

Glyphosate formulations with adjuvants. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Mooreton, ND, to evaluate weed control from glyphosate with adjuvants applied POST. Asgrow 'AG0801' soybean was planted on April 25, 2003. POST treatments were applied on June 18 at 10:15 am with 73 F air, 86 F soil surface, 37% relative humidity, 0% clouds, 6 to 10 mph N wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V3 to V4 soybean. Weed species present were: 1 to 8 inch (5 to 25/yd²) redroot pigweed; 2 to 5 inch (5 to 10/yd²) common lambsquarters; 2 to 10 inch (5 to 15/yd²) yellow foxtail; 1 to 6 inch (1 to 10/yd²) barnyard grass and volunteer wheat; cotyledon to 8 inch (1 to 5/yd²) common cocklebur; 2 to 6 inch (1 to 3/yd²) common ragweed; 2 to 4 inch (5 to 10/yd²) wild mustard; 1 to 5 inch (3 to 10/yd²) Pa. smartweed; and 6 to 18 inch (<1/yd²) marshelder. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with three replicates per treatment.

The objectives were to evaluate six glyphosate formulations applied with adjuvant systems allowed by label. Two full adjuvant load potassium salt formulations (Roundup Weather Max and A13998A), one full adjuvant load isopropyl amine formulation (Glyphomax Plus), two partial load isopropyl amine formulations (Roundup Original and ClearOut 41 Plus), and one no load isopropyl amine formulation (Roundup Custom) was used with one adjuvant system from five major adjuvant companies selling products in the northern great plains: ClassAct Next Generation (Agrilience), N Tank (Adjuvants Plus), One-Ap XL (West Central), Bronc Plus (Wilbur-Ellis), and Blendmaster (UAP). A reduced rate of glyphosate (~0.192 lb ae/A) was used to measure adjuvant enhancement differences. The high degree of grass and broadleaf weed control was impressive considering the low rate of glyphosate used.

No soybean injury was observed with any treatment and all treatments gave 99% control of yellow foxtail, barnyardgrass, volunteer wheat, wild mustard, common cocklebur, and marshelder. No treatment provided adequate Pennsylvania smartweed control and little difference in adjuvant enhancement was observed. Roundup Weather Max and A13998A applied at a low rate may not contain enough adjuvant load in the spray solution for optimum weed control. Nonionic surfactant (NIS) + ammonium sulfate (AMS) adjuvants, ClassAct Next Generation and N Tank, greatly increased weed control from Roundup WeatherMax and A13998A. Lack of common lambsquarters control from glyphosate at full rates has been reported by growers. It has been proposed that glyphosate-K formulations convert to glyphosate-NH₃ when applied with adjuvant products containing AMS. However, isopropyl amine formulations with AMS adjuvants generally gave greater common lambsquarters control than glyphosate-K formulations with AMS. Data on common lambsquarters and common ragweed show that no- or partial-adjuvant isopropyl amine formulations plus NIS + AMS gave equal or greater weed control than glyphosate-K formulations plus AMS or NIS + AMS. Averaged across all adjuvants, Roundup Original and Roundup Custom gave the highest common lambsquarters control and averaged across all herbicides, N Tank and One-Ap XL enhanced common lambsquarters control the most. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Glyphosate formulations with adjuvants (Zollinger and Ries).

Treatment ¹	Rate (lb/A)	July 2					July 26				
		GRASS ⁸ (%)	AMARE (%)	CHEAL (%)	AMBEL (%)	POLPY (%)	GRASS ⁸ (%)	AMARE (%)	CHEAL (%)	AMBEL (%)	POLPY (%)
Glyphosate ² +AMS	0.193	83	87	70	62	62	80	78	68	60	60
Glyt ² +ClassAct NG	0.193	87	98	80	65	60	92	95	85	72	60
Glyt ² +N Tank	0.193	85	92	78	63	60	92	94	80	72	62
A13998A ³ +AMS	0.18	75	78	70	60	57	82	82	70	70	60
A13998A ³ +ClassAct NG	0.18	90	98	68	73	68	96	99	80	75	67
A13998A ³ +N Tank	0.18	93	98	75	75	70	96	99	80	73	65
Glyt ⁴ +AMS	0.192	65	82	50	60	53	63	82	53	50	40
Glyt ⁴ +ClassAct NG	0.192	94	99	87	80	67	95	99	89	85	67
Glyt ⁴ +N Tank	0.192	93	99	86	85	73	95	99	91	86	67
Glyt ⁵ +ClassAct NG	0.192	73	99	70	60	50	89	99	82	70	60
Glyt ⁵ +N Tank	0.192	98	99	93	90	82	99	98	90	90	70
Glyt ⁵ +One-Ap XL	0.192	91	99	85	75	75	95	99	92	82	65
Glyt ⁵ +Bronc Plus	0.192	91	99	73	60	50	95	99	86	73	65
Glyt ⁵ +Blendmaster	0.192	80	94	78	60	53	86	99	75	67	57
Glyt ⁶ +ClassAct NG	0.194	94	99	88	80	70	95	99	86	79	65
Glyt ⁶ +N Tank	0.194	94	99	87	80	70	96	99	91	83	65
Glyt ⁶ +One-Ap XL	0.194	77	90	70	67	50	90	95	82	65	50
Glyt ⁶ +Bronc Plus	0.194	92	99	80	75	75	96	99	87	76	65
Glyt ⁶ +Blendmaster	0.194	90	96	72	68	62	94	99	79	73	63
Glyt ⁷ +ClassAct NG	0.192	94	99	92	83	77	95	99	85	78	68
Glyt ⁷ +N Tank	0.192	90	95	83	75	72	95	98	83	73	65
Glyt ⁷ +One-Ap XL	0.192	93	99	83	73	75	97	99	84	72	65
Glyt ⁷ +Bronc Plus	0.192	80	90	77	65	62	92	96	82	70	65
Glyt ⁷ +Blendmaster	0.192	93	99	78	73	72	96	99	82	72	65
LSD (0.05)		6	5	5	6	5	3	2	4	4	3

¹AMS = ammonium sulfate at 8.5 lb/100 gallon; ClassAct NG (Next Generation) and Bronc Plus = surfactants + fertilizer at 2.5% v/v and 3% v/v respectively; N-Tank = water conditioner and buffer at 1% v/v; One-Ap XL = AMS fertilizer + surfactant + deposition + defoamer at 10 lb/100 gallon; BlendMaster = water conditioning agents + surfactants at 1% v/v.

²Glyphosate = Roundup WeatherMax.

³A13998A = glyphosate-K at a 5.0 lb ae/gal.

⁴Glyphosate = Glyphomax Plus.

⁵Glyphosate = Roundup Original.

⁶Glyphosate = Roundup Custom.

⁷Glyphosate = ClearOut 41 Plus.

⁸Grass = yellow foxtail, barnyardgrass, and volunteer wheat.