

Blazer Russet: An Early to Mid-Season Potato Cultivar With High U.S. No. 1 Yields and Good Processing and Culinary Qualities

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ABSTRACT

'Blazer Russet' is an early to mid-season cultivar notable for its high U.S. No. 1 yield of medium-russeted tubers and its good processing and culinary qualities. It was derived from the cross A7816-14 x 'NorKing Russet' and was released in 2005 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon and Washington. Blazer Russet is very suitable for processing into French fries and other frozen potato products directly from the field or from extended storage, with higher merit scores than 'Russet Burbank' and 'Ranger Russet' in processing and post-harvest evaluations. Blazer Russet also has high merit for use in the fresh market, with sensory evaluations comparable to those of Russet Burbank. Total yields for Blazer Russet at five early harvest trial locations in the western United States were 12% greater than either 'Russet Norkotah' or 'Shepody', while U.S. No. 1 yields were 12% greater than Russet Norkotah and 35% greater than Shepody. Specific gravities of Blazer Russet tubers were comparable to tubers of Shepody, and higher than those of Russet Norkotah in early harvest trials. In full-season trials in the western United States, total yields for Blazer Rus-

set were slightly lower than Ranger Russet and slightly higher than Russet Burbank, but U.S. No. 1 yields were 8% greater than Ranger Russet and 38% greater than Russet Burbank. In these full-season trials, tuber specific gravity of Blazer Russet was similar to Russet Burbank, but lower than Ranger Russet. Blazer Russet is resistant to sugar ends, tuber malformations and most internal and external defects, the exception being its moderate susceptibility to hollow heart. Blazer Russet is resistant to common scab, tuber powdery scab and PVX, and has moderate resistance to blackspot bruise and tuber late blight infections. It is moderately susceptible to powdery scab root galling, PVY⁰, early blight infection of the tuber, Erwinia soft rot and Fusarium dry rot. Blazer Russet is susceptible to Verticillium wilt, pink rot, PLRV net necrosis, corky ringspot, and foliar early blight and late blight.

RESUMEN

'Blazer Russet' es un cultivar de precoz a mediano, notable por su rendimiento de tubérculos U.S. No. 1, de tubérculos rugoso mediano y buenas cualidades culinarias y de procesamiento. Es derivado de un cruzamiento de A7816-14 x 'NorKing Russet' y fue liberado en 2005 por el USDA-ARS y las Estaciones Experimentales Agrí-

colas de Idaho, Oregon y Washington. Blazer Russet es muy apropiado para el procesamiento de papa frita y otros productos congelados, directamente del campo o de almacenamiento prolongado, con mayores méritos que 'Russet Burbank' y 'Ranger Russet' en evaluaciones de procesamiento de pos cosecha. Blazer Russet también tiene grandes méritos para su comercialización en fresco, con evaluaciones sensoriales comparables a las de Russet Burbank. El rendimiento total de Blazer Russet en pruebas de cosecha temprana en cinco localidades en el oeste de los Estados Unidos fueron 12% mayores que 'Russet Norkotah' o 'Shepody', mientras que el rendimiento de U.S. No. 1 fue 12% mayor que Russet Norkotah y 35% más que Shepody. La gravedad específica de los tubérculos de Blazer Russet fue comparable a los de Shepody y más alta que los de Russet Norkotah en pruebas de cosecha temprana. En pruebas de periodo de cultivo completo en el Oeste de Estados Unidos, el rendimiento total de Blazer Russet fue ligeramente menor que el de Ranger Russet y un poco mayor que Russet Burbank, pero los rendimientos de U.S. No. 1 fueron 8% mayores que Ranger Russet y 38% mayores que Russet Burbank. En las pruebas de periodo de cultivo completo, la gravedad específica del tubérculo de Blazer Russet fue similar a Russet Burbank, pero más baja que

Ranger Russet. Blazer Russet es resistente a punta azucarada, malformaciones del tubérculo y la mayoría de defectos internos y externos, con excepción de su moderada susceptibilidad al corazón vacío. Blazer Russet es resistente a la sarna común, sarna polvorienta del tubérculo y PVX y tiene resistencia moderada a la mancha negra por golpes y a la infección al tubérculo de tizón tardío. Es moderadamente susceptible a la agalla de la raíz por sarna polvorienta, PVY⁰, infección al tubérculo de tizón temprano, pudrición blanda por *Erwinia* y pudrición seca por *Fusarium*. Blazer Russet es susceptible a marchitez por *Verticillium*, pudrición rosada, a la necrosis en red por PLRV, anillo corchoso y tizón temprano y tardío al follaje.

INTRODUCTION

'Blazer Russet' is a product of the cooperative Northwest Potato Variety Development Program, comprised of the USDA Agricultural Research Service and the Agricultural Experiment Stations of Idaho, Oregon and Washington. Blazer Russet resulted from a 1988 cross between A7816-14 and 'NorKing Russet' (Figure 1) made by J.J. Pavék, and was given the clonal designation A8893-1. Advanced selection A7816-14 is a medium- to late-maturing russeted selection, with a high percentage of U.S. No. 1 tubers, high specific gravity and vitamin C (ascorbic acid) and resistance to common scab. NorKing Russet is a medium-maturing, russet cultivar with excellent vine vigor, high U.S. No. 1 yield, and resistance to *Verticillium* wilt and common scab (Johansen et al. 1986). Additional potato cultivars in the pedigree of Blazer Russet include 'Nooksack' (Hoyman and Holland 1974), 'Butte' (Pavék et al. 1978), 'Kennebec' (Akeley et al. 1948), 'Norgold Russet' (Johansen 1965), 'Norchip' (Johansen et al. 1969) and 'Lenape' (Akeley et al. 1967).

