

The flight and bus ride to Augusta National are routine, but once we're departing the bus for the entrance gate the excitement starts to build for everybody. The pace mutually quickens, as if we're all afraid of missing something or somebody.

I must admit that I didn't try to shake his hand, although he passed within three feet of me climbing the 18th fairway. I am not much on shak-

I also got a good look at Nicklaus and Norman in their pairing...Jack didn't look too good in double bogeying the ninth, but he's had his competitive day. He's the greatest golfer of all time, I think. All of this "Tiger talk"

(Continued on page 53)

51

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(Continued from page 51)

makes me think that the accomplishments of Nicklaus and Palmer are being grossly overlooked. These guys were golf's legends, and couldn't achieve the Grand Slam! Tiger wins the Masters, and everybody thinks he's never going to lose!!

After bloating myself with golf merchandise at mid-day...that stuff was flying off the racks all day long, I decided to catch the leading groups on the tenth hole. Without a doubt, the tenth is the best hole on the golf course. The tee is up so high, with the fairway falling away down the hill seemingly forever... heck, it's got the descent of a pretty decent ski slope! Towering pines surround both sides of the fairway as you proceed down the fairway, down to the green. It's definitely the feeling of entering another part of this golf dreamworld.

On this hole I'm watching Montgomerie and Couples, who both ask me for advice on how to approach the green. I tell them both to just calm down, hit the shot, and can their putts for birdie. Actually though, they both look like they're

throwing long range darts at a beautiful green dartboard. The greens are such that if you miss the dartboard, especially the No. 10 dartboard, there'll be some severe penalties!

I proceed with them through the 11th green, where I find a seat in the bleachers behind the 12th tee. From here you can see 11 green, all of the par 3 12th hole, and the thirteenth tee. This is a pretty cool stretch of golf holes, and a great place to finish off a memorable day.

I decide to walk the thirteenth hole, which is where I began this incredible foot journey around Augusta National. I spend the last hour of our allotted time watching the contenders pass through no. 13 green and 14 tee. Tiger Woods cans a twenty five footer for eagle at thirteen, and the crowd goes wild! Tiger Woods just absolutely rips a drive at 14, while Paul Azinger looks 'week-endish' by comparison in following him at the tee.

The bus ride and air charter flight are routine on the way back to Milwaukee, but then the fun really starts as the pilot tells us that it's snowing down below...on April

17th!! And it's snowing and blowing really strongly...sort of like blizzard conditions!

I proceed home southward down I-94 towards Illinois thinking how ironic it is that so much can change and happen in one day. Beautiful fantasy-world golf course all day long, followed by the nightmarish, otherworldly feel of driving home three hours through a blizzard. Calm, peaceful, and relaxing Augusta National...then the scared feeling of either sliding off the road, getting clipped by a truck, or sliding off a highway bank because some idiot can't see the wisdom of driving slowly through terrible, snowy, windy conditions.

I plop into bed at about 1AM, the entire family having been there for hours. I am exhausted, but really feeling good. I saw one of the shrines of golf...a distinctly American shrine of golf. I felt the history and tradition of the place...which is the same feeling I get when I'm on most any golf course.

At Augusta National, though, that feeling is intensified about a hundred times. It's an awesome place, and it was an awesome day. ♣



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Turf Students Spend Week in Racine at Jacobsen School; WGCSA Members Serve as 'Faculty'

By Monroe S. Miller

More than 30 undergrad turf students spent a week in May at Jacobsen headquarters in Racine for the 30th annual Future Turf Managers Seminar. The students came from all over the U.S.; Canada, Australia and New Zealand were are represented.

Members of the Wisconsin Golf Course Superintendents were involved in the seminar. Ric Lange conducted a tour of Meadowbrook CC, which was followed by a tour of Racine CC, led by Mike Handrich. Scott Bartosh of Kenosha CC was part of the group and answered student questions about golf course management in Wisconsin.

As in all previous years, students were given an extensive tour of the Racine manufacturing facility, afterwards, they had a chance to operate the line of Jacobsen equipment.

Other WGCSA members served on the Jake faculty. Larry Lennert of Milorganite gave a lecture entitled 'What Did They Teach You at Turf School?' Danny Quast spoke about golf course budgets and Bob Vavrek discussed environmental issues



Part of the Jake school program is operating equipment at Meadowbrook.

facing golf course superintendents today.

On a personal note, this reporter was a student in the first Jacobsen school for turfgrass science majors in 1968. It was a thrill to see the Triplex greensking prototype and actually use one of the three in the country! 🏌️



UW-Madison student turf student Dave Rappold is on the far left of the fourth row. He works at the new Whistling Straits golf course.

