Influence of Valor Timing and Rate on Dry Bean Injury at Scottsbluff, Nebraska during the 2009 Growing Season.

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A field study was initiated near Scottsbluff, Nebraska to examine the influence of different application timings and rates of Valor on early season dry bean injury. The experimental design was a randomized complete block with four replications. Plots were 11 feet wide by 25 feet long and were located on a sandy loam soil with a pH of 8.1 and organic matter content of 1.2%. Herbicides were applied on nine different dates; three before bean planting and six after planting. Valor was applied at two rates 0.047 lb/acre which is equivalent to 1.5 ounces of product per acre and 0.094 which is equivalent to 3 ounces of product per acre. Valor was applied to six different market classes of dry beans: Great Northern 'Marquis', small red, black 'Shania', pinto 'Poncho', yellow 'Enola', and light-red kidney 'Pink Panther'. Beans were planted on June 10 with a Monosum vacuum planter calibrated to plant 100,000 seeds per acre and seeds were planted 1.5 inches deep in rows spaced 22-inches apart. Herbicide was applied with a backpack sprayer calibrated to deliver 20 gallons of spray solution per acre at 36-psi pressure using Spraying Systems 11002 nozzles. Environment conditions and rainfall before and after planting are presented in Table 1.

Environment conditions before and after planting were cool and wet with 1.5 inches of rain occurring over a 9 day period before planting and 3.3 inches of rain occurring over a 9 day period after planting. Dry beans began cracking the soil surface 9 days after planting. Dry bean emergence 12 days after planting was 98, 93, 89, 87, 83, and 82% for Great Northern, small red, light-red kidney, pinto, black, and yellow, respectively in nontreated areas of the study (Table 2). Dry bean final stands were affected by Valor with the degree of stand reduction related to Valor timing and market class. Several hours after planting 1.35 inches of rain was received, which was also 1 day after Valor was applied (1DBP), dry bean stands were reduced from the 1 day before planting Valor timing. Dry bean stand reductions fell when Valor was applied 1 and 2 days after planting and then increased when Valor was applied 5, 6, and 7 days after planting. The least amount of stand reduction occurred when Valor was applied 11 days before planting and 1 and 2 days after planting. Dry bean stand reduction was greatest for Great Northern, black, and pinto market classes, intermediate for small reds, and least for light-red kidneys and yellow market classes.

Dry bean visual injury was recorded on July 7 and was influenced by market class and Valor timing (Table 3). The greatest amount of injury occurred when Valor was applied 9 days after planting and at the time dry beans were cracking the soil surface. Crop injury for Great Northern and small red beans also occurred when Valor was applied 2 days after planting and for black and pinto beans when Valor was applied 6 days after planting. Visual injury was reduced with light-red kidneys compared to the other market classes.

Weed control was evaluated on July 7 by counting weeds in a 275 sq ft area in the center of each plot. Common lambsquarters was the most prevalent weed in the plot area with a density of over 400 plants per 275 sq ft. There was a trend for common lambsquarters control to increase the later in the season Valor was applied (Table 4). Valor applied 12 days before

planting averaged 49% common lambsquarters control on July 7 while Valor applied 1 day after planting provided 85% control, and Valor applied 9 days after planting controlled 99% of the common lambsquarters population.

The results from this experiment suggest that applying Valor 12 days before planting or 1 to 2 days after planting reduces the potential for crop injury. Rainfall of over an inch after applying Valor can cause crop injury and applying Valor when the bean plant is cracking the soil surface can also result in crop injury. The injury to dry beans varies with market class with yellow and light-red kidney beans more tolerant of Valor than Great Northern or black beans.

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

Date	Air temperature	Humidity	Wind speed & direction	Time of day	Application	Dry bean growth stage
	(F)	(%)	(mph)			
May 29	91	16	2 SW	1:00 PM	12 DBP	
June 5	76	50	3 SE	3:00 PM	5 DBP	
June 9	74	35	7 NW	2:00 PM	1 DBP	
June 10	Planted beans					
June 11	60	76	4 SE	1:00 PM	1 DAP	
June 12	70	52	5 NW	1:00 PM	2 DAP	
June 15	53	92	0	2:00 PM	5 DAP	
June 16	62	62	5 NW	8:00 AM	6 DAP	
June 17	62	76	0	5:00 AM	7 DAP	
June 19	64	69	6 NW	9:00 AM	9 DAP	Beans cracking the soil

Rainfall following herbicide application.

Date	Amount inches	Application	Date	Amount inches	Application
May 29	--	12 DBP	June 11	0.26	1 DAP
May 31	0.42		June 12	--	2 DAP
June 1	0.04		June 13	0.05	
June 2	0.06		June 14	0.63	
June 3	0.29		June 15	0.04	5 DAP
June 4	0.09		June 16	--	6 DAP
June 5	0.15	5 DBP	June 17	0.95	7 DAP
June 7	0.32		June 18	0.02	
June 8	0.16		June 19	--	9 DAP
June 9	--	1 DBP	June 20	--	
June 10	1.35	Beans planted	June 21	0.03	

Table 2. Influence of Valor Timing and Rate on the Stand of Different Market Classes of Dry Beans during the 2009 Growing Season.

