

Program with Tenacity for Bentgrass Removal and Overseeding in Spring

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Background/Objective: Will Tenacity eliminate bentgrass when multiple applications are made? Can turf be overseeded while selectively removing bentgrass from a turf site? Are applications best when made prior to seeding or after turf emergence?

Site Information

Location:	Coyote Crossing Golf Course, W Laf IN
Turfgrass Species:	Kentucky bluegrass blend
Turf Condition:	good
Turf Management: Mowing Height cm (in):	10 (4)
Testing on Site Previous Year:	none
Target Pest:	Creeping bentgrass (<i>Agrostis palustris</i>)
Growth Stage:	Mature

Application Information

Application Date:	10 April	27 April	8 May	30 May	11 June
Application Time:	10:00am	11:00am	8:30am	9:45am	10:00am
Air Temperature C°(F°):	5.6 (42)	10.3 (51)	20.5 (69)	27.0 (81)	26.4 (80)
Relative Humidity(%):	48	80	69	60	50
Wind Speed m s⁻¹ (mph):	0.9 (2)	1.3 (3)	1.3 (3)	0.4 (1)	0.4 (1)
Soil Temperature(7.6 cm depth) C°(F°):	5.6 (42)	12.5 (55)	16.1 (61)	20.0 (68)	21.1 (70)
Soil Moisture:	moist	wet	moist	moist	dry
Spray Volume L ha⁻¹ (gal 1000 ft⁻²):	814 (2)				
Spray Pressure:	30psi				
Spray Nozzle:	8001.5				
Spray Equipment:	CO ₂ backpack and shaker bottle				
Irrigation After Application:	None				
Experimental Design:	Randomized complete block				
Replications:	3				
Plot Size m (ft):	1.5 X 1.5 (5 X 5)				

Results:

- This study was designed as a 3 X 5 factorial with 3 seeding treatments and 5 herbicide treatments. When analyzed as a factorial, only herbicides treatments caused significant effects. Therefore, herbicide means are presented in Tables 1-3.
- All Tenacity treatments caused significant phytotoxicity to the creeping bentgrass (Table 1), but there was no phytotoxicity to the Kentucky bluegrass during this study (data not shown).
- All Tenacity treatments reduced creeping bentgrass cover from >50% down to 5% or less by the end of the study, but there were no differences in bentgrass cover among the herbicide treatments (Table 2) .
- Conversely, all Tenacity treatments increased cover of Kentucky bluegrass as expected and there were no differences in bluegrass cover among the herbicide treatments (Table 3).
- The herbicide treatments used in this study are being used in additional studies this fall, next spring, and next fall.
- Seeding Kentucky bluegrass had no effect on Kentucky bluegrass cover, nor did power slitting the plots without seeding.
- The seeding X herbicide means are presented in Tables 4-6 for informational purposes only.

Table 1. Injury^a to bentgrass after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^b	Rate of application	Application timing ^c	8 May	30 May	11 June
	oz ai/A	wks			
Tenacity 4SC	2	+2, 0, -3	6	4	2
Tenacity 4SC	2.5	+2, 0, -3	6	3	2
Tenacity 4SC	2	+2, 0, -3, -5	6	3	1
Tenacity 4SC	2	+4, +2, 0, -3	4	2	1
Check		0	9	9	9
LSD (0.05)			1	1	1

^a Injury was rated on a scale of 1 to 9 with 1 = brown/white turf, and 9 = no injury.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

Table 2. Percent cover of creeping bentgrass^a after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^b	Rate of application	Application timing ^c	27 April	8 May	30 May	11 June	29 June	25 July	7 Sept
	oz ai/A	wks	-----%-----						
Tenacity 4SC	2	+2, 0, -3	58	49	8	4	4	5	5
Tenacity 4SC	2.5	+2, 0, -3	52	48	7	1	2	1	1
Tenacity 4SC	2	+2, 0, -3, -5	57	46	7	3	1	2	1
Tenacity 4SC	2	+4, +2, 0, -3	52	46	5	2	2	2	3
Check		0	59	53	53	49	73	59	53
LSD (0.05)			NS	NS	8	7	6	11	15

^a Percent of the plot area covered by creeping bentgrass.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

Table 3. Percent cover of Kentucky bluegrass^a after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^b	Rate of application	Application timing ^c	27 April	8 May	30 May	11 June	29 June	25 July
	oz ai/A	wks	-----%-----					
Tenacity 4SC	2	+2, 0, -3	50	51	81	85	90	91
Tenacity 4SC	2.5	+2, 0, -3	52	52	81	85	92	95
Tenacity 4SC	2	+2, 0, -3, -5	54	54	81	88	93	95
Tenacity 4SC	2	+4, +2, 0, -3	54	54	80	89	90	94
Check		0	47	46	47	51	27	39
LSD (0.05)			NS	NS	8	9	8	10

^a Percent of the plot area covered by Kentucky bluegrass.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

