POTATO VARIETY TRIALS 2003

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Introduction

Potatoes are grown under contract in Malheur County for potato processors to produce frozen products for the food service industry. There is very little production for fresh pack or open market, and very few growers have potato storage buildings on their farms. There is also no production of varieties for making potato chips. There is no potato seed production in Malheur County because high populations of aphids result in virus infection in the tubers. The varieties grown are mainly 'Shepody', 'Ranger Russet' and 'Russet Burbank'. Harvest begins in July, providing potatoes to processing plants directly from the field. Yields are limited by "early die" syndrome, causing early senescence of the vines. Early die is caused by a complex of soil pathogens, including bacteria, nematodes, and fungi, and is worse when rotations between potato crops are shorter.

Small acreages of some advanced selections or new varieties are contracted by processors each year to study the feasibility of expanding the use of the new varieties. To displace an existing processing variety, a new potato variety needs to have several outstanding characteristics. The yield should be at least as high as the yield of Russet Burbank. The tubers need to have low reducing sugars for light, uniform fry color, and high specific gravity. A new variety should be resistant to tuber defects or deformities caused by disease, water stress, or heat. It should begin tuber bulking early if it is a variety for early harvest. Or, if it is a late-harvest variety, it should be resistant to early die.

Potato variety development trials at Malheur Experiment Station in 2003 included a trial of 9 selected strains of Umatilla Russet, an 8-Hill trial of 54 long russet clones from the USDA Agricultural Research Service (ARS) potato breeding program at Aberdeen, Idaho; the Oregon Preliminary Yield Trial with 99 entries; the Oregon Statewide Trial with 28 entries; the Western Regional Early Harvest Trial with 19 entries; and the Western Regional Late Harvest Trial with 17 entries. Through these trials and active cooperation with other scientists in Idaho, Oregon, and Washington, promising new lines are bred, evaluated, and eventually released as new varieties.

Materials and Methods

The six potato variety trials were grown under sprinkler irrigation on Owyhee silt loam, where winter wheat was the previous crop. The wheat stubble was flailed and the field

was irrigated and disked. A soil test taken September 9, 2002 showed 18 ppm NO_3, 18 ppm P, 306 ppm K, organic matter 2.2 percent, and pH 7.6. Fall fertilizer was broadcast to apply 21 lb N/acre, 100 lb P_2O_5/acre, 60 lb K_2O/acre, 60 lb S/acre, 30 lb Mg/acre, 4 lb Zn/acre, 2 lb Cu/acre, 1 lb Mn/acre, and 1 lb B/acre. The field was ripped, Telone II was injected at 25 gal/acre, and the field was bedded on 36-inch row spacing.

Seed of all varieties was hand cut into approximately 2-oz seed pieces and treated with Tops-MZ + Gaucho dust 1-2 weeks before planting and placed in storage at approximately 90 percent relative humidity and 45°F to suberize. On April 4, 2003, Roundup was applied at 1 qt/acre to control winter annual weeds and volunteer wheat. The Western Regional Early Harvest Trial was planted on April 10, 2003, the Preliminary Yield Trial was planted on April 17, and the other trials were planted on April 18. The 8-Hill Trial was unreplicated, the Preliminary Yield Trial had two replicates, and the Umatilla Strain, Statewide, Western Regional Early Harvest, and Western Regional Late Harvest trials each had four replicates.

Potatoes were planted in single row plots using a two-row cup planter with seed spacing 9 inches in the row, with rows 36 inches apart. Red potatoes were planted between each pair of plots to serve as markers to separate the plots at harvest. After planting, hills were formed over the rows with a Lilliston rolling cultivator. Prowl at 1 lb/acre plus Dual at 2 lb/acre was applied on May 1 and was incorporated by a total of 0.42 inch of rain May 3-5. Matrix herbicide was applied at 1.25 oz/acre on May 28 and was incorporated with a 1.5-inch sprinkler irrigation on May 29.

Fungicide applications to help control early blight and prevent late blight infection started with an aerial application of Ridomil Gold and Bravo at 1.5 pint/acre on June 7, which was repeated on June 25. Bravo fungicide plus liquid sulfur was applied by aerial applicator on July 2, and again on August 8. Sulfur dust was applied by aerial applicator on July 20 at 40 lb S/acre to prevent mite infestation and powdery mildew infection.

Petiole tests were taken every 2 weeks from June 12, and fertilizer was injected into the sprinkler line during irrigation to supply the crop nutrient needs. A total of 103 lb N/acre, 50 lb P_2O_5/acre, 21 lb K_2O/acre, 53 lb SO_4/acre, 40 lb S/acre, 0.5 lb Mg/acre, 0.55 lb Mn/acre, 0.32 lb Cu/acre, 0.1 lb Fe/acre, and 0.02 lb B/acre were applied. The sprinkler system was operated 22 times, from May 29 to September 23, with scheduling based on potato evapotranspiration (ET), which was calculated based on measurements made by a U.S. Bureau of Reclamation AgriMet weather station at the Malheur Experiment Station. The soil water potential was monitored with 6 Watermark soil moisture sensors (Irrometer Co. Inc., Riverside, CA) logged every 8 hours by a Hansen AM400 (M. K. Hansen Co., East Wenatchee, WA). The AM400 unit was read frequently through the summer to predict crop water needs, with the objective to apply an irrigation just before the average soil moisture in the potato root zone at the seedpiece depth reached -60 kPa. Water applied was measured by recording the sprinkler set duration at 55 psi.

