NEW INSIGHTS ON *POA ANNUA* AND *POA TRIVIALIS* CONTROL

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Perhaps the most difficult task that can be found in turfgrass weed control is the selective control of one perennial grass weed while leaving other desirable perennial grasses uninjured. The herbicides available today generally control broadleaves or grasses but not one specific grass while leaving other grasses untouched.

There are some examples where some herbicides do exhibit some selectivity within grasses. For instance, chlorsulfuron (sold as Glean for wheat and as Lesco TFC for tall fescue control in Kentucky bluegrass) has been marketed for nearly ten years as an effective tall fescue control. Sethoxydim (Vantage) will remove most grasses from annual bluegrass or fine fescue. While removing other grasses from annual bluegrass seems totally backwards, turf managers could use the selectivity of Vantage to help establish fine fescues as ornamental grasses. But the overarching point is that it is very difficult to control one perennial grass (annual bluegrass or rough bluegrass) growing within another perennial grass, e.g. Kentucky bluegrass or creeping bentgrass.

In 1997, with a grant from the Golf Course Superintendents Association, the Midwestern Golf Course Superintendents Association, and Novartis, we began exploring the potential of herbicides from the sulfonylurea chemical family (of which chlorsulfuron is a member) to selectively control annual bluegrass and rough bluegrass in a creeping bentgrass turf.

Greenhouse screening trials were conducted in 1997-98 and yielded some promising herbicide candidates. However, field testing conducted during 1998 showed no significant selectivity of any of the sulfonylurea herbicides between annual bluegrass, rough bluegrass, and creeping bentgrass.

While this was disappointing, our research direction changed at this time based upon research findings by graduate student Eric Kohler. Eric was studying the herbicide ethofumesate (trade name - Prograss) as a selective control for annual bluegrass. After many years of research on Prograss in Michigan that yielded inconsistent results when used according to label directions, I decided to start over and determine basic information on Prograss absorption, translocation, metabolism, and site of uptake in turfgrasses.

During the course of the research, we discovered that ethofumesate is slightly volatile. This led to a field experiment to see if the herbicidal activity of Prograss could be seen in the summer by using higher rates to overcome volatility losses.

Prograss was applied at rates of 0, 1, 2, 3, 4, and 5 lbs ai/A beginning on July 4, 1997. Subsequent applications were made in August, September, and October of 1997. Results observed the following spring were surprising and dramatic (Table 1). Rates of 1 or 2 lbs ai/A applied four times provided little to no annual bluegrass control while rates of 3, 4, or 5 lbs ai/A applied four times provided increasing levels of annual bluegrass control. Previous research, at normal use rates, had shown no response from summer applications of Prograss. This experiment confirmed those results, i.e. the 1 or 2 lbs ai/A rates did little, but also showed that higher rates applied in the summer could control annual bluegrass during the growing season.

When used according to current label rates and timings, Prograss is applied in the fall with annual bluegrass kill occurring early the next spring. With these applications, annual bluegrass control occurs at a time when the turf is not actively growing. Death of annual bluegrass results in large voids in the turf requiring overseeding or a lot of time for the desirable turf to fill in the voids left by annual bluegrass. So, even when Prograss works well, turf managers may not be happy with the results.

The results observed in 1997-98 were exciting because control was achieved during the growing season, when the remaining grasses are actively growing and can readily fill in the voids left by the loss of annual bluegrass.

Further research was initiated in 1998 to determine if Prograss activity could be enhanced by adding wetting agents or surfactants to the spray solution. Work by field researchers from AgroEvo USA had indicated that the addition of urea to the spray tank will boost the herbicidal activity of Prograss.

We tested the effect of added nitrogen in a preliminary trial conducted in 1998. Nitrogen sources, with or without spray adjuvants, were tank-mixed with Prograss EC and SC formulations. Three sequential Prograss applications were made on 3 week spacing. Applications were made on July 28, August 24, and September 17. Excellent annual bluegrass control was achieved particularly when Prograss was applied with urea or AMS plus a non-ionic surfactant. The highest levels of annual bluegrass control were seen with the tank mix combinations of Prograss EC + 0.25 lbs N/M as urea + 0.5% v/v non-ionic surfactant. Similar activity was seen when AMS at 17 lbs/100 gallons of spray was substituted for urea as the nitrogen source.

Research in 1999 will focus on determining optimum rates of nitrogen to have in the spray solution, finding the best adjuvant to maximize Prograss activity and testing combinations of these products in the field.

Table 1. Effect of Sequential, High Rate Applications of Prograss on Annual Bluegrass Populations in a Mixed Tall Fescue/Annual Bluegrass Turf.

Prograss Rate (lbs ai/A)	**% Annual Bluegrass**
Control	85
1	74
2	57
3	29
4	19
5	11
LSD (p=0.05)	25