

2017 Weed Management Options in Coreopsis Plantings (Rowan County)

Introduction

It is a challenge to successfully establish and maintain pollinator / wildflower plots. Oftentimes, these plantings are primarily perennial plants and, due to establishment problems, sometimes these plantings fail. Questions of how to salvage or improve a previously established pollinator/wildflower stand are common. The objective of this study was to evaluate selective herbicides and herbicide combinations to help with establishing, salvaging or improving pollinator/wildflower plantings.

Materials and Methods

The study was established June 27, 2017 at an interchange near Morehead, KY on a planting of coreopsis. There were unusually dry and warm conditions in February at this location when the area was disked and the coreopsis seed was broadcast. This resulted in a poor and uneven stand with other plant species invading the open space. The recommended coreopsis planting time is in the spring (April or May) after a burndown treatment to control emerged weeds. The trial was established later than ideal. The trial had 10 treatments replicated 3 times each arranged in a randomized complete block design with 10 ft by 30 ft plots. Herbicide applications were made at 30 gallons per acre carrier volume and included a surfactant (Activator 90), except for Treatment 9 (Table 1). Some plants may suffer phytotoxicity from including a surfactant which is why Dual was tested with and without surfactant. At the time of first application, the coreopsis was 18 inches tall if flowering and 10 inches if not flowering. Red clover was flowering 15 inches tall, the foxtails were 6 inches tall and ragweed was 12 inches tall and buckhorn plantain was 8 inches tall. The maximum height for good control of yellow foxtail is stated as 4 inches on the Plateau label. The second application of Fusilade (Treatments 2 and 5) was late and made on September 19, 2017.

The plots were mowed in the fall of 2017 and reseeded in 2018 with the KYTC pollinator mix. The stand was still very poor and the plots were rated once. Plots were rated for coreopsis and clover damage plus ragweed and yellow foxtail control 21 (7/18/2017) days after initial treatment (DAIT). They were assessed for % cover of coreopsis, clover, ragweed, wild carrot, and yellow foxtail 50 (8/16/2017), and 87 (9/22/2017) DAIT in 2017. The coreopsis plants had been damaged by frost before the last visit October 22 and the annual grasses were already brown so there was nothing left to rate. In 2018, they were rated for % cover of coreopsis, clover, wild carrot, and yellow foxtail 338 (5/31/2018) DAIT. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at $p = 0.05$.

Results and Discussion

At the first rating there were a few coreopsis plants with foliar damage 21 DAIT (Table 2). Coreopsis plants treated with Plateau were smaller (stunted) than untreated plants (Figure 1). There was no damage from surfactant evident on the plants when comparing treatments 8 and 9 (Dual Magnum with and without surfactant). The Plateau treatments (3 – 5) were effective against red clover and ragweed (60-73% clover damage and 27-35% ragweed control).

Treatments 1 to 7 damaged yellow foxtail when applied post-emergence. Yellow foxtail emergence normally begins at the end of corn planting season (May 15). Using growing degree days (GDD) and a base temperature of 48F, one would expect 10% of final yellow foxtail total emergence at 250-400 GDD (*Weed Emergence Sequence: Knowledge to guide scouting and control, Iowa State University IPM-64*). Yellow foxtail has a medium length of germination period. Most foxtail plants would have already emerged by the first application so no benefit from pre-emerge herbicides would have been seen.

The vegetation composition varied between plots and was quite variable for the different species and, in many cases, were difficult to relate to treatments. Treatments 1 and 2 had both only received one application of Fusilade but had 30% and 10% clover cover and 10% vs 40% yellow foxtail cover 50 DAIT (Table 3). This is one of the challenges of conducting research in these situations.

Later in the season (87 DAIT), there was more coreopsis cover visible over other species (Table 4). There was less visible clover cover than earlier in the season as other species dominated. There were no evident treatment effects or benefits.