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A Review of 1996-97 Snow Mold Control Evaluations: *The Winter of New Findings*

By Jeffrey S. Gregos, TDDL, Department of Plant Pathology,
University of Wisconsin-Madison

This past winter was an excellent winter to do snow mold evaluations throughout most of the state. The snow-fall was plentiful, and the snow cover was long. On top of this, the Northern Regions of the state lost their frost halfway through the winter, which is ideal for the development of snow molds. These uninvited guests visited much of the state, even those with the no trespassing signs (AKA: fungicide treatments). Failure of chemical treatments was noted in many of the north-central states. In a conversation with Dr. Ward Steinstra of the University of Minnesota, he said, "I am sorry that I was unable to put out trials this year; it was a perfect year to do trials."

Why was there so much failure this year or so much snow mold? This is probably a question that will never

fully be answered. One thing that complicates the problem is that there are at least three different low temperature
(Continued on page 56)

TABLE 1. O. J. NOER FACILITY BENTGRASS FAIRWAY
(*Typhula incarnata* & *Microdochium nivale*)

Trt. #	Treatment	Form.	Amount /1000 ft ²	4-9-97 % Damage Rating	
1	Bio-Releaf B Plus Plasma 10-0-0 High K 6-2-18		1.47 fl. oz. 2.44 fl. oz. 5.88 fl. oz.	15.0	a b c
2	Bio-Releaf B Plus Plasma 10-0-0 High K 6-2-18		1.47 fl. oz. 2.44 fl. oz. 5.88 fl. oz.	5.0	c
3	Bio-Releaf 8-2-4 Bio-Releaf 8-2-4 PCNB	75 WP	8.0 fl. oz. 110.2 oz. 110.2 oz.	18.8 6.3	a b c c
4	Bio-Releaf 8-2-4 Bio-Releaf 8-2-4 PCNB	75 WP	8.0 fl. oz. 110.2 oz. 110.2 oz.	20.0	a b c
5	Bio-Releaf B Plus Plasma 10-0-0 High K 6-2-18		1.47 fl. oz. 2.44 fl. oz. 5.88 fl. oz.	12.5	a b c
6	Bio-Releaf 8-2-4 Bio-Releaf 8-2-4 Plasma 10-0-0 High K 6-2-18 Bio-Releaf 8-2-4 PCNB	75 WP	8.0 fl. oz. 110.2 oz. 2.44 fl. oz. 5.88 fl. oz. 110.2 oz. 8.0 oz.	13.8	a b c
7	Eminent Star Surfactant	F	2.0 fl. oz. 0.05%	11.3	b c
8	Eminent Star Surfactant	F	4.0 fl. oz. 0.05%	10.0	b c
9	PCNB	75 WP	8.0 oz.	12.5	a b c
10	Iprodione Chlorothalonil	2 F 4.17 F	4.0 fl. oz. 8.0 fl. oz.	30.0 25.0	a a b
11	PennMulch		125.0 lb.	18.8	a b c
12	PennTarp		125.0 lb.	22.5	a b c
13	PennMulch PCNB	75 WP	125.0 lb. 8.0 oz.	8.8 6.3	b c c
14	PennTarp PCNB	75 WP	125.0 lb. 8.0 oz.	30.0 15.0	a a b c
15	Confidential			8.8	b c
16	Confidential			6.3	c
17	Green Cover			30.0	a
18	Green Cover 5.8 PCNB	75 WP	8.0 oz.	15.0	a b c
19	Untreated Control			21.3	a b c

LSD (P=.05)

14.72

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT).

TABLE 2. NORTH HILLS COUNTRY CLUB BENT/POA FAIRWAY
(*Typhula incarnata* & *Microdochium nivale*)

