

Weed control with Fierce and Cobra in Roundup Ready soybeans at Rosemount, MN - 2014. Gunsolus, Jeffrey L., Douglas W. Miller, and Bradley Kinkaid. The objective of this experiment was to evaluate weed control and crop response with Fierce and Cobra plus Roundup in a Roundup Ready soybean system. The experiment was conducted at Rosemount, MN on a Waukegon silt loam soil with pH 6.5 and 4.1% organic matter. Soil test P and K were 14 and 172 lbs/A respectively. Following weedy fallow, the experimental area was fall chisel plowed. In the spring, 60 lbs/A P and 60 lbs/A K were applied and the area was field cultivated on May 5. The area was field cultivated again on May 22 and planted with Asgrow AG 1733 (RR) soybeans 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 with either a tractor mounted, compressed air sprayer with an eight nozzle boom and 15 inch nozzle spacing or a CO₂ powered backpack sprayer with a six nozzle boom and 20 inch nozzle spacing. Both sprayers utilized 110015VS XR Teejet flat-fan nozzles at 35 psi pressure producing a spray volume of 15 gpa. A broadcast application of Select Max was applied on June 13 at a rate of 14 oz/A to control grass species. Plots were visually rated throughout the growing season. On October 9, giant ragweed plants with seed were counted in each plot (center 7.5 feet x 30 feet length). Soybean yields were determined by harvesting the two center rows of each plot. Application dates, environmental conditions, and weed data are presented below. Weed control data are presented in Tables 1 and 2. Soybean injury and yield data are presented in Table 2.

Treatment Date	May 23	June 17	June 21	July 10
Application Target	Preemergence	EPost 2" weeds Roundup only	2-4" weeds following Preemergence	LPost 2-4" weeds Roundup only
Sprayer type	Tractor	Backpack	Tractor	Tractor
Air Temperature (°F)	70	72	80	79
Relative humidity (%)	39	70	45	53
Dewpoint (°F)	44	61	57	61
Soil Moisture	dry to 1.0"	moist	moist at 0.1"	not recorded
Soil Temperature (°F)	69	73	87	not recorded
Sky	clear	10% clouds	5% clouds	10% clouds
Wind (mph)	W 0-4	S 0-4	NNE 4-8	SE 10
Rainfall before Application				
Week 1 (inch)	1.61	2.90	5.88	0.65
Rainfall after Application				
Week 1 (inch)	0.54	3.23	0.20	1.58
Week 2 (inch)	2.44	0.85	0.88	0.02
Soybean				
Stage	--	V2 (20%) -V3 (80%)	V3 (5%)-V4 (95%)	R1
Height (inch)	--	5-6	7-10	20-21
<u>Average weed density (plants/ft²) in untreated check</u>				
Common Lambsquarters - Colq	--	2.8	--	--
Common Ragweed - Corw	--	3.7	--	--
Giant Ragweed - Girw	--	0.7	--	--
Nightshade - Ebns	--	7.0	--	--
Pennsylvania Smartweed - Pesw	--	1.3	--	--
Amaranth species	--	6.2	--	--
Grass species	--	150-700	--	--
<u>Weed height (inches)</u>				
Common Lambsquarters - Colq	--	0.5-1.25	0.5-1"	0.25-2" (new)
Common Ragweed - Corw	--	1-2.5"	1-8"	1-5" (new)
Giant Ragweed - Girw	--	3-5"	up to 10" most 5-8"	4-6" (old)
Nightshade - Ebns	--	0.25-1"	0.25-1"	0.5-1" (new)
Pennsylvania Smartweed - Pesw	--	1-2.5"	1-3"	none present
Amaranth species	--	0.5-2.5"	0.5-4"	0.5-3" (new)
Grasses	--	--	--	0.25-4" (new)

Results

Amaranth species included redroot pigweed and Powell amaranth with light and variable populations of tall waterhemp. Giant ragweed was present throughout the experimental area but densities were variable. Grass species densities were very high and heavy growth flushes occurred into July. Early populations consisted of giant and yellow foxtail and woolly cupgrass. Late germinating flushes consisted mainly of wild proso millet. Foxtails and proso millet were the most evenly distributed while woolly cupgrass populations were patchier.

Rainfall (0.54 inches) occurred 5 days after planting to activate the preemergence treatments. Total rainfall for the month of June was 10.57 inches.

