TURFAX™

of the International Sports Turf Institute, Inc.

The International Newsletter about Current Developments in Turfgrass

Volume V Number 1 January-February 1997

CONTENTS:

J B Comments: Rumors Versus The Facts

The rumor mill is that winter overseeding cannot be accomplished in such a high density turf as Champion vertical dwarf bermudagrass. What are the facts? Winter overseeding of various mixtures including perennial ryegrass (*Lolium perenne*), rough bluegrass (*Poa trivialis*) and creeping bentgrass (*Agrostis stolonifera*) have been successful on Champion putting greens from Houston, to Wichita Falls, to Bay City, to San Angelo, Texas. These golf courses typically have utilized a 3.2 mm (1/8 inch) mowing height and in-season vertical cutting to control unwanted thatch-stem biomass buildup, plus 2 to 4 pre-plant vertical cuttings using a 3/4-inch (20 mm) blade spacing.

RESEARCH SUMMARY: GRAY LEAF SPOT CONTROL STUDY

Gray leaf spot has been recognized as a problem on St. Augustinegrass (*Stenotaphrum secundatum*) for many years. But only recently it has become of concern on tall fescue (*Festuca arundinacea*) and perennial ryegrass (*Lolium perenne*) turfs. Thus, there is considerable interest in terms of control strategies.

Replicated investigations were conducted concerning eight fungicides for the control of gray leaf spot (*Pyricularia grisea*), which was inoculated onto a tall fescue turf in early August of 1996. At 4 and 6 weeks after inoculation only azoxystrobin (Heritage™) and thiophanate-methyl (Cleary 3336 ™) provided acceptable gray leaf spot disease control, of less than 10% under the hot, humid conditions in Griffin, Georgia. Other fungicides that gave unsatisfactory control in the test included chlorothalonil (Daconil 2787™), flutolanil (ProStar™), iprodione (Chipco 26016™), mancozeb (FORE™), procymidone (Sumilex™), and propiconozole (Banner™).

For more specifics see the original publication on pages 33 through 35 of the 1996 University of Georgia Turfgrass Pathology Research Report. The paper is authored by L.L. Burpee and S.L. Stephens. University of Georgia Experiment Station, Griffin, Georgia, 30223-1797, USA.

DISEASE SYMPTOMS MAY VARY WIDELY AMONG TURFGRASS SPECIES

Cool-Season Turfgrass. Initial symptoms of gray leaf spot appear as a melting-out. Perennial ryegrass (*Lolium perenne*) seedlings and sometimes mature plants, can be severely injured during late summer and fall. Gray lesions with a brown border occur along the margins of infected leaves. The leaf blades often are twisted and die back from the tips. The turf may be thinned, especially under hot, humid conditions.

Warm-Season Turfgrass. Initial symptoms of gray leaf spot on St. Augustinegrass (*Stenotaphrum secundatum*) are tiny, brown spots on the leaves and stems that enlarge rapidly, turn bluish-gray, and become oval to elongated with a 6 to 8 mm length. A gray mold may occasionally be seen covering the lesions during hot, humid weather. Mature lesions have tan to gray, depressed centers with irregular, purplish-brown margins. A yellow border may be present. A severe infection results in leaves with a scorched or burned appearance, and the turf is thinned.

NEW PUBLICATION AVAILABLE:

A Guide to Golf Course Irrigation System Design and Drainage - by Edward Pira. Ann Arbor Press, Chelsea, Michigan. (1997)

This book addresses irrigation system design, construction, scheduling, and operation. It also covers the fundamentals of drainage design and installation. Used in numerous academic courses for years, this is the first commercially-available edition. It has been completely reorganized, is easy-to-use, and contains more than 450 pages, 700 figures and illustrations, 100 tables, hands-on examples, and student problems. A detailed reference book for the practitioner, as well as an instructional manual. The book price is $59.95, plus shipping.

Contact: Ann Arbor Press, Inc., P.O. Box 310, Chelsea, Michigan 48118.
Phone: 313-475-8787.
Fax: 313-475-8852.

THREE-DIMENSIONAL VERSUS TWO-DIMENSIONAL ROOT ZONE STABILIZERS

Based on a number of questions during a recent international conference, it is evident there is still confusion concerning the use of stabilizing materials in high-sand root zones. A question commonly raised is "don't they cause hardness?" The answer is "yes" for the two-dimensional types such as the fibrillated fibers. However, it is a distinct "no" for the three-dimensional interlocking mesh of which there is only one available on the market developed by Netlon, Ltd.

