



TURF AX™

of the International Sports Turf Institute, Inc.

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CULTIVAR GENETIC INTEGRITY:

An important question that needs to be asked is whether the genetic integrity of individual cultivars that are vegetatively propagated is being retained. Of especial concern are the older, nonproprietary cultivars. The original grass breeder involved in the development of a cultivar is expected to assume responsibility for retaining the long-term integrity of a cultivar that will function as a reference base and a reliable breeders source of vegetative plant material for use by commercial sprig and sod growers.

An example of what can happen is as follows: Toronto creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*) was released in 1936. Following World War II it became the preferred cultivar of creeping bentgrass for use on putting greens across the northern United States due to its fine texture, distinct dark green color, and good shoot density. In the early 1960's controversy arose among stolons producers as to just who possessed

the original "Toronto" creeping bentgrass. As a young Assistant Professor I decided in 1965 to resolve this issue. Stolons were submitted by seven different bentgrass producers scattered from coast to coast across the United States. In addition, stolons from the original release source maintained by the USDA in Beltsville, Maryland were obtained. All were planted under replicated putting green conditions.

Subsequent assessments revealed that among the seven Toronto creeping bentgrass cultivars evaluated each was distinctly different from the others. Equally significant was that original source of creeping bentgrass from the United States Department of Agriculture in Beltsville, Maryland was the poorest of the eight bentgrass sources being evaluated. This illustrates what can happen over a thirty-year period.

The question that needs to be raised is whether the same thing may have happened with one or more of the warm-season turfgrass cultivars, particularly within the bermudagrasses. Tifgreen and Tifway were released in 1956, Texturf 10 in 1957, Midway and Tifdwarf in 1965, and Santa Ana in 1966. These cultivars have been commercially available and propagated for 30 to 40 years. Has the same genotype variance developed within one or more of these cultivars over the years while grown by the various sod and sprig producers around the United States? Will the particular cultivar you are purchasing behave as described in the research with the original cultivar source material? Also, has a similar genetic variance occurred in some of the older seeded cultivars as well?

JB COMMENTS:

Sometimes it is the simplest of things that we tend to overlook in communications. I personally experienced this while presenting a keynote paper before the World Scientific Congress of Golf at St. Andrews University in St. Andrews, Scotland. The title of the paper was "Environmental Protection and Beneficial Contributions of Golf Course Turfs". It was published in "Science in Golf II" edited by A.J. Cochran and M.R. Farrallay and published by E and FN Spon of London, England, UK.

In the introductory section of this ten page paper is a summary of the comparative types of use and maintenance on a representative 18 hole golf course (see Table 1).

Table 1. Comparative turf use by area for a representative 18-hole golf course in the United States.

Turf Use	Area in hectares (acres)	Percent of total area
Roughs-water - woodlands	52.7 (130)	72.2
Tees	0.93 (2.3)	1.3
Fairways	16.2 (40.0)	22.2
Buildings-parking lots	2.1 (5.2)	2.9
Putting greens	1.0 (2.5)	1.4
Total	72.9 (180)	100.0

The audience consisted predominantly of individuals involved in golf equipment manufacturing, professional golfers, architects, and golf association leaders from around the world. To my surprise the one bit of information which I received the most comment on and evidently created the most stir was that only 1.4% of a golf course is devoted to the more intensive

maintenance for putting greens and another 22.2% on average is devoted to intermediate maintenance of fairways. They were surprised to learn that it is not the entire golf course acreage. Evidently these non-turfgrass oriented individuals associated with the golf industry had never considered this fact in relation to criticisms related to the environmental issues they encounter. They have assumed that the same pesticides and other chemicals were being applied fence-to-fence. This illustrates an important impact-statement that many of us may have overlooked in the past, but may be one of the first facts we should emphasize.

Note: A survey among those reviewing my revision of "Turf Management for Golf Courses" reveals an interesting trend in fairway size in the United States. Specifically, the average acreage of fairways on 18-hole golf courses has declined from 50 to 35 acres (20 to 14 hectares). While the intensity of fairway maintenance has increased, the size has decreased greatly with much of that area being converted to lower-maintenance intermediate rough and/or primary rough.

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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.

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1996 INSTITUTE PROGRAM:

A frequently received question concerns the specific activities of the International Sports Turf Institute. Thus, as we start the 1996 year it seems appropriate to give a review of the planned program of activities for the year. There are four basic areas of activity. They are as follows:

EDUCATION - 40%.

