

Weed Control Programs for Dry Beans during the 2009 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 30 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 preplant on June 9 and immediately incorporated with a rototiller. Six different market classes of dry beans: Great Northern 'Marquis', small red, black 'Shania', pinto 'Poncho', yellow 'Enola', and light-red kidney 'Pink Panther' were planted on June 10. Herbicides were applied preemergence on June 12 and postemergence on June 29 and July 6. 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 July 9. A preplant application of Eptam plus Sonalan followed postemergence with Permit caused the greatest amount of crop injury (Table 2). Injury was greatest on black beans followed by yellow, red, light-red kidney, Great Northern, and pinto beans. Crop injury was greatest on the small seeded market classes, black and reds and injury was not as severe on the larger seeded market classes of light-red kidney and pinto. Adding Basagran at 0.187 lb/acre to a postemergence application of Permit reduced crop injury on all market classes of dry beans. Adding Permit at planting to Eptam plus Sonalan increased crop injury on black beans while a preplant application of Eptam plus Sonalan followed postemergence with Eptam caused injury to Great Northern, red, and black beans. Prowl H₂O applied preemergence and followed postemergence with Raptor plus Basagran caused crop injury to black beans.

Dry beans were planted with a Monosam vacuum planter calibrated to deliver approximately 100,000 seeds per acre. Seed size of different market classes varied from small seeds with blacks to larger seed size with light-red kidneys. To compensate for different seed sizes, different diameter planter plates were utilized but the number of seed planted per acre remained approximately the same. The plant population observed in the field on July 10 varied according to market class (Table 2). Plant populations in the nontreated ranged from a high of 81510 plants/acre with pintos to a low of 29470 plants/acre with the yellow market class. In general plant populations were adequate in areas planted to Great Northern, red, black, and pinto market classes and marginal in plots seeded with yellow and light-red kidney market classes. There was a trend for plant populations of black, pinto, and light-red kidney market classes to be reduced by a preemergence application of Prowl H₂O plus Valor.

Weed density in the plot area was moderate and consisted of common lambsquarters, redroot pigweed, green foxtail, and common purslane at average weed density of 735, 5, 1, and 2 plants per 275 sq ft, respectively. Common lambsquarters was present at the greatest density and all treatments except Prowl H₂O plus Outlook, Prowl H₂O plus Valor, and Dual Magnum plus Valor provided 97% or greater common lambsquarters control (Table 2). Adding Permit to a preplant application of Eptam plus Sonalan improved redroot pigweed, green foxtail, and

common purslane control over that obtained with Eptam plus Sonalan. Outlook applied preemergence after planting and followed postemergence with a combination of Raptor plus Basagran was safe on the six market classes of beans and provided excellent weed control.

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	Rrdw	Grfx	Colu
	(F)	(%)	(mph)			----- (inches) -----			
June 9	75	35	3 NW	3:00 PM	PPI	-	-	-	-
June 12	70	52	5 NW	1:30 PM	PRE	-	-	-	-
June 29	96	13	1 SE	5:00 PM	1 trifoliolate	1.5	0.5	-	-
July 6	68	67	1 SE	9:00 AM	4 trifoliolate	3	1.0	1.0	0.5

Rainfall and irrigation following herbicide application.

Date	Amount
	(inch)
June 1 to 8	1.11
June 10	1.35
June 11	0.26
June 13	0.05
June 14	0.63
June 15	0.04
June 17	0.95
June 18	0.02
June 21	0.03
June 22	0.09
June 24	0.12
June 25	0.08
June 26	0.17

Table 2. Weed Control Programs for Dry Beans during the 2009 Growing Season.

Herbicide Treatment ¹	Rate	Time of application ²	Great Northern		Red		Black	
			Visual Injury ³ 7/9	Plants/acre 7/10	Visual Injury 7/9	Plants/acre 7/10	Visual Injury 7/9	Plants/acre 7/10
	lb/acre		%		%		%	
Eptam + Sonalan	3.06 + 0.75	PPI	0	38480	0	38480	0	54860
Eptam + Sonalan + Permit	3.06 + 0.75 + 0.031	PPI	0	47980	5.0	45130	7.5	62230
Eptam + Sonalan Permit + NIS + UAN	3.06 + 0.75 0.031	PPI 1 trif	5.7	59140	9.0	47260	11.5	49160
Eptam + Sonalan Permit + Basagran + NIS + UAN	3.06 + 0.75 0.031 + 0.187	PPI 1 trif	0	51300	1.3	52960	3.8	42040
Eptam + Outlook Eptam	3.06 + 0.65 3.50	PPI 4 trif	5.0	70540	6.3	62460	8.8	39190
Dual Magnum + Sonalan + Permit Eptam	1.27 + 0.75 + 0.031 3.5	PPI 4 trif	5.0	61040	5.8	49640	6.3	30160
Prowl H ₂ O Basagran + Raptor + NIS + UAN	0.95 0.5 + 0.031	PRE 1 trif	1.3	44650	2.0	44890	7.5	37530
Outlook Basagran + Raptor + NIS + UAN	0.65 0.5 + 0.031	PRE 1 trif	0	52010	1.3	60330	1.3	36580
Prowl H ₂ O + Outlook	0.95 + 0.65	PRE	3.8	42280	5.8	43940	0	47740
Prowl H ₂ O + Valor	0.95 + 0.047	PRE	1.3	42040	2.0	46080	2.5	29210
Dual Magnum + Valor	0.95 + 0.047	PRE	1.3	39660	5.8	38710	2.5	37760
Dual Magnum + Valor + Permit	0.95 + 0.047 + 0.031	PRE	1.3	38710	1.3	41330	4.5	38480
Prowl H ₂ O Basagran + COC + UAN	0.95 1.0	PRE 1 trif	2.5	37760	1.4	44890	1.0	43460
Prowl H ₂ O + Permit	0.95 + 0.031	PRE	0	61280	2.5	50590	0	48960
Nontreated	--	--	0	58720	0	56060	0	47230
LSD at (P = 0.05)	--	--	5	NS	6	NS	6	NS

Table 2. Weed Control Programs for Dry Beans during the 2009 Growing Season – Continued.

