

## **Effectiveness of Different Herbicides for Harvest Aids in Dry Beans during the 2009 Growing Season.**

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A field study was initiated near Scottsbluff, Nebraska to compare different herbicides as harvest aids in dry beans. The objective of the experiment was to measure the influence of the herbicides on the dry-down or loss of moisture from the bean plant following treatment. The experimental design was a randomized complete block with four replications. The dry bean variety 'Poncho' (pinto market class) was planted on June 18. Plots were six rows wide by 30 feet long. Dry beans were grown in a conventional manner throughout the growing season. Herbicides were applied on September 11 when approximately 80% of the bean pods were yellow (physiological maturity of the plant). Treatments were applied with a backpack sprayer calibrated to deliver 20.8 GPA of water. Herbicides were applied between 9 to 10 AM, wind was out of the northwest at 2 mph and humidity was 51%.

At the time of treatment four dry bean plants were pulled from the soil in each replicate of the nontreated plot. Plant moisture (leaves and stems), pod moisture (pods removed from the plant and seeds removed from pods), and seed moisture were determined by weighing plant materials after removal from the field and after drying in an oven set at 120 (F) for 72 hours. Four dry bean plants were removed from each plot 7 and 14 days after herbicide application and fresh and dry weights were determined to calculate plant, pod, and seed moisture. On September 24 dry beans were pulled from a 37 sq ft area in the center of each plot, placed in a paper bag, taken to the greenhouse for drying, and thrashed with a Hege plot combine on September 25.

Environmental conditions the first 10 days following herbicide application were excellent for dry-down of bean plants (Table 1). Beginning on day 11 (September 20) light rain fell for the next three days and day-time highs ranged from 56 to 61 (F). However after 14 days seed moisture was below 10% for all treatments except areas treated with Sharpen at 0.046 lb/acre (Table 2). Sharpen applied at 0.0223 lb/acre reduced seed moisture 7 and 14 days after treatment when compared to the nontreated, while Sharpen applied at 0.0446 lb/acre did not reduce seed moisture. This suggests that Sharpen's effect on dry bean desiccation may be rate dependent.

Seven days after treatment plant, pod, and seed moisture averaged 64, 31, and 22%, respectively in the nontreated areas (Table 2). Application of Sharpen at 0.0223 lb/acre, Roundup Power Max plus Sharpen at 0.75 plus 0.0161 lb/acre, and Roundup Power Max plus Aim at 0.75 plus 0.0391 lb/acre reduced plant, pod, and seed moisture compared to the nontreated. Bean plants in the above treated areas would have been dry enough to harvest. Visual evaluation of crop desiccation taken 6 days after treatment indicated that Gramoxone Inteon reduced dry bean moisture to a greater extent than other herbicides. However plant, pod, and seed moisture measured 7 days after treatment did not indicate that Gramoxone Inteon had reduced pod and seed moisture to the same extent as Sharpen or Roundup Power Max plus Sharpen. Dry bean seed yields were not affected by any of the herbicide treatments.

Table 1. Environmental Conditions Following Herbicide Treatment of Dry Beans.

Date	2007					2008					2009				
	Air temperature			Humidity	Rain	Air temperature			Humidity	Rain	Air temperature			Humidity	Rain
	High	Low	Avg			High	Low	Avg			High	Low	Avg		
		(F)		(%)	(inch)		(F)		(%)	(inch)		(F)		(%)	(inch)
September 1	95	58	77	48		83	52	68	77	0.35		92	50	71	54
September 2	93	54	74	51		67	44	55	61			87	54	71	51
September 3	95	55	75	46		71	42	56	52			85	48	67	55
September 4	94	53	74	43		72	40	56	60	0.07		78	52	65	74
September 5	86	57	71	53	0.03	64	46	55	75	0.30		82	52	67	72
September 6	80	53	67	63	0.02	65	41	53	81	0.19		87	55	71	67
September 7	80	49	64	53		57	41	49	84	0.13		92	56	74	57
September 8	72	47	59	57		59	40	49	79			89	52	71	62
September 9	54	46	50	78	0.01	80	48	64	67			74	57	65	77
September 10	69	39	54	65		80	51	66	71			87	51	69	63
September 11	81	35	58	41		67	47	57	73			73	44	59	47
September 12	88	40	64	36		57	45	51	97	0.42		66	42	54	69
September 13	68	45	56	55		74	42	58	66			76	50	63	73
September 14	67	47	57	46		65	37	51	63			86	53	70	59
September 15	88	49	68	42		75	34	54	62			85	53	69	62
September 16	91	48	69	41		84	37	61	54			90	50	70	58
September 17	79	54	66	53		83	39	61	58			79	46	62	55

Table 1. Environmental Conditions Following Herbicide Treatment of Dry Beans – Continued.

