POTATO VARIETIES
An introduction to variety characteristics, management and performance in the Klamath Basin

Agricultural Experiment Stations
Oregon State University, Corvallis
University of California, Davis
in cooperation with Klamath County, OR, Siskiyou County and Modoc County, CA.

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POTATO VARIETIES
An introduction to variety characteristics, management and performance in the Klamath Basin

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Oregon State University and University of California
in cooperation with
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The Russet Burbank variety dominates potato production acreage in the Klamath Basin and throughout the Pacific Northwest. The success of this variety is based on its high culinary acceptance in the fresh market, its long storage life and its excellent quality for processed french fries. This variety also produces relatively high yields but requires careful management to maximize tubers of market size and to minimize economic loss due to the development of tuber defects. Recently, cooperating USDA, university and private potato researchers have developed varieties with characteristics that offer possible advantages over Russet Burbank. Several of these new varieties are higher yielding or offer better tuber quality, shape or size distribution. Most new varieties are earlier maturing and may exploit different segments of the potato market. A few new varieties offer improved pest and disease resistance. Grower adoption of varieties with these improved characteristics has the potential to increase potato profitability and to help stabilize marketing.

This special report is intended to introduce growers, handlers and buyers to emerging varieties that are available. Basic information is provided in the form of outlines for eighteen potato varieties. Each outline contains information on variety characteristics, yield performance, cultural management and marketing. Many of the varieties fit into the Klamath Basin’s primary market of tablestock russets sold out of storage. However, the potential exists for the expansion of local production of other potato market classes. For this reason, a limited number of white and red skinned varieties, and varieties with french fry or chip processing potential have been included. Descriptions of the standard Russet Burbank, Norgold Russet and Red LaSoda cultivars are also included for comparative purposes. Pictures of representative tubers of each variety grown on Poe fine sandy loam soil at the Klamath Experiment Station and stored for 100 days at approximately 40°F are presented.

**Variety Selection.** The outlines provide information on many factors that affect variety selection. Yield is of primary concern since increased yields reduce cost per unit of production and increase net revenue. The tuber quality of potential new varieties is also critical to marketing and in determining final crop price. With fresh market russets, shape and smoothness of tubers, degree of skin russetting, tuber size distribution, storability, and the absence of internal defects all affect marketability.

**Disease And Pest Resistance.** Variety resistances to pests and diseases are important and may become more so if currently available pesticides are lost because of regulatory review. New varieties may be more or less tolerant than standard varieties to pest and disease pressures. Knowledge of varietal sensitivity to these problems is critical to crop management and to the assessment of risk associated with the production of a new cultivar. Fields with histories of soil borne diseases such as verticillium wilt, common or powdery scab and white mold should not be planted to varieties that are relatively sensitive to these problems.
Growing Conditions. Many of the characteristics associated with different varieties are influenced by growing conditions. For example, the degree of skin russetting, the shape and smoothness of tubers, and the development of internal tuber defects are all varietal characteristics that are impacted by environmental conditions and cultural management. In this regard, growers that have had a history of hollow heart in their potato crop should avoid varieties that are susceptible to this defect. Fields known to produce light russet skin should probably not be planted to new varieties that produce a light net. Likewise, in fields with a history of elephant hide, heavily netted varieties should be avoided.

Production Management. Specific changes in production management may be needed to realize the full potential of new varieties. For example, most new varieties set fewer tubers per stem than Russet Burbank and should be planted at higher population densities to achieve optimum yields and to avoid the development of excessively large tubers. In the Klamath Basin, the typical seeding rate of Russet Burbank is 18 to 20 cwt/A. Varieties requiring medium to high population densities should be seeded at around 25 to 30 cwt/A, respectively. Many early maturing varieties may not need as much nitrogen fertilizer to produce a full crop. The nitrogen fertilizer rates required by Russet Burbank are considered high. Varieties with low to medium nitrogen needs will produce optimum yields given 70 to 85% of Russet Burbank nitrogen requirements.

Grower Experience. Because variety performance varies with field conditions and cultural management, growers should limit initial plantings of a new variety to small acreages. The experience gained from small initial plantings will be useful in subsequent field management and in assessing the market acceptance of a new cultivar. Small commercial scale evaluation of a new potato variety should be conducted in a manner to provide the variety a fair opportunity for success. Appropriate cultural management practices, good soil, uniform irrigation and timely planting and harvest should all be provided.

