The Effect of Roundup/Tenacity used in a Late Fall Renovation on Subsequent *Poa annua* Re-establishment in a Golf Course Fairway

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Charles T. Golob, William J. Johnston and Matthew W. Williams
Washington State University-Pullman
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A study was conducted at Palouse Ridge Golf Club (PRGC) at Washington State University in Pullman, WA to determine whether applications of Tenacity during various stages of a late Fall fairway renovation would reduce the subsequent amount of annual bluegrass (*Poa annua*) re-establishing in those areas. The Kentucky bluegrass (*Poa pratensis*) fairway at PRGC was heavily infested with both *P. annua* and creeping bentgrass (*Agrostis stolonifera*) prior to treatment application. Roundup Pro (glyphosate) alone or with Tenacity (mesotrione) was applied 21 days before planting (DBP) on 12 Sept. 2008. Some treatments received additional Tenacity at planting (1 Oct. 2008) and 26 days after planting (DAP) on 27 Oct. 2008. Immediately prior to planting, the area was mowed with a triplex mower at 0.5", verticut in 2 directions, then using a Landpride slice-seeder, slices were made in 2 directions perpendicular to each other (Fig. 1). All treatments were planted with 'Gallery' perennial ryegrass (*Lolium perenne*) at 10 lbs/1000 ft^2 using a drop spreader. Following planting all treatments were heavily topdressed with sand. Since overseeding occurred late in the Fall (1 Oct. 2009), establishment of the perennial ryegrass was very slow. Therefore, rating for percentage of turfgrass cover and *P. annua* emergence was not taken until the following spring, beginning on 11 May 2009.

At the first rating date (11 May), there was no significant difference in the percentage of *P. annua* in any of the Roundup/Tenacity treatments. However, numerically percent *P. annua* was less in the treatment with Tenacity applied 3 times in the fall: Roundup Pro +Tenacity 21 DBP, Tenacity at planting, and Tenacity 21 DAP and also the treatment with Tenacity applied 2 times in the fall: Roundup Pro + Tenacity 21 DBP and Tenacity 28 DAP. These same 2 treatments had significantly lower *P. annua* approximately 2 weeks later. Unfortunately, following a late May 2009 fertilizer application it was impossible to visually distinguish between the perennial ryegrass and *P. annua* present on 10 June 2009. Subsequent ratings in July and October, for the most part, showed increased levels of *P. annua* in all treatments and no difference among treatments.

The amount of turfgrass covering the ground on 11 May 2009 for all treatments except the non-treated control was approximately 50%, and was nearly complete cover by 10 June

(Table 2). There were no differences in percentage of turf cover among any treatment at each rating date.

The 2 treatments with multiple Fall Tenacity applications resulted in lower levels of *P. annua* seedheads compared to Roundup Pro 21 DBP (check) on 26 May (Table 3). But this appears to be primarily due to the lower percentage of *P. annua* in these treatments compared to the check. Therefore it is difficult to conclude that Tenacity actually inhibited seedhead formation on an individual plant basis.

In conclusion, even though there appeared to be some early control, before June 2009, with the 2 treatments with multiple Fall Tenacity applications, the inhibition of *P. annua* emergence did not persist. Perhaps additional spring Tenacity application(s), before the end of May, following the treatments with multiple Fall Tenacity applications would be of some benefit to further inhibit *P. annua* emergence and allow the perennial ryegrass to establish. In addition, for our region, planting perennial ryegrass on 1 October is approximately 2 weeks later than is recommended. An additional couple of weeks of growth in the Fall would allow better establishment of the perennial ryegrass and earlier complete turf cover in the spring which may result in much less *P. annua* re-establishing in these renovated treatments. Even though the 2 treatments with multiple Fall Tenacity applications resulted in substantial reductions in seedheads compared to the check this also coincided with lower percentages of *P. annua*. A final observation was that no creeping bentgrass re-established in any of the treatments by the end of this study.

Figure 1. Planting perennial ryegrass on 1 Oct. 2008 at 10 lbs/M, 21 days after roundup was applied. Immediately prior to planting, plot area was mowed, verticut in 2 directions, and sliced in 2 directions with a Landpride slice-seeder.

