

## **Influence of Spray Volume and Adjuvant on the Desiccation of Dry Beans with Sharpen.**

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A field study was initiated near Scottsbluff, Nebraska to compare the influence of spray volume and adjuvants on the effectiveness of Sharpen as a dry bean desiccant. The study was designed to measure the dry-down or loss of moisture from the bean plant following treatment with Sharpen. 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 either 9.4 or 6.5 gallons of water per acre. Herbicides were applied between 11 to 12 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 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). Seven days after treatment dry bean seed moisture was at or below 13% in all treated plots except where beans were treated with Sharpen plus nonionic surfactant (Table 2). In plots where Sharpen was applied at the same rate and GPA (9.4) except methylated seed oil (MSO) was added to the spray solution instead of nonionic surfactant pod moisture was 11% lower. There was also a trend for plant and seed moisture to be lower where MSO was added to the spray solution instead of nonionic surfactant. Applications of Sharpen plus MSO applied at 9.4 and 6.5 GPA were equally effective in desiccating dry beans. Dry bean seed yields were not affected by applications of Sharpen as a desiccant.

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	81	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	80	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	0.16
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. Influence of Spray Volume and Adjuvant on Desiccation of Dry Beans with the Herbicide Sharpen.

Treatment <sup>1</sup>	Rate	Spray volume	Surfactant	Visual evaluation of desiccant dry bean		Dry-bean moisture content									Dry bean seed yield				
						At the time of treatment			7 days after treatment			14 days after treatment							
						9/16		9/21	9/11			9/17				9/24			9/25
						Plants	Pods	Seed	Plants	Pods	Seed	Plants	Pods	Seed					
	(lb/acre)	(GPA)		----- (%) -----									(bu/acre)						
Nontreated	--	--	--	33	91	65	74	50	32	10	10	21	13	8	53.6				
Sharpen + AMS	0.0223	9.4	X77 @ 0.23%	63	98				57	22	19	21	10	8	55.8				
Sharpen + AMS	0.0223	9.4	COC @ 1%	71	97				55	11	13	23	11	7	51.0				
Sharpen + AMS	0.0223	9.4	MSO 1%	75	99				48	10	12	25	11	7	49.6				
Sharpen + AMS	0.0223	6.5	MSO 1%	70	97				43	10	11	32	12	10	51.4				
LSD (P = 0.05)	--	--	--	8	3				23	11	7	NS	NS	NS	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.