Research from six different studies conducted over a four-to five-year duration has consistently shown that use of the three-dimensional interlocking mesh root zone actually results in a softer surface, based on numerous Clegg Impact Hammer peak deceleration assessments. This translates to a more safe surface for sports participants. In addition, this same extensive research has shown that the three-dimensional interlocking mesh system also has a self-flexing action which contributes to an improved root zone environment in terms of drainage and aeration that enhances root growth and turfgrass health.

ISTI Chief Scientist: James B Beard
TURFAX™ Production Editor: Harriet J. Beard

The goal of the six issue per year TURFAX™ newsletter is to provide international turf specialists with a network for current information about turf. This newsletter 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 given below. Foreign orders please send a check or money order on a U.S. bank.

Direct inquiries to:
International Sports Turf Institute, Inc.
1812 Shadowood Drive
College Station, Texas 77840 USA
Telephone: (409) 693-4066
Fax: (409) 693-4878

JB VISITATIONS

December - Austin, Texas.

Visited the Barton Creek Club and Resort facility and specifically the Fazio and Crenshaw golf courses. The Champion vertical dwarf bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) has now been in two years on all 18 greens at the Fazio Course. It was converted from Crenshaw creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*) after the latter had failed during two successive summer stress periods that resulted in closure of the golf course. This is the oldest installation of Champion bermudagrass on putting greens. Thus, Superintendent Dale Miller is in the forefront in developing a more complete understanding of the "real world" cultural requirements for this new cultivar, including the nitrogen nutritional level, vertical cutting requirements, and winter overseeding timing.

Under extreme close mowing heights creeping bentgrass has the capability to shorten its internode lengths, while the previous dwarf hybrid bermudagrasses lacked this capability. It appears that Champion vertical dwarf bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) behaves more like creeping bentgrass.

Prairie buffalograss (*Buchloe dactyloides*) had been planted in a number of locations in the roughs and around bunkers at the Crenshaw Course five years ago. Even in these rough areas it is exhibiting a lack of tolerance to traffic. As a result, it has been severely thinned. Of the original 25 acres of Prairie buffalograss, 75% has now been converted to Tifway bermudagrass. There also have been problems with Prairie buffalograss sodded around the perimeters of bunkers. Its poor stem and root development do not adequately stabilize the integrity of a distinct lip. Thus, they have had considerable problems with the collapse of the lips which then require costly rebuilding with another species.

January - Reno, Nevada.

Under sponsorship of the Reno landscape organizations, presented testimony before a regional committee charged through state legislation to develop what would become state wide water conservation laws. The wording in a very voluminous document included a small section which assumed the elimination of turfgrasses within the county encompassing Reno and Sparks, Nevada. Their claims for water savings were bogus figures generated from undocumented or illegitimate sources. The testimony by myself and representatives from the local landscape organizations reversed the proposed legislation. The result being that turfgrasses will be allowed within the concept of maximum strategies for water conservation in that region. The local landscape groups worked with a legal council, who was very helpful in the preparation leading up to the actual testimony. Should other localities face a similar type of legislation, it would be worthwhile to contact the Reno, Nevada group concerning their experiences during this and an earlier similar attempt.

January - Orlando, Florida.

Presented a lecture before a general session on Turfgrass Benefits and a one-day seminar on Modern Trends in Golf Course Maintenance before the Club Managers Association of American Annual Meeting. Attendance at both sessions were at full capacity. There was a great deal of interest in the high density Penn series bentgrasses and Champion vertical dwarf bermudagrass for putting greens. Cultural approaches to satisfying putting green speed issues for the golfing clientele also received considerable attention.

January-Indianapolis, Indiana.

Presented two lectures at the Midwest Turf Exposition. Dr's Clark Throssell and Zac Reicher of Purdue University are building a quality turfgrass education and research program.

ENHANCING PARTICIPANT SAFETY ON NATURAL TURFGRASS SURFACES - PART I

by

Col. S. I. Sifers and Dr. J.B Beard

Injuries on football fields and other sports surfaces can be grouped into different categories as related to the type of athlete movement and to the relative softness of the turf-soil surface. Many impact-type injuries are related to varying degrees of surface hardness, with the safety of the participant increasing inversely with a lessening of surface hardness. There are other surface playability characteristics of concern, such as traction, wear tolerance, divot opening/turf recovery, and smoothness. This paper will address primarily the aspects of hardness of surfaces.

