

PREMIER RUSSET CHARACTERISTICS

Proposed name: (Premier Russet)

Experimental designation: A93157-6LS

Botanical name: Solanum tuberosum L.

Intended Market: French fry processing/Fresh Market

General Description:

Premier Russet is a product of the cooperative USDA/ARS, University of Idaho breeding program in Aberdeen. It resulted from a 1993 cross between A87149-4 and A88108-7 (Figure 1). It has been evaluated for over 13 years in public and industry trials throughout the western U.S. The release will be made jointly by the USDA/ARS and the experiment stations of Idaho, Washington, and Oregon.

Premier Russet is a mid-to late season variety notable for its high yield of oblong-long, medium-russeted tubers, high specific gravity, excellent fry color from cold storage and resistances to sugar ends, tuber malformations and most internal and external defects. Premier Russet is highly resistant to the accumulation of reducing sugars following long-term storage at 40-45 F. Its cold-sweetening resistance allows storage at colder temperatures thereby prolonging tuber dormancy and quality for processing or fresh pack use. Premier Russet should be useful in both tablestock and processing markets. Relative strengths include high yield with a very high proportion of U.S. No. 1 tubers, good tuber appearance, excellent processing quality and a high level of PVY resistance. Weaknesses include susceptibility to blackspot bruise, and moderate susceptibility to hollow heart and dry rot.

Plant Characteristics:

Premier Russet has a semi-erect, medium vine that matures late in the season. It produces white flowers with abundant pollen production and relatively good viability. See Table 1 for a full description of plant characteristics and Figure 2 for photographs.

Table 1. Foliage characteristics of Premier Russet compared with those of Russet Burbank. Comparisons were made on plants growing in Aberdeen, Idaho in 2004-2005.

Characteristic	Premier Russet	Russet Burbank
Maturity	Late	Late
Growth Habit	Erect to semi-erect	Semi-erect to spreading
Leaf type (silhouette)	Medium to open	Medium to open
Leaflet Shape (terminal)	Narrowly ovate	Medium ovate
Terminal Leaflet waviness	Strong	Slight
Flower color	White	White
Pollen production	Abundant	None

Tuber Characteristics:

Premier Russet produces oblong-long tubers with brown, russet skin. The eyes are intermediate in depth and number and are evenly distributed. Tuber set is low, and tuber size is medium to large (Table 2). See Figure 2 for photographs.

Table 2. Physical tuber characteristics of Premier Russet compared with those of Russet Burbank. Comparisons were made using tubers grown at Aberdeen, Idaho in 2004-2005

Characteristic	Premier Russet	Russet Burbank
Skin Color	Brown	Tan
Skin texture	Russet	Russet
Size ¹	Medium (Ave. 7.6 oz)	Medium (Ave. 6.8 oz)
Shape	Oblong –Long (3.6 ²)	Long (4.2)
Thickness	Medium-thick	Slightly flattened
Eye depth	Intermediate	Intermediate
Eye number	High	High
Eye distribution	Evenly distributed	Evenly distributed
Eyebrow prominence	Slight prominence	Slight prominence
Flesh color	White	Cream-white
Tuber set	Low	Low
Dormancy	Medium-Short	Long

¹ Tuber size data were collected from 15 trials grown in Idaho, Oregon, and Washington in 2001-2005.

² Shape is a 1-5 rating scale with 1 = round and 5 = long and narrow; data taken from 20 trials between 2001 and 2005.

Tuber Yield:

Premier Russet produced higher average total yields than Russet Burbank in late harvest trials in eastern, western and central Idaho, Oregon and Washington (Table 3). Premier Russet produced substantially higher (108-247 cwt/acre) U.S. No. 1 yields than Russet Burbank at all locations (Table 3). Total and U.S. No. 1 yields for Premier Russet were slightly higher than Ranger Russet in Western Idaho and Oregon but were slightly lower than Ranger Russet in Eastern Idaho and Washington. Yields of tubers >12 oz were substantially higher than Russet Burbank at all locations but were similar to or slightly lower than Ranger Russet.

Table 3. Premier Russet total yield, U.S. No. 1 yield, and greater than 12 ounce yield as compared to those of Russet Burbank and Ranger Russet in Late Harvest Trials.

