

With Winter On Hand, Store Pesticides Properly

With winter on hand, we need to remind ourselves of a few basic principles about proper pesticide storage.

Regardless of the size of your operation or the volume of materials you use, pesticides should be stored in a separate building, room or enclosure. The storage area should be kept dry, reasonably cool, and out of direct sunlight. An exhaust fan should be used for proper ventilation to help reduce the temperature and build up of toxic fumes.

Be sure to locate the exhaust fan where it will not damage plants or harm humans. Some pesticides have special storage requirements and require protection against freezing or extreme heat.

As a general rule, most pesticides will begin to deteriorate at temperatures below 40°F. and above 90°F. Be sure to read the label for proper storage requirements. Pesticide bags, cartons and boxes should be stored off the floor on shelves or on pallets to avoid moisture and deterioration of the packaging.

The storage area should be securely locked when not in use and warning signs with "**Danger—Pesticides, Keep Out**" should be posted on the door and other appropriate areas. Be sure not to store glass and metal pesticide containers near a heat source such as steam pipes or in direct sunlight. Heating of the container may result in expansion of the liquid contents and lead to an explosion.

If you are using several different types of pesticides (i.e., insecticides, herbicides, and fungicides), be sure to keep each pesticide type in separate areas to avoid confusion and inadvertent misuse. Keep a current inventory of your materials as to purchase date, quantity, and condition of the container, and use up pesticides that may be reaching the limits of their shelf life storage.

By doing this, you will reduce the volume of unused chemicals preventing a large disposal problem and avoid the mistake of spraying with a pesticide that has lost its pest controlling ability. **Under no circumstances should a pesticide be stored in a food or drink container!**

When examining chemicals for evidence of deterioration, look for these warning signs:

Emulsifiable Concentrates: Milky coloration does not occur with the addition of water, sludge is present or any separation of components is evident in the container.

Oil Sprays: Milky coloration does not occur with the addition of water.

Dusts: Granules and Wettable Powders: Excessive lumping.

—The Bull Sheet

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GCSAA to Elect Officers at Annual Meeting

Gary Grigg, CGCS, has been nominated for the presidency of the Golf Course Superintendents Association of America (GCSAA).

The association's 1995 election of officers and directors is scheduled for Monday, Feb. 27, during its annual meeting at the GCSAA International Golf Course Conference and Show at Moscone Center in San Francisco, Calif.

Grigg, superintendent at Naples (Fla.) National Golf Club, currently is vice-president of GCSAA.

The nominee for GCSAA vice-president is Bruce R. Williams, CGCS, of Bob O'Link Golf Club in Highland Park, Ill. Williams currently is secretary/treasurer of the association.

A three-way race for secretary/treasurer marks the first election to be held under GCSAA bylaws that make the post and elected office rather than an appointed position. That bylaws amendment, which was enacted at the 1994 GCSAA Annual Meeting in Dallas, Texas, specified a minimum of one candidate each for president and vice president, a minimum of two for secretary/treasurer, and at least one more for director than is needed to fill vacant seats.

The nominees for secretary/treasurer are directors Dave Fearis, CGCS, Blue Hills Country Club, Kansas City, Mo.;

Paul S. McGinnis, CGCS, Union Hills Country Club, Sun City, Ariz., and George E. Renault III, CGCS, Burning Tree Club, Bethesda, Md.

Three candidates for director will be elected for two-year terms. The four nominees for director are Paul A.C. Dermott, CGCS, Oakdale Golf & Country Club, Downsview, Ontario, Canada; David W. Gourlay, CGCS, Club Summerlea, Inc., Dorion, Quebec, Canada; Michael Wallace, CGCS, Hop Meadows Country Club, Simsbury, Ct., and Tommy D. Witt, CGCS, Wynstone Golf Club, North Barrington, Ill. Witt currently serves on the GCSAA board of directors.

