

Weed control in Liberty Link soybeans with Cheetah and Cheetah Max at Rosemount, MN - 2015.

Gunsolus, Jeffrey L., Douglas W. Miller, and Bradley Kinkaid. The objective of this experiment was to evaluate weed control and crop response with Cheetah and Cheetah Max in Liberty Link soybeans. The experiment was conducted at Rosemount, MN on a Waukegon silt loam soil with pH 6.4 and 4.9% organic matter. Soil test P and K were 32 and 208 lbs/A respectively. Following corn, the experimental area was fall chisel plowed. The area was disked twice on May 20. On May 21, 60 lbs/A P and 60 lbs/A K were applied and the area was field cultivated. Viking L188N (var 14U-75HR) soybeans were planted on May 22 at a rate of 150,000 seeds/A with 30 inch row spacing. The experimental design was a randomized complete block with four replications and plot size was 10 by 30 ft. Herbicide treatments were applied on June 18 with a tractor mounted, compressed air sprayer with an eight nozzle boom and 15 inch nozzle spacing utilizing 110015VS XR Teejet flat-fan nozzles at 35 psi pressure producing a spray volume of 15 gpa. Weed control and soybean injury were visually rated and results are presented in the Table. Soybeans were not harvested for yield determination due to weed populations present. Environmental conditions and weed data at application are presented below.

<u>Treatment Date</u>	<u>June 18</u>
Time	2:15 – 2:30 pm
Air Temperature (°F)	76
Relative humidity (%)	53
Dewpoint (°F)	58
Soil Moisture	moist at 0.5"
Soil Temperature (°F)	88
Sky	25% clouds
Wind (mph)	variable NE-NW 2-6
Rainfall before Application	
Week 1 (inch)	0.50
Rainfall after Application	
Week 1 (inch)	1.80
Week 2 (inch)	0.90
Week 3 (inch)	4.80
Soybean	
Stage	1-2 trifoliolate
Height (inch)	5-6
<u>Average weed density (plants/ft²) in untreated check</u>	
Common Lambsquarters – Colq	7.5
Common Ragweed - Corw	21
Redroot Pigweed - Rrpw	5
Velvetleaf - Vele	0.75
Grass species (mostly giant foxtail)	4.75
<u>Weed height (inches)</u>	
Common Lambsquarters - Colq	0.5-1.25 (most 0.5)
Common Ragweed - Corw	0.5-3 (most 1.5-2)
Redroot Pigweed - Rrpw	0.5-2.5 (most .75-1)
Velvetleaf - Vele	1.25-1.75
Grass species (mostly giant foxtail)	0.5-4 (most 1.25-2)

Results

General observations

Common ragweed was the dominate weed species present and densities were uniform over the plot area. Most common ragweed had emerged by the June 18 application date. In contrast, late flushes of common lambsquarters, redroot pigweed, and to a lesser extent velvetleaf occurred after the application date. Initial densities of lambsquarters and pigweeds were relatively uniform while the later flushes were much more variable and patchy. Velvetleaf populations were extremely variable and were much lower in replications three and four. Giant foxtail was the main grass species present at application. Late flushes of grasses consisted primarily of wild proso millet and were variable throughout the experimental area. Other weed species present in light and variable amounts were eastern black nightshade, Pennsylvania smartweed, and woolly cupgrass.

Overall, late season weed control was fair to poor across all treatments due to the late weed flushes. This can be attributed to the one-pass system combined with high rainfall amounts after the application date that most likely reduced the residual activity of Dual Magnum (s-metolachlor) and the fomesafen component of Cheetah Max. Due to the amount and size of weeds present in October, soybeans were not harvested for yield.

Weed Control

Weed control ratings on June 24 represent the initial burndown activity of the herbicide treatments as weeds were still in the process of dying. Based on general observations at the July 14 rating date, control ratings for lambsquarters, pigweed, velvetleaf, and grasses generally represent the emergence of new weeds, as the majority of the weeds present at application had been controlled. However, common ragweed ratings on July 14 reflect the control of the initial population present on the June 18 application date, as there was little to no late emergence. The ratings presented for July 14 do not specifically differentiate between control of older weeds present at application and weeds that emerged after application.

