

PRE AND POSTEMERGENCE POA ANNUA CONTROL

B.E. Branham

Department Crop and Soil Sciences, M.S.U.

East Lansing, MI

Control of annual bluegrass has been a goal for golf course superintendents since the beginning of time (from a golf perspective, of course). Annual bluegrass is an extremely competitive species that invades golf course turf. Two different subspecies of annual bluegrass are commonly found on golf courses, a perennial type called *Poa annua* var *reptans* and a true annual type called *Poa annua* var *annua*. In the northern portion of the United States the perennial type is more commonly found on golf courses. Having the perennial type makes control much more difficult because it requires the availability of a postemergence control to be able to combat this pest. If you're fighting only the true annual type then you would have a new opportunity to get preemergence control each year. However, with a perennial type any annual bluegrass that successfully establishes during a given growing season becomes a permanent part of the turfgrass community. Thus, having a reliable postemergence herbicide is a necessity for developing an overall control strategy for perennial type annual bluegrass. For the past 20 years all postemergence controls would fall in the unreliable category. Recently two products have emerged which give more consistent control of annual bluegrass although both still have some peculiarities which make them somewhat tricky to use. The first product is ethofumesate (trade name – Prograss) and the second product is a class of plant growth regulators which work by inhibiting gibberellic acid (GA) biosynthesis. Gibberellic acid is the plant hormone responsible for cell elongation, i.e. growth, and when its production is inhibited then plants will exhibit reduced growth. For some reason, this class of PGR's seems to inhibit annual bluegrass more so than other turfgrasses which can allow these other grasses to outcompete annual bluegrass. With repeated use of these products, the percentage of annual bluegrass in the treated turf will slowly decrease. Current PGR products on the market include flurprimidol (trade name – Cutless) and paclobutrazol (trade name – Scott's TGR and Scott's Turf Enhancer).

With this introduction, we can begin discussing the current options available for pre and postemergence control of annual bluegrass. Preemergence control of annual bluegrass has historically not been very effective because no good postemergence control existed. Thus, preemergence control without a postemergence partner only delayed the inevitable invasion of annual bluegrass. Now with some postemergence controls available and with large number of new and renovated golf courses, an increased emphasis on preemergence control has developed. We have worked extensively with ethofumesate for controlling annual bluegrass postemergence and since its principal use in field crops is as a preemergence herbicide, it was assumed that fall applications to provide postemergence control would also

provide preemergence control in the fall with the potential for some carryover preemergence activity the next spring. An initial study we conducted on bare ground did indeed show that ethofumesate would provide preemergence control from a fall application with significant carryover into the spring. However, studies of preemergence control from ethofumesate conducted on turf showed little preemergence activity (Table 1). We have concluded that ethofumesate is so strongly bound to organic matter that applications to turf are effectively unavailable for preemergence control thus yielding the low levels of control shown in Table 1. Herbicides providing excellent annual bluegrass control would include Ronstar, Dimension, Barricade, and PreM. Of this group only Dimension is currently labeled for use on greens height bentgrass. Only Dimension and PreM are labeled for bentgrass fairways.

In order to control annual bluegrass preemergence, at least two applications per year will be necessary. One application should be made in late August to control late summer/early fall germination of annual bluegrass. As the data in Table 1 shows, the herbicides classified as excellent gave significant carryover of preemergence herbicide activity into the following spring. Therefore, the second, spring application should not be necessary until sometime in mid to late April or even into May for some of the herbicide products. This spring application should provide control through the peak spring period for annual bluegrass germination.

For postemergence control of annual bluegrass, the most effective herbicidal product is ethofumesate. Ethofumesate is a somewhat unusual herbicide in relation to annual bluegrass control. At least two applications are required to get good control of annual bluegrass and 3-4 applications can be used to achieve high levels (90-100%) of control. Applications are only effective when made in the fall and 2-4 weeks should separate each application. In addition we have some experimental evidence that would suggest that freezing temperatures prior to application will improve the activity of the application. Results of multiple applications of ethofumesate are shown in table 2. The current label rate is 0.75 lb ai/A and this rate does seem to provide the best control with no to slight injury or discoloration to bentgrass.

Caution should be exercised when first using ethofumesate. One of the biggest problems that can result from ethofumesate use is that it works too well! For example, if you get 100% control from your first set of applications, and control seems to vary with season so that typical results would range from 50-100% control, this could mean that a large portion of the existing fairway turf has been removed. Many superintendents have trouble accurately assessing the percentage of annual bluegrass in a mixed stand of turf. If you thought you only had 15% annual bluegrass and the true value was closer to 50%, this would create a serious problem for the superintendent. So, go slow with ethofumesate. Getting rid of annual bluegrass is not a simple, one step program. Instead it is a continual battle using all available control options to give the best results. First year results should be evaluated and then decisions made on number and timings of applications for the next year as well as deciding how much of the golf course to treat. Annual bluegrass is an extremely competitive weed. Options now exist to manage this weed so it is a small percentage of the total turf population. However, a detailed, multi-year plan needs to be developed and implemented to achieve a significant reduction in this species.

