

# Storage Management of **Blazer Russet** Potatoes



## **Introduction**

Blazer Russet is an early maturing, high-yielding potato variety that produces oblong to long tubers with a medium-russet skin. This variety is suitable for use as an early season processing potato and can be considered a replacement for Shepody. Its culinary qualities and excellent appearance make this variety suitable for fresh market use as well.

Blazer Russet was released in 2005 by the USDA Agricultural Research Service and the agricultural experiment stations of Idaho, Oregon, and Washington. Its name refers to its earliness—blazing the way for potato harvest.

Tubers have moderate specific gravity and resistance to sugar ends, tuber malformations, and most internal and external defects. Blazer Russet is moderately susceptible to hollow heart and moderately resistant to blackspot bruise.

Blazer Russet tubers are resistant to common and powdery scabs, but plants are moderately susceptible to root galling caused by powdery scab. Blazer Russet is resistant to PVX and moderately resistant to tuber late blight.

### About the study

Blazer Russet potatoes were grown at the University of Idaho Kimberly Research and Extension Center from G2 seed in 2001, 2002, and 2003. After harvest, the potatoes were placed in storage and allowed to cure at 55°F and 95% relative humidity for 14 days. The temperature was then decreased at a rate of 0.5°F per day to holding temperatures of 42°F, 45°F, and 48°F. The potatoes were subsequently stored for 9 months at these temperatures.

Potatoes to be used in analyses of sugar content, fry color, mottling, and disease susceptibility were treated with a thermal aerosol application of chlorpropham (CIPC) at 22 ppm approximately 60 days after harvest. Potatoes to be used in assessing dormancy length were not treated with a sprout inhibitor.

Glucose, sucrose, and fry color data were collected each month from three replications of 10 tubers per variety and storage temperature. Glucose and sucrose concentrations were determined using a YSI model 2700 Analyzer (Yellow Springs Instrument Co., Inc., Yellow Springs, OH) and expressed on a percentage fresh weight basis.

Fry color analysis was performed concurrent with sugar extraction

and using the same tubers. Fry color was determined on 10 planks (1.2 inch x 0.3 inch) per sample after cooking the planks in canola oil at 375°F for 3.5 minutes. Percentage reflectance was read with a Photovolt Reflection Meter Model 577 (Photovolt Inc., Indianapolis, IN) on the stem ends of each plank. The planks were also scored subjectively for mottling.

In studies to evaluate *Fusarium* dry rot infection, potatoes were first bruised and then inoculated with *Fusarium sambucinum*. Following inoculation, potatoes were cured at 55°F and 95% relative humidity for 2 weeks and then stored at 45°F. After approximately 3 months in storage, tubers were evaluated for the percentage of dry rot decay and the incidence of the disease, expressed as the percentage of tubers evaluated having more than 5% decay.

### Dormancy

Dormancy length for Blazer Russet is shorter than for Russet Burbank

(table 1). Dormancy length is defined as the number of days from harvest until sprout elongation (at least 0.2 inches) occurs in 80% of tubers in the sample. This definition is used because the length of time between initial sprout development (peeping) and sprout elongation varies greatly among potato varieties.

In the absence of sprout inhibitors, dormancy length of Blazer Russet is 40 to 50 days shorter than for Russet Burbank. Since dormancy length of Blazer Russet is relatively short, it is important to apply proper sprout inhibitors early if the intended storage duration is longer than the indicated dormancy length.

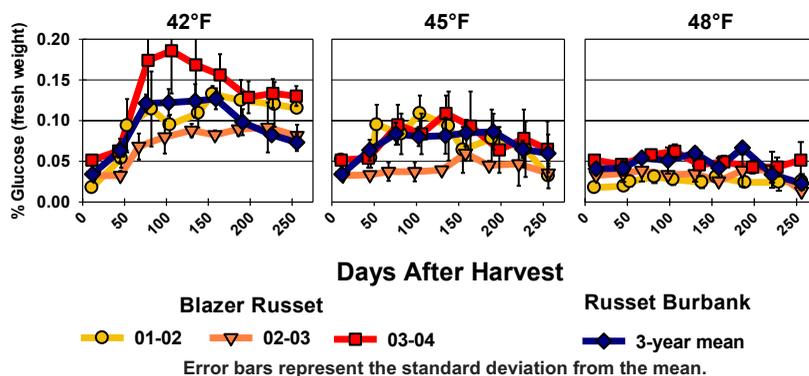
### Glucose and sucrose concentrations

Potatoes used for frozen or dehydration processing must meet reducing sugar criteria specific to the end use. High concentrations of glucose (a reducing sugar) in potato tubers produce a dark

