Controlling *Poa annua* on putting green height turf in Indiana, Michigan, and Nebraska: 2011 Research Update

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SUMMARY: Annual bluegrass (*Poa annua*) is the most troublesome and probably the most studied weed on golf courses throughout the United States. A number of herbicides and growth regulators are labeled and effective for *Poa annua* control on fairway height turf including bispyribac-sodium (Velocity), ethofumesate (Prograss), flurprimidol (Cutless) and paclobutrazol (Trimmit). As turfgrass extension specialists, we often enter discussions about how to limit or control annual bluegrass on putting greens and how control varies from one location to another. We are evaluating seven season-long treatments of growth regulators or herbicides to control annual bluegrass on putting greens. By completing identical studies at multiple locations that differ widely geographically, we are able to extrapolate our results to a large portion of the United States. The three best treatments improved annual bluegrass control vs. the untreated check on 36% of the rating dates over multiple locations and three years. Velocity at 2 oz/A applied 4 times, Trimmit, and Cutless were the best performers across all years and locations; however, the results are variable by location. This may help explain the highly variable anecdotal results from superintendents across the country and support the fact that a superintendent may have to experiment to find the best treatment for controlling annual bluegrass at their location.

Annual bluegrass (*Poa annua*) is the most troublesome and probably the most studied weed on golf courses throughout the United States. A number of herbicides and growth regulators are labeled and effective for *Poa annua* control on fairway height turf including bispyribac-sodium (Velocity), ethofumesate (Prograss), flurprimidol (Cutless) and paclobutrazol (Trimmit, TGR). As turfgrass extension specialists, we often enter discussions about how to limit or control annual bluegrass on putting greens. Outside of the typical cultural methods for exclusion on new putting greens, we have little confidence in using growth regulators or herbicides on greens north of the transition zone because of labeling issues and the following three reasons:

ADDITIONAL INDEX WORDS:
bispyribac; cumyluron; Cutless; ethofumesate; flurprimidol; paclobutrazol; Primo; Prograss; Trimmit; trinexapac-ethyl; Velocity.

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1. Most of the previous research was done on fairway height bentgrass which is more competitive with annual bluegrass and more tolerant of herbicides or growth regulators (Bigelow et al., 2007; Woosley et al., 2003).
2. Most of the previous plant growth regulator research was done with monthly applications and/or either summer or fall applications, unlike applications made every two weeks with today's standards (Isgrigg et al., 1999a, 1999b; Johnson and Murphy, 1995, 1996).
3. Most of the putting greens-height research was done in the southeast United States where annual bluegrass is likely more susceptible to control during the warmer summers (Isgrigg et al., 1999a, 1999b; Johnson and Murphy, 1995, 1996; Teuton et al., 2007).

Because of these issues, we are evaluating seven season-long treatments of growth regulators or herbicides to control annual bluegrass on putting greens. By completing identical studies at four locations that differ widely geographically, we are able to extrapolate our results to a large portion of the United States.

Materials and Methods

Plots of green-height annual bluegrass/creeping bentgrass were already established on putting greens that are mowed daily at 0.125" and sand-topdressed regularly. The areas receive 2.5 to 3.0 lbs N/1000 ft^2/yr. Treatments are applied in 2 gals water/1000 ft^2 and are listed in Table 1. Most of these treatments are within label limits with the exception of Velocity, and are based on superintendents and label recommendations as well as previous research experience. Treatment 3 is an experimental herbicide with potential for *Poa annua* control (Askew et al., 2009). Visual quality and percent cover of creeping bentgrass and annual bluegrass are recorded monthly and transect counts are taken in mid-May and mid-August, the expected high and low points for annual bluegrass populations, respectively. The transect counts minimize subjectiveness between rates and will allow reliable comparisons between years within locations and across locations. This study has been done on the same plots in West Lafayette, IN, and East Lansing, MI, in 2009-2011, Lexington, KY, in 2009-2010, and Lincoln, NE, in 2010-2011. We expect this study to continue one more year in IN, MI, and NE.

Results and Discussion

Annual bluegrass populations are naturally at a seasonal high in April or May, drop to a seasonal low in August and then return to a seasonal high the following spring. Our data show that regardless of treatment, annual bluegrass cover dropped dramatically over the summer to almost insignificant populations (Fig. 1). Therefore, one could deduce incorrectly that their control strategy is working if no untreated area for comparison is included on their golf course. Annual bluegrass control was highly variable from location to location and among years. Though data were recorded on 72 dates over the four locations and three years, treatment differences were only evident on 44 of the dates. This suggests that regardless of the control regime attempted, the superintendent will not see any detectable differences on 40% of the days the greens are examined. Therefore if an annual bluegrass control program is attempted, it is critical to manage expectations of the staff and other decision makers who might expect dramatic results.