Spray drift of Status herbicide from an adjacent corn production field occurred on June 26. This resulted in soybean injury to the entire experiment. Leaf cupping occurred on the upper 3 to 4 trifoliolate leaves with greatest injury on the youngest leaves. Subsequent leaf growth was normal and the crop appeared to have recovered well.

Weed Control

On June 20, preemergence control of lambsquarters, nightshade, smartweed, and amaranth species was 100% for all treatments. Common ragweed control was excellent with Fierce and Gangster but poor with Authority MTZ. Giant ragweed control was fair to good with Fierce and Gangster but poor with Authority MTZ.

The postemergence sequential applications on June 21 controlled the weeds present. The addition of Cobra and Marvel resulted in faster and more complete burndown of giant ragweed compared to Roundup alone. However, giant ragweed control on July 9 and later did not differ significantly and was excellent for these sequential treatments. Residual control of nightshade, smartweed, and amaranth species remained excellent throughout the season. Some late germinating common lambsquarters, common ragweed, and giant ragweed were present at the later rating dates but provided little competition due to soybean canopy closure.

The initial application of Roundup in the two pass Roundup treatment controlled all weeds present. With the exception of Pennsylvania smartweed, a second flush of all weed species occurred but these were controlled by the late sequential Roundup application.

All treatments had some giant ragweed plants with seed prior to harvest but these plants were small and generally had few seeds per plant. Seed viability was not determined. Giant ragweed in the check plots ranged from 4 to 7 feet tall with high seed numbers.

Grass control on June 13 was excellent with Fierce and good with Gangster. Authority MTZ provided fair to poor grass control. Due to the high grass density, Select Max was applied on June 13 to allow for better evaluation of broadleaf species. Grass germination continued after the sequential applications on June 21. Marvel supplied some control/suppression of grass species at the July 28 and October 9 ratings. The July 10 Roundup late sequential treatment controlled all grasses present and few grasses germinated after that date resulting in excellent control for the remaining season.

Soybean Injury and Yields

Fierce and Gangster resulted in some injury at the early rating date. Both caused a "drawstring" effect on the first trifoliolate leaf. Cobra caused severe leaf necrosis. Marvel also caused leaf necrosis but the degree was less severe. Both resulted in soybean stunting as observed on July 9. Treatment yields did not differ significantly but were all significantly greater than the untreated check.

Weed control with Fierce and Cobra in Roundup Ready soybeans at Rosemount, MN - 2014 (Gunsolus, Miller, and Kinkaid).

Table 1. Weed control (part 1).

Treatment ¹	Rate ¹ (product/A)	Broadleaf Weed Control															
		Colq				Ebns				Pesw				Amaranth species			
		6/20	7/9	7/28	10/9	6/20	7/9	7/28	10/9	6/20	7/9	7/28	10/9	6/20	7/9	7/28	10/9
		----- (%) -----															
(Preemergence May 23) / (Postemergence June 21)																	
(Fierce ²) / (Roundup ³ + AMS ⁴ + NIS ⁵)	(3 oz) / (32 oz + 3 qt + 4.8 oz)	100	100	90	99	100	100	100	100	100	100	100	100	100	100	100	100
(Fierce) / (Cobra ⁶ + Roundup + AMS + COC ⁷)	(3 oz) / (12.5 oz + 32 oz + 3 qt + 1 pt)	100	99	94	97	100	100	99	99	100	100	100	99	100	100	100	100
(Gangster V ⁸ + Gangster FR ⁹) / (Cobra + Roundup + AMS + COC)	(2 oz + 0.4 oz) / (12.5 oz + 32 oz + 3 qt + 1 pt)	100	99	91	98	100	100	100	100	100	100	100	100	100	100	100	100
(Authority MTZ ¹⁰) / (Roundup + Marvel ¹¹ + AMS)	(15 oz) / (32 oz + 9.75 oz + 3 qt)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
(Postemergence June 17) / (Postemergence July 10)																	
(Roundup + AMS + NIS) / (Roundup + AMS + NIS)	(32 oz + 3 qt + 4.8 oz) / (32 oz + 3 qt + 4.8 oz)	--	96	95	100	--	96	100	100	--	100	100	100	--	91	100	100
LSD (0.05)		ns	1	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	3	ns	ns

¹ Treatments and rates in parenthesis represent a separate application timing.

