᪥ TURFAX™ ᪥
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International Sports Turf Institute, Inc.
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TURFAX™ — The International Newsletter about Current Developments in Turfgrass

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The goal of this 6 issue per year newsletter is to provide international turf specialists with a network for current information about turf. It is FAXed to all Institute Affiliates that use the ISTI technical assistance services on an annual basis. FAXing is more costly, but ensures quick delivery to those outside the United States.

For non-affiliates, a TURFAX™ subscription is available by annual payment of U.S. $60.00. Payment may be made by sending a check to the address below. Foreign orders please send a check or money order on a U.S. bank.

Payment of the 1995 subscription to TURFAX™ of $60.00 is now being accepted from our 1994 subscribers.

Best Wishes in the Holiday Season!

JB COMMENTS

Due to the actions of animal activists in concert with governmental agencies, the Canada geese populations have become an excessive burden in many public areas of the United States. Of most concern are park and golf course areas with ponds or similar bodies of water that attract these birds. The result is many acres of quality park land that are completely denuded of vegetation, including turfgrasses and are now covered with a sloppy residue of bird excrement. These areas have become totally unusable for human esthetics and recreational activities, and now present odor and health problems.

Governmental authorities in some states are finally becoming aware of the problem and are meeting in an attempt to develop a solution. Whatever is done, they will be subject to an intolerant advisory position from the animal activists.

In the meantime, a new natural organic material is being shown to have the potential to discourage the activities of Canada geese. It is found in the juice of the concord grape which is sprayed over the turf area. Once exposed to its irritant properties evidently the geese imprint the location where this occurred and do not return. While the tests are still limited, the findings to date are promising.

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ZINC TOXICITY - An Increasing Problem?

Certain heavy metals, such as zinc (Zn) and copper (Cu), are essential nutrients required for turfgrass growth. If either is totally deficient the plant dies. These two heavy metals are micronutrients, which means they are required by the plant in very small amounts. When either zinc or copper are applied to the turfgrass area they tend to remain near the soil surface due to their water insolubility, particularly at a neutral to alkaline soil reaction (pH).

Characteristic toxicity symptoms include a lack of rooting, which gets progressively more severe over several years, and a lack of lateral stem development, both rhizomes and stolons, at higher toxicity levels. In many cases this problem has been associated with high-sand root zones which varied outside the limits of the USGA root zone modification guidelines. This problem has been observed on creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*), bermudagrass (*Cynodon* spp.), and perennial ryegrasses (*Lolium perenne*).

The most common problem has been a zinc (Zn) toxicity, which seems to be accentuated by a high soil iron (Fe) level and sometimes a high soil manganese (Mn) level. The source of the excessive zinc may vary including (a) being present in the sand deposit obtained from a large river where industrial dumping has occurred recently, (b) topdressing with a sand from a manufacturing source in which heavy metals were added during the sand utilization, and (c) post-turf establishment addition in a locally-mixed composition fertilizer usually applied through an irrigation system.

Development of such zinc toxicity problems can be avoided if appropriate chemical tests are conducted at the time each material source is selected. The cost of a test is small, but the importance will be great once high levels of the relatively immobile zinc are in place in the surface root zone. Frequently, the only option is total reconstruction of the root zone. Thus, be forewarned.

PUBLICATIONS AVAILABLE:

Turfgrass Patch Diseases - caused by ectotropic root-infecting fungi.
APS Press. 161 pages. (1993).

The numerous ectotropic root infecting fungi described as patch diseases have only become identified and characterized as serious diseases of turfgrasses since 1984. This book contains seven papers by individual groups of authors that provide a historical perspective and subsequent up-to-date evaluations of the science-based information and understanding of the patch diseases attacking diseases. This would be a good book for those seeking detailed scientific information on patch disease problems of turfgrasses.

Contact. APS Press, The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, Minnesota 55121-2097, USA.

TEXAS TURFGRASS RESEARCH - 1993
CBR 510. Consolidated Progress Reports 5104 to 5146. The Texas Agricultural Experiment Station, Texas A&M University. (1994).