Trt. #	Treatment	Form.	Amount /1000 ft ²	4-4-97 % Damage Rating	
1	Chipco 26019 Daconil 2787	2 F 4.17 F	4.0 fl. oz. 8.0 fl. oz.	0.0	c
2	EXP 10790A Daconil 2787	2 F 4.17 F	4.0 fl. oz. 8.0 fl. oz.	0.0	c
3	Exp 10790A Daconil 2787	2 F 4.17 F	4.0 fl. oz. 8.0 fl. oz.	0.0	c
4	Turficide 400 Exp 10790A Daconil WS	4 F 2 F 6 F	8.0 fl. oz. 4.0 fl. oz. 6.0 fl. oz.	0.0	c
5	Exp 10790A Heritage	2 F 50 D	4.0 fl. oz. 0.4 fl. oz.	0.0	c
6	Exp 10790A Penstar	2 F 75 WP	4.0 fl. oz. 4.0 fl. oz.	0.0	c
7	Daconil 2787 Daconil ZN	4.17 F 4.17 F	8.0 fl. oz. 8.0 fl. oz.	0.0	c
8	Chipco 26019 Daconil Ultrex	2 F 82.5 D	4.0 fl. oz. 3.8 oz.	0.0	c
9	Chipco 26019 Daconil WS	2 F 6 F	4.0 fl. oz. 6.0 fl. oz.	0.0	c
10	Turficide 400 Prostar	4 F 50 WP	8.0 fl. oz. 6.0 oz.	0.0	c
11	Terraclor Prostar	75 WP 50 WP	8.0 oz. 6.0 oz.	0.0	c
12	Daconil 2787	4.17 F	10.0 fl. oz.	8.8	b
13	Fore	80 WP	8.0 oz.	0.0	c
14	Terraclor	75 WP	8.0 oz.	0.0	c
15	Fore	80 WP	8.0 oz.	0.0	c
16	Terraclor	75 WP	8.0 oz.	1.3	c
17	Eagle	40 WP	1.2 oz.	0.0	c
18	Fore	80 WP	8.0 oz.	0.0	c
19	Terraclor	75 WP	8.0 oz.	0.0	c
20	Rizolex	75 WP	4.0 oz.	0.0	c
21	Rizolex	75 WP	4.0 oz.	0.0	c
22	Terraclor	75 WP	4.0 oz.	0.0	c
23	Sentinel	40 D	0.33 oz.	0.0	c
24	Terraclor	75 WP	4.0 oz.	0.0	c
25	Sentinel	40 D	0.33 oz.	0.0	c
26	Chipco 26019	50 WP	2.0 oz.	0.0	c
27	Sentinel	40 D	0.33 oz.	0.0	c
28	Heritage	50 D	0.4 oz.	0.0	c
29	FF II / 14-3-3	15.4 G	3.15 lb.	0.0	c
30	FF II / 14-3-3	15.4 G	6.30 lb.	0.0	c
31	Fungicide IX	4.9 G	5.7 lb.	0.0	c
32	FF II / 14-3-3	15.4 G	3.15 lb.	0.0	c
33	Fungicide IX	4.9 G	5.7 lb.	0.0	c
34	Heritage	50 D	0.4 oz.	0.0	c
35	Heritage	50 D	0.7 oz.	0.0	c
36	Heritage	50 D	0.4 oz.	0.0	c
37	Terraclor	75 WP	8.0 oz.	0.0	c
38	Heritage	50 D	0.7 oz.	0.0	c
39	Terraclor	75 WP	8.0 oz.	0.0	c
40	Untreated Check			21.3	a

LSD (P=.05)

6.37

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT).

(Continued from page 55)

pathogens that are currently recorded as pathogenic to turf in Wisconsin (*Typhula incarnata*, *T. ishkariensis*, and *Microdochium nivale*). But, this may change in the next couple months. This spring, during the rating of my evaluations, I found some sclerotia that were quite a bit larger than those of the Typhulas (see Millett, Typhula Tour '97 for comparison pictures).

These sclerotia range in size from about 1 mm to over 5 mm. The color of the sclerotia are tan, burgundy, or even black. The shape varies from a tear-drop to almost banana shaped. One of the most interesting differences of this low temperature pathogen is its rind pattern. Under magnifications of 400x and 1000x the rind almost looks like a jig-saw puzzle.

So, what is this pathogen? This is the same question that we are asking some of the world's authorities on snow molds. So far we have sent micrographs to Dr. Drew Smith, retired Turfgrass Pathologist from Saskatoon, Canada, and Dr. Ward Steinstra. Neither could give a firm confirmation on its identity.

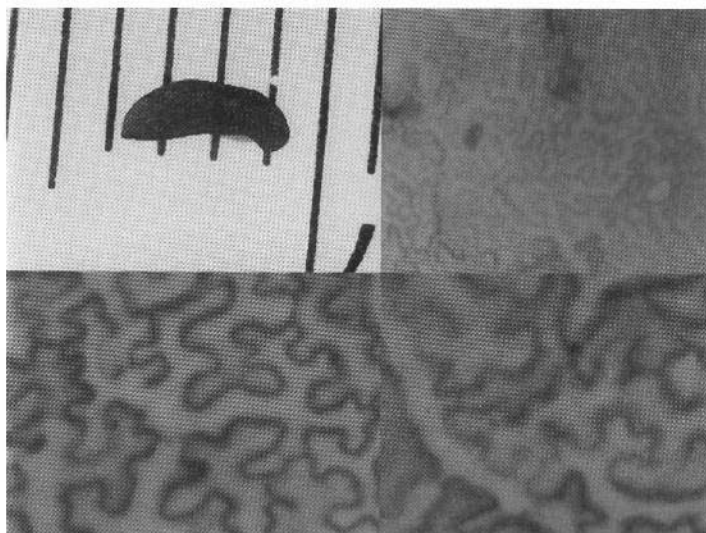


FIG 1. Unknown Pathogen Sclerotia & Rind Pattern (starting upper left and moving clockwise); Sclerotia on millimeter ruler; rind pattern at 400x magnification, rind pattern at 1000x magnification.