Vines were flailed in the early harvest trial on August 19, and in the late harvest trials on October 2. The vines of most varieties had died by the date of the last irrigation on September 23. Western Regional Early Harvest Trial potatoes were lifted August 20 with a two-row digger that laid the tubers back onto the soil in each row. Visual evaluations included observations of desirable traits, such as a high yield of large, smooth, uniformly shaped and sized, oblong to long, attractively russetted tubers, with shallow eyes evenly distributed over the tuber length. Notes were also made of tuber defects such as growth cracks, knobs, curved or irregularly shaped tubers, pointed ends, stem-end decay, stolons that remained attached, folded bud ends, rough skin due to excessive russetting, pigmented eyes, or any other defect, and a note to keep or discard the clone based on the overall appearance of the tubers.

Tubers were placed into burlap sacks and hauled to a barn where they were kept under tarps until grading. After grading, a 20-tuber sample from each plot in the Western Regional Early Harvest Trial was evaluated for tuber quality traits for processing. Specific gravity was measured using the weight-in-air, weight-in-water method, and 10 tubers per plot were cut lengthwise and examined for internal defects. Center slices from 10 tubers were fried for 3.5 min in 375°F soybean oil. Percent light reflectance was measured on the stem and bud ends of each slice using a model 577 Photovolt Reflectance Meter (Seradyn, Inc., Indianapolis, IN), with a green tristimulus filter, calibrated to read 0 percent light reflectance on the black standard cup and 73.6 percent light reflectance on the white porcelain standard plate.

The potatoes in the Preliminary Yield Trial were dug on October 7, and the potatoes in the Statewide Trial on October 8. Western Regional Late Harvest and 8-Hill Trial tubers were dug on October 14, and the Umatilla Strain Trial tubers were dug on October 15. At each harvest, the potatoes in each plot were visually evaluated. Tubers were graded and a 20-tuber sample from each plot was placed into storage. The storage was kept near 90 percent relative humidity and the temperature was gradually reduced to 45°F. Tubers were removed from storage November 3 through 13 and evaluated for tuber quality traits, specific gravity, and fry color as described above.

Results and Discussion

At the Malheur Experiment Station in 2003, spring weather was cool and wet, followed by prolonged heat and a record high temperature on July 22 of 110°F. The extreme heat stressed the potato plants, causing reduced yields and early senescence. Dry weather prevented late blight from developing in 2003. No powdery mildew or mite problems were observed in the field.

Precipitation for May 1 through September 30 was 2.38 inches, the crop ET for the late-harvest trials totaled 30.34 inches, and the trials received 31.19 inches of irrigation plus precipitation, or 103 percent of crop ET (Fig. 1). The step increases in the irrigation plus rainfall curve show the 22 sprinkler irrigations applied during the growing season.

The trend of soil moisture during the growing season is shown in Figure 2. The data were not recorded frequently enough to show the individual irrigations, and the sensors

did not always respond to an irrigation. Although the irrigation plus rainfall was in excess of the AgriMet ET prediction through the growing season, sensor data show that average root zone soil water potential became drier than -60 kPa at least three times during the hottest part of the season.

Soil water potential at the seedpiece depth was allowed to become drier than -60 kPa at the end of the growing season, after the vines died on the early maturing varieties, by applying frequent sprinkler irrigations of short duration, as shown in Figure 1. This was necessary to avoid swollen lenticels and the associated potential for rotting the tubers of the early senescing varieties, while continuing to apply the ET requirement for the late maturing varieties in shallow moisture increments.

Umatilla Strain Trial

This was the first year of a Umatilla Strain Trial, which was conducted at this location (MES) and also at the Hermiston Agricultural Research and Extension Center (HAREC). Umatilla Russet was released jointly by the Oregon, Idaho, and Washington Agricultural Experiment Stations and the USDA ARS in 1998, and over the years some plants had been selected in the field that appeared to be superior strains. Nine of these strains were compared to Russet Burbank and Umatilla Russet (Table 1). Four of the strains had adequate yield, produced a high percent of U.S. No. 1 tubers and had acceptable processing quality. Based on the data from MES and HAREC trials, UM407, UM418, UM432, and OURS311 were advanced to the 2004 Statewide Trial.

8-Hill Trial

Eight hills were grown of each of 54 clones selected for long, russeted tubers from the Aberdeen ARS potato breeding program, including 11 clones with the LB suffix that were bred for resistance to late blight. The 54 clones were evaluated for tuber type, yield, grade, and processing quality (Table 2). Several of the clones had high yields, produced a high percent of U.S. No. 1 tubers, and had good processing quality. The clone 'A96112-20' yielded a total of 905 cwt/acre, with 90 percent U.S. No. 1 grade tubers, specific gravity of 1.0978 g/cm^3, and an average fry strip light reflectance of 49.5 percent, which was acceptable for processing, with 0 percent sugar ends. The clone 'A96783-109LB' yielded 828 cwt/acre total, with 91 percent U.S. No. 1 grade, with specific gravity 1.1092, and fry strip light reflectance of 45.3 percent. The clone 'A99123-1' yielded 751 cwt/acre total, with 97 percent U.S. No. 1 grade, with specific gravity 1.0887, fry strip light reflectance of 49.1 percent and 0 percent sugar ends. The clone 'A99133-6' produced a total yield of 769 cwt, with 99 percent U.S. No. 1, specific gravity 1.1038, average fry strip light reflectance 54.4, and 0 percent sugar ends.

Preliminary Yield Trial

In the Preliminary Yield Trial, 94 numbered clones were compared to Russet Burbank, Ranger Russet, Shepody, 'Norkotah', and 'Umatilla Russet' (Table 3). The Oregon potato variety selection committee kept 12 clones to advance to the Statewide Trial for 2004. The clones that were advanced were: 'AO9006-4', 'AO94007-1', 'AO96047-2', 'AO96073-2', 'AO96162-1', 'AO98114-2', 'AO98141-2', 'AO99002-4', 'AO99002-7', 'AO99024-8', 'AO99060-5', and 'AO99099-3', and are marked with an asterisk in the entry list. These clones yielded well across the four locations (Hermiston, Klamath

Falls, and Powell Butte data are not shown in this report), had low incidence of undesirable characteristics, had high percent U.S. No. 1 grade tubers, and if selected as promising clones for processing, had high specific gravity and light fry color.