² Fierce 76WDG = 33.5% flumioxazin & 42.5% pyroxasulfone.

³ Roundup PowerMax 4.5L = glyphosate.

⁴ AMS = N-Pak ammonium sulfate solution (3.4 lbs/gal).

⁵ NIS = Preference nonionic surfactant.

⁶ Cobra 2EC = lactofen.

⁷ COC = crop oil concentrate.

⁸ Gangster V 51DF = flumioxazin (part of Gangster Co-Pack product).

⁹ Gangster FR 84DF = chloransulam-methyl (part of Gangster Co-Pack product).

¹⁰ Authority MTZ 45WG = 18% sulfentrazone & 27% metribuzin .

¹¹ Marvel 3SC = fluthiacet methyl (0.117 lb ai/gal) & fomasafen (2.883 lb ai/gal).

Weed control with Fierce and Cobra in Roundup Ready soybeans at Rosemount, MN - 2014 (Gunsolus, Miller, and Kinkaid).

Table 2. Weed control (part 2), soybean injury, and soybean yields.

Treatment ⁴	Rate ⁴ (product/A)	Broadleaf Weed Control								Girw Counts ¹ 10/9	Grass Weed Control				Soybean					Soybean Yield (bu/A)
		Corw				Girw					6/13	7/09	7/28	10/9	Injury		Stu ² Nec ³			
		6/20	7/9	7/28	10/9	6/20	7/9	7/28	10/9	6/16					6/20	6/26	7/9	7/9		
(Preemergence May 23) / (Postemergence June 21)																				
(Fierce ⁵) / (Roundup ⁶ + AMS ⁷ + NIS ⁸)	(3 oz) / (32 oz + 3 qt + 4.8 oz)	97	99	98	98	89	99	99	99	58	99	94	76	70	14	4	3	0	0	63
(Fierce) / (Cobra ⁹ + Roundup + AMS + COC ¹⁰)	(3 oz) / (12.5 oz + 32 oz + 3 qt + 1 pt)	99	99	99	100	84	100	100	99	97	99	99	84	60	11	4	41	20	30	57
(Gangster V ¹¹ + Gangster FR ¹²) / (Cobra + Roundup + AMS + COC)	(2 oz + 0.4 oz) / (12.5 oz + 32 oz + 3 qt + 1 pt)	99	100	100	100	80	98	100	99	58	90	96	81	65	6	4	40	15	18	59
(Authority MTZ ¹³) / (Roundup + Marvel ¹⁴ + AMS)	(15 oz) / (32 oz + 9.75 oz + 3 qt)	20	100	100	100	34	99	100	99	97	65	97	91	90	0	0	25	11	16	61
(Postemergence June 17) / (Postemergence July 10)																				
(Roundup + AMS + NIS) / (Roundup + AMS + NIS)	(32 oz + 3 qt + 4.8 oz) / (32 oz + 3 qt + 4.8 oz)	--	93	100	100	--	94	99	99	58	--	55	96	99	--	--	0	0	0	61
Untreated Check		--	--	--	--	--	--	--	--	6447	--	--	--	--	0	0	0	0	0	32
LSD (0.05)		13	2	ns	1	40	3	ns	ns	2517	22	7	12	ns	2	1	5	7	8	9

¹ Giant ragweed plants with seed.

² Stu = stunting.

³ Nec = Necrosis.

⁴ Treatments and rates in parenthesis represent a separate application timing.

⁵ Fierce 76WDG = 33.5% flumioxazin & 42.5% pyroxasulfone.

⁶ Roundup PowerMax 4.5L = glyphosate.

⁷ AMS = N-Pak ammonium sulfate solution (3.4 lbs/gal).

⁸ NIS = Preference nonionic surfactant.

⁹ Cobra 2EC = lactofen.

¹⁰ COC = crop oil concentrate.

¹¹ Gangster V 51DF = flumioxazin (part of Gangster Co-Pack product).

¹² Gangster FR 84DF = chloransulam-methyl (part of Gangster Co-Pack product).

¹³ Authority MTZ 45WG = 18% sulfentrazone & 27% metribuzin .

¹⁴ Marvel 3SC = fluthiacet methyl (0.117 lb ai/gal) & fomasafen (2.883 lb ai/gal).