Evaluation of herbicide efficacy on a waterhemp population. Young, Bryan G. and Hank J. Mager. This study was designed to evaluate the efficacy of individual herbicide active ingredients on a population of waterhemp suspected to be resistant to PPO inhibiting herbicides. The study was conducted at an off-station location in Pierron, IL. The previous crop was soybean in 2001. Glyphosate-resistant soybean was planted 1.0 inch deep at 75 lb/A into a reduced-till seedbed on June 7. Plots consisted of eight rows with 15 inch row spacing, 26 ft long arranged in a randomized complete block design with 4 replications. The herbicides were broadcast applied with a CO_2 pressurized sprayer using 8003 flat fan tips at 40 PSI in 20 GPA water. Application timings were preemergence (PRE) and 4 to 6 inch weeds (4-6"W). Rainfall was adequate following soil herbicide application and weeds were actively growing at the time of the postemergence application. Common waterhemp population was 597 per 1 m^2 in the nontreated plots, mid-season.

Application information is listed below.

Date	Jun-10-02	Jul-8-02
Treatment	PRE	4-6"W
Soil moisture	wet	dry
soybean		
leaf no.		V2
height (inch)		6
common waterhemp		
leaf no.		8-12
height (inch)		2-6

This study was initiated on a grower's field in Pierron, IL where multiple applications of the PPO inhibiting herbicide lactofen had failed to control common waterhemp the previous year. Lactofen did not provide any control of common waterhemp at either the 1 or 2X rate. Similarly, acifluorfen and fomesafen controlled less than 25% of common waterhemp. Postemergence applications of carfentrazone, flumiclorac, sulfentrazone, and lactofen & flumiclorac provided 0% control of common waterhemp at 14 DAT while flumioxazin applied postemergence provided only 30% control. Preemergence (PRE) applications of flumioxazin controlled only 23% of common waterhemp at 56 days after the postemergence application timing while sulfentrazone applied preemergence controlled 73% of common waterhemp. Imazamox also failed to control any common waterhemp in this study which suggests that this population is also resistant to the ALS-inhibiting herbicides. Only paraquat, glyphosate (UM) at 0.75 lb ae/A or greater, and glyphosate (TD) at 0.75 lb ae/A controlled over 90% of common waterhemp at this site. (Dept. of Plant, Soil and General Agriculture, Southern Illinois University, Carbondale).

Table. Evaluation of herbicide efficacy on a waterhemp population. (Young and Mager)

					Common waterhemp					
	Application		Soybean injury[b]	Soybean height	control days after POST[c]				plants days after POST	
Treatment[a]	Rate	Time	at POST	56 da POST	0	14	28	56	0	28
	(lb/A)		%	cm	%	%	%	%	1 m^2	1 m^2
Nontreated			0	56	0	0	0	0	754	597
Lactofen+COC+28%N	0.195+1.0%+2.5%	4-6"W		58		0	0	0		576
Lactofen+COC+28%N	0.39+1.0%+2.5%	4-6"W		58		0	0	0		571
Acifluorfen+COC+28%N	0.375+1.0%+2.5%	4-6"W		55		5	5	10		739
Acifluorfen+COC+28%N	0.75+1.0%+2.5%	4-6"W		58		10	10	11		647
Fomesafen+COC+28%N	0.375+1.0%+2.5%	4-6"W		58		15	13	13		676
Fomesafen+COC+28%N	0.75+1.0%+2.5%	4-6"W		62		23	20	21		459
Carfentrazone+NIS+28%N	0.025+0.25%+2.5%	4-6"W		59		0	0	0		790
Flumiclorac+COC+28%N	0.081+1.0%+2.5%	4-6"W		58		0	0	0		862
Paraquat+NIS	0.75+0.25%	4-6"W				99	98	75		27
Flumioxazin+COC	0.078+1.0%	4-6"W		50		30	18	21		716
Sulfentrazone+COC	0.25+1.0%	4-6"W		65		0	0	4		1000
Flumioxazin	0.078	PRE	20	61	50	33	3	23	106	91
Sulfentrazone	0.25	PRE	0	67	98	90	83	73	9	18
Imazamox+COC+28%N	0.039+1.0%+2.5%	4-6"W		54		0	0	0		614
Glyphosate(UM)+AMS	0.375+2.0%	4-6"W		64		78	85	83		87
Glyphosate(UM)+AMS	0.75+2.0%	4-6"W		70		97	98	95		28
Glyphosate(UM)+AMS	1.13+2.0%	4-6"W		64		99	99	98		3
Glyphosate(TD)+AMS	0.75+2.0%	4-6"W		67		99	98	93		34
Glufosinate+AMS	0.42+2.0%	4-6"W				28	26	28		878
Lactofen&flumiclorac+COC+28%N	0.094&0.027+1.0%+2.5%	4-6"W		66		0	0	0		758
Lactofen&flumiclorac+COC+28%N	0.187&0.055+1.0%+2.5%	4-6"W		58		0	0	0		552
LSD			6	11	8	4	6	10	282	312
P			0.01	0.07	0.01	0.01	0.01	0.01	0.01	0.01

[a]A Blanket EPOST application of clethodim + COC at 0.094 lb/A + 1.0 % v/v, was applied at 2-4 inch grass, to all plots including the nontreated.
COC = Prime Oil crop oil concentrate, a petroleum based additive with 17% emulsifier from Agriliance.
28%N = 28% urea ammonium nitrate.
NIS = Activator 90, a nonionic surfactant from Loveland Industries, Inc.
Glyphosate(UM) was Roundup UltraMax from Monsanto.
Glyphosate(TD) was Touchdown from Syngenta.

[b]At 14 days after the POST application, there was no crop injury except when postemergence treatments included either glufosinate or paraquat.

[c]Ratings at 0, 14, 28, and 56 days after POST were taken on Jul-8-02, Jul-22-02, Aug-5-02, and Sep-2-02, respectively.