**Table 1.** Dormancy length (days after harvest) determined during three storage seasons (2001–2004) for Russet Burbank and Blazer Russet potatoes stored at three temperatures. Values are means of 3 years—2001 to 2004.

Variety	42°F	45°F	48°F
Russet Burbank	175 days	155 days	130 days
Blazer Russet	135 days	110 days	95 days

**Figure 1.** Mean glucose concentrations (% fresh weight) in Blazer Russet potatoes stored at three temperatures during three storage seasons (2001 through 2004) compared with Russet Burbank potatoes (3-year mean) stored those same years.



coloration in potatoes exposed to high processing temperatures. Glucose concentrations above 0.10% fresh weight (FW) are often considered too high for frozen processing. Sucrose serves as a potential pool for glucose formation in stored tubers and therefore is monitored throughout storage.

**Glucose concentrations at harvest.** Glucose concentrations at harvest (11 days after harvest) in Blazer Russet were low across the three study years, ranging from 0.018% FW in 2001 to 0.051% FW in 2003 (figure 1). The 3-year average glucose concentrations in Russet Burbank at harvest were similar to concentrations in Blazer Russet at harvest in each of the three storage years, indicating the two cultivars have similar glucose levels.

**Glucose concentrations during storage.** Glucose concentrations in Blazer Russet tubers were similar to those in Russet Burbank at all three storage temperatures (figure 1). These glucose concentrations make this cultivar suitable for use in the processing market as a long-term storage variety:

- At 48°F, glucose concentrations of Blazer Russet remained at or below 0.07% FW throughout the 9-month storage season during 3 years of testing.
- At 45°F, glucose concentrations in Blazer Russet remained at or below 0.06% FW throughout the 9-month storage season in the 2002–03 year. In the other two storage seasons the glucose concentrations in Blazer Russet were similar to those in Russet Burbank and higher than 0.05% FW.
- At 42°F, glucose concentrations in Blazer Russet remained near or below 0.10% FW throughout the storage season in 1 of the 3

years tested. The other years it greatly exceeded 0.10% FW. This low storage temperature is not recommended for Blazer Russet potatoes destined for processing use.

**Sucrose concentrations.** Sucrose concentrations in Blazer Russet at harvest varied across the 3 years, ranging from 0.10% (2003) to 0.15% (2001) FW. These concentrations are similar to those observed in Russet Burbank—0.11% FW averaged over the 3-year study (figure 2).

In general, the seasonal pattern of sucrose concentrations in Blazer Russet was similar to that in Russet Burbank, decreasing slightly over the storage season. Peak sucrose concentrations in Blazer Russet were observed in 42°F storage:

- 0.16% FW at 53 days after harvest (DAH) in 2001–2002
- 0.13% FW at 13 DAH in 2002–2003
- 0.15% FW at 106 DAH in 2003–2004

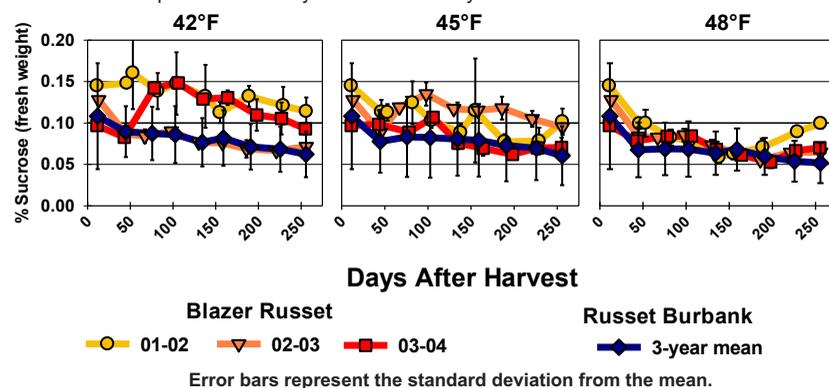
Peak sucrose concentrations in Russet Burbank occurred at harvest and decreased over time in storage.