Herbicide Treatment ¹	Rate	Time of application ²	Pinto		Yellow		Light Red Kidney	
			Visual Injury 7/9	Plants/acre 7/10	Visual Injury 7/9	Plants/acre 7/10	Visual Injury 7/9	Plants/acre 7/10
	lb/acre		%		%		%	
Eptam + Sonalan	3.06 + 0.75	PPI	0	62460	2.5	42510	2.5	50110
Eptam + Sonalan + Permit	3.06 + 0.75 + 0.031	PPI	3.8	59380	2.5	31590	3.8	47980
Eptam + Sonalan Permit + NIS + UAN	3.06 + 0.75 0.031	PPI 1 trif	2.3	50830	9.5	20430	6.3	37530
Petam + Sonalan Permit + Basagran + NIS + UAN	3.06 + 1.75 0.031 + 0.187	PPI 1 trif	1.3	67690	5.0	26840	5.0	33490
Eptam + Outlook Eptam	3.06 + 0.65 3.50	PPI 4 trif	3.8	77430	5.0	33490	2.5	45130
Dual Magnum + Sonalan + Permit Eptam	1.27 + 0.75 + 0.031 3.5	PPI 4 trif	7.6	58430	6.3	24460	1.3	41800
Prowl H ₂ O Basagran + Raptor + NIS + UAN	0.95 0.5 + 0.031	PRE 1 trif	0	57710	6.3	18760	3.8	32540
Outlook Basagran + Raptor + NIS + UAN	0.65 0.5 + 0.031	PRE 1 trif	0	63410	2.5	21610	5.0	32540
Prowl H ₂ O + Outlook	0.95 + 0.65	PRE	1.3	68640	7.0	20190	7.5	43940
Prowl H ₂ O + Valor	0.95 + 0.047	PRE	2.0	33960	0	23040	1.3	29210
Dual Magnum + Valor	0.95 + 0.047	PRE	0	50590	3.8	23990	3.8	40380
Dual Magnum + Valor + Permit	0.95 + 0.047	PRE	6.6	28740	3.8	16390	8.8	33010
Prowl H ₂ O Basagran + COC + UAN	0.95 1.0	PRE 1 trif	1.6	55580	4.8	13780	1.0	32300
Prowl H ₂ O + Permit	0.95 + 0.031	PRE	0	82650	3.8	16390	1.3	35630
Nontreated	--	--	0	81510	0	29470	0	37280
LSD at (P = 0.05)	--	--	5	NS	8	NS	9	NS

Table 2. Weed Control Programs for Dry Beans during the 2009 Growing Season – Continued.

Herbicide Treatment ¹	Rate	Time of application ²	Percent weed control 7/10 ⁴				Average weed control
			Common lambsquarters	Redroot pigweed	Green foxtail	Common purslane	
	lb/acre		----- % -----				
Eptam + Sonalan	3.06 + 0.75	PPI	97	74	78	78	81
Eptam + Sonalan + Permit	3.06 + 0.75 + 0.031	PPI	99	99	99	99	99
Eptam + Sonalan Permit + NIS + UAN	3.06 + 0.75 0.031	PPI 1 trif	99	99	99	99	99
Petam + Sonalan Permit + Basagran + NIS + UAN	3.06 + 1.75 0.031 + 0.187	PPI 1 trif	99	99	74	99	93
Eptam + Outlook Eptam	3.06 + 0.65 3.50	PPI 4 trif	97	93	99	99	97
Dual Magnum + Sonalan + Permit Eptam	1.27 + 0.75 + 0.031 3.5	PPI 4 trif	99	99	99	99	99
Prowl H ₂ O Basagran + Raptor + NIS + UAN	0.95 0.5 + 0.031	PRE 1 trif	99	99	99	99	99
Outlook Basagran + Raptor + NIS + UAN	0.65 0.5 + 0.031	PRE 1 trif	99	99	99	99	99
Prowl H ₂ O + Outlook	0.95 + 0.65	PRE	91	82	99	99	93
Prowl H ₂ O + Valor	0.95 + 0.047	PRE	87	50	99	64	75
Dual Magnum + Valor	0.95 + 0.047	PRE	87	50	99	64	75
Dual Magnum + Valor + Permit	0.95 + 0.047	PRE	98	99	74	74	86
Prowl H ₂ O Basagran + COC + UAN	0.95 1.0	PRE 1 trif	99	93	25	99	79
Prowl H ₂ O + Permit	0.95 + 0.031	PRE	99	99	50	88	84
Nontreated	--	--	0	0	0	0	0
LSD at (P = 0.05)	--	--	9	35	41	33	20

¹Spray additives were combined with the spray solution at the following rates: nonionic surfactant (NIS) at 0.25% v/v, liquid nitrogen 33-0-0 (UAN) at 1% v/v, and crop oil concentrate (COC) at 1% v/v.

²Time of application: preplant incorporated (PPI) on June 9, preemergence (PRE) after planting on June 12, postemergence at the first trifoliolate growth stage (1 trif) on June 29, and postemergence at the fourth trifoliolate growth stage (4 trif) on July 6.

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

⁴Percent weed control calculated from weed counts taken on July 10.