Acetochlor and Competitive Weed Control Systems in Roundup-Ready Corn at Rosemount, MN - 2010. Gunsolus, Jeffrey L. and Douglas W. Miller. The purpose of this experiment was to compare weed control efficacy with preemergence tank mixes of acetochlor (Harness) and acetochlor plus atrazine (Harness Extra 6SE) in combination with saflufenacil (Sharpen) to premixes of acetochlor plus atrazine (Harness Extra 5.6SE), dimethenamid & saflufenacil (Verdict), dimethenamid & atrazine (Guardsman Max) and metolachlor & mesotrione & atrazine (Lumax) in a Roundup-Ready corn system. The experiment was conducted at Rosemount, MN on a Waukegon silt loam soil with 5.1% organic matter, pH 6.4, and soil test P and K levels of 64 and 422 lb/A, respectively. Following soybeans, the experimental area was fall chisel plowed. In the spring, the field was field cultivated once on April 26. On April 28, the field was fertilized with 100 lbs/A N as urea and field cultivated a second time. Dekalb DKC5044 corn was planted on April 28 at a rate of 32,000 seeds/acre with 30 inch row spacing. The experimental design was a randomized complete block with four replications and plot size was 15 by 35 ft. Preemergence herbicide treatments were applied immediately after planting to a center 10 ft strip with a CO_2 powered bicycle sprayer utilizing an eight nozzle boom with 15 inch nozzle spacing, 11002 teejet flat-fan nozzles, 30 psi pressure, and a spray volume of 20 gpa. Gylphosate (Roundup PowerMax) at 0.75 lb ae/A plus ammonium sulfate was broadcast applied postemergence to 5-6 collar corn on June 10. Yields were not measured. Application dates, environmental conditions, and weed data are presented below. Weed control ratings are presented in Tables 1 and 2.

Treatment Date	**April 26**	**June 10**
Application Time	3:30 – 4:30 pm	10:00 am
Corn Stage	--	5-6 collar, 14-18”
Air Temperature (°F)	69	61
Relative humidity (%)	19	70
Dewpoint (°F)	--	51
Soil Moisture	moist at 2”	moist
Soil Temperature (°F)	59	62
Sky	10% clouds	cloudy
Wind	ESE 8-14	SE 3-7
Rainfall before Application		
Week 1 (inch)	0.27	1.56
Rainfall after Application		
Week 1 (inch)	0.23	1.28
Week 2 (inch)	1.90	0.64
Weed Density and Height		
Giant Foxtail - Gift (28 /ft^2)	--	2-10 inches
Woolly Cupgrass - Wocg (9 /ft^2)	--	2-10 inches – most 4-8 inches
Yellow Foxtail - Yeft (13 /ft^2)	--	2-10 inches
Common Lambsquarters - Colq (6 /ft^2)	--	2-6 inches
Erect Knotweed - Erkw (2 /ft^2)	--	--
Pennsylvania Smartweed – Pesw (6 /ft^2)	--	2-5 inches
Pigweed species - pigweed (15 /ft^2)	--	2-9 inches
(- Primarily Powell amaranth)		

Initial populations of Pennsylvania smartweed were variable and erect knotweed populations were highly variable and the June 9 ratings of those species reflect that variability. Populations of Pennsylvania smartweed and wild buckwheat emerging after the glyphosate application were more uniform throughout the experimental area.

Low soil moisture and cool temperatures at planting delayed germination and emergence of both corn and weed species. The first substantial rain (1 inch) occurred 9 days after the preemergence herbicide application. Foxtail began emerging 12 days after planting. Corn was 25% emerged 19 days after planting and fully emerged 21 days after planting. Despite the delay in sufficient rainfall to activate the herbicides, effectiveness of the preemergence treatments was good due to the delay in weed germination.

No crop injury or stand reduction was noted at the June 9 rating date. Crop height reduction was observed in the plots not treated with a preemergence herbicide at the July 2 rating date (data not shown). This height reduction was a result of weed competition prior to the glyphosate application.

Control ratings prior to postemergence glyphosate application are presented in Table 1. Preemergence control of giant and yellow foxtail was excellent for all treatments except for the 13 oz/A rate of Verdict where giant foxtail control was significantly less compared to other treatments. Woolly cupgrass control was fair to poor. Verdict (in particular the 13 oz/A rate), Harness Extra 6SE + Sharpen, and Guardsman Max had the poorest control ratings for woolly cupgrass. Harness + Sharpen, Harness Extra 5.6SE, and Lumax provided slightly better woolly cupgrass control but not the excellent control observed for the foxtail grass species. Preemergence control of common lambsquarters and pigweed was good to excellent for all treatments. The low rate of Verdict resulted in the lowest control ratings of both of these broadleaf species and Guardsman Max also resulted in lower pigweed control compared to the other treatments. Pennsylvania smartweed control appeared good for most treatments but variable populations resulted in un-reliable ratings for this date. The variable populations of erect knotweed also resulted in un-reliable ratings; however it was obvious that several treatments did not effectively control this species.

Residual control ratings are presented in Table 2. Glyphosate controlled existing weed populations on June 10 and few weeds germinated after that application. Pennsylvania smartweed had the highest residual flush of the weed species present as reflected in the untreated control ratings (population counts were not taken). No differences in residual control were noted between herbicide treatments and the untreated check for grass or pigweed species. Residual control of common lambsquarters and wild buckwheat were slightly higher for the treated plots versus the untreated check but the difference was small as few weeds germinated late. All preemergence treatments provided excellent residual control of Pennsylvania smartweed which was significantly higher than the untreated check.

