



# Wayne's World

By Dr. Frank S. Rossi, Department of Ornamental Horticulture, Cornell University

Like most of you, as soon as I learned of Wayne Otto's illness I recalled the last time I saw him. Wayne, JoAnn and I were chatting away in the Wisconsin Room at the GCSAA Conference in San Diego, reveling in Monroe Miller's USGA Green Section Award and Dan Quast's GCSAA Distinguished Service Award.

Wayne seemed as thrilled for them as he would have been if he received the award himself. When I think about knowing Wayne I am reminded of the ordinary events and how he always enjoyed people's success and viewed things from a unique perspective. This was Wayne's World.

When I joined the faculty in Wisconsin in 1992, Wayne was one of the first superintendents I met. While Rod Johnson was challenging me to some golf, Wayne was asking me to do some research at his golf course. Not knowing him I assumed he was more interested in turf than golf, but I was mistaken. His passion for golf was equal to his passion for turf. Wayne's World was not predictable.

I recall visiting Ozaukee CC and touring the course with Wayne. He was informing me about his fertility program and how he felt he had "too much grass on his greens." "The key to good greens," Wayne stated, "is to put a padlock on the fertilizer shed after May 1." In fact, over the years Wayne would discuss with me how many guys he felt had too much grass on their greens. He'd say, "so and so has more grass on one green than I have on all of mine!" In Wayne's World he had an opinion on everything, but never had a closed mind on anything.

Of all the guys I have known over my career, Wayne was a guy I always looked forward to seeing and chatting with about the latest management trends. For an "mature" superintendent I was impressed by how much he was aware of the innovations superintendents were implementing. He would cite his sources as "so and so was doing such and such in Arizona" or "I was chatting with so and so in Connecticut or Nebraska and they are doing such and such." Wayne's World spanned the globe.

How did Wayne know all these guys? Even more amazing is how every one of them knew him and would smile when his name was mentioned. In fact, there was hardly a guy I met who didn't have a Wayne Otto story. I figured it was all a by-product of graduating from the Penn State Turf Program in like 1895! In Wayne's World he was the Forest Gump of golf course superintendents.

Wayne and I would often lament about how things had changed regarding education. My favorite Wayne suggestion was to try and resurrect the "walking tours" of golf courses. He told me that when

he was a superintendent in Nebraska, they used to wear suits and ties and walk around the host superintendent's course. In Wayne's World a good education mattered more than a free round of golf.

As I was writing this I began to realize I really did not know Wayne all that well. I knew very little about his likes and dislikes and even less about him personally, but up until now I thought I did. I felt comfortable in Wayne's World with his unassuming nature and engaging manner.

This year was tough on our industry. I was in State College, PA in July for George Hamilton's Memorial Service. Like Wayne, George had a unique perspective on golf turf management and like Wayne is gone too soon.

It won't be the same in the Wisconsin Room this year at the GCSAA Conference and I am sure the Symposium will feel Wayne's absence. I can't imagine the Wisconsin Golf Turf World without Wayne; it might be because his world and Wisconsin's were one and the same.

I'll miss you Wayne. 🌿

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# Results of Fungicide Evaluation for 2003-04 Snow Mold Control in Wisconsin and Minnesota

By Dr. G. Jung, J.S. Gregos, and S.W. Abler, Department of Plant Pathology, University of Wisconsin-Madison



Snow molds, including Typhula blight (*Typhula ishikariensis* and *T. incarnata*) and pink snow mold (*Microdochium nivale*), are the most difficult and economically important diseases on golf courses in the Great Lakes region. This is due to disease damage which directly correlates with decreased playability and the expensive preventive fungicide applications that are required regardless of the environmental conditions of the upcoming winter. It is very clear that environmental factors such as snow cover days and cold temperatures, affect the degree of pathogenicity of the pathogens as well as plant physiological conditions and defense mechanisms. Furthermore, based on our previous research results, each of the snow mold species maintains its environmental and geographical niche where they can survive better than in other areas. In order to provide superintendents the most effective chemicals, we carry out field trials to evaluate commercial and experimental fungicides for the control of snow molds at several golf courses with diverse environmental conditions each year. Trial results on efficacy of fungicides for snow mold control at Gateway GC, WI and Giants Ridge Resort, MN are discussed and presented.