Blazer Russet was evaluated as a 12-hill selection in 1991 and from 1992 to 1997 in replicated yield trials in Idaho. It was entered in 1998 into Tri-State trials comprised of sites in Idaho, Oregon, and Washington. On the basis of its acceptable performance in the Tri-State trials, A8893-1 was subsequently entered into the 1999-2001 Western Regional Potato Variety Trials, where it was evaluated at sites in Idaho, Oregon, Washington, Colorado, Texas, California and New Mexico. Prior to release, seed increases and commercial trials were conducted in Idaho, Oregon and Washington.

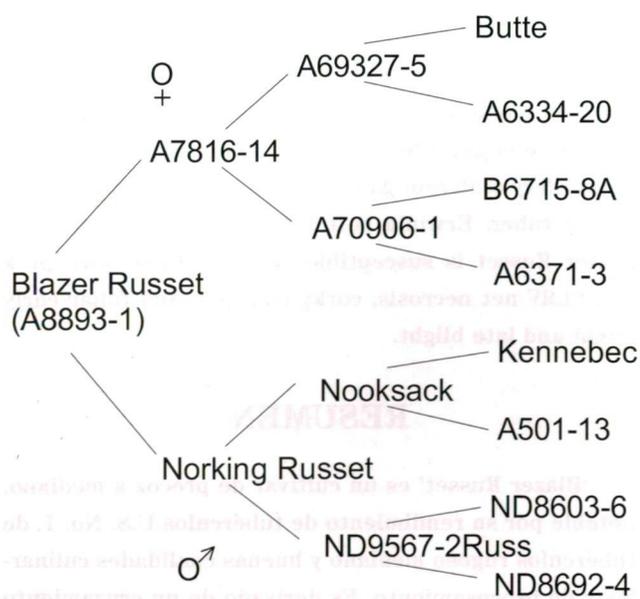


FIGURE 1.
Four-generation pedigree of Blazer Russet (A8893-1).

VARIETAL DESCRIPTION

Plant and tuber descriptions were obtained from field evaluations conducted at Aberdeen, ID (Figure 2).

Plants (Figure 2A)

Growth habit: small to medium-sized; semi-erect vine expressing medium maturity 95 to 110 days from planting to harvest (compared with 130 to 150 days for 'Russet Burbank'). Vine type is open with stems visible. *Stems:* medium-thick, very strong purple anthocyanin pigmentation that accompanies maturation; somewhat prominent wings (2 to 4 mm wide).

Leaves (Figure 2B)

Medium-sized, narrow in outline; secondary leaves becoming larger near the terminus; dark green (147B, Royal Horticultural Society Color Chart [RHSCC]) with a medium-closed silhouette; strong anthocyanin pigmentation on the petioles and midribs. *Terminal leaflets:* medium ovate shape with an acuminate tip and acute base; moderately wavy margins; average length 82.9 mm, width 48.0 mm; average of 80 mid-canopy leaflets. *Primary leaflets:* 3 to 6 pairs, average of 3.7 pairs; narrowly ovate with an acuminate tip and acute base. *Secondary leaflets:* 2 to 6 pairs, average 3.8 pairs. *Tertiary leaflets:* 0 to 10 pairs, average 4.9 pairs. *Stipules:* medium, non-clasping.

Flowers (Figure 2C)

Inflorescences: abundant florets, averaging 13.9 per inflorescence; inflorescences averaging 3.8 per plant. *Buds:* strong purple anthocyanin pigmentation; strongly pubescent calyx and pedicel; pedicel articulation prominent. *Calyx:* sepals awl-shaped, fused to one-fourth the length of the bud. *Corolla:* pentagonal shape; white (155B, RHSCC) on both inside and outside surfaces; large, averaging 39 mm across. *Anthers:* yellowish-orange (17A, RHSCC); arranged as a narrow cone. *Stigma:* capitate, yellow-green (146A, RHSCC). *Pollen:* shed is limited; no or limited success as a male parent in hybridizations. *Berries:* spherical, mottled with purple anthocyanin pigmentation; low spontaneous production in the field.

Tubers (Figure 2D, 2E, 2F)

Shape: oblong; shorter than Russet Burbank; mean length 117 mm, range 87 to 154 mm; mean width 65 mm, range 55 to 76 mm; mean thickness 59 mm, range 48 to 73 mm. *Yield:* average of 80 tubers weighing 168 to 336 g. *Skin:* tan (164B, RHSCC); moderately heavy russet pattern; not scaly. *Eyes:* apical eye moderately deep, lateral eyes shallow; moderately prominent eyebrow; somewhat predominantly apical; low to moderate number of eyes per tuber, mean 16, range 7 to 27. *Flesh:* cream (158C, RHSCC); slightly prominent pith region. *Dormancy:* medium length, approximately 130 to 140 days when stored at 5.6 C, compared to Russet Burbank at 170 to 180 days (Kleinkopf et al. 2004, 2005). *Light sprouts:* dark purple anthocyanin pigmentation; globose to slightly flattened base; open bud scales; heavily pubescent base with strongly hirsute bud scales.

AGRONOMIC PERFORMANCE

Average total yields for Blazer Russet in irrigated, full-season trials in southern Idaho were intermediate between cvs Ranger Russet (higher) and Russet Burbank (lower) (Table 1).

