

A close-up photograph of a wheat field. The wheat stalks are golden-brown and mature, with some heads visible. In the rows between the wheat, there are several green, leafy weeds growing. The background is slightly blurred, showing more of the field under bright, natural light.

No-till Weed Research in Southwest North Dakota in 2021

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Environmental Conditions

- Winter through April: Dry
 - Crops planted early due to dry conditions
 - Mostly planted into dry soil with hope for rain to germinate seed
 - Few weeds emerged prior to planting
 - Most fields didn't require burndown at planting
 - Good time to make use of PRE herbicides
 - Rain needed for crop seed germination and activation of herbicides
 - Weed seed waiting for rain (enforced dormancy)

Environmental Conditions

- May: Wetter than average (nearly 5 inches of rain; normal is 2.5 inches)
 - Crops emerged with weeds
 - Rainfall needed for crop seed germination also needed for weed seed germination
 - Quick emerging crops (small grains, canola) had advantage compared with slower emerging crop (peas)
 - PRE herbicides activated
 - Good weed control due to more than enough rainfall for activation
 - Activation occurred prior to weed seed germination
 - Increased risk for crop injury (too much rain?)

Environmental Conditions

- June and July: Hot and Dry
 - Difficult to control drought stressed weeds
 - Less herbicide uptake due to thicker cuticles on leaves
 - Systemic herbicides were less effective than normal
 - Less movement (translocation) of herbicides within plants
 - Slowed growth of plants equals less injury from growth regulating herbicides
 - Reduced control of grasses with grass herbicides (Group 1)
 - Higher rates of herbicides needed for control
 - Contact herbicides better but not always consistent in control
 - Less absorption of herbicide (need for adjuvants)
 - Oil-based formulations (esters and ECs) more consistent than dry or water based herbicides
 - Fewer weeds emerged during summer months
 - Late-emerging weeds lacked soil moisture and died due to drought stress
 - Less drought tolerant weeds died due to low soil moisture
 - More drought tolerant weeds (kochia, Russian thistle, field bindweed) reduced in growth but able to survive and wait for late-summer rains (post-harvest infestations)

POST Kochia Control in Spring Wheat

Objective: compare various options for postemergence control of kochia and other weeds in spring wheat

- Wheat was planted on April 28, 2021 (emerged May 12)
 - Plots were 10 by 40 feet with 4 replications of each treatment
- Herbicide treatments applied on June 2
 - Applied using tractor-mounted research sprayer (10 gallons per acre)
 - Wheat was beginning to tiller
 - Kochia was 3 inches in height
- Evaluated at 2, 3, and 7 weeks after treatment application
- Harvested on July 27 (8 weeks after application)
- Environmental conditions:
 - Rainfall in May was 4.77 inches
 - Rainfall in June and July was 1.7 inches
 - Above average temperatures in June and July
 - Drought stress to crops and weeds

POST Kochia Control in Spring Wheat

Herbicide treatment	Active ingredient(s)	Rate (oz/A)
1 Untreated		
2 Starane Ultra	fluroxypyr	5.3
3 OpenSky	pyroxsulam+fluroxypyr	16
4 Quelex	halauxifen+florasulam	0.75
Starane Ultra	fluroxypyr	5.3
5 Quelex	halauxifen+florasulam	0.75
OpenSky	pyroxsulam+fluroxypyr	16
6 WideMatch	fluroxypyr+clopyralid	21.3
7 WideMatch	fluroxypyr+clopyralid	21.3
MCPE	mcpa-ester	8
8 WideMatch	fluroxypyr+clopyralid	21.3
Quelex	halauxifen+florasulam	0.75
9 PerfectMatch	pyroxsulam+fluroxypyr+clopyralid	16
10 Supremacy	fluroxypyr+tribenuron+thifensulfuron	4
11 Talinor	bromoxynil+bicyclopyrone	13.7
12 Huskie Complete	bromoxynil+pyrasulfotole+thiencarbazon	13.7
13 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18
14 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18
LuxxurB	thifensulfuron	6.85
15 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18
LuxxurA	tribenuron	0.21
LuxxurB	thifensulfuron	6.85
16 Carnivore	bromoxynil+fluroxypyr+mcpa	16