Additional Information. Yield performance and management notes were summarized from small plot research conducted on the Oregon State University Klamath Experiment Station and on the University of California Tulelake Field Station and from limited local commercial production experience. Researchers, growers and advisors will continue to gain insight into the management and market potential of the cultivars described in this guide. Growers may wish to consult local potato advisors and specialists for the latest research and management information on new varieties. Additional sources of information on new varieties include seed certification agencies, seed growers, potato processor representatives and university publications.

Acknowledgments. The variety descriptions presented in this special report were derived from original variety release information, from the American Potato Journal and from New Brunswick Department of Agriculture and Agriculture Canada publications on potato varieties. Several of the varieties listed in this guide have undergone little local observation, but were included because they represent variety choices recently made available to Klamath Basin growers. In cases with limited local experience, the expertise of potato researchers and breeders from other regions was used to estimate the potential strengths and limitations of these new varieties. For their generous contributions to the information provided herein, and for their review of this manuscript, the authors would like to thank Joe Pavek, USDA potato breeder, Dennis Corsini, USDA plant pathologist and Steve Love, University of Idaho Horticulturalist, Aberdeen, Idaho. The field research assistance of Jerry Maxwell, Jerry Smalley, Don Kirby and Dale Beck is also gratefully acknowledged.
### Russet Burbank

<table>
<thead>
<tr>
<th>Market Class</th>
<th>*Full season fresh market and processing russet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td>*A mutant of Burbank</td>
</tr>
<tr>
<td>Origin</td>
<td>*Luther Burbank (selection by Lou D. Sweet)</td>
</tr>
<tr>
<td>Released</td>
<td>*Burbank released 1874, Russet Burbank selected prior to 1914</td>
</tr>
</tbody>
</table>

**Description**

- **Tuber Shape**: *Long*
- **Eyes**: *Numerous and well distributed, medium deep*
- **Skin Color**: *Medium russet*
- **Flesh Color**: *White*
- **Plant**: *Large, spreading*

**Characteristics**

- **Yield**: *Medium to high total yield, low US #1's*
- **Specific Gravity**: *Medium to high*
- **Maturity**: *Full season*
- **Disease Reaction**: *Susceptible to late blight, PVX, PVY, PLRV, white mold and to tuber net necrosis following leafroll infection; moderately susceptible to early blight, verticillium wilt and storage rots; highly resistant to common and powdery scab*
- **Physio Disorders**: *Susceptible to brown center, hollow heart, sugar end, knobbiness and growth cracks; moderately resistant to black spot and shatter bruising*
- **Storability**: *Stores very well with long dormancy*
- **Consumer Quality**: *Excellent quality baked, and for frozen french fries*

**Remarks**

*Potato industry standard for full season table stock from storage, and industry standard for frozen french fries. Tendency for high proportion of crop in small or off type tubers. Careful cultural management required for maximum yield of marketable tubers.*

**Local Experience:**

Russet Burbank remains the predominate variety grown in the Klamath Basin. It's principle attractions are good fresh market quality and long storage life. The long storage capabilities allow rational marketing of crops in the fresh market channels over a nine-month period. Russet Burbank's relative tolerance to early blight, verticillium wilt, and fusarium dry rot contribute to its popularity.

Russet Burbank's susceptibility to physiological disorders often results in erratic US #1 and count-carton yields from year to year and from field to field. The disorders may become prevalent with environmental conditions that cause erratic plant growth and/or variable soil moisture contents. Irrigation management is critical for avoiding serious physiological disorders in Russet Burbank.

Under local conditions, optimum yields and quality are attained with 150 to 180 lbs per acre of nitrogen fertilizer on organic soils and 180 to 240 lbs per acre of nitrogen on mineral or sandy soils. Plant spacing of 9 to 10 inches in 36 inch rows is common. In relative terms these practices represent high fertilization rates and low plant densities.