The three best treatments improved annual bluegrass control vs. the untreated check on 36% of the rating dates over the four locations and three years (Table 1). Velocity at 2 oz/A applied 4 times, Trimmit, and Cutless were the best performers across all years and locations. Within locations, Trimmit has been the best performer at Purdue (Fig. 2), Trimmit and Cutless at Michigan State (Fig. 3), HM9530 and Velocity at 1 oz/ A at University of Kentucky, and Velocity at 2 oz/A at University of Nebraska (Fig. 4). These results not only help explain the highly variable anecdotal results from superintendents across the country, but also suggest that a superintendent may have to experiment to find the best treatment for controlling annual bluegrass at their location.

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Table 1. Treatments used to control annual bluegrass in identical experiments in four states over 2009-2011. Out of the total 72 rating dates across all locations and years, the best performing treatments reduced annual bluegrass cover in 36% of the ratings.

Trt	Product	Rate	Application frequency	Application dates	Total applications per year	Percent of 2009-2011 dates where Poa cover < untreated check (72 total ratings in 4 states & 3 years)
1	Velocity WSP	1 oz/A	2 wks	May-Sep	8	26%
2	Velocity WSP	2 oz/A	2 wks	Aug-Sep	4	36%
3	HM9530	130 oz/A	5 mo	Apr, Aug	2	21%
4	Trimmit	8 oz/A 16 oz/A	2 wks 2 wks	Apr-May, Aug-Sep June-July	8 4	36%
5	Cutless	8 oz/A 16 oz/A	2 wks 2 wks	Apr-May May-Aug	5 7	36%
6	Legacy	10 oz/A	2 wks	Apr-Sep	12	21%
7	Primo	11 oz/A	2 wks	Apr-Sep	12	14%
8	Check	-	-	-	-	0%

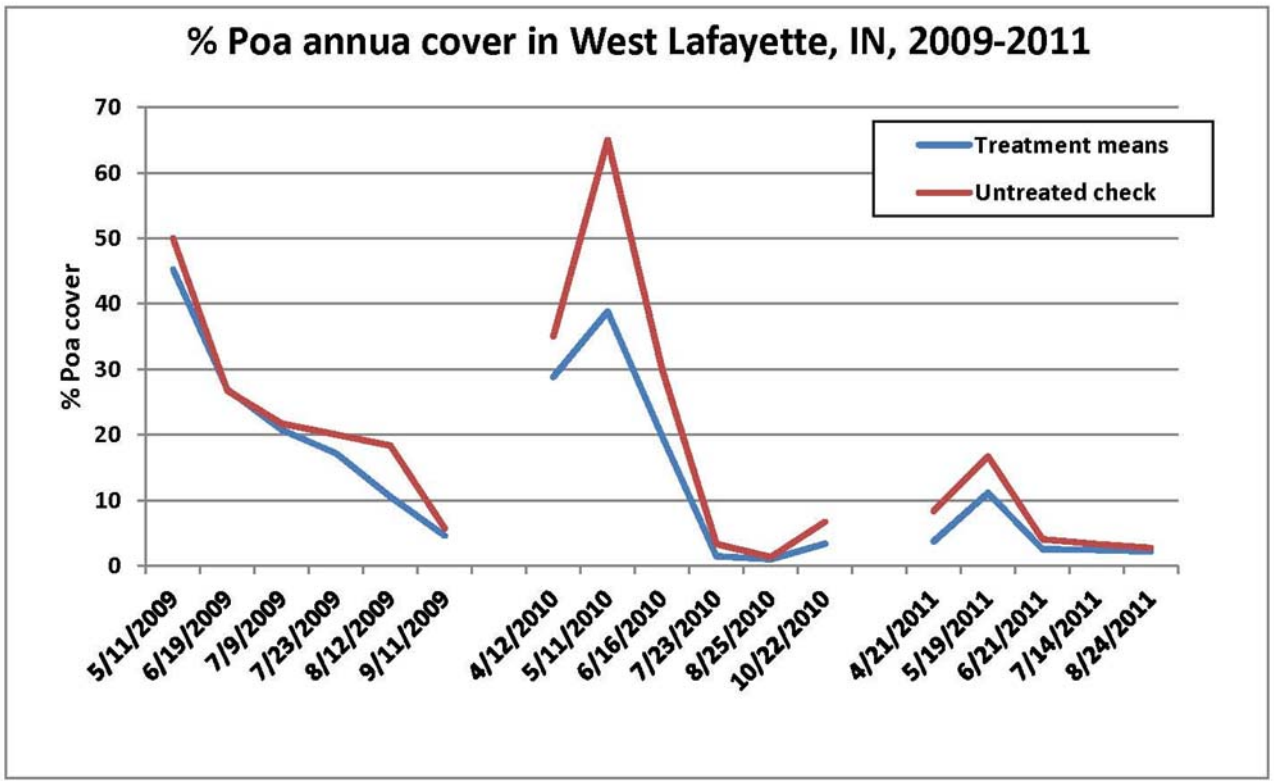

Figure 1. Percent cover of *Poa annua* visually rated in 2009-2011 in Indiana. Cover of the treatments was averaged over the 7 treatments. Regardless of treatment, *Poa annua* cover decreases naturally in August. This suggests that success of *Poa annua* control strategies could be misinterpreted as successful if untreated areas are not included for comparison.