Note: adjuvants, when recommended by label, were included with treatments

POST Kochia Control in Spring Wheat

Herbicide treatment		Active ingredient(s)	Rate (oz/A)	Kochia Control (%)		
				2 WAT	3 WAT	7 WAT
1	Untreated			0	0	0
2	Starane Ultra	fluroxypyr	5.3	73	67	71
3	OpenSky	pyroxsulam+fluroxypyr	16	76	78	79
4	Quelex	halauxifen+florasulam	0.75	77	76	86
	Starane Ultra	fluroxypyr	5.3			
5	Quelex	halauxifen+florasulam	0.75	57	66	63
	OpenSky	pyroxsulam+fluroxypyr	16			
6	WideMatch	fluroxypyr+clopyralid	21.3	72	79	81
7	WideMatch	fluroxypyr+clopyralid	21.3	64	65	66
	MCPE	mcpa-ester	8			
8	WideMatch	fluroxypyr+clopyralid	21.3	73	76	83
	Quelex	halauxifen+florasulam	0.75			
9	PerfectMatch	pyroxsulam+fluroxypyr+clopyralid	16	76	80	83
10	Supremacy	fluroxypyr+tribenuron+thifensulfuron	4	71	63	66
11	Talinor	bromoxynil+bicyclopyrone	13.7	85*	89*	90*
12	Huskie Complete	bromoxynil+pyrasulfotole+thiencarbazone	13.7	89*	92*	93*
13	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	94*	97*	97*
14	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	83	86	92*
	LuxxurB	thifensulfuron	6.85			
15	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	89*	92*	95*
	LuxxurA	tribenuron	0.21			
	LuxxurB	thifensulfuron	6.85			
16	Carnivore	bromoxynil+fluroxypyr+mcpa	1	81	84	84
LSD (p=0.05)				10.8	8.9	8.4

POST Kochia Control in Spring Wheat

Herbicide treatment		Active ingredient(s)	Rate (oz/A)	Common mallow Control (%)	
				2 WAT	3 WAT
1	Untreated			0	0
2	Starane Ultra	fluroxypyr	5.3	77	93*
3	OpenSky	pyroxsulam+fluroxypyr	16	79	97*
4	Quelex	halauxifen+florasulam	0.75	84	95*
	Starane Ultra	fluroxypyr	5.3		
5	Quelex	halauxifen+florasulam	0.75	72	83
	OpenSky	pyroxsulam+fluroxypyr	16		
6	WideMatch	fluroxypyr+clopyralid	21.3	78	95*
7	WideMatch	fluroxypyr+clopyralid	21.3	76	91
	MCPE	mcpa-ester	8		
8	WideMatch	fluroxypyr+clopyralid	21.3	80	94*
	Quelex	halauxifen+florasulam	0.75		
9	PerfectMatch	pyroxsulam+fluroxypyr+clopyralid	16	82	99*
10	Supremacy	fluroxypyr+tribenuron+thifensulfuron	4	76	88
11	Talinor	bromoxynil+bicyclopyrone	13.7	83*	92
12	Huskie Complete	bromoxynil+pyrasulfotole+thiencarbazone	13.7	89*	99*
13	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	91*	100*
14	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	89*	99*
	LuxxurB	thifensulfuron	6.85		
15	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	89*	99*
	LuxxurA	tribenuron	0.21		
	LuxxurB	thifensulfuron	6.85		
16	Carnivore	bromoxynil+fluroxypyr+mcpa	1	85*	94*
LSD (p=0.05)				8.2	7.9