## EXPERIMENTAL METHODS

This past year's fungicide evaluation for the snow mold control was conducted at Gateway Golf Club (GWGC) in Land O' Lakes, WI on annual bluegrass and at Giants Ridge Golf Resort (GRGR) in Biwabik, MN on creeping bentgrass maintained under golf course fairway management conditions. Two additional sites were at O. J. Noer Turfgrass Research and Education Facility, Verona, WI and at Sentryworld GC, Stevens Point, WI where results of data are not presented due to a lack of disease pressure.

Individual 3 ft x 10 ft plots (a total of 71 treatments listed in table) were arranged in a randomized complete block design with three replications. The experimental area was not inoculated and all disease development was of natural occurrence. Treatments were applied with a CO<sub>2</sub>-powered boom sprayer, using XR TeeJet 8005 VS nozzles, at 30 psi, in water carrier volume of 2 gal/1000ft<sup>2</sup>. Granular applications were applied using a shaker jar. Early applications were made on October 22 (GWGC) and 23 (GRGR), mid-applications on November 8 (both), and late applications on November 12 (GWGC) and 16 (GRGR) in 2003. Percent snow mold, speckled snow mold (*T. ishikariensis*) and pink snow mold ratings were taken on April 15, 2004 at both

sites. Data obtained were subjected to analysis of variance and LSD was used to determine significant differences between treatment means.

## RESULTS and DISCUSSION

Interesting observations were made this year. Each site had only one fungal species causing the most damage. The predominant disease active this year at Gateway GC was pink snow mold, which might be due to the relatively mild winter (less days of snow cover). No single or combination of chemicals provided 100% control of pink snow mold. This could be due to a slight onset of pink snow mold disease symptoms prior to the late fungicide application (Nov. 12, 03). Overall, the disease pressure was relatively low. On the other hand, only *T. ishikariensis* was active



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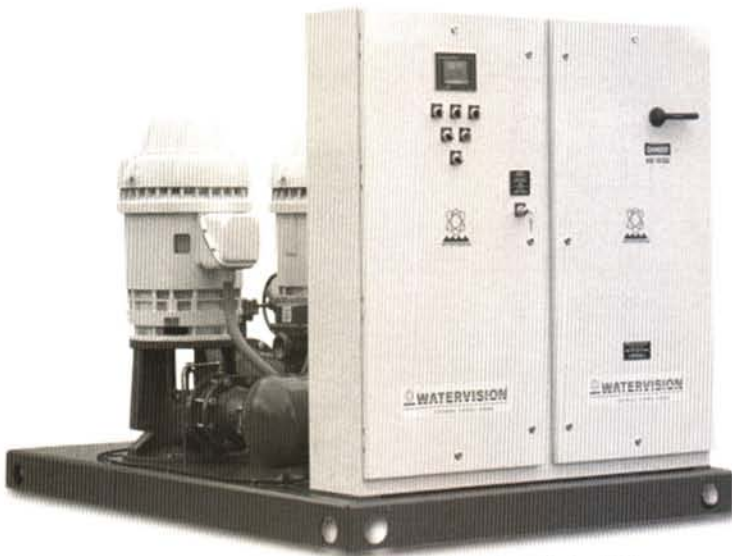


