

Creeping Bentgrass/ Snow Mold Study

(*Agrostis palustris* 'Procup' or 'Pennncross')

Fusarium patch; *Microdochium nivale*
Typhula blight; *Typhula incarnata*

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Depts. of Microbiology and Plant and Soil Sciences
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Each treatment was applied to 3 ft x 3 ft plots on two different application dates: 12 or 18 Nov 01. The original plan was to have a longer time period between the application dates, but threatening weather conditions resulted in only a 6-day interval. The experimental design was a randomized complete block with four replications. Two separate experimental areas were used. One set of plots was on creeping bentgrass cv. 'Procup' that had been established Jun 96 on Hadley silt loam with pH 6.8. Novex 18-2-18 fertilizer was applied at a rate of 1lb N per 1000 sq ft on 18 Aug 01. Daconil Weather Stik (chlorothalonil) was applied at a rate of 6 oz per 1000 sq ft on 20 Aug 01. The other set of plots was on creeping bentgrass cv. 'Pennncross' that had been established in fall, 1999 on the same soil adjacent to the Procup experimental area. The same Novex fertilizer and Daconil Weather Stik applications were made to this experimental area. In both areas, the mowing height was 0.5 in., and the last mowing date was 1 Nov 01. Fungicides were applied with a CO2 backpack sprayer in water equivalent to 2.5 gal per 1000 sq ft at 30 psi. The snow mold pathogens (*M. nivale* and *T. incarnata*) were grown separately on sterilized rye (*Secale cereale*) grain for several weeks before the experiment was initiated. Approximately 1.7 oz (by volume) of pathogen-infested grain were applied by hand to each plot following the second fungicide application (18 Nov 01). *Microdochium nivale*-infested grain was applied to the Procup experimental area; *Typhula incarnata*-infested grain was applied to the Pennncross experimental area. After inoculation, the plots were covered with a high-density woven polyethylene commercial greens cover. Rainfall was far below normal, and temperatures were the highest on record for the winter months. Snowfall was sporadic and did not last long because of the warm temperatures. On 26 Feb 02, the turf covers were removed, and the plots were rated.

No *Typhula* blight developed in any of the plots inoculated with *T. incarnata*. This is not surprising given the warm and dry weather conditions. *Fusarium* patch did develop in some plots inoculated with *M. nivale*, but there was less disease in the nontreated plots than expected from past experience due to the warm, dry winter. Eighteen treatments resulted in no *Fusarium* patch on either application date. Sixteen additional treatments resulted in only

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Creeping Bentgrass

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trace amounts of disease (<2% Fusarium patch on both application dates). Applications of Insignia alone, Chipco 26GT + TADS12529, or TD2390 resulted in disease development that was commercially unacceptable. No phytotoxicity or other quality differences were observed in any of the plots. There were no significant differences in disease development at the two application dates with the exception of plots treated with TD2390.

