

Foxtail control in spring wheat with three application times at Rosemount, MN - 2019. Durgan, Beverly R., Douglas W. Miller, Ryan Mentz, McKenzie Barth and Lewis Sheaffer. This experiment was designed to evaluate foxtail control with several herbicides applied at three different foxtail stages. The experiment was conducted at Rosemount, MN on a Waukegon silt loam soil (5% sand, 53% silt, 42% clay) with pH 5.4 and 4.3% organic matter. Soil test for P and K were 40 lbs/A and 214 lbs/A, respectively. Following soybeans, the experimental area was fall chisel plowed. On April 25, the area was tilled with a field cultivator. On April 29, the area was fertilized with 70 lbs/A N, 120 lbs/A P, and 120 lbs/A K and field cultivated. The area was field cultivated on May 6 and 'Linkert' hard red spring wheat was seeded with a 12 foot wide drill at 120 lbs/A. Broadleaf weeds were controlled with an application of bromoxynil + MCPA ester (0.375 lb ai/A + 0.375 lb ae/A) on June 10. The experimental design was a randomized complete block with three replications. Plot size was 10 by 24 ft. All herbicide treatments were applied to a 6 foot wide strip with a backpack type CO₂ powered sprayer delivering 10 gpa at 35 psi using 11001 flat fan nozzles with 18 inch spacing. Target application stages were 1 leaf, 3-4 leaf, and 5-6 leaf foxtail. Application data and environmental conditions are listed below. Weed control and wheat injury were visually rated. Yields were determined by harvesting a 5.74 X 24 foot strip in the treated area with a small plot combine. Foxtail emergence was monitored weekly in 1 ft² quadrants in the weedy check plots.

Treatment Date	May 20	June 3	June 17
<u>Foxtail (giant 80-85% and yellow 15-20%)</u>			
leaf stage	90%-1 lf, 10%-2 lf	25%-1 lf, 40%-2 lf, 25%-3 lf, 10%-4 lf	15%-3 lf, 20%-4 lf, 35%-5 lf, 25%-6 lf, 5%-7 lf
height (inch)	0.25-0.75	0.25-3	1-11
density (#/ft ²)	7	17	40
<u>Wheat</u>			
stage (Haun)	1.0-1.6 leaf (Zadoks Z10-11)	3.3-3.9 leaf (Zadoks Z13, Z20-22)	6.2-7.0 (Zadoks Z16, Z20-23)
tillers	0	0-2	0-3
height (inch)	2-4	4-7	9-12
Air temperature (°F)	60	68	62
Relative humidity (%)	41	48	96
Dewpoint (°F)	36	48	61
Sky	20% clouds	50% clouds	100% clouds
Wind	NE 2-8 mph	SSE 3-6 mph	S 4 mph
Soil conditions	moist	moist at 0.5"	moist at 1"
Soil temperature (°F)	54	79	64
Rainfall before Application			
Week 1 (inch)	2.15	1.56	0.20
Rainfall after Application			
Week 1 (inch)	2.48	1.05	0.83
Week 2 (inch)	0.00	0.20	2.89

Results

Giant (80-85%) and yellow (15-20%) foxtail densities averaged 40/ft² and were the primary target weeds in this experiment. Foxtail density was variable throughout the experimental area. Woolly cupgrass was also present and populations were highly variable with an average density of 16/ft² on June 3.

18% of foxtail had emerged by the first application date on May 20. 43% had emerged by the second application date on June 3. 100% of the foxtail had emerged by June 10, one week prior to the final application date. Woolly cupgrass densities were only recorded on June 3 when the average was 16/ft². Woolly cupgrass has been observed to emerge over an extended (later) period than foxtail species at this experimental location. However woolly cupgrass densities were not monitored on a weekly basis and total density was not recorded later in the growing season. Foxtail and woolly cupgrass control were rated together on June 28 and July 19 and separately on July 27.

At the early (June 28) rating date, combined grass control was highest among treatments applied at the first application timing and lowest for those applied at the third timing. By the July 19 rating date, combined grass control was highest among treatments applied at the third application timing and lowest for those applied at the first timing. At the late (July 27) rating date, average foxtail control was highest for treatments applied at the second or third application timing and significantly higher than the average of those applied at the first application timing. Average woolly cupgrass control on July 27 was highest for treatments applied at the third application timing, followed by the second application timing, and

lowest for those applied at the first timing, however those averages were not significantly different due to high variability. Later emerging grasses would most likely explain these trends in average control between application dates.

Differences between individual herbicide treatments within or between application timings were generally not significant due to high variability. Slight wheat injury symptoms were observed on the June 28 rating date. Average wheat yields did not differ between application timings and there were no significant differences between individual herbicide treatments or the weedy check.