Russet Burbank has been included as a standard in most local potato variety experiments. In recent experiments on the Tulelake Field Station and on the Klamath Experiment Station, many varieties and selections exceeded Russet Burbank's yield with greater proportions of the crop in the high value US #1 and count-carton categories.
Norgold Russet

Market Class: *Early fresh market russet
Parentage: *A119-1 x ND3475-8
Origin: *North Dakota State University, Fargo, North Dakota
Released: *1964

Description
- Tuber Shape: *Oblong to blocky
- Eyes: *Shallow, very well distributed
- Skin Color: *Medium russet
- Flesh Color: *White
- Plant: *Medium, compact

Characteristics
- Yield: *Low to high
- Specific Gravity: *Low
- Maturity: *Early season
- Disease Reaction: *Susceptible to most fungal and viral diseases and blackleg; resistant to common scab
- Physio Disorders: *Susceptible to brown center and hollow heart; resistant to growth cracks and knobbiness
- Storability: *Fair short term, short dormancy
- Consumer Quality: *Acceptable boiling and baking quality

Remarks: *Industry standard early russet prior to the late 1980's. Good yield potential but erratic grower returns due to verticillium wilt susceptibility and tendency for internal defects.

Local Experience:
In the Klamath Basin, Norgold Russet has traditionally been grown as the early out-of-field fresh market russet variety. Norgold Russet generally produces high yields and a smoother tuber type than Russet Burbank; however, it is more susceptible than Russet Burbank to fungal diseases and environmental stress and relatively poor crops are not uncommon. Verticillium wilt has been a particularly serious problem with local Norgold Russet production. Hollow heart problems have also been experienced.

In the Klamath Basin, Norgold Russet is typically fertilized similar to Russet Burbank. Seed spacing data and local commercial experience suggest a medium planting density is appropriate for Norgold Russet. Low plant densities and excessive nitrogen rates lead to excessive tuber size and hollow heart. Careful attention to tuber sizing and timely vine desiccation reduces the risks of excessive size and hollow heart.

Until recently, Norgold Russet was the principle early russet in the Pacific Northwest. Several new varieties offer advantages over Norgold Russet in one or more attributes (maturity, appearance, culinary quality, disease resistance, resistance to hollow heart, storability).
**Sierra**

<table>
<thead>
<tr>
<th>Market Class</th>
<th><em>Mid to full season fresh market russet</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td><em>A66110-39 x Targhee</em></td>
</tr>
<tr>
<td>Origin</td>
<td><em>California Agricultural Experiment Station and USDA-ARS, Aberdeen, Idaho</em></td>
</tr>
<tr>
<td>Released</td>
<td><em>1987</em></td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Tuber Shape</th>
<th><em>Blocky to oblong, somewhat flattened</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td><em>Shallow, moderate in number</em></td>
</tr>
<tr>
<td>Skin Color</td>
<td><em>Medium to heavy russet</em></td>
</tr>
<tr>
<td>Flesh Color</td>
<td><em>White</em></td>
</tr>
<tr>
<td>Plant</td>
<td><em>Medium-large, spreading</em></td>
</tr>
</tbody>
</table>

**Characteristics**

<table>
<thead>
<tr>
<th>Yield</th>
<th><em>High</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td><em>Low</em></td>
</tr>
<tr>
<td>Maturity</td>
<td><em>Slightly earlier than Russet Burbank</em></td>
</tr>
<tr>
<td>Disease Reaction</td>
<td><em>More resistant to verticillium wilt and early blight than Russet Burbank; resistant to storage rots, common scab and to net necrosis caused by PLRV</em></td>
</tr>
<tr>
<td>Physio Disorders</td>
<td><em>Resistant to growth cracks, knobbiness and hollow heart; occasionally expresses a tendency for pointed ends</em></td>
</tr>
<tr>
<td>Storability</td>
<td><em>Stores well short term, short dormancy</em></td>
</tr>
<tr>
<td>Consumer Quality</td>
<td><em>Limited taste tests indicate good acceptance boiled or baked</em></td>
</tr>
</tbody>
</table>

**Remarks**

*Very attractive fresh market russet out of the field or short term storage with multiple disease resistance*

**Local Experience:**

In limited commercial production in the Tulelake and Klamath Basin, Sierra generally has produced crops of high yield and quality. Under some growing conditions flattened tubers, pointed ends and excessive shatter bruising have been observed.

Sierra has been extensively tested in experimental plots on the Tulelake Field Station. It has a high yield potential and produces well with cultural management practices typical for Russet Burbank. Limited testing at the Klamath Experiment Station suggests Sierra requires slightly lower nitrogen rates and slightly higher planting density than Russet Burbank for optimum performance.

Sierra tubers generally are smooth and well russeted. Disorders such as knobbiness, growth cracks, black spot and hollow heart are not common. Size grade is uniform with a high percentage of US #1’s and a high proportion of count-carton size.