The major activities involve lecturing at turfgrass conferences and presenting 2- to 3-day seminars in various countries around the world. Typically, the seminar presentation also involves the writing of a manual which is translated into the specific language of the host country. During 1995 extended seminar presentations were given in Argentina, Japan, Malaysia, and the United States. Invited lectures were presented in France, Spain, Italy, Canada, and the United States.

RESEARCH - 30%.

Specific activities involve major efforts in research planning, staff training and monitoring, data collection and analysis, and research report preparation for a range of turfgrass research activities. We now have substantial field research programs in Italy, Japan, and United States. Additional research programs are in the planning stage in several other countries. Institute Research Associate Sam Sifers devotes a considerable portion of his time to these research efforts.

TURFGRASS TECHNICAL ASSISTANCE - 20%.

Technical assistance in turfgrass-soil problems is provided on-site at various locations around the world. This activity involves a broad range of turf uses including golf courses, sport fields, bowling greens, horse race tracks, tennis courts, polo fields, and sod production operations.

BOOK WRITING - 10%.

Considerable effort is focused on book authorship. Scheduled to be completed during 1996 are three books.

- **A COLOR ATLAS OF TURFGRASS DISEASES**, which is coauthored with Dr. Tani, a Japanese plant pathologist, based on a translation and expansion of his earlier 1991 book.

- **TURFGRASS HISTORY OF SPORTS, LAWNS, AND GOLF**. This turfgrass evolution and history book is a unique one-of-a-kind effort which has evolved over the past 30 years. It includes extensive early photographs and quotes from early turfgrass books.

- A second revision of **TURF MANAGEMENT FOR GOLF COURSES**, authored in association with the United States Golf Association. This second edition contains significant modifications that reflect the changes in turfgrass science and technology on golf courses that have occurred during the past 12 years.

All three books should be available in early 1997.

PEST MANAGEMENT STATUS:

United Kingdom. The registration of carbaryl (Sevin®) has been revoked for most non-agricultural uses in the United Kingdom, including as a garden-lawn pesticide. However, they are allowing its use for head lice control in the hair of humans. They also are allowing the use of carbaryl on vegetable crops because "the intake levels detected were 1000 to 6000 times less than the dose at which an increased incidence of tumors occurs in rats and mice." Editor note — How this relates to the real world of humans has not been demonstrated!

Hong Kong. Was surprised to learn from the Park Department officials that the government of Hong Kong has withdrawn the registration of glyphosate (Roundup®). When I asked the reason why, no one could explain.

United States. Finally, propiconazole (Banner Maxx®) is now officially registered for the control of take-all patch (*Gaeumannomyces graminis* var. *avenae*) on bentgrass (*Agrostis* spp.) in the U.S., plus certain other patch diseases.

Note: The 8th International Turfgrass Research Conference sponsored at 4-year intervals by the International Turfgrass Society is scheduled for July 20 to 26, 1997 in Sydney, Australia.

JB VISITATIONS:**November - Illinois.**

Presented a keynote address before the North Central Turfgrass Conference held in the Chicago suburbs on the topic of Past, Present, and Future Trends In Turfgrass Science. The extraordinarily severe, hot, humid conditions during the summer of 1995 were a major topic of conversation during the conference. Such severe summer environmental stresses occur once in ten to twenty years, but in between there is a tendency for turfgrass managers to pay less attention to many of the small cultural practices that contribute to enhanced environmental stress resistance and thus do not properly prepare the turf so that it is best able to survive such stresses. Thus, 1995 was certainly a reality check that requires each turfgrass manager to reassess the cultural practices which should be integrated into the overall cultural program in order to maximize stress hardiness for such extraordinary occasions.

December - Ohio.

Presented a keynote address on Turfgrass Benefits and Environmental Protection before the Ohio Turfgrass Conference. This regional conference is the industry leader that surpassed 5,300 in attendance in 1995. I also participated in a two-hour evening session that involved simply the opportunity for those attending to ask questions to a panel of four participants. It was certainly a lively and stimulating discussion.

January - Texas.

Presented a keynote lecture on environmental issues before the Southern Texas Section of the PGA of America plus two lectures on trends in turfgrass science and culture. This was a rare opportunity to speak before a group of professional golfers which included my son, Jim, PGA Professional at Lost Creek Country Club in Austin, Texas. Many questions were asked and great interest was focused on potential new grass cultivars, especially for putting greens.

January - Massachusetts.