Oregon Statewide Trial

In the Oregon Statewide Trial, five clones were retained by the variety selection committee, 'AO96160-3', 'AO96141-3', 'AO96205-3', 'AO98133-2' and 'AO98133-4' will be maintained in the Statewide Trial in 2004 (Table 4). The clone 'AO96160-3' will be recommended for advancement to the Western Regional Trials for 2004, and 'AO96141-3' will be discarded unless there is interest in it from the other states.

At this location in 2003, AO96160-3 produced total yield of 452 cwt/acre, with 89 percent U.S. No. 1, specific gravity of 1.093 g/cm^3, and fry strip light reflectance of 52.2 percent, with no sugar ends. AO96141-3 produced total yield of 497 cwt/acre, with 75 percent U.S. No. 1, specific gravity of 1.091 g/cm^3, and fry strip light reflectance of 51.4 percent, and 3 percent sugar ends. AO96205-3 produced total yield of 534 cwt/acre, with 83 percent U.S. No. 1, specific gravity of 1.097 g/cm^3, and fry strip light reflectance of 47.9 percent with no sugar ends. AO98133-2 produced total yield of 395 cwt/acre, with 94 percent U.S. No. 1, specific gravity of 1.098, and fry strip light reflectance of 51.6 percent, with 3 percent sugar ends. AO98133-4 produced total yield of 380 cwt/acre, with 83 percent U.S. No. 1, specific gravity of 1.095, and fry strip light reflectance of 44.5 percent, with 8 percent sugar ends. Russet Burbank had 63 percent sugar ends, far more than any other variety.

Western Regional Early Harvest Trial

In the Western Regional Early Harvest Trial, 'A91814-5' with 641 cwt/acre total yield, 'A92294-6' with 608 cwt/acre total yield, Shepody with 603 cwt/acre, and Russet Burbank with 602 cwt/acre, were among the highest in total yields (Table 5). All of those clones except Russet Burbank had acceptable specific gravity and fry color. In production of marketable tubers (the total of U.S. No.1 plus U.S. No. 2 grades), Shepody with 574 cwt/acre, and Russet Burbank with 522 cwt/acre, were among the highest.

Western Regional Late Harvest Trial

In the Western Regional Late Harvest Trial, among the highest for total yield were, 'A91814-5' with 719 cwt/acre, 'A9305-10' with 714 cwt/acre, 'A92294-6' with 713 cwt/acre, Ranger Russet with 629 cwt/acre, 'A93157-6LS' with 627 cwt/acre, and Russet Burbank with 570 cwt/acre (Table 6). Among the highest for marketable yield, A9305-10 yielded 678 cwt/acre marketable yield, Ranger Russet produced 610 cwt/acre marketable yield, and A91814-5 yielded 576 cwt/acre marketable yield. Russet Burbank produced 279 cwt/acre U.S. No. 2 tubers, and A92294-6 produced 217 cwt/acre U.S. No. 2 tubers, which were significantly more than other clones in this trial. The clone A91814-5 produced 143 cwt/acre undersized tubers under 4 oz, significantly more than the other clones.

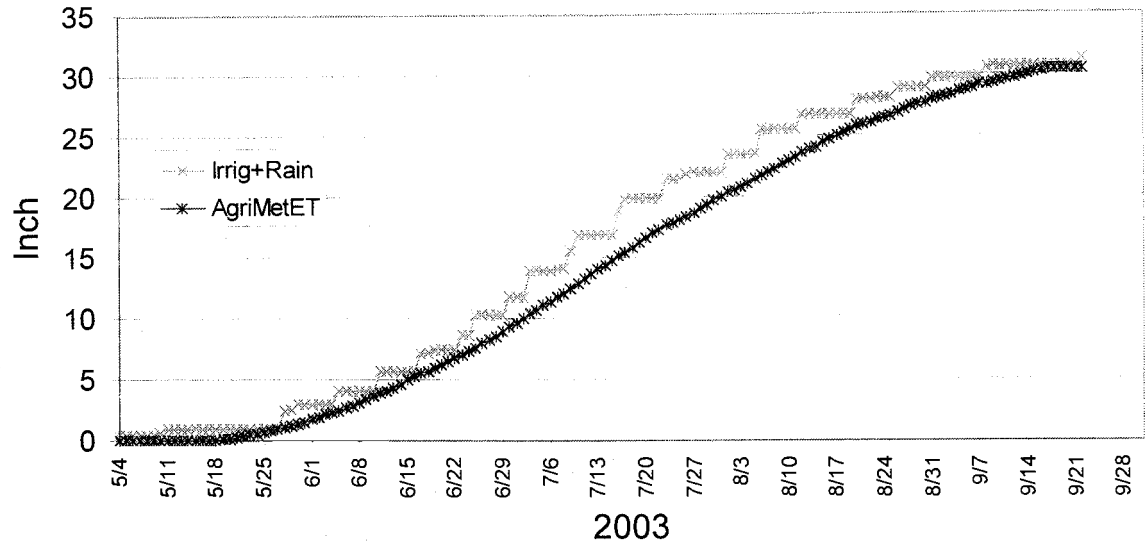

Figure 1. Evapotranspiration (ET) and sprinkler irrigation applied (plus rain) to potato variety trials, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

