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.

Many of you have enquired about obtaining back issues of the Turfax™. We have decided to offer the back issues for the previous two year period (starting January-February, 1993) at the price of U.S. $5.00 per issue mailed to you. Those wishing to purchase back issues to complete their files should address their enquiries to Harriet Beard.

LOW TEMPERATURE KILL VARIATIONS

Low temperature kill involves the death of any turfgrass that occurs as a result of interior tissue ice formation at temperatures below 0°C (32°F). The last two years have seen extensive kill by this mechanism, first on the closely mowed perennial ryegrasses (*Lolium perenne*) in the intermediate cool-humid region and more recently this past year on bermudagrasses (*Cynodon* spp) in the cooler portion of the warm-humid region. Note that this type of kill should not be confused with chilling injury or low temperature discoloration that occurs at temperatures of 12 to 18°C (54-60°F).

Confusion has arisen in making comparisons among cultivars of warm-season grasses in terms of their hardiness to low temperature kill. The hardiness comparisons normally given relate to low temperature stress that occurs during the winter period and are certainly valid among cultivars such as bermudagrass (*Cynodon* spp) and St. Augustinegrass (*Stenotaphrum secundatum*).

However, the confusion arises when low stress temperatures occur after spring greenup has been initiated. In this case, the cultivars most susceptible to low temperature kill would be those that initiate spring greenup the earliest. The warm-season turfgrass

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cultivars that remain dormant the longest in the spring would exhibit the least susceptibility to low temperature kill. In other words, the relative ranking of susceptibility to low temperature kill among turfgrass cultivars is different during the normal dormant winter period in comparison to the spring greenup period. During spring greenup the low temperature hardening mechanism ceases to be operative and the comparison among cultivars depends strictly on whether new spring shoot growth which is highly susceptible to low temperature kill has been initiated or whether the shoots of a cultivar remain brown and dormant.

JB VISITATIONS:

Bradenton, Florida - February
Presented a keynote address on "Future US Sports Turf Perspectives" before the Annual Winter Conference of the Sports Turf Managers Association (STMA). The organization has unfortunately struggled over the years to become an active national force. From personal experience, be assured it is not easy to accomplish. It appears they are starting to gain additional momentum. We should all support this organization and its future development.

Orlando, Florida - February
Presented a keynote address entitled "The Future of Sod in 2020" before the Annual Winter Conference of Turfgrass Producers International. There are significant marketing and technical changes occurring within the sod industry. It will be interesting to see how these evolve over the next years.

San Francisco, California - February
Presented a 2-day seminar on Basic Turfgrass Botany and Physiology. The GCSAA International Conference and Show continues to grow with over 17,500 in attendance this year. For the past 20 years I have heard attendees and exhibitors question whether people and companies can justify the cost of the many national, regional, and state turfgrass conferences that continue to develop around the country. Am now hearing the same thing from countries in other parts of the world. The interesting thing is that most of these turfgrass conferences continue to grow in attendance and quality, assuming there is sound leadership behind the effort. This would suggest additional needs and desire on the part of attending turfgrass practitioners.

Sioux Falls, South Dakota - March
Presented three lectures before this young turfgrass conference. The hospitality was great in spite of the 17°F (-8°C) temperatures.

Kuala Lumpur, Malaysia - March
Assisting a Golf Course Association and the government to develop a five-week turfgrass educational program which should start in February or March of 1996.

Singapore - March
Conducted visitations on the issue of grass cultivar identification in terms of Tifdwarf versus Tifgreen versus some off-type. It is certainly a difficult issue of world-wide concern.

UPCOMING JB VISITATIONS:

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

- May 3 to 5 - Orlando, Florida.
- May 14 to 20 - Buenos Aires, Argentina.
- June 1 to 9 - Italy, Europe.
- June 11 to 17 - Oregon and North Carolina.

UPCOMING INTERNATIONAL EVENTS:

July 22 to 25, 1995. American Association of Botanical Gardens and Arboreta Annual Conference. Montreal, Quebec, Canada. Montreal Bonaventure Hilton. Theme: Diversity - Natural and Cultural, includes 42 conference sessions, 10 pre-conference work shops, and 8 study tours.
Contact: American Association of Botanical Gardens and Arboreta, 786 Church Road, Wayne, Pennsylvania, 19087. USA.
Phone: (610) 688-1120.