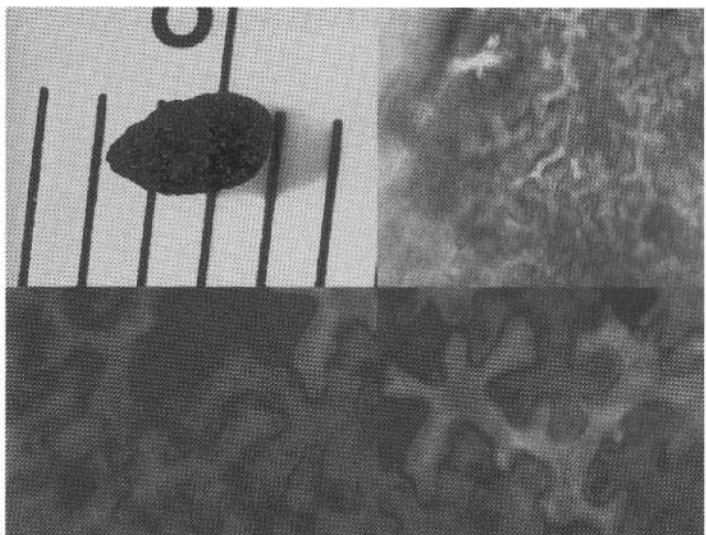


FIG. 2 (same as FIG 1.)

New Snow Mold?

Currently, we have run some preliminary molecular techniques and have differentiated it from the *T. incarnata* and *T. ishkariensis*. The next step is to sequence the DNA so we can compare it with other sequence data. Also, we are obtaining import permits to receive isolates from other researchers in Canada. Within the next couple months, we should have a positive identification of this pathogen and be able to pass this information on to you.

To date we have obtained sclerotia of this pathogen from only a few sites in Wisconsin. A majority of them are in northern Wisconsin near the Michigan U. P. But a home lawn sample came into the lab with similar sclerotia from the La Crosse area. This means that the pathogen has a potential of having a very large distribution area within the state. We are asking your help in the future to determine the distribution of this pathogen.

Snow Mold Control Evaluation Trials

A total of six evaluations was conducted in five locations in the state. There were essentially two trials conducted. One trial had 19 treatments and was conducted at the O.J. Noer Facility. This trial looked at some biological, cultural, and chemical control methods. The other trial had 30 fungicide treatments and was conducted at four sites: one at North Hills CC, Menomonee Falls (Bentgrass

TABLE 3. SENTRYWORLD BENTGRASS PUTTING GREEN & PENNLINKS NURSERY
(*Typhula incarnata* & *Typhula ishkariensis*)

Trt. #	Treatment	Form.	Amount /1000 ft2	Putting Green % Damage Rating 4-7-97	Pennlinks Nursery % Damage Rating 4-7-97
1	Chipco 26019	2 F	4.0 fl. oz.	0.0 a	12.5
	Daconil 2787	4.17 F	8.0 fl. oz.		
2	EXP 10790A	2 F	4.0 fl. oz.	0.0 a	15.0
	Daconil 2787	4.17 F	8.0 fl. oz.		
3	Exp 10790A	2 F	4.0 fl. oz.	0.0 a	2.5
	Daconil 2787	4.17 F	8.0 fl. oz.		
	Turficide 400	4 F	8.0 fl. oz.		
4	Exp 10790A	2 F	4.0 fl. oz.	0.0 a	8.8
	Daconil WS	6 F	6.0 fl. oz.		
5	Exp 10790A	2 F	4.0 fl. oz.	0.0 a	43.8
	Heritage	50 D	0.4 fl. oz.		
6	Exp 10790A	2 F	4.0 fl. oz.	0.0 a	0.0
	Penstar	75 WP	4.0 fl. oz.		
	Daconil 2787	4.17 F	8.0 fl. oz.		
7	Daconil ZN	4.17 F	8.0 fl. oz.	0.0 a	13.8
	Chipco 26019	2 F	4.0 fl. oz.		
8	Daconil Ultrex	82.5 D	3.8 oz.	3.8 a	26.3
	Chipco 26019	2 F	4.0 fl. oz.		
9	Daconil WS	6 F	6.0 fl. oz.	0.0 a	5.0
	Turficide 400	4 F	8.0 fl. oz.		
10	Prostar	50 WP	6.0 oz.	0.0 a	0.0
	Terracolor	75 WP	4.0 oz.		
11	Prostar	50 WP	6.0 oz.	0.0 a	0.0
	Daconil 2787	4.17 F	10.0 fl. oz.		
12	Fore	80 WP	8.0 oz.	2.5 a	31.3
13	Fore	80 WP	6.0 oz.	0.0 a	15.0
	Terracolor	75 WP	8.0 oz.		
14	Fore	80 WP	8.0 oz.	0.0 a	10.0
	Terracolor	75 WP	8.0 oz.		
15	Eagle	40 WP	1.2 oz.	0.0 a	17.5
	Fore	80 WP	8.0 oz.		
16	Terracolor	75 WP	8.0 oz.	0.0 a	40.0
17	Rizolex	75 WP	4.0 oz.	0.0 a	5.0
18	Rizolex	75 WP	4.0 oz.	0.0 a	12.5
	Terracolor	75 WP	4.0 oz.		
19	Sentinel	40 D	0.33 oz.	1.3 a	1.3
	Terracolor	75 WP	4.0 oz.		
20	Sentinel	40 D	0.33 oz.	0.0 a	10.0
	Chipco 26019	50 WP	2.0 oz.		
21	Sentinel	40 D	0.33 oz.	0.0 a	6.3
	Heritage	50 D	0.4 oz.		
22	FF II / 14-3-3	15.4 G	3.15 lb.	2.5 a	36.3
23	FF II / 14-3-3	15.4 G	6.30 lb.	0.0 a	22.5
24	Fungicide IX	4.9 G	5.7 lb.	0.0 a	62.5
25	FF II / 14-3-3	15.4 G	3.15 lb.	0.0 a	31.3
	Fungicide IX	4.9 G	5.7 lb.		
26	Heritage	50 D	0.4 oz.	0.0 a	46.3
27	Heritage	50 D	0.7 oz.	0.0 a	41.3
28	Heritage	50 D	0.4 oz.	0.0 a	13.8
	Terracolor	75 WP	8.0 oz.		
29	Heritage	50 D	0.7 oz.	0.0 a	10.0
	Terracolor	75 WP	8.0 oz.		
30	Untreated Check			3.8 a	95.0 a
LSD (P=05)				3.03	14.37
Means followed by same letter do not significantly differ (P=05, Duncan's New MRT).					

