TURFAX™
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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.

Note: As of November 1, 1994 the Institute main office and its Director will operate from College Station, Texas.

JB COMMENTS - TAKEALL PATCH

Takeall patch was formerly called Ophiobolus patch. The causal pathogen is ***Gaeumannomyces graminis* var. *avenae***. It is a serious disease of bentgrass (*Agrostis* spp.). The severity is greatest during the first 3 to 5 years on new greens which have been fumigated or constructed of a high-sand content. The initial serious problem phase is followed by a subsequent gradual decline which is thought to be due to a natural buildup of microorganisms that are antagonistic to the *Gaeumannomyces graminis* in the soil.

Disease Symptoms. The symptoms first occur during periods of high evapotranspiration when the restricted root system results in a distinct leaf wilting in rings or patches. If not watered immediately, they will progress to light brown rings or patches of 100 to 150 mm (4 to 6 inches) diameter that may enlarge up to 0.6 to 1.0 meter (2 to 3 feet) in diameter over a period of several years if not controlled. Individual plants within the patches will have a severely restricted root system. In addition, dark brown to black ectrotropic runner hyphae can be observed on the roots, crowns, stolons, and rhizomes of the host grass plants.

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Causal Agent Occurrence. The *Gaeumannomyces graminis* may survive as a saprophyte in the dead plant debris and thatch within the turf canopy in the form of dormant mycelium or in live grass tissues. Growth and spread of the causal fungus occurs in the underground roots and rhizomes during cool, moist weather in the spring, and also the fall.

Favorable Disease Conditions. Actual aboveground turf symptoms of the takeall patch disease appear during hot, dry weather of the summer, even though the actual pathogen infection may have occurred during the previous spring. Because the pathogen severely attacks the root system causing it to become nonfunctional, the initial symptoms appear in the form of aboveground wilt of the leaves. The casual organism is considered to be favored by neutral to alkaline soil conditions, although this author has observed it occurring at root zone pHs below 5.5. Adequate levels of phosphorus (P) and potassium (K) must also be maintained.

Takeall Patch Control. There are no cultivars of *Agrostis* species that are resistant to takeall patch. Thus, the principal alternative is use of an effective fungicide during the first 2 to 6 years until the newly constructed root zone becomes ecologically balanced, including the development of antagonistic microorganisms. I have observed effective control of this disease in a number of European countries, plus in Japan and the United States by the use of propiconazole. Takeall patch control with propiconazole is best achieved during in the spring and fall when the causal fungus is active. Follow-up irrigation with 6 mm of water should be done immediately after fungicide application to ensure maximum effectiveness. Also, application is best made in late afternoon or early morning, as some grass leaf-tip burn may occur at temperatures above 32°C. (90°F). After control of the causal fungus is achieved, recovery of severely damage patches to full turf density may require 2 years.

PUBLICATIONS AVAILABLE:

1993 Rutgers Turfgrass Proceedings.
Plant Science Department, The Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, Cook College, Rutgers University. 196 pages (1994).

This proceedings divided into two sections. The first section contains 13 papers of lectures presented at the 1993 New Jersey Turfgrass Expo as volume 25. The second section contains 7 technical papers of original research findings and reviews covering a broad range of subjects being investigated by turfgrass researchers at Rutgers University. Included are performance evaluations of cultivars and selections of Kentucky bluegrass (*Poa pratensis*), perennial ryegrass (*Lolium perenne*), bentgrass (*Agrostis* spp.), fine fescues (*Festuca rubra* and *F. longifolia*), and tall fescue (*Festuca arundinacea*) under the hot, humid summer conditions in New Jersey. Also included are assessments of leaf spot susceptibility of Kentucky bluegrass cultivars and the occurrence of endophytic fungi in the fine fescue cultivars and selections. This research report on the assessment of a range of cool-season perennial turfgrass cultivars is a must for anyone involved in specifying or selecting specific cultivars of cool-season turfgrasses for seeding or sodding turfed areas.