July 26 to 28, 1995. TPI Summer Convention and Field Day. Omaha, Nebraska, USA. Red Lion Hotel and Todd Valley Farms. Encompasses equipment field day and tours.
Contact: Turfgrass Producers International, 1855-A Hicks Road, Rolling Meadows, Illinois 60008, USA.
Phone: (708) 705-9898
Fax: (708) 705-8347

GOOSE REPELLENT

A number of you have written to me about additional information on a goose repellent mentioned in an earlier Turfax™. The material is an artificial grape flavoring known as methyl anthranilate, which is a naturally occurring chemical that gives the flavor to Concord grapes. Dr. Russ Mason of the U.S. Department of Agriculture's Animal Control Division has been working with the chemical for approximately 12 years as a safe repellent for birds. He states that methyl anthranilate has the same effect on birds as chili peppers have on humans in that it stimulates pain reflexes. It is anticipated that a product will be commercially available on the market in the not too distant future.

PUBLICATIONS AVAILABLE:

Iowa Turfgrass Research Report.
Iowa State University. 98 pages. (1994).

Contains 37 reports of turfgrass research conducted at the Horticultural Research Station of Iowa State University. Topic headings include 8 papers on cool-season turfgrass species and cultivars, 8 papers on herbicide and growth regulators, 6 papers on diseases and insect control, 5 paper on fertilizers, and 8 papers on environmental quality issues.
Contact: Dr. Nick Christians, Department of Horticulture, Iowa State University, Ames, Iowa 50011, USA.
Phone: (515) 294-0036
Fax: (515) 294-0730.

Field Day 12 Proceedings Turf-Seed, Inc./Pure Seed Testing, Inc. 150 pages. (1994).

Consists of 19 reports of turfgrass breeding and evaluations for cultivars of such cool-season turfgrasses as Kentucky bluegrass, fine-leafed fescue, perennial ryegrass, tall fescue, and creeping bentgrass. The report includes assessments in the hot-humid climate of North Carolina and winter-overseeding in Arizona; plus low-maintenance and shade studies. Finally, there are papers on wild flowers and summer patch disease control.
Contact: Dr. William A. Meyer, Pure Seed Testing, Inc., P.O. Box 250, Hubbard, Oregon 97032, USA.
Phone: (503) 981-9571
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Name change:
The American Sod Producers Association or ASPA has changed names to Turfgrass Producers International or TPI.

BENTGRASS (*AGROSTIS* spp.) CULTIVAR CHARACTERIZATIONS FOR 1994 IN TORINO, ITALY

Research Progress Report No. 301
of
Green Section, Italian Golf Federation
by
P. Croce[1], M. Mocioni[2], V. Merlo Pich[3], and J. B Beard[4]

INTRODUCTION

Creeping bentgrass is widely used as the preferred grass species on putting greens in Italy. Penncross has been the cultivar most widely accepted and used throughout the world for the past 20 years. In the past 6 years, a number of commercial companies have released new creeping bentgrass cultivars. Thus, there is a need to assess their potential for use under golf course putting green conditions in Italy. Accordingly, the Italian Golf Federation (F.I.G.) initiated a bentgrass cultivar putting green evaluation study in cooperation with the Torino Golf Club north of Torino, Italy.

Creeping bentgrass (*Agrostis stolonifera* L. var *stolonifera*) is uniquely adapted morphologically for use on putting greens (Beard, 1982). Extensive, prostrate lateral stem development via stolons and high shoot-leaf density can be sustained under frequent, close mowing of 4 to 6 mm (0.16-0.25 in). The stolon development allows turf recovery from ball marks and other damages to the surface. Creeping bentgrass is a cool-season, C-3 perennial turfgrass that has an optimum growing temperature of 16 to 24°C (60-75°F). It responds to nitrogen (N) fertilization and irrigation.

It should be noted that this is a F.I.G. Green Section Research Progress Report on the initial performance of these turfgrass cultivars. Further, that final conclusions concerning the adaptation and performance of these creeping bentgrass cultivars under the conditions of the study in Italy can not be drawn under after a minimum of 4 and preferably 4 years of evaluation. It requires that long for the turf-soil ecosystem to stabilize in terms of the soil physical characteristics, microorganisms, disease causing fungi, insect pests, and nematode populations.

