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(Winter Kill continued)

Recall how plants produce their own food. The soil is important for providing nutrients, but all plants actually produce food from photosynthesis. Remember, sunlight, water and carbon dioxide convert to oxygen and sugars. When plants are growing these sugars are quickly utilized for making more plant tissue. When growth slows appreciatively in the fall at cooler temperatures, where do all of the sugars go? To storage reserves? No, plants do not get fat, but the sugars are stored in the roots and crown where they later can be used by the plant to get energy. Rather than fat, plants store up potential energy in the form of fructans. Did the sugars build up to lesson ice formation, or was this purely in response to decreased growth rates while photosynthesis was still continuing? This is another question that is being addressed at UW-Madison.

### What Can We Do?

Rgardless of why plants build of sugars, we do know that we need to have sugar reserves to improve winter survival. To get more sugars we need more photosynthesis and less growth. Less growth is occurring because we are not fertilizing with water soluble fertilizers in September and October, right? More photosynthesis can only come from increasing leaf surface area (raising mowing heights) and decreasing shading. Plants actually continue photosynthesis throughout the winter, and there is not a lot we can do to increase photosynthetic rates. Therefore, we need to concentrate our efforts in reducing growth rates in the late fall and early spring.

*Therefore, we need to concentrate our efforts  
in reducing growth rates in the late fall  
and early spring.*

The late fall, dormant N fertilization that has become so popular is probably not detrimental to winter survival because the plants have stopped growing appreciatively. If nothing else, dormant N fertilization may improve the turf's recovery potential the following spring when injury occurs. My concern is that the late fall N fertilization is encouraging early spring green up which is just too early, but the effect of late fall N fertilization on dehardening has not been evaluated.

What about potassium? This is one area that has been addressed by researchers and nothing conclusive was ever found. In one study, winter injury was lessened; in the next there was no improvement. There was even one study where tissue K concentrations reached 3% of the tissue weight, but winter survival was not improved. Therefore application of K in the early fall will not worsen winter injury, but its benefit is still not proven.

Clearly we need to have a balanced fertility program throughout all year to lesson the damage from all stresses that may occur. Therefore, if soil tests indicate adequate K levels, the application of additional K is futile.

The use of synthetic covers has gained tremendous popularity for nursing sensitive grasses through low temperatures. Winter covers can help grass plants acclimate to cold by continuing the storage of photosyn-

(continued page 15)

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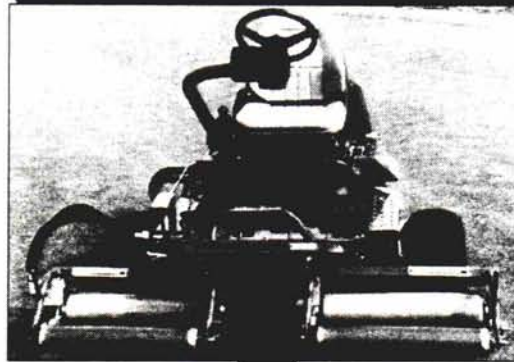
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(Winter Kill continued)

thates when such processes have slowed appreciatively, but the grass under covers dehardens quickly in spring due to the buffering of temperature extremes. Dehardening under synthetic covers greatly increases the moisture content of plants, making them very susceptible to damage during freeze-thaw cycles. Therefore, you can expect labor intensive application and removal of covers during the spring or else winter injury will be worse than if no covers were used.

If ice is allowed to remain on annual bluegrass for more than 60 days, turf damage can be expected. Surprisingly, some varieties of creeping bentgrass can remain alive under ice for as long as 90 days, but there are not very many pure strands of creeping bentgrass, are there? Consequently, superintendents are usually taking necessary steps to mechanically remove ice from turf as soon as possible and the removal of ice usually lessens winter injury.


