A Selective Annual Bluegrass Control — Finally!

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ANNUAL BLUEGRASS (*Poa annua*) is considered by many golf course superintendents to be the worst weed they have to deal with. It is so invasive that in many northern areas of the United States it is the dominant species on most golf courses. For the average homeowner, it would be comparable to having a lawn of 75 percent to 90 percent perennial crabgrass! Dr. Don White, at the University of Minnesota, has begun a breeding program to develop improved varieties of annual bluegrass, indicating just how successful this species is — if you can't beat it, breed it.

At last, there appear to be several methods of halting the spread of this species on golf courses. Practices such as clipping removal, reduced levels of nitrogen fertilizer, and plant growth regulators all have been shown to be effective in reducing annual bluegrass populations. In my opinion, though, the most effective means of eliminating annual bluegrass is with the herbicide called ethofumesate (trade name Prograss). It has been around for a number of years, but we are just beginning to understand how to use it on fine turf.

I have observed results with this product in Michigan. This discussion concentrates on three uses — established greens, established fairways, and in fairway renovation to prevent re-establishment of annual bluegrass.

Before discussing the various uses of Prograss, let me describe how it works. There is so much more to learn about this product, and the potential is tremendous. Prograss is primarily a preemergence herbicide (it controls most weeds by killing germinating seeds and thus must be in the soil prior to weed seed germination). But it also has excellent postemergence (applied directly to the established weed) activity on annual bluegrass. Preemergence control is achieved from a single application, while postemergence activity requires from 2 to 4 sequential applications that can be made 20 to 30 days apart.

Interestingly, Prograss is only effective when applied in the fall. Applications in the spring or summer showed little effect. The need for, and the spacing of, the sequential applications is also curious. Applications made one week apart were not very effective, but when the spacing between applications was increased to 20 to 30 days, much better annual bluegrass control was seen. Also, the first application was much less important in controlling annual bluegrass than the second or third application. Thus, an application of 0.5 lb. AI/A followed by 1.0 lb. AI/A will give much better control than an application of 1.0 lb. AI/A followed by 0.5 lb. AI/A, even though the same total amount of herbicide was applied.

This information suggests that the first application of Prograss sets up the annual bluegrass plant for injury from the subsequent applications. If the

Figure 1: A bentgrass/annual bluegrass fairway in mid-May after Prograss applications the previous fall. A high percentage of bentgrass or ryegrass must be present if Prograss is to be used in this manner.

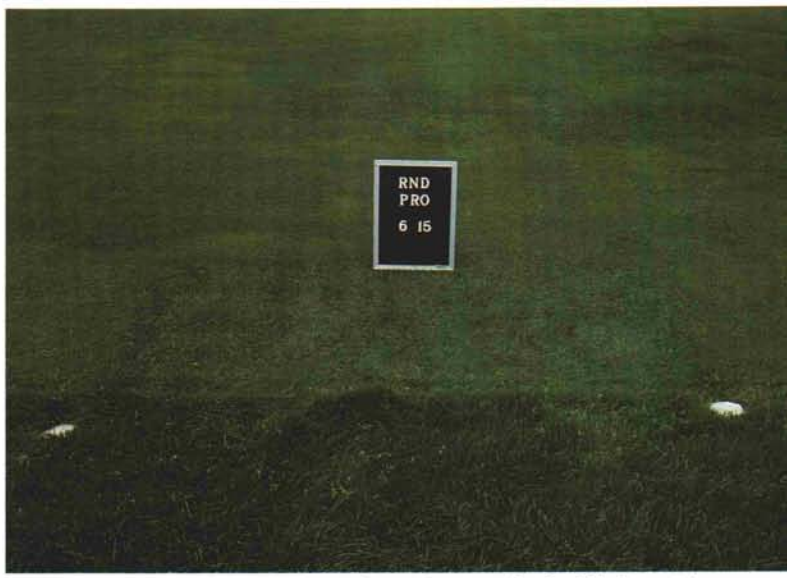

Figure 2 (left): Seedling bentgrass experienced injury from fall application of Prograss (mid-April photo), but plot completely filled in with bentgrass by mid-June in Figure 3 (right).

spacing of the applications is too close (e.g., one week), little control will be observed. Lower rates can be used initially because all you're doing is setting up the plants for the additional applications. Since only fall applications give good control, perhaps the Prograss makes the annual bluegrass susceptible to winter injury.

The use of Prograss on established fairways is probably the worst fit I see for this product. The reasoning is simple: If the Prograss works as intended on fairways that contain more than 20 percent annual bluegrass, then the fairways will be very unsightly while the golf course superintendent waits for the creeping bentgrass to fill in. The picture in Figure 1 shows the results of using Prograss on a typical bentgrass/annual bluegrass fairway. This photo was taken in mid-May, after the superintendent had been overseeding and pushing the existing turf to get it to fill in as quickly as possible. Imagine how the fairway looked in mid-April.