<u>Treatment and Rate per 1000 sq ft</u>	<u>Application Date</u>	<u>Per Cent Turf Affected by Fusarium Patch</u>
Bayleton 50WP 2 oz + Compass 50WG 0.25 oz	Nov 12	0c
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Chipco Signature 80WG 4 oz + Turfcide 400 4SC 8 fl oz	Nov 12	0
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Chipco Triton 1.67SC 1 fl oz + Turfcide 400 4SC 8 fl oz + Surfactant 13093 16 fl oz/ 100 gal	Nov 12	0
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Daconil Weather Stik 6F 5.5 fl oz + Turfcide 400 4SC 8 fl oz + Surfactant 13093 16 fl oz/100 gal	Nov 12	0
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + TADS12529 70WG 0.3 oz + Turfcide 400 4SC 8 fl oz	Nov 12	0
	Nov 18	0
Defend 75WP 8 oz	Nov 12	0
	Nov 18	0
Honor 50WG 0.2 oz	Nov 12	0
	Nov 18	0
Honor 50WG 0.2 oz + Chipco 26GT 2SC 4 fl oz	Nov 12	0
	Nov 18	0
Lynx 45WP 2.22 oz + Compass 50WG 0.15 oz	Nov 12	0
	Nov 18	0
Lynx 45WP 2.22 oz + Compass 50WG 0.25 oz	Nov 12	0
	Nov 18	0
Medallion 50WP 0.33 oz + Banner MAXX 1.24MEC 3 fl oz + Daconil Weather Stik 6F 5.5 fl oz	Nov 12	0
	Nov 18	0
Spectro 90WDG 5 oz	Nov 12	0
	Nov 18	0
Spectro 90WDG 4 oz + Defend 75WP 6 oz	Nov 12	0
	Nov 18	0
Spectro 90WDG 4 oz + Defend 75WP 6 oz + Nutri-Grow 0-28-26 3 fl oz	Nov 12	0
	Nov 18	0
TD2390 42DF 6 oz + Topsin-M 70WP 3 oz	Nov 12	0
	Nov 18	0
Topsin-M 70WP 3 oz	Nov 12	0
	Nov 18	0
Turfcide 400 4SC 9 fl oz + Daconil Ultrex 82.5WDG 3.7 oz	Nov 12	0
	Nov 18	0
UCC UBI 4277 4SC 15 fl oz	Nov 12	0
	Nov 18	0
Bayleton 50WP 2 oz + Compass 50WG 0.25 oz + Turfcide 400 4SC 6 fl oz	Nov 12	0.3
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Chipco Triton 1.67SC 1 fl oz + Surfactant 13093 16 fl oz/ 100 gal	Nov 12	0.3
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Chipco Triton 1.67SC 1 fl oz + Turfcide 400 4SC 8 fl oz	Nov 12	0
	Nov 18	0.3
Chipco 26GT 2SC 4 fl oz + TADS12529 70WG 0.3 oz + Surfactant 13093 16 fl oz/100 gal	Nov 12	0
	Nov 18	0.3
Medallion 50WP 0.5 oz + Banner MAXX 1.24MEC 4 fl oz	Nov 12	0
	Nov 18	0.3
Spectro 90WDG 5 oz + Nutri-Grow 0-28-26 3 fl oz	Nov 12	0
	Nov 18	0.3
Turfcide 400 4SC 12 fl oz	Nov 12	0
	Nov 18	0.5
Chipco 26GT 2SC 4 fl oz + Chipco Triton 1.67SC 1 fl oz	Nov 12	0.5
	Nov 18	0.3
UCC UBI 4278 5SC 12 fl oz	Nov 12	0
	Nov 18	0.8
Chipco 26GT 2SC 2 fl oz + TADS14649 0.3 G 70 oz	Nov 12	0
	Nov 18	1.0
Insignia 20WG 0.9 oz + Chipco 26GT 2SC 4 fl oz	Nov 12	1.0
	Nov 18	0

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MGCSA Calendar

August 18

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Brainerd, Minn.

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STODOLA RESEARCH SCRAMBLE OAK MARSH GOLF COURSE

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Creeping Bentgrass—

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	Application Date	Per Cent Turf Affected by Fusarium Patch
Insignia 20WG 0.9 oz + Chipco 26GT 2SC 4 fl oz	Nov 12	1.0
	Nov 18	0
Chipco 26GT 2SC 4 fl oz + Daconil Weather Stik 6F 5.5 fl oz + Turfcide 400 4SC 8 fl oz	Nov 12	1.3
	Nov 18	0
Insignia 20WG 0.9 oz + Turfcide 400 4SC 8 fl oz	Nov 12	1.3
	Nov 18	0.3
Heritage 50WDG 0.4 oz + Banner MAXX 1.24MEC 2 fl oz + Daconil Weather Stik 6F 5.5 fl oz	Nov 12	0.5
	Nov 18	1.5
Lesco PCNB 12.5G 6 lb	Nov 12	1.5
	Nov 18	0.5
Medallion 50WP 0.5 oz + Daconil Weather Stik 6F 5.5 fl oz	Nov 12	0
	Nov 18	2.5
Chipco 26GT 2SC 4 fl oz + Chipco Triton 1.67SC 1 fl oz + Chipco Signature 80WG 4 oz	Nov 12	0.5
	Nov 18	2.3
Chipco 26GT 2SC 4 fl oz + TADS12529 70WG 0.3 oz	Nov 12	4.0
	Nov 18	0.3
Insignia 20WG 0.9 oz	Nov 12	4.5
	Nov 18	4.8
TD2390 42DF 6 oz	Nov 12	18.0
	Nov 18	6.5
Nontreated		21.5
	LSD (p=0.05)	4.1

a All treatments were applied to separate plots on 12 Nov 01 or 18 Nov 01.

b Experimental area on creeping bentgrass cv. Procup. Each plot was inoculated with a measured volume of rye grain infested with *Microdochium nivale*. No *Typhula* blight developed in the plots inoculated with *T. incarnata*.

c Data are the means of four replications of each treatment except that there were eight nontreated plots.