In conclusion, I recommend increasing your population of creeping bentgrass or Kentucky bluegrass, maintaining moderate N levels throughout the year, improving soil infiltration rates, raising mowing heights in the fall, removing ice and stopping all traffic in order to minimize winter injury on turf. Since none of these management practices has become an acceptable method for completely preventing winter injury, synthetic turf covers are available to ensure plant survival when turf quality must be maximized the following spring. Otherwise you must plan on minimizing the turfgrass's recovery potential in the fall so that the stand will rapidly recover in the spring from any injury that occurs.

The value of such management practices are being investigated, and new management practices for insuring winter survival will soon be evaluated.


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## **Upcoming Events — Mark Your Calendar**

**November 9** MAGCS Clinic & Annual meeting at  
Medinah C.C.

**November 27-29** — NCTE at Pheasant Run Resort,  
St. Charles, IL

**January 24-26** — Midwest Turf Expo. Call 317/  
494-8039.

**February 5-11, 1996** — GCSAA 67th Conference &  
Show, Orlando, FL

### **NECROLOGY**

It is with a deep sense of loss that we report the death of Sandra Williamson, the wife of Joe Williamson of Briar Ridge C.C., who passed away on September 22, 1995.

Wanted: Used verticutting units for Toro Triplex Greensmower. Any condition. Call Tom Morgensen at 708/949-8730.

Rich Mika had knee surgery in September. He is well on the road to recovery and is once again calling on people.

Ed Fischer had his gall bladder removed in late September and was back at work in 3 days. Today having your gall bladder removed is not the surgery it was a few years ago. Ed is feeling fine, the best he has felt in months.

For Sale: Smithco Easy Rider Sandtrap Rake, Model 10-500, with 1 year old Kohler engine. \$1200 - best offer. Call Steven at 708/748-5698.

Congratulations to Bruce Burchfield who has moved to Eureka, MO to be the superintendent at the Fox Run G.C. Bruce started on October 9th at the club. It is a private club only a few years old. You can call Bruce at 314/938-4653.

Mechanic Needed: Cantigny G.C. is looking for a full time mechanic, salary comparable with experience, good benefits. Call Scott Witte for details, 708/260-8179.

Assistant Supt., Course foreman and mechanic needed. Call Stephen Gay, T.L.C. Companies, 708/789-8877.

There is a new Penn State Department Head in Agronomy as of last July 1st. Dr. Steven Fales has replaced Dr. Al Turgeon who has stepped down to become director of Distance Education in the Agricultural Sciences.

Your newsletter will be looking for photos for its new cover for next year. What we need are black & white photos taken with 200 Tri-X film. Try to keep the sky in the top 1/3 of the picture, for that is where our new title and logo will be. We do not want slides, but pictures. If you are going to be a host club a color picture of your club may be a possibility.

Steve Jump has been keeping busy with much remodeling going on. This past summer besides trying to keep his turf, they rebuilt two new holes, the 6th and 16th. This fall he will be rebuilding the 5th green since it had to be relocated due to a town home being built on the old site.

Superintendent Position: (27 Hole Public Course). Contact General Manager, Edward P. Hurley, Lake Windsor Golf & Banquet Facility, 4628 Golf Rd., Winsor, WI 53598. Phone 608/255-6100.

For Sale: Ransomes T3100, 5' Rotary deck, good condition, \$2000; John Deere F911 Rotary mower, 60" deck, excellent condition, \$8000. Call Gary Schweber, 708/566-8592.

Edgewood Valley C.C. will be doing major renovating of their bunkers with over 40 plus to remodel over the next couple years.

John Lebedevs has been hobbling around after some foot surgery to correct varicose veins in his foot. By the time you read this he should be normal — at least we hope so.

Lake Barrington Shores has kept Steve Cummins busy with bunker remodeling. Fall of '93 5 new bunkers, '94 2 new bunkers on 12 fairway, and this fall 2 new bunkers on the 12 fairway and the 4th green.

Looking to cut costs at the GCSAA Conference? Brian Bossert at Bryn Mawr has a room to share for the golf tournament. Give him a call — if you are not the snoring type, 708/677-4112.