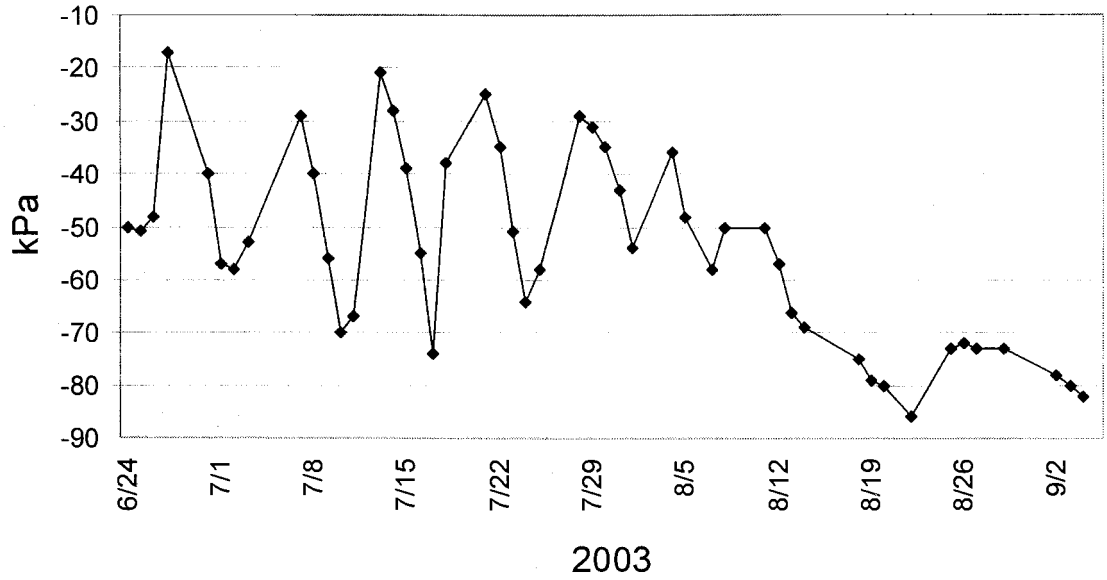

Figure 2. Soil moisture data for sprinkler-irrigated potato variety trials, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Table 1. Umatilla Strain Trial: yield, grade, and processing quality of Umatilla Russet strains grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Clone or Strain	Total yield	U.S. No. 1					U.S.No. 2	Market-able	<4 oz	Rot	Length/ width	Specific gravity	Average fry color, light reflectance	Percent sugar ends
		Percent No. 1	Total	>12 oz	4-6 oz	6-12 oz								
	cwt/acre	%					oz				ratio	g cm^{-3}	%	%
Russet Burbank	640.9	55.6	355.3	83.1	200.0	72.2	214.0	569.2	64.1	7.6	2.31	1.069	35.24	45.00
Umatilla Russet	660.1	72.1	474.4	175.8	231.1	67.5	141.3	615.7	40.8	3.6	1.95	1.082	44.66	0.00
*UM407	627.7	75.6	468.2	184.9	224.3	59.0	115.0	583.2	41.6	2.9	1.96	1.085	45.53	0.00
*UM418	590.2	81.8	480.6	159.5	248.2	72.9	67.8	548.4	41.1	0.7	1.88	1.086	47.20	0.00
*UM432	533.0	78.6	421.1	139.5	234.6	47.1	75.1	496.2	29.8	7.0	1.98	1.090	46.37	0.00
UM433	644.3	70.8	459.8	170.6	216.5	72.6	144.2	603.9	40.3	0.0	2.06	1.089	45.86	2.50
UM436	618.9	77.7	478.0	140.8	275.5	61.7	100.8	578.8	39.3	0.8	1.86	1.085	45.25	0.00
UM446	626.0	65.0	407.8	135.9	200.7	71.2	173.9	581.6	43.8	0.6	1.96	1.084	45.05	2.50
OURS307	633.0	63.1	400.5	151.7	192.4	56.4	192.6	593.2	39.3	0.5	2.05	1.090	44.49	5.00
*OURS311	632.3	79.5	502.8	159.9	267.6	75.2	89.9	592.7	37.8	1.8	1.89	1.084	48.17	0.00
OURS313	643.5	59.6	382.7	112.6	196.9	73.2	187.7	570.3	70.3	2.9	1.89	1.089	45.99	7.50
mean	622.7	70.9	439.2	146.7	226.2	66.3	136.6	575.8	44.4	2.6	1.98	1.085	44.89	5.68
LSD (0.05)	NS	7.5	NS	NS	53.3	NS	53.0	NS	15.5	NS	0.06	0.005	2.94	10.12

*Advanced to the 2004 Statewide Trial, based on the data from Malheur Experiment Station and Hermiston Agriculture Research and Extension Center.

Table 2. Yield, grade, and processing quality of 54 early selections in an unreplicated 8-Hill Trial, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 4-12 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre							ratio	g cm^{-3}	%	%
A95061-67LB	715	85	607	78	353	177	617	10	97	1.62	1.077	44.2	0
A95061-93LB	709	89	630	454	123	53	693	63	16	1.86	1.095	44.8	0
A95061-94LB	869	92	803	234	422	147	815	12	54	1.75	1.105	47.5	0
A96002-38	560	91	509	315	165	29	521	12	40	1.79	1.102	54.8	0
A96002-55	706	85	598	308	239	52	675	77	31	1.96	1.076	44.5	0
A96005-31	960	69	660	260	307	94	917	256	44	1.78	1.091	49.3	0
A96108-16	807	85	685	164	405	116	685	0	122	1.64	1.087	43.4	10
A96108-27	599	80	479	79	374	27	496	17	103	1.88	1.085	39.9	20
A96111-12	779	68	527	49	344	133	665	137	114	1.59	1.102	41.9	10
A96112-20	905	90	816	272	503	41	854	38	31	2.04	1.098	49.5	0
A96783-109LB	828	91	754	212	470	73	754	0	74	1.57	1.109	45.3	0
A96783-114LB	706	76	535	308	189	39	672	137	33	1.71	1.095	47.2	10
A97044-107LB	930	81	757	120	399	238	838	80	92	1.55	1.087	35.6	10
A97044-112LB	762	91	693	313	285	95	707	14	55	1.50	1.103	46.2	0
A97110-27	623	97	602	362	211	29	602	0	21	2.50	1.068	34.1	60
A97110-29	466	86	399	105	218	76	441	42	25	1.88	1.094	41.7	0
A97130-22	805	82	658	140	455	64	762	104	43	2.04	1.08	49.9	10
A97130-25	630	87	550	258	239	53	558	8	62	2.08	1.080	51.3	0
A97130-28	608	89	541	60	410	70	581	41	26	2.00	1.086	51.1	0
A97179-29	608	90	548	211	297	39	582	34	26	1.71	1.090	51.9	0
A97198-20	607	81	493	62	297	135	567	74	39	2.33	1.082	46.8	0
A99001-7	529	88	468	165	228	74	468	0	62	1.80	1.086	41.4	10
A99006-3	655	87	568	81	386	101	576	8	79	1.62	1.0947	51.5	0
A99007-12	554	68	378	254	93	31	524	146	30	2.25	1.096	54.6	0
A99007-13	724	78	564	447	96	21	673	109	17	2.50	1.094	47.8	0
A99007-5	734	74	544	326	171	47	643	99	91	1.79	1.071	40.9	0
A99008-6	677	70	474	325	116	33	597	123	79	2.00	1.081	39.4	20