Date	2007					2008					2009				
	Air temperature			Humidity	Rain	Air temperature			Humidity	Rain	Air temperature			Humidity	Rain
	High	Low	Avg			High	Low	Avg			High	Low	Avg		
		(F)		(%)	(inch)		(F)		(%)	(inch)		(F)		(%)	(inch)
September 18	74	48	61	54		85	46	65	58		80	48	64	54	
September 19	71	48	59	74		80	45	63	57		80	46	63	48	
September 20	91	53	72	49		81	41	61	53		82	45	64	57	0.01
September 21	75	50	62	37		84	50	67	68	0.06	55	42	49	74	0.16
September 22	91	49	70	36		84	45	65	61		56	41	49	68	0.09
September 23	83	56	69	67	0.02	75	38	56	42		61	36	48	68	
September 24	57	42	50	86	0.07	81	36	58	55		62	34	48	86	0.03
September 25	66	34	50	61		89	45	67	48		68	37	53	74	0.01
September 26	70	34	52	47		90	43	66	40		85	36	61	51	
September 27	74	36	55	42		78	53	65	61		70	33	51	42	
September 28	82	48	65	32		83	44	63	48		67	29	48	47	
September 29	81	53	67	41		73	35	54	50		79	39	59	47	
September 30	65	41	53	66	0.16	79	34	57	51		76	40	58	57	
Averages	79	47	63	52		75	43	59	62		78	46	62	61	

Date of herbicide application: September 1, 2007, September 3, 2008, September 11, 2009. 7 days after treatment: September 7, 2007, September 9, 2008, September 17, 2009. 14 days after treatment: September 14, 2007, September 16, 2008, September 24, 2009.

Table 2. Effectiveness of Different Herbicides for Harvest Aids in Dry Beans during the 2009 Growing Season.

Treatment <sup>1</sup>	Rate	Surfactant	Visual evaluation of desiccation Dry bean		Dry-bean moisture content									Dry bean seed yield
					At the time of treatment			7 days after treatment			14 days after treatment			
					9/11			9/17			9/24			
					Plants	Pods	Seed	Plants	Pods	Seed	Plants	Pods	Seed	
	(lb/acre)		----- (%) -----									(bu/acre)		
			-											
Nontreated	--	--	8	81	65	74	50	64	31	22	37	13	9	59.8
Sharpen + AMS	0.0161	MSO @ 1%	68	96				53	16	15	24	11	8	53.8
Sharpen + AMS	0.0223	MSO @ 1%	71	99				37	12	13	28	12	8	49.3
Sharpen + AMS	0.0446	MSO @ 1%	80	96				57	27	21	30	8	16	55.9
Roundup Power Max + AMS	0.75	MSO @ 1%	63	98				57	21	19	26	11	8	54.2
Roundup Power Max + Sharpen + AMS	0.75 0.0161	MSO @ 1%	81	99				40	9	12	24	11	8	51.6
Valor SX	0.0478	MSO @ 1%	68	97				48	19	17	21	12	8	53.9
Roundup Power Max + Valor SX + AMS	0.75 0.0478	MSO @ 1%	79	99				35	16	15	32	11	8	54.7
Aim + AMS	0.0391	MSO @ 1%	53	92				47	15	16	33	12	8	57.0
Roundup Power Mac + Aim + AMS	0.75 0.0391	MSO @ 1%	76	99				36	14	13	23	12	8	56.5
Gramoxone Inteon	0.5	X77 @ 0.25%	93	98				41	21	19	19	12	8	56.0
Roundup Power Max + AMS	0.75	--	30	99				43	22	19	36	19	9	55.3
LSD (P = 0.05)	--	--	10	3				20	15	9	11	5	3	NS

<sup>1</sup>Herbicides applied on September 11, 2009. Ammonium sulfate (AMS) added at the rate of 17 lb/100 gallons of spray solution.