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2009 Intermountain Research & Extension Center (IREC) Potato Management Trials

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Chip Management Trial

A management trial was established to determine the influence of nitrogen fertilizer and proprietary seed treatments on chip potato yield and tuber size. We intended to plant two trials, an early spring trial and a late spring trial, but due to heavy rain in early June the second planting date was not possible. The early-spring trial was planted on May 14th. A proprietary chip variety of local grower interest was planted on 36" raised beds using 7 inch seed spacing. The trial was irrigated with solid-set sprinklers. Crop fertility (except for nitrogen) and pest management practices followed university recommendations.

The chip trial included four nitrogen fertilizer treatments comparing nitrogen rates and application times. Treatments are listed in Table 1. Side-dress applications at first cultivation and 6 inch crop height were made on May 27th and June 24th respectively. Liquid nitrogen (UAN 32) applications started shortly after tuber initiation and were applied on June 30th and July 8th. Treatments 5 through 8 were the same as treatments 1 through 4 with regard to nitrogen fertilizer, but treatments 5 through 8 included application of PGPR, a growth promoting rhizobacteria and 1-19-0 applied in-furrow at planting. Treatments 9 and 10 had the same nitrogen fertilizer program as treatment 3, but treatments 9 and 10 included Intracept, a nutrient enhancer, applied at planting in furrow (trt 9) or to the foliage on June 24th(trt 10).

Vines were rolled in early September then followed by an application of Reglone a week later for vine kill. The trial was harvested on October 7, 2009 for tuber yield and grade.

Results

Fifty lbs of N/acre applied at planting as the total season nitrogen rate (treatments 1 and 5) was insufficient to maximize yield (Table 2). Adding 50 lbs N/acre of liquid nitrogen fertilizer during tuber bulking (treatments 2 and 6) to the 50 lbs N/acre at planting treatment did influence yield compared to only applying 50 lbs N/acre at planting. Nitrogen fertilizer treatments with the highest yield included 50 lbs N/acre applied at planting plus nitrogen side-dressed at 100 lbs N/acre at first cultivation (trts 3 and 7) or nitrogen side-dressed at 50 lbs N/acre at first cultivation and when potatoes were 6 inches high (trts 4 and 8). The addition of PGPR or Intracept did not influence tuber yield or quality (Tables 3 &4).

Russet Burbank Management Trial

Two proprietary plant growth enhancers were evaluated to determine their influence on Russet Burbank yield and quality. The trial was planted on May 19, 2009 at 11 inch seed spacing with a custom two row planter. Plots were 50ft long. Irrigation, fertilizer, and pest management practices followed UC recommendations, and they were the same across treatments.

Treatments included X-tra Power applied in furrow at planting, Intracept applied in furrow at planting, Intracept broadcast-applied to foliage on June 24th, and an untreated control. All seed was treated with Quadris fungicide at planting. The trial was harvested on October 7, 2009. Tuber yield, tuber size grade, and internal tuber condition were evaluated.

Results

All treatments including the untreated control did not differ with regard to tuber yield, tuber size, culls, and internal evaluation (Tables 5 & 6).

Table 1. 2009 Chip Management Treatment List

Trt #	Nitrogen applied at planting	Nitrogen side-dressed at 1st cultivation	Nitrogen side-dressed at 6" foliage	Nitrogen during bulking	PGPR + 1-19-0 in furrow at planting	Intracept
	---------- lbs N/A ----------					
1	50					
2	50			50		
3	50	100				
4	50	50	50			
5	50				x	
6	50			50	x	
7	50	100			x	
8	50	50	50		x	
9	50	100				in furrow
10	50	100				foliar

[1] UAN-32 was applied twice on 6-30 and 7-8 at 25lbs, starting at early tuber bulking

[2] PGPR applied at 1 oz/a; & 1-19-0 applied @ 2 qts/a

[3] Intracept applied at 1 pt/a in furrow at planting or to foliage shortly before row closure

Table 2. Effect of Nitrogen Rate, Nitrogen Application Time, and PGPR on Tuber Yield and Size of Chip Potatoes. Tulelake Chip Management Trial, 2009.

	Tuber Yield (cwt/A)								
	U.S. No. 1's								
Treatment	**Total 1's**	**12-16oz**	**8-12oz**	**4-8oz**	**<4oz**	**>16oz**	**Culls**	**Total**	**%1's**
1	340	25	153	162	117	3	8	467	73
2	324	26	146	152	102	7	7	440	74
3	386	61	196	129	80	22	15	502	77
4	393	53	194	145	85	11	15	504	78
5	333	25	151	158	109	3	9	454	73
6	352	31	167	154	104	6	8	470	75
7	405	55	203	147	98	14	18	535	76
8	398	52	210	136	86	11	12	508	78
Mean	366	41	177	148	98	10	12	485	75
LSD {0.05}	37.9	17.3	28.3	NS	17.3	9.6	6.5	41.2	3.4

Table 3. Effect of Intracept on Tuber Yield and Size of Chip Potatoes. Tulelake Chip Management Trial, 2009.