TABLE 1—Total yield, U.S. No. 1 yield, tuber specific gravity and French fry color of Blazer Russet and Russet Burbank in 20 full-season, southern Idaho variety trials.¹

Variety	Total Yield t ha ⁻¹	U.S. No. 1 Yield t ha ⁻¹	Percent No. 1s	Specific ² Gravity	Fry Color ³ 4.4 C	Fry Color ³ 7.2 C
SE Idaho						
Blazer Russet	46.5	36.3	78	1.083	2.9	0.6
Ranger Russet	50.5	38.9	77	1.089	3.2	1.2
Russet Burbank	38.8	23.3	59	1.080	3.5	1.1
SC and SW Idaho						
Blazer Russet	57.0	48.3	84	1.079	3.2	1.2
Ranger Russet	56.7	42.4	75	1.086	3.2	1.4
Russet Burbank	58.3	33.8	57	1.080	3.4	1.5
Overall Mean						
Blazer Russet	51.7	42.3	81	1.081	3.1	0.9
Ranger Russet	53.6	40.7	76	1.088	3.2	1.3
Russet Burbank	48.6	28.6	58	1.080	3.5	1.3

¹Trial locations for southeastern (SE) Idaho included Aberdeen (four years), Rexburg (two years) and Shelley (four years). Trial locations for south central (SC) and southwestern (SW) Idaho included Kimberly (three years) and Parma (seven years), respectively.

²Specific gravity determined using the weight-in-air, weight-in-water method.

³French fry color rated using USDA standards, where 0=light, 4=dark. French fries rated ≤ 2 are considered acceptable. Tubers were evaluated after three to six months storage at 4.4 or 7.2 C.

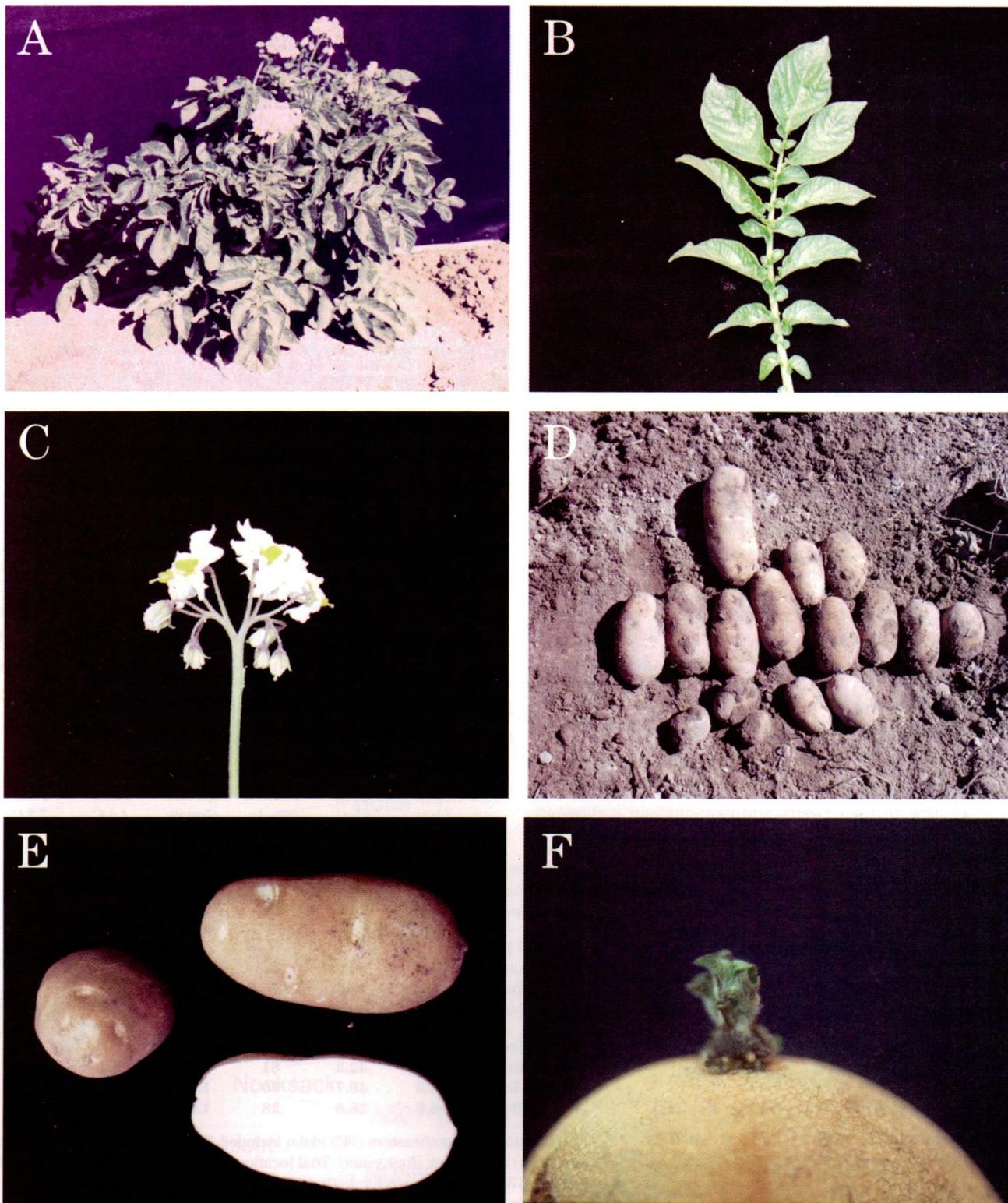


FIGURE 2.

Photographs of Blazer Russet showing A) whole plant, B) compound leaf, C) flower, D) field tubers, E) external tuber appearance and tuber flesh color and F) light sprout.