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2002-03 UMASS SNOW MOLD FUNGICIDE TRIAL RESULTS AND REAL WORLD RESULTS FROM SUPERINTENDENTS

By Dr. Gail Schumann

Professor of Plant Pathology and Turfgrass Pathologist

UMASS SNOW MOLD FUNGICIDE TRIAL

Graduate Research Assistant: Richard Anair, Jr.

Student Assistants: Andrew Cavanagh, Chris Donadio, Jason Dowgiewicz, Jason Griffith, Nick Lessner, Nick Lubold, Errin McDonald, Yerick Mendez, Eric Mongeau, Craig Walker, Nick Welch

Introduction

This experiment is part of a bigger research project on snow mold funded by the CTAGCS, GCMACC, MEGCSA, New England Regional Turf Foundation, NEGCSA and VTGCSA. In this experiment, we ran two tests. In one area, we inoculated the turf with *Fusarium nivale* (the *Fusarium* patch or pink snow mold pathogen), and in the other area, we inoculated the turf with *Typhula incarnata* (the *Typhula* blight or gray snow mold pathogen). We noted phytotoxicity or other effects on the turfgrass in response to the chemical applications. Note below that combinations of chemical ingredients often give better control than single fungicides. To interpret the results, use the LSD- least significant difference. If the difference between treatment results is less than the LSD number, then they are statistically the same. They are only statistically different when the difference exceeds the LSD. This is used to help determine if treatment results are really different because there is always a certain amount of variability in the amount of disease among the replication plots.

Experimental Protocol

Each treatment was applied to 3 ft x 3 ft plots on 8 Nov 02. The experimental design was a randomized complete block with four replications. Two separate experimental areas were used. One set of plots was on creeping bentgrass cv. 'Procup' that had been established Jun 96 on Hadley silt loam with pH 6.8. Urea fertilizer was applied at a rate of 11b N per 1000 sq ft on 15 Oct 02. Daconil 2787 (chlorothalonil) was applied at a rate of 8 fl oz per 1000 sq ft on 2 Sep 02. The other set of plots was on creeping bentgrass cv. 'Penncross' that had been established in fall, 1999 on the same soil adjacent to the Procup experimental area. The same urea fertilizer and Daconil 2787 applications were made to this experimental area. In both areas, the mowing height was 0.5 in., and the last mowing date was 24 Oct 02. Fungicides were applied with a CO2 backpack sprayer in water equivalent to 2.5 gal per 1000 sq ft at 30 psi. on 8 Nov 02. The snow mold pathogens (*M. nivale* and *T. incarnata*) were grown separately on sterilized rye (*Secale cereale*) grain for about eight weeks before the experiment was initiated. Approximately 1.7 oz (by volume) of pathogen-infested grain was applied by hand to each plot following the fungicide applications. *Microdochium nivale*-infested grain was applied to the Procup experimental area; *Typhula incarnata*-infested grain was applied to the Penncross experimental area. After inoculation, the plots were covered with a high-density woven polyethylene commercial greens cover. Heavy snowfall occurred in late Nov and early Dec, and the turf remain covered with 1-2 ft of snow until 22 Mar 03. Temperatures were below normal for several weeks in Jan and Feb. On 24 Mar 03, the turf covers were removed, and the plots were rated.

Results

The disease data below are ranked based on the total amount of disease in both disease areas. *Typhula* blight disease pressure was severe, and *Fusarium* patch disease pressure was moderate in this test. Standard PCNB treatments, Endorse, and thiophanate-methyl in various formulations did not provide acceptable control. Phytotoxicity was observed in most plots treated with spray applications containing PCNB. Several combinations of two or three active ingredients in spray or granular applications gave excellent protection against both snow mold diseases following a single application and nearly four months of snow cover.

