Evaluation of weed control options for soybean in SW North Dakota at Hettinger, 2024.

A trial was conducted near Hettinger, ND to evaluate weed control options for soybean. Soybean were planted on May 20, 2024, into wheat stubble using a no-till planter at a depth of 1.5 inches at a seeding rate of 110,000 seeds/A. Soybean emerged on June 3. One weeks prior to planting, the entire plot area was treated with glyphosate (Roundup PowerMax) plus carfentrazone (Aim EC) to control emerged weeds. Treatments were applied either at planting (preemergence, PRE), after emergence of soybean at the V1 growth stage (early postemergence, EPOST), at the V2 soybean growth stage (postemergence, POST), or at the R1 growth stage (late postemergence LPOST) (Table 2). Weed control was evaluated at 5 and 8 weeks after the PRE treatment timing (WAT), with the 8 WAT evaluation occurring 1 weeks after the LPOST application. Weed evaluated in this trial included kochia, common lambsquarters, green foxtail, wild oat, and barnyardgrass. Herbicides applied at the PRE timing contain active ingredients that are active in the soil on seedling weeds. Herbicides applied at all postemergence timings were primarily foliar active on controlling emerged weeds. At 5 WAT, only PRE and EPOST treatments had been applied. At this evaluation, the only PRE treatment that resulted in good kochia control (89-91%) was Authority MTZ (sulfentrazone plus metribuzin). All others controlled kochia at 69-76%. Common lambsquarters was controlled at 88-100% by metribuzin, Authority MTZ, and Authority Supreme (sulfentrazone plus pyroxasulfone). Green foxtail and barnyardgrass were controlled 89-96% by Authority MTZ, Zidua (pyroxasulfone), and Authority Supreme. No PRE treatment provided good control of wild oat. EPOST treatments evaluated at this time included glyphosate, Liberty (glufosinate), glyphosate plus Xtendimax (dicamba), and Zalo (glufosinate plus quizalofop). For kochia control, products containing glufosinate provided better control that glyphosate. Glyphosate controlled wild oat better than glufosinate containing products.
At 8 WAT, the POST application of glyphosate improved weed control compared with PRE herbicides alone in nearly all cases. The best overall control occurred with sequential applications of Zalo (EPOST and LPOST), and with Authority MTZ (PRE) followed by glyphosate (POST). Plant stands and heights were not affected by herbicide treatments. The entire trial was treated with glyphosate two weeks after the LPOST timing to control weeds not controlled by earlier applications. Soybean yield was affected by drought conditions that occurred in July and August. Yields were very low and not commercially viable. However, the same two treatments have the best overall weed control 8 WAT also had the highest soybean yield. It would be interesting to evaluate these same treatments under better rainfall conditions. These herbicides show the importance of using multiple applications for weed control and not relying on a single herbicide or mode of action for weed control in soybean.

Table 2. Application environment and equipment for application of herbicide treatments for weed control in soybean.

Application Description					Application equipment				
	PRE	EPOST	POST	LPOST		PRE	EPOST	POST	LPOST
Date	May-21-	Jun-19-24	Jun-26-24	Jul-10-24	Type	Tractor	Tractor	Tractor	Tractor
Start Time	8:24 AM	8:45 AM	5:58 PM	12:10 PM	Pressure	42 PSI	42 PSI	42 PSI	20 PSI
Stop Time	8:49 AM	9:00 AM	6:23 AM	12:15 PM	Nozzle[a]	11002DG	11002DG	11002DG	11002DG
Air Temperature	56 F	60 F	78.3 F	85.4 F	Spacing	20 IN	20 IN	20 IN	20 IN
% RH	59.3	50	43.4	42.9	Length	100 IN	100 IN	100 IN	100 IN
Wind Spped	7.1 MPH	0.9 MPH	6.2 MPH	2.9 MPH	Height	20 IN	28.0 IN	28.0 IN	36.0 IN
Wet Leaves (Y/N)	No	No	No	No	Speed	2.8 MPH	2.8 MPH	2.8 MPH	3 MPH
Soil Temperature	53 F	43 F	66 F	F	Volume	15 GAL/A	15 GAL/A	15 GAL/A	15 GAL/A
% Cloud Cover	100	5	10	5	Propellant	CO2	CO2	CO2	CO2

[a]Treaments containing Xtendimax were applied with TTI 11002 nozzles.