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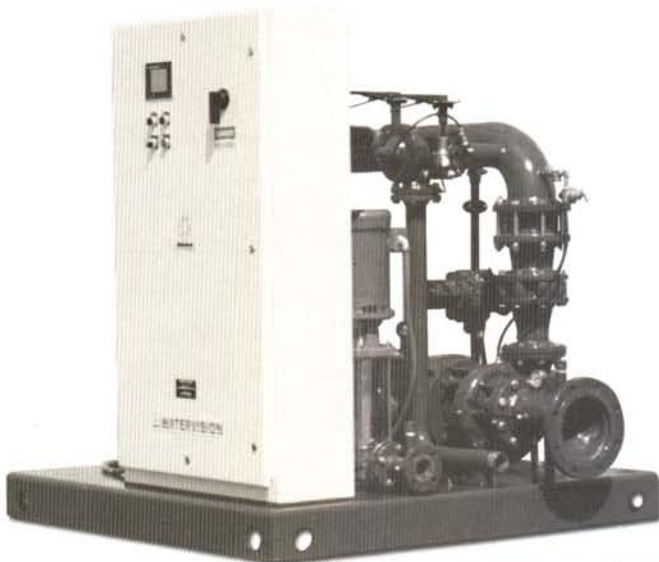
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at Giants Ridge. A very small number of sporadic patches were found to be pink snow mold and *Myriosclerotinia borealis*, one of cold loving fungi. Currently, I haven't seen any damage caused by *M. borealis* in Wisconsin. Disease pressure was considerably high compared to other testing sites, with the untreated control averaging 51.7% damage. Five treatments provide 100% control (treatment numbers 6, 20, 22, 42, and 46) in table. Interestingly, treatment #2, a combo of Chipco 26 GT (4 oz), Daconil WeatherStik (5.5 oz), and Turfcide 400 (6

oz), which has worked well in Wisconsin testing sites over past years did not have a complete control (average 0.33% damage) at this MN site. Trt#20 (a combo of 5.5 oz Daconil WeatherStik and 0.5 oz Medallion) has a complete control over *T. ishikariensis* in MN. More tests are required to be tested in WI plots. In Minnesota, another combo (4.5 oz Prostar and 6 oz Turfcide 400) gave an excellent control. Treatment # 6, a mixture of Chipco 26 GT (4 oz), Bayleton (1 oz), and Turfcide 400 (6 oz), also offered a complete control in MN.

In conclusion, environment factors (especially snow cover day, frequency of melting during the winter) play important roles in fungicide efficacy for snow mold control. Combinations (two or three chemicals) which gave excellent control of snow molds in MN in 2003-04 should be confirmed in WI.

**Table. Percent snow mold ratings from plot at Gateway Golf Course (mainly pink snow mold), Land O' Lakes, WI and Giants Ridge Golf Resort (mainly Typhula blight, especially *T. ishikariensis*), Biwabik, MN taken April 15, 2004**