GCSAA's current president, Joseph G. Baidy, CGCS, Acacia Country Club, Lyndhurst, Ohio, will continue to serve on the board of directors for one year as immediate past president.

Randy Nichols, CGCS, Cherokee Town & Country Club, Atlanta, Ga., whose one-year term as immediate past president expires, will end seven years' service on the GCSAA Board of Directors.

One current board member, R. Scott Woodhead, CGCS, Valley View Golf Club, Bozeman, Mont., has one year remaining on his term.

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Winter Kill—

(Continued from Page 14)

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, the 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 lessen 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 photosynthates when such processes have slowed appreciatively, but the grass under covers dehardens quickly in the 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 the 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 stands 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 maximizing 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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Understanding Bentgrass Performance —

(Continued from Page 12)

modified soil greens) and to date has scored well in our trials at the Noer Facility.

Another excellent performer in the NTEP trials was Putter, a selection from the state of Washington. It performed in the top 10% of all trials with respect to quality and demonstrated exceptional seedling vigor with moderate levels of thatch. It has been promoted as a dark green selection with take-all patch resistance. However, results from the fairway/tee study did not reveal a significant difference between the creeping bentgrass varieties relative to take-all patch, and Putter scored in the lower 50% on genetic color. Still, it performed better in the two green trials relative to color and overall quality, which begins to suggest site specificity for this variety.

Middle of the Pack

Cobra, SR1020 and National all scored in the middle of the pack in the fairway/tee trial. However, we have found SR1020 to be more susceptible to dollar spot than other comparable varieties. Seed research may have recognized this fact early in development and introduced a blend of SR1020 and Providence sold as Dominant. SR1020 is the #1 selling grass in Australia, and with Providence make up the most widely used of the new bentgrasses. Currently, we are not recommending pure strands of SR1020 because of the limitations with dollar spot.

The "Penn" series performed from the middle of the pack with Penncross and Penneagle entering the top 5 best fairway/tee varieties for overall quality. Also, Pennlinks ended up in the middle of the pack on both greens trails. In general, these grasses are still reliable and remain valuable "stand by" species, should other varieties not be available.

Sleepers

Several varieties that I would classify as having great potential are Regent for fairway/tee quality turf. This variety demonstrated exceptional density that did not translate into high thatch accumulation levels. Regent was the top variety in the modified soil (sand-based) green trial over the 5-year period. Other varieties worthy of further look are Viper and 18th Green. Both varieties are the darkest green and finest leaf texture in the trials, which can provide both an aesthetic and functional benefit. One could speculate that excellent genetic color, taken in concert with some demonstrated wear tolerance, could result in lower N rates for color without compromising wear tolerance. Interestingly, Viper did accumulate the highest thatch levels in the one location where it was measured.

Schizophrenic Variety

An interesting trend appeared with Pro/Cup, a selection handled by Scotts. This variety was at the top of the fair-

way/tee list and native soil green trial with Providence. However, it was right in the middle of the pack on the modified (sand-based) green. It is moderately aggressive, dark green selection with good brown patch resistance.

Pro/Cup demonstrates a point that I have attempted to imply throughout this discussion. With the availability of new varieties developed in a wide range of environments, we may now have specialist bentgrasses that are ideal in specific locations for specific needs.

Southern Man

The increased demand for bentgrass playing surfaces in the southern United States, as far south as Miami, has prompted breeders to develop improved heat and drought tolerant bentgrasses. Currently, the two premier selections that dominated the 1994 market were Cato and Crenshaw, from the Southern Man Dr. Milt Engleke. The research conducted with these varieties is very impressive, including data on rooting, response to high temperature, and species capacity to adjust to drought stress conditions. These varieties were not included in the last round of NTEP trials, but were planted in the latest trial. I expect to have more to say about these varieties, as we learn if there are trade-offs in our cooler region for the improved heat tolerance. Stay tuned.

Decisions, Decisions . . .

