KJM44 for Weed Control in Summer Fallow and Tolerance of Subsequent Winter Wheat

A field study was initiated at the High Plains Agricultural Laboratory near Sidney, NE to evaluate the efficacy of KJM44 for weed control during summer fallow and the tolerance of subsequently seeded winter wheat. Herbicide treatments were applied with an ATV-mounted sprayer set to deliver 11 gallons/acre at 3 miles/hour and 20 psi. Plots were 10 feet wide by 40 feet long. The study was located on an Alliance silt loam soil with an organic matter content of 3.5 % and a pH of 6.5. The summer fallow was not tilled and the previous crop was corn. Immediately prior to each treatment application timing, the entire plot area was sprayed with Roundup UltraMax at a rate of 24 oz/A to control emerged weeds. KJM44 treatment applications were made at three different timings prior to winter wheat seeding in the fall. The first treatment was applied on April 17, 2007, approximately five months prior to wheat seeding. On May 15, approximately four months prior to wheat seeding, the second herbicide application was made. The third herbicide application was made on July 17, about two months prior to wheat seeding. Roundup UltraMax was applied again on August 24, prior to winter wheat seeding on September 9, 2007. 'Millenium' winter wheat was no-till seeded at a rate of 55 pounds/A.

Plots that had been treated with KJM44 were evaluated for residual weed control just prior to, or immediately after, the entire plot area was sprayed with Roundup UltraMax (Table 1). The first application timing was rated about one month after application. Russian thistle was the only weed present at densities that allowed for rating. KJM44 provided excellent residual control of Russian thistle one month after application when applied at 0.86 or 1.71 oz ai/A. Control declined as rates declined below 0.86 oz/A. The second treatment application was rated for residual weed control approximately two months after application. Residual weed control from the first application was also rated at this time. Excellent tumble and redroot pigweed control was obtained with KJM44 applied at the rate of 1.71 oz/A. Redroot pigweed control remained excellent down to the 0.43 oz/A rate, but tumble pigweed control declined as KJM44 rate declined below 1.71 oz/A. The 1.71 oz/A rate of KJM44 applied in April, about three months earlier, was still providing excellent control of redroot pigweed. Puncturevine control ranged between 60 to 68% at KJM44 rates from 0.43 to 1.71 oz/A. Surprisingly, puncturevine control was nearly 80% in the plots receiving KJM44 at 1.71 oz/A at the first application timing, about three months earlier.

Approximately five weeks after the third application timing, redroot pigweed control was excellent with all but the lowest rate of KJM44. In fact, good to excellent control of redroot pigweed was observed in plots receiving KJM44 at any rate at the second application timing and the 1.71 oz/A rate at the first application timing. Redroot pigweed appears to be very susceptible

to residual levels of KJM44. Tumble pigweed control, on the other hand, never exceeded 50% at any rate of KJM44. Puncturevine control ranged between 63 to 83% at KJM44 rates from 0.43 to 1.71 oz/A. Puncturevine control with earlier applications of KJM44 never exceeded 40%.

No crop injury was observed during the fall of 2007. Injury did not become visible until after head emergence. Although plant height in mid-June was only reduced compared to the nontreated check by the 1.71 oz/A rate applied about two months before wheat seeding, visible wheat injury was apparent for a number of treatments in mid June (Table 2). This injury consisted of trapped heads, reduced head size, heads with few developing kernels, and delayed crop development. Very little injury was observed in plots treated with KJM44 at the first application timing in April. Injury was apparent in plots treated with KJM at the two highest rates in May and July. Visual injury was greatest at the 1.71 oz/A rate applied in either May or July. Wheat yields generally followed visual injury ratings with the exception that although the 1.71 oz/A rate applied in April resulted in very little visible crop injury, grain yield was significantly reduced and similar to yields obtained at the two highest rates applied in May or July.

Table 1. Weed control during summer fallow with KJM44 applied 2, 4 and 5 months prior to winter wheat seeding.

			May 16	July 12			August 21		
Treatment	Rate	Timing*	Russian thistle	Tumble pigweed	Redroot pigweed	Punctur-vine	Tumble pigweed	Redroot pigweed	Puncture-vine
	oz ai/A	months	%						
KJM44	0.214	5	60	0	0	7	0	0	0
KJM44	0.43	5	82	13	23	23	7	70	13
KJM44	0.86	5	98	37	73	37	23	70	23
KJM44	1.71	5	100	33	92	78	20	88	33
KJM44	0.214	4	--	17	37	23	13	88	40
KJM44	0.43	4	--	37	93	60	0	87	33
KJM44	0.86	4	--	63	87	67	0	98	23
KJM44	1.71	4	--	92	97	68	0	100	27
KJM44	0.214	2	--	--	--	--	17	83	27
KJM44	0.43	2	--	--	--	--	33	98	63
KJM44	0.86	2	--	--	--	--	37	100	73
KJM44	1.71	2	--	--	--	--	50	100	83
Nontreated check			0	0	0	0	0	0	0
LSD (5%)			45	19	24	28	16	19	37

*Months prior to winter wheat seeding.

Table 2. Winter wheat injury following the application of KJM44 for weed control at various times during summer fallow.

Treatment	Rate	Timing*	Plant height	Visual crop injury	Yield
	oz ai/A	months	inches	%	bu/A
KJM44	0.214	5	33	0	43.6
KJM44	0.43	5	34	0	37.7
KJM44	0.86	5	33	0	24.6
KJM44	1.71	5	34	3	9.9
KJM44	0.214	4	36	0	38.6
KJM44	0.43	4	34	2	19.4
KJM44	0.86	4	32	7	8.2
KJM44	1.71	4	32	23	3.5
KJM44	0.214	2	34	0	38.4
KJM44	0.43	2	32	5	24.9
KJM44	0.86	2	34	17	5.6
KJM44	1.71	2	27	27	4.5
Nontreated check			31	0	46.7
LSD 5%			4	6	7.2

*Months prior to winter wheat seeding.