In southeastern Idaho, Blazer Russet total yields were lower than Ranger Russet and higher than Russet Burbank, but total yields for all three cultivars were similar in southwestern and southcentral Idaho. When averaged across all southern Idaho locations, U.S. No. 1 yields for Blazer Russet were 4% higher than Ranger Russet, but were 48% higher than Russet Burbank. Average percent U.S. No. 1 tubers for Blazer Russet were 5% higher than Ranger Russet and 23% higher than Russet Burbank. U.S. No. 1 tubers are those that are firm, fairly well shaped with diameters greater than 48 mm, and with less than 5% internal and external defects.

TABLE 2—Total yield, U.S. No. 1 yield, percent No. 1s and tuber specific gravity of Blazer Russet, Russet Norkotah and Shepody in early harvest trials grown in the Columbia Basin and Eastern Oregon, 1998 through 2001.¹

Location/ Variety	Total Yield t ha ⁻¹	U.S. No. 1 Yield t ha ⁻¹	Percent No. 1s	Specific ² Gravity
Hermiston, OR				
Blazer Russet	62.5	49.8	80	1.074
Russet Norkotah	48.7	39.7	81	1.066
Shepody	54.4	34.3	74	1.069
Malheur, OR				
Blazer Russet	63.6	46.4	72	1.081
Russet Norkotah	49.9	37.3	75	1.075
Shepody	47.9	29.0	69	1.081
Othello, WA				
Blazer Russet	67.5	50.5	75	1.073
Russet Norkotah	74.7	60.5	81	1.073
Shepody	65.9	44.0	67	1.065
Eltopia, WA				
Blazer Russet	75.8	66.8	88	1.083
Russet Norkotah	71.3	59.4	84	1.073
Shepody	75.8	59.8	79	1.073
Warden, WA				
Blazer Russet	55.6	47.8	86	1.075
Russet Norkotah	54.5	44.2	82	1.074
Shepody	53.0	34.9	74	1.079
Overall Mean				
Blazer Russet	63.3	50.7	80	1.077
Russet Norkotah	56.6	45.3	80	1.073
Shepody	56.6	37.6	72	1.076

¹Trial locations included Hermiston, Oregon (three years), Malheur County, Oregon (three years), Othello, Washington, (one year), Eltopia, Washington (two years) and Warden, Washington (two years).

²Specific gravity determined using the weight-in-air, weight-in-water method.

Blazer Russet was evaluated for four years (1998 to 2001) in both early and late harvest trials in Idaho, Oregon and Washington as part of the Tri-State and Western Regional Variety Trial programs. Average total yields for Blazer Russet at five early harvest trial locations were 12% higher than either 'Russet Norkotah' or 'Shepody' (Table 2). Early harvest U.S. No. 1 yields for Blazer Russet also averaged 12% higher than Russet Norkotah, but were 35% higher than Shepody. Blazer Russet produced higher total yields than Russet Norkotah and Shepody at both Oregon locations, while total yields at the three

TABLE 3—Total yield, U.S. No. 1 yield, percent No. 1s and tuber specific gravity of Blazer Russet, Ranger Russet and Russet Burbank in full-season irrigated trials grown in Idaho, Oregon and Washington, 1998 through 2001.

Location/ Variety	Total Yield t ha ⁻¹	U.S. No. 1 Yield t ha ⁻¹	Percent No. 1s	Specific ¹ Gravity
Aberdeen, ID				
Blazer Russet	53.0	44.0	83	1.083
Ranger Russet	52.9	42.4	80	1.089
Russet Burbank	49.1	27.5	56	1.080
Kimberly, ID				
Blazer Russet	61.9	47.3	76	1.080
Ranger Russet	56.9	34.6	61	1.085
Russet Burbank	51.0	20.5	39	1.079
Othello/Warden, WA ²				
Blazer Russet	83.8	67.5	81	1.078
Ranger Russet	86.7	66.0	76	1.089
Russet Burbank	84.4	46.6	55	1.082
Hermiston, OR				
Blazer Russet	79.7	60.1	76	1.072
Ranger Russet	95.5	68.9	73	1.076
Russet Burbank	85.3	49.5	58	1.076
Klamath Falls, OR				
Blazer Russet	64.2	55.8	87	1.082
Ranger Russet	64.2	46.8	73	1.084
Russet Burbank	60.9	41.2	68	1.085
Malheur, OR				
Blazer Russet	60.9	47.7	77	1.081
Ranger Russet	54.7	36.6	66	1.099
Russet Burbank	60.2	30.2	49	1.079
Overall Mean				
Blazer Russet	69.7	54.3	78	1.078
Ranger Russet	71.0	50.5	71	1.086
Russet Burbank	67.7	39.3	52	1.079

¹Tuber specific gravity determined using the weight-in-air, weight-in-water method.

²The 2000 trial was grown at Warden, Washington.

Washington locations were fairly similar. However, Blazer Russet produced higher U.S. No. 1 yields than Shepody at all five Oregon and Washington locations, and had higher yields than Russet Norkotah at four of the five locations. Overall, percent U.S. No. 1 tubers for Blazer Russet was similar to Russet Norkotah and 8% higher than Shepody.

