

A Perspective on *Poa annua*

by
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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.