

Effect of Nutrient Additives on Herbicide Performance in Soybeans

A trial was established at the University of Delaware, Research and Education Center in Georgetown DE to evaluate the benefit of nutritional products on soybean. Objectives were to determine if crop injury would be reduced and/or if crop would recover sooner with the addition of nutrients. Experiment was a factorial design with 4 replications with ten combination treatments. DynaGrow E3 soybean variety S39EN19 was planted into no-till ground at 120K seeds per acre in 30-inch rows with 4 rows per plot and 25 ft plots on May 22, 2024. Soil was a Rosedale loamy sand (75% sand, 14% silt 11% clay) with 1.6 O.M. and 6.2 pH. Plots were sprayed with a 4-nozzle boom with 11002 AirMix tips at 20 GPA on June 20 (23 days after planting). Two combination herbicide treatments were used, Reflex plus Basagran, plus Select Max plus crop oil concentrate was one treatment and Liberty plus Enlist One plus Roundup PowerMax 3 plus dry ammonium sulfate was the other. Each of the herbicide treatments were applied with no fertilizer additive, PhosFix, Microplex, ENC Flex or sucrose. All treatments were applied at the 3rd trifoliolate (*Table 1*). Rates of the nutrients was based on manufacturer recommendations. PhosFix contained mostly macro-nutrients, Microplex was mostly micro-nutrients, and ENC Flex contained both macro- and micro-nutrients

The study was conducted as a randomized complete block design and treatments were arranged as a factorial, with herbicide treatment and fertilizer additives as the main effects.

Overhead irrigation was supplied as needed. Soybean response was evaluated visually, three times.

Table 1. Soybean injury with herbicide and nutrient combinations. Rated at 5, 12, and 19 days after application (DAA).

Trt No.	Herbicides	Nutrient additive	Rate/A	% Leafburn 5 DAA ¹		% Stunting 5 DAA		% Stunting 12 DAA		% Stunting 19 DAA	
1	Reflex Basagran Select Max	No additive		20	bc	25	b	13	ab	10	a
2	Reflex Basagran Select Max	Microplex	1.33 lb	17	c	22	b	12	ab	6	abc
3	Reflex Basagran Select Max	PhosFix	1.33 qt	20	bc	21	b	10	bc	7	abc
4	Reflex Basagran Select Max	ENC Flex	4 qt	26	a	34	a	17	a	9	a
5	Reflex Basagran Select Max	Sucrose	4 lb	24	ab	29	a	13	ab	9	ab
6	Roundup PMX Liberty 280 Enlist One	No additive		8	de	2	cd	4	d	4	b-e
7	Roundup PMX Liberty 280 Enlist One	Microplex	1.33 lb	11	d	8	c	4	d	4	cde
8	Roundup PMX Liberty 280 Enlist One	PhosFix	1.33 qt	8	de	0	d	3	d	2	de

9	Roundup PMX Liberty 280 Enlist One	ENC Flex	4 qt	8	de	3	cd	4	d	0	e
10	Roundup PMX Liberty 280 Enlist One	Sucrose	4 lb	5	e	2	cd	5	cd	5	a-d
		0.0001	0.0001	0.0001	0.0049						

Reflex at 2pt; Basagran at 1.3qt, and Select Max at 21 fl oz

Roundup PowerMax3, Liberty 280, and Enlist One were all applied at 1.3 qt/A

¹ DAA = days after application.

^x P values ≤ 0.05 indicate significant differences exist among treatments.

^z Means followed by the same letters do not significantly differ.

Treatments were rated for injury from 0 (no injury) to 100 (plant death).

Summary.

- Additives used had limited impact on herbicide efficacy or weed control in soybean.
- At five days after treatment, leaf burn was lower with the Roundup + Liberty + Enlist combination compared to the Reflex + Basagran + Select Max combination. The addition of Microplex increased injury in the Roundup-based treatment from 2% to 8%. Injury from the Reflex-based treatment increased with the addition of ENC Flex and sucrose.
- Stunting at five days after treatment followed the same pattern as leaf burn.
- Fertilizer additives had no noticeable impact at 12 or 19 days after treatment.
- Palmer amaranth control was better with Roundup-based treatments than with Reflex-based treatments. Only one significant difference was observed with the addition of nutrient additives: Microplex, when tank-mixed with the Reflex-based treatment, reduced Palmer amaranth control by 10%.
- Overall, nutrient additives had limited impact on crop safety or herbicide performance.
- No season-long differences in herbicide performance were observed when nutrient additives were included.
- This study used only three products and so need to be careful about generalizing across all nutrient additives.

In a separate study in snap bean, ENC Flex caused additional injury when used with both Reflex + Basagran + Select Max and Raptor + Basagran + Select Max. This injury was still evident three weeks after application.