Herbicide	Rate	Application[1]	GN 12 DAP	GN 16 DAP	GN[2] 21 DAP	Percent stand reduction	Red 12 DAP	Red 16 DAP	Red 21 DAP	Percent stand reduction	Black 12 DAP	Black 16 DAP	Black 21 DAP	Percent stand reduction
	lb/acre		(plants/25 ft of row)											
Nontreated	--	--	48	51	49		48	60	51		46	58	60	
Nontreated	--	--	47	45	47		44	50	47		46	53	50	
Prowl H_2O + Outlook	0.95+0.65	1 DBP	34	34	36		25	37	41		12	29	40	
Valor SX	0.047	12 DBP	34	32	40		38	45	29		20	45	41	
Valor SX	0.094	12DBP	18	31	29		21	26	26		17	35	28	
						28				44				37
Valor SX	0.047	5 DBP	21	35	30		22	52	40		21	38	27	
Valor SX	0.094	5 DBP	36	26	33		24	29	30		14	28	21	
						35				28				56
Valor SX	0.047	1 DBP	14	22	12		19	17	24		10	17	19	
Valor SX	0.094	1 DBP	19	15	10		25	24	31		9	14	11	
						77				43				72
Valor SX	0.047	1 DAP	33	35	34		30	32	33		37	48	44	
Valor SX	0.094	1 DAP	22	22	21		23	18	26		13	27	25	
						41				39				37
Valor SX	0.047	2 DAP	25	43	41		36	49	45		32	38	34	
Valor SX	0.094	2 DAP	17	14	13		14	30	26		12	21	18	
						43				27				52
Valor SX	0.047	5 DAP	17	25	23		31	35	36		14	30	27	
Valor SX	0.094	5 DAP	9	9	9		24	25	25		12	19	15	
						66				37				61
Valor SX	0.047	6 DAP	21	26	22		26	32	35		16	22	30	
Valor SX	0.094	6 DAP	17	24	17		20	22	28		7	12	14	
						59				35				60
Valor SX	0.047	7 DAP	16	24	24		18	25	28		14	20	25	
Valor SX	0.094	7 DAP	13	19	15		19	29	24		9	20	11	
						59				46				67
Valor SX	0.047	9 DAP	45	41	33		34	25	33		28	35	15	
Valor SX	0.094	9 DAP	27	36	28		21	23	21		39	21	5	
						36				44				81
LSD at (0.05)	--	--	17	20	21		18	19	18		16	21	17	

Table 2. Influence of Valor Timing and Rate on the Stand of Different Market Classes of Dry Beans during the 2009 Growing Season – Continued.

Herbicide	Rate	Application[1]	Pinto 12 DAP	Pinto 16 DAP	Pinto 21 DAP	Percent stand reduction	Yellow 12 DAP	Yellow 16 DAP	Yellow 21 DAP	Percent stand reduction	LRK 12 DAP	LRK 16 DAP	LRK 21 DAP	Percent stand reduction
	lb/acre		(plants/25 ft of row)											
Nontreated	-	-	51	66	66		18	17	24		31	37	35	
Nontreated	-	-	58	65	58		16	15	17		26	29	29	
Prowl H^2O + Outlook	0.95+0.65	1 DBP	11	34	45		6	16	14		11	31	32	
Valor SX	0.047	12 DBP	38	50	50		15	27	36		27	30	22	
Valor SX	0.094	12DBP	30	28	37		22	26	24		23	20	23	
						29				0				29
Valor SX	0.047	5 DBP	29	62	51		21	26	23		38	37	31	
Valor SX	0.094	5 DBP	26	23	38		11	25	15		26	32	25	
						28				7				12
Valor SX	0.047	1 DBP	15	25	31		19	22	18		36	32	39	
Valor SX	0.094	1 DBP	15	22	26		19	18	12		21	28	30	
						54				26				0
Valor SX	0.047	1 DAP	39	48	48		19	32	28		27	32	29	
Valor SX	0.094	1 DAP	31	29	37		14	22	25		21	34	30	
						31				0				7
Valor SX	0.047	2 DAP	34	57	52		20	21	25		37	34	31	
Valor SX	0.094	2 DAP	8	28	21		13	26	19		21	24	21	
						41				0				18
Valor SX	0.047	5 DAP	27	26	35		17	22	23		33	31	26	
Valor SX	0.094	5 DAP	12	20	26		18	21	21		27	30	26	
						50				0				18
Valor SX	0.047	6 DAP	16	22	26		23	31	26		32	26	30	
Valor SX	0.094	6 DAP	8	13	18		9	17	15		21	21	25	
						64				0				14
Valor SX	0.047	7 DAP	12	22	18		13	27	25		38	32	32	
Valor SX	0.094	7 DAP	13	20	24		13	21	13		21	21	23	
						66				7				14
Valor SX	0.047	9 DAP	35	24	37		12	23	17		32	40	32	
Valor SX	0.094	9 DAP	37	33	23		33	14	11		24	26	25	
						51				31				10
LSD at (0.05)	-	-	18	21	20		13	14	14		14	16	12	

[1]Application timings: days before planting (DBP) and days after planting (DAP).