Total and U.S. No. 1 yields for Blazer Russet, Ranger Russet and Russet Burbank were compared for full-season trials conducted at six locations in Idaho, Washington and Oregon during 1998 to 2001 (Table 3). Overall, total yields for Blazer Russet were slightly lower than Ranger Russet and slightly

TABLE 4—Total yield, U.S. No. 1 yield, percent No. 1s and tuber specific gravity of Blazer Russet, Russet Burbank and Russet Norkotah in irrigated trials grown in California, Colorado and Texas, 1999 through 2001.¹

Location/ Variety	Total Yield t ha ⁻¹	U.S. No. 1 Yield t ha ⁻¹	Percent No. 1s	Specific ² Gravity
Kern, CA				
Blazer Russet	50.1	45.2	90	1.084
Russet Burbank	50.2	31.8	67	1.089
Russet Norkotah	55.3	50.8	90	1.081
Tulelake, CA				
Blazer Russet	60.0	50.2	82	1.077
Russet Burbank	62.9	41.8	67	1.083
Russet Norkotah	41.8	33.8	81	1.071
San Luis Valley, CO				
Blazer Russet	52.2	44.0	82	1.077
Russet Burbank	51.7	33.8	67	1.083
Russet Norkotah	41.7	34.4	81	1.071
Springlake, TX				
Blazer Russet	42.5	30.5	70	1.064
Russet Burbank	30.7	6.2	21	1.061
Russet Norkotah	30.8	24.0	77	1.059
Dalhart, TX				
Blazer Russet	32.7	26.3	81	1.066
Russet Burbank	22.7	9.9	43	1.063
Russet Norkotah	25.3	18.6	73	1.062
Overall Mean				
Blazer Russet	47.5	39.3	82	1.076
Russet Burbank	43.7	24.7	52	1.077
Russet Norkotah	39.3	32.3	80	1.070

¹Data collected from the 1999-2001 Western Regional Potato Variety Trials. Trial years at each location were: Kern County (three), Tulelake (three), San Luis Valley (one), Springlake (three) and Dalhart (one).

²Tuber specific gravity determined using the weight-in-air, weight-in-water method.

higher than Russet Burbank. Blazer Russet yields were equal to or greater than the other two cultivars at all locations except Hermiston, Oregon, where yields for Ranger Russet and Russet Burbank were appreciably greater than Blazer Russet, and Othello, Washington, where yield differences were relatively small. The longer growing seasons at these two locations likely accounted for the yield advantage of the two late-season cultivars. Blazer Russet did, however, have an advantage with respect to U.S. No. 1 tuber production, producing 8% higher U.S. No. 1 yields than Ranger Russet and 38% higher than Russet Burbank. Blazer Russet produced greater yields than Russet Burbank at all locations and outyielded Ranger Russet at all locations except Hermiston, Oregon.

Blazer Russet was also evaluated at five additional locations in the 1999-2001 Western Regional Variety Trials (Table 4). Total yields for Blazer Russet were higher than Russet Burbank and Russet Norkotah when compared across locations. Blazer Russet performed particularly well in Texas, where it out yielded Russet Burbank by 38 to 44% and Russet Norkotah by 29 to 38%. U.S. No. 1 yields for Blazer Russet were substantially greater than Russet Burbank at all locations and were greater than Russet Norkotah at all but the Kern Co., California location. Percent U.S. No. 1 tubers for Blazer Russet were similar to Russet Norkotah but were considerably higher than Russet Burbank.

TUBER QUALITY CHARACTERISTICS AND USAGE

Specific Gravity

When averaged across locations, specific gravities of Blazer Russet tubers grown in full-season trials were similar to those of Russet Burbank (Tables 1, 3 and 4). However, specific gravities for Blazer Russet were generally equal to or higher than Russet Burbank in Idaho and Texas trials but lower in Washington, Oregon, California and Colorado trials. In early harvest and full-season trials (Tables 2 and 4), Blazer Russet tubers had higher specific gravity than Russet Norkotah at all sites except an early harvest site at Othello, Washington, where specific gravities of the two cultivars were equal. Blazer Russet had lower specific gravities than Ranger Russet at all locations (Tables 1 and 3). At early harvest sites, the average specific gravity of Blazer Russet was very similar to that of Shepody (Table 2).

Incidence of Tuber Defects

Blazer Russet has exhibited a lower incidence of second growth and growth cracks than either Ranger Russet or Russet Burbank (Table 5). Blazer Russet's resistance to shatter bruise has been similar to Russet Burbank and Ranger Russet. Its blackspot bruise susceptibility has been similar to Russet Burbank but less than Ranger Russet. Hollow heart susceptibility of Blazer Russet tubers has been higher than either Ranger Russet or Russet Burbank. However, the incidence of stem-end discoloration has been relatively low.

Fry Characteristics

The colors of French fries from tubers of Blazer Russet, harvested from full-season trials and stored for extended periods, were generally lighter than those of Russet Burbank and Ranger Russet at 7.2 C, but were equivalent at 4.4 C (Table 1).

Blazer Russet fry color was consistently acceptable in comprehensive processing evaluations (Table 6) following long-term storage of tubers obtained from trials conducted in Washington, Idaho and Oregon. Average fry color was slightly darker than Russet Burbank in all three states but lighter than that of Ranger Russet in Washington and Oregon. Accordingly, average reducing-sugar concentrations for Blazer Russet were slightly higher than Russet Burbank but lower than Ranger Russet. However, fry color uniformity from stem to bud end was consistently better for Blazer Russet than the other two cultivars. Blazer Russet broke dormancy earlier than either Ranger Russet or Russet Burbank, resulting in greater sprout length following seven months of storage.

Mean post-harvest merit score ratings for Blazer Russet, Russet Burbank and Ranger Russet (Table 7) were compiled over a three-year period using data from the aforementioned Washington, Idaho and Oregon trials and sensory evaluations. The rating values were determined by combining individual ratings for fry color characteristics, reducing-sugar concentrations, tuber specific gravity and taste panel sensory evaluations. Averaged over the three-year period and across production sites, the processing rating for Blazer Russet was higher than ratings for Ranger Russet and Russet Burbank.