Location	Variety	Total Yield (cwt/A)	U.S. No. 1 Yield (cwt/A)	Yield > 12 oz. (cwt/A)
Eastern Idaho ¹	Premier Russet	471	392	142
	Russet Burbank	426	271	56
	Ranger Russet	496	409	158
Western Idaho ²	Premier Russet	489	416	118
	Russet Burbank	486	308	86
	Ranger Russet	474	341	138
Oregon ³	Premier Russet	816	686	319
	Russet Burbank	771	439	134
	Ranger Russet	752	567	305
Washington ⁴	Premier Russet	726	632	236
	Russet Burbank	690	455	125
	Ranger Russet	763	642	321

¹ Data from 10 trials conducted from 2001-2005 in Aberdeen, Shelley and Rexburg.

² Data from 4 trials conducted from 1999-2005 in Kimberly and Parma.

³ Data from 11 trials conducted from 2001-2005 in Hermiston, Klamath Falls, and Malheur, OR.

⁴ Data from 5 trials conducted from 2001-2005 in Othello, WA.

Tuber Quality Characteristics

In 20 trials grown in Idaho, Oregon, and Washington, average specific gravity and solids content for Premier Russet were substantially higher than Russet Burbank and slightly higher than Ranger Russet. Premier Russet also produced significantly lighter fry color than both Russet Burbank and Ranger Russet out of 40⁰ and 45⁰F storage (Table 5).

Table 5. Tuber specific gravity french fry color of Premier Russet as compared with Russet Burbank.

Characteristic	Premier Russet	Russet Burbank	Ranger Russet
Specific gravity ¹	1.086	1.078	1.084
Fry color (45°F storage) ²	0.5	1.5	1.2
Fry color (40°F storage)	1.5	3.5	3.2
Solids (%)	22.45	20.25	21.78

¹ Specific gravity data from 35 trials grown in Idaho, Oregon and Washington.

² French fry color data from 14 (40 and 45°F) trials grown in Idaho. USDA color chart [00 (lightest) – 4.0(darkest)]

Premier Russet is less susceptible to growth cracks, secondary growth, and shatter bruise than Russet Burbank, particularly under stress conditions (Table 6). However, it's susceptibility to tuber malformations is similar to that of Ranger Russet. It also has shown greater resistance to sugar ends than either Russet Burbank or Ranger Russet. Blackspot bruise susceptibility of Premier Russet is similar to Ranger Russet and slightly higher than Russet Burbank, while hollow heart susceptibility is higher than Ranger Russet but slightly lower than Russet Burbank.

Table 6. Internal and external defects of Premier Russet tubers compared with those of Russet Burbank and Ranger Russet. Data taken are from trials grown in Idaho, Oregon and Washington from 2001-2005.

Defect	Premier Russet	Russet Burbank	Ranger Russet
Growth cracks ¹	4.6	3.8	4.5
Second growth ¹	4.8	3.6	4.5
Shatter bruise ¹	3.1	2.7	3.2
Blackspot bruise ¹	2.0	2.7	2.2
Hollow heart/Brown Center ²	6%	9%	1%

¹ Growth cracks, second growth, shatter bruise, and blackspot bruise rated on a scale 1-5 where 1 = severe occurrence of the defect and 5 = no occurrence of the defect.

² Hollow heart/Brown Center measured as percent of >12 oz tubers with the defect.

Premier Russet tubers have slightly higher sucrose concentrations than Russet Burbank and Ranger Russet but lower reducing sugar concentrations (Table 7). Premier Russet has slightly higher glycoalkaloid and protein concentrations than either Russet Burbank or Ranger Russet, and vitamin C concentrations that are similar to Russet Burbank but lower than Ranger Russet.

Table 7. Biochemical composition of Premier Russet tubers compared with those from Russet Burbank. Data was taken from three trials grown from 2003-2005 at Aberdeen, Idaho.

