

Ammonium Sulfate Replacement Products with Glyphosate

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Experiments were conducted near Manhattan Kansas to evaluate various commercial additives as replacements for the addition of ammonium sulfate with glyphosate. Velvetleaf, sorghum, corn, and sunflower were planted in rows across the plot area as assay species on June 6, 2007. All treatments included Roundup WeatherMax at 11 oz/a. A low rate of glyphosate was used to accentuate any differences between adjuvant effects. Two experiments were conducted with different spray water sources having different levels of hardness. Exp 1 used spray water with a hardness of 452 ppm, and Exp 2 utilized spray water with a hardness of 134 ppm. Treatments were applied 16 inch velvetleaf, 20 inch sorghum, 32 inch corn, and 20 inch common sunflower on July 6 with 85 F, 55% relative humidity and clear skies. Treatments were applied with a compressed air tractor sprayer delivering 15 gpa at 20 psi through TT11003 Turbo Tee spray tips to the center 6.7 ft of 15 by 25 ft plots. The experiment had a randomized complete block design with three replications. Plant response was evaluated 4 weeks after treatments.

Exp 1. Weed control at 4 weeks after treatment as influenced by ammonium sulfate replacement adjuvants with glyphosate at Manhattan, Kansas, in 2007.

Treatment	Application Rate Product/100Gal	Velvetleaf	Sorghum (% control)	Corn	Common sunflower
Roundup WeatherMax +:	11 oz/a +:				
None		30	92	80	97
Liquid AMS	2.5 Gal	67	99	98	100
Liquid AMS	5 Gal	77	100	100	100
Class Act NG	2.5 Gal	77	100	100	100
Alliance	1.25 Gal	65	99	99	100
Placement ProPak	1 Gal	55	94	92	100
Dispatch AMS	2.5 Gal	72	100	100	100
Weather Gard Complete	2 qt	40	87	80	100
Choice WeatherMaster	2 qt	35	87	82	98
Flame	2 qt	42	90	90	100
Interactive	1 Gal	52	92	95	100
Accuquest	2 qt	30	90	87	100
Request	2 qt	38	88	88	98
Bronc Plus Dry EDT	10 lb	75	100	100	100
Cut Rate	4 lb	47	95	97	100
Cayuse Plus	2 qt	40	93	95	100
Bronc Max	2 qt	30	93	95	100
Array	9 lb	77	99	100	100
Zenith	10 lb	72	100	100	100
Power House	1.25 Gal	37	100	100	100
Enact	2 qt	38	85	83	100
Load Out	2 qt	38	88	90	97
Citron	2.2 lb	35	90	85	100
N-Tank	2 qt	63	98	98	100
N-Tense	2 qt	43	90	90	100
N-Tense	4 qt	57	96	98	100
Drigard	9 lb	75	100	100	100
Pro-One XL	10 lb	75	100	100	100
Ammonium Thiosulfate	2.5 Gal	42	85	83	100
Sul Act D	4 lb	40	93	95	100
LSD 5%		9	4	6	2

Exp 2. Weed control at 4 weeks after treatment as influenced by ammonium sulfate replacement adjuvants with glyphosate at Manhattan, Kansas, in 2007.

Treatment	Application				Common sunflower
	Rate	Velvetleaf	Sorghum	Corn	
	Product/100Gal	(% control)			
Roundup WeatherMax +:	11 oz/a +:				
None		53	90	95	98
Liquid AMS	2.5 Gal	67	93	97	100
Liquid AMS	5 Gal	75	95	100	98
Class Act NG	2.5 Gal	73	96	100	100
Alliance	1.25 Gal	65	98	99	100
Placement ProPak	1 Gal	63	93	98	100
Dispatch AMS	2.5 Gal	63	97	100	100
Weather Gard Complete	2 qt	57	92	95	98
Choice WeatherMaster	2 qt	47	85	95	98
Flame	2 qt	47	85	95	100
Interactive	1 Gal	63	97	100	100
Accuquest	2 qt	50	92	97	100
Request	2 qt	53	87	97	97
Bronc Plus Dry EDT	10 lb	73	97	100	98
Cut Rate	4 lb	60	90	97	100
Cayuse Plus	2 qt	53	90	99	100
Bronc Max	2 qt	52	88	98	100
Array	9 lb	80	96	100	100
Zenith	10 lb	78	95	100	100
Power House	1.25 Gal	62	97	100	100
Enact	2 qt	57	90	97	98
Load Out	2 qt	57	93	97	100
Citron	2.2 lb	53	90	95	97
N-Tank	2 qt	65	96	100	100
N-Tense	2 qt	50	94	98	100
N-Tense	4 qt	58	97	100	100
Drigard	9 lb	70	100	99	100
Pro-One XL	10 lb	80	97	100	100
Ammonium Thiosulfate	2 qtl	50	87	97	98
Sul Act D	4 lb	57	92	100	100
LSD 5%		11	4	4	3

Glyphosate activity in general was very good for the low application rate and large plants, probably due to the favorable environmental conditions preceding and at treatment time. The species exhibiting the most differences was velvetleaf, presumably because of the lower level of control in general. The addition of ammonium sulfate (AMS) greatly enhanced weed control with glyphosate. The differences in control were more pronounced in Exp 1 than Exp 2, probably because of the higher level of hardness of the spray water. Liquid AMS at 5 gal/100 gal (= 17 lb dry AMS/100 gal) generally enhanced control more than 2.5 gal liquid AMS/100gal. Weed control by glyphosate with Class Act NG was generally better than with 2.5 gal liquid AMS/100 gal. Control by glyphosate with Class Act NG, Dispatch AMS, Bronc Plus Dry EDT, Array, Zenith, Drigard, and Pro-One XL generally was similar to control with glyphosate plus full rates of AMS. Weed control by glyphosate with the other adjuvants tended to be less than with glyphosate plus AMS, and often proportional to the adjuvant rate. The low rate water conditioners evaluated did not enhance weed control with glyphosate to the same degree as the recommended rates of ammonium sulfate.