Sensory Evaluations

Blazer Russet compared favorably to Russet Burbank in both pre- and post-storage sensory evaluations of baked potatoes (Table 8) conducted over a four-year period (1998 to 2001). Blazer Russet scored slightly lower than Russet Burbank with respect to texture in pre-harvest evaluations, but color and flavor ratings were similar. Results following five to six months of storage were nearly identical to the pre-storage results. These sensory evaluations support the use of Blazer Russet for fresh-pack usage as well as for processing.

Biochemical and Nutritional Characteristics

Blazer Russet, Russet Burbank and Russet Norkotah tubers from trials conducted at Aberdeen, Idaho, in 1999-2001 were evaluated for several biochemical and nutritional characteristics (Table 9). Blazer Russet had higher dry matter than Russet Burbank or Russet Norkotah, as well as higher sucrose concentrations. Vitamin C concentrations for Blazer Russet were 21% higher than Russet Burbank but only slightly higher than Russet Norkotah. Total glycoalkaloid contents were higher for Blazer Russet than either Russet Burbank or Russet Norkotah, but were still well below the critical threshold concentration of 20 mg per 100 g tuber fresh weight.

Usage

Blazer Russet appears to have potential for both the processing and fresh markets due to its high grade, attractive appearance, moderate specific gravity, resistance to most

TABLE 5—Internal and external defects for Blazer Russet, Ranger Russet and Russet Burbank tubers grown in 13 trials in southeastern and south-central Idaho.¹

Variety	Second ²	Growth ²	Shatter ²	Blackspot ²	Hollow ³	Stem-end ³
	Growth	Cracks	Bruise	Bruise	Heart -%	Discoloration -%
Blazer Russet	4.7	4.7	4.6	2.8	10	1
Ranger Russet	4.5	4.5	4.6	1.9	0	1
Russet Burbank	3.4	3.8	4.4	2.8	7	1

¹Includes trials at Aberdeen (four years), Kimberly (three years), Rexburg (two years) and Shelley (four years), Idaho, conducted from 1998 through 2002.

²Second growth, growth cracks, shatter bruise and blackspot bruise rated 1 to 5 where 1=severe, 5=none. Shatter bruise evaluations were conducted two months post-harvest using a bruise chamber designed to mimic rough handling. Blackspot bruise evaluations were conducted using an abrasive peel test and is a measure of blackspot potential (Pavek et al. 1985).

³Incidence of hollow heart and stem-end discoloration are reported as a percentage of tubers over 336 g with visible symptoms. Hollow heart percentages include both visible hollow cavity and brown center symptoms.

internal and external defects, good baking and frying characteristics, and good culinary qualities.

DISEASE RESPONSE

Evaluations of disease responses for Blazer Russet were based on data collected from replicated field trials conducted for a minimum of two years. Common scab, *Verticillium* wilt and early blight evaluations were conducted at Aberdeen, Idaho, using naturally occurring inocula; Hermiston, Oregon evaluations for *Verticillium* wilt also included naturally occurring inocula. Common scab evaluations were based on visual assessments of tuber lesion size and severity in three replicate plots of a randomized complete block design. Early blight evaluations were based on visual estimates of the amount of leaf area infected in three replicate plots of a randomized complete block design. The protocol for evaluating *Verticillium* wilt was previously described by Corsini et al. (1988). Powdery scab evaluations were conducted at Aberdeen, Idaho, by estimating root galling and tuber lesion severity in three replications of a randomized complete block design. Pink rot was also evaluated at harvest, and healthy tubers were subsequently evalu-

ated for pink rot and powdery scab symptoms after one month of storage.

Blazer Russet exhibited a very high level of resistance to common scab caused by *Streptomyces scabies* (Table 10), rarely exhibiting symptoms while susceptible cultivars were severely infected. It exhibited moderate susceptibility to root infections of powdery scab (*Spongospora subterranea*) but showed good resistance to tuber infections. Blazer Russet is susceptible to *Verticillium* wilt (*Verticillium dahliae*), pink rot (*Phytophthora erythroseptica*) and foliar early blight (*Alternaria solani*) infections, and is moderately susceptible to tuber early blight infections. Blazer Russet's susceptibility to *Verticillium* wilt is comparable to that of Russet Burbank, but greater than that of Ranger Russet. Resistance to powdery scab is similar to that of Russet Burbank and Ranger Russet. However, Blazer Russet is more susceptible to pink rot and foliar early blight than the two check cultivars, and has similar susceptibility to tuber early blight infections.

Late blight (*Phytophthora infestans*) field evaluations were conducted at Corvallis, Oregon, under artificial inoculation conditions using the strain US-8 as described by Mosley et al. (2003). Blazer Russet is more susceptible to foliar late blight

TABLE 6—Post-harvest ratings of Blazer Russet, Ranger Russet and Russet Burbank following seven months of storage (three months at 8.9 C and four months at 6.7 C). All post-harvest evaluations and ratings were conducted at Pullman, WA, 1999 through 2001 using tubers from trials at Aberdeen, ID, Hermiston, OR and Warden/Othello, WA.