Table 1. Percentage of *Poa annua* in plots following Fall 2008 Roundup/Tenacity applications and overseeding with 'Gallery' perennial ryegrass on a golf course fairway.

Treatment	Rate	App date	*Poa annua* (% of plot area) 5/11/09	5/26/09	6/10/09	7/14/09	10/1/09
Roundup Pro	3 qt/A	21 DBP	16.8	19.3 ab	NA**	47.5 ab	51.3
Roundup Pro	3 qt/A	21 DBP	20.5	22.5 a	NA	36.3 b	55.0
Tenacity	175 GA/ha	at planting					
Roundup Pro +	3 qt/A	21 DBP	17.1	17.7 abc	NA	57.7 a	60.7
Tenacity +	210 GA/ha	21 DBP					
Activator 90	0.25%	21 DBP					
Roundup Pro +	3 qt/A	21 DBP	4.5	2.5 c	NA	41.3 ab	47.5
Tenacity +	210 GA/ha	21 DBP					
Activator 90	0.25%	21 DBP					
Tenacity	175 GA/ha	at planting					
Tenacity +	175 GA/ha	28 DAP					
Activator 90	0.25%	28 DAP					
Roundup Pro +	3 qt/A	21 DBP	5.5	5.8 bc	NA	42.5 ab	52.5
Tenacity	280 GA/ha	21 DBP					
Tenacity +	210 GA/ha	28 DAP					
Activator 90	0.25%	28 DAP					

*Means followed by the same letter are not significantly different. LSD *P* = 0.05.

**Could not distinguish annual bluegrass from perennial ryegrass due to heavy nitrogen fertilization at the end of May 2009.

Table 2. Percentage of turf cover following Fall 2008 Roundup/Tenacity applications and overseeding with 'Gallery' perennial ryegrass on a golf course fairway.

Treatment	Rate	App date	Turf cover (% plot area) 5/11/09	5/26/09	6/10/09	7/14/09
Roundup Pro	3 qt/A	21 DBP	53.8	66.3	93.8	100.0
Roundup Pro	3 qt/A	21 DBP	56.3	68.8	97.5	100.0
Tenacity	175 GA/ha	at planting				
Roundup Pro +	3 qt/A	21 DBP	50.1	63.1	94.5	100.0
Tenacity +	210 GA/ha	21 DBP				
Activator 90	0.25%	21 DBP				
Roundup Pro +	3 qt/A	21 DBP	50.0	67.5	98.8	100.0
Tenacity +	210 GA/ha	21 DBP				
Activator 90	0.25%	21 DBP				
Tenacity	175 GA/ha	at planting				
Tenacity +	175 GA/ha	28 DAP				
Activator 90	0.25%	28 DAP				
Roundup Pro +	3 qt/A	21 DBP	43.8	60.0	91.3	100.0
Tenacity	280 GA/ha	21 DBP				
Tenacity +	210 GA/ha	28 DAP				
Activator 90	0.25%	28 DAP				
			NS	NS	NS	NS

Table 3. Percentage of *Poa annua* seedheads compared to the check (Roundup Pro alone) following Fall 2008 Roundup/Tenacity applications and overseeding with 'Gallery' perennial ryegrass on a golf course fairway.

Treatment	Rate	App date	*P. annua* seedheads compared to check* 5/26/09 (%)
Roundup Pro	3 qt/A	21 DBP	100 a**
Roundup Pro	3 qt/A	21 DBP	120 a
Tenacity	175 GA/ha	at planting	
Roundup Pro +	3 qt/A	21 DBP	77 ab
Tenacity +	210 GA/ha	21 DBP	
Activator 90	0.25%	21 DBP	
Roundup Pro +	3 qt/A	21 DBP	13 c
Tenacity +	210 GA/ha	21 DBP	
Activator 90	0.25%	21 DBP	
Tenacity	175 GA/ha	at planting	
Tenacity +	175 GA/ha	28 DAP	
Activator 90	0.25%	28 DAP	
Roundup Pro +	3 qt/A	21 DBP	38 bc
Tenacity	280 GA/ha	21 DBP	
Tenacity +	210 GA/ha	28 DAP	
Activator 90	0.25%	28 DAP	

*The check plot is the Roundup Pro alone 21 DBP treatment.

**Means followed by the same letter are not significantly different. LSD $P = 0.05$.