This is an annual research report prepared by the turfgrass researchers of the Texas Agricultural Experiment Station encompassing 42 individual research reports. The reports are presented within five topic areas of I. Growth and Development, II. Turfgrass Cultivars, III. Environment, IV. Pests, and V. Culture. The majority of the research is oriented to warm-season turfgrasses.

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JB VISITATIONS:

Seattle, Washington - November
Attended the annual meetings of the American Society of Agronomy which included the CSSA Turfgrass Division (C-5). There were a total of 101 research papers presented. Sam Sifers and myself were involved in a paper on comparative heat resistance of cool-season turfgrasses which generated considerable interest. Abstracts of all papers presented are available from ASA Headquarters in Madison, Wisconsin.

Reims, France - November
Participated as a speaker at the French National Turfgrass Conference and Show. The topic was Trends To The Year 2000. This conference is only four years old and is developing quite well for a new effort. A unique dimension was three banquets for all attendees on three consecutive nights. Reims is champagne country and we fully experienced their local products.

Phoenix, Arizona - December
Sam Sifers and myself presented a paper before the American Society of Testing and Materials Symposium on Sports Safety. These were an interesting series of invitational papers from all phases of sports medicine and equipment as well as the playing surfaces themselves. The topic of our paper was on the comparative hardness of surfaces as assessed by deaccelerometer techniques. Much interest was generated. The paper will be published in the Symposium Proceedings by April and will be available to you via TURFAX™.

Minneapolis, Minnesota - December
Presented two talks before the Annual Minnesota Turf and Grounds Conference. turf professionals in Minnesota are very active in education/research and are on a rapid growth curve. Their enthusiasm was excellent. The big topic being discussed was winterkill of turfgrasses. This was a major problem in some parts of Minnesota this past year and in many areas in north central and northeastern U.S.

UPCOMING INTERNATIONAL EVENTS:

January 23 to 27, 1995. BIGGA Turf Management Exhibition & Educational Seminar Programme. Harrogate, England, United Kingdom. The theme is "The Learning Experience."
Contact: B.I.G.G.A. Aldwark Manor, Aldwark, Alne, York, England YO6 2TU, United Kingdom.
Phone: 0347-838581.
Fax: 0347-838864.

February 4 to 8, 1995. Annual Conference and Exhibition of the Sports Turf Manager's Association. Pirate City/Mckechnie Field, Bradenton, Florida, USA. The theme is "Sports Turf Spring Training." Headquarters hotel is the Holiday Inn Riverfront.
Contact: Sports Turf Manager's Association, P.O. Box 809119, Chicago, Illinois, 60680-9119, USA.
Phone: (312) 644-6610 ext. 4731.

February 8 to 10, 1995. Turfgrass Producers International Midwinter Conference and Exposition. Orlando, Florida, USA. The theme is "2020 - A Vision Of The Future." Headquarters hotel is the Hilton Hotel in Walt Disney World Village.
Contact: Turf Resource Center, Turfgrass Producers International, (formerly ASPA) 1855-A Hicks Road, Rolling Meadows, Illinois 60008, USA.
Phone: 800 (405) 887-28873.
Fax: (708) 705-8347.

February 20 to 27, 1995. GCSAA International Golf Course Conference and Show. San Francisco, California, USA. The theme is "Golden Opportunity." Host site the Moscone Center.
Contact: Golf Course Superintendents Association Conference Registration, Dept. 458, P.O. Box 419263, Kansas City, Missouri, 64193-0458, USA.
Phone: (913) 832-4430.
Fax: (913) 832-4420.

LOW TEMPERATURE Kill Causes

Low Temperature Kill is caused by ice crystal formation in plant tissues that fatally injures the protoplasm in cells. The extent of kill increases at higher tissue water contents and low carbohydrate reserves. All the leaves and roots may be killed, but the turf will survive as long as the meristematic tissues in the crown of plants and in the nodes of lateral shoots survive.