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Treatment	Rate (Product/A)	Control				Wheat Injury 6/28 (%)	Wheat Yield (Bu/A)
		Foxtail + Wocg		Foxtail	Wocg		
		6/28 (%)	7/19 (%)	7/27 (%)	7/27 (%)		
Application #1 (May 20)							
Everest 3.0 + Widematch + MCPA ester + Preference + AMS	2 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	92	80	82	63	2	31
GoldSky + Widematch + MCPA ester + Preference + AMS	1 pt + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	83	80	83	60	3	31
Varro + Widematch + MCPA ester + Preference + AMS	6.85 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	90	60	73	47	2	30
Rimfire Max + Widematch + MCPA ester+ Destiny HC	3 oz + 1 pt + 0.5 pt + 0.75 pt	90	67	67	50	5	29
Axial XL+ Widematch + MCPA ester	16.4 oz+ 1 pt + 0.5 pt	93	77	80	75	5	30
Wolverive Advanced	27.4 oz	92	43	57	43	0	30
Huskie Complete	13.7 oz	92	63	70	53	2	32
PerfectMatch + Activator 90 + AMS	1 pt + 6.4 oz + 3.5 pt	93	80	77	67	3	31
Axial Bold+ Widematch + MCPA ester	15 oz+ 1 pt + 0.5 pt	90	70	77	65	5	33
Application Date Mean *		91 a	69 b	74 b	58 a	3 a	31 a
Application #2 (June 3)							
Everest 3.0 + Widematch + MCPA ester + Preference + AMS	2 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	87	90	90	90	2	32
GoldSky + Widematch + MCPA ester + Preference + AMS	1 pt + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	90	63	77	60	2	32
Varro + Widematch + MCPA ester + Preference + AMS	6.85 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	83	67	77	63	5	33
Rimfire Max + Widematch + MCPA ester+ Destiny HC	3 oz + 1 pt + 0.5 pt + 0.75 pt	85	47	83	47	7	31
Axial XL+ Widematch + MCPA ester	16.4 oz+ 1 pt + 0.5 pt	92	90	90	87	5	32
Wolverive Advanced	27.4 oz	92	90	90	87	3	35
Huskie Complete	13.7 oz	92	63	73	53	0	29
PerfectMatch + Activator 90 + AMS	1 pt + 6.4 oz + 3.5 pt	85	43	67	40	5	31
Axial Bold+ Widematch + MCPA ester	15 oz+ 1 pt + 0.5 pt	93	92	82	70	0	35
Application Date Mean *		89 ab	72 ab	81 a	66 a	3 a	32 a
Application #3 (June 17)							
Everest 3.0 + Widematch + MCPA ester + Preference + AMS	2 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	88	77	87	77	7	35
GoldSky + Widematch + MCPA ester + Preference + AMS	1 pt + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	88	88	85	83	5	32
Varro + Widematch + MCPA ester + Preference + AMS	6.85 oz + 1 pt + 0.5 pt + 3.2 oz + 2.35 pt	83	90	80	72	7	33
Rimfire Max + Widematch + MCPA ester+ Destiny HC	3 oz + 1 pt + 0.5 pt + 0.75 pt	82	37	70	47	8	31
Axial XL+ Widematch + MCPA ester	16.4 oz+ 1 pt + 0.5 pt	80	90	90	85	3	31
Wolverive Advanced	27.4 oz	92	93	85	73	7	33
Huskie Complete	13.7 oz	85	83	83	70	2	31
PerfectMatch + Activator 90 + AMS	1 pt + 6.4 oz + 3.5 pt	80	83	77	57	10	28
Axial Bold+ Widematch + MCPA ester	15 oz+ 1 pt + 0.5 pt	93	88	88	75	0	32
Application Date Mean *		86 b	81 a	83 a	71 a	5 a	32 a
Weedy Check	--	--	--	--	--	0	25
LSD (0.05) **		ns	30.6	ns	ns	ns	ns

Everest 3.0 1.75SC = flucarbazone-sodium & cloquintacet (safener).

Widematch 1.5E = clopyralid (0.75 lb ae/gal) & fluroxypyr (0.75 lb ae/gal).

MCPA Ester 4E.

Preference = nonionic surfactant.

AMS = N-PaK AMS = 34% ammonium sulfate solution (3.4 lbs ammonium sulfate/gal).

GoldSky 0.84L = pyroxsulam (0.11 lb ai/gal) & fluroxypyr (0.71 lb ae/gal) & florasulam (0.018 lb ai/gal).

Varro 0.083OD = thiencazabone-methyl & safener.

Rimfire Max 6.67WDG = propoxycarbazone-sodium (4.76%) & mesosulfuron-methyl (1.91%).

Destiny HC = methylated soybean oil, high fructose corn syrup, sorbitan fatty acid esters.

Axial XL 0.42EC = pinoxaden and adigor adjuvant.

Wolverine Advanced 1.58E = fenoxaprop-p-ethyl (0.40 lb ai/gal) & pyrasulfotole (0.13 lb ai/gal) & bromoxynil (1.05 lb ai/gal).

Huskie Complete 1.76L = thiencazabone-methyl (0.042 lb ai/gal) & pyrasulfotole (0.26 lb ai/gal) & bromoxynil phenol equivalent (1.46 lb ai/gal).

PerfectMatch 1.61SE = clopyralid (0.75 lb ae/gal) & fluroxypyr (0.75 lb ae/gal) & pyroxsulam (0.11 lb ai/gal).

Activator 90 = nonionic surfactant.

Axial Bold 0.685EC = pinoxaden (0.457 lb/gal) & fenoxaprop-p-ethyl (0.228 lb/gal).

* Application date means followed by same letter are not significantly different as determined by factorial anova (P=0.05, LSD).

** LSD for comparing all herbicide treatment means.