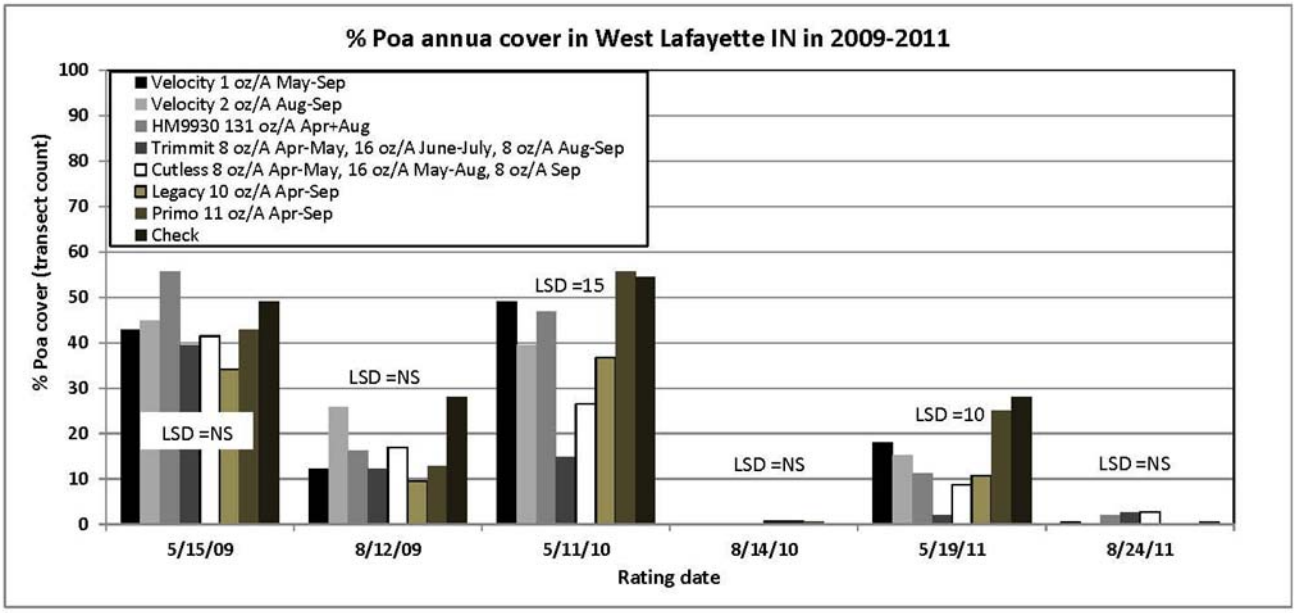

Figure 2. Percent *Poa annua* cover in Indiana 2009-2011. *Poa annua* cover was counted using a transect and then converted to percent cover. Trimmit was the best performing treatment in Indiana.