One of the challenges of having more bentgrasses to choose from is how to decide which is best. One way is to read articles like this where the habits of the grasses are discussed. A much better way is to review the results of the NTEP trial from 1990-1993 that was recently completed for fairway/tee and green (modified and native soil) situations. A still better way is to see them growing at the Noer Facility (which you are always welcome to visit) and then look at the NTEP results. However, the best way would be to plant some on your golf course. Set aside an area and plant a nursery, or maybe a new chipping green, or better still a new tee. Conducting your own research will provide you with first hand experience not only with quality but also with management.

—Grass Roots

National Convention Hospitality Night

We will have our annual MGCSA hospitality night in San Francisco the evening of Saturday, February 25. We have contracted the Red and Blue fleet for a four hour cruise on the Bay. There will be food provided with a cash bar and a disc jockey. There will be ample room inside as well as outside on this ship to see some of the attractions that make San Francisco famous. Hope to see you and the family there. The cost per person will be \$15.00. We will be sending a monthly meeting notice to pre-register for this cruise in January.

In Brief...

■ **Innovations in pesticide packaging will continue**, according to Ciba packaging czar Larry Dull. Dull told attendees at a recent industry meeting to look for more closed handles to facilitate easier rinsing, more "pre-packs" (two products packaged together, but not formulated together), more refillables, more biodegradable containers, more water solubles, gels and water-soluble bagged liquids. The manufacturers are listening to what users are saying, and the options seem to be growing constantly...

■ **The "moon suit" syndrome continues.** At the same industry meeting, Kevin Downing, CGCS, of Florida's Willoughby, GC, noted how hard it can be to answer golfers who ask, "If this guy's all bundled up, how dangerous is this stuff to me?" Some superintendents find it effective to answer this question with a comparison to x-rays: The x-ray is harmless to the patient but the technician is required by law to protect herself because of the increased potential risks of frequent exposure...

■ **Tentative "Delaney" settlement doesn't impact turf.** You may have read that EPA and the National Resources Defense Council (NRDC) settled a long-standing court battle over enforcement of the Delaney Clause, a decades-old amendment that seems to mandate that no detectable levels of pesticide residues be allowed in food. The settlement could lead to a ban on the use of approximately three dozen pesticides on more than 140 different raw and processed foods. The key word here is "food," so the measure doesn't directly impact T&O uses...

■ **What's sauce for the goose?** It may be Kool-Aid. According to an item in the Met GCSA's *Tee to Green*, a New York homeowner heard about research suggesting that odor and flavor of grapes can repel geese—and decided to conduct her own front-yard experiment using grape Kool-Aid powder. Reportedly, the nuisance geese that were fouling (fowling?) her

yard beat a hasty retreat the next day. We wonder if the sticky purple web-prints in her driveway are now a bigger problem.

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If you have questions about regulatory, legal, environmental or legislative issues affecting golf courses, feel free to contact the GCSAA Government Relations Office at 913/841-2240. If you need specific advice, contact Pat Jones, Director of Communications. For information about media relations, contact Scott Smith, Manager of Public Relations. For general information, copies of articles, studies, etc., contact David Bishop, Manager of Technical Information Services.

Readers should note that GCSAA has reorganized its Communications Department to better serve members and others who need assistance with public affairs issues. The association is also planning to name a new Manager of Government Relations very soon. Look for more information in upcoming issues of Briefing.



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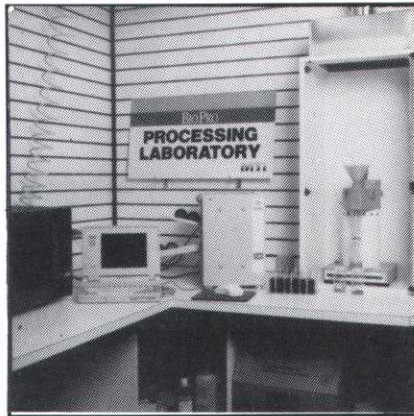
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S&R Changes Name To 'The GCSAA Foundation'

The 501(c)(3) corporation created by the Golf Course Superintendents Association of America (GCSAA) in 1956 to support education, scholarship, science and research programs in the area of turfgrass and golf course management has a new name: The GCSAA Foundation.

