

Weed Control During Summer Fallow with KJM44 and Subsequent Wheat Tolerance

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 determine 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 Duroc loam soil with an organic matter content of 3.4% and a pH of 6.2. 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 ounces/acre to control emerged weeds. KJM44 treatment applications were made 6, 4 and 2 months prior to winter wheat seeding in the fall. The first treatment was applied on April 2, 2008, approximately six months prior to wheat seeding. On May 20, approximately four months prior to wheat seeding, the second herbicide application was made. The third herbicide application was made on July 19, about two months prior to wheat seeding. Roundup UltraMax was applied again on September 1, prior to winter wheat seeding on September 10. ‘Pronghorn’ winter wheat was no-till seeded at a rate of 50 pounds/acre. Kochia and Russian thistle were the primary weeds for the six and four month ratings. Redroot pigweed and sandbur were the most prevalent at the two month application time before wheat seeding.

Weed control was evaluated about three weeks after treatment applications (Table 1). KJM44 provided very good to excellent control of kochia and Russian thistle at all rates when applied 6 and 4 months prior to winter wheat seeding. Control of redroot pigweed and sandbur with treatments applied 2 months prior to winter wheat seeding was rate dependent and ranged from poor to excellent for redroot pigweed and poor to fair for sandbur. The efficacy of earlier applications on redroot pigweed and sandbur were also evaluated on August 11. Only slight activity was observed for sandbur. Redroot pigweed control from treatments applied 4 months prior to wheat seeding were similar to those observed for the 2 month treatments. Fair control of redroot pigweed was still observed for the highest rate applied 6 months prior to wheat seeding.

Crop injury was not observed in the fall of 2008. In the spring of 2009, some plots in the third replication showed signs of winter kill and stand loss. This injury was worst in plots that had been treated with the higher rates at 2 and 4 months prior to seeding. These symptoms were not evident in the first two replications, suggesting the possible influence of soil type. More crop injury was observed at the time of heading (Table 2). This injury was primarily observed as plant stunting and heads that were deformed and sterile. Some head sterility was not detected by visual observation. Many treatments with low visual injury ratings still had significant yield loss compared to the nontreated check. The only treatments that did not have a significant yield loss compared to the nontreated check were the two lowest rates of KJM44 applied 6 months prior to wheat seeding.



Wheat head injury.

Table 1. Weed control during summer fallow with KJM44 and subsequent wheat tolerance.

Treatment	Rate	Timing ^a	April 27		June 18		August 11	
			Kochia	R. thistle	Kochia	R. thistle	Redroot pigweed	Sandbur
	oz ai/A	months	%					
KJM44	0.214	6	88	90	--	--	0	0
KJM44	0.43	6	90	88	--	--	27	30
KJM44	0.86	6	99	97	--	--	37	0
KJM44	1.71	6	100	98	--	--	80	23
KJM44	0.214	4	--	--	92	97	47	27
KJM44	0.43	4	--	--	100	100	47	30
KJM44	0.86	4	--	--	98	100	63	23
KJM44	1.71	4	--	--	100	100	93	30
KJM44	0.214	2	--	--	--	--	50	37
KJM44	0.43	2	--	--	--	--	63	40
KJM44	0.86	2	--	--	--	--	88	40
KJM44	1.71	2	--	--	--	--	95	77
Nontreated check			0	0	0	0	0	0
LSD (5%)			10	8	4	5	42	40

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

Treatment	Rate	Timing ^a	Plant height	Crop injury	Yield
	oz ai/A	months	inches	%	bu/A
KJM44	0.214	6	41	0	46.2
KJM44	0.43	6	42	0	41.1
KJM44	0.86	6	42	0	27.4
KJM44	1.71	6	39	8	4.4
KJM44	0.214	4	42	0	29.6
KJM44	0.43	4	42	0	23.5
KJM44	0.86	4	39	5	3.9
KJM44	1.71	4	36	22	1.3
KJM44	0.214	2	41	0	20.0
KJM44	0.43	2	41	3	7.9
KJM44	0.86	2	38	17	2.2
KJM44	1.71	2	34	30	1.3
Nontreated check			42	0	49.4
LSD (5%)			4	11	8.4

^aMonths prior to winter wheat seeding.