Contact: Dr. Bruce B. Clarke, Box 231, Cook College, Rutgers University, New Brunswick, New Jersey, 08901, USA.
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WHERE WE'VE COME FROM:

"Sweeping greens is necessary every morning where sheep and rabbits feed on them, but they should be swept as lightly as possible so as not to injure the grass." E. Mepham, Golf Greens and Green-Keeping. (1906).

TURFGRASS WINTER OVERSEEDING SYSTEM

The following is a summary of findings generated from an eight-year turfgrass research program conducted by Dr. James B Beard at Texas A&M University. Primary emphasis was on winter overseeding of cool-season turfgrasses onto bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) putting greens. Twenty-eight distinct field experiments were conducted, mostly in College Station, Texas at the TAMU Turfgrass Field Research Laboratory, with some studies conducted in Corpus Christi, Dallas, Houston, and San Antonio, Texas, USA.

Summer Turfgrass Preparation:

A cultural system was developed where via season-long vertical cutting for thatch control, followed by coring and fertilization at least one month prior to the projected overseeding date, the actual overseeding and topdressing operations could be accomplished on a relatively undisturbed turf surface. Thus, the turf facility is withheld from play for only a 24-hour period.

The warm-season turfgrasses develop low-temperature leaf discoloration or chill stress injury at canopy temperatures of 13 to 16°C (55 to 60°F), depending on the species. For a 3- to 4-week period prior to low-temperature discoloration, the turfgrass cultural strategy should be to maximize carbohydrate accumulation. A visual indicator that this has been achieved is plump, health rhizomes and stolons.

Seeding Date Prediction Model:

A biological prediction model for the optimum winter overseeding window has been established. It is the period when the soil temperature at a 100 mm (4-inch) depth is between 22 and 26°C (72 and 78°F.).

Species/Cultivar Blend Selection:

The preferred turfgrass community for winter overseeding of putting greens involves either a blend of 3 to 4 improved perennial ryegrass (*Lolium perenne*) cultivars or a mixture involving an 80% by weight blend of improved perennial ryegrass (*Lolium perenne*) cultivars and 20% by weight of an improved rough bluegrass (*Poa trivialis*) cultivar.

Seeding Rate:

The preferred seeding rate for putting greens has been established in the range of 15 to 17.5 kg per 100 m^2 (30 to 35 lbs. per 1,000 sq. ft.) for a perennial ryegrass (*Lolium perenne*) blend. For sports fields and fairways where a green turf cover and initial wear tolerance are desired during the first month involves a minimum seeding rate of 10 kg per 100 m^2 (20 lbs. per 1,000 sq. ft.) for a perennial ryegrass (*Lolium perenne*) blend.

Annual Bluegrass Control:

Fenarimol (Rubigan®) has been shown to be the first herbicide that will provide selective, preemergence control of annual bluegrass (*Poa annua*) in winter overseeded perennial ryegrass (*Lolium perenne*) - rough bluegrass (*Poa trivialis*) turfs with a dormant bermudagrass (*Cynodon* spp.) base turf.

Spring Transition Enhancement:

Detailed studies indicate that the preferred procedure for proper spring transition back to the warm-season turfgrass is achieved by manipulating the cultural system. This involves (a) relatively close mowing, (b) a high nitrogen fertility level, and (c) modest weekly vertical cutting during the warm-season turfgrass shoot greenup period when soil temperatures at a 100 mm (4 inch) depth approach 18°C (64°F). Bermudagrass (*Cynodon* spp.) does not tolerate shade. Thus, this combination ensures sunlight penetration through the winter overseeded canopy to the bermudagrass (*Cynodon* spp.), thereby stimulating spring greenup. Techniques such as withholding water are ineffective and can enhance death of the bermudagrass (*Cynodon* spp.), especially when spring root decline (SRD) occurs.

JB VISITATIONS:

Halifax, Nova Scotia, Canada - September

Presented an all-day seminar on "Modern Turfgrass Developments" and a keynote address at the Fall Research Days sponsored by the Atlantic Golf Superintendents Association. This organization has evolved to the point where they are raising funds to support turfgrass research in the Atlantic Providences region. In addition, they recently arranged for the donation of materials and provided the skilled labor for construction of an experimental putting green at Nova Scotia Agricultural College, Truro, Nova Scotia.

