

BROADLEAF WEED CONTROL IN SPRING WHEAT

Charles E. Stanger and Joey Ishida
Malheur Experiment Station
Oregon State University
Ontario, Oregon, 1995

Purpose

In two separate trials, 13 different herbicides and formulations were evaluated for weed control and tolerance to spring wheat when applied at different rates in tank-mix combinations.

Materials and Methods

Treasure variety of spring wheat and kochia (*Kochia scoparia*) weed seed were planted on April 3, 1995, in a field where potatoes had been grown during 1994. Herbicides applied to control weeds in potatoes included Prowl, Eptam, Matrix and Poast. Herbicide rates for potatoes were 1.5, 3.0, 0.028 and 0.3 lb ai/ac, respectively. The potatoes had been irrigated by sprinkler irrigation. The field was not plowed after potatoes but left over-winter to freeze leftover tubers and tilled with a triple-K field cultivator and ground-hog field cultivator in the spring before planting the wheat. Seeding rate of wheat was 130 lb/ac planted with a double-disc drill with 6-inch row spacing. The field was harrowed and corrugated after planting in preparation for furrow irrigation. One hundred lbs/ac nitrogen was applied broadcast and tilled in the soil as the seedbed was prepared. Soil texture was a silt loam with a pH of 7.3 and 1.1 percent organic matter.

Herbicide treatments were applied on May 18. The wheat had two to three tillers and was 6 to 8 inches tall. Weed populations were dense, and species included kochia, lambsquarters, redroot pigweed, tumble mustard, hairy nightshade, and annual sow thistle. Weed species varied from 1 to 6 inches tall. The tallest species was kochia. Tumble mustard and sowthistle had 2 to 3-inch rosettes. At application, the wind was blowing 2 to 3 mph from the northwest. Air temperature was 78° F, and soil temperature at 4-inches deep was 72° F. Relative humidity was 38 percent with clear skies.

Herbicides were applied with a single bicycle-wheel plot sprayer. The spray boom was 8.5 feet long. Teejet fan nozzles size 8002 were spaced 10-inches apart on the spray boom, and herbicides were applied broadcast as double-overlap applications. Spray pressure was 42 psi, and water as the herbicide carrier was applied at a volume of 33.4 gal/ac. Individual plots were 9 feet wide and 40 feet long, and each treatment was replicated three times in blocks using a randomized complete block experimental design.

The plots were harvested on August 22 and 23 to determine grain yields. Harvest area was 4 feet wide x 35 feet long. Grain yields are reported as bushels per acre of clean wheat.

Results

All herbicide treatments, with the exception of Peak, controlled all weed species (Tables 1 and 3). Peak controlled about 90 percent of kochia, lambsquarters, and redroot pigweed and about 82 percent control of hairy nightshade and 63 percent control of annual sow thistle. The highest wheat yields occurred when weeds were fully controlled with herbicides. Weed competition in the untreated checks reduced wheat yields significantly (Tables 2 and 4). Kochia was very vigorous and grew 3 to 4 feet above the height of the wheat in the untreated checks. Tough, a herbicide, in tank-mix combination with Sencor caused severe necrosis to the leaves of the wheat. The wheat plants recovered from the foliar injury, but wheat yields were significantly less compared to yields from other treatments.

Table 1. Crop injury ratings and percent weed control from herbicide treatments applied to Treasure spring wheat. Malheur Experiment Station, Oregon State University, Ontario, Oregon, 1995.

		Percent weed control																					
		Crop injury			Kochia			Lambsquarters			Pigweed			Tumble mustard			H. nightshade			Sowthistle			
Herbicides	Rate	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
	lb ai/ac	— % —			— % —																		
Peak + X-77	0.018 + 0.25%	0	0	0	93	90	90	85	90	85	95	95	95	90	95	90	85	80	80	65	60	60	
Bronate Gel	0.5	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate	0.5	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate	0.8	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Harmony Extra + X-77	0.016 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate Gel + Harmony Extra + X-77	0.5 + 0.016 + 0.25%	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate + Harmony Extra + X-77	0.5 + 0.016 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
MCPA Ester + Harmony Extra + X-77	0.25 + 0.016 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Weedar 64 + Harmony Extra + X-77	0.25 + 0.016 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Banvel SGF + Harmony Extra + X-77	0.25 + 0.016 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate + Express + X-77	0.5 + 0.004 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate	1.0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Weedar 64	1.0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Harmony Extra + X-77	0.0234 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Harmony Extra + Weedar 64 + X-77	0.0234 + 0.5 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bronate + Harmony Extra + X-77	0.25 + 0.0234 + 0.25 %	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Untreated Check	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evaluated on May 30 and June 6. Ratings on the two dates were the same.

Ratings: 0 = No herbicide effect. 100 = all plants killed.

Table 2. Grain yields of Treasure spring wheat treated with herbicides applied postemergence for control. Malheur Experiment Station, Oregon State University, Ontario, Oregon, 1995.