Table 2. *(continued)* Yield, grade, and processing quality of 54 early selections in an unreplicated 8-Hill Trial, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 4-12 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre							ratio	g cm^{-3}	%	%
A99015-1	644	96	618	197	355	67	618	0	26	2.29	1.080	48.5	0
A99017-1	555	84	467	52	394	21	507	39	48	1.62	1.079	41.7	0
A99020-3	796	83	664	415	226	23	773	109	23	1.78	1.080	34.2	60
A99039-10	627	94	588	454	97	36	588	0	39	1.74	1.088	47.0	0
A99041-18	817	80	653	218	338	98	750	97	36	1.81	1.092	49.0	0
A99041-7	600	77	463	153	253	57	548	85	52	1.71	1.083	44.8	0
A99043-1	672	94	629	262	255	112	635	6	37	1.46	1.092	49.7	0
A99048-2	628	90	566	171	309	86	577	11	51	1.88	1.086	44.7	30
A99048-8	325	88	287	87	177	23	308	21	17	1.77	1.097	47.7	0
A99051-2	605	66	398	27	216	155	520	122	85	1.96	1.094	47.9	10
A99052-14	652	85	556	164	274	118	563	8	89	1.62	1.085	38.5	10
A99052-2	649	77	500	169	276	55	612	112	37	1.65	1.090	42.4	30
A99054-1	1082	93	1005	750	216	39	1060	55	23	1.81	1.085	46.8	10
A99054-8	563	77	434	160	239	35	497	62	66	1.85	1.068	35.0	70
A99068-9	925	90	829	297	416	116	894	66	31	1.75	1.091	44.5	0
A99073-1	851	82	698	555	136	8	836	137	15	1.48	1.083	47.9	0
A99080-3	964	83	803	619	153	31	936	133	28	1.89	1.094	47.4	0
A99123-1	751	97	727	358	309	60	727	0	24	1.69	1.089	49.1	0
A99133-6	769	99	759	454	283	22	759	0	10	1.64	1.104	54.4	0
A99394-55LB	611	84	516	102	308	106	535	19	76	1.48	1.101	48.3	0
A99394-58LB	1010	74	751	242	345	165	925	174	85	1.59	1.090	50.0	0
A99394-61LB	480	82	392	33	287	71	436	44	45	2.04	1.085	44.1	10
A99396-53LB	740	93	690	265	302	123	708	18	32	1.37	1.093	50.5	0
A99396-56LB	656	63	415	225	113	77	623	208	33	1.79	1.088	49.9	0
A99439-3	670	78	521	56	288	177	521	0	149	1.63	1.077	45.8	0
A99453-2	573	80	459	162	244	53	513	54	60	1.77	1.084	44.2	0
COA99163-7	687	75	517	266	165	86	647	130	41	1.88	1.082	49.3	0
Mean	703	84	588	238	273	76	650	62	51	1.8	1.089	45.9	7

Table 3. Preliminary Yield Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 6-12 oz	U.S. No. 1 4-6 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
R. Burbank	422	55	228	8	130	91	135	363	54	0	2.3	1.063	40.5	20
Ranger	501	72	361	98	199	64	95	456	43	0	2.1	1.087	42.2	10
Shepody	466	69	328	116	153	59	119	447	18	0	1.8	1.084	51.6	0
Norkotah	370	88	325	26	221	77	1	326	44	0	1.8	1.070	35.4	0
Umatilla	460	80	367	44	218	106	34	401	59	0	2.0	1.083	47.2	0
AO94006-3	414	79	332	98	191	43	57	389	25	0	2.2	1.079	51.4	0
*AO94006-4	462	88	409	100	249	60	24	433	29	0	2.0	1.080	47.4	0
*AO94007-1	477	87	415	34	272	109	6	421	55	0	2.0	1.085	56.7	0
AO94020-1	446	82	368	24	243	101	17	385	61	0	2.0	1.070	42.6	5
AO94030-1	404	56	227	0	69	159	49	276	125	0	2.0	1.070	44.8	5
AO94032-2	433	86	373	38	219	117	15	388	45	0	1.3	1.081	55.5	0
AO94032-4	469	74	353	93	172	87	34	386	83	0	1.6	1.083	53.6	0
AO94047-1	316	73	232	0	131	101	12	244	72	0	2.0	1.083	50.9	0
AO94047-2	484	61	292	35	139	118	46	337	147	0	1.9	1.098	49.1	5
AO94047-3	480	72	344	34	198	113	51	396	85	0	2.3	1.077	50.0	0
AO94047-4	390	79	309	56	187	66	37	346	44	0	1.8	1.088	48.0	0
AO94048-1	275	70	198	9	114	75	6	204	70	0	1.8	1.088	54.2	0
AO95101-2	491	85	422	37	257	128	0	422	66	0	1.6	1.084	48.2	10
AO95101-3	396	54	214	36	104	74	147	360	34	0	2.3	1.084	53.6	0
AO95102-4	353	63	222	13	73	136	11	232	121	0	1.9	1.077	53.8	0
AO95102-6	301	79	241	55	139	46	24	265	37	0	1.5	1.086	49.9	5
AO95109-1	343	73	254	53	140	62	55	309	35	0	1.9	1.080	47.8	5
AO95154-4	568	79	452	154	228	70	68	520	48	0	2.4	1.084	47.3	0
AO95179-2	479	89	429	84	270	75	29	458	21	0	1.8	1.073	54.7	0
AO95179-3	478	68	328	61	205	62	106	434	44	0	1.7	1.066	46.2	0
AO95185-2	379	83	313	39	173	102	11	324	55	0	1.7	1.074	54.0	0
AO95188-2	437	82	356	33	210	113	4	360	77	0	1.5	1.074	52.4	0
AO95189-1	591	73	444	88	232	124	34	478	113	0	1.6	1.086	51.3	0