Table 1. Evaluation of herbicide options for weed control in soybean at Hettinger, ND, 2024

				Kochia[1,2]		Lambsquarters		Green foxtail		Wild oat		Barnyardgrass		Soybean[3]		
		Rate	Timing	5 WAT	8 WAT	5 WAT	8 WAT	5 WAT	8 WAT	5 WAT	8 WAT	5 WAT	8 WAT	Stand	Height	Yield
Treatment[4]		oz/A		% control										plants/A	inches	BU/A
1	Untreated			0h	0g	0f	0h	0i	0h	0g	0h	0i	0h	107393-	7.1-	1.6ef
2	Roundup PowerMAX3	22	EPOST	81def	61e	100a	96ab	100ab	83de	96a	96ab	100ab	83de	115634-	8.3-	3.7ab
3	Liberty	28	EPOST	100a	87bc	100a	82def	100ab	77ef	84bc	82def	100ab	77ef	110462-	8.1-	2.9bcd
4	Xtendimax	22	PRE	72fg	0g	63e	0h	0i	0h	0g	0h	0i	0h	110235-	7.7-	1.2f
5	Roundup PowerMAX3	22	EPOST	85cde	87bc	100a	87cde	99ab	84cde	94a	87cde	99ab	84cde	110393-	8.0-	2.8bcd
	Xtendimax	22	EPOST													
6	Xtendimax	22	PRE	76efg	87bc	73de	94abc	40h	92abc	0g	94abc	40h	92abc	97954-	8.0-	3.1abc
	Roundup PowerMAX3	22	POST													
	Xtendimax	22	POST													
7	Zalo® Herbicide	32	EPOST	96ab	100a	100a	97ab	100a	100a	94a	97ab	100a	100a	106666-	8.0-	4.1a
	Zalo® Herbicide	32	LPOST													
8	Zalo® Herbicide	32	EPOST	97ab	83bcd	99ab	80ef	100ab	84cde	91ab	80ef	100ab	84cde	116609-	7.6-	2.0def
	Dual II Magnum	21	PRE													
9	Zalo® Herbicide	32	EPOST	95ab	89b	100a	82def	100ab	90bcd	92ab	82def	100ab	90bcd	105606-	7.7-	2.1c-f
	Dual II Magnum	1.33	EPOST													
10	Metribuzin	5.33	PRE	72fg	52e	90bc	70g	81f	60g	68de	70g	81f	60g	101214-	8.2-	2.0c-f
11	Metribuzin	5.33	PRE	75fg	86bcd	88cd	96ab	74g	90bcd	66e	96ab	74g	90bcd	100531-	7.7-	3.8ab
	Roundup PowerMAX3	22	POST													
12	Authority MTZ	18	PRE	89bcd	81bcd	100ab	78f	89de	80ef	52f	78f	89de	80ef	97881-	8.3-	2.9bcd
13	Authority MTZ	18	PRE	91abc	91ab	100a	100a	93cd	95ab	53f	100a	93cd	95ab	111197-	8.6-	4.1a
	Roundup PowerMAX3	22	POST													
14	Zidua SC	5	PRE	69g	22f	71e	79f	91cd	73f	75de	79f	91cd	73f	115858-	7.5-	2.3cde
15	Zidua SC	5	PRE	70g	75d	82cd	100a	83ef	95ab	75cd	100a	83ef	95ab	108792-	7.9-	3.4ab
	Roundup PowerMAX3	22	POST													
16	Authority Supreme	9.8	PRE	72fg	55e	97ab	90bcd	96abc	89bcd	50f	90bcd	96abc	89bcd	104186-	8.1-	2.9bcd
17	Authority Supreme	9.8	PRE	76efg	78cd	96ab	100a	94bcd	96ab	49f	100a	94bcd	96ab	104908-	7.7-	3.5ab
	Roundup PowerMax3	20	POST													
LSD P=.05				9.1	10.7	9.9	9.7	8.0	6.5	8.5	7.8	6.2	8.6	12627.3	0.93	0.98
Standard Deviation				6.4	7.6	6.9	6.8	5.6	4.6	5.9	5.5	4.4	6.0	8848.8	0.65	0.69
CV				8.21	11.31	8.32	9.62	6.91	6.19	8.88	7.04	5.5	7.9	8.02	7.84	22.41
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.1440	0.0824	0.0001

Abbreviations: weeks after treatment, WAT; preemergence, PRE; early postemergence, EPOST; postemergence, POST; late post emergence, LPOST; acre, A; bushel, BU.

[1]Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

[2]Weed control evaluations were taken 5 and 8 weeks after the preemergence (PRE) herbicide application timing; Application timings were: PRE, at planting; early postemergence (EPOST), 29 days after planting at the V1 soybean growth stage; postemergence (POST), 36 days after planting; and late postemergence (LPOST) 50 days after planting.

[3]Soybean stand was measure 5 WAT; height was measured 8 WAT, and harvested 18 WAT

[4]Adjuvants were added to treatment mixtures according with label guidelines for each herbicide.