Sierra tends to be late initiating tubers but bulks rapidly late in the season and should be considered slightly earlier than Russet Burbank. This variety has a short dormancy and should be marketed by February from controlled storage. Premature sprouting of seed can be a problem. Careful storage management of seed crops will be required or young seed should be used.
### HiLite Russet

<table>
<thead>
<tr>
<th>Market Class</th>
<th>*Early fresh market russet with processing potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td>*Field selection, parentage unknown</td>
</tr>
<tr>
<td>Origin</td>
<td>*Selection made by John Cochran, at Ashton, Idaho</td>
</tr>
</tbody>
</table>

#### Description

<table>
<thead>
<tr>
<th>Tuber Shape</th>
<th>*Smooth, oblong to long</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>*Shallow</td>
</tr>
<tr>
<td>Skin Color</td>
<td>*Medium russet</td>
</tr>
<tr>
<td>Flesh Color</td>
<td>*White</td>
</tr>
<tr>
<td>Plant</td>
<td>*Very small to medium small, bushy, upright</td>
</tr>
</tbody>
</table>

#### Characteristics

<table>
<thead>
<tr>
<th>Yield</th>
<th>*Medium, lower than Russet Burbank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>*Medium</td>
</tr>
<tr>
<td>Maturity</td>
<td>*Early, similar to Norgold Russet</td>
</tr>
<tr>
<td>Disease Reaction</td>
<td>*Resistant to leafroll net necrosis and common scab; moderately resistant to PVX, PVY and PLRV; susceptible to most fungal diseases; very susceptible to early blight and white mold</td>
</tr>
<tr>
<td>Physio Disorders</td>
<td>*Resistant to sugar ends, second growth, growth cracks and bruising</td>
</tr>
<tr>
<td>Storability</td>
<td>*Acceptable, good resistance to storage rots</td>
</tr>
<tr>
<td>Consumer Quality</td>
<td>*Good quality for baking; fry color equal to Russet Burbank out of the field</td>
</tr>
</tbody>
</table>

#### Remarks

*Smooth, attractive, early season russet with high pack out percentage

#### Local Experience:

Limited local commercial experience suggests that HiLite Russet is capable of high yields with good pack-out percentages when grown in fertile, well-drained soil in the absence of serious disease pressures. In 1989 Tulelake trials, yields were comparable to Russet Norkotah and Frontier Russet. In 1988 and 1989 trials at the Klamath Experiment Station, HiLite Russet yields were lower than yields of Norgold Russet and Russet Norkotah. In 1989 tests, HiLite achieved maximum marketable yields at a low nitrogen rate and medium plant density. It had a high percentage of US '4's with few internal or external defects or disorders. Tubers tended to be uniform in size and were predominantly under 10 ounces. HiLite has a tendency for slight tapering of tubers to a pear shape.
Krantz

Market Class  *Mid-season fresh market russet with processing potential
Parentage  *MN366.65-3 x G6743-5(2x)
Origin  *Minnesota Agricultural Experiment Station and Texas Agricultural Experiment Station
Released  *1988 (American Potato Journal, Vol. 65, No. 7)

Description
- **Tuber Shape**: Blocky
- **Eyes**: Shallow
- **Skin Color**: Medium - light russet
- **Flesh Color**: White
- **Plant**: Tall, erect, light canopy

Characteristics
- **Yield**: Medium to high, somewhat inconsistent
- **Specific Gravity**: Medium
- **Maturity**: Mid-season
- **Disease Reaction**: High resistance to common scab; high field resistance to late blight; moderate resistance to verticillium wilt; field resistances to some viruses; susceptible to PVS, PVX and early blight; moderately resistant to white mold
- **Physio Disorders**: Highly resistant to hollow heart; susceptible to growth cracks in large tubers and in heavier soils; resistant to second growth
- **Storability**: Stores fair, short dormancy
- **Consumer Quality**: Good boiled and baked, good french fried, unsuited to chipping

Remarks  *An attractive medium-light, early season russet*

Local Experience:

Krantz has been grown commercially in the Klamath Basin since 1987. Stands have been low and plant vigor quite poor on sandy soils. Moderate yields have been offset somewhat by high pack-out with good quality. Excessive size has resulted in numerous growth cracks on at least one occasion. Better plant vigor and yields have been achieved in tests on organic soils.