MATERIALS AND METHODS

Eleven commercially available cultivars of creeping bentgrass (*Agrostis stolonifera* L. var. *stolonifera*) and one cultivar of colonial bentgrass (*Agrostis capillaris* L.) were planted to a specially constructed experimental putting green located at the Torino Golf Course north of Torino, Italy. The plot size was 2.0 by 1.75 meters (6.6 x 5.7 ft), arranged in a randomized block design with four replications. In addition, 5 advanced experimental selections of creeping bentgrass from Pennsylvania State University were located in an adjacent set of plots, involving a 1.0 x 1.0 meter (3.3 x 3.3 ft) plot size with 2 replications in a randomized block design. Root zone profile construction was a high-sand composition meeting Texas-USGA specifications, including a subsurface drainage system.

The experimental area was planted May 4, 1992. Preplant fertilization involved of 1.0 kg each of N, P, and K per 100 square meters (2.0 lb/1,000 sq ft) incorporated into the upper 100 mm of the root zone. All cultivars were planted at a seeding rate of 0.5 kg per 100 square meters (1 lb/1,000 sq ft), with the seed lightly raked into the surface. Care was taken to avoid contamination of seed between plots. No lateral movement occurred and successful turfgrass establishment was achieved with distinct genotype perimeters between individual cultivar plots.

Subsequent cultural practices on the experimental putting green involved mowing five times per week in multiple directions at a 5 mm height, with clippings removed. The fertilization program consisted of 0.35 kg of nitrogen (N) per 100 m^2 (0.7 lb/1,000 sq ft) per growing month from May through September. The base phosphorus (P) and potassium (K) levels were applied as needed to maintain these nutrient levels in the high range based on an annual chemical soil test. The pH of the root zone was 6.8.

Supplemental water was applied as needed to prevent visual wilt of the turf, via a newly installed irrigation system involving gear driven, pop-up heads arranged in a tight spacing which sustained uniform moisture conditions across the experimental area. Topdressing was practiced at two-month intervals at a rate of 0.16 m^3 per 100 m^2 (0.2 cu yd/1,000 sq ft). No turf cultivation or vertical cutting has been practiced on the turfed plots, to avoid interplot genotype contamination.

Disease and insect problems have been minimal, except for dollar spot (*Sclerotinia homoeocarpa*) which was allowed to develop as no fungicide applications were made during the 1994 growing season. All emerging weeds were manually removed during the 1992 growing season. In 1993, after the turfs had fully stabilized, all weeds were allowed to develop across the experimental area.

Turfgrass quality and morphological assessments were made on the experimental area. The turfgrass quality involved visual estimates made by 2 people at 15-day intervals throughout the growing season. The visual estimates were based on a composite of two components: (a) uniformity of appearance and (b) shoot density. The rating scale was 9 = best and 1 = poorest. A rating of 5.0 or higher represented an acceptable quality putting surface.

Morphological assessments were made in September of each growing season. They consisted of actual shoot density counts conducted on a 645 mm^2 area of turf. Measurements of leaf width were based on the mid-point of the second youngest leaf, with 10 leaves measured per plot. All data were summarized at the end of each growing season and statistically assessed by analysis of variance.

RESULTS

Turfgrass Quality. Visual estimates of turfgrass quality, although subjective, remain the best, cost-effective means of assessing the composite turfgrass quality. The estimates reflect primarily 2 key components of turfgrass quality: (a) shoot/leaf density and (b) uniformity, along with the other components growth habit and smoothness. Color is described. A rating of 5.0 or higher indicates an acceptable quality putting green.

The comparative biweekly visual assessments of turfgrass quality across the 12 bentgrass (*Agrostis* spp.) cultivars are summarized for the 1994 growing season in Table 1. Ranking highest in mean seasonal turfgrass quality were Southshore, Penneagle, Putter, Providence, and Pennlinks. Ranking decidedly inferior and unacceptable for putting green surfaces at a seasonal mean below 5.0 were Astoria and Seaside, plus Emerald and National. Two Pennsylvania State University selections, PSU A1 and G1, ranked higher than any of the 12 commercially available bentgrass cultivars.

Table 1. Comparative seasonal turfgrass quality ratings, shoot density, leaf blade width, and moss invasion of 17 bentgrass (*Agrostis* spp.) cultivars in 1994. Torino, Italy.