No.	Treatment		Appl. Timing	% of Snow Mold	
	Name	Form Rate (/1000 FT <sup>2</sup> )		Gateway GC, WI	Biwabik, MN
1	Untreated Control			7	51.67
2	Chipco 26 GT	2 SC 4 FL OZ	Late	3.67	0.33
3	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
3	Turfcide 400	40 F 6 FL OZ	Late	0.67	3.67
3	Compass	50 WG 0.25 OZ	Late		
3	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
3	Turfcide 400	40 F 6 FL OZ	Late		
4	Compass	50 WG 0.25 OZ	Late	1.17	5
4	Turfcide 400	40 F 6 FL OZ	Late		
5	Compass	50 WG 0.25 OZ	Late	1.17	7.5
5	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
6	Chipco 26 GT	2 SC 4 FL OZ	Late	2.83	0
6	Bayleton	50 WG 1 OZ	Late		
6	Turfcide 400	40 F 6 FL OZ	Late		
7	Bayleton	50 WG 1 OZ	Late	4.17	0.33
7	Turfcide 400	40 F 6 FL OZ	Late		
8	Bayleton	50 WG 1 OZ	Late	4.17	4.50
8	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
9	Signature	80 WG 4 OZ	Late	3.33	0.83
9	Chipco 26 GT	2 SC 4 FL OZ	Late		
9	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
10	Insigma	20 WG 0.9 OZ	Both	4.5	15.83
11	Insigma	20 WG 0.9 OZ	Both	2.33	1.17
	Iprodione Pro	2 SE 4 FL OZ	Both		
12	Banner MAXX	1.3 ME 2 OZ	Late	12	10
13	Medallion	50 WP 0.33 OZ	Late	15.3	11.67
14	Medallion	50 WP 0.5 OZ	Late	8.67	7
15	Medallion	50 WP 0.5 OZ	Late	7.33	11.17
15	Turfcide 400	40 F 6 FL OZ	Late		
16	Daconil Ultrex	82.5 WG 3.2 OZ	Late	15	31.67
17	Heritage	50 WG 0.4 OZ	Late	10	35
18	Banner MAXX	1.3 ME 2 OZ	Late	3.67	3.33
	Medallion	50 WP 0.5 OZ	Late		
19	Banner MAXX	1.3 ME 3 OZ	Both	1.17	0.33
	Medallion	50 WP 0.5 OZ	Late		
20	Daconil WeatherStik	6 F 5.5 OZ	Late	2.33	0
	Medallion	50 WP 0.8 OZ	Late		
21	AND3118 (chlorothalonil)	5 G 15.1 LB	Early	1	7
	AND3224 (PCNB)	15.4 G 6.36 LB	Late		
	AND3238 (iprodione)	1.3 G 7.21 LB	Early		
22	AND3118 (chlorothalonil)	5 G 15.1 LB	Three	2.33	0
	AND3237 (tridimefon)	1 G 12.8 LB	Three		
	AND3238 (iprodione)	1.3 G 7.21 LB	Three		
23	AND3131 (chloroneb)	6.26 G 5.93 LB	Late	1.17	6.17
	AND3224 (PCNB)	15.4 G 6.36 LB	Mid		
24	AND3131 (chloroneb)	6.26 G 5.93 LB	Late	2	13.33
	AND3226 (PCNB)	15 G 6.36 LB	Mid		
25	AND3099 topsin/chloroneb	4.9 G 5.76 LB	Early	1	8.67
	AND3118 (chlorothalonil)	5 G 15.1 LB	Early		
	AND3224 (PCNB)	15.4 G 6.36 LB	Late		
26	Chipco 26 GT	2 SC 4 FL OZ	Late	5.33	20.33
27	Daconil WeatherStik	6 F 5.5 FL OZ	Late	2.5	18.33
28	Turfcide 400	40 F 6 FL OZ	Late	4	8.67
29	Compass	50 WG 0.25 OZ	Late	2.5	20.83
30	Bayleton	50 WG 1 OZ	Late	4.5	18.33
31	Signature	80 WG 4 OZ	Late	8.33	43.33
32	Iprodione Pro	2 SE 4 FL OZ	Late	5	18.33
33	Banner MAXX	1.3 ME 2 OZ	Late	15	13.33
34	Banner MAXX	1.3 ME 3 OZ	Late	4.5	4.50
35	AND3118 (chlorothalonil)	5 G 15.1 LB	Early	4.17	20
36	AND3039 (PCNB)	15.4 G 6.36 LB	Late	8.67	14.17
37	AND3224 (PCNB)	15.4 G 6.36 LB	Late	7.5	20
38	AND3226 (PCNB)	15 G 6.36 LB	Mid	2.83	36.67
39	AND3238 (iprodione)	1.3 G 7.21 LB	Early	2.33	26.67
40	AND3131 (chloroneb)	6.26 G 5.93 LB	Late	2.33	13.33
41	AND3099 topsin/chloroneb	4.9 G 5.76 LB	Early	0.33	25
42	AND3237 (tridimefon)	1 G 12.8 LB	Three	6.17	0
43	Fore	80 WP 8 OZ	Late	5	12
44	Heritage	50 WG 0.7 OZ	Late	5	12.50
45	Prostar	70 WP 4.5 OZ	Late	2.5	3.33
46	Prostar	70 WP 4.5 OZ	Late	2.33	0
	Turfcide 400	40 F 6 FL OZ	Late		
47	Prostar	70 WP 4.5 OZ	Late	7.5	1.50
	Banner MAXX	1.3 ME 2 OZ	Late		
48	Fore	80 WP 8 OZ	Late	2.33	8.33
	Turfcide 400	40 F 6 FL OZ	Late		
49	Heritage	50 WG 0.7 OZ	Late	2	1
	Turfcide 400	40 F 6 FL OZ	Late		
50	Banner MAXX	1.3 ME 2 OZ	Late	2.83	7.5
	Chipco 26 GT	2 SC 4 FL OZ	Late		
51	Banner MAXX	1.3 ME 2 OZ	Late		7
	Daconil WeatherStik	6 F 5.5 OZ	Late		
52	Banner MAXX	1.3 ME 2 OZ	Late	4.5	8.67
	Bayleton	50 WG 1 OZ	Late		