Table 3. *(continued)* Preliminary Yield Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1					U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
		Percent No. 1	Total	>12 oz	6-12 oz	4-6 oz								
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
AO95191-1	542	84	457	150	237	69	45	502	40	0	1.7	1.084	40.4	20
*AO96047-2	446	92	411	32	253	126	2	414	33	0	1.6	1.097	51.7	0
AO96049-1	505	93	468	120	276	72	21	489	16	0	1.8	1.093	47.8	0
AO96049-2	494	76	378	182	154	42	61	438	41	11	2.0	1.063	39.2	30
AO96073-1	477	55	274	18	134	122	106	380	82	0	2.3	1.077	41.3	20
*AO96073-2	388	66	265	20	131	114	6	271	117	0	1.8	1.079	42.3	10
AO96073-5	494	90	448	173	215	59	10	457	37	0	1.7	1.089	42.3	20
AO96075-1	395	80	315	30	172	113	3	318	77	0	1.6	1.083	46.8	0
AO96081-2	421	62	261	20	117	124	8	269	152	0	1.7	1.080	42.9	10
AO96084-3	496	90	445	38	290	117	0	445	51	0	1.6	1.087	52.8	0
AO96084-4	480	62	294	155	125	13	166	460	20	0	1.7	1.095	50.8	0
AO96109-1	481	81	395	16	235	143	5	399	81	0	1.8	1.090	47.4	0
*AO96162-1	464	61	281	9	82	190	30	311	153	0	2.0	1.096	57.3	0
AO96162-2	287	66	191	4	109	78	1	192	95	0	1.9	1.077	54.5	0
AO96168-3	499	73	365	23	229	112	39	404	95	0	2.0	1.072	39.0	0
AO96277-3	469	62	290	29	164	97	125	415	54	0	2.0	1.085	49.1	0
AO96279-2	513	63	324	28	166	130	70	393	119	0	1.6	1.084	48.5	0
AO97256-4	464	70	346	154	122	71	64	410	54	0	1.6	1.085	46.1	5
AO97286-5	552	83	457	127	231	99	45	502	50	0	1.6	1.092	52.6	0
AO97296-1	563	95	535	235	260	40	0	535	24	0	1.5	1.085	39.8	10
AO97297-1	292	60	177	4	58	115	11	188	104	0	1.7	1.078	46.2	0
AO97299-2	286	89	255	69	147	39	2	257	29	0	1.8	1.076	52.2	0
AO97308-2	492	85	419	192	179	47	34	453	39	0	1.6	1.092	50.7	0
AO97310-3	655	70	464	65	268	132	80	545	111	0	1.6	1.069	40.4	40
AO97315-5	325	65	214	4	102	108	12	225	99	0	1.8	1.083	48.7	0
AO97315-6	485	81	392	55	242	94	16	408	77	0	1.7	1.097	49.2	0
AO97316-1	435	87	380	16	266	97	3	383	52	0	1.7	1.077	47.4	0
AO97373-4	365	81	298	53	183	62	22	320	42	0	1.8	1.085	46.3	0