In these situations the Prograss works so well that the fairways are left with large dead patches. Some progress is made, but the creeping bentgrass cannot fill in quickly enough and the annual bluegrass reestablishes itself from late May to early June. This is not to say that Prograss does not have a use on fairways, but it is essential that fairways consist predominately of bentgrass or ryegrass before using this herbicide.

Prograss is a very good preemergence annual bluegrass herbicide, and could be used effectively in such a manner on ryegrass fairways. Because some discoloration is occasionally observed on bentgrass from even a single application of Prograss, the best way to control annual bluegrass in a recently established bentgrass fairway is to wait until annual bluegrass invasion is observed in significant amounts (1 to 5 percent). Then, in the fall, treat with 2 or 3 applications of Prograss to eliminate what is there, while providing preemergence control for the fall and the following spring.

If a superintendent is converting his fairways to creeping bentgrass by using PGRs or cultural practices, Prograss could be used to eliminate the last 10 to 15 percent of the annual bluegrass. When a fairway contains 85 to 90 percent bentgrass, thin areas left when the annual bluegrass dies out are quickly filled. As already noted, using Prograss on fairways with less than 80 percent bentgrass usually results in large dead patches each spring and an unacceptable appearance.

Another use for Prograss is in a fairway conversion program. This is occasionally done in the northern United States to convert annual bluegrass fairways to creeping bentgrass. The procedure typically followed is to kill the existing fairways with Roundup in the late summer period (during August), and reseed with a quality creeping bentgrass. The problem with this approach is that the soil carries a quantity of annual bluegrass seed which will germinate along with the creeping bentgrass, resulting in a substantial degree of reinfestation. My observations in Michigan indicate that best results are obtained when the bentgrass seeding is done in late August, prior to the optimum annual bluegrass germination period (mid-September).

Fortunately, Prograss can be used to kill annual bluegrass seedlings without killing the creeping bentgrass seedlings. If done properly, an essentially pure stand of bentgrass will exist by late spring following the fall applications. Our initial research work called for Prograss at 1.0 lb. AI/A approximately 4 weeks after seeding, followed by another 1.0 lb. AI/A application 8 weeks after seeding. While these rates were too high and applied a little too early, the result was dramatic. Figure 2 shows a treated plot in mid-April. The bentgrass was severely injured, but no annual bluegrass was present. By mid-June (Figure 3) the turf had recovered completely and the stand was solid bentgrass.

WE ARE presently testing a variety of rates and application dates for this procedure. My current recommendation is to apply ⅜ lb. AI/A at 4 weeks after germination (WAG) (roughly 5 weeks after seeding), followed by a ¾ lb. AI/A application at 8 WAG. The longer you wait after seeding to make the first application, the less control you will have over annual bluegrass. However, by waiting longer there will be less

injury to the creeping bentgrass. In my experience, the 4 and 8 WAG spacing gives the best results, but we are currently testing this procedure more thoroughly and will have better information in 1990.

The final use for Prograss is probably the most controversial. Prograss is not labeled for greens and probably never will be because of liability concerns. To many golf course superintendents, however, annual bluegrass in bentgrass greens is one of their most serious problems because of the potential for summer and winter decline. We have been testing Prograss on greens for a number of years, with some excellent results. Figure 4 shows a plot treated with Prograss at 1.0 plus 0.5 lbs. AI/A in the fall of 1986. The photo was taken in May of 1987; note the difference between the treated plot and the surrounding four check plots.

Our research indicates best results with a 0.25 lb. AI/A application in mid-September, followed by a 0.75 lb. AI/A application in mid-October. These applications produce minimal discoloration to the bentgrass, yet provide good annual bluegrass control.

Some words of caution are in order. The only cases where I've observed the outright kill of creeping bentgrass were in areas which were poorly drained or where water collected. Don't use Prograss treatments on wet areas. Another point to keep in mind is that the removal of annual bluegrass should be approached as a 3- to 5-year program. It will not be accomplished in one year. Therefore, I suggest a cautious, experimental approach to using Prograss. If you want to try it on greens, do not treat all 18 greens at 0.25 plus 0.75 lb. AI/A. First, try it on a 200- to 300-square-foot section of the practice putting green. Evaluate the results and decide how to proceed in subsequent years. If you have a larger percentage of annual bluegrass, you may want to reduce the rates of Prograss to 0.25 plus 0.5 lb. AI/A to try to make a more gradual transition to bentgrass. These rates will cause injury to the annual bluegrass but will not cause much kill. As the bentgrass begins to predominate, rates can slowly be increased to achieve complete conversion.

All of my research has been in Michigan. There is clearly an important environmental component to the action of Prograss, so I do not recommend using this product in other states without first consulting your state cooperative extension service or turfgrass specialist to find out what works best in your region.

Prograss holds the promise of being an important tool in maintaining quality turf in the 1990s. More in-depth research will eventually unlock the potential of this product for giving us consistent, reliable annual bluegrass control.

Figure 4: Center plot on this bentgrass/annual bluegrass green contains much less annual bluegrass in May after two fall treatments of Prograss compared to surrounding check plots.