Influence of Different Herbicides on Weeds and Dry Beans at Scottsbluff, NE during the 2008 Growing Season.

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A field study was initiated near Scottsbluff, Nebraska to compare the effectiveness of various herbicides applied at planting and postemergence for weed control in dry beans. The experimental design was a randomized complete block with four replications. Plots were 11 feet wide by 40 feet long and were located on a sandy loam soil with a pH of 7.9 and organic matter content of 0.9%. Herbicides were applied preplant on June 2 and immediately incorporated with a rototiller. Dry beans, 'Orion', were planted on June 3. Herbicides were applied preemergence on June 6 and postemergence on June 25 and July 2. Pertinent data on environmental conditions at the time of herbicide application are given in Table 1. Herbicides were applied with a tractor-mounted sprayer calibrated to deliver 20 gallons of water per acre at 36-psi pressure using Spraying Systems 11002 VS nozzles.

Crop injury from herbicides was evident on June 18 and increased in intensity and was greatest on June 30 (Table 2). Valor caused early season crop injury in the range of 11 to 19%. Increasing the Valor rate from0.047 to 0.095 (1.5 to 3 oz/acre) lb/acre did result in an increase in crop injury. Tank mixing Valor with Dual Magnum, Outlook, or Prowl H_2O also resulted in crop injury but injury was similar to that observed with Valor alone. Prowl H_2O plus Outlook, Eptam plus Outlook, Dual Magnum plus Valor plus Permit, and Dual Magnum plus Valor plus Reflex also caused significant early season crop injury. Rainfall which occurred on June 4 and June 5 caused soil crusting which slowed the emergence of dry beans and may have resulted in more early season crop injury. The greatest amount of crop injury was observed in areas treated with Dual Magnum plus Valor preemergence and postemergence with Basagran plus crop oil 19 days later. Dry bean stand averaged 53,757 plants/acre in the non-treated and none of the herbicide treatments caused a reduction in crop stand.

Weed density in the plot area was severe and consisted of common lambsquarters, redroot pigweed, and hairy nightshade at an average weed density of 81, 45, and 8 plants/137 sq ft, respectively. Common lambsquarters was present at the greatest density and only two treatments applied preemergence, Valor plus Outlook at 0.063 plus 0.65 lb/acre and

Permit plus Sonalan at 0.031 plus 0.75 provided 95% or greater control (Table 2). Combining Prowl H_2O plus Outlook or Outlook with Raptor plus Basagran postemergence was effective in controlling common lambsqurters. Dual Magnum plus Valor preemergence followed by Basagran postemergence provided excellent control of common lambsquarters, redroot pigweed, and hairy nightshade but caused a 24% reduction in early season crop vigor.

Table 1. Environmental Conditions at the Time of Herbicide Application.

Date	Air temperature	Humidity	Wind speed & direction	Time of day	Crop growth stage	Weed height		
						Colq	Rrpw	Hans
	(F)	(%)	(mph)			– (inches) –		
June 2	74	62	2 NE	2-3	PPI	—	—	—
June 6	69	40	13 W	9-12	PRE	—	—	—
June 25	70	62	2 SE	8-9	1 trifoliate	4	6	6
July 2	68	61	8 W	8-9	3 trifoliate	8	10	8

Rainfall and irrigation following herbicide application (in inches).

Date	Amount	Date	Amount	Date	Amount
June 4	0.75	June 13	0.75	June 19	0.07
June 5	0.21	June 15	0.01	June 20	0.36
June 7	0.01	June 16	0.17	June 26	0.02

Table 2. Weed Control Program for Dry Edible Beans during the 2008 Growing Season.

Herbicide treatment [1]	Rate	Time of application [2]	Dry bean								
			Injury [3]				Stand	Percent weed control 7/7 [4]			
			6/18	6/24	6/30	7/8	6/30	Colq	Rrpw	Hans	Avg
	lb/acre		(%)				(plants/acre)	(%)			
Nontreated	—	—	0	0	0	0	53757	0	0	0	0
Valor SX	0.047	Pre	1	2	13	14	51500	72	85	99	85
Valor SX + Dual Magnum	0.047 + 0.95	Pre	2	2	12	11	53638	68	95	99	87
Valor SX + Outlook	0.047 + 0.65	Pre	1	2	17	9	53163	56	97	96	83
Valor SX + Prowl H_2O	0.047 + 0.95	Pre	2	2	13	6	46451	72	72	76	73
Valor SX	0.063	Pre	3	3	12	7	49005	26	90	73	63
Valor SX + Dual Magnum	0.063 + 0.95	Pre	5	5	18	13	46748	70	98	99	89
Valor SX + Outlook	0.063 + 0.65	Pre	4	7	21	16	49421	98	99	99	98
Valor SX + Prowl H_2O	0.063 + 0.95	Pre	1	1	11	10	59400	86	93	89	89
Valor SX	0.095	Pre	0	2	19	11	51737	69	89	93	83
Outlook + Valor SX + Permit + Prowl H_2O	0.65 + 0.047 0.031 + 0.95	Pre Pre	0	1	18	15	55777	78	99	99	92
Prowl H_2O Raptor + Basagran + X77 + AMS	0.95 0.031 0.5	Pre 1 Trif 1 Trif	1	1	11	11	53460	95	99	99	97