Cultivar Treatment	Seasonal Turfgrass Quality Mean**	Shoot Density (per sq dm)	Leaf Blade Width (mm)	Moss Invasion Seasonal Mean (% area)
Southshore***	6.7 a*	1509 a*	0.84*	0.1 a*
Penneagle	6.6 a	1241 bcd	0.92	0.9 ab
Providence	6.4 ab	1272 bc	0.94	1.5 ab
Putter	6.4 ab	1425 ab	0.96	0.5 a
Pennlinks	6.3 ab	1504 a	0.93	1.9 ab
Penncross	5.8 c	1195 bcd	0.93	2.6 ab
Cobra	5.8 c	1022 cde	0.89	3.6 ab
SR 1020***	5.1 d	1419 ab	0.84	2.4 ab
National	4.8 d	1013 cde	0.94	11.7 c
Emerald***	4.2 e	1010 cde	0.95	10.7 cd
Seaside	3.6 f	755 f	0.96	26.9 d
Astoria	3.4 f	835 ef	0.96	33.8 e
PSU A1	7.4 a	2241	0.75	0.1 a
PSU G1	7.2 a	2612	0.69	0.1 a
PSU G6	6.7 b	2378	0.73	0.4 a
PSU G2	6.5 b	2548	0.73	0.3 a
PSU DF1	5.8 c	2053	0.76	3.8 b

*Numbers followed by the same letter(s) are not significantly different based on the Duncan test (p=0.05).
**Turfgrass quality ratings based on 1 to 9, with 9=best and 1=poorest.
***Substantial dollar spot (*Sclerotina homeocarpa*) infestion, indicating serious suceptibility.

Shoot Density. A high shoot density is preferred for putting greens as it causes the leaves to be narrower in width and more vertical in growth habit. A high density also results in the turf being more competitive against weed invasion. However, certain previous cultivars of very high density have tended to form a puffy surface over time, if not mowed closely and frequently.

The shoot densities of 12 bentgrass (*Agrostis* spp.) cultivars are summarized in Table 1. Shoot densities ranged from 2,612 to 755 shoots per square decimeter, a 3+ fold differential. Ranking highest in density were Southshore and Pennlinks, followed by Providence and SR 1020. Ranking lowest and unacceptable in turf density were Seaside and the colonial bentgrass, Astoria. Neither cultivar sustained an acceptable putting green turf at this close cutting height, and thus both would be especially prone to annual bluegrass (*Poa annua*) invasion. All 5 PSU bentgrass selections were substantially higher in shoot density than were the commercially available cultivars.

Leaf Texture. The leaf blade widths of the 12 bentgrass (*Agrostis* spp.) cultivars are summarized in Table 1. Leaf textures among the 12 cultivars ranged from 0.84 mm for Southshore and SR 1020 to 0.96 mm for Astoria, Providence, and Seaside; and 0.95 mm for Emerald. The leaf width variation among most of the commercial bentgrass cultivars was minimal, except for Southshore, SR 1020, and Penncross which were more narrow. In contrast, the PSU bentgrass selections all ranked narrower in leaf blade width, as well as having the highest shoot densities.

Moss Invasion. Differential rates of moss invasion were observed during 1993 as shown in Table 1. Those bentgrass (*Agrostis* spp.) cultivars with lower shoot densities exhibited the most proneness of moss invasion, which ranged from a minimal amount to as high as 43% coverage at certain times during the year. Cultivars with the highest rates of moss invasion were Astoria and Seaside, with National and Emerald also exhibiting substantial moss invasion problems. Four PSU bentgrass selections ranked very low in proneness to moss invasion at less than 1% for the seasonal mean.

SUMMARY

Bentgrass cultivar characterization were initiated in May of 1992 under putting green conditions at the Torino Golf Club. The experimental area was a well drained, high-sand root zone. This progress report represents assessments made during the second full growing season of a 4-year study. The findings reveal substantial variations in turfgrass quality and morphological characteristics of 17 bentgrass cultivars. Ranking high in quality were Southshore, Penneagle, Putter, Providence and Pennlinks, followed by Cobra and Penncross. Both Astoria and Seaside were totally unacceptable. Southshore, Pennlinks, Providence and SR 1020 exhibited a high shoot density, as well as being low in proneness to moss invasion. Ranking even higher than any of the commercially available bentgrass cultivars were several PSU experimental selections.

Acknowledgements:

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Special appreciation is given to the Torino Golf Club and its Club Manager, Renato Bianco, and its President, Alberto Brignone, for providing the host experimental site and turf maintenance of the putting green.

References:

- Beard, J.B. 1982. Turfgrass Management for Golf Courses. Macmillan Company, New York, N.Y., USA. 642 pp.
- Croce, P., M. Mocioni, V. Merlo Pich, and J. B Beard. 1994. Comparative dollar spot (*Sclerotinia homoeocarpa*) susceptibility of seventeen bentgrass (*Agrostis* spp.) cultivars under putting green conditions. Italian Golf Federation, Green Section-Final Research Report No. 201. 7 pp.

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