### Fry color

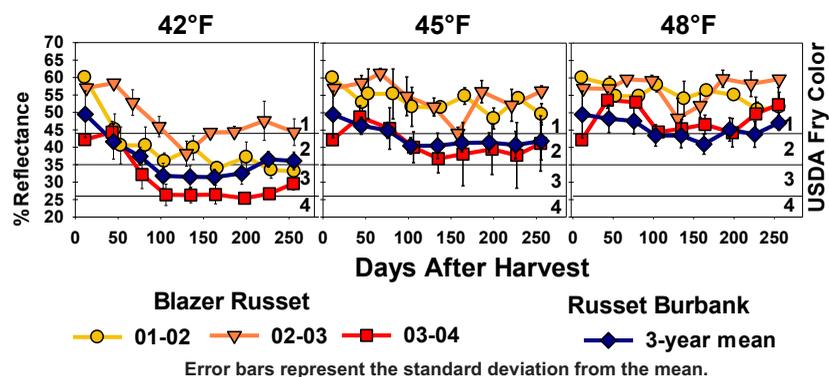
Glucose concentrations in potato tubers are a good indicator of fry color. The higher the glucose concentration, the darker the fry color. However, the processing industry generally makes fry color determinations using samples of fried potato strips, discs, or planks to assess product quality.

When variation in fry color occurs within a potato, it is generally the stem end of the potato that has

**Figure 2.** Mean sucrose concentrations (% fresh weight) in Blazer Russet potatoes stored at three temperatures during three storage seasons (2001 through 2004) compared with the 3-year mean in Russet Burbank potatoes similarly stored the same years.



**Figure 3.** Mean percentage reflectance and USDA fry color of stem-end fries from Blazer Russet potatoes stored at three temperatures during three storage seasons (2001 to 2004) compared with the 3-year mean reflectance of Russet Burbank potatoes similarly stored the same years.



the highest levels of sugar and darkest color. Representing the most stringent test of fry color, the stem-end fry color data are presented in figure 3. Reflectance readings are presented together with the corresponding USDA fry color data. The USDA colors correspond to the following reflectance ranges:

- USDA 1 > 44% reflectance
- USDA 2 = 35 to 44% reflectance
- USDA 3 = 26 to 34.9% reflectance
- USDA 4 < 25.9% reflectance

The higher the reflectance reading, the lighter the fry color. Fry color of USDA 2 or lower is generally considered acceptable by the frozen potato industry.

Stem-end fry color of Blazer Russet was lighter (higher reflectance) at the higher storage temperature, darker at the lower storage temperature, and similar to that of Russet Burbank (figure 3):

- Storage at 48°F—Fry color was lightest in Blazer Russet stored at this temperature. The average fry color was less than or equal to a USDA 1 and similar to the 3-year mean of Russet Burbank.
- Storage at 45°F—USDA fry color rating of Blazer Russet samples was less than or equal to a USDA 1 in 2 out of 3 years, while the average fry color in Russet Burbank was a USDA 1 or 2.
- Storage at 42°F—Fry color of Blazer Russet was lighter than or similar to fry color of Russet Burbank and less than or equal to a USDA 2 throughout 2 of 3 years. In 2003–04, fry color in Blazer Russet scored an unacceptable USDA 3 or more beginning at 78 days after harvest (DAH) through the remainder of the storage season.

## Mottling

Thin, thread-like areas of dark coloration found in the cortex of the fried potato tissue, known as mottling, can occur in some varieties. Each fry was subjectively evaluated for mottling on a scale of 1 to 4, where 1 = no mottling, 2 = mild, 3 = moderate, and 4 = severe mottling (figure 4).

