University of California
Agriculture and Natural Resources
Intermountain Research & Extension Center

RESEARCH REPORT
Number 132, 2011

2010 Herbicide Influence on Russet Burbank Yield

Rob Wilson, Center Director/Farm Advisor; Don Kirby, Superintendent of Agriculture; Brooke Kliewer & Kevin Nicholson, Staff Research Associates. University of California Intermountain Research & Extension Center, 2816 Havlina Rd. Tulelake, CA. 96134 Phone: 530/667-2719 Fax: 530/667-5265
Email: rgwilson@ucdavis.edu

Introduction: In 2010, a weed control trial was established at the Intermountain Research & Extension Center (IREC) to evaluate the efficacy and crop safety of preemergent and postemergent herbicides in a Russet Burbank potato crop. The primary objective was to determine the influence of Tulelake's unique high organic matter silty clay loam soils on dimethenamid (Outlook) and pendimethalin (Prowl H_20) efficacy and crop safety. Some herbicide rates used in this trial are not labeled for use in potatoes. Please consult herbicide labels for use instructions.

General Trial Information:

Location:	IREC, Tulelake, CA
Soil Type:	Tulebasin mucky silty clay loam with 6% organic matter
Planting Date:	May 14, 2010
Vine Kill Date:	September 16, 2010
Days to Vine Kill:	125 days
Harvest Date:	October 8, 2010
Irrigation:	Solid-set sprinklers
Plot Size:	2 rows by 25 feet
In-Row Seed Spacing:	10.0 inch
Row Spacing:	36 inch wide beds
Number of Reps:	4 replications
Fertilizer:	195-246-6-84
Insecticides:	None
Fungicides:	Maxim (seed treatment), Quadris & Blocker (in-furrow at planting), Bravo & Quadris (foliar applications)
Fumigation:	None

Herbicide Treatments and Application Method:

- See Table 1 for a list of herbicide treatments. Herbicides were applied with CO_2 backpack sprayer at 20 GPA. The plot area was irrigated with 1 acre inch of water 24 hours after each herbicide application.

Weed Density Counts and % Control Rating:

- Weed density was measured by counting weeds in the center 20 ft of each plot. Percent weed control was visually estimated within the entire plot area. Evaluations occurred on June 14th, June 24th, and September 16th. Weed species in every plot included redroot pigweed, henbit, and hairy nightshade.

Yield:

- Every plot (2 beds by 25ft) was harvested for tuber yield and then graded for tuber size, shape, and quality.

Results:

Potato yield, tuber size distribution, and culls did not differ between treatments (Table 2). The primary weed species in the trial were redroot pigweed, henbit, and hairy nightshade. All rates of Outlook and Outlook + Prowl H_20 applied after hilling reduced hairy nightshade and pigweed density compared to the untreated control (Figure 1). Matrix and Matrix + Sencor applied shortly after potato emergence greatly reduced hairy nightshade, pigweed, and henbit density compared to untreated plots. Matrix + Sencor applied after hilling and before potato emergence provided significantly less hairy nightshade control compared to Matrix + Sencor applied after potato emergence. Tank-mixing Outlook + Prowl H_20 provided better control of henbit compared to using either product alone.

Tank-mixing Outlook and Prowl H_20 as a pre-emergent application after hilling reduced density of several weeds species on Tulelake soils. The pre-emergent tank-mix did not provide 100% weed control of any weed species, but it reduced weed density and stunted weeds to provide optimal conditions for postemergent herbicide application. Outlook and Prowl H_20 will likely require a follow up post-emergent application of Matrix or Matrix + Sencor for effective weed control.

Table 1. Herbicide Treatment Rates and Timing			
Treatment	Application Date		
	5/18/2010*	6/14/2010**	7/1/2010 ***
1. Untreated			E
2. Outlook 10.5 oz/A	X		E
3. Outlook 21 oz/A	X		E
4. Outlook 31.5 oz/A	X		E
5. Prowl H20 3 pt/A	X		E
6. Outlook 10.5 oz/A + Prowl H20 3 pt/A	X		E
7. Outlook 21 oz/A + Prowl H20 3 pt/A	X		E
8. Outlook 31.5 oz/A + Prowl H20 3 pt/A	X		E
9. Matrix 1.5 oz/A + Sencor (4L) 1.0 pt/A	X		E
10. Matrix 1.5 oz/A + Sencor (4L) 1.0 pt/A + NIS 0.125% v/v		X	
11. Matrix 1.5 oz/A + NIS		X	E
12. Matrix 1.5 oz/A + MSO		X	E
12. Matrix 1.5 oz/A + MSO			E

**** 5/18/2010- Weeds and potatoes had yet to emerge. Application occurred after hilling.***

***** 6/14/2010- Potatoes were 2 to 3 inches tall. Weeds were 0.5 to 2 inches tall.***

******7/1/2010- Sencor + Matrix was applied to most treatments when potatoes were 1 ft tall.***

This 7/1/2010 application was applied to control the weed escapes in the plots to prevent weed competition from influencing yield.

Table 2. The Influence of Herbicides on Russet Burbank Yield at IREC in 2010.

	Total Yield (cwt/A)									
	U.S. No. 1's (cwt)									
Treatment	Total 1's	12-16 oz	8-12 oz	4-8 oz	<4 oz	>16oz	2's	Culls	Total	% 1's
Untreated	311	18	84	209	109	6	13	18	457	68
Outlook 10.5 Fl oz/A immediately after planting*	314	16	85	213	102	8	13	26	462	68
Outlook 21 Fl oz/A immediately after planting*	330	25	95	210	105	6	20	20	480	69
Outlook 31.5 Fl oz/A immediately after planting*	318	23	81	214	100	6	23	20	467	68
Prowl H20 3 pt/A immediately after planting*	330	27	93	210	107	3	17	22	479	69
Outlook 10.5 Fl oz/A + Prowl H20 3 pt/A immediately after planting*	320	20	83	218	99	3	18	20	461	70
Outlook 21 Fl oz/A + Prowl H20 3 pt/A immediately after planting*	316	27	88	202	103	2	15	20	456	69
Outlook 31.5 Fl oz/A + Prowl H20 3 pt/A immediately after planting*	320	24	92	205	100	2	20	16	459	70
Matrix 1.5 oz/A + Sencor immediately after planting*	300	11	78	211	118	2	23	15	458	66
Matrix 1.5 oz/A + Sencor 1.0 pt/A + NIS 0.125% v/v Post-emergent**	341	33	95	213	97	14	19	24	494	69
Matrix 1.5 oz/A + NIS Post-emergent**	317	17	88	212	106	5	16	13	457	69
Matrix 1.5 oz/A + MSO Post-emergent**	322	19	81	222	102	3	33	16	476	68
Mean	320	22	87	212	104	5	19	19	467	69
LSD {0.05}	NS	NS	NS	NS	NS	NS	10.4	NS	NS	NS

*Post-plant treatments were applied immediately after planting on 5/18/10 at 20 GPA. The plots were hilled before application. No weeds had emerged.

**Post-emergent treatments were applied on 6/14/10 at 20 GPA when potatoes reached 100% emergence and were 2-3 inches tall. Weeds were 0.5-2 inches tall.

Plots were irrigated with 1 inch of water after herbicide application.

Figure 1. Herbicides' Influence on Weed Density in Russet Burbank Potatoes

(weed density measured when crop was 8 inch tall on 6/24/10)