Herbicide treatment [1]	Rate	Time of application [2]	Dry bean								
			Injury [3]				Stand	Percent weed control 7/7 [4]			
			6/18	6/24	6/30	7/8	6/30	Colq	Rrpw	Hans	Avg
	lb/acre		(%)				(plants/acre)	(%)			
Prowl H_2O	0.95	PPI	4	2	6	8	55598	82	99	83	88
Raptor +	0.031	1 Trif									
Basagran + X77 + AMS	0.5	1 Trif									
Prowl H_2O + Outlook	0.95 + 0.65	Pre	5	5	13	10	47164	65	70	26	53
Prowl H_2O + Outlook	0.95 + 0.65	Pre	3	5	15	16	41224	98	99	99	98
Raptor +	0.031	1 Trif									
Basagran + X77 + AMS	0.5	1 Trif									
Outlook	0.65	Pre	3	3	10	9	48352	94	99	99	97
Raptor +	0.031	1 Trif									
Basagran + X77 + AMS	0.5	1 Trif									
Eptam + Sonalan HFP	3.06 + 0.75	PPI	3	3	10	5	52688	74	94	99	89
Eptam + Sonalan HFP	3.06 + 0.75	PPI	0	1	11	15	61301	74	93	79	82
Permit + X77 + UAN	0.023	1 Trif									
Eptam + Outlook	3.06 + 0.65	PPI	8	7	18	20	49183	48	71	99	72
Eptam + Permit	3.06 + 0.031	PPI	1	1	12	12	59875	64	97	63	74
Permit + Sonalan HFP	0.031 + 0.75	PPI	0	0	6	9	56965	97	98	40	78
Permit + Sonalan HFP	0.031 + 0.75	PPI	5	2	14	17	58271	92	98	55	81
Eptam	3.5	3 Trif									
Permit + Prowl H_2O	0.031 + 1.42	Pre	3	3	11	11	56786	75	96	25	65

Herbicide treatment [1]	Rate	Time of application [2]	Dry bean								
			Injury [3]				Stand	Percent weed control 7/7 [4]			
			6/18	6/24	6/30	7/8	6/30	Colq	Rrpw	Hans	Avg
	lb/acre		(%)				(plants/acre)	(%)			
Permit + Outlook	0.031 + 0.65	Pre	1	0	10	8	55123	66	47	25	46
Permit + Outlook Eptam	0.031 + 0.65 3.5	Pre 3 Trif	2	3	13	16	55123	67	66	25	52
Dual Magnum + Valor SX + Permit	0.95 0.047 + 0.031	Pre Pre	2	3	19	15	48886	76	93	96	88
Dual Magnum + Reflex	0.95 + 0.25	Pre	3	2	8	9	50846	38	93	65	65
Dual Magnum + Reflex	0.95 + 0.17	Pre	1	1	5	8	55598	9	86	96	63
Dual Magnum + Valor SX + Reflex	0.95 0.031 + 0.25	Pre Pre	1	2	18	11	59341	84	99	74	85
Dual Magnum Reflex + X77	0.95 0.25	Pre 1 Trif	1	1	14	11	53816	25	99	99	74
Dual Magnum + Valor SX Basagran + COC + UAN	0.95 + 0.047 1	Pre 1 Trif	0	1	24	16	56786	99	99	99	99
LSD at 5%	—	—	5	5	12	11	NS	45	24	41	24

[1] Spray additives were combined with the spray solution at the following rates: surfactant X77 at 0.25%, liquid nitrogen 33-0-0 (UAN) at 1%, crop oil concentrate (COC) at 1%, and ammonium sulfate (AMS) at 17lbs/100 gal.

[2] Time of application: preplant incorporated (PPI) on June 2, preemergence (Pre) on June 6, first trifoliate stage of growth (1 Trif) on June 25, and third trifoliate stage (3 Trif) on July 2.

[3] Visual crop injury evaluated on a scale from 0 to 100 with 0 equal to no injury and 100 equal to death of the plant.

[4] Percent weed control calculated from weed counts taken on July 7. Weed abbreviations: kochia (Kocz), common lambsquarters (Colq), redroot pigweed (Rrpw), and hairy nightshade (Hans).