Mottling in Blazer Russet was similar to or slightly higher than in Russet Burbank at the 48°F storage temperature during 3 years of testing and ranged from none to mild. Mottling in Blazer Russet was none to mild at the 45°F storage temperature and similar to Russet Burbank. At the 42°F storage temperature mottling in Ranger Russet was higher than in Russet Burbank and ranged from mild to moderate.

## Fusarium dry rot

Because Fusarium dry rot is an important storage disease in potatoes, new varieties are screened for susceptibility to this disease. The disease organism infects tubers through cuts or openings in the skin.

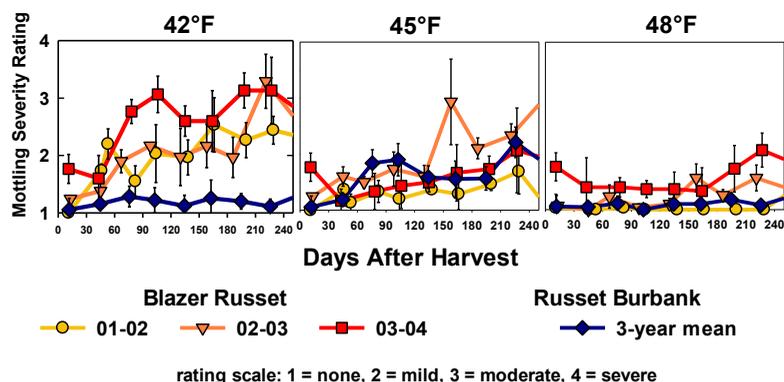
Results averaged over 3 years indicate that the percentage of decay due to dry rot in Blazer Russet (8%) was slightly lower than in Russet Burbank (11%) (table 2). The incidence of potatoes with at least 5% decay was not significantly different between the two varieties. These results indicate that Blazer Russet is moderately resistant to Fusarium dry rot.

At Aberdeen, Idaho, dry rot studies were also done with *F. sambucinum*. Tubers were washed and inoculated and then stored at 50°F for approximately 3 months. Tubers were cut and evaluated on a 0–5 scale with 5 equaling the most

**Table 2.** Infection severity (% decay) and incidence of potatoes with greater than 5% decay of Fusarium dry rot in bruised and inoculated lots of Russet Burbank and Blazer Russet potato samples at Kimberly, Idaho. Values are means of 3 years—2001 to 2004.

Variety	Infection Severity (% decay)	Incidence (% potatoes with >5% decay)
Russet Burbank	11	43
Blazer Russet	8	40
LSD ( $P < 0.05$ )	1	ns

**Figure 4.** Mean severity of mottling in fried planks of Blazer Russet potatoes stored at three temperatures during three storage seasons (2001 to 2004) compared to the 3-year mean of Russet Burbank potatoes similarly stored during the same time periods.



dry rot. Blazer Russet had an average score of 1.7 over 3 years (1999–2001), while Russet Burbank had an average score of 3.1. Scores of Blazer Russet and Russet Burbank were significantly different in 2 of the 3 years. These results are similar to those at Kimberly, and indicate that Blazer Russet is moderately resistant to dry rot.

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## Storage recommendations for Blazer Russet

**Curing.** Cure at 55°F and 95% relative humidity for 14 days.

**Storage.** Maintain 95% relative humidity throughout storage.

- **Frozen processing.** Hold at 48°F.
- **Fresh market.** Hold at 42°F.
- **Dehydration processing.** Hold at 42°F to 45°F, depending on intended product.

**Sprout inhibition.** Apply CIPC before dormancy break but after curing.

- **42°F.** Apply CIPC between 2 and 18 weeks after harvest
- **45°F.** Apply CIPC between 2 and 14 weeks after harvest
- **48°F.** Apply CIPC between 2 and 12 weeks after harvest

**Storage duration.** High processing quality persists throughout 36 weeks after harvest at 48°F.

**Fry mottling.** Mottling can occur in Blazer Russet at lower storage temperatures in some years. To minimize mottling, store at 48°F.

**Fusarium dry rot.** Blazer Russet is moderately resistant and has slightly greater resistance than Russet Burbank.

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