San Antonio, Texas, USA - October

Presented a two-hour seminar before the American Society of Landscape Architects Annual Meeting on "Xeriscaping - What About Turfgrasses?" Throughout most of the conference the speakers were making negative comments about turfgrasses. The advocates of this philosophy intertwine unsubstantiated accusations and claims that are attributed to pseudo-scientists to justify their position. It was a challenge to give a science-based, factual presentation which in fact created a very pleasant response from those in attendance.

Westwood, California, USA - October

Presented a talk on "Turf-Soil Compaction and Prevention" before the West Coast Sports Turf Managers Association held on the UCLA campus. The program had a very unique and interesting mix alternating speakers between a turfgrass specialist and a coach of a team sport played on turfgrass at the university. Participant safety and quality of play as affected by the turfed surface, or lack thereof, were consistently mentioned by the coaches.

Roma, Torino, and Milano, Italy - October

The primary activity was providing technical assistance for ongoing investigations of bentgrass cultivars and fertility programs being conducted on an experimental putting green in Torino, Italy. The summer of 1994 was characterized by an extensive attack of Pythium blight throughout northern Italy. As Pythium rarely occurs in this region, few golf courses were stocked with the appropriate fungicide for immediate treatment. Thus, the extent of turf injury was considerable.

UPCOMING JB VISITATIONS:

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

- Nov. 11 to 12 - Phoenix, Arizona, USA.
- Nov. 13 to 16 - ASA, Seattle, Washington.
- Nov. 17 to 12 - Reims and Paris, France
- Dec. 4 to 7 - ASTM, Phoenix, Arizona.
- Dec. 8 to 9 - Minneapolis, Minnesota, USA.
- Dec. 9 to 11 - Dayton/Greenville, Ohio.
- Dec. 12 to 16 - New York, N.Y., USA.

UPCOMING INTERNATIONAL EVENTS:

November 13 to 18, 1994. Annual Meeting of the C-5 Turfgrass Division of the Crop Science Society and the American Society of Agronomy. Seattle, Washington, USA. Approximately 100 scientific papers on research conducted with turfgrasses will be presented at 15-minute intervals. Also, a symposium on a selected topic will be presented along with the annual meeting of the Turfgrass Division and a field tour of local turf facilities.
Contact: David Kral, American Society of Agronomy, 677 South Segoe Road, Madison, WI 53711, USA. FAX: 608-273-2021.

TURF PLANT RESPONSES AND SOIL CHARACTERIZATIONS IN SANDY CLAY LOAM AND CLAY LOAM SOILS AUGMENTED BY INTERLOCKING MESH ELEMENTS - 1992

S.I. Sifers, J.B Beard, and M.H. Hall

The objectives of this long-term study were to assess the effects of four mesh element inclusion treatments on the turfgrass injury and playing surface characteristics when amended into sandy clay loam and clay loam soils.

One study area consisted of a **sandy clay loam** (65.12% sand, 23.44% clay, and 11.44% silt) and the second study area of a **clay loam** (46.96% sand, 28.88% clay, and 24.16% silt) to form the root zone.

A subsurface drainage system was constructed with 100 mm (4 in.) diameter drain lines in trenches spaced at 1,200 mm (4 ft.) intervals. The trench was backfilled with pea gravel around the drain lines, followed by a 150 mm (6 in.) soil zone. Then the five mesh treatments in three replications were installed in the upper 150 mm (6 in.). The mesh elements were 50 by 100 mm (2 x 4 in.) rectangles with 10 mm square apertures as manufactured by Netlon, Ltd. from polypropylene. Off-site mixing of the mesh element-root zone mix and the no-mesh root zone were followed to maximize mix uniformity.

