

## **The Influence of Seed Spacing on Potato Variety Yield and Quality in 2011**

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**Introduction:** This study evaluated the influence of seed spacing on potato varieties' yield, tuber size distribution, and quality. Each variety was planted at four seed spacings: 6.5, 9.1, 11.8 and 14.3 inches. Varieties included: CO97043-14W (chip), IR 618 (chip), IR 617 (chip), IR 616 (chip), ATC00293-1W/Y (white skin yellow flesh), and CO99053-3RU (russet).

### **General Trial Information:**

**Location:** Tulelake, CA

**Soil Type:** Tulebasin mucky silty clay loam

**Planting Date:** May 25<sup>th</sup>, 2011

**Vine Kill Date:** September 15<sup>th</sup>, 2011

**Days to Vine Kill:** 113 days

**Harvest Date:** October 22<sup>nd</sup>, 2011

**Irrigation:** Solid-set sprinklers

**Plot Size:** 2 rows (6 ft) wide by 22.6 to 23.9 ft long. Plot lengths varied due to the seed spacing requirement.

**In-Row Spacing:** 6.5", 9.1", 11.8", and 14.3"

**Row Spacing:** 36 inch row spacing

**Number of Reps:** 4 replications

**Fertilizer:** 219-80-48-22S

**Yield:** The entire plot area was harvested and then graded for yield, tuber size distribution, and quality.

**Results:**

Seed spacing and variety had a significant influence on tuber yield, average tuber weight, tuber size distribution, and the number of tubers per plant (Tables 1 and 2). Averaged across seed spacing, CO97043-14W, IR 616, and IR 618 produced the highest total and US No. 1 tuber yields (Table 1). Averaged across variety, the 6.5 and 9.1 inch spacing produced the highest yields (Table 2). Average tuber size and the number of tubers per plant increased with increasing seed spacing averaged across varieties (Table 2), but this trend did not hold true for all varieties (Table 3).

Yield, tuber size distribution, tubers per plant, average tuber size, and revenue for each variety and seed spacing combination are presented on Table 3. For most varieties, the 6.5 or 9.1 inch spacing maximized total yield. Spacing had little effect on total yield for chip variety IR 616. Revenue minus seed cost was calculated for all chip varieties with the assumption that the potato price and seed cost were the same across varieties (Figure and Table 3). The grower potato price was assumed to be \$8.00 per CWT for all tubers in the 4 ounce to >14 ounce size categories. The price for tubers less than 4 ounces and culls was assumed to be -\$0.85 per CWT to cover their processing/handling cost. Spacing did not have a significant effect on revenue for the varieties IR 617 and IR 616. The 9.1 inch spacing maximized revenue for variety CO97043-14W. The 6.5 and 11.8 inch spacing maximized revenue for variety IR 618.

***Special Thanks to the California Potato Research Advisory Board for funding support!***

**Table 1. Potato Varieties' Yield, Tuber Size Distribution, and Tuber Set Averaged Across Seed Spacing Treatments at IREC in 2011.**

Entry Name	Tuber Yield (cwt/A)							Culls	Total	Tubers/ Plant	Avg Tuber Size (oz)
	U.S. No. 1's (cwt)										
	Total 1's	10-14 oz	6-10 oz	4-6 oz	<4 oz	>14 oz					
CO97043-14W- Chip	353	94	176	83	59	76	22	510	7.6	6.5	
IR 618 - Chip	358	68	174	115	83	17	22	481	9.3	5.4	
IR 617 - Chip	201	10	75	116	182	2	19	404	10.8	4.6	
IR 616 - Chip	357	98	174	85	48	56	50	511	7.5	6.6	
ATC00293-1W/Y- Specialty	289	64	137	88	79	36	37	440	8.8	5.5	
CO99053-3RU- Russet	268	69	126	73	58	50	29	405	7.2	6.2	
95% confidence interval	34	16	20	9	15	13	7	32	1.1	0.7	

**Table 2. Influence of Seed Spacing Averaged Across Varieties on Tuber Yield, Tuber Size Distribution, and Tuber Set at IREC in 2011.**