Presented a major talk on root zone stabilization of sports fields with interlocking mesh elements. The feature of the conference was an evening reception at which Dr. Joseph Troll, retired teacher of turfgrass science at the University of Massachusetts, was honored for his many years of teaching contributions especially to the turfgrass managers in the New England area.

NEW PUBLICATION AVAILABLE:

Handbook of Turfgrass Insect Pests. edited by Rich L. Brandenburg and Michael G. Villani. The Entomological Society of America. 140 pages. 1995.

This book was prepared by 31 contributing authors from throughout the United States. The book contains information on 31 insect and mite pests associated with turfgrasses, and encompasses the scientific classification, origin, distribution, description, turfgrass, and symptoms, pest life cycle, pest management, and illustrations for each insect. In addition, there is a discussion of beneficial organisms and strategies for turfgrass pest management. Included are 60 color photographs and 58 illustrations, plus a glossary of terms.

Contact: Entomological Society of America, 9301 Annapolis Road, Lanham, Maryland 20706-3115, USA. Phone: 301-731-4535; Fax: 301-731-4538. Price is U.S. \$30, plus U.S. \$2.50 for shipping within U.S. and U.S. \$3.50 for shipping of foreign orders.

UPCOMING JB VISITATIONS:

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

- March 1 to 4 - Vancouver, BC, Canada.
- March 6 to 9 - Cromwell, Connecticut.
- March 11 to 14 - Columbus, Ohio.
- May 10 to 13 - Netherlands.
- May 14 to 31 - England.
- June - Italy

A Perspective on *Poa annua*

by
James B Beard

Annual bluegrass (*Poa annua* L.) has excellent survival mechanisms and thus is found distributed throughout the cool and transitional climatic regions of the world. It has been the subject of many discussions and articles throughout the history of turfgrass culture.

In 1812 William Curtis described *Poa annua* in the book "Grasses of England" as follows: "*Dwarf meadow-grass is common to every quarter of the globe; when cold does not prevent it, perpetually flowering and seeding, and that most rapidly; growing in almost any soil and situation, varying in size, but never acquiring any great height; its foliage tender, but liable to be killed by winter's frost, and summer's drought; the first to cover earth made bare, from any cause, hence frequent on the edges of paths, where its seeds being scattered, quickly vegetate, and where it is not overpowered by more luxuriant herbage.*"

In 1969, 27 years ago, this author presented a lead-off paper at a *Poa annua* symposium held at an earlier GCSAA Conference. At the time, I put forth the "shocking" proposal that many turfgrass managers must admit the fact that they are basically growing *Poa annua* and that we needed to learn the appropriate cultural practices to maximize the performance of this species under various use conditions on golf courses. What have we learned in the interim?

Genetic Diversity - Botanical Characteristics

The *Poa annua* found on golf courses typically represents a diversity of botanical types ranging from an erect, noncreeping annual that produces profuse seedheads to a prostrate, strongly stoloniferous perennial that has minimum to no seedhead formation. In many field situations there are not just these two types of *Poa annua*, but a broad spectrum of intermediate types ranging from one extreme to the other. Finally in 1957 the annual type was taxonomically termed *Poa annua* var. *annua*, while the perennial type was named *Poa annua* var. *reptans*. This is an incongruity in that the scientific name *Poa annua* encompasses a taxonomic grouping of grasses that includes perennial types. Thus, we have come to recognize that *Poa annua* as it occurs on golf courses may be composed of a very diverse range of genotypes.

Further, it must be recognized that the annual types of *Poa annua* may have distinctly different cultural requirements in comparison to the perennial types. Depending on whether the annual or perennial types are more dominant may strongly influence (1) the appropriate cultural practices selected if the objective is to retain the *Poa annua* as a permanent turf or (2) the specific type of management-control practices selected if the objective is to minimize the presence of *Poa annua* in the turf polystand. For example, certain herbicides that are very good in the control of annual types are far less effective in the control of perennial types of *Poa annua*.

Adaptation

Extensive research has been conducted to document the adaptation and stress tolerances of *Poa annua*. Unfortunately, there is a lack of research on the soil adaptation aspects. Compared to most cool-season perennial turfgrasses, *Poa annua* has greater proneness to heat, cold, water, smog and wear stresses. In making the decision as to whether *Poa annua* is to be retained as the dominant component in a turfgrass polystand versus minimizing it through cultural controls, the turfgrass manager must assess the types and severity of various environmental stresses that occur in a specific location, as well as the frequency with which they occur. This will be a major factor in deciding whether to promote or suppress the *Poa annua* population in the turfgrass polystand.