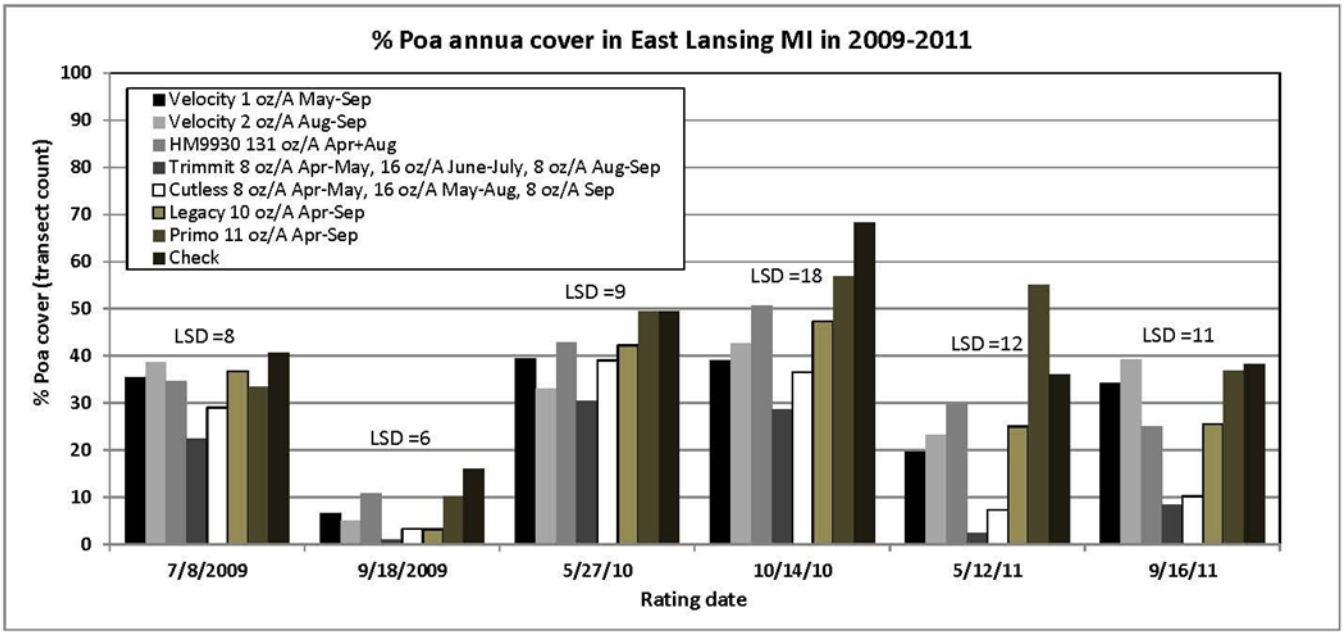

Figure 3. Percent *Poa annua* cover in Michigan 2009-2011. *Poa annua* cover was counted using a transect and then converted to percent cover. Trimmit and Cutless were the best performing treatments in Michigan to date.

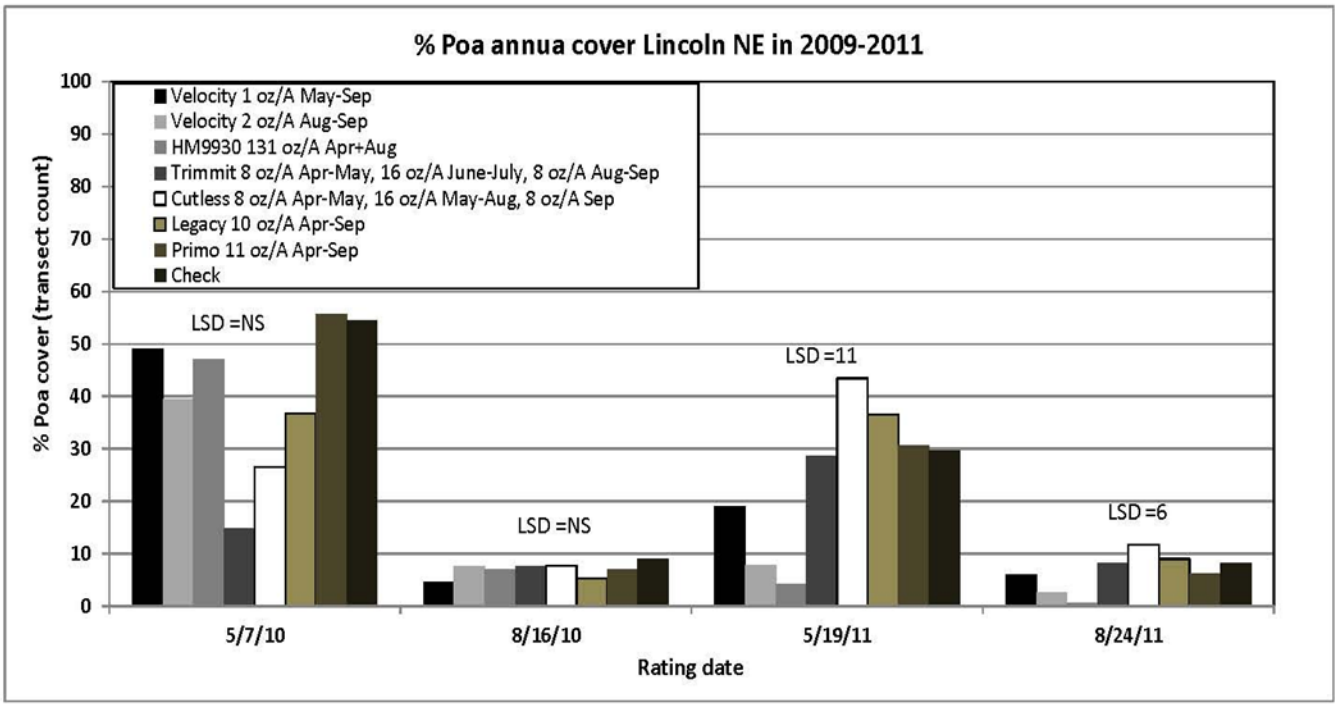

Figure 4. Percent *Poa annua* cover in Nebraska 2010-2011. *Poa annua* cover was counted using a transect and then converted to percent cover. Velocity applied four times at 2 oz/Acre was the best performing treatment to date.