Snow Mold Research Report

1993-1994 Winter Season

Treatments were applied at three locations: Nursery green at Duluth - 22 October, Fairway at Edinburgh USA - 2 November, Green not in play at Stillwater - 3 November and a Nursery green at Northfield - 3 November. Additional treatments were applied 17 November at two Metro locations. Products were measured, mixed and applied at 45PSI to four replicates at each site in 2 gal./1,000 sq. ft. The 4 by 10 foot plus were scored for percent disease (mycelium and sclerotia) and a 2nd record was made to record the level of live or dead turf about 3 weeks after the first notes were taken. This began 8 March and continued through 7 May.

Disease level was high at Duluth, 99% mycelium and 90% dead turf in the UTC (untreated controls), while Edinburgh had 6%, Stillwater had 3.3% and Northfield had no disease. The first three sites were observed a 2nd time and with so little disease meaningful observations were not possible; however, the plots that had disease levels at or near the UTC level were those plots that performed poorly at Duluth also. The usual phytotoxic symptoms associated with mercury and PCNB were present in the sites with no or little disease. This tip burn/mercury symptom is leaf tip injury and is removed in the first or 2nd mowing. The pale green grass color/PCNB symptom does not last long and, with renewed growth, color returns, a bright green normal grass color. Neither of these symptoms are much of a negative and may be seen only if you have side by side plots.

Several products have acceptable levels of disease control and this is now the 2nd year for such performance. The standard mix of Caloclor + Chloroneb + PCNB (1 oz + 2 oz + 2 oz) had 0.5% disease and a range of performance of +/−0.5, a high level of control and little variation in the 4 replicates. Other good performers are: Prostar + PCNB (4.3 oz + 4 oz), or Chipco 26019 + Daconil 2787 F (4 fl oz + 8 fl oz) and (2 fl oz + 8 fl oz) or Chipco 26019 + PCNB + Daconil 2787 F (4 fl oz + 4 oz + 8 fl oz) or at (2 fl oz + 4 oz + 4 fl oz), or Vorlan + PCNB + Daconil 2787 F (2 oz + 4 oz + 4 fl oz), or the new product from Zeneca ICIA5504 in combination with either Daconil 2787 F or PCNB (0.7 oz Plus either 8 fl oz or 8 oz), and combinations of PCNB and Daconil 2787 F or Daconil 2787 75W or Daconil 2787 WDG (2 oz + either 8.6 fl oz or 6 oz 75W or 6 oz WDG).

Products with low disease score and a small range are judged to be best. The small −/+ following the Average Disease Score indicates the lack of or presence or mycelium and the superscript "s" indicates sclerotia of *Typhula ishikariensis* were present. The development of mycelium indicates some disease activity occurred, while the formation of sclerotia indicates a greater level of disease development. Color and grass growth scores three weeks after the initial readings indicate a strong relationship between disease/mycelium and dead turf. The UTC had 99% disease and 90% dead turf and the standard three way treatment of Caloclor + Chloroneb + PCNB had 0.5% disease and 0.5% dead turf.

The results of '93-'94 confirm the results from '92-'93. The winter disease agent this season was nearly all *Typhula ishikariensis* and little *Microdochium nivale (Fusarium nivale* or *Gerlachia nivalis*) was present. This species of Typhula is the more difficult one to control and is the most common Typhula in Minnesota. *T. incarnata* is also present some years, but is easier to control. Lower levels of disease control in the '92-'93 season are attributed to more Pink Patch or Pink Snow Mold. PCNB offers some control on both Typhula and Microdochium and therefore can improve both the control of Grey by Daconil 2787 and Pink by Chipco 26019 or Vorlan. The use of Daconil alone allows for development of Pink and the use of Chipco or Vorlan alone allows for the development of Grey, while a low rate (2 to 4 oz) of PCNB alone is not adequate.

The results of the last two years indicate that we have several choices for winter disease management. Some may be tempted to do nothing and hope for a winter season with no damage. I don't recommend that. Others who have open winters and little long term snow cover may wish to direct products towards the Pink group and those with more snow cover should consider the Grey types. A large area of Minnesota will have the potential for both and I cannot predict which species will be the most common. Early spring/late winter loss of turf can be due to Microdochium species, an early application of Chipco 26019, Vorlan, Fungo 50 or Tersan 1991 may be important to those who have good winter survival, but then experience rapid turf loss.

