



Better Turf for Better Golf

TURF MANAGEMENT

from the USGA Green Section

Poa Annua Control

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Poa annua continues to be one of the major problems in golf course maintenance. Despite the efforts of many research workers, there still is not a satisfactory chemical control for this pest. Progress in chemical control of unwanted plants has been so great as to merit confidence that continued research will provide an herbicide that will selectively eliminate *Poa annua* from putting greens. On the other hand, when we examine the growth requirements and the habits of *Poa annua* in comparison with those of the desirable plants in putting greens, we may be justifiably pessimistic about the prospects of easy control of this weedy grass.

It appears to be unrealistic to anticipate the development of control methods that will operate independently of good management. As a matter of fact the practice of good management in all its phases will go far in reducing the seriousness of the *Poa annua* problem.

What are the characteristics of the *Poa annua* plant?

It is shallow rooted, but the shallow roots are produced in abundance and in a thick stand they may almost completely occupy the surface two inches of soil.

It is not drought resistant. The shallow root system causes *Poa annua* to wilt readily in hot weather. This is one of the reasons the grass is considered undesirable.

It is undependable during spells of heat and drought.

Poa annua is an annual by nature and produces an abundance of seeds. The seeds are produced at heights of from less than ¼ inch to heights of 8 inches or more depending upon the condition under which the grass is grown. This ability of the plant to produce seed under a wide range of conditions insures a constantly ready source of reinfestation. Under some favorable conditions *Poa annua* will survive the summer and behave as a perennial. These situations are exceptional, however, and in most of the United States the grass behaves as an annual.

It is susceptible to diseases. *Poa annua* is attacked readily by the leafspot organisms such as *Helminthosporium* species and by *Fusarium* species.

With all its inherent weaknesses, one wonders how *Poa annua* manages to continue as a serious pest. One answer is its prolific reseeding habit. Another is that conditions are provided which meet the requirements of the grass.

Shallow rooted *Poa annua* should not be able to compete with deep rooted bent, but a low area in the putting green that is poorly drained prevents the deep roots of the bent from functioning and consequently they die. The *Poa annua* is far superior to bent in its ability to extract

moisture and nutrients from the shallow region of the soil.

Heavily compacted areas of putting greens generally are more severely infested with *Poa annua* than are the areas that have relatively little use. Compaction causes the soil to hold more water near the surface. The surface wetness permits ready germination of seeds and ample moisture for the shallow roots of *Poa annua* while it serves as a barrier to the oxygen which normally would diffuse into the deeper bentgrass root zone. Furthermore traffic thins out the bent and bruises the turf making it more susceptible to disease.

Even though *Poa annua* is quite susceptible to attacks of diseases, it usually makes further inroads as a result of disease activity. The abundance of *Poa annua* seeds in the soil provide for ready invasion of thin areas whereas the bent makes a relatively slow recovery.

Thatch is a condition that favors *Poa annua*. Here again the deep rooting advantage of bentgrass is neutralized by the fact that moisture is held by the layer of organic matter. Roots of both bentgrass and *Poa* grow in the organic layer but the *Poa* has a decided advantage in this shallow foraging. Again, the moisture near the surface encourages *Poa annua* germination.

Twelve Point Management Program

After considering these facts concerning the growth habit of *Poa annua* and the conditions which favor it, we may conclude that there are certain management practices which would discourage *Poa annua* in putting greens. The following twelve point program is suggested:

1. Provide for good drainage. Good drainage implies ready removal of excess water both from the surface and through the soil by the process of percolation. Good drainage is almost always accompanied by good aeration. Thus the normal root zone of bentgrass, which extends at least twelve inches, is kept in a favorable condition for root activity. Conversely, the surface portion of the soil is allowed to become relatively dry and the shallow rooted grasses such as *Poa annua* and crabgrass do not thrive at the expense of the bentgrass.

Good internal drainage must be established when the green is built.

2. Topdress and cultivate to relieve surface compaction. Cultivation has come to be an accepted part of maintenance routine. Topdressing lost favor for awhile but now is being practiced to some extent on most golf courses. Both these practices relieve surface compaction. This promotes good internal drainage. Removal of moisture from the surface is one of the prime principles in *Poa annua* control. Topdressing and cultivation improve soil aeration. Aeration, or oxygen diffusion, is extremely important to the health and vigor of bentgrass roots.
3. Move the flagstick frequently. Traffic becomes increasingly important in its effects upon turf. First there is the simple wear and tear of the turf. This attrition makes grass plants more susceptible to diseases such as *Curvularia*. The turf is crushed down into the mat in which are present many fungus spores capable of infecting the plant. The bruising of the plant and the pushing it into contact with a source of inoculum is thought to further the occurrence of disease in turf. Furthermore traffic affects the soil. These soil effects appear to be even more serious than are those of attrition to the grass plant itself. Traffic produces compaction, which produces a moist surface, and a poorly aerated soil, conditions which in turn are detrimental to bentgrass but not particularly damaging to *Poa annua*.
4. Follow an irrigation program which is favorable to bent grass and unfavorable to *Poa annua*. Bent will survive on rather infrequent irrigations, if temporary midday wilting is taken care of by the practice of light showering of the turf. *Poa annua* requires moisture at or near the surface and this implies frequent irrigation. Unfortunately, soils frequently dictate the irrigation schedule. A permeable soil, one which holds a good supply of

available moisture is desirable on putting greens. Such soil requirements have been discussed elsewhere. Many putting green soils do not meet this requirement. They are quite impermeable and consequently hard at the surface.