[2]Dry bean market classes and variety: Great Northern 'Marquis' (GN), small red (Red), black 'Shania' (Black), pinto 'Poncho' (Pinto), yellow 'Enola' (Yellow), and light-red kidney "Pink Panther' (LRK).

Table 3. Influence of Valor Timing and Rate on Visual Dry Bean Injury during the 2009 Growing Season.

Herbicide	Rate	Application[1]	GN[2]	Red	Black	Pinto	Yellow	LRK
	(lb/acre)		(%)					
Nontreated	--	--	2.0	2.5	2.5	2.5	7.5	3.8
Nontreated	--	--	0	0	0	0	0	0
Prowl H_2O + Outlook	0.95 + 0.65	1 DBP	5	8.8	15.0	12.0	18.8	14.5
Valor SX	0..047	12 DBP	13.8	7.0	13.8	5.0	12.5	11.3
Valor SX	0.094	12DBP	13.8	8.8	12.5	5.8	3.8	5.0
Valor SX	0.047	5 DBP	8.8	7.5	16.3	8.3	13.3	2.0
Valor SX	0.094	5 DBP	8.8	10.0	18.8	11.3	15.8	8.8
Valor SX	0.047	1 DBP	16.3	13.8	17.5	12.5	11.3	10.8
Valor SX	0.094	1 DBP	20.0	10.0	18.8	15.0	16.3	8.8
Valor SX	0.047	1 DAP	10.0	7.5	8.8	4.5	8.8	3.8
Valor SX	0.094	1 DAP	15.0	6.3	11.3	8.8	9.5	6.3
Valor SX	0.047	2 DAP	10.0	5.0	7.5	5.0	13.8	7.5
Valor SX	0.094	2 DAP	28.8	18.8	20.0	11.3	11.3	10.0
Valor SX	0.047	5 DAP	12.5	4.5	15.0	6.3	11.3	3.8
Valor SX	0.094	5DAP	12.5	8.8	13.3	12.5	8.3	2.5
Valor SX	0.047	6 DAP	8.3	3.8	12.5	12.5	6.3	5.0
Valor SX	0.094	6 DAP	15.0	12.0	25.0	26.3	17.5	15.8
Valor SX	0.047	7 DAP	17.0	8.8	8.8	10.0	10.0	1.3
Valor SX	0.094	7 DAP	17.0	7.5	20.0	20.0	14.3	13.8
Valor SX	0.047	9 DAP	27.5	23.8	41.3	22.5	26.3	11.3
Valor SX	0.094	9 DAP	18.8	25.0	63.8	60.0	47.5	35.0
LSD at (0.05)	--	--	14	8	12	9	12	11

[1]Application timings: days before planting (DBP) and days after planting (DAP).

[2]Dry bean market classes and variety: Great Northern 'Marquis' (GN), small red (Red), black 'Shania' (Black), pinto 'Poncho' (Pinto), yellow 'Enola' (Yellow), and light-red kidney "Pink Panther' (LRK). Injury evaluated on July 7.

Table 4. Influence of Valor Timing and Rate on Weed Control in Dry Beans during the 2009 Growing Season.

			Weed control July 7			
Herbicide	Rate	Application[1]	Common lambsquarters	Redroot pigweed	Hairy nightshade	Average weed control
	(lb/acre)		(%)			
Prowl H_2O + Outlook	0.95 + 0.65	1 DBP	64	89	99	84
Valor SX	0.047	12 DBP	40	70	99	76
Valor SX	0.094	12DBP	59	71	99	76
Valor SX	0.047	5 DBP	62	58	99	73
Valor SX	0.094	5 DBP	69	97	99	88
Valor SX	0.047	1 DBP	57	89	99	81
Valor SX	0.094	1 DBP	89	82	99	90
Valor SX	0.047	1 DAP	86	87	99	90
Valor SX	0.094	1 DAP	85	89	99	91
Valor SX	0.047	2 DAP	65	83	99	82
Valor SX	0.094	2 DAP	65	87	89	80
Valor SX	0.047	5 DAP	87	83	99	89
Valor SX	0.094	5 DAP	97	84	99	93
Valor SX	0.047	6 DAP	88	93	99	93
Valor SX	0.094	6 DAP	87	92	99	92
Valor SX	0.047	7 DAP	92	85	99	92
Valor SX	0.094	7 DAP	98	98	99	98
Valor SX	0.047	9 DAP	95	99	99	97
Valor SX	0.094	9 DAP	94	99	99	97
LSD at (0.05)	--	--	33	25	5	15

[1]Application timings: days before planting (DBP) and days after planting (DAP).