Initial burndown of common lambsquarters (June 24) was good with all Cheetah treatments and with Cheetah Max alone. The addition of Dual Magnum with Cheetah Max provided significant extra burndown of lambsquarters compared to Cheetah Max alone and the Cheetah treatments. New flushes of lambsquarters were present by July 14. These flushes were highly variable and therefore the differences between treatments were not statically different. However, it appeared that residual activity of Cheetah Max plus Dual Magnum was better than the other treatments at the July 14 rating date.

Cheetah Max provided better overall common ragweed burndown than Cheetah. The addition of Dual Magnum to both products improved ragweed burndown as evident at the June 24 rating. Dual Magnum may have contributed to some residual control of common ragweed but as already noted, very little ragweed emerged in any of the treatments after the application date and the later ratings mainly reflect the initial postemergence control.

Cheetah Max generally provided better burndown control of pigweed than Cheetah. The addition of the higher rate of Dual Magnum to Cheetah improved the initial control of pigweed over Cheetah alone. All treatments eventually controlled pigweed present at application time. While the population variation of the late emerging pigweeds was high, residual activity of fomesafen in Cheetah Max was observed at the July 14 rating date. The addition of Dual Magnum (1 pt/a) with Cheetah Max appeared to increase the residual control but the difference was not statistically significant. The higher rate of Dual Magnum (1.33 pt/a) with Cheetah increased residual control of pigweed compared to Cheetah plus Dual Magnum at the lower (1 pt/a) rate (Cheetah did not provide any residual control). Pigweed control ratings on October 14 were not statistically different but followed the trends of the July 14 rating.

Burndown control of velvetleaf was good for all treatments on June 24 and all treatments eventually controlled velvetleaf present at application time. Residual control of velvetleaf was best with Cheetah Max plus Dual Magnum. Dual also appeared to contribute some residual velvetleaf control in the tank mixes with Cheetah.

Burndown control of grass species was generally good for all treatments on June 24 with Cheetah Max plus Dual magnum performing the best. Cheetah Max provided some residual grass control versus Cheetah at the July 14 rating but no difference was observer between these treatments at the October rating. Dual Magnum added significant season long grass control compared to Cheetah and Cheetah Max alone.

Soybean Injury

Cheetah Max caused greater initial injury (necrosis and chlorosis) than Cheetah. The addition of Dual Magnum (1pt/a) to Cheetah Max increased these injury symptoms and also resulted in some soybean stunting at the July rating date. The addition of Dual Magnum to Cheetah also increased injury symptoms, in particular the higher Dual Magnum rate (1.33 pt/a). This higher Dual Magnum rate with Cheetah also resulted in slight stunting at the July rating date.

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Treatment	Rate (product/A)	Weed Control															Soybean Injury		
		Colq			Corw			Rrpw			Vele			Grass species ¹			Necrosis	Chlorosis	Stunting
		6/24	7/14	10/14	6/24	7/14	10/14	6/24	7/14	10/14	6/24	7/14	10/14	6/24	7/14	10/14	6/24	6/24	7/14
		----- (%) -----																	
Postemergence June 18																			
Cheetah Max ²	32 oz	93	43	33	95	95	84	98	71	53	90	56	65	88	87	54	5	19	0
Cheetah ³	29 oz	93	50	58	80	86	70	91	26	38	88	35	66	86	53	49	0	6	0
Cheetah Max + Dual Magnum ⁴	32 oz + 1 pt	100	83	39	97	97	93	99	92	70	98	94	86	95	89	75	15	25	8
Cheetah + Dual Magnum	29 oz + 1 pt	90	33	43	84	91	86	93	25	29	91	76	88	89	93	84	3	9	0
Cheetah + Dual Magnum	29 oz + 1.33 pt	94	49	53	85	91	84	95	61	56	93	85	85	83	94	83	6	16	4
LSD (0.05)		4	ns	ns	2	6	7	3	33	ns	ns	27	ns	6	27	19	4	4	3

¹ Grass species = giant foxtail and wild proso millet.

² Cheetah 2.34L = glufosinate ammonium.

³ Cheetah Max 3L = glufosinate ammonium (2 lbs ai/gal) + fomesafen (1 lb/gal).

⁴ Dual Magnum 7.62E = s-metolachlor.