Component	Premier Russet	Russet Burbank	Ranger Russet
Glycoalkaloids (mg/100g)	4.4	3.2	3.9
Reducing sugars (% FWB)	0.05	0.08	0.09
Sucrose (% FWB)	0.25	0.17	0.21
Protein (%DWB)	6.3	5.2	5.7
Vitamin C (mg/100g)	25.5	24.1	34.3

Disease Reactions:

Premier Russet is more resistant to Verticillium wilt than either Russet Burbank or Ranger Russet and more resistant to common scab than Ranger Russet (Table 8). Susceptibility to pink rot and powdery scab is similar to Russet Burbank, but it is more susceptible to powdery scab than Ranger Russet. Its resistance to foliar and tuber early blight and late blight is similar to Russet Burbank, but is slightly better than Ranger Russet for foliar early blight and tuber late blight resistance. Premier Russet is very susceptible to PVX and PLRV, although it is only moderately susceptible to PLRV net necrosis. However, it is highly resistant to PVY, which should be a major advantage in seed production. Resistance to corky ringspot and Fusarium dry rot is similar to Russet Burbank but it is more resistant to Erwinia soft rot. It also is more susceptible to Fusarium dry rot than Ranger Russet but has similar reactions to corky ringspot and Erwinia soft rot.

Table 8 Disease reactions of Premier Russet (2003-2005), Russet Burbank and Ranger Russet (1996-2005).

Disease/Pest Reaction	Premier Russet	Russet Burbank	Ranger Russet
Vert. wilt ²	MR	S	MS
Pink rot	MS	MS	MS
Scab			
Common	R	R	S
Powdery	MS(r),R(t)	MS(r),R(t)	MR(r),MR(t)
Early Blight			
Foliar	MR	MR	MS
Tuber	MR	MR	MR
Late Blight ³			
Foliar	S	S	S
Tuber	MS	MR	S
Viruses ⁴			
PLRV	VS	VS	S
PVY ⁰	VR	S	MR
PVX	VS	S	R
PLRV Net Necrosis	MS	S	S
Corky ringspot ⁵	MS	MS	MS
Erwinia soft rot	MR	MS	MR
Fusarium ⁶ dry rot	S	S	MS

¹ Responses are defined as very resistant (VR), resistant (R), moderately resistant (MR), moderately susceptible (MS), susceptible (S), very susceptible (VS).

² Verticillium - combined from Aberdeen, Idaho and Hermiston, Oregon.

³ Late blight - Corvallis, Oregon.

⁴ Virus responses are based on seed borne 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 PVY, and mechanical inoculation with PVX.

⁵ Corky Ringspot - Prosser, Washington. Ranger Russet, 2002-2004.

⁶ Fusarium - combination of *F. sambucinum* and *F. solani* var. *coeruleum* reactions