Fairway); two at SentryWorld, Stevens Point (bentgrass green, pennlinks nursery); one at Plum Lake GC, Sayner (*Poa annua* fairway); one at Gateway GC., Land O' Lakes (*Poa annua* fairway). Treatments were applied in late October to early November, using the equivalent of 3 gallons/1000 ft². Granular applications were applied using a shaker jar. The plots were evaluated within a short time after snow melt. See Table 1 to Table 5 for specific treatments, rates, and percent damage ratings.

In a general summary, no two trials were alike. In selecting snow mold control products it is very important to know what you may be battling. The controls will not cover every pathogen as many of my trials have proven. If you are north of Highway 10, it might be a good idea to use a tank mixture of two or three components. The southern regions will probably be able to get by with more standard applications.

Future Trials

This next season we hope to expand our evaluations to look at rate adjustments, application timings and alternative controls. If you have several thousand square feet of turf that you would want to loan us for the winter, let's us know. Again this year I will be looking to put treatments in at least five locations of the state (northwest, northeast, central, southwest, southeast). Another important requirement is that the site has not received mercury fungicide

TABLE 4. GATEWAY GOLF CLUB POA FAIRWAY
(*Typhula incarnata*, *T. ishikariensis*, *Microdochium nivale*, & currently unidentified low-temperature pathogen)