Clone	Photovolt Reading ¹			Difference ² Stem -vs- Bud	USDA Color Rating ³	% Reducing Sugars ⁴			Sprouting	
	Stem	Bud	Avg.			Stem	Bud	Avg.	% of Tubers	Sprout Length (mm)
Washington										
Blazer Russet	25.2	28.3	26.8	5.2	1.7	1.5	1.6	1.5	100	15
Ranger Russet	18.7	25.9	22.3	9.3	2.3	2.8	2.1	2.5	100	12
Russet Burbank	25.0	31.4	28.2	8.4	1.7	2.0	1.2	1.6	66.7	1
Idaho										
Blazer Russet	25.6	30.0	27.8	7.0	1.3	1.6	1.4	1.5	100	16
Ranger Russet	24.6	36.0	30.3	11.5	1.3	2.2	0.8	1.5	100	6
Russet Burbank	25.9	34.2	30.1	9.9	1.7	1.6	0.9	1.2	66.7	1
Oregon										
Blazer Russet	22.6	27.0	24.8	6.1	2.0	2.5	1.7	2.1	100	23
Ranger Russet	16.5	27.3	21.9	10.9	3.0	4.2	2.2	3.2	100	7
Russet Burbank	21.9	35.3	28.6	13.8	2.0	2.1	0.9	1.5	66.7	1

¹Fries (0.95 cm x 2.87 cm) were fried at 191 C for 3.5 minutes and color was measured with a Photovolt meter within 3 minutes of removal from oil. A Photovolt reading of ≤ 19 is considered unacceptably dark (see footnote 3 below).

²A difference of ≥ 9 Photovolt units between bud and stem end constitutes non-uniform fry color. Values represent an average of actual Photovolt differences in each of three years and therefore do not relate directly to averaged stem and bud values listed in the table.

³USDA color (0=light and 4=dark) ratings were assigned based upon Photovolt readings of the darkest ends of fries (typically stem ends); Photovolt readings (31=USDA 0, 25 to 30=USDA 1, 20 to 24=USDA 2, 15 to 19=USDA 3, ≤ 14 =USDA 4).

⁴Dry matter basis.

infections than Russet Burbank or Ranger Russet. However, it has moderate resistance to tuber late blight infections, which is a higher level of resistance than that exhibited by either Russet Burbank or Ranger Russet.

Evaluations of PLRV, PVY⁰ and PVX resistances were conducted at Kimberly, Idaho, using virus-infected spreader rows as described by Corsini et al. (1994). In these trials, Blazer Russet showed a high level of resistance to PVX, a level similar to Ranger Russet but greater than Russet Burbank. It also showed a similar level of susceptibility to PLRV and PLRV net necrosis as the two check cultivars. Blazer Russet was more resistant to PVY⁰ than Russet Burbank but more susceptible than Ranger Russet.

Corky ringspot evaluations were conducted at Pasco, Washington, using protocols described by Brown et al. (2000) in soils naturally infected with Tobacco rattle virus (TRV) and stubby root nematode. Blazer Russet's susceptibility to corky

ringspot in these trials was similar to Russet Burbank but greater than Ranger Russet.

Storage disease ratings were determined as described by Corsini and Pavek (1986). Blazer Russet showed moderate susceptibility to *Erwinia* soft rot and *Fusarium* dry rot, which is similar to Ranger Russet but somewhat better than Russet Burbank. In ringrot (*Clavibacter michiganensis*) evaluations conducted in 2002 to 2003 at Colorado State University by Dr. Robert Davidson, Blazer Russet demonstrated consistent and relatively early vine symptoms following seed inoculation, and showed consistent and strong tuber symptoms.

MANAGEMENT

A limited number of studies on the management of Blazer Russet have been conducted in southern Idaho and the Columbia Basin. Optimal seedpiece size ranges from 70 to 100 g. It is recommended that seed be planted near optimal temperatures to minimize the potential for soft rot decay. Dry rot potential of seed lots should also be determined, and seed should be treated with an effective fungicide when needed. Optimal seedpiece spacing for 91 cm wide rows is 23 to 28 cm with a 13 to 15 cm planting depth. Adequate soil needs to be applied to the surface of the hill at final hilling to minimize tuber greening.

Blazer Russet has exhibited good resistance to metribuzin when applied at labeled rates. It has a semi-erect, medium- to small-sized vine that competes reasonably well with weeds after the rows close during early to mid-tuber bulking, but it becomes susceptible to weed competition later in the growing season as the vine senesces.

Fumigation is recommended for soils infested with root knot nematodes or a history of severe early die problems. Rou-

tine fungicide applications may also be made to prevent serious early blight infections. Early blight control is important in fields scheduled for storage to minimize tuber infection. This can be accomplished by minimizing tuber skinning and bruising during harvest and subsequent handling, and by avoiding harvesting in wet weather conditions.

Total seasonal nitrogen (N) requirements for Blazer Russet are

TABLE 7—Mean post-harvest merit score ratings¹ of Blazer Russet, Ranger Russet and Russet Burbank in full-season trials of the 1999 to 2001 Western Regional Potato Variety Trial.¹

	Idaho	Oregon	Washington	3-State Mean
Blazer Russet	25.3	16.9	21.9	21.4
Ranger Russet	27.9	11.8	18.9	19.5
Russet Burbank	20.5	12.9	18.6	17.3

¹Merit scores were assigned based on the sum of individual ratings for fry color from the field, 8.9 and 6.7 C (60 days storage), reducing-sugar concentrations following 60 days storage at 8.9 and 6.7 C, specific gravity, and sensory evaluations by taste panels. Maximum value possible was 38; higher values are indicative of superior post-harvest attributes. Post-harvest evaluations and ratings were conducted at Pullman, WA, using tubers from trials grown at Aberdeen, ID, Hermiston, OR and Warden/Othello, WA.