No.	Treatment		Appl. Timing	% of Snow Mold	
	Name	Form Rate (/1000 FT <sup>2</sup> )		Gateway GC, WI	Biwabik, MN
53	Banner MAXX	1.3 ME 2 OZ	Late	9.17	6.67
	Curalan	50 HG 1 OZ	Late		
54	Curalan	50 HG 1 OZ	Late	6.67	36.67
55	Emerald	70 WG 0.18 OZ	Late	9.17	31.67
56	Emerald	70 WG 0.18 OZ	Late	6.67	8.67
	Turfcide 400	40 F 6 FL OZ	Late		
57	Emerald	70 WG 0.18 OZ	Late	3.67	14.17
	Iprodione Pro	2 SE 4 FL OZ	Late		
	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
58	Emerald	70 WG 0.18 OZ	Late	6.67	28.33
	Insigma	20 WG 0.9 OZ	Late		
59	Spectro	90 WG 4 OZ	Both	0.33	20
	Endorse	2.5 WP 4 OZ	Late		
60	Spectro	90 WG 4 OZ	Early	0.67	11.67
	Endorse	2.5 WP 4 OZ	Late		
61	Spectro	90 WG 5.75 OZ	Both	0.33	3.33
	Emberse	2.5 WP 4 OZ	Late		
	Aimile	48 E 5.5 FL OZ	Late		
62	Endorse	2.5 WP 4 OZ	Late	1.5	9.17
	Spectro	90 WG 4 OZ	Late		
63	Endorse	2.5 WP 4 OZ	Late	3.33	9.50
	Spectro	90 WG 5.75 OZ	Late		
64	Endorse	2.5 WP 4 OZ	Late	2.33	6.67
	Spotrete	75 WG 8 OZ	Late		
65	Endorse	2.5 WP 6 OZ	Late	2.83	10.83
	Spotrete	75 WG 8 OZ	Late		
66	PCNB12.5+Novex 9-0-19	12.5 G 96 OZ	Late	3.33	20.33
67	Revere	10 G 120 OZ	Late	3.5	48.67
68	Lesco 18 Plus	2 SC 4 FL OZ	Late	1	0.33
	Lesco Mancure Ultrex	82.5 WG 5 OZ	Late		
	Lesco Revere 4000	4 SC 8 FL OZ	Late		
49	Lesco 18 Plus	2 SC 4 FL OZ	Late	4.17	11.67
	Lesco Mancure Ultrex	82.5 WG 5 OZ	Late		
70	Chipco 26 GT	2 SC 2 FL OZ	Late	5.83	2.83
	Daconil Weatherstik	6 F 2.75 FL OZ	Late		
	Turfcide 400	4 F 4 FL OZ	Late		
71	Catbacter	90 WP 3 OZ	Late	3.33	1.67
	LSD (P=0.95)			7.91	16.95
	Standard Deviation			4.89	10.48
	CV			113	88.11

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# Secrets of Fall Color Unlocked at UW - Madison

By **Monroe S. Miller**, Golf Course Superintendent, Blackhawk Country Club



I love to follow the change in seasons from the promontory that dominates the eastern end of our golf course and overlooks Lake Mendota.