Table 4. Injury^a to bentgrass after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^{bc}	Rate of application	Application timing ^d	8 May	30 May	11 June
	oz ai/A	wks			
Tenacity 4SC	2	+2, 0, -3	6	4	2
Tenacity 4SC	2.5	+2, 0, -3	6	4	2
Tenacity 4SC	2	+2, 0, -3, -5	6	3	2
Tenacity 4SC	2	+4, +2, 0, -3	4	2	1
Check		0	9	9	9
Tenacity 4SC Slit	2	+2, 0, -3 0	5	4	2
Tenacity 4SC Slit	2.5	+2, 0, -3 0	5	2	1
Tenacity 4SC Slit	2	+2, 0, -3, -5 0	6	3	2
Tenacity 4SC Slit	2	+4, +2, 0, -3 0	4	3	2
Check - Slit		0	9	9	9
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3 0	6	3	2
Tenacity 4SC Slit + seed	2.5 2 ^e	+2, 0, -3 0	6	2	1
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3, -5 0	6	2	1
Tenacity 4SC Slit + seed	2 2 ^e	+4, +2, 0, -3 0	5	2	1
Check - Slit + seed	2 ^e	0	9	9	9
LSD (0.05)			1	2	1

^a Injury was rated on a scale of 1 to 9 with 1 = brown/white turf, and 9 = no injury.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Slit was using Ryan Renothin in one direction over plot area.

^d Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

^e Rate of application was 2 pounds of Kentucky bluegrass seed per thousand square feet.

Table 5. Percent cover of creeping bentgrass^a after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^{bc}	Rate of application	Application timing ^d	27 April	8 May	30 May	11 June	29 June	25 July	7 Sept
	oz ai/A	wks	-----%-----						
Tenacity 4SC	2	+2, 0, -3	55	40	7	5	4	7	5
Tenacity 4SC	2.5	+2, 0, -3	42	43	7	4	2	1	2
Tenacity 4SC	2	+2, 0, -3, -5	57	40	9	5	2	2	2
Tenacity 4SC	2	+4, +2, 0, -3	62	48	5	0	3	1	2
Check		0	65	47	58	52	73	70	57
Tenacity 4SC Slit	2	+2, 0, -3 0	73	57	10	3	3	3	6
Tenacity 4SC Slit	2.5	+2, 0, -3 0	65	52	8	1	2	1	1
Tenacity 4SC Slit	2	+2, 0, -453, -5 0	58	50	6	4	2	3	2
Tenacity 4SC Slit	2	+4, +2, 0, -3 0	45	47	6	3	3	3	4
Check - Slit		0	58	55	55	53	75	68	53
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3 0	45	52	8	5	5	5	4
Tenacity 4SC Slit + seed	2.5 2 ^e	+2, 0, -3 0	50	50	5	0	1	0	1
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3, -5 0	55	48	6	0	1	1	0
Tenacity 4SC Slit + seed	2 2 ^e	+4, +2, 0, -3 0	48	42	6	2	1	1	2
Check - Slit + seed	2 ^e	0	55	58	45	43	73	40	48
LSD (0.05)			NS	NS	14	13	12	18	26

^a Percent of the plot area covered by creeping bentgrass.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Slit was using Ryan Renothin in one direction over plot area.

^d Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

^e Rate of application was 2 pounds of Kentucky bluegrass seed per thousand square feet.

Table 6. Percent cover of Kentucky bluegrass^a after applications of Tenacity to a creeping bentgrass/Kentucky bluegrass rough.

Treatment ^{bc}	Rate of application	Application timing ^d	27 April	8 May	30 May	11 June	29 June	25 July
	oz ai/A	wks	-----%-----					
Tenacity 4SC	2	+2, 0, -3	45	60	83	87	92	87
Tenacity 4SC	2.5	+2, 0, -3	58	57	83	89	96	97
Tenacity 4SC	2	+2, 0, -3, -5	43	60	82	87	93	96
Tenacity 4SC	2	+4, +2, 0, -3	39	52	80	88	88	96
Check		0	35	53	42	48	27	28
Tenacity 4SC Slit	2	+2, 0, -3 0	27	43	75	82	90	92
Tenacity 4SC Slit	2.5	+2, 0, -3 0	35	48	75	78	87	92
Tenacity 4SC Slit	2	+2, 0, -3, -5 0	42	50	82	91	94	94
Tenacity 4SC Slit	2	+4, +2, 0, -3 0	55	53	83	88	92	93
Check - Slit		0	42	45	45	47	25	32
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3 0	55	48	82	87	89	93
Tenacity 4SC Slit + seed	2.5 2 ^e	+2, 0, -3 0	50	50	85	88	92	96
Tenacity 4SC Slit + seed	2 2 ^e	+2, 0, -3, -5 0	45	52	80	86	93	95
Tenacity 4SC Slit + seed	2 2 ^e	+4, +2, 0, -3 0	52	58	80	90	90	93
Check - Slit + seed	2 ^e	0	45	42	55	57	27	58
LSD (0.05)			NS	NS	15	16	13	18

^a Percent of the plot area covered by Kentucky bluegrass.

^b All Tenacity applications contained X-77 spreader at 0.25% v/v.

^c Slit was using Ryan Renothin in one direction over plot area.

^d Application timing was based on seeding with +4 on 10 April, +2 on 27 April, 0 (day of seeding) on 8 May, -3 on 30 May, and -5 on 11 June.

^e Rate of application was 2 pounds of Kentucky bluegrass seed per thousand square feet.