Chipco 26019 or Vorlan with Daconil 2787 F is a good choice in much of Minnesota and the addition of PCNB to this program strengthens both side of the treatment target. The Metro area should have good results with this recommendation; as you move north in the state the addition of PCNB is more important. Prostar or ICIA 5504 (when registered) in combination with either Daconil 2787 or PCNB is another good choice. Daconil in '93-'94 was a better choice then PCNB due to the fact the most disease pressure was from Typhula species. Products like Banner, Bayleton, Rubigan and now Sentinel are not good choices for most of Minnesota due to the fact that *Typhula ishikariensis* is not controlled.

(Continued on Page 28)

Snow Mold —

(Continued from Page 27)

Table 1. Snow Mold 1993-94 Minnesota

Snow Mold Treatment	Rate/1,000 sq. ft.	Average Disease Score	Range ±
SN 84364 NA314 Prostar	4.3 oz.	95–	5.0
SN 84364 NA314 Prostar & PCNB	4.3 oz. 4.0 oz.	0–	0.5
SN 84364 NA313 Prostar plus Triadimefon	3.6 oz.	54+	33.
Chipco 26019 F & Daconil 2787 F	4.0 fl. 8.0 fl.	2–	1.0
Chipco 26019 F & PCNB	4.0 fl. 6.0 oz.	13–	12.
Chipco 26019 F & PCNB	2.0 fl 4.0 oz.	32+	14.
Chipco 26019 & PCNB & Daconil 2787 F	4.0 fl. 4.0 oz. 8.0 fl.	0–	0
Chipco 26019 & PCNB & Daconil 2787 F	2.0 fl. 4.0 oz. 4.0 fl.	0–	0
Vorlan & Daconil 2787 & PCNB	2.0 oz. 4.0 fl. 4.0 oz.	2–	2
Calcolar & Tersan SP & PCNB	1.0 oz. 2.0 oz. 2.0 oz.	0.5–	0.5
ICIA 5504	0.7 oz.	79–	15
ICIA 5504 & PCNB	0.7 oz.	2–	1
ICIA 5504 & Daconil	0.7 oz. 8.0 fl.	0–	0
ICIA 5504 & Daconil F & PCNB	0.7 oz. 8.0 fl. 8.0 oz.	0–	0
Chipco 26019 F & Daconil 2787 F	2.0 fl. 8.0 fl.	0–	1
PCNB	2.0 oz.	80+	10
PCNB & Tersan SP &	2.0 oz. 2.0 oz.	55–	15
PCNB & Daconil 2787 F	2.0 oz. 8.6 fl.	1–	1
PCNB & Daconil 2787 75W	2.0 oz. 6.0 oz.	3–	3
PCNB & Daconil 2787WDG	6.0 oz. 6.0 oz.	3–	2.0
UTC		99+	5

Winter Injury Report '93 - '94

Situation

Winter injury, a serious problem for golf courses, has become even worse for those who have prevented one form of injury-desiccation only to have another problem related to crown hydration become the reason for turf loss. The high expectation for excellent turf quality in the early spring has stimulated the use of covers and the expense-labor and cost has driven the expectations even higher for quality turf.

Objectives

The study was to evaluate the ability of two grass populations, Poa and Bent, to survive freeze/thaw cycles after being removed from covers. Turf survival and green up data were collected to measure differences.

Procedure

Turf plugs were taken last fall from the University of Minnesota Golf Course from a site having Poa and another having Bent. These plugs were placed in metal flats as individual cores, surrounded with sand and then covered with green covers. Samples were taken three times during the winter and the cores were then saturated with water before freezing or left at normal soil water levels and stored in a growth chamber programmed to freeze the soil cores to minus 4 C or 25 degrees F. The cores were removed after one to 5 freeze cycles and placed in the green house for color and growth evaluations.

Results

The first plugs removed and grown out in the greenhouse were nearly identical in response: A 100% survival and 100% regrowth for both Poa and Bent. This was a real change from last year and the pattern continued. All 5 grow outs and all 3 replicates performed the same. Early in the process we identified that all plugs were nearly 100% Bent and no Poa was present. At first we believed it was a mix-up in plug labeling, but this was not the case. All plugs were mostly Bent and the source site was checked in the spring confirming the high Bent level. The only information gathered is that Bent grass survived all treatments. Covers made no difference to Bent grass. At least 90 to 95% survival of Bent was recorded in all plugs taken in 1993 and tested in 1994. The level of Bent in the test plugs prevented any meaningful measurements.