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Snow Mold-

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Treatment and Rate per 1000 sq ft

Treatment and Rate per 1000 sq ft	% Turf Area Affected by <i>Typhula blighty</i>	% Turf Area Affected by <i>Fusarium patch</i>
Bayleton 50WP 2.0 oz + Compass 50WG 0.25 oz + Daconil Ultrex 82.5WG 3.2 oz	0.00w	0.00
Compass 50WG 0.25 oz + Lynx 45WP 2.22 oz + Daconil Ultrex 82.5WG 3.2 oz	0.00	0.00
Chipco 26GT 2SC 4.0 fl oz + Turfcide 400 4SC 8.0 fl oz + Daconil Weather Stik 6F 5.5 fl oz	0.00	0.25
SYN021832 9.93 fl oz	0.25	0.00
Bayleton 50WP 2.0 oz + Compass 50WG 0.25 oz + Turfcide 400 4SC 8 fl oz	0.50	0.00
Chipco 26GT 2SC 4 fl oz + Signature 80WG 8oz + Turfcide 400 4SC 8 fl oz + Daconil Weather Stik 6F 5.5 fl oz	0.00	0.75
Chipco 26GT 2SC 4.0 fl oz + Signature 80WG 8.0 oz + Turfcide 400 4SC 8.0 fl oz	1.00	0.00
Chipco 26GT 2SC 4.0 fl oz + Turfcide 400 4SC 8.0 fl oz	1.00	0.00
Bayleton 50WP 2.0 oz + Compass 50WG 0.25 oz + Turfcide 400 4SC 6 fl oz	1.25	0.00
SYN021831 9.93 fl oz	0.50	1.00
Compass 50WG 0.25 oz + Lynx 45WP 2.22 oz	0.00	1.50
Insignia 20WG 0.9 oz + Iprodione Pro 2SC 4 fl oz	0.25	1.25
Lesco 18 Plus 2F 4 fl oz + Manicure Ultrex 82.5WDG 5 oz	0.00	1.75
AND1207 G 8.0 lb + Andersons FFII 15G 6.36 lb + Andersons Daconil 5G 15.1 lb	2.25	0.00
Insignia 20WG 0.9 oz + Concorde 82.5WG 3.2 oz	2.00	1.25
AND1121 G 5.05 lb + Andersons FFII 15G 6.36 lb	3.00	0.50
Chipco 26GT 2SC 4.0 fl oz + Signature 80WG 4.0 oz + Turfcide 400 4SC 8.0 fl oz	4.25	0.00
AND1205 G 8.0 lb + Andersons FFII 15G 6.36 lb + Andersons Daconil 5G 15.1 lb	4.50	0.25
AND1206 G 8.0 lb + Andersons FFII 15G 6.36 lb + Andersons Daconil 5G 15.1 lb	4.75	0.00
Insignia 20WG 0.9 oz + Turfcide 400 4SC 8 fl oz	5.25	0.50
Insignia 20WG 0.9 oz	4.00	2.25
Chipco 26GT 2SC 4.0 fl oz + Signature 80WG 8.0 oz	3.25	3.25
AND1208 G 8.0 lb + Andersons FFII 15G 6.36 lb + Andersons Daconil 5G 15.1 lb	7.25	0.00
Endorse 50WP 6.0 oz + Spectro 90WDG 5.75 oz	2.75	4.75
Endorse 50WP 4.0 oz + Spectro 90WDG 5.75 oz	2.75	6.25
AND1121 G 5.05 lb + Andersons PCNB 10-0-14 15G 6.36 lb	8.00	3.75
TD 2458-01 70WDG 3.0 oz	12.00	6.25
AND1123 G 5.05 lb	12.50	6.50
Cleary's 3336 4F 4.0 fl oz	13.75	7.5
TD 2193-07 4.5F 3.6 fl oz	17.50	6.75
Cleary's 3336 50WP 4.0 oz	16.25	11.75
Topsin-M 70WP 3.0 oz	17.50	11.25
Turfcide 400 4SC 12 fl oz	29.50	1.25
AND1121 G 5.05 lb	30.00	6.75
D1 PCNB 15G 6.36 lb	41.25	2.25
D2 PCNB 15G 6.36 lb	55.00	7.50
Endorse 50WP 6.0 oz	62.00	13.50
Endorse 50WP 8.0 oz	72.00	14.25
Endorse 50WP 4.0 oz	73.75	17.00
Lesco PCNB 12.4G plus fertilizer (Novex 9-0-19) 6 lb	83.75	21.75
Nontreated	88.25	35.00
LSD (P£0.05)	15.70	10.80

z All treatments were applied to the two separate sets of plots on 8 Nov 02.