Herbicides	Rate	Yield			
		R ₁	R ₂	R ₃	Mean
	lb ai/ac	bu/ac			
Peak + X-77	0.018 + 0.25%	96	99	101	98.7
Bronate Gel	0.5	102	105	100	102.3
Bronate	0.5	106	102	104	104.0
Bronate	0.8	104	101	107	104.0
Harmony Extra + X-77	0.016 + 0.25%	101	103	105	103.0
Bronate Gel + Harmony Extra + X-77	0.5 + 0.016 + 0.25%	105	100	103	102.7
Bronate + Harmony Extra + X-77	0.5 + 0.016 + 0.25%	103	106	105	104.7
MCPA ester + Harmony Extra + X-77	0.25 + 0.016 + 0.25%	101	104	98	101.0
Weedar 64 + Harmony Extra + X-77	0.25 + 0.016 + 0.25%	99	103	96	99.3
Banvel SGF + Harmony Extra + X-77	0.25 + 0.016 + 0.25%	98	100	97	98.3
Bronate + Express + X-77	0.5 + 0.004 + 0.25%	104	101	99	101.3
Bronate	1.0	102	104	106	104.0
Weedar	1.0	101	98	104	101.0
Harmony Extra + X-77	0.02	103	105	99	102.3
Harmony Extra + X-77 Harmony Extra + Weedar 64 + X-77	0.0234 + 0.5 + 0.25%	99	103	101	101.0
Bronate + Harmony Extra + X-77	0.25 + 0.0234 + 0.25%	104	106	103	104.3
Untreated Check	—	81	88	93	87.3
LSD (0.05)					5.0
CV (%)					3.0
Mean					101.3

Harvested August 22, 1995.

Table 3. Crop injury and percent weed control from herbicide treatments applied to Treasure spring wheat. Malheur Experiment Station, Oregon State University, Ontario, Oregon, 1995.

Herbicides	Rate	Percent weed control																										
		Crop injury			Kochia			Lambsquarters			Pigweed			Tumble mustard			H. nightshade											
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3									
	lb ai/ac	-----%-----			-----%-----																							
Barvel + Buctril	0.094 + 0.25	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Barvel + Buctril + MCPA amine	0.094 + 0.125 + 0.25	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Barvel + Buctril + MCPA amine	0.094 + 0.025 + 0.25	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Barvel + Buctril + Harmony Extra	0.094 + 0.125 + 0.0078	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Barvel + Buctril + Harmony Extra	0.094 + 0.25 + 0.0078	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Buctril + Harmony Extra	0.125 + 0.0078	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Barvel + Buctril + MCPA amine	0.094 + 0.125 + 0.25 + 0.0078	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						
Tough (ec)	0.9	40	30	40	85	90	85	90	90	85	90	95	95	75	80	75	95	90	95									
Tough (ec)	0.5	20	25	15	75	80	80	80	85	80	90	80	80	65	70	70	85	80	80									
Barvel + Tough (ec)	0.094 + 0.47	30	30	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64	0.094 + 0.38	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64 + Tough (ec)	0.094 + 0.38 + 0.235	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Tough (ec) + Sencor	0.47 + 0.125	45	50	45	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64 + Harmony Extra	0.094 + 0.25 + 0.0078	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64 + Harmony Extra	0.094 + 0.25 + 0.0156	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64 + Tough (ec)	0.094 + 0.25 + 0.47	10	10	15	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Barvel + Weedar 64 + Buctril	0.094 + 0.25 + 0.25	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
San 845H + Weedar 64	0.094 + 0.38	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
San 845H + Savage	0.094 + 0.38	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100									
Untreated Check	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

Barvel formulated 45L was used in all Barvel treatments.

X-77 was added to all herbicide treatments at the rate of 0.25 % v/v.

Evaluated on May 30 and June 6. On June 6 the wheat plants were recovering from the Tough and Tough combination treatments.

Ratings: 0 = No herbicide effect. 100 = all plants killed.

Table 4. Grain yields in bushels per acre from herbicide treatments applied to Treasure spring wheat. Malheur Experiment Station, Oregon State University, Ontario, Oregon, 1995.

Herbicides	Rate	Yield			
		R ₁	R ₂	R ₃	Mean
	lb ai/ac	bu/ac			
Banvel + Buctril	0.094 + 0.25	98	102	99	99.7
Banvel + Buctril + MCPA amine	0.094 + 0.125 + 0.25	101	98	96	98.3
Banvel + Buctril + MCPA amine	0.094 + 0.25 + 0.25	98	100	102	100.0
Banvel + Buctril + Harmony Extra	0.094 + 0.125 + 0.0078	104	102	99	101.7
Banvel + Buctril + Harmony Extra	0.094 + 0.25 + 0.0078	103	101	104	102.7
Buctril + Harmony Extra	0.125 + 0.0078	106	103	101	103.3
Banvel + Buctril + MCPA amine + Harmony Extra	0.094 + 0.125 + 0.0078	103	99	102	101.3
Tough (ec)	0.9	101	105	99	101.7
Tough (ec)	0.5	99	103	98	100.0
Banvel + Tough (ec)	0.094 + 0.47	102	99	101	100.7
Banvel + Weedar 64	0.094 + 0.38	103	98	99	100.0
Banvel + Weedar 64 + Tough	0.094 + 0.38 + 0.235	102	104	98	101.3
Tough (ec) + Sencor	0.47 + 0.125	96	94	97	95.6
Banvel + Weedar 64 + Harmony Extra	0.094 + 0.25 + 0.0078	102	104	98	101.3
Banvel + Weedar 64 + Harmony Extra	0.094 + 0.25 + 0.0156	103	99	101	101.0
Banvel + Weedar 64 + Tough	0.94 + 0.25 + 0.47	104	102	103	103.0
Banvel + Weedar 64 + Buctril	0.094 + 0.25 + 0.25	101	104	99	101.3
San 845 H + Weedar 64	0.094 + 0.38	103	99	101	101.0
San 845 H + Savage	0.094 + 0.38	104	101	98	101.0
Untreated check	--	83	85	80	82.7
LSD (0.05)					3.6
CV (%)					2.2
Mean					99.8

Harvested August 23, 1995.