Surface Hardness Assessment

The hardness and resultant safety of a surface can be measured using a light-weight, portable, peak deaccelerometer apparatus, the Clegg Impact Soil Tester. Several models of this device, with differing hammer weights of 0.5, 2.25, and 4.5 kg (1, 5, and 10 lb), are used in turf research. Each provides a relative scale of impact resistance of the surface measured in gravities (g), with a decreasing number indicating a lessening of hardness.

Comparisons of surface hardness for nine surfaces, ranging from concrete to turfed soil, as assessed by the Clegg device with a hammer weight of 2.25 kg (5 lb), are shown in Table 1. Results indicate a decrease in surface hardness as the composition of the material becomes less dense. Major differences in hardness occur among (a) solids, materials such as cement, composition, or wood floor surfaces, (b) other types of artificial playing surfaces, and (c) the natural turf-soil surfaces.

Turfgrasses offer the least hard surface in comparison to other alternatives available for sports activities. This is due to the biomass of the turf and the associated root zone that provide a uniquely resilient characteristic and cushion. Differences occur within the natural turf-soil surfaces with changes in (a) soil texture, (b) moisture content, and (c) whether the surface is bare soil or turfed.

Table 1. Comparisons of hardness for representative surfaces in the College Station, Texas area, expressed as means of multiple observations of Clegg Impact Values (CIV).

Representative Surface Types	Clegg Impact Value (g)
cement floor	1426
asphalt road	1442
tennis court - outdoor composition	1422
composition running track	1432
basketball court - permanent wood	640
football stadium - outdoor, 4-year-old artificial surface	175
football stadium - indoor, 1-year-old artificial surface	141
baseball - bare clay infield	504
baseball - natural turfed field of bermudagrass	100

Sports participant safety on natural turfgrass is maximized through providing a dense biomass of above-ground turfgrass leaves, shoots, and stems grown on a stable, low-density root zone. It, therefore, is important to select the (a) correct turfgrass species/cultivar, (b) root zone, and (c) cultural practices that have the capability of sustaining the highest possible biomass over the entire use period. Results of several of our cultural studies as described in the following paragraphs illustrate these effects.

Other considerations should include the turfgrass species/cultivar adaptation, turfgrass wear tolerance, pest resistance, environmental stress tolerance, and the ability to recover rapidly from turf injury during the time of year when intense use occurs.

Cutting Height Effects

Surface hardness of turfed sport venues can be modified by changing the height of cut. This was shown in our study with Tifway hybrid bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) grown on a modified high-sand root zone at seven heights of cut from 12 to 250 mm (0.5 to 10 inches). Total shoot biomass density was determined by counting the shoots per decimeter, harvesting, and obtaining dry weight of shoots per square decimeter.

As the height of cut increased the number of shoots per square decimeter decreased at each of the seven heights, and the shoot biomass per dm^2 decreased at each height up to 100 mm (4 inches) then increased at 250 mm (10 inches). This was accompanied by a decrease in surface hardness from 12 to 25 mm (0.5-1.0 inch), then a stable reading to 50 mm (2 inches) and another plateau to 100 mm (4 inches), followed by a further decrease to 250 mm (10 inches) (Table 2).

Table 2. Effects of seven heights of cut on the surface hardness, expressed as five-year means of the Clegg Impact Values (CIV), of Tifway bermudagrass turfs grown on a modified high-sand root zone. 1989-1994.

Height of Cut in mm (inch) Treatment	Shoot Density per dm^2	Clegg Impact Value - g (2.25 kg Hammer)
12 (0.5)	501	62 a*
25 (1.0)	304	58 bc
37 (1.5)	297	57 c
50 (2.0)	241	54 cd
75 (3.0)	207	51 d
100 (4.0)	131	51 d
250 (10.0)	40	47 e

*Means followed by the same letter within the same column are not significantly different at the 5% level, LSD t-Test.

All results were within the acceptable range specified in the standard for surface playability of football (soccer) fields (10-100g) proposed by the Sports Turf Research Institute, Bingley, U.K. and the acceptable running range in the proposed standard for turfed horse racing surfaces (30-110 g) by the authors (Beard and Sifers, 1990).

Soccer Field Turf-Soil Status	CIV Value (g)
Too hard	> 100
Acceptable	10 to 100
Preferred	20 - 80
Too soft	< 10

Although seven heights of cut were assessed in our study, the most appropriate turfgrass cutting height for football and other field sports from the playability and turfgrass health viewpoints ranges from 12 to 50 mm (0.5 to 2.0 inches), depending on the turfgrass species. Turfed horse racing surfaces generally have cutting heights of 50 to 100 mm (2 to 4 inches), depending on the turfgrass species.