y Experimental area on creeping bentgrass cv. Penncross. Each plot was inoculated with a measured volume of rye grain infested with *Typhula incarnata*.

x Experimental area on creeping bentgrass cv. Procup. Each plot was inoculated with a measured volume of rye grain infested with *Microdochium nivale*.

w Plots were rated on 22 Mar 03. Data are the means of four replications of each treatment except that there were eight nontreated plots.

Active Ingredient List

AND1121 G	proprietary	Daconil Weather Stik 6F	chlorothalonil
AND1123 G	proprietary	Endorse 0.5WP	polyoxin zinc
AND1205 G	proprietary	Insignia (BAS500) 20WG	pyraclostrobin
AND1206 G	proprietary	Iprodione Pro 2SC	iprodione
AND1207 G	proprietary	Lesco 18 Plus 2F	iprodione
AND1208 G	proprietary	Lesco PCNB 12.4G plus fertilizer	PCNB plus Novex 9-0-19
Andersons Daconil 5G	chlorothalonil	Lynx 45WP	terbuconazole
Andersons FFII 15G	PCNB plus 14-3-3 fertilizer	Manicure Ultrex 82.5WG	chlorothalonil
Andersons PCNB 10-0-14	PCNB plus 10-0-14 fertilizer	Signature 80WG	fosetyl-Al
Bayleton 50WP	triadimefon	Spectro 90WDG	thiophanate-methyl
Chipco 26GT 2SC	iprodione		methyl+chlorothalonil
Cleary's 3336 50WP and 4F	thiophanate-methyl	SYN021831	proprietary
Compass 50WG	trifloxystrobin	SYN021832	proprietary
Concorde 82.5W	chlorothalonil	TD 2193-07 4.5F	thiophanate-methyl
D1 PCNB 15G	PCNB plus fertilizer	TD 2458-01 70WDG	thiophanate-methyl
D2 PCNB 15G	PCNB plus fertilizer	Topsin-M 70WP	thiophanate-methyl
Daconil Ultrex 82.5WDG	chlorothalonil	Turfcide 400 4SC	PCNB

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Snow Mold-

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REAL WORLD RESULTS FROM SUPERINTENDENTS

Turfgrass managers were invited to test the results of the UMass snow mold fungicide trials. Some of them tested fungicide combinations that had been successful in the UMass trials. Others tested these combinations in a timing study similar to those conducted at UMass. Additional superintendents participated in similar tests in 2001-2002, but the mild winter precluded any meaningful results. The winter of 2002-2003 produced long snow cover in most areas of New England. We thank the golf course superintendents listed below for generously sharing their results. They have had success with a number of different fungicide combinations and rates. As in the UMass timing studies, they obtained successful snow mold control at various dates following the cessation of top growth (i.e. after the last mowing).