	Tuber Yield (cwt/A)								
	U.S. No. 1's								
Treatment	**Total 1's**	**12-16oz**	**8-12oz**	**4-8oz**	**<4oz**	**>16oz**	**Culls**	**Total**	**%1's**
trt 3- N fertilizer alone	386	61	196	129	80	22	15	502	77
trt 9- N fertilizer + Intercept in furrow	406	42	215	149	93	9	15	524	77
trt 10- N fertilizer + Intercept foliar	408	42	215	151	92	12	13	525	78
Mean	400	48	209	143	88	14	14	517	77
LSD {0.05}	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4. Chip Fry Quality and External Defects. Tulelake Chipper Management Trial, 2009.

Treatment	Specific Gravity[1]	SFA Rating[2]	% Total Defects[3]	Knobs[4]	Growth Cracks[4]	Total Culls[4]
1	1.095	1.5	6.1	2.3	0.8	22.5
2	1.100	1.0	4.8	3.3	1.0	16.3
3	1.097	1.3	6.1	3.0	0.5	31.5
4	1.092	1.5	7.5	2.5	0.0	38.0
5	1.099	1.0	4.5	1.0	1.3	20.3
6	1.098	1.3	4.7	3.0	0.3	18.8
7	1.095	1.8	4.4	4.0	0.3	35.8
8	1.093	1.3	5.3	3.8	1.0	32.8
Mean	1.096	1.3	5.4	2.8	0.6	27.0
LSD {0.05}	0.005	NS	NS	NS	NS	12.6

Treatment	Specific Gravity[1]	SFA Rating[2]	% Total Defects[3]	Knobs[4]	Growth Cracks[4]	Total Culls[4]
3	1.097	1.3	6.1	3.5	0.5	31.5
9	1.094	1.3	6.4	1.7	2.3	31.7
10	1.097	1.2	6.1	2.2	0.6	24.8
Mean	1.096	1.3	6.2	2.5	1.1	29.3
LSD {0.05}	NS	NS	NS	NS	NS	NS

[1] Data collected from local commercial packing shed

[2] Snack Food Association Rating of 1-3 (1=best or most desired, 3= worst or dark yellow to brown in color)

[3] % of potato found to have undesirable coloring, external, and/or internal defects

[4] Number of tubers pulled from each plot with defects

Table 5. Tuber Yield and Size Grade for Russet Burbank Management Trial. Tulelake 2009.

	Tuber Yield (cwt/A)								
	U.S. No. 1's								
Treatment	Total 1's	12-16oz	8-12oz	4-8oz	<4oz	>16oz	Cull	Total	% 1's
X-TRA Power	271.7	9.5	61.9	200.3	98.0	2.0	20.9	392.5	69%
Intracept-Furrow	285.8	13.4	71.3	201.1	95.0	1.8	22.9	405.5	70%
Intracept-Foliar	306.2	11.3	74.2	220.7	86.0	0.8	28.4	421.4	73%
Untreated	270.7	9.1	66.1	195.5	94.1	1.1	25.4	391.2	69%
Mean	283.6	10.8	68.4	204.4	93.3	1.4	24.4	402.7	70%
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 6. Culls and Internal Evaluation for Russet Burbank Management Trial. Tulelake 2009.

Treatment	Knobs[1]	Growth Cracks[1]	Total Cull[1]	Hollow Heart[2] %	Brown Center[2] %
X-TRA Power	10.2	12.0	22.2	11.7	11.7
Intracept-Furrow	11.5	13.8	25.3	10.0	16.7
Intracept-Foliar	16.7	11.8	28.5	15.0	18.3
Untreated	12.7	15.7	28.3	6.7	9.8
Mean	12.8	13.3	26.1	10.9	14.1
LSD (0.05)	NS	NS	NS	NS	NS

[1] Number of tubers pulled from each plot with defects

[2] 10 tubers evaluated from each plot in the 12-16oz and/or 8-12oz tubers

Treatment List

Chemical	Application	Rate	
X-TRA Power	furrow	2 pt/a	plus Quadris in furrow at planting
Intracept	furrow	1 pt/a	plus Quadris in furrow at planting
Intracept	foliar	1 pt/a	plus Quadris in furrow at planting
Untreated			plus Quadris in furrow at planting