The area was planted to Tifway bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) in July of 1991. A preplant fertilization was incorporated in the upper 25 mm (1 in.) at a rate of 1 kg (2.2 lb) each of nitrogen (N), phosphorus (P), and potassium (K) per 100 m^2 (1,000 ft^2). Vegetative sprigs were broadcast at a rate of 0.4 m^3 per 100 m^2 (16 bu/1,000 ft^2), lightly topdressed, and fertilized at a rate of 1 kg phosphorus (P) per 100 m^2 (2.2 lb/1,000 ft^2) to encourage rapid establishment. The area was irrigated via perimeter popup, gear-driven sprinkler heads positioned at 3.5 m (11.5 ft) spacings. Turf establishment was achieved in September of 1991.

The cultural practices imposed on the experimental area were representative for hybrid bermudagrass sports fields. Mowing was twice weekly at 13 mm (0.5 in.) cutting height using a reel mower, with clippings removed. The nitrogen (N) fertilization rate was 0.45 kg N 100 m^{-2} (0.9 lb N/1,000 ft^2) per growing month, which extended from April to September. Phosphorus (P) and potassium (K) were maintained in the high range based on annual soil tests. Irrigation was practiced as needed to prevent visual turf wilt. No pesticides were applied and no turf cultivation or vertical cutting was practiced.

The methods and apparatus used to assess the influence of randomly oriented interlocking mesh elements were identical to those used in the earlier high-sand studies and are described in detail in several papers. Briefly, the apparatus used for **divot simulation** earlier was an adjustable horizontal swinging pivot bar with a golf club head attached to the terminal end. The **compression displacement, turf tear, and traction** apparatus was a steel disc with cleats or studs which was dropped from 60 mm (2.4 inch) height and rotated with a torque wrench to create tear and traction pressure readings. **Ball bounce** was assessed using a vertical support of 3 m (9.8 ft) in height from which a soccer ball was dropped without spin or impulse and was expressed as the ratio of height bounced to height dropped. **Surface hardness** was measured using the Clegg Impact Soil Tester. **Turf quality** was visually assessed in terms of both uniformity and high shoot density. Assessments were made at 6-week intervals beginning in June of 1992. Three individual simulations were imposed within each subplot, except for ball bounce where five simulations were dropped.

RESULTS AND DISCUSSION

No turf quality differences were noted among treatments throughout the study. There also were no visual symptoms of turfgrass injury caused by disease or insect activity.

SANDY CLAY LOAM STUDY

TURFGRASS INJURY:

The **divot opening lengths** for the no-mesh and the 5.0 kg m^{-3} mesh density up-to-the-surface were significantly larger than the three other mesh element treatments of 2.5, 3.75, and 5.0 kg m^{-3} during all three assessments. Effects varied from 33 to 39% longer for the no-mesh and 28 to 57% longer for the 5.0 kg m^{-3} up-to-the-surface treatment.

One explanation for this response is that the mesh elements are close to the surface and those extending laterally outward from the divot simulation head are pulled sufficiently to cause lateral turf tears that radiate outward from the divot opening perimeter, thereby causing increased turf damage and an allied slowing of the divot opening turf recovery rate. These data indicate the desirability of placing a 25 mm (1 in.) layer of sandy clay loam over the top of the mesh matrix where divoting will occur. Note that 25 mm is the maximum depth.

Divot opening width was different in the summer and fall observations, with the no-mesh and 5.0 kg m^{-3} up-to-the-surface treatments being widest. No major differences were found in divot opening depth.

Rate of **divot opening turf recovery** varied by date and by density of mesh elements. The most rapid, complete divot opening turf recovery occurred at the three mesh densities of 2.5, 3.75, and 5.0 kg m^{-3} regardless of the assessment date. The no-mesh treatment and the 5.0 kg m^{-3} up-to-the-surface treatment were 40 to 60% slower in turf recovery than the other mesh inclusion treatments. Expressed another way, they required 2 to 3 weeks longer to obtain the same percentage of turf recovery. Seventy percent turf recovery of the no-mesh and 5.0 kg m^{-3} up-to-the-surface treatment required 7 weeks in June and 5 weeks in August and September.

