4. Smith, J.D. and Knowles, R.P. 1973. Resistance to *Pyrenophora bromi* in brome grass. Can. J. Plant Sci. 53: 93-99.

SELENOPHOMA LEAF SPOT

Selenophoma bromigena

Cultural: Graze 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.
2. Hsiang, T., and Gossen, B.D. 2003. Diseases of grasses. Pg. 246-258 in Diseases of Field Crops in Canada. K.L. Bailey *et al.* (eds.), Canadian Phytopathological Society, Saskatoon, SK. 290 pp.
3. Smith, J.D. and Knowles, R.P. 1967. Mass selection for resistance to *Selenophoma bromigena* in northern and southern types of *Bromus inermis*. Can. J. Plant Sci. 47: 679-681.
4. Smith, J.D. 1969. Control of *Selenophoma* leaf spot in clones of *Bromus inermis* by burning crop debris. Can. J. Plant Sci. 49: 381-383.

SILVERTOP

See bluegrass, SILVERTOP on page 12.

OTHER DISEASES

The following diseases of brome grass 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:

1. Hardison, J.R. 1980. Role of fire for disease control in grass seed production. *Plant Dis.* 64: 641-645.

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:

1. Gossen, B.D., Soroka, J.J. and Najda, H. 2002. Residue management increases seed yield of three turfgrass species in western Canada. *Can. J. Plant Sci.* 82: 687-692.
2. Smith, J.D. 1974. *Didymella festucae* and its imperfect state, *Phleospora idahoensis*, on *Festuca* species in western North America. *Can. J. Bot.* 52: 2061-2074.

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:

1. Smith, J.D. 1981. Some turf grass disease problems in Saskatchewan. *Greenmaster* 17: 5-7.

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:

1. Smith, J.D. 1970. Resistance of timothy cultivars to *Heterosporium phlei*, *Drechslera phlei* and frost injury. Can. Plant Dis. Surv. 50: 95-98.

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

1. Bailey, K.L., B.D. Gossen, Gugel, R. and Morall, R.A.A. (*Editors*). 2003. Diseases of Field Crops in Canada. Canadian Phytopathological Society, Saskatoon, SK. 290 pp.
2. Clarke, B.B. and Gould, A.B. (eds.). 1993. Turfgrass Patch Diseases Caused by Ectotrophic Root Infecting Fungi. APS Press. 161 pp.
3. Fushtey, S.G. and Sears, M.K. 1981. Turfgrass diseases and insect pests. Ont. Minist. Agric. Food, Publ. 162.
4. Gossen, B.D. *et al.* 2001. Managing snow mold diseases of winter cereals and turf. Pg 181-192 in Iriki, N. *et al.* Low Temperature Plant-Microbe Interactions Under Snow. Hokkaido National Agriculture Research Station, Sapporo, Japan.
5. Ormrod, D.J. and S.G Fushtey. 1983. Diseases of lawns. B.C. Minist. Agric. Food, Publ. 81-2, 12 pp.
6. Smith, J.D. 1980. Major diseases of turfgrasses in western Canada. Univ. Saskatchewan Publ. 162.
7. Smith, J.D. 1987. Winter-hardiness and overwintering diseases of amenity turfgrasses with special reference to the Canadian Prairies. Agriculture Canada Research Branch. Tech. Bull. 1987-12E. 193 pp.
8. Smith, J.D. *et al.* 1989. Fungal Diseases of Amenity Turf Grasses (3rd Ed.), E & F.N. Spon, N.Y., N.Y. 401 pp.
9. Smiley, R.W. *et al.* 2005. Compendium of Turfgrass Diseases (3rd Ed.). APS Press, St Paul, MN. 167 pp.

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

Fungicides					Diseases														
Active Ingredient	Trade Name	Formulation	PCP#	C or D	GSM	PSM	BP	DS	P	MO	RR	DO	FP	CSM	RT	R	AN	PM	FR
azoxystrobin	Heritage	50% WP	26155	C	X	X	X		X	X			X				X ^a		X
captan	Captan 7.5 Dust	7.5% DU	9319	C			X			X	X	X							
	Captan 50 WP	50% WP	4559, 5371, 14823, 15210	C			X			X	X	X							
	Captan 80 WP	80% WP	9582, 10780, 22423, 23190	C			X			X	X	X							
	Supra Captan 80 WDG	80% WG	24613	C			X			X	X	X							
carbathiin + oxycarboxin + thiram	Arrest 75W	20% 5% 50% WP	13431	C	X	X								X					
chloroneb	Proturf Granular V	6.25% GR	11466	C	X				X										
	Terraneb SP Turf	65% WP	10866	C	X				X										
chlorothalonil	C. I. L. Lawn	300 g/L SU	14563	D	X	X	X	X		X									
	Daconil 2787	40.4% SU	15724	C	X ^a	X ^a	X	X		X							X ^a		
	Daconil Ultrex 90 SDG Turf Care	90% SG	24794	C	X ^a	X ^a	X	X		X							X ^a		
etridiazole	Truban	30% WP	11460	C					X										
fosetyl AL	Aliette WP	80% WP	24564	C					X										
	Aliette WDG	80% WG	24458	C					X										
	Chipco Aliette T & O	80% WG	27557	C					X								X		

^a Preventive treatment

C or D = Commercial or Domestic

GSM = grey snow mold
PSM = pink snow mold
BP = brown patch
DS = dollar spot

P = Pythium spp.
MO = melting out
RR = root rot
DO = damping off

FP = fusarium patch
CSM = cottony snow mold
RT = red thread
R = rust

AN = anthracnose
PM = powdery mildew
FR = fairy ring

APPENDIX I. Fungicides Registered for Use on Turf Grasses (continued)

Active Ingredient	Trade Name	Formulation	PCP#	C or D	GSM	PSM	BP	DS	P	MO	RR	DO	FP	CSM	RT	R	AN	PM	FR
iprodione	Rovral Green GT	240 g/L SU	24379	C	X	X	X	X		X									
	Rovral	50% WP	15213	C	X	X	X	X		X									
	Rovral WDG	500 g/kg WG	24709	C	X	X	X	X		X									
	Proturf Granular Fungicide X	1.3% GR	23494	C	X	X	X	X ^a		X									
metalaxyl	Subdue MAXX	240 g/L EC	27055	C					X										
myclobutanil	Eagle WSP	40% WP	26585	C				X											
propiconazole	Banner	130 g/L EC	23693	C	X	X	X ^a	X		X			X		X		X		
	Banner MAXX	14.3% EC	27003	C	X	X	X ^a	X		X			X		X		X		
	Topas 250E	250 g/L EC	24030	C														X ¹	
pyraclostrobin	Headline	250 g/L EC	27322	C												X ²		X ²	
quintozene	Terraclor	75% WP	7251, 27691	C	X	X	X												
	Quintozene 75W	75% WP	11425, 27416	C	X	X	X												
	Crusoe 75WP	75% WP	28238	C	X	X	X												
thiophanate-methyl	Scotts Proturf Granular Systemic	2.3% GR	16660	C			X	X											
	Senator	70% WP	12279, 25343	C		X	X	X											X
	Easout T & O	70% WP	19465	C		X	X	X											X
trifloxystrobin	Compass 50WG	50% WG	27527	C			X			X			X						

^apreventive 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
 PSM = pink snow mold
 BP = brown patch
 DS = dollar spot

P = Pythium spp.
 MO = melting out
 RR = root rot
 DO = damping off

FP = fusarium patch
 CSM = cottony snow mold
 RT = red thread
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AN = anthracnose
 PM = powdery mildew
 FR = fairy ring