The Foundation's board of trustees voted in October to adopt the new name for the former "GCSAA Scholarship & Research Fund, Inc."

"The GCSAA Foundation suggests a closer link with the association," said GCSAA President Joseph G. Baidy, CGCS. "More importantly, the new name is a more accurate reflection of our goals and objectives."

Scholarship and research will remain primary functions of The GCSAA Foundation, but the new name also will embrace GCSAA's Disaster Assistance Fund, its non-turf-related Legacy Awards and other programs appropriate to an institution supported by private gifts.



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MGCSA Mailbox

Retired Superintendent Says MGCSA Membership Still Valuable

After retiring and finding I have much more time to travel and play golf, I find my membership in the Minnesota and National Golf Course Superintendents Associations an added bonus.

In the past four years my wife and I have used my membership card to play golf at Hilton Head Island, Hawaii, Palm Springs, Arizona, etc. It is like having a \$2,000-3,000 perk card when we travel. Additionally, I have attended five U.S. Opens, The Walker Cup, Senior Tour events and other golf tournaments with my membership card.

I joined the Minnesota Golf Course Superintendents Association in 1971. I had worked on golf courses before, but was unaware we had a state association. I have found it extremely rewarding to be part of a great organization. As I also taught school for 32 years, I was unable to be as active in the organization as I would have liked.

I just wanted to inform other members that the benefits of membership continue even after you stop working. It was my pleasure to be a member of the Minnesota Golf Course Superintendents Association.

—Sincerely,
Tom Gibbons

Retired Greens Superintendent-
Vallebrook Golf Course

GCSAA Adds Two Managers to Its Headquarters Staff

The Golf Course Superintendents Association of America (GCSAA) has announced the appointment of two managers to its headquarters staff.

Charles M. Borman has been hired as membership manager. He will oversee existing membership programs and services and formulate recruiting plans to non-members.

Prior to joining GCSAA, Borman was adjutant/executive director of the American Legion Department of North Carolina in Raleigh. During a 23-year career in the U.S. Army, Borman achieved the rank of lieutenant colonel. He served as recruiting battalion commander in Raleigh and as division inspector general at Fort Hood, Texas.

Borman has a master's degree in finance from Hardin-Simmons University in Abilene, Texas, and a bachelor's degree in business from Southwestern University in Georgetown, Texas. He also attended the U.S. Army Command and General Staff College at Fort Leavenworth, Kan.

Brad Short has been hired as government relations manager. He will assist GCSAA members in their efforts to achieve regulatory compliance and to represent the association in regulatory and legislative activities.

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Short was assistant director of government relations at the American College of Radiology in Reston, Va. Prior to that, he was a legislative assistant for Scribner, Hall & Thompson in Washington, D.C. Short has a master's degree in legislative affairs from George Washington University in Washington, D.C., and a bachelor's degree in public administration from George Mason University in Fairfax, Va.

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James Swart
President

Ecological Side Effects of Pesticide And Fertilizer Use of Turfgrass

By Daniel A. Potter, Associate Professor
University of Kentucky

Recent growth of the turfgrass industry has resulted in an increasing number of lawns, golf courses, and other areas being maintained with regular applications of pesticides and fertilizers. Pesticides are indispensable tools of the modern turf manager and there are many situations for which use of a pesticide will be required in order to maintain quality turf. Nevertheless, the unnecessary or excessive use of pesticides can sometimes have undesirable side effects on beneficial organisms and on important processes, such as thatch decomposition and natural regulation of pest populations. Research is underway to clarify how chemical applications affect these processes.