Lateral cleat turf tear data were variable, with no difference in June at the 10 kg (22 lb.) and the 40 kg (88 lb.) drop weights. Small differences occurred in August and September at the 10 kg drop weight. The 40 kg drop weight resulted in turf tear from cleat-to-cleat for each observation.

PLAYING SURFACE CHARACTERISTICS:

Statistical differences in **compression displacement** occurred at the drop weight of 10 kg (22 lb.), but not at the 40 kg (88 lb.) drop weight. The no-mesh and the mesh up-to-the-surface treatments allowed less surface penetration than the other mesh density treatments. One interpretation of these data is that greater surface compaction had occurred on the no-mesh turf plots and that the mesh up-to-the-surface treatment interfered with instrument penetration.

There were no differences in **traction** measurements attributed to the mesh element treatments, except with the 10 kg (22 lb.) drop weight in September. However, there were differences in absolute values among assessment dates within the year. These traction differences appeared to be related to soil moisture and the resultant depth of penetration of the cleated base into the turf surface zone.

There were few statistical differences in the treatment means for **ball bounce** for any of the test dates. However, the range from the maximum to the minimum for the no-mesh and the up-to-the-surface treatments were 3 to 4 times greater than for the other inclusion treatments. The improved consistency in ball bounce from mesh element augmented treatments is a significant component of surface quality for sports use.

Less **surface hardness** means a safer surface in terms of reduced injuries. Surface hardness measurements varied slightly from date to date. The 0.5 kg (1.1 lb.) and 2.25 kg (5 lb.) hammer weight data indicated statistical differences, with the no-mesh treatment being harder or having a higher CIV than the CIV's of all four mesh inclusion treatments. There was no statistical separation of CIV's for treatment effects using the 4.5 kg (10 lb.) hammer.

The data indicate the benefits of mesh element inclusion in sandy clay loam soils in terms of less surface hardness, but no indication of which is the preferred mesh inclusion density as it affects surface hardness. The variation in CIV results also appeared to be a function of the soil moisture content, with higher moisture levels resulting in lower CIV values.

There were differences in **soil moisture**, with more moisture present in all four treatments with mesh inclusions when compared with the no-mesh treatment.

CLAY LOAM STUDY

Results of measurements on this area were practically identical to those on the sandy clay loam, with some order of magnitude changes that could be attributed to the more dense texture of the soil.

Divot opening dimensions were very similar. The **turf recovery in divot openings** was somewhat slower overall, approximately one week slower, but again the no-mesh and 5.0 kg m^{-3} up-to-the-surface treatments were significantly slower than the other mesh densities by 30 to 50%. The 5.0 kg m^{-3} mesh density treatment was the most rapid in divot opening turf recovery.

The traction, compression displacement, ball bounce, and **lateral cleat turf tear** responses were all very similar to the sandy clay loam observations.

Soil moisture percentages were higher in the mesh treatments, especially in June and August. The higher surface hardness CIV's at all hammer weights were probably more a function of the denser clay loam soil than the moisture content of the soil.

CONCLUSIONS

These results indicate clear benefits to the turfgrass user accruing through the use of mesh elements in both sandy clay loam and clay loam soils via (1) decreased size of divot openings, (2) much faster turf recovery of divot openings, (3) more consistent and predictable ball bounce, (4) lessening of surface hardness, and (5) improved soil moisture. These benefits occurred consistently when a 150 mm (6 in.) depth of mesh elements were placed below the surface by 25 mm (1 in.).

Results from these data with the sandy clay loam and clay loam soils correspond very closely with the data from the earlier long-term assessments using mesh elements in a high-sand matrix system, especially for the divot size and divot opening turf recovery. This research is being continued.

Note: This summary is an excerpt from Texas Turfgrass Research - 1993. Texas Agricultural Experiment Station Consolidated Progress Report 5104-5146. p. 112-115.

REFERENCES

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2. Beard, J.B, and S.I. Sifers. 1993. Stabilization and enhancement of sand-modified root zones for high traffic sport turfs with mesh elements; A randomly oriented, interlocking mesh inclusion system. Texas Agricultural Experiment Station Bulletin 1710. 40 pp.