Performance in research plots at Tulelake and Klamath Falls correspond with commercial experience. In limited tests at Tulelake, Krantz produced higher marketable yields than Russet Norkotah. At Klamath Falls Russet Norkotah has achieved higher yields in all years except 1989.

Response to seed piece spacing and nitrogen fertilizer rates has been evaluated at Klamath Falls for three years. Krantz performed best at a high planting density in each year. Nitrogen response data suggest a medium nitrogen requirement.

Problems due to poor stands may be overcome by use of larger seed pieces, and perhaps pre-cutting and suberization of seed prior to planting.
**Russet Norkotah**

<table>
<thead>
<tr>
<th><strong>Market Class</strong></th>
<th><em>Very early fresh market russet</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parentage</strong></td>
<td><em>ND9526-4 Russ x ND9687-5 Russ</em></td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td><em>North Dakota Agricultural Experiment Station - USDA-ARS</em></td>
</tr>
<tr>
<td><strong>Released</strong></td>
<td><em>1988 (American Potato Journal, Vol. 65, No. 10)</em></td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th><strong>Tuber Shape</strong></th>
<th><em>Long to slightly oblong</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eyes</strong></td>
<td><em>Shallow, white</em></td>
</tr>
<tr>
<td><strong>Skin Color</strong></td>
<td><em>Medium to heavy russet</em></td>
</tr>
<tr>
<td><strong>Flesh Color</strong></td>
<td><em>White</em></td>
</tr>
<tr>
<td><strong>Plant</strong></td>
<td><em>Medium, slightly upright</em></td>
</tr>
</tbody>
</table>

**Characteristics**

<table>
<thead>
<tr>
<th><strong>Yield</strong></th>
<th><em>Low to high, quite inconsistent</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Gravity</strong></td>
<td><em>Low to medium</em></td>
</tr>
<tr>
<td><strong>Maturity</strong></td>
<td><em>Very early</em></td>
</tr>
<tr>
<td><strong>Disease Reaction</strong></td>
<td><em>Very susceptible to early blight, white mold, late blight, black dot and verticillium wilt; susceptible to most virus diseases; resistant to common scab</em></td>
</tr>
<tr>
<td><strong>Physio Disorders</strong></td>
<td><em>Very resistant to second growth and growth cracks; resistant to hollow heart</em></td>
</tr>
<tr>
<td><strong>Storability</strong></td>
<td><em>Stores well, medium dormancy</em></td>
</tr>
<tr>
<td><strong>Consumer Quality</strong></td>
<td><em>Boils and bakes well, solids marginal for french fries; not suitable for chipping</em></td>
</tr>
</tbody>
</table>

**Remarks**

*Very attractive and smooth, requires careful cultural and disease management*

**Local Experience:**

Russet Norkotah has been grown commercially in the Klamath Basin since 1987. Performance has been good to very good in some fields with an excellent pack-out. In several fields, infection with white mold, early blight, and/or verticillium wilt have resulted in small tuber size and low yields. A survey of fields in 1989 indicated black dot may also be involved in early foliage senescence. These findings are consistent with reports from other production areas.

Research trials at Tulelake and Klamath Falls have shown results consistent with commercial experience. At Tulelake, disease infections have limited yields and size below levels achieved with other varieties and selections. At Klamath Falls, Russet Norkotah has performed well nearly every year, with yields exceeding most varieties and selections. Exceptions to these trends have been noted in one year at each location.

Response to planting density and nitrogen rates have been evaluated at Klamath Falls for three years. Maximum yields of count-carton sized tubers have consistently occurred at medium planting density. Nitrogen response has been inconsistent and appears to be strongly influenced by disease pressure. In one year, when verticillium wilt was prominent, a high nitrogen rate significantly increased the yield of Norkotah. In the absence of disease problems Norkotah has produced economically optimum yields at low nitrogen rates.