Trt. #	Treatment	Form.	Amount /1000 ft ²	Rating 4-15-97
1	Chipco 26019	2 F	4.0 fl. oz.	45.0 e f g h i j
	Daconil 2787	4.17 F	8.0 fl. oz.	
2	EXP 10790A	2 F	4.0 fl. oz.	58.8 b c d e f
	Daconil 2787	4.17 F	8.0 fl. oz.	
3	Exp 10790A	2 F	4.0 fl. oz.	10.0 k l
	Daconil 2787	4.17 F	8.0 fl. oz.	
4	Turfide 400	4 F	8.0 fl. oz.	
	Exp 10790A	2 F	4.0 fl. oz.	37.5 f g h i j k
	Daconil WS	6 F	6.0 fl. oz.	
5	Exp 10790A	2 F	4.0 fl. oz.	51.3 c d e f g h i
	Heritage	50 D	0.4 fl. oz.	
6	Exp 10790A	2 F	4.0 fl. oz.	12.5 k l
	Penstar	75 WP	4.0 fl. oz.	
	Daconil 2787	4.17 F	8.0 fl. oz.	
7	Daconil ZN	4.17 F	8.0 fl. oz.	46.3 d e f g h i j
	Chipco 26019	2 F	4.0 fl. oz.	
8	Daconil Ultrex	82.5 D	3.8 oz.	36.3 f g h i j k
	Chipco 26019	2 F	4.0 fl. oz.	
9	Daconil WS	6 F	6.0 fl. oz.	13.8 k l
	Turfide 400	4 F	8.0 fl. oz.	
10	Prostar	50 WP	6.0 oz.	85.0 a b
	Terracolor	75 WP	4.0 oz.	
11	Prostar	50 WP	6.0 oz.	83.8 a b
	Daconil 2787	4.17 F	10.0 fl. oz.	
12	Fore	80 WP	8.0 oz.	83.8 a b
13	Fore	80 WP	6.0 oz.	21.3 i j k l
	Terracolor	75 WP	8.0 oz.	
14	Fore	80 WP	8.0 oz.	27.5 g h i j k l
	Terracolor	75 WP	8.0 oz.	
15	Eagle	40 WP	1.2 oz.	47.5 d e f g h i j
	Fore	80 WP	8.0 oz.	
16	Terracolor	75 WP	8.0 oz.	60.0 b c d e f
17	Rizolex	75 WP	4.0 oz.	55.0 b c d e f g h
18	Rizolex	75 WP	4.0 oz.	32.5 f g h i j k l
	Terracolor	75 WP	4.0 oz.	
19	Sentinel	40 D	0.33 oz.	25.0 h i j k l
	Terracolor	75 WP	4.0 oz.	
20	Sentinel	40 D	0.33 oz.	76.3 a b c d
	Chipco 26019	50 WP	2.0 oz.	
21	Sentinel	40 D	0.33 oz.	80.0 a b c
	Heritage	50 D	0.4 oz.	
22	FF II / 14-3-3	15.4 G	3.15 lb.	75.0 a b c d e
23	FF II / 14-3-3	15.4 G	6.30 lb.	45.0 e f g h i j
24	Fungicide IX	4.9 G	5.7 lb.	35.0 f g h i j k
25	FF II / 14-3-3	15.4 G	3.15 lb.	2.5
	Fungicide IX	4.9 G	5.7 lb.	
26	Heritage	50 D	0.4 oz.	83.8 a b
27	Heritage	50 D	0.7 oz.	57.5 b c d e f g
28	Heritage	50 D	0.4 oz.	20.0 j k l
	Terracolor	75 WP	8.0 oz.	
29	Heritage	50 D	0.7 oz.	17.5 j k l
	Terracolor	75 WP	8.0 oz.	
30	Untreated Check			95.0 a

LSD (P=.05)

25.84

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT).

applications. Fairways are an ideal size for the trials as they can consume large areas.

* A note on the statistics and reading the data tables. The letters that follow the percent damage are used as a comparison factor in statistics. Any treatment that is followed by the same letter is not statistically different. This is the form that I will be using in the future when I print data from any evaluation trials.

I would also like to thank the superintendents that left some untreated areas for us to use: Randy DuPont, North Hills CC; Gary Tanko, SentryWorld; Bob Brooker, Plum Lake; Todd Renk, Gateway GC. 🍷

TABLE 5. PLUM LAKE GOLF CLUB POA FAIRWAY
(*Typhula incarnata*, *T. ishikariensis*, *Microdochium nivale*, & currently unidentified low-temperature pathogen)