Surface hardness, in turn, brings complaints from golfers and a great many superintendents find it necessary to water frequently to keep greens soft, even though such watering is harmful to turf. If it were possible for the superintendent to irrigate in such a way that the one or two inches of soil nearest the surface would remain relatively dry while the remainder of the root zone was relatively moist, a long step toward *Poa annua* control would be taken. Highly permeable soils lend themselves to this practice.

5. Keep thatch in greens to a minimum. As greens tend to build up a layer of undecomposed stems and leaves at the surface of the soil, roots tend to arise in this layer. This layer is similar to peat. Peat is used commercially as a rooting medium in plant propagation because it provides a condition where oxygen and moisture vapor combine to make the environment suitable for root growth. This condition is undesirable in bentgrass because the roots tend to be formed near the surface. Bentgrass roots in this region cannot compete effectively with those of *Poa annua*. *Poa annua* control is, of course, not the only reason for removing thatch but it is a good one.
6. Control diseases and insects. Anything that serves to open up the turf provides for ready invasion of *Poa annua*. It is capable of taking over bare areas much more rapidly than bentgrass during seasons favorable to its growth.
7. Fertilize bentgrasses when *Poa* is weak. During the last few years more superintendents have begun to use fertilizers more liberally during the summer months. This trend has been accompanied, or perhaps preceded, by more effective disease control practices. When bentgrass is kept in a vigorous condition during the summer months it enters the autumn season of *Poa annua* germination better able to resist the invasion of this weed. The use of fertilizer in the summer must be tempered with caution but judicious fertilization at this time appears to be beneficial.
8. Use such materials as lead arsenate to discourage *Poa annua*. There appears to be a considerable amount of difference in the tolerance of bentgrass and of *Poa annua* to the effects of lead arsenate. While the nature of this selectivity is not completely understood, its existence is adequately confirmed and it becomes a useful tool in combatting *Poa annua*. Calcium arsenate also exhibits selectivity but its use has been accompanied by erratic behavior. In the light of this experience it probably should not be used on putting greens until further testing has been done.
9. Keep phosphorous levels down. It has been demonstrated by the research done at Purdue University that the presence of high levels of phosphorous in the soil counteracts to some extent the herbicidal effect of lead arsenate on *Poa annua*. Bentgrass requires relatively small quantities of phosphorous for healthy growth. Therefore the use of fertilizers which provide the nutrients, nitrogen, phosphorous acid, and potassium oxide in the approximate ratio 3-1-2 appears to be indicated.
10. The use of wetting agents may be of some help in preventing the standing of water at the surface. On compacted soils or on thatched greens, water is almost certain to remain on or near the soil surface. An agent which will lower the surface tension of water, thereby permitting more ready penetration into the soil would appear to be helpful in reducing the advantage of *Poa annua*. It should be stated that in the author's knowledge no experimental work has been re-

ported along this line and that the foregoing statement is based entirely on the author's suppositions.

11. The judicious use of herbicides appears to have a place in *Poa annua* control. There are several chemical materials that exhibit some degree of selectivity between *Poa annua* and the bentgrasses. Bentgrasses, however, seem to be quite susceptible to damage by most herbicidal chemicals and therefore any herbicide should be used cautiously on putting greens.

Herbicidal control measures may eliminate a stand of *Poa annua* and they may discourage its return. It will be very difficult to maintain putting green turf in a "Poa-free" condition, however, unless the points discussed in foregoing paragraphs are given some attention.

The use of herbicides to control other weeds will help indirectly in the control of *Poa annua*. For instance an infestation of crabgrass

which goes out in the fall opens the turf for *Poa* invasion.

12. Use a bentgrass that grows vigorously and resists diseases that would thin it out. There are several excellent putting green strains of bentgrass available. Some of them do well in almost every part of the country where bentgrass is grown. A good vigorous strain of bentgrass will go a long way toward winning the battle against *Poa annua*.

When the reader considers this "Twelve Point Program," he is likely to conclude that "this is not just a *Poa annua* control program it is almost a complete management program." If the reader reaches such a conclusion, this article will have achieved its purpose. Indeed, nothing short of a complete program of good management will provide good *Poa annua* control. Conversely, it appears that we have the means for effective, if not complete, *Poa annua* control, but everyone of these tools must be used if our efforts are to meet with success.

Pilot Study Of Maintenance Costs Is Started

The USGA Green Section staff has undertaken a pilot study designed to provide a uniform method of recording maintenance costs. The need for a uniform system of accounting arises from the natural desire of club officials to compare their costs of operation with those of other clubs. Obviously, such comparisons cannot be made with validity unless accounting procedures and units of maintenance are standardized.

Mr. Allan Brown, Chairman of the Green Section Special Committee on Uniform Accounting and Terminology said in a recent report, "We hope that the study will result in a system by which golf clubs can compare their costs of operation and their various accounting practices with those of other clubs of equal standing among the USGA member clubs."

In order that this pilot study may provide a thorough test of the adequacy of the proposed system, approximately 120 clubs throughout the United States will be asked to cooperate. Each Green Section staff member will contact representa-

tive clubs in his area and ask them to use the suggested procedures for a period of one year.

Tributary to the value of the system is the concept of dividing all maintenance into units. The cost of maintenance of a single unit in terms of man hours becomes a figure that can be used satisfactorily in comparisons. Without such bases for comparison, a representative club of "A" says, "We spent \$4,000 last year for labor for mowing fairways," and the member from club "B" says, "Why we only spent \$3,400 for that item." Nothing is ever said about the price of the labor, the number of acres of fairways, nor the frequency of mowing. Club "A" actually may be doing a more efficient job of mowing fairways than club "B" when costs are reduced to units of maintenance.

If your club should be asked to participate in this study, your cooperation would be much appreciated. The expressions resulting from a broad sample of experience will provide a better method of accounting procedure.