

Efficacy of Mesotrione on Crabgrass

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Background/Objective:

Evaluate the efficacy and turf safety of a mesotrione/Barricade tank mix on crabgrass.

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 (%):	
Turfgrass Species:	Kentucky bluegrass
Turf Condition:	Fair
Turf Management: Mowing Height cm (in):	6.25 (2.5)
Fertilization:	143 kg N/ha/yr (3 lbs/1000 ft ² /yr)
Irrigation:	To prevent moisture stress
Testing on Site Previous Year:	None
Target Pest:	<i>Digitaria</i> sp (crabgrass)
Growth Stage:	Various

Application Information

Application Date:	16 April	7 July	17 July
Application Time:	8:00 am	9:00 am	9:30 am
Air Temperature C⁰(F⁰):	24.4 (76)	27.5 (82)	29.5 (85)
Relative Humidity(%):	34	77	41
Wind Speed m s⁻¹ (mph):	3.6 (8)	1.3 (3)	1.3 (3)
Soil Temperature(7.6 cm depth) C⁰(F⁰):	10.6 (51)	25.6 (78)	23.9 (75)
Soil Moisture:	Dry	Wet	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:

No treatments caused noticeable phytotoxicity to the Kentucky bluegrass at any time during the experiment (Table 1). All mesotrione/Barricade treatments reduced crabgrass cover significantly (Table 2). Though there were almost no significant differences in crabgrass cover among the mesotrione/Barricade treatments, a number of conclusions can be drawn:

- There's no benefit to adding mesotrione to Barricade as a strictly preemergence application.
- Single applications of mesotrione at either the 1-3 leaf or 1-2 tiller stage reduced crabgrass cover compared to the check, but this control will likely not be commercially acceptable season long.
- With a single application of mesotrione/Barricade tankmix at 1-3 leaf, 210 g ai/ha mesotrione appears to be the minimum rate for most effective crabgrass control.
- A single application of mesotrione (210 g ai/ha)/Barricade tankmix at 1-3 leaf will provide season long control of crabgrass.
- If sequential applications of mesotrione/Barricade tankmix will be used, the mesotrione rate can be reduced to 140 g ai/ha.
- Sequential applications of mesotrione at 210 g ai/ha applied at 1-3 leaf and again at 1-2 tiller provided 0% crabgrass cover. Thus Barricade would not be needed in either the first and/or second application.

Mesotrione appears to be extremely promising for postemergence crabgrass control while being safe on Kentucky bluegrass.

Table 1. Phytotoxicity^a to Kentucky bluegrass

Treatment	Rate of application	Growth stage	18 April	23 April	18 July	22 July	25 July	1 Aug	15 Aug
	g a.i./ha								
Barricade 4FL (480 g/L)	730	Pre ^d	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Mesotrione (480 g/L)	210	Pre ^d	9.0	9.0	9.0	9.0	9.0	8.7	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Barricade 4FL (480 g/L)	730	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
NIS	0.25 ^b								
Mesotrione (480 g/L)	70	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	140	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	140	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	140	1 - 2 tiller							
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 2 tiller							
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Barricade 4FL (480 g/L)	730	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
NIS	0.25 ^b								
Mesotrione (480 g/L)	280	1 - 2 tiller							
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 2 tiller							
NIS	0.25 ^b								
Mesotrione (480 g/L)	140	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	140	1 - 2 tiller							
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 3 leaf	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Barricade 4FL (480 g/L)	730								
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 2 tiller							
NIS	0.25 ^b								
Mesotrione (480 g/L)	210	1 - 2 tiller	9.0	9.0	9.0	9.0	8.7	9.0	9.0
NIS	0.25 ^b								
Drive 75DF	1 ^c	1 - 2 tiller	9.0	9.0	8.7	9.0	9.0	9.0	9.0
Mesotrione (480 g/L)	1 ^b								
Check			9.0	9.0	9.0	9.0	9.0	9.0	9.0
LSD (0.05)			NS	NS	NS	NS	0.5	0.5	NS

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

^b Rate of application was percent volume per volume.

^c Rate of application was pounds of product/acre.

^d Application dates: Pre= 16 Apr; 1 - 3 leaf= 27 June; and 1 - 2 tiller = 17 July.

Table 2. Percent^a crabgrass cover

Treatment	Rate of application	Growth stage	18 July	25 July	1 Aug	15 Aug	30 Aug
	g a.i./ha						
Barricade 4FL (480 g/L)	730	Pre ^d	0.0	0.0	1.0	1.3	2.7
Mesotrione (480 g/L)	210	Pre ^d	0.0	0.0	0.3	1.0	1.0
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Barricade 4FL (480 g/L)	730	1 - 3 leaf	4.0	3.3	6.0	6.7	5.0
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 3 leaf	1.3	0.3	1.0	4.0	4.3
NIS	0.25 ^b						
Mesotrione (480 g/L)	70	1 - 3 leaf	3.3	2.3	3.0	6.0	4.0
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	140	1 - 3 leaf	2.0	0.3	1.0	3.3	3.7
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 3 leaf	0.7	1.0	0.0	0.7	0.3
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	140	1 - 3 leaf	1.3	0.0	0.0	0.0	0.0
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	140	1 - 2 tiller					
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 3 leaf	1.3	0.0	0.0	0.0	0.0
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 2 tiller					
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Barricade 4FL (480 g/L)	730	1 - 3 leaf	8.7	3.0	1.0	0.0	0.0
NIS	0.25 ^b						
Mesotrione (480 g/L)	280	1 - 2 tiller					
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 3 leaf	0.7	0.0	0.0	0.0	0.0
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 2 tiller					
NIS	0.25 ^b						
Mesotrione (480 g/L)	140	1 - 3 leaf	1.0	0.0	0.0	0.0	0.7
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	140	1 - 2 tiller					
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 3 leaf	1.0	0.0	0.0	0.0	0.0
Barricade 4FL (480 g/L)	730						
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 2 tiller					
NIS	0.25 ^b						
Mesotrione (480 g/L)	210	1 - 2 tiller	5.3	3.7	2.7	3.3	5.7
NIS	0.25 ^b						
Drive 75DF	1 ^c	1 - 2 tiller	7.3	1.7	2.3	8.7	7.7
MSO	1 ^b						
Check			6.0	7.7	11.7	25.0	18.3
LSD (0.05)			5.4	2.3	2.2	4.2	4.5

^a Percent cover visually estimated.

^b Rate of application was percent volume per volume.

^c Rate of application was pounds of product/acre.

^d Application dates: Pre= 16 Apr; 1 - 3 leaf= 27 June; and 1 - 2 tiller =17 July.