In the following spring after the plots were replanted (338 DAIT), the residual effects of the Plateau treatments were still evident (Table 5). There was less clover cover as well as less wild carrot with these treatments (3-5). These same treatments had lots of yellow foxtail cover. Treatments that would not harm established broadleaves (like clover) allowed them to compete more effectively against the annual grasses. There was more clover and wild carrot in those plots (Treatments 1 and 2 plus 6 to 9).

This trial gave us an opportunity to evaluate some options to “rescue” a planting that was a single species and was Plateau tolerant. However, timely (earlier, pre-emerge) treatments may have helped more than the ones applied. In short, rescue efforts did not appear to be effective.

Non-Crop and Invasive Vegetation Management Weed Science
2017 Annual Research Report

Table 1. Herbicide treatments, active ingredients, and application rates.

Trt. No.	Product Name	Rate	Rate Unit	Application Time	Active Ingredient(s)	ai Application Rates
1	Fusilade II	24	FL OZ/A	A	fluazifop	6 OZ/A
2	Fusilade II	24	FL OZ/A	A	fluazifop	6 OZ/A
	Fusilade II	24	FL OZ/A	B	fluazifop	6 OZ/A
3	Plateau	4	FL OZ/A	A	imazapic	1 OZ AE/A
4	Plateau	4	FL OZ/A	A	imazapic	1 OZ AE/A
	Pendulum Aquacap	4	PT/A		pendimethalin	1.9 LB/A
5	Plateau	4	FL OZ/A	A	imazapic	1 OZ AE/A
	Pendulum Aquacap	4	PT/A		pendimethalin	1.9 LB/A
	Fusilade II	24	FL OZ/A	B	fluazifop	6 OZ/A
6	Fusilade II	24	FL OZ/A	A	fluazifop	6 OZ/A
	Pendulum Aquacap	4	PT/A		pendimethalin	1.9 LB/A
7	Fusilade II	24	FL OZ/A	A	fluazifop	6 OZ/A
	Dual Magnum	1.33	PT/A		s-metolachlor	1.3 LB/A
8	Dual Magnum	1.33	PT/A	A	s-metolachlor	1.3 LB/A
9*	Dual Magnum	1.33	PT/A	A	s-metolachlor	1.3 LB/A
10	Nontreated Check					

All herbicide treatments (except Trt. #9) contained the adjuvant, Activator 90 at 0.25% v/v.

Application dates: June 27 and September 19, 2017

Non-Crop and Invasive Vegetation Management Weed Science
2017 Annual Research Report

Table 2. Herbicide treatments, application rates, and results 21 Days After Initial Treatment (DAIT¹).

Trt. No.	Product Name	Rate	Rate Unit	Application Time	Coreopsis Damage (%)	Clover Damage (%)	Ragweed Control (%)	Yellow Foxtail Control (%)
					21 DAIT			
1	Fusilade II	24	FL OZ/A	A	0 b ²	10 b	10 bc	42 b
2	Fusilade II	24	FL OZ/A	A	0 b	10 b	10 bc	42 b
	Fusilade II	24	FL OZ/A	B				
3	Plateau	4	FL OZ/A	A	10 a	73 a	27 ab	53 ab
4	Plateau	4	FL OZ/A	A	0 b	60 a	30 a	65 a
	Pendulum Aquacap	4	PT/A					
5	Plateau	4	FL OZ/A	A	0 b	70 a	35 a	62 ab
	Pendulum Aquacap	4	PT/A					
	Fusilade II	24	FL OZ/A					
6	Fusilade II	24	FL OZ/A	A	0 b	0 b	3 c	57 ab
	Pendulum Aquacap	4	PT/A					
7	Fusilade II Dual Magnum	24 1.33	FL OZ/A PT/A	A	0 b	0 b	3 c	60 ab
8	Dual Magnum	1.33	PT/A	A	0 b	0 b	0 c	5 c
9*	Dual Magnum	1.33	PT/A	A	0 b	1 b	7 c	7 c
10	Nontreated Check				0 b	0 b	0 c	0 c

All herbicide treatments (except Trt. #9) contained the adjuvant, Activator 90 at 0.25% v/v.
Application dates: June 27 and September 19, 2017

¹ DAIT = Days after initial treatment

² Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

Non-Crop and Invasive Vegetation Management Weed Science
2017 Annual Research Report

Table 3. Herbicide treatments, application rates, and results 50 Days After Initial Treatment (DAIT¹).

