

Table 1. Comparison of weed control and soybean yield from preemergence (PRE) herbicides applied at planting, 1 week before planting (1WEPP) and 2 weeks before planting (2WEPP) compared with other PRE/POST herbicide programs at Hettinger, ND, 2023.

Herbicide treatment ^a	Rate oz/A	Timing ^b	Percent control							Height cm	Yield bu/A
			Kochia	Common mallow	Lambs- quarters	Wild buckwheat	Green foxtail	Wild oat			
1 Untreated			0	0	0	0	0	0	29 a-e	20 f	
2 Valor	3	2WEPP	72 i	100 a	100 a	100 a	0 i	0 i	32 a	19 f	
3 Valor	3	1WEPP	57 j	91 bc	78 d	100 a	0 i	42 g	28 b-f	28 a-e	
4 Valor	3	PRE	74 hi	95 abc	92 abc	97 a	83 def	80 bcd	24 hi	32 a-d	
5 Valor	3	2WEPP	88 c-f	100 a	90 bc	100 a	86 c-f	60 f	29 a-f	29 a-e	
Zidua SC	5	2WEPP									
6 Valor	3	1WEPP	84 d-g	100 a	90 bc	100 a	87 b-e	77 cd	26 e-i	28 b-e	
Zidua SC	5	1WEPP									
7 Valor	3	PRE	83 efg	100 a	97 abc	100 a	94 ab	86 abc	23 i	33 abc	
Zidua SC	5	PRE									
8 BroadAxe XC	32	2WEPP	84 d-g	100 a	100 a	98 a	89 bcd	0 i	27 c-g	25 ef	
9 BroadAxe XC	32	1WEPP	80 gh	100 a	96 abc	100 a	68 h	0 i	31 ab	26 def	
10 BroadAxe XC	32	PRE	85 d-g	92 abc	100 a	97 a	88 bcd	82 abc	25 ghi	31 a-d	
11 Authority Sup	9.8	2WEPP	91 bcd	100 a	96 abc	97 a	82 def	41 g	29 a-f	27 cde	
12 Authority Sup	9.8	1WEPP	89 b-e	91 bc	100 a	97 a	80 ef	63 ef	27 c-h	29 a-e	
13 Authority Supr	9.8	PRE	86 d-g	93 abc	94 abc	97 a	84 def	84 abc	24 ghi	32 a-d	
14 Authority MTZ	18	2WEPP	85 d-g	100 a	99 a	97 a	0 i	0 i	30 abc	24 ef	
15 Authority MTZ	18	1WEPP	82 fg	100 a	100 a	100 a	79 fg	20 h	30 a-d	24 ef	
16 Authority MTZ	18	PRE	93 bc	100 a	100 a	100 a	89 bcd	80 bcd	25 ghi	32 abc	
17 Xtendimax	22	PRE	95 ab	87 c	90 bc	99 a	72 gh	71 de	26 f-i	30 a-e	
Glyphosate	20	PRE									
18 Xtendimax	22	POST	95 abc	96 ab	99 ab	99 a	99 a	87 ab	25 ghi	33 abc	
Glyphosate	20	POST									
19 Glyphosate	20	PRE	89 b-f	94 abc	89 c	98 a	94 abc	81 bcd	26 d-i	34 a	
Glyphosate	20	POST									
20 Glyphosate	20	PRE	100 a	100 a	100 a	100 a	99 a	92 a	25 ghi	34 ab	
BroadAxe XC	32	PRE									
Glyphosate	20	POST									
LSD P=.05			6.8	8.7	9.0	4.4	7.5	10.0	3.4	6.3	
Standard Deviation			4.78	6.11	6.31	3.11	5.28	7.10	2.41	4.43	
CV			5.96	6.65	6.98	3.31	7.71	13.56	8.93	16.04	
Treatment F			78.76	51.99	49.23	202.35	185.31	101.62	4.59	4.77	
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

^a Valor, flumioxazin; Zidua, pyroxasulfone; BroadAxe XC, sulfentrazone + metolachlor; Authority Supreme; sulfentrazone + pyroxasulfone; Authority MTZ, sulfentrazone + metribuzin; Xtendimax, dicamba; glyphosate, Roundup PowerMax3. Treatments 1 to 16 included the addition of glyphosate (Roundup PowerMax3) at 20 oz/A plus AMS at 8.5 lb/100gal plus HS-MSO (Destiny) at 1% v/v. Xtendimax treatments included volatility reduction agent (Volt Edge) and water conditioner/NIS (Class Act Ridion). Treatments 19 and 20 included AMS at 8.5 lb/100 gal. Glyphosate was applied at R1 to all treatments.