POST Kochia Control in Spring Wheat

Herbicide treatment		Active ingredient(s)	Rate (oz/A)	Field bindweed Control (%)	
				2 WAT	3 WAT
1	Untreated			0	0
2	Starane Ultra	fluroxypyr	5.3	73*	91*
3	OpenSky	pyroxsulam+fluroxypyr	16	69*	83*
4	Quelex	halauxifen+florasulam	0.75	76*	88*
	Starane Ultra	fluroxypyr	5.3		
5	Quelex	halauxifen+florasulam	0.75	57	70
	OpenSky	pyroxsulam+fluroxypyr	16		
6	WideMatch	fluroxypyr+clopyralid	21.3	67*	90*
7	WideMatch	fluroxypyr+clopyralid	21.3	72*	92*
	MCPE	mcpa-ester	8		
8	WideMatch	fluroxypyr+clopyralid	21.3	71*	82*
	Quelex	halauxifen+florasulam	0.75		
9	PerfectMatch	pyroxsulam+fluroxypyr+clopyralid	16	68*	89*
10	Supremacy	fluroxypyr+tribenuron+thifensulfuron	4	63	58
11	Talinor	bromoxynil+bicyclopyrone	13.7	61	89*
12	Huskie Complete	bromoxynil+pyrasulfotole+thiencarbazone	13.7	73*	80*
13	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	78*	85*
14	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	78*	79
	LuxxurB	thifensulfuron	6.85		
15	Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	77*	88*
	LuxxurA	tribenuron	0.21		
	LuxxurB	thifensulfuron	6.85		
16	Carnivore	bromoxynil+fluroxypyr+mcpa	1	76*	88*
LSD (p=0.05)				11.7	11.8

POST Kochia Control in Spring Wheat

Herbicide treatment	Active ingredient(s)	Rate (oz/A)	Wheat Yield
1 Untreated			22.4
2 Starane Ultra	fluroxypyr	5.3	24.8
3 OpenSky	pyroxsulam+fluroxypyr	16	21.3
4 Quelex	halauxifen+florasulam	0.75	24.8
Starane Ultra	fluroxypyr	5.3	
5 Quelex	halauxifen+florasulam	0.75	25.8
OpenSky	pyroxsulam+fluroxypyr	16	
6 WideMatch	fluroxypyr+clopyralid	21.3	23.7
7 WideMatch	fluroxypyr+clopyralid	21.3	20.1
MCPE	mcpa-ester	8	
8 WideMatch	fluroxypyr+clopyralid	21.3	23.2
Quelex	halauxifen+florasulam	0.75	
9 PerfectMatch	pyroxsulam+fluroxypyr+clopyralid	16	22.5
10 Supremacy	fluroxypyr+tribenuron+thifensulfuron	4	23.1
11 Talinor	bromoxynil+bicyclopyrone	13.7	22.8
12 Huskie Complete	bromoxynil+pyrasulfotole+thiencarbazone	13.7	26.9
13 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	29.3
14 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	22.0
LuxxurB	thifensulfuron	6.85	
15 Huskie FX	bromoxynil+fluroxypyr+pyrasulfotole	18	24.1
LuxxurA	tribenuron	0.21	
LuxxurB	thifensulfuron	6.85	
16 Carnivore	bromoxynil+fluroxypyr+mcpa	1	29.2
LSD (p=0.05)			NS

POST Kochia Control in Spring Wheat Untreated



POST Kochia Control in Spring Wheat Starane Ultra (fluroxypyr)



POST Kochia Control in Spring Wheat WideMatch (fluroxpyr+clopyralid)



**POST Kochia Control in Spring Wheat
Huskie Complete
(bromoxynil+pyrasulfotole+thiencarbazono)**



**POST Kochia Control in Spring Wheat
Huskie FX (bromoxynil+fluroxypyr+pyrasulfotole)**



POST Kochia Control in Spring Wheat Talinor (bromoxnil+bicyclopyrone)



POST Kochia Control in Spring Wheat

Things to consider:

- Hot dry conditions following application reduced weed control of systemic herbicides
 - Typically fluroxypyr (Starane) is one of better treatments for kochia control
 - Hot dry conditions reduced growth of weeds and effects of herbicides were also reduced because fluroxypyr affects plant growth
- Herbicide combinations containing bromoxynil performed better than those without
 - Bromoxynil affects photosynthesis and is considered a contact herbicide (very little movement inside plant)
 - Under conditions with more rainfall, weeds often recover from bromoxynil if spray coverage is inadequate or weeds are too large