Trt. No.	Product Name	Rate	Rate Unit	Application Time	Coreopsis Cover (%)	Clover Cover (%)	Ragweed Cover (%)	Wild Carrot Cover (%)	Yellow Foxtail Cover (%)
					50 DAIT				
1	Fusilade II	24	FL OZ/A	A	17	30 a ²	10 b	33 a	10 b
2	Fusilade II	24	FL OZ/A	A	7	10 b	26 ab	17 abc	40 ab
	Fusilade II	24	FL OZ/A	B					
3	Plateau	4	FL OZ/A	A	5	10 b	7 b	5 bc	73 a
4	Plateau	4	FL OZ/A	A	10	20 ab	16 ab	2 c	52 a
	Pendulum Aquacap	4	PT/A						
5	Plateau	4	FL OZ/A	A	17	9 b	13 b	23 abc	38 ab
	Pendulum Aquacap	4	PT/A						
	Fusilade II	24	FL OZ/A	B					
6	Fusilade II	24	FL OZ/A	A	15	17 ab	43 a	13 abc	12 b
	Pendulum Aquacap	4	PT/A						
7	Fusilade II Dual Magnum	24 1.33	FL OZ/A PT/A	A	10	12 b	45 a	23 abc	13 b
8	Dual Magnum	1.33	PT/A	A	3	12 b	12 b	17 abc	57 a
9*	Dual Magnum	1.33	PT/A	A	8	15 ab	7 b	17 abc	53 a
10	Nontreated Check				2	8 b	3 b	30 ab	57 a

All herbicide treatments (except Trt. #9) contained the adjuvant, Activator 90 at 0.25% v/v.
Application dates: June 27 and September 19, 2017

¹ DAIT = Days after initial treatment

² Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

Non-Crop and Invasive Vegetation Management Weed Science
2017 Annual Research Report

Table 4. Herbicide treatments, application rates, and results 87 Days After Initial Treatment (DAIT¹).

Trt. No.	Product Name	Rate	Rate Unit	Application Time	Coreopsis Cover (%)	Clover Cover (%)	Ragweed Cover (%)	Wild Carrot Cover (%)	Yellow Foxtail Cover (%)
					87 DAIT (3 DAT)				
1	Fusilade II	24	FL OZ/A	A	30	10	22 bc ²	35 a	3 d
2	Fusilade II	24	FL OZ/A	A	18	0	35 abc	15 bcd	32 abc
	Fusilade II	24	FL OZ/A	B					
3	Plateau	4	FL OZ/A	A	22	0	10 c	23 abc	37 abc
4	Plateau	4	FL OZ/A	A	23	10	23 abc	7 cd	37 abc
	Pendulum Aquacap	4	PT/A						
5	Plateau	4	FL OZ/A	A	28	3	17 bc	25 ab	27 bcd
	Pendulum Aquacap	4	PT/A						
	Fusilade II	24	FL OZ/A	B					
6	Fusilade II	24	FL OZ/A	A	18	7	53 a	5 d	13 cd
	Pendulum Aquacap	4	PT/A						
7	Fusilade II Dual Magnum	24 1.33	FL OZ/A PT/A	A	18	3	47 ab	22 abcd	10 cd
8	Dual Magnum	1.33	PT/A	A	8	0	33 abc	12 bcd	47 ab
9*	Dual Magnum	1.33	PT/A	A	22	0	12 c	10 bcd	57 a
10	Nontreated Check				27	7	12 c	23 abc	32 abc

All herbicide treatments (except Trt. #9) contained the adjuvant, Activator 90 at 0.25% v/v.
Application dates: June 27 and September 19, 2017

¹ DAIT = Days after initial treatment

² Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

Non-Crop and Invasive Vegetation Management Weed Science
2017 Annual Research Report

Table 5. Herbicide treatments, application rates, and results 338 Days After Initial Treatment (DAIT¹).