Seed Spacing (inches)	Tuber Yield (cwt/A)							Culls	Total	Tubers / Plant	Tuber Size (oz)
	U.S. No. 1's (cwt)										
	Total 1's	10-14 oz	6-10 oz	4-6 oz	<4 oz	>14 oz					
6.5	330	60	156	114	109	29	29	496	8.1	5.4	
9.1	316	71	149	96	84	38	28	466	7.7	5.9	
11.8	298	65	143	90	76	40	30	445	8.7	5.6	
14.3	273	72	129	73	70	51	32	426	9.7	6.2	
95% confidence interval	33	15	19	7	14	11	NS	32	0.8	0.6	

**Table 3. Influence of Seed Spacing on Potato Varieties' Yield, Tuber Size, Tuber Set, and Revenue at IREC in 2011.**

Entry Name	Seed Spacing (inches)	Tuber Yield (cwt/A)						Culls	Total	Plant	Avg Tuber Size (oz)	Revenue - Seed Cost <sup>1</sup> \$/A
		U.S. No. 1's (cwt)										
		Total	10-14	6-10	4-6	<4	>14					
CO97043-14W- Chip	6.5	382	78	191	113	89	44	19	533	7.9	5.8	3090.3
CO97043-14W- Chip	9.1	397	103	200	95	65	75	18	556	6.7	6.8	3493.0
CO97043-14W- Chip	11.8	355	100	185	71	46	78	22	500	7.6	6.5	3176.0
CO97043-14W- Chip	14.3	279	97	131	51	38	107	28	451	8.3	7.0	2811.3
IR 618 - Chip	6.5	412	66	203	143	108	14	29	566	9.3	5.3	3060.5
IR 618 - Chip	9.1	332	55	159	117	88	13	15	447	8.3	4.9	2443.3
IR 618 - Chip	11.8	377	71	187	120	77	21	26	501	10.4	5.2	2868.3
IR 618 - Chip	14.3	311	79	149	82	59	21	20	410	9.4	6.2	2371.5
IR 617 - Chip	6.5	216	13	81	123	205	2	18	441	9.6	4.7	1331.8
IR 617 - Chip	9.1	211	7	80	125	183	2	20	415	9.8	4.5	1315.5
IR 617 - Chip	11.8	178	8	64	106	175	1	21	375	11.0	4.5	1033.3
IR 617 - Chip	14.3	199	13	77	109	166	2	17	384	12.9	4.8	1241.0
IR 616 - Chip	6.5	360	68	180	112	79	52	39	529	7.7	6.0	2968.0
IR 616 - Chip	9.1	365	106	181	78	40	53	55	513	6.7	7.3	3048.8
IR 616 - Chip	11.8	360	104	174	82	41	60	58	519	7.8	6.0	3037.5
IR 616 - Chip	14.3	342	113	163	67	34	61	49	486	8.0	7.1	2936.0
ATC00293-1W/Y- Specialty	6.5	304	72	135	97	89	31	39	461	7.4	5.4	*** <sup>2</sup>
ATC00293-1W/Y- Specialty	9.1	306	72	144	90	76	30	33	445	7.9	5.3	***
ATC00293-1W/Y- Specialty	11.8	275	56	136	83	66	39	35	414	7.8	6.1	***
ATC00293-1W/Y- Specialty	14.3	270	55	135	80	84	44	41	439	12.2	5.0	***
CO99053-3RU- Russet	6.5	306	65	148	93	82	31	31	450	6.8	5.6	***
CO99053-3RU- Russet	9.1	286	84	128	75	55	52	29	422	6.7	6.4	***
CO99053-3RU- Russet	11.8	242	54	112	77	54	43	20	359	7.7	5.5	***
CO99053-3RU- Russet	14.3	237	73	117	47	41	73	36	387	7.8	7.3	***
95% confidence interval		42	20	26	16	18	19	NS	43	1.7	1.0	365.8

<sup>1</sup>Pack-out Revenue - Potato Seed Cost

Pack-out Revenue = \$8.00 per CWT for tubers 4 oz to >14 oz.; \$-0.85 per CWT for tubers <4 oz. and culls  
 Potato Seed Cost per acre: 6.5 inch= \$388, 9.1 inch=\$277/acre, 11.8 inch=\$215, 14.3 inch=\$176

<sup>2</sup>\*\*\* Revenue was only calculated for chip varieties in this trial