Favorable Cultural Practices

In comparison to creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*) we have learned that *Poa annua* is favored by less close mowing and higher nitrogen (N) levels as well as by poorly drained, wet soil conditions which can be further accentuated by excessive irrigation. We also have learned much more about the specific turfgrass pests, especially diseases, that attack *Poa annua* and the appropriate controls that can be used to help sustain the summer-long performance of *Poa annua*. However, there are still additional investigations needed concerning the best cultural practices to maximize the potential to sustain *Poa annua* on a long-term basis in various types of golf course turfs.

Management - Control Approaches

In 1825 George Sinclair discussed the control of *Poa annua* in Hortus Gramineus Woburnensis. "How to control *Poa annua* is the point of most importance. Some recommend boiling water to be poured on where it abounds; but the most effectual mode is to cover the spot with a layer of litter, or the mowings of the lawn, in sufficient thickness to create fermentation. On removing this, in the course of ten days or a fortnight, the *Poa annua*, and most other weeds will be found completely destroyed. But the most effectual remedy to destroy this grass when growing on gravel and sand walks, is, by an application of common salt, which since the reduction of the duty on this article can be had at a price that will allow its application economically. The best manner of applying it is, just after the walks have been cleaned, to strew the salt over the surface sufficiently thick to make each particle of the salt touch another. This dressing will be found to prevent the vegetation of the seeds and roots of the grass. It will also be found to destroy worms and slugs."

From 1910 to the 1960's *Poa annua* was readily controlled on greens by the use of lead arsenate applied at 4 to 5 year intervals; with other annual grasses plus root-feeding insects also being controlled.

Since then numerous herbicides have become available that are effective in the control of *Poa annua*. They are successfully used on hybrid bermudagrass (*Cynodon* spp.) turfs in warm climates, including fenarimol for dormant bermudagrass that is winter overseeded with perennial ryegrass (*Lolium perenne*) and rough bluegrass (*Poa trivialis*). However, a continuing problem has been a lack of adequate selectivity to the desired creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*) in cool climates. These injurious effects from a spring or fall application are most likely to appear during the heat stress of midsummer in terms of a shortened root system, reduced shoot density, and an overall decline in turfgrass vigor.

In contrast, certain plant growth regulators have exhibited good potential for the selective suppression of *Poa annua*, and thereby allowing the creeping bentgrass or perennial ryegrass to dominate the turfgrass polystand community. Specific cultural practices also have been identified that contribute to *Poa annua* control. For example:

Polystand Cultural Preferences

Creeping bentgrass dominance	<i>Poa annua</i> dominance
Mow below 0.75 inch (19 mm)	Mow above 0.75 inch (19 mm)
Remove clippings	Return clippings
Low nitrogen nutrition	High nitrogen nutrition
Moderate soil moisture	High soil moisture
Aerated soils	Compacted, clay soils

Bentgrass Fairways. The first cultural system for *Poa annua* on greens and on fairway and sports turfs was not published until 1978 (see Beard, Rieke, Turgeon, and Vargas). The use of light-weight mowers and a relatively close cutting height of less than 0.75 inch (19 mm) and a high mowing frequency of 3 to 5 times per week, when combined with moderate to low nitrogen (N) fertilization and judicious conservative irrigation, have proven beneficial in promoting the dominance of creeping bentgrass over *Poa annua* in polystand turfgrass communities.

Bentgrass Putting Greens. For newly constructed putting greens established to creeping bentgrass, this author has been fostering one approach for over 12 years. The program was suggested by J. Beard for use in South Germany where laws do not allow the use of most pesticides on golf courses. Then it was pursued on golf course developments in Japan, and more recently in the United States. It involves a program of **hand weeding** the newly-emerged *Poa annua* seedlings from the greens. One trained person working 0.5 day per week in manual removal could maintain *Poa annua*-free bentgrass putting greens on 18 holes, even where *Poa annua* was the dominant species on fairways. For success the program (1) must be started on newly constructed greens before the *Poa annua* starts to encroach and (2) must be sustained each and every week throughout the growing season.

Reference

- Annual bluegrass (*Poa annua* L.) — Description, Adaptation, Culture and Control. 1978. J.B Beard, P.E. Rieke, A.J. Turgeon, and J.M. Vargas, Jr. Research Report 352, Michigan State University Agricultural Experiment Station, East Lansing, Michigan. 32 pages.