Table 1. FALL PREEMERGENCE APPLICATION FOR CONTROL OF ANNUAL BLUEGRASS IN 1991.

	FORMULATION		RATE lbs A/A ¹	PERCENT CONTROL					
				10/22	11/8	4/23	5/13	6/01	6/22
Control				0	0	0	0	0	0
Oxadiazon	2	G	2.0	100	100	66	25	33	0
Oxadiazon	2	G	4.0	100	100	79	89	50	25
Pendimethalin	60	WDG	3.0	100	100	94	100	100	5
Pendimethalin	60	WDG	2.0	100	100	55	75	100	0
Dithiopyr	0.25	G	0.38	100	100	98	100	66	1
Dithiopyr	0.25	G	0.25	100	100	78	92	33	0
Dithiopyr	0.25	G	0.50	100	100	100	92	100	0
Dithiopyr	1	EC	0.38	100	100	97	36	62	0
Dithiopyr	1	EC	0.50	100	100	67	89	67	0
Benefin	2.5	G	2.0	67	100	11	8	31	4
Benefin	2.5	G	3.0	100	94	50	56	40	0
Prodiamine	65	WDG	0.50	100	100	100	58	100	31
Prodiamine	65	WDG	0.75	100	100	88	81	67	23
Bensulide	4	EC	12.5	100	100	52	58	83	8
Bensulide	4	EC	10.0	100	100	59	83	62	0
DCPA	75	WP	10.5	100	100	88	83	79	0
DCPA	75	WP	15.0	100	100	88	33	90	5
Ethofumesate	1.5	EC	0.75	33	94	29	67	14	35
Ethofumesate	1.5	EC	1.5	33	50	35	22	21	1
Benefin + Trifluralin	2	G	1.5	<u>100</u>	<u>67</u>	<u>22</u>	<u>25</u>	<u>0</u>	<u>17</u>
LSD (P=0.05)				47	28	46	56	54	NS

¹ - Treated 09/11/91

Table 2.ETHOFUMESATE APPLICATIONS FOR SAFETY AND *Poa annua* CONTROL IN 1990.

ETHOFUMESATE RATES (lb ai A ⁻¹) AND TIMINGS ¹	11/6/90	3/21/91	5/9/91		5/23/91	
	<u>Injury</u>		<u>% Poa</u>	<u>% Cover</u>	<u>% Poa</u>	<u>% Cover</u>
Control	9.0	8.0	53	100	62	100
0.75 Sept & 0.75 Oct	7.0	6.3	23	99	43	100
0.75 Sept & 0.75 Oct & 0.75 Nov	7.0	5.3	8	100	13	100
0.75 Sept & 0.75 Oct & 0.75 Nov & 0.75 Apr	6.7	5.3	5	99	7	99
0.75 Sept & 0.75 Oct & 0.75 Apr	7.0	6.0	17	99	22	100
0.75 Sept & 1.50 Oct	7.0	4.0	13	99	25	100
0.75 Sept & 1.50 Oct & 0.75 Nov	6.3	2.3	6	94	13	99
0.75 Sept & 1.50 Oct & 1.50 Nov	7.0	2.3	2	92	7	97
0.75 Sept & 0.75 Oct & 1.50 Nov	6.7	4.3	6	98	7	100
0.75 Sept & 1.50 Oct & 0.75 Apr	7.0	4.0	12	97	17	100
0.75 Sept & 1.50 Oct & 0.75 Nov & 0.75 Apr	6.3	3.0	1	96	3	98
0.75 Sept & 1.50 Oct & 1.50 Nov & 0.75 Apr	6.7	1.7	1	88	2	95
0.75 Sept & 0.75 Oct & 1.50 Nov & 0.75 Apr	6.7	4.0	3	97	3	99
1.50 Sept & 1.50 Oct	4.0	3.0	3	94	13	97
1.50 Sept & 1.50 Oct & 0.75 Nov	4.0	3.0	4	93	5	97
1.50 Sept & 1.50 Oct & 1.50 Nov	4.0	2.0	2	87	3	94
1.50 Sept & 1.50 Oct & 0.75 Nov & 0.75 Apr	4.0	2.3	0	82	1	93
1.50 Sept & 1.50 Oct & 0.75 Apr	4.0	3.7	8	87	5	94
1.50 Sept & 0.75 Oct & 1.50 Nov	4.0	3.3	1	86	4	97
1.50 Sept & 1.50 Oct & 1.50 Nov & 0.75 Apr	4.0	1.7	0	63	2	83
1.50 Sept & 0.75 Oct & 1.50 Nov & 0.75 Apr	4.0	2.7	1	85	1	94
LSD (P= 0.05)	0.7	1.4	6.8	12.3	7.2	5.7

¹ - Treated 9/17/90, 10/11/90, 11/6/90 and 4/11/91