Trt. #	Treatment	Form.	Amount /1000 ft ²	% Damage Rating 4/24/97
1	Chipco 26019	2 F	4.0 fl. oz.	78.8 a b c d
	Daconil 2787	4.17 F	8.0 fl. oz.	
2	EXP 10790A	2 F	4.0 fl. oz.	83.8 a b c
	Daconil 2787	4.17 F	8.0 fl. oz.	
3	Exp 10790A	2 F	4.0 fl. oz.	11.3 k
	Daconil 2787	4.17 F	8.0 fl. oz.	
4	Turfide 400	4 F	8.0 fl. oz.	
	Exp 10790A	2 F	4.0 fl. oz.	73.8 a b c d
	Daconil WS	6 F	6.0 fl. oz.	
5	Exp 10790A	2 F	4.0 fl. oz.	51.3 d e f g h i
	Heritage	50 D	0.4 fl. oz.	
6	Exp 10790A	2 F	4.0 fl. oz.	15.0 j k
	Penstar	75 WP	4.0 fl. oz.	
	Daconil 2787	4.17 F	8.0 fl. oz.	
7	Daconil ZN	4.17 F	8.0 fl. oz.	63.8 a b c d e f
	Chipco 26019	2 F	4.0 fl. oz.	
8	Daconil Ultrex	82.5 D	3.8 oz.	90.0 a b
	Chipco 26019	2 F	4.0 fl. oz.	
9	Daconil WS	6 F	6.0 fl. oz.	41.3 f g h i j
	Turfide 400	4 F	8.0 fl. oz.	
10	Prostar	50 WP	6.0 oz.	73.8 a b c d
	Terracolor	75 WP	4.0 oz.	
11	Prostar	50 WP	6.0 oz.	91.3 a
	Daconil 2787	4.17 F	10.0 fl. oz.	
12	Fore	80 WP	8.0 oz.	67.5 a b c d e f
13	Fore	80 WP	6.0 oz.	33.8 g h i j k
	Terracolor	75 WP	8.0 oz.	
14	Fore	80 WP	8.0 oz.	60.0 c d e f g
	Terracolor	75 WP	8.0 oz.	
15	Eagle	40 WP	1.2 oz.	65.0 a b c d e f
	Fore	80 WP	8.0 oz.	
16	Terracolor	75 WP	8.0 oz.	57.5 c d e f g h
17	Rizolex	75 WP	4.0 oz.	62.5 b c d e f
18	Rizolex	75 WP	4.0 oz.	45.0 e f g h i
	Terracolor	75 WP	4.0 oz.	
19	Sentinel	40 D	0.33 oz.	28.8 i j k
	Terracolor	75 WP	4.0 oz.	
20	Sentinel	40 D	0.33 oz.	83.8 a b c
	Chipco 26019	50 WP	2.0 oz.	
21	Sentinel	40 D	0.33 oz.	67.5 a b c d e f
	Heritage	50 D	0.4 oz.	
22	FF II / 14-3-3	15.4 G	3.15 lb.	33.8 g h i j k
23	FF II / 14-3-3	15.4 G	6.30 lb.	32.5 h i j k
24	Fungicide IX	4.9 G	5.7 lb.	75.0 a b c d
25	FF II / 14-3-3	15.4 G	3.15 lb.	40.0 f g h i j
	Fungicide IX	4.9 G	5.7 lb.	
26	Heritage	50 D	0.4 oz.	78.8 a b c d
27	Heritage	50 D	0.7 oz.	71.3 a b c d e
28	Heritage	50 D	0.4 oz.	11.3 k
	Terracolor	75 WP	8.0 oz.	
29	Heritage	50 D	0.7 oz.	8.8 k
	Terracolor	75 WP	8.0 oz.	
30	Untreated Check			83.8 a b c

LSD (P=.05)

23.53

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT).

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Bentgrass Response to Non-Traditional Soil Additives

By Timothy Wegner

INTRODUCTION

The basis for a good stand of turf starts with what it is grown upon. Having soil with good physical, chemical, and biological properties allows for healthier plants and a simpler management program. Many times superintendents are faced with poor soil conditions on their putting greens and are expected to "fix" them. In order to help those unfortunate individuals out, many new products are being developed. The claims range from reclaiming the soil and bringing it back up to acceptable standards, to feeding microorganisms to ensure healthy turf. These products are being referred to here as non-traditional soil additives.

Several of these products were tested. One such product was Sand-Aid. Sand-Aid was developed by Emerald Isle and is a granular sea plant meal containing micronutrients and alginic acid (the key ingredient), which is claimed to reduce nutrient leaching and water losses in sandy soils. In addition, Sand-Aid has been said to promote flocculation, stimulate microbial activity, and improve soil fertility. According to the manufacturer, Sand-Aid works best when used in conjunction with topdressing, aerifying, or verticutting operations.

A second product that was tested was Carbo-Aid. Developed by Aqua-Aid, Inc., Carbo-Aid is a carbohydrate-based microbial food supplement comprised of complex natural sugars and proteins, leather tankage, kelp, humic and fulvic acids. The manufacturer claims it is specially formulated to feed the microorganism in the soil and to ultimately lead to healthier plants. Their theories state that with healthy microbes, thatch accumulation will be reduced, less leaching of nutrients will occur, disease and stress tolerance will increase, and root growth and vigor will rise as well.

The remaining products tested were all developed by a company whose products are all organically based. Their products utilize humates and sea kelp as basic building blocks. Humates are highly compressed prehistoric organic matter, consisting of plant and animal matter that is decomposed over thousands of centuries. Ultimately, the company claims the benefits of their products include the stimulation of microbial activity, chelation of nutrients, improvement of soil structure, and enhanced root and shoot growth.

The philosophy behind the use of sea kelp stems from the fact that kelp provides nutrients, growth stimulants, hormones, carbohydrates, and soil conditioners. With their use, claims are that one will see stronger, healthier plants, greater stress handling abilities, and an increase in nutrient availability.

One of the products tested was "Humact-G+Fe." It is a homogeneous granular humate product containing primary nutrients plus iron and sulfur. The Humact-G is derived from a Florida ore and processed through a proprietary

activation process. The company claims this product will provide color and correct iron deficiencies in turfgrass.

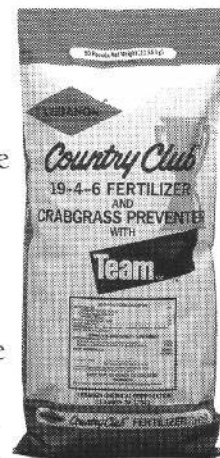
A second product tested was "H-15." This is a liquid form of activated humates. This product can either be used alone or in conjunction with other growth and plant protection products. Claims are that this product will lead to decreased plant stress, improved soil, and an overall healthier stand of turf.