Numerous kinds of predators and parasites are abundant in turfgrass. In Kentucky, more than 30 species of spiders, 42 species of ground beetles (Carabidae), and 40 species of rove beetles (Staphylinidae) were represented in pitfall trap samples from urban turf sites. (Cockfield and Potter 1985). These creatures may be important in maintaining pests at non-damaging levels. For example, in one field experiment (Cockfield and Potter 1984) we placed sod webworm eggs in untreated lawns and recorded their fate over time. Interestingly, turf-inhabiting predators consumed up to 75% of the eggs within 48 hours. Natural enemies that may help to reduce turf pest populations include parasite wasps, nematodes, spiders, ants and beetles.

Insecticides applied for the control of pests may also affect beneficial species. For example, one surface application of insecticide was found to reduce predator populations by 60% for as long as six weeks (Cockfield and Potter 1983). In another experiment, natural predation on sod webworm eggs was greatly reduced by an insecticide application (Cockfield and Potter 1984). Although there has been little research on this subject, a few studies do suggest that pest outbreaks on treated lawns are sometimes related to interference with natural control agents (Streu and Gingrich 1972, Reinert 1978, Potter 1982). Research is underway to identify insecticides that provide good control of pests with minimum impact on beneficial organisms.

Another important role that non-target invertebrates play in turfgrass involves decomposition of thatch. Thatch is a tightly intermingled layer of living and dead roots, stolons and organic debris that accumulates between the soil surface and green vegetation in turfgrass. Problems associated with excessive thatch buildup include restricted penetration of fertilizers and insecticides, reduced water infiltration and shallow root growth accompanied by increased vulnerability to heat and drought stress.

Excessive thatch results from an imbalance between

production and decomposition of organic matter. Soil animals (other than microorganisms) that may contribute to decomposition include earthworms, mites, springtails, millipedes and others. The main effect of these creatures is in breaking up organic matter and helping to incorporate it into the topsoil, where it can be further broken down by bacteria and fungi. Earthworms also aerify the soil and enrich it with their excreta.

Experiments with thatch pieces buried in mesh bags showed that thatch decomposition is much more rapid with earthworms present than without them. The earthworms pull down the organic matter into the soil, and mix soil into the thatch. Destruction of earthworms by pesticides results in slower thatch breakdown. After only 3 months underground, thatch pieces that were exposed to earthworms contained ca. 33% less organic matter and 33% more soil by weight than pieces from which earthworms were excluded (Potter, unpublished data). Turfgrass pesticides found to be particularly toxic to earthworms in our field tests include Sevin, Turcam, Mocap and Benlate. Heavy use of ammonium nitrate fertilizer may also affect earthworms.

Applications of 5 lbs. of nitrogen per 1000 sq. ft. per year for seven years resulted in a decline of soil pH (6.2 to 4.8), increased thatch accumulation and 50% reduction in earthworm populations (Potter et al. 1985). Earthworms are intolerant of acidic soils (Satchell 1967, Edwards and Lofty 1977).

A four year experiment was conducted to study the side effects of a total high-maintenance lawn care program on the turfgrass system. Although changes in predators, herbivores, and decomposers were observed, the overall impact of the program was generally less severe than might be expected given the frequency of pesticide and fertilizer use (Arnold and Potter 1987).

In summary, the intent of this presentation is not to condemn chemical use on turf, but rather to provide "food for thought" for turf managers. There are clearly many situations for which the use of pesticides is essential for the maintenance of quality turf. However, pesticide applications, like human medicines, may have some side-effects, and these must be weighed against the overall benefits that the treatment provides. The accumulated evidence suggests that turfgrass is a complex system with many buffers. Understanding these interactions will make it easier to develop new products and turf management programs that get the job done with minimum disruption of the natural processes that are important to healthy turf. In general, it takes a better turf manager to use less pesticide.

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