Table 3. *(continued)* Preliminary Yield Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 6-12 oz	U.S. No. 1 4-6 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
AO97375-2	383	87	335	29	192	114	3	338	45	0	1.7	1.080	53.4	0
AO98076-2	391	83	327	108	161	58	28	355	36	0	2.2	1.090	49.4	0
AO98082-1	501	89	442	184	210	48	41	483	17	0	1.8	1.080	45.3	0
AO98082-3	604	94	569	256	260	54	6	575	29	0	1.7	1.080	45	10
AO98082-4	377	85	321	46	214	61	20	340	37	0	1.8	1.073	44.3	0
AO98083-2	563	69	393	44	205	145	29	423	132	0	1.8	1.079	51.5	0
AO98114-1	397	83	330	48	194	89	5	336	61	0	1.8	1.104	50.0	0
AO98114-2	377	85	321	87	170	64	18	339	39	0	2.1	1.086	48.9	0
*AO98114-6	508	78	393	34	253	106	27	420	88	0	1.9	1.086	43.2	5
AO98114-8	419	42	196	4	71	121	15	211	208	0	1.5	1.089	46.5	0
AO98131-1	347	87	306	89	136	80	0	306	41	0	1.4	1.086	52.0	0
*AO98141-2	412	75	309	9	172	128	6	315	97	0	1.8	1.082	52.3	0
AO98147-1	342	67	230	30	107	93	27	257	85	0	2.0	1.094	52.9	0
AO98164-1	393	61	251	8	123	119	3	253	140	0	1.6	1.070	48.3	0
AO98216-1	487	92	449	212	205	31	19	468	19	0	2.1	1.077	38.0	45
AO98217-1	486	84	407	103	202	101	24	431	56	0	1.9	1.095	45.6	0
AO98218-1	362	88	318	77	185	57	12	330	32	0	1.5	1.077	54.0	0
AO98231-3	292	70	204	8	94	102	7	211	81	0	1.8	1.083	52.1	0
*AO99002-4	387	94	365	73	243	49	2	367	20	0	1.8	1.075	52.1	0
AO99002-5	310	79	244	63	126	55	27	271	39	0	1.9	1.074	43.5	0
AO99002-6	263	83	217	15	147	55	8	225	37	0	1.7	1.075	53.6	0
*AO99002-7	448	93	417	210	186	22	6	423	24	0	2.0	1.082	50.6	0
AO99002-8	339	69	236	57	123	56	60	296	44	0	2.2	1.082	47.3	0
AO99003-1	585	65	381	28	181	172	62	443	142	0	2.2	1.079	43.0	5
AO99004-6	448	85	386	83	246	57	28	414	34	0	1.9	1.082	51.7	0
AO99004-7	205	54	114	4	53	56	13	127	79	0	1.9	1.069	42.6	10
AO99012-4	414	88	375	89	203	84	0	375	38	0	1.9	1.087	47.1	0
AO99024-2	397	77	308	15	206	87	39	347	50	0	2.0	1.085	50.9	5

Table 3. *(continued)* Preliminary Yield Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 6-12 oz	U.S. No. 1 4-6 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
AO99024-3	326	81	263	20	177	66	17	279	47	0	1.8	1.068	38.4	15
*AO99024-8	484	80	394	25	237	132	2	395	89	0	1.5	1.103	57.0	0
AO99029-4	416	87	362	56	208	98	11	373	42	0	1.9	1.089	50.1	0
AO99040-1	641	89	570	125	338	107	33	604	37	0	1.6	1.094	47.6	5
AO99041-1	342	71	245	0	138	107	20	264	77	0	1.9	1.082	39.8	55
AO99041-2	438	54	241	4	125	112	50	291	147	0	1.8	1.071	44.5	5
AO99042-1	511	85	428	73	264	91	55	483	28	0	1.8	1.087	51.3	0
AO99042-4	339	93	316	45	211	60	0	316	23	0	1.6	1.077	48.9	0
*AO99060-5	536	92	501	277	202	22	24	525	11	0	2.0	1.078	46.7	0
AO99060-6	368	73	269	9	129	132	14	283	85	0	1.5	1.072	50.9	0
AO99064-3	436	90	395	37	278	81	15	410	26	0	2.2	1.076	50.4	0
AO99092-3	382	71	270	118	105	47	50	320	62	0	2.0	1.080	49.2	5
AO99099-1	545	78	439	169	223	47	35	474	71	0	1.8	1.083	46.0	10
*AO99099-3	337	69	255	35	145	75	15	271	66	0	1.6	1.079	49.8	0
AO96180-2	358	78	281	0	142	139	0	281	77	0	1.5	1.079	47.8	5

*Advanced to 2004 Statewide Trial based on the results from four locations.

Table 4. Oregon Statewide Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total	U.S. No. 1 >12 oz	U.S. No. 1 6-12 oz	U.S. No. 1 4-6 oz	U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
Russet Burbank	445	69	307	26	206	76	85	392	45	0	2.3	1.067	33.0	63
Ranger	518	82	424	120	241	62	60	484	32	2	2.1	1.095	41.7	13
Shepody	459	83	381	178	173	31	55	436	22	0	1.7	1.083	46.2	3
Norkotah	390	84	328	37	207	84	9	337	52	0	2.0	1.068	32.8	8
Umatilla	456	78	350	71	197	82	48	398	58	0	1.9	1.086	45.9	0
AO96160-3	452	89	400	29	266	106	4	404	48	0	1.9	1.093	52.2	0
AO96164-1	450	90	403	88	255	60	20	422	26	1	2.0	1.088	49.5	0
AO97178-1	488	85	415	64	276	76	34	450	39	0	1.9	1.097	40.0	13
AO97133-2	375	84	317	31	185	101	11	328	47	0	1.7	1.077	46.0	0
AO97143-1	512	77	395	38	199	159	26	421	91	0	1.9	1.090	45.3	3
AO97175-13	471	63	297	50	182	65	119	415	55	0	2.0	1.087	42.9	0
AO95250-4	377	88	330	66	203	62	16	346	31	0	2.0	1.089	54.4	0
AO95250-5	491	90	443	126	254	64	19	463	29	0	2.0	1.094	57.1	0
AO96128-10	470	70	332	16	203	113	63	395	75	0	2.1	1.093	48.8	3
AO96141-3	497	75	368	56	217	95	77	445	52	0	2.1	1.091	51.4	3
AO96148-1	523	87	452	165	231	56	34	486	34	0	2.0	1.087	45.2	18
AO96201-1	499	74	379	63	205	111	39	418	80	0	2.0	1.092	47.0	3
AO96205-3	534	83	443	104	275	64	51	494	37	1	2.0	1.097	47.9	0
AO96212-3	523	77	408	96	218	94	65	473	50	0	2.1	1.089	42.1	13
AO96212-6	419	80	335	46	210	79	42	377	41	0	2.1	1.091	47.7	5
AO96213-3	487	73	362	15	213	134	33	394	93	0	1.8	1.085	47.3	8
AO96240-5	575	69	398	122	234	43	151	549	25	0	2.2	1.084	47.2	3
AO96241-3	580	81	472	50	297	124	42	514	67	0	1.8	1.074	49.3	0
AO96249-16	481	92	441	212	198	31	27	468	13	0	2.0	1.091	45.5	3
AO96261-2	582	89	523	246	230	47	33	555	25	0	1.9	1.090	42.6	10
AO98130-1	381	88	336	65	201	71	10	346	33	2	1.9	1.088	48.4	0
AO98133-2	395	94	370	252	101	17	18	388	7	0	1.9	1.098	51.6	3
AO98133-4	380	83	317	55	189	73	8	324	55	0	1.8	1.095	44.5	8
Mean	472	81	383	89	217	78	43	426	45	0	2.0	1.088	46.2	6
(LSD 0.05)	91	10	95	64	72	29	42	102	26	NS*	0.1	0.005	3.6	13

*NS = Not significant.