Another product, "Root'N Shoot," is a combination of humic acids, seaweed, amino acids, carbohydrates, enzymes, and bacteria. The company claims this product will encourage rooting and promote plant vigor.

A final product that was tested was "Biocatalyst." This is a microbiological substrate solution containing microorganisms and enzymes beneficial to the soil. This product presumably works through inoculating the soil with bacteria designed to enhance nitrogen fertility.

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MATERIALS AND METHODS

The non-traditional products were tested on simulated greens constructed in 6-inch diameter PVC cylinders. The growing medium consisted of 12 inches of 80/20 root zone mix over 3 inches of pea gravel.

The greens were assembled on March 7, and 1.75 lb P₂O₅ as Lebanon 13-25-12 was applied as a starter fertilizer (incorporated into the top 1/2 inch of root zone mix). The greens were seeded with 'Providence' creeping bentgrass at a rate of 2.5 lb/M. On March 21 (2 weeks after planting), 1.0 lb N/M was applied as Country Club 18-4-10. Then, on April 7, the non-traditional products were applied in accordance with the manufacturer's suggested application rates and methods (Table 1). On April 12, the bentgrass was stressed for nitrogen, so 0.5 lb N/M was applied as urea; on April 14, the greens were clipped and the clippings were collected, dried, and weighed. The non-traditional products were applied once again. The bentgrass was clipped for the final time on April 21 and the roots sampled using a 12-inch Turf-Tech sampler.

Table 1. Non-traditional product treatments.

Treatment	Rates	Method of application
Biocatalyst	0.37 oz/M	Sprayed
H-15	6 oz/M	Sprayed
Root'N Shoot	3 oz/M	Sprayed
Humact G+Fe	6 lb/M	Topdressed
Carbo-Aid	8 oz/M	Sprayed
Sand-Aid	5 lb/M	Topdressed

RESULTS AND DISCUSSION

Bentgrass responses to the non-traditional products were measured as clipping weights collected 7 days after each of the two applications and crown+root weights at the end of the study. When the non-traditional products were applied to bentgrass showing nitrogen stress, the only shoot growth responses observed were to the applications of Biocatalyst and Humact-G+Fe (Table 2). Associated with the growth response to the Humact-G

Table 2. Creeping bentgrass growth responses to non-traditional turf products.

Products applied	Clipping weights		Root and crown weight
	Low N status	Adequate N status	
	mg		mg
None	119	286	275
Biocatalyst	199	313	207
H-15	116	290	249
Root'N Shoot	116	257	241
Humact G+Fe	397	677	209
Carbo-Aid	151	252	262
Sand-Aid	136	282	266
LSD (p=0.05)	64	113	64

was a marked improvement in bentgrass color. No color change was observed in the Biocatalyst treatment.

Two days prior to the second application of the non-traditional products, all putting greens received 0.5 lb N/M in the form of urea. This quickly eliminated any bentgrass color differences among the treatments. Even so, there was a significant shoot growth response to the Humact-G (Table 2).

Even though the crown+root weights of the bentgrass ranged from 207 to 275 mg (Table 2), none of the treatment differences were significant. In general, the crown+root weights showed the typical reduction associated with a stimulation of shoot growth.

(Continued on page 61)

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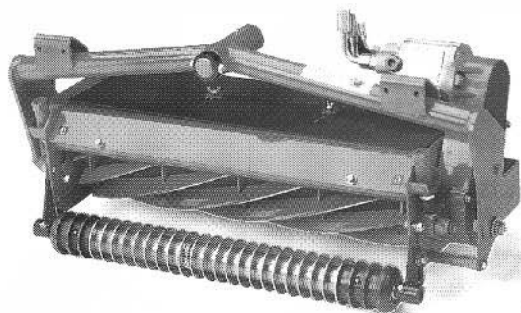
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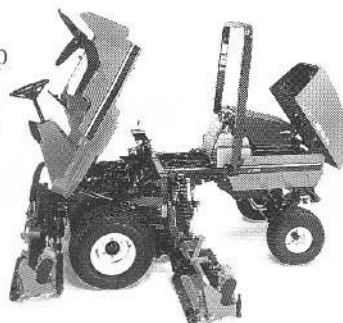
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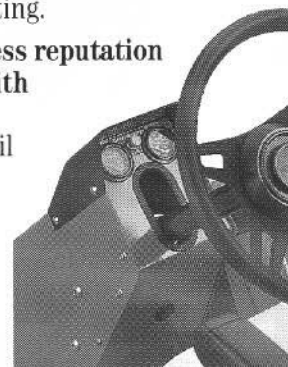


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