^b Application dates: 2WEPP, 5/10/23; 1WEPP, 5/19/23; PRE, 5/30/23; POST, 6/19/23

^c Weed control was evaluated on July 19 (46 days after soybean emergence); soybean height was measured on 7/5.

Table 2. Description of herbicide application and equipment for treatments applied in soybean to evaluate weed control and soybean response at Hettinger, ND, 2023.

Application Description					
Date	5/10/2023	5/19/2023	5/30/2023	6/19/2023	6/19/2023
Start Time	4:30 PM	9:49 AM	9:22 AM	8:58 AM	9:00 AM
Stop Time	4:49 PM	10:03 AM	9:59 AM	9:00 AM	9:10 AM
Timing	2WEPP	1WEPP	PRE	POST	Xtendimax
Air Temp	78 F	54 F	76 F	72 F	72 F
Rel Humidity	38	52	46	54	54
Wind Speed (mph)	1.6	4.3	3.7	2	3.4
Soil Temperature	71 F	52 F	64 F	68 F	68 F
% Cloud Cover	10	0	0	20	20
Application Equipment					
Sprayer Type	Tractor	Tractor	Tractor	Tractor	Tractor
Operation Pressure	38 PSI	38 PSI	37 PSI	39 PSI	39 PSI
Nozzle Model	DG11002	DG11002	DG11002	DG11003	TTI11003
Nozzle Spacing	20 IN	20 IN	20 IN	20 IN	20 IN
Boom Length	100 IN	100 IN	100 IN	100 IN	100 IN
Boom Height	20 IN	20 IN	22 IN	28 IN	28 IN
Ground Speed	3.7 MPH	3.7 MPH	3.5 MPH	4.4 MPH	2.9 MPH
Application Amount	10 GAL/AC	10 GAL/AC	10 GAL/AC	10 GAL/AC	15 GAL/AC
Propellant	CO2	CO2	CO2	CO2	CO2

A trial was conducted to evaluate timing of preemergence herbicide application of herbicides commonly used in soybean. These treatments were compared with Xtendimax plus glyphosate applied PRE at planting or as a total postemergence at the V1 soybean or with two applications of glyphosate (PRE and POST) or with glyphosate plus BroadAxe XC applied PRE followed by glyphosate POST. Valor plus glyphosate provided only fair to poor control of kochia, but good to excellent control of common mallow, common lambsquarters, and wild buckwheat, control of green foxtail and wild oat was best at the PRE timing as it had not full emerged at the earlier application dates. The addition of Zidua SC to the Valor plus glyphosate treatment improved control of kochia, green foxtail, and wild oat. Adequate rainfall was received for activation of Zidua; Four inches of rain fell in the week following the 2WEPP application, only 0.1 inches of rain fell in the week after the 1WEPP application, and 0.69 inches of rain fell in the week following the PRE application. BroadAxe XC provided good control of kochia, and excellent control of common mallow, common lambsquarters, and wild buckwheat, and good control of green foxtail at the 2WEPP and PRE applications, but poor green foxtail control for the 1WEPP. Poor control of green foxtail at this timing was likely due to low rainfall during the week following this application timing. Wild oat control was best at the PRE timing as it had not emerged at the two earlier timings. Authority Supreme and Authority MTZ both provided good to excellent control of kochia, common lambsquarters, and common mallow. At the earlier application timings, Authority Supreme controlled both green foxtail and wild oat better than Authority MTZ, but control was similar at the PRE application timing. Xtendimax plus glyphosate applied PRE provided good control of all broadleaf weeds, but only fair control of grass, likely because grasses continued to emerge after application; delaying this application to the V1 stage of soybean improved control of common mallow, green foxtail, and wild oat. Two applications of glyphosate, with and without BroadAxe provided good to excellent control of all weeds in this trial. Soybean height was generally greatest in soybean with poorer weed control as the soybean tried to outgrow neighboring weeds. Soybean yield was highest in soybean where weeds were controlled best, improving from 20 bu/A in the untreated to 34 bu/A in the highest yielding treatments.