The snow of winter, the blossoms of spring and the expansive green of summer are beautiful from there. But my favorite scene is the color created by tree leaves in autumn.

Science has understood for quite a time the processes that give us the showy brilliance of fall color.

Plant leaves use sunlight, water and carbon dioxide in the presence of chlorophyll and through the

process of photosynthesis to produce glucose. Chlorophyll gives plant leaves their green color.

Pigments other than chlorophyll are present in leaves. Xanthophyll is a yellow pigment, carotene is orange (like carrots) and anthocyanin is a red pigment. During summer the large amount of chlorophyll masks the red, orange and yellow colors of these and other pigments.

Sugar production in leaves goes down as the shorter days and cooler temperatures of fall arrive. Chlorophyll production declines

and the colors of the other pigments start to dominate over green. Tannin, another pigment, turns oak leaves brown as it overpowers the green of the chlorophyll.

The fall color of an individual tree depends on the infinite proportions possible of the various pigments in the leaves, along with other factors such as soil moisture, nutrient levels, weather conditions and the health of the tree. Leaves on the sunny side of a tree will be redder while the leaves on the shady side will be more yellow.

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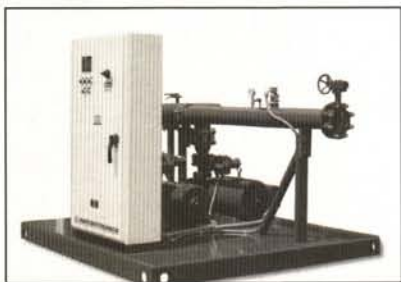


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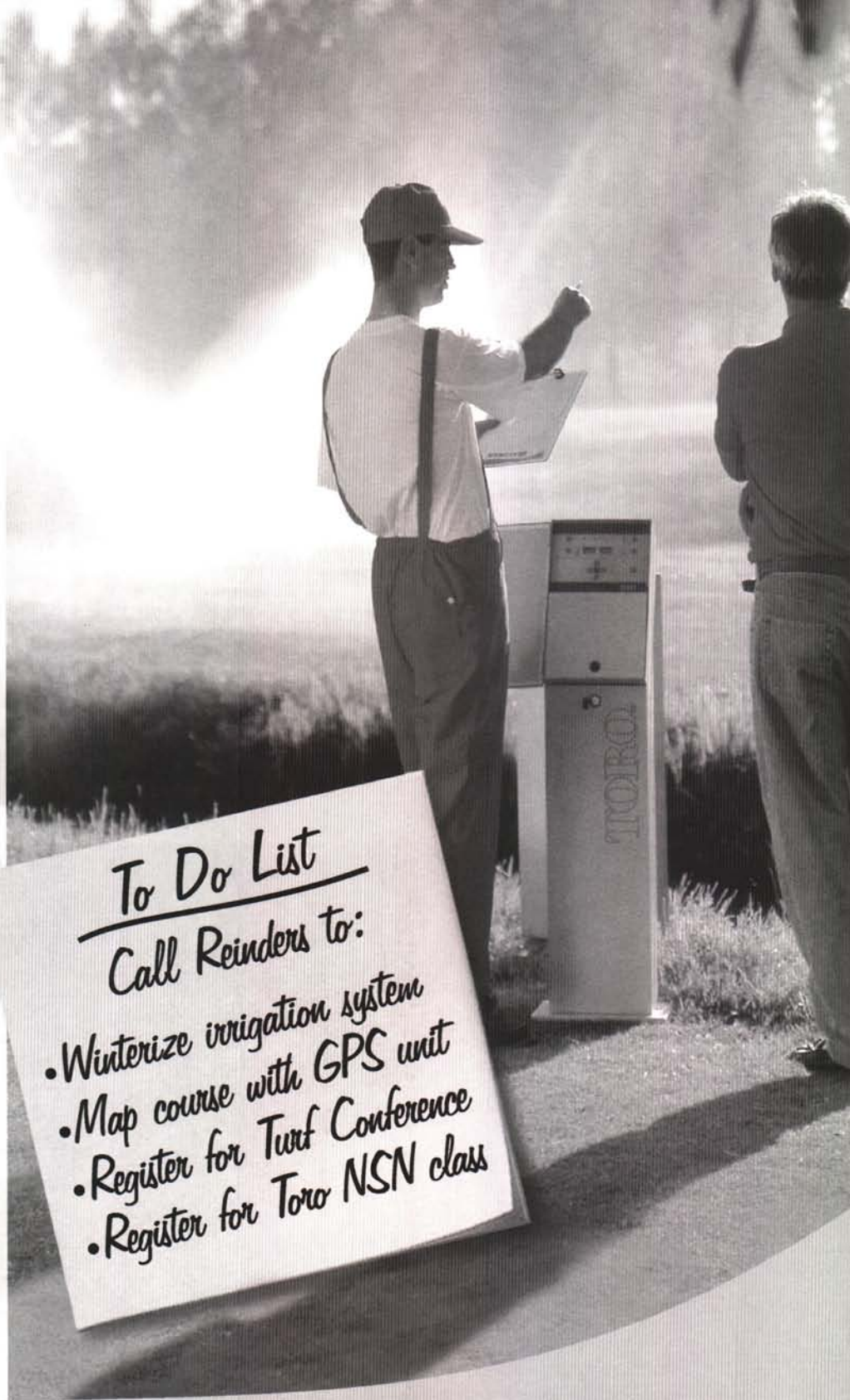