Nitrogen Fertility Effects

Smaller changes in surface hardness can be made by increasing the nitrogen fertility rate within the same height of cut (Table 3). The increased nitrogen fertility resulted in increased shoot biomass at each of the three heights. However, in this study on Tifway hybrid bermudagrass (*Cynodon dactylon* x *C. transvaalensis*), the height of cut effects on surface hardness was more dominate than the effects from an increased nitrogen nutritional level.

Proper turfgrass P and K fertilization, irrigation, and cultivation practices also aid in maximizing the biomass cushion, thus lessening surface hardness.

Table 3. Effects of three heights of cut and three nitrogen (N) fertilization levels on the surface hardness, expressed as five-year means of the Clegg Impact Values, of turfs grown on a modified high-sand root zone. 1989-1994.

Height of Cut in mm (inch) Treatment	Nitrogen Rate Per Growing Month as N kg/100 m² (lb/1,000 ft²)	Clegg Impact Value (g) (2.25 kg Hammer)
12 (0.5)	0.25 (0.5)	62 a*
12 (0.5)	0.50 (1.0)	58 ab
12 (0.5)	0.75 (1.5)	53 b
25 (1.0)	0.25 (0.5)	58 ab
25 (1.0)	0.50 (1.0)	53 b
25 (1.0)	0.75 (1.5)	60 ab
37 (1.5)	0.25 (0.5)	60 ab
37 (1.5)	0.50 (1.0)	59 ab
37 (1.5)	0.75 (1.5)	55 b

*Means followed by the same letter within the same column are not significantly different at the 5% level, LSD t-Test.

Turfgrass Cultivar Effects

The effects of six *Zoysia* cultivars and two heights of cut, assessed with the 0.5 kg Clegg hammer and the fourth drop, indicate that surface hardness can be modified by cultivar selection and by height of cut. The softness benefits exceeded 50% among the six cultivars (Table 4). The increasing softness among cultivars was associated with an increase in shoot density and a higher leaf-to-stem ratio. The effects of an increased cutting height on enhanced softness of the surface were substantial as reported earlier.

ROOF GREENING

Roof greening involves the development of a root zone and the establishment of turf and/or landscape plantings on the flat roofs of buildings. This is an issue that is gaining favor in Germany. Cities have actually enacted roof greening regulations for specific buildings and in some cases provide financial support for this effort. Some German states provide recommendations relative to roof greening, with the objective of improving the ecological and aesthetic environment of urban areas.

Table 4. Effects of six mature *Zoysia* cultivar turfs and two heights of cut on the surface hardness expressed as the Clegg Impact Values (CIV), when grown on a modified high-sand root zone.

Zoysiagrass Cultivar Treatment	Height of Cut - mm (inch)		Percent Change from 12 to 25 mm Cutting Heights
	12 mm (0.5 in.)	25 mm (1.0 inch)	
Belair	69 a*	41 a	-41
El Toro	54 b	39 a	-28
Korean Common	55 b	35 a	-36
Meyer	48 bc	33 a	-31
FC 13251	44 c	31 ab	-30
Emerald	32 d	22 b	-31

*Means followed by the same letter within the same column are not significantly different at the 5% level, LSD t-Test.

References:

- Beard, J.B and S.I. Sifers. 1990. Feasibility assessment of randomly oriented interlocking mesh element matrices for turfed root zones. American Society of Testing Materials, Standard Technical Publication 1073. pp 154-165.
- Beard, J.B and S.I. Sifers. 1993. Stabilization and enhancement of sand-modified root zones for high traffic sports turfs with mesh elements. Texas Agricultural Experiment Station, Texas A&M University System. B-1710, 40 pages.
- Beard, J.B and S.I. Sifers. 1989. A randomly oriented, interlocking mesh element matrices system for sport turf root zone construction. Proc. Int. Turfgrass Res. Conf. 6:253-257.

UPCOMING JB VISITATIONS:

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

- March 1 to 5 - Montreal Canada.
- March 11 to 14 - Columbus, Ohio.
- April 14 to 17 - Washington, D.C.
- April 21 to 22 - Phoenix, Arizona.
- May 21 to June 6 - UK, Netherlands, Belgium, & Germany.
- May 7 to 14 - Italy.