Table 5. Western Regional Early Harvest Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1 Percent No. 1	U.S. No. 1 Total No. 1	U.S. No. 1 >12 oz	U.S. No. 1 6-12 oz	U.S. No. 1 4-6 oz	US No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
Russet Burbank	602	63	378	35	218	125	144	522	72	6	2.20	1.077	45.18	0.00
Shepody	603	80	483	250	183	51	91	574	17	12	1.83	1.085	55.78	0.00
Ranger Russet	499	65	324	117	162	45	98	422	26	50	2.00	1.096	49.28	0.00
Russet Norkotah	522	86	447	58	283	105	19	465	48	7	1.95	1.074	47.68	0.00
A91186-2	381	77	294	33	172	89	31	325	27	26	2.33	1.083	54.30	0.00
A91814-5	641	72	462	22	205	235	21	483	149	6	1.33	1.094	53.83	0.00
A92030-5	458	86	393	186	168	39	17	410	25	22	1.80	1.092	53.33	0.00
A92294-6	608	76	462	26	253	183	42	503	70	33	2.08	1.092	56.03	0.00
A9304-3	510	81	414	169	203	43	23	437	13	53	2.13	1.094	56.00	0.00
A9305-10	559	83	462	108	259	96	19	481	39	38	1.88	1.085	56.63	0.00
A93157-6LS	507	87	440	78	276	86	29	469	24	14	1.95	1.092	50.35	0.00
AC92009-4RU	483	85	408	61	271	76	6	414	26	39	1.79	1.098	54.10	0.00
AC93026-9RU	490	82	402	102	225	75	30	432	53	4	2.18	1.086	50.38	0.00
ATX9202-1RU	493	86	426	91	247	87	15	440	43	8	1.90	1.091	59.48	0.00
ATX92230-1RU	467	88	413	83	267	63	24	437	14	15	1.93	1.085	58.63	0.00
CO93001-11RU	514	82	424	39	254	131	24	448	50	16	2.13	1.079	48.55	0.00
CO93016-3RU	522	74	387	45	200	141	24	411	86	24	2.00	1.083	49.98	0.00
PA95A11-14	528	71	375	33	239	103	65	440	75	11	1.93	1.081	51.80	0.00
TC1675-1RU	494	87	428	75	229	124	9	437	54	3	1.78	1.100	56.95	0.00
Mean	520	80	412	85	227	100	38	450	48	20	1.95	1.088	53.06	0.00
LSD (0.05)	60	10	70	55	51	33	37	68	21	NS*	0.162	0.004	3.95	NS

*NS = Not significant.

Table 6. Western Regional Late Harvest Trial: yield, grade, and processing quality of potato varieties grown at the Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Variety	Total yield	U.S. No. 1					U.S. No. 2	Marketable	<4 oz	Cull	Length/ width	Specific gravity	Average fry color, light reflectance	Sugar ends
		Percent No. 1	Total No. 1	>12 oz	6-12 oz	4-6 oz								
	cwt/acre	%	cwt/acre								ratio	g cm^{-3}	%	%
Russet Burbank	570	44	224	17	138	69	279	503	58	0	2.3	1.070	32.4	45.0
Ranger Russet	629	73	455	223	192	39	155	610	19	0	2.0	1.096	41.3	0.0
Russet Norkotah	473	84	400	61	238	102	29	428	45	0	2.0	1.069	29.3	12.5
A91186-2	514	63	314	58	201	55	159	473	42	0	2.1	1.082	45.1	2.5
A91814-5	719	73	523	40	285	198	53	576	143	0	1.3	1.090	51.6	0.0
A92030-5	473	86	409	199	163	47	36	445	28	0	1.7	1.089	47.1	0.0
A92294-6	713	64	450	60	272	118	217	667	43	0	2.0	1.093	48.6	2.5
A9304-3	579	75	434	232	171	31	125	559	9	0	2.2	1.090	47.3	0.0
A9305-10	714	80	571	219	283	69	107	678	35	2	1.9	1.087	48.6	0.0
A93157-6LS	627	88	548	279	230	39	56	604	24	0	1.9	1.097	45.3	0.0
AC92009-4RU	472	93	438	210	198	30	17	455	18	0	1.8	1.095	45.2	0.0
AC93026-9RU	548	73	401	190	159	52	115	516	29	0	2.1	1.085	36.3	32.5
ATX9202-1RU	491	87	425	155	214	56	41	466	25	0	1.9	1.085	46.6	12.5
ATX92230-1RU	518	88	456	148	245	64	38	494	24	0	1.8	1.085	49.0	0.0
CO93001-11RU	497	81	402	49	247	107	28	430	67	0	1.9	1.074	44.0	0.0
CO93016-3RU	577	71	408	54	224	130	88	496	80	0	1.9	1.088	33.5	35.0
TC1675-1RU	544	90	491	137	271	83	10	501	43	0	1.7	1.095	50.0	0.0
Mean	568	0	432	137	219	76	91	523	43		1.9	1.086	43.6	8.4
LSD (0.05)	103	13	83	61	52	25	99	102	17	NS*	0.2	0.005	3.9	14.9

*NS = Not significant.