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Table 1. Weed control prior to postemergence glyphosate application

			Control on June 9 prior to postemergence glyphosate application						
Preemergence Herbicide Treatment[1]	Rate	Rate	Gift	Wocg	Yeft	Colq	Erkw	Pesw	pigweed
	(product/A)	(lb active ingredient/A)	%	%	%	%	%	%	%
acetochlor[2] + saflufenacil[3]	0.8 qt + 2 oz	1.4 + 0.0223	99.8	80.8	98.3	98.3	45.0	100.0	99.8
acetochlor + saflufenacil	0.8 qt + 3 oz	1.4 + 0.0334	98.5	88.8	97.0	99.8	87.5	100.0	100.0
acetochlor & atrazine[4] + saflufenacil	1.12 qt + 2 oz	1.2 & 0.48 + 0.0223	99.3	66.3	98.8	99.5	97.5	99.5	98.8
acetochlor & atrazine[4] + saflufenacil	1.12 qt + 3 oz	1.2 & 0.48 + 0.0334	99.3	65.0	99.3	99.8	87.5	100.0	99.3
dimethenamid-P & saflufenacil[5]	13 oz	0.51 & 0.0579	87.5	45.0	88.3	95.8	32.5	100.0	92.5
dimethenamid-P & saflufenacil	16 oz	0.62 & 0.0712	97.0	65.0	97.0	97.3	41.3	100.0	98.8
acetochlor & atrazine[6]	1.5 qt	1.16 & 0.94	99.8	87.5	98.3	98.8	76.3	80.0	98.8
dimethenamid-P & atrazine[7]	1 qt	0.42 & 0.82	96.8	60.0	90.3	97.8	60.0	60.0	92.5
metolachlor & mesotrione & atrazine[8]	3 qt	2.0 & 0.2 & 0.75	98.5	87.5	96.5	100.0	100.0	100.0	100.0
Untreated			--	--	--	--	--	--	--
LSD (0.05)			6.38	21.34	ns	2.33	24.11	ns	5.64

[1] Postemergence application of 0.75 lb ae/A glyphosate (Roundup PowerMax 1.33 pt/A) + 3.4 lb/A ammonium sulfate (N-Pak AMS 4 qt/A) applied on June 10.

[2] Harness 7EC .

[3] Sharpen 2.85SC.

[4] Harness Extra 6SE = premix of acetochlor (4.3 lb/gal) & atrazine (1.7 lb/gal).

[5] Verdict 5.57EC = premix of dimethenamid-P (5 lbs.gal) & saflufenacil (0.57 lb/gal).

[6] Harness Extra 5.6SE = premix of acetochlor (3.1 lb/gal) & atrazine (2.5 lb/gal).

[7] Guardsman Max 5SC = premix of dimethenamid (1.7 lbs/gal) & atrazine (3.3 lbs/gal).

[8] Lumax 3.95EC = premix of metolachlor (2.68 lb/gal) & mesotrione (0.268 lb/gal) & atrazine (1 lb/gal).

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Table 2. Weed control after postemergence glyphosate application

			Control after postemergence glyphosate application									
			Grass		Colq		Pesw		pigweed		Wibu	
Preemergence Herbicide Treatment[1]	Rate	Rate	7/2	8/25	7/2	8/25	7/2	8/25	7/2	8/25	7/2	8/25
	(product/A)	(lb active ingredient/A)	%	%	%	%	%	%	%	%	%	%
acetochlor[2] + saflufenacil[3]	0.8 qt + 2 oz	1.4 + 0.0223	99.0	99.0	99.5	99.5	99.5	99.0	99.8	99.3	99.3	99.3
acetochlor + saflufenacil	0.8 qt + 3 oz	1.4 + 0.0334	99.3	99.0	99.8	99.8	99.5	99.5	99.8	100.0	99.5	99.8
acetochlor & atrazine[4] + saflufenacil	1.12 qt + 2 oz	1.2 & 0.48 + 0.0223	99.0	99.0	100.0	99.8	99.5	99.5	100.0	99.8	100.0	99.8
acetochlor & atrazine[4] + saflufenacil	1.12 qt + 3 oz	1.2 & 0.48 + 0.0334	98.8	99.0	100.0	99.8	99.8	99.8	99.5	99.5	99.8	99.3
dimethenamid-P & saflufenacil[5]	13 oz	0.51 & 0.0579	99.3	99.0	99.3	99.3	98.0	99.0	98.5	99.5	98.8	98.5
dimethenamid-P & saflufenacil	16 oz	0.62 & 0.0712	99.0	99.3	99.5	99.5	99.3	99.0	99.8	99.5	99.3	98.8
acetochlor & atrazine[6]	1.5 qt	1.16 & 0.94	99.3	99.3	100.0	100.0	99.8	99.5	99.8	100.0	100.0	100.0
dimethenamid-P & atrazine[7]	1 qt	0.42 & 0.82	99.0	99.3	100.0	100.0	99.5	99.5	99.8	99.5	99.8	99.8
metolachlor & mesotrione & atrazine[8]	3 qt	2.0 & 0.2 & 0.75	99.8	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Untreated			95.0	95.3	97.8	98.0	90.0	91.3	99.3	98.0	96.5	97.8
LSD (0.05)			ns	ns	1.08	1.09	1.16	1.36	ns	ns	1.13	1.24

[1] Postemergence application of 0.75 lb ae/A glyphosate (Roundup PowerMax 1.33 pt/A) + 3.4 lb/A ammonium sulfate (N-Pak AMS 4 qt/A) applied on June 10.

[2] Harness 7EC .

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