TABLE 8—Results of University of Idaho sensory evaluations of Blazer Russet and Russet Burbank baked potatoes.¹

Variety	Pre-storage ²				Post-storage ³			
	Color	Texture	Flavor	General	Color	Texture	Flavor	General
Blazer Russet	6.6	6.0	5.9	6.0	6.6	5.8	5.8	5.9
Russet Burbank	6.6	6.2	6.0	6.1	6.6	6.1	5.9	6.0

¹Tests consisted of ten sessions, each involving 10 to 12 trained panelists, conducted over four years, 1998 through 2001. Tubers were rated for color, texture, flavor, and general appeal on a 1 to 9 scale with 1=very poor quality, 9=exceptionally good quality.

²Pre-storage evaluations were conducted in early November, approximately one month after harvest, and before the storage temperature was brought to its final holding point.

³Post-storage evaluations were conducted in March, after five to six months storage at approximately 4.4 C.

about 90% of that for Russet Burbank, but a higher proportion should be applied early in the growing season to facilitate the earlier tuber development. It is recommended that 1/2 to 2/3 of the seasonal N requirement should be applied by row closure, with subsequent in-season applications being based on petiole nitrate concentrations. For southern Idaho, total soil plus fertilizer N recommendations range from about 235 kg ha⁻¹ in areas with a 45 t ha⁻¹ yield potential to 325 kg ha⁻¹ in areas with a 67 t ha⁻¹ yield potential. Nitrogen uptake decreases substan-

tially after August 1, so applications after that time will likely not be beneficial. Nitrogen response studies conducted for two years at Aberdeen, Idaho, indicate that petiole nitrate sufficiency levels for Blazer Russet are similar to those for Russet Burbank (Stark et al. 2004).

Phosphorus, potassium and micronutrient requirements have not been established for Blazer Russet. Therefore, it is recommended that growers follow local nutrient management recommendations for Russet Burbank until new guidelines for

Blazer Russet become available.

Seasonal irrigation requirements for Blazer Russet are similar to those for Russet Burbank, although Blazer Russet is significantly more resistant to water stress-related tuber defects. Therefore, it is recommended that available soil moisture (ASM) be maintained within the range of 65 to 80% for optimal yield and quality.

Plant water uptake decreases appreciably in late August, so irrigation application rates need to be adjusted according to soil moisture measurements to avoid developing excessively wet soil conditions that promote disease. Bruise susceptibility is similar to Russet Burbank. Consequently, low soil moisture (<60% ASM) conditions should be avoided during tuber maturation and harvest to minimize tuber dehydration.

Tuber dormancy for Blazer Russet is about 40 to 50 days shorter than Russet Burbank. Consequently, sprout inhibition will normally be required after two to four months when tubers are stored at relatively warm temperatures (7 to 9 C). In the absence of dry rot problems, Blazer Russet can be stored for up to nine months for processing or fresh market uses (Kleinkopf et al. 2004).

During three years of storage research, Blazer Russet exhibited low sucrose concentrations from harvest throughout nine months of storage at 7 to 9 C (Kleinkopf et al. 2005). Glucose and fry color from non-stressed tubers also remained acceptable throughout nine months of storage, with glucose peaking at about 120 days in storage and then progressively decreasing with time. Research with Blazer Russet indicates that in growing seasons with normal temperatures, a storage temperature of 7 C is appropriate for processing. However, in years with significant periods of high temperature stress, a higher storage temperature (8 to 9 C) may be necessary to maintain optimum processing quality.

TABLE 9—Biochemical analyses of Blazer Russet and Russet Burbank tubers.¹

Variety	Dry Matter %	Sucrose % FW	Dextrose % FW	Protein % DW	Vitamin C mg 100 g ⁻¹	Total Glycoalkaloids mg 100 g ⁻¹
Blazer Russet	22.8	0.22	0.08	6.9	25.7	7.3
Russet Burbank	21.7	0.17	0.08	5.3	21.2	5.7
Russet Norkotah	20.7	0.15	0.12	5.1	24.6	3.0

¹Tubers sampled from 1999 through 2001 trials grown at Aberdeen, Idaho. Tubers were stored for one month at 7.3 to 12.7 C prior to sample preparation. Tubers were cubed, freeze-dried and ground through a 4-mesh screen prior to analysis.

TABLE 10—Disease responses of Blazer Russet, Russet Burbank, and Ranger Russet.¹

Disease/ Pest	Blazer Russet	Russet Burbank	Ranger Russet
Verticillium wilt	S	S	MS
Pink rot	S	MS	MS
Scab			
Common	VR	MR	S
Powdery	MS(r) ² ,R(t)	MS(r),R(t)	MS(r),MR(t)
Early Blight			
Foliar	S	MS	MS
Tuber	MS	MS	MR
Late Blight			
Foliar	VS	S	S
Tuber	MR	S	S
Viruses ³			
PLRV	S	S	S
PVY ⁰	MS	S	MR
PVX	R	S	R
PLRV Net Necrosis	S	S	S
Corky ringspot	S	S	MS
Erwinia soft rot	MS	S	MR
Fusarium dry rot	MS	S	MS

¹Based on a minimum of two years of controlled field evaluations. Responses defined as very resistant (VR), resistant (R), moderately resistant (MR), moderately susceptible (MS), susceptible (S), very susceptible (VS).

²(r) = root galling, (t) = tuber.

³Virus responses are based on seedborne infections as determined by ELISA, following field infection with PLRV from aphid-vectored source of inter-planted virus infected potato, mechanical inoculation and aphid-vectored PVY⁰, and mechanical inoculation with PVX.

AVAILABILITY

In 2007, seed was available from potato seed growers in Idaho, Oregon and Montana. Small amounts of seed for research purposes can be obtained from the corresponding author. The University of Idaho, acting on behalf of the Potato Variety Management Institute, has applied for Plant Variety Protection for Blazer Russet.

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