⁷ (r) = root galling, (t) = tuber

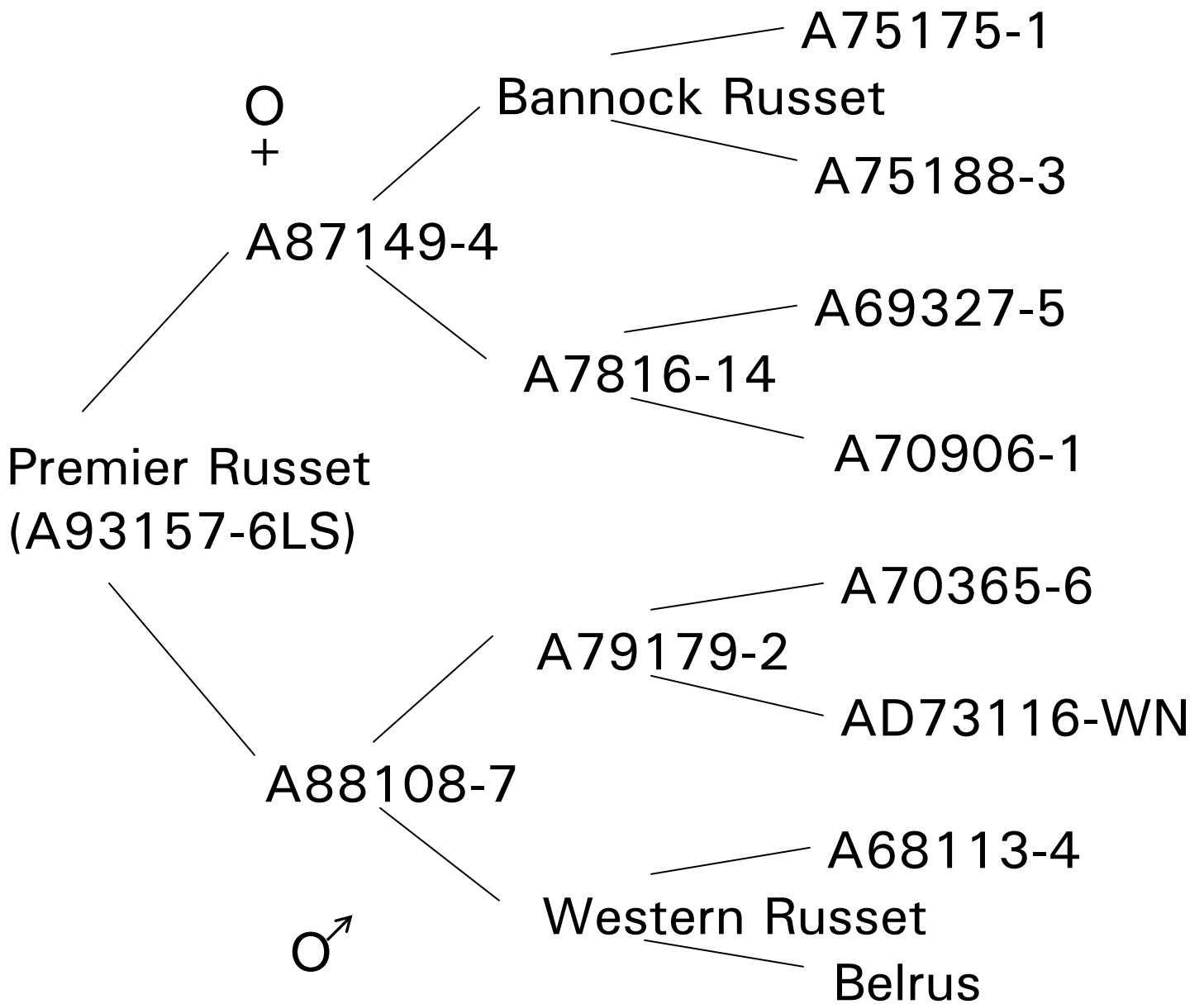


Figure 1. Four-generation pedigree of Premier Russet (A93157-6LS).

Premier Russet

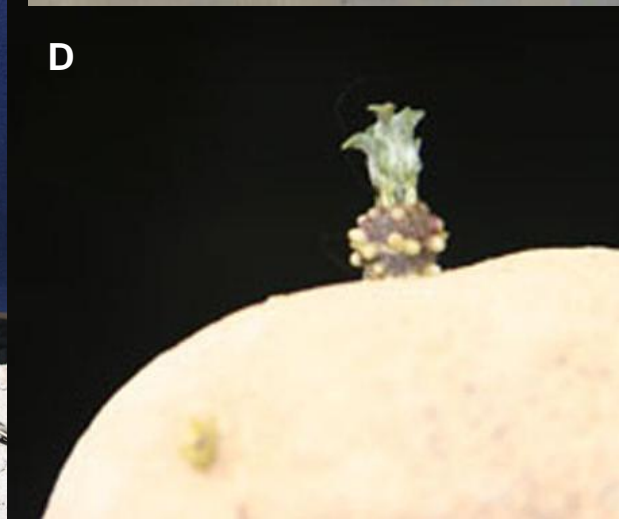
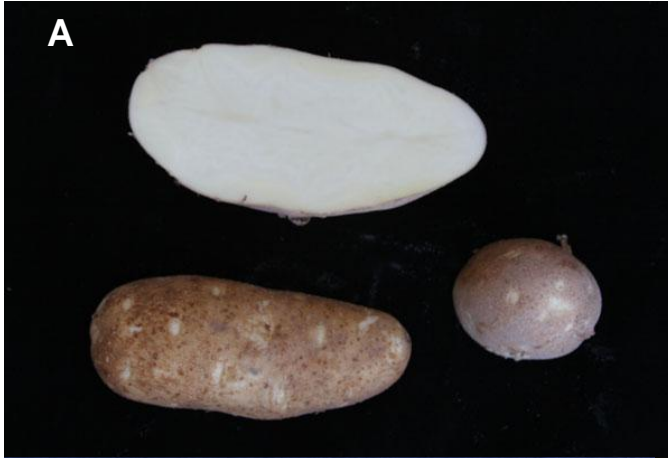


Figure 2. Photographs of Premier Russet showing a) external and internal tuber appearance, b) field tubers, c) whole plant, d) light sprout, e) flower and f) compound leaf.