Congratulations to Joe Reents who is the new Superintendent at Broken Arrow G.C. in Lockport, IL. Now Joe needs a full time mechanic. Call 815/836-8217 or 815/767-7474.

*If you have your sight, you are blessed.  
If you have insight, you are a  
thousand times blessed.*



## The Art of Spraying-Fungicides

by Dr. Ward Steinstra

Extension Plant Pathologist

University of Minnesota/St. Paul

"To Put" and "To Putt". What is the difference? One is a verb, the other a noun. The first is to "place something where I want it" and the other is often a "futile attempt to do the same thing". Spraying could be likened to "a Putt" when you are reminded that approximately 85% of spray operations make significant errors in — mixing, loading, equipment set-up and operation as well as delivery rates. The National loss was estimated to be 1 billion dollars. The same study reported that less than 25% apply within 5% plus or minus of the goal. How are you doing? I expect most will not need to make changes, but some should.

Since 1991, events like Sprayer Tune-Up Week have focused on "Safe, Accurate and Environmentally Sound Application to Avoid Drift." The environmental concerns like "not in my air, water or yard" have focused most comments and research on spraying to reduce drift. What is Effective Spraying? What is golf course spraying like today? Is it only done when the course is closed? As fast as possible? At low dilution rates to reduce refill times and travel time? Are multiple products in the tank? Is spraying related to irrigation schedules and dry turf? The idea for this topic developed after seeing spray operations on golf courses by superintendents who have challenged me about product applications/recommendations I've made

and because of increasing concerns about "Fungicides Resistance" and product failure reports. Are such concerns related? I believe it does and hope to convince you that effective spraying is more than drift avoidance. What is Effective Spraying?

Some basic facts about spraying you must understand:

**1. Flow Rate.** To double the flow rate you must increase pressure four times. Pressure adjustment up, while it is an easy way to change flow rate it also must be noted that this also reduces the drop size and increases nozzle wear rate. This can result in increased drift potential - smaller drop size and loss of uniformity in the spray pattern-ineffective nozzle openings.

**2. Spray Angle.** An 8002 nozzle operated at 40 PSI will cover 30 inches of turf when positioned 18 inches high, but will cover only 23 inches of turf at 18 inches high if the pressure is too low. Spray angle may be less than the reported degree if pressure is below the recommended range. A smaller spray angle results in less coverage and may product strip or band patterns.

**3. Volume Median Diameter.** This is a measure of droplet size, half of the drops are larger and half are smaller. A larger Volume Median Diameter (VMD) results in less drift, but smaller VMDs may be required to obtain maximum surface coverage on the target plant. The number (VMD) is given in Microns. One Micron is equal to 0.001 millimeter or 1/25,400 inch. An 1/8 inch drop is 3,175 microns. A standard to remember is that drops less than 200 Microns are considered to be drifters.

(continued page 21)

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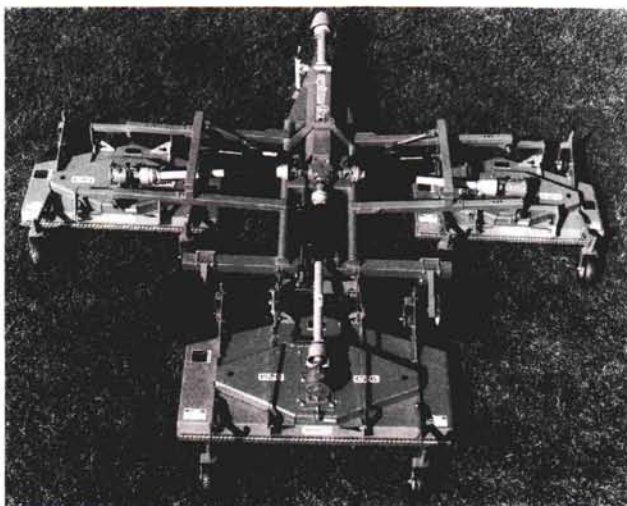
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