The above type of winterkill is distinctly different from two other types: (a) winter desiccation and (b) low temperature diseases. Also, direct low temperature kill occurs at temperatures below 32°F (0°C); while low temperature leaf discoloration, or chilling injury, occurs at tissue temperatures between 55 and 60°F (13-15°C) with a resultant loss of green color. Do not confuse these types.

Low Temperature Kill Is Increased By:

A. Environmental Stress Conditions:

1. Wet, saturated surface soil.
2. Rapid rate of freezing or thawing.
3. Repeated freezing and thawing.
4. Shaded site.

B. Unfavorable Cultural Practices:

1. Poor surface and subsurface drainage.
2. Close cutting height.
3. Low potassium (K) level.
4. Excessive nitrogen (N) level.
5. Thatch accumulation.

C. Susceptible Plant Physiology Status:

1. Active shoot growth.
2. High tissue hydration (succulence).
3. Lateral shoots (stolons & rhizomes) elevated above protective soil, such as by excessive thatch.

D. Poor Plant Species and Cultivar Selection.

UNDERSTANDING TERMINOLOGY:

- **Winter dormancy** - The cessation of growth and subsequent death of the leaves of perennial grasses at low temperatures.
- **Winter overseeding** - Seeding cool-season turfgrasses onto warm-season turfgrasses at or near their start of winter dormancy; used in mild climates to provide green, growing turf during the winter period when the warm-season species are brown, dormant and prone to wear stress.
- **Low-temperature chill discoloration** - The loss of chlorophyll and associated green color that occurs in warm-season turfgrasses at low-temperature chill stress of 55 to 60° (13-15°C).
- **Direct low temperature kill** - The death of turfgrasses caused by either intercellular or extracellular ice crystal formation at temperatures below 32°F (0°C), that kills the living cells in the protoplasm of cells. It is most severe in plants that are highly hydrated, that is high in water content in the critical meristematic areas of the plant crown and nodes on rhizomes and stolon.
- **Spring greenup** - The initial seasonal appearance of green shoots as spring temperature and moisture conditions become favorable; thus, breaking winter dormancy.

UPCOMING JB VISITATIONS:

Provided for Institute Affiliates who might wish to request a visitation when I'm nearby.

- January 8 to 14 - La Manga, Spain.
- Jan. 16 to 20 - East Lansing, Michigan.
- January 21 to 28 - Harrogate, England.
- January 31 to Feb. 2 - Columbus, Ohio.
- February 3 to 7 - Brandenton, Florida.
- February 8 to 10 - Orlando, Florida.
- February 21 to 27 - San Francisco, Calif.

GUIDELINES FOR PRACTITIONER TURFGRASS FIELD TESTS

Research at universities and private companies can eliminate 90% of the materials and practices that will not work in turfgrass culture. These organizations, in turn, will identify certain key cultivars, root zones, fertilizers, pesticides, equipment and cultural practices that have the greatest probability of success. Ultimately however, the final demonstration of their practical application under specific climatic and soil conditions at individual turfgrass sites is by conducting on-site field tests.

To ensure valid conclusions concerning comparative assessments of various turfgrass field test treatments, it is important that all other potential variables that could influence the results be controlled across all treatments. In addition, it's imperative that the cultural program be adjusted, particularly where variations in the root zone composition are involved, to ensure that the soil chemistry, allied plant nutritional responses, and plant water status are comparable across the various treatments. Thus, the following key guidelines should be followed in terms of research methodology to ensure valid field test conclusions. They include the following:

A. SITE SELECTION:

- **Topography**. A level to slightly sloping (1 to 2%) plot area is preferred. The slope throughout the full length of the plot area must be uniform, particularly as it affects drainage of surface water and solar radiation exposure.

- **Traffic Intensity**. The site should be subject to the same type and frequency of traffic stress throughout the area.

- **Solar Radiation Exposure.** Of particular concern is partial tree or building shade over only a portion of the experimental area. If there is shading, it should be the same amount from the same angle for a comparable duration over a 24-hour period over the entire turf plot area.

B. TREATMENTS AND LAYOUT:

- **Number of Replications**. Typically a minimum of 3, and preferably 4 replications, are used for detailed turf studies. Occasionally, as few as 2 replications of each treatment are employed for simplistic demonstration tests on very uniform sites. The greater the internal experimental site variability, the more replications required.