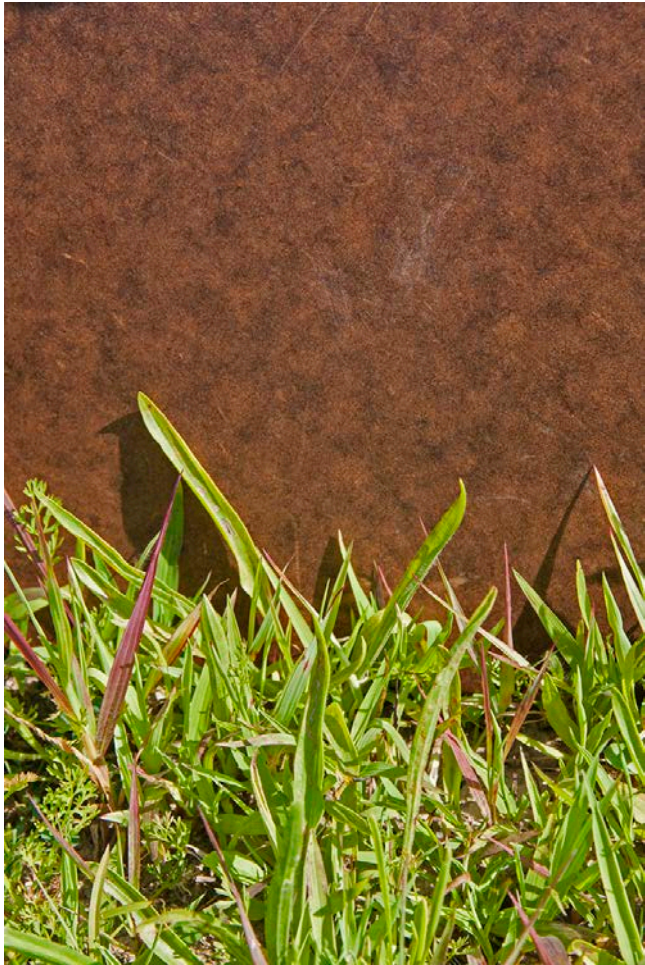
Trt. No.	Product Name	Rate	Rate Unit	Application Code	Coreopsis Cover (%)	Clover Cover (%)	Wild Carrot Cover (%)	Yellow Foxtail Cover (%)
					338 DAIT (254 DAT)			
1	Fusilade II	24	FL OZ/A	A	4 a ²	27 ab	18 a	20 b
2	Fusilade II	24	FL OZ/A	A	3 ab	16 ab	11 ab	30 ab
	Fusilade II	24	FL OZ/A	B				
3	Plateau	4	FL OZ/A	A	0 c	2 b	3 b	60 a
4	Plateau	4	FL OZ/A	A	0 c	0 b	2 b	58 a
	Pendulum Aquacap	4	PT/A					
5	Plateau	4	FL OZ/A	A	0 c	1 b	3 b	58 a
	Pendulum Aquacap	4	PT/A					
	Fusilade II	24	FL OZ/A	B				
6	Fusilade II	24	FL OZ/A	A	1 bc	27 ab	7 ab	27 ab
	Pendulum Aquacap	4	PT/A					
7	Fusilade II	24	FL OZ/A	A	2 ab	40 a	8 ab	17 b
	Dual Magnum	1.33	PT/A					
8	Dual Magnum	1.33	PT/A	A	1 bc	47 a	12 ab	18 b
9*	Dual Magnum	1.33	PT/A	A	1 bc	28 ab	4 b	18 b
10	Nontreated Check				1 bc	42 a	13 ab	12 b

All herbicide treatments (except Trt. #9) contained the adjuvant, Activator 90 at 0.25% v/v.
Application dates: June 27 and September 19, 2017

¹ DAIT = Days after initial treatment

² Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

Figure 1. Examples of Plateau treated (stunted) (A) and untreated coreopsis (B) plants 21 Days After Treatment (DAT)



A



B