1) Roger Brink
Indian Ridge Country Club, Andover, MA

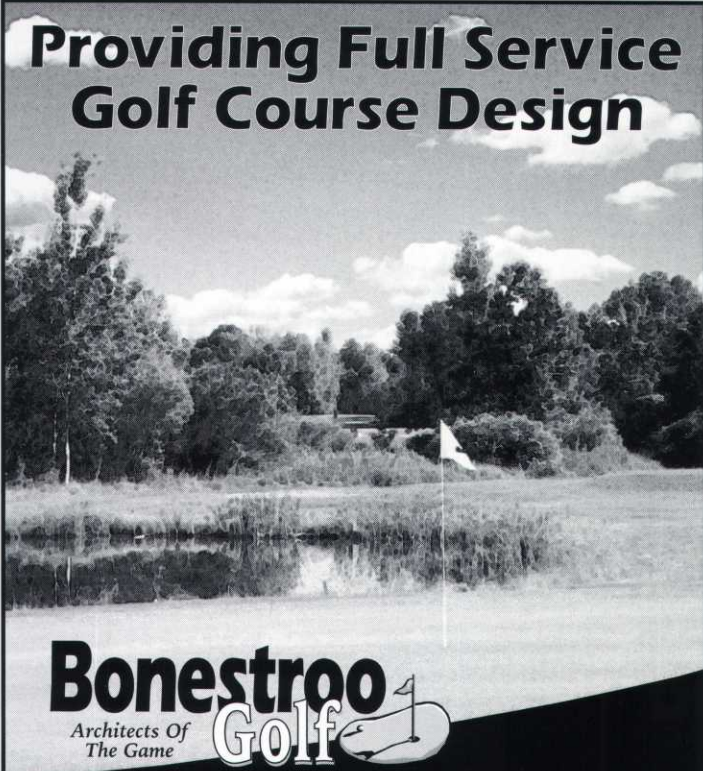
<u>Fungicides</u>	<u>Rate/1000 sq ft</u>	<u>Application date</u>	<u>Water volume</u>
Heritage +	0.4 oz +	November 20, 2002	2 gal/1000 sq ft
Manicure +	3.7 oz +		
Spectator	0.37 fl oz		

Results: Only greens and tees were treated. Complete disease control following very long snow cover and severe disease pressure as noted on the nontreated fairways.

2) Jeff Corcoran
Weston Golf Club, Weston, MA

[Each green was split, so half would receive the November 19 application and half would receive the same application on November 30.]

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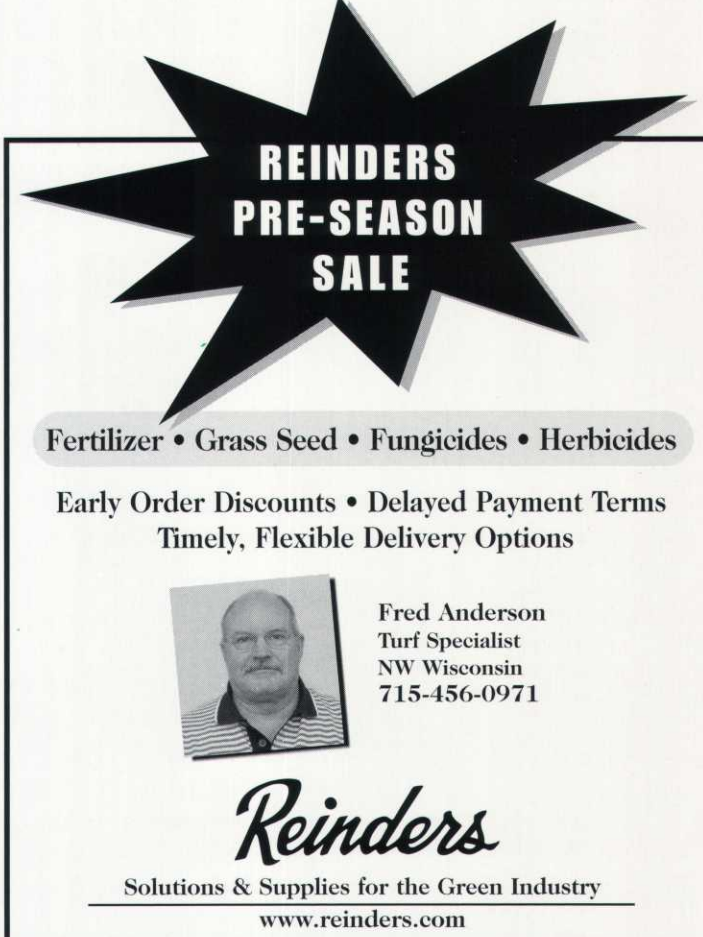


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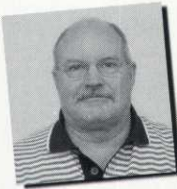
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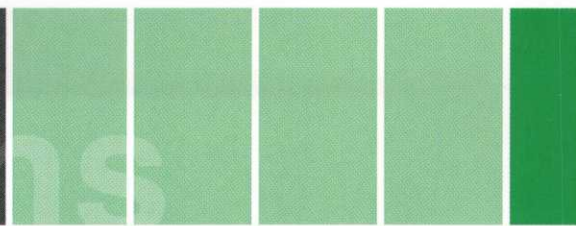
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