

Timing of MON 44951 Postemergence Application for Yellow Nutsedge Control

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Background/Objective:

Previous trials with MON 44951 have indicated that sedges can be selectively removed from bermudagrass and other warm-season turfgrasses. This study investigated the use of MON 44951 for yellow nutsedge control in cool-season turfgrasses.

Site Information

Location:	William H. Daniel Research and Diagnostic Center, W. Lafayette, IN.
Soil Type:	Starks-Fincastle silt loam
Soil pH:	7.2
Soil Organic Matter (%):	6 %
Turfgrass Species:	Perennial ryegrass
Turf Condition:	Fair
Turf Management: Mowing Height cm (in):	6.25 (2.5)
Fertilization:	3.5 lbs/1000/year
Irrigation:	To prevent moisture stress
Testing on Site Previous Year:	None
Target Pest:	Yellow nutsedge (<i>Cyperus esculentus</i>)
Growth Stage:	3 to 6 leaf

Application Information

Application Date:	17 July	5 Sept
Application Time:	9:30 AM	9:00 AM
Air Temperature C⁰(F⁰):	29.5 (85)	16 (61)
Relative Humidity(%):	41	67
Wind Speed m s⁻¹ (mph):	1.3 (3)	0.9-1.8 (2-4)
Soil Temperature(7.6 cm depth) C⁰(F⁰):	23.9 (75)	17.8 (64)
Soil Moisture:	Moist	Moist
Spray Volume L ha⁻¹ (gal 1000 ft⁻²):	814 (2)	
Spray Pressure:	35psi	
Spray Nozzle:	8001.5	
Spray Equipment:	CO ₂ backpack	
Irrigation After Application:	None	
Experimental Design:	Randomized complete block	
Replications:	3	
Plot Size m (ft):	1.5 X 1.5 (5 X 5)	

Results:

All 17 July applications of MON 44951 caused unacceptable phytotoxicity within 2 weeks of application, especially at the 2 oz/A rate (Table 1). The 10 week application of MON 44951 caused further damage to the perennial ryegrass, regardless of rate. Manage caused some phytotoxicity also, but it was never deemed unacceptable.

The perennial ryegrass in this study was intentionally mismanaged to encourage yellow nutsedge, and thus quality ratings were poor throughout the study (Table 2). However, single applications of MON 44951 at 2.0 oz/A and sequential applications decreased quality significantly compared to Manage, the untreated checks, and single applications of MON 44951 at 1.5 oz/A or lower.

The yellow nutsedge was late-germinating in this area, became visible in early July, and thus the experiment was started in mid-July. All treatments reduced yellow nutsedge, but the 0+10 week applications of MON 44951 did not improve control significantly over the other treatments (Table 3). However, 0.66 oz/A MON44951 had the least control of yellow nutsedge among the MON44951 treatments, and this nutsedge potentially may have recovered if the study was initiated earlier in the summer.

In summary from this study, it appears that single applications of MON 44591 at 0.75 to 1.5 oz/A will provide optimum yellow nutsedge control while minimizing the risk of phytotoxicity and decreased turf quality.

Table 1. Phytotoxicity^a on poorly maintained perennial ryegrass after applications of yellow nutsedge controls.

Treatment	Rate of application	Application timing ^b	24 July	1 Aug	11 Sept	18 Sept
	oz/A					
MON 44951	0.66	0	7.3	6.3	8.7	9.0
NIS	0.25 ^c					
MON 44951	0.75	0	8.3	6.0	9.0	9.0
NIS	0.25 ^c					
MON 44951	1.0	0	8.3	6.3	8.7	9.0
NIS	0.25 ^c					
MON 44951	1.33	0	7.0	5.7	9.0	9.0
NIS	0.25 ^c					
MON 44951	1.5	0	8.0	6.0	9.0	9.0
NIS	0.25 ^c					
MON 44951	2.0	0	5.7	3.0	9.0	9.0
NIS	0.25 ^c					
MON 44951	0.66	0	8.0	7.0	6.0	3.0
NIS	0.25 ^c					
MON 44951	0.66	10				
NIS	0.25 ^c					
MON 44951	1.33	0	6.0	4.7	6.0	3.0
NIS	0.25 ^c					
MON 44951	1.33	10				
NIS	0.25 ^c					
Manage	1.33	0	8.3	8.3	8.7	8.3
NIS	0.25 ^c					
Manage	1.33	0	8.3	8.0	8.0	8.0
NIS	0.25 ^c					
Manage	1.33	10				
NIS	0.25 ^c					
Check			8.3	8.3	9.0	9.0
Check II			8.3	8.0	9.0	9.0
LSD (0.05)			NS	1.8	1.1	0.9

^a Phytotoxicity was rated on a scale of 1 to 9 where 1 = completely brown turf, 7 = acceptable damage, and 9 = no phytotoxicity.