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base of the petiole, slowly closing the veins between the leaves and the wood. Sugars produced during the day are trapped in the leaf at night, adding to the color of that leaf.

Despite all that is known about the fall color of leaves, there are always unknowns and some processes that are imperfectly understood. Botanists are now rethinking that fall colors are merely by-products of dying leaves.

A biologist from Oxford University, Dr. William Hamilton, proposed that the bright color of autumn leaves was a signal to various insects to stay away. His "leaf signal" hypothesis suggested that brightly colored leaves evolved because insects avoided them. Insects that over winter as eggs on tree bark cause damage to trees when they hatch in the spring. This damage is caused by the larvae feeding on the new, spring leaves.

As the insects avoided trees with

bright fall colors, natural selection favored trees that were even brighter.

Hamilton's theory was so appealing that other botanists initiated experiments to test it. One of those is Dr. William Hoch, a plant physiologist in the Botany Department at the University of Wisconsin - Madison. Dr. Hoch's research on fall color was featured in the October 19, 2004 issue of *Science Times*, the weekly New York Times science section.

Dr. Hoch's research has led him to explain that fall colors serve primarily as a sunscreen. "If you are up here in Wisconsin, by the time the leaves change, all the insects that feed on foliage are gone," Dr. Hoch said in the *Times* article.

In the fall much of the photosynthetic process has declined and isn't working efficiently. Leaves cannot capture all of the sunlight falling on them and leftover energy

can cause tissue damage to the leaves. The anthocyanin pigments serve to block some of that sunlight so the leaf can continue producing sugars to help the tree over winter.

Hoch and his grad students raised some normal trees along side of mutants that were unable to produce anthocyanins. The mutants survived in the greenhouse but could not move nutrients out of their leaves when moved outside in the fall.

New theories give rise to new questions and the need for more research. For example, what happens to trees like birch that do not produce anthocyanins? Dr. Hoch is starting to study that question.

As science unlocks more and more secrets of the complex process of fall color, my appreciation is actually heightened. Especially from our 10th tee. 🍂



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