- **Check Treatment**. It is always important to include one replicated set of untreated check plots in order to confirm that a specific response observed is a result of the treatment being assessed.

- **Plot Size**. In general, the greater the variability in site conditions, encompassing the conditions listed in the other sections, the larger the plot size required. Plot size also is dictated by the number and kinds of evaluation assessments to be conducted.

C. ROOT ZONE:

- **Drainage**. Where a high-sand root zone plot treatment is placed within a turf facility composed of an older compacted soil, such a sports field or horse race track, it is imperative that a subsurface drainage system is provided. There is the tendency for surface water to move into the high-sand plot area from surrounding surface areas due to its superior infiltration rate. Without subsurface drains, the water is trapped as in a bathtub. This results in soil water saturation, loss of the root system, and a decline in turf health. However, turf failure would be a result of poor subsurface drainage rather than the treatment.

- **Soil Settling**. Where more than one type of root zone, especially clayey soil types, are included in a study, it is important to consider the differential amount of settling that can be anticipated between the various soil textures. This factor is important to ensure a long-term, uniform, level surface throughout the plot area. If some treatment plots settle more than others, the result can be a differential in relative surface drainage, mowing, and other cultural-environmental factors which in turn may adversely affect the treatment response.

D. TURFGRASS:

- **Species-Cultivar.** Initially both must be the same throughout the entire treatment area.

- **Age.** All turfs should be of the same age on both the treated and untreated check areas to ensure valid conclusions.

- **Thatch.** Initially, it is imperative that all treatments have comparable thatch levels.

- **Planting.** If involved, the same planting procedures should be practiced throughout the entire plot area.

E. CULTURAL SYSTEM:

- **Mowing.** Be sure the same cutting height, mowing frequency, mower type, mowing pattern, and clipping removal/return strategies are employed across the entire experimental area.

- **Fertilization.** Assuming there are no fertilization treatments involved, fertilization practices should ensure that the same plant nutritional levels exist across all treatments, especially where root zones of different textures are involved, particularly high-sand versus clayey soils. This imperative strategy may necessitate using different nutritional levels on individual soil treatments, particularly nitrogen (N) and potassium (K), both for the preplant fertilization and for subsequent post-establishment fertilization. Failure to recognize this need is one of the most common errors in conducting research with different root zone soil textures. If the Texas-USGA Method of root zone construction is used, the initial one- to two-year fertilization period may be significantly higher until the development of a living, biologically active soil develops. After this occurs, the nutritional requirements will be significantly less than for a high-sand root zone without the perched hydration zone. To summarize, plot-by-plot fertilization for each individual soil treatment within each replication should be practiced where different soil textures are included in the study.

- **Irrigation.** Irrigation should be practiced at levels that ensure the same turfgrass tissue moisture levels across each individual treatment. This is particularly important where root zones of different textures are compared. High-sand root zones without the Texas-USGA Method of a perched hydration zone can be very droughty and require a greater frequency and amount of water than a nearby of clay or loam soil. To ensure a uniform turfgrass plant water status throughout all treatments, it may involve the proper, timely manual irrigation of individual plots and/or dividing root zone treatments into separate areas such that they can be watered differentially as needed by zonal irrigation heads operated by separate controllers.

- **Pests.** Typically, the development of weed, disease, or insect problems is an important reflection of the treatment effects and this cultivar assessment. However, if pests are allowed to develop to the point where a majority of the turf is destroyed, then the original objective of comparing the test treatments is lost. If a particular disease or insect attack occurs to the extent that it threatens total loss of the turf plots, it is imperative that the appropriate target specific pesticide be applied. In this case, the pesticide application should be made to the entire experimental area. It is always best to minimize the use of preemergence herbicides as many will adversely affect the turfgrass root system.

Note: The guidelines presented are by necessity general in nature. Thus, it is best to secure more specific advise from a knowledgeable turfgrass researcher where important field test evaluations are to be conducted.