^b The 0 week application was 17 July and the 10 week application was 5 September.

^c Rate of application was percent volume per volume.

Table 2. Quality^a of poorly maintained perennial ryegrass after applications of yellow nutsedge controls.

Treatment	Rate of application	Application timing ^b	15 Aug	28 Aug	25 Sept
	oz/A				
MON 44951	0.66	0	5.7	6.3	5.3
NIS	0.25 ^c				
MON 44951	0.75	0	5.7	6.7	6.3
NIS	0.25 ^c				
MON 44951	1.0	0	5.3	5.7	5.7
NIS	0.25 ^c				
MON 44951	1.33	0	5.3	5.3	5.7
NIS	0.25 ^c				
MON 44951	1.5	0	5.3	6.3	5.7
NIS	0.25 ^c				
MON 44951	2.0	0	2.7	2.7	3.3
NIS	0.25 ^c				
MON 44951	0.66	0	5.7	6.0	2.7
NIS	0.25 ^c				
MON 44951	0.66	10			
NIS	0.25 ^c				
MON 44951	1.33	0	4.0	4.0	2.0
NIS	0.25 ^c				
MON 44951	1.33	10			
NIS	0.25 ^c				
Manage	1.33	0	6.0	6.7	5.0
NIS	0.25 ^c				
Manage	1.33	0	5.7	6.3	4.7
NIS	0.25 ^c				
Manage	1.33	10			
NIS	0.25 ^c				
Check			6.0	6.7	5.7
Check II			6.0	7.0	6.0
LSD (0.05)			1.0	1.1	0.9

^a Quality was rated on a scale of 1 to 9 where 1 = no turf, 5 = acceptable turf, and 9 = ideal turf.

^b The 0 week application was 17 July and the 10 week application was 5 September.

^c Rate of application was percent volume per volume.

Table 3. Yellow nutsedge plants^a in poorly maintained perennial ryegrass after applications of yellow nutsedge controls.

Treatment	Rate of application oz/A	Application timing ^b	5 Aug	15 Aug	28 Aug	12 Sept
MON 44951	0.66	0	0.3	2.0	5.3	4.0
NIS	0.25 ^c					
MON 44951	0.75	0	0.7	0.0	3.3	0.7
NIS	0.25 ^c					
MON 44951	1.0	0	0.0	0.0	1.3	0.7
NIS	0.25 ^c					
MON 44951	1.33	0	0.0	0.0	0.7	0.0
NIS	0.25 ^c					
MON 44951	1.5	0	0.0	0.7	1.3	1.3
NIS	0.25 ^c					
MON 44951	2.0	0	0.0	0.0	0.3	0.7
NIS	0.25 ^c					
MON 44951	0.66	0	0.7	3.7	12.0	9.0
NIS	0.25 ^c					
MON 44951	0.66	10				
NIS	0.25 ^c					
MON 44951	1.33	0	0.0	0.3	2.3	3.3
NIS	0.25 ^c					
MON 44951	1.33	10				
NIS	0.25 ^c					
Manage	1.33	0	1.0	1.3	1.0	0.3
NIS	0.25 ^c					
Manage	1.33	0	0.3	0.0	1.0	0.3
NIS	0.25 ^c					
Manage	1.33	10				
NIS	0.25 ^c					
Check			21.7	16.7	31.7	22.3
Check II			25.7	23.7	40.3	45.3
LSD (0.05)			9.5	4.0	14.3	9.6

^a Number of green yellow sedge plants/plot clearly visible above the turf canopy.

^b The 0 week application was 17 July and the 10 week application was 5 September.

^c Rate of application was percent volume per volume.