Fields with a history of verticillium wilt, white mold, early blight, or black dot should be avoided. Excessive irrigation will encourage these diseases and should also be avoided. High quality seed will be important for success with this variety. Russet Norkotah is an excellent early variety, but will not fit every situation.
Cal-Ore

<table>
<thead>
<tr>
<th>Market Class</th>
<th>*Mid-season fresh market russet with processing potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td>*Field selection, possibly a mutation from Calgold</td>
</tr>
<tr>
<td>Origin</td>
<td>*Selected by Albert Fradkin, Cal-Ore Seed Inc., San Joaquin County, CA</td>
</tr>
<tr>
<td>Released</td>
<td>*Exclusively licensed to Plant Genetics, Inc., Davis, CA. Patent pending at U.S. Patent and Trademark Office on variety</td>
</tr>
<tr>
<td>Description</td>
<td>*Very uniform oblong to blocky</td>
</tr>
<tr>
<td>Tuber Shape</td>
<td>*Shallow, well distributed</td>
</tr>
<tr>
<td>Eyes</td>
<td>*Heavy russet, good net</td>
</tr>
<tr>
<td>Skin Color</td>
<td>*White to slightly yellowish</td>
</tr>
<tr>
<td>Flesh Color</td>
<td>*Medium, upright</td>
</tr>
<tr>
<td>Plant</td>
<td>*Medium, upright</td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
</tr>
<tr>
<td>Yield</td>
<td>*Medium</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>*Medium to high, similar to Russet Burbank</td>
</tr>
<tr>
<td>Maturity</td>
<td>*Medium, two weeks later than Russet Norkotah</td>
</tr>
<tr>
<td>Disease Reaction</td>
<td>*More resistant to early dying and early blight than Russet Norkotah; quite susceptible to PVY</td>
</tr>
<tr>
<td>Physio Disorders</td>
<td>*Fairly resistant to heat stress and bruising; susceptible to hollow heart</td>
</tr>
<tr>
<td>Storability</td>
<td>*Stores well, short dormancy similar to Norgold</td>
</tr>
<tr>
<td>Consumer Quality</td>
<td>*Good boiling and baking quality, may process</td>
</tr>
</tbody>
</table>

Remarks

*Very attractive, medium early, heavy russet

Local Experience:

Cal-Ore was included in variety trials at Tulelake and Klamath Falls for the first time in 1989. Yields of US #1's ones were similar to those of Frontier Russet at Tulelake. At Klamath Falls Cal-Ore produced a higher yield than Frontier Russet but lower than Russet Burbank. At both sites the percentage of US #1's was very high and tubers were very attractive. At Klamath Falls a hollow heart problem was noted. Cal-Ore had specific gravity similar to Russet Burbank.

On the basis of tuber size distribution observed in 1989 trials, a medium nitrogen rate and seed spacing may be appropriate for Cal-Ore.
Frontier Russet

<table>
<thead>
<tr>
<th>Market Class</th>
<th>*Early season fresh market and processing russet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td>*A66102-16 x WN330-1</td>
</tr>
<tr>
<td>Origin</td>
<td>*USDA-ARS, Aberdeen, Idaho and Idaho, Washington, Oregon and Colorado Agricultural Experiment Stations</td>
</tr>
<tr>
<td>Released</td>
<td>*1990</td>
</tr>
</tbody>
</table>

**Description**

- **Tuber Shape**: Oblong to long, cylindrical
- **Eyes**: Shallow, very well distributed
- **Skin Color**: Light russet
- **Flesh Color**: White
- **Plant**: Medium-small, upright

**Characteristics**

- **Yield**: Medium
- **Specific Gravity**: Medium
- **Maturity**: Early
- **Disease Reaction**: Resistant to storage rots; better resistance to verticillium wilt than most other early varieties; susceptible to early blight
- **Physio Disorders**: Resistant to shatter bruise, black spot, knobbiness and growth cracks; less susceptible to hollow heart than Russet Burbank; susceptible to stem end discoloration
- **Storability**: Good with dormancy only slightly shorter than Russet Burbank
- **Consumer Quality**: Good fresh market and processing quality with fry color as good as Russet Burbank out of field and short term storage

**Remarks**

*An attractive early season light russet suitable for fresh market or processing with good storage characteristics

**Local Experience:**

Frontier Russet has not been grown commercially in the Klamath Basin and has only had limited testing in variety development experiments at the local experiment stations. Tubers are attractive, smooth and lightly russeted.

From trials in other Pacific Northwest states, yields are similar to Russet Burbank with much higher percentage US 1's. Tubers set early and can get too large. Tubers may set too high in the hill or may be pushed to the top of the bed by overcrowding. Providing a large, broad hill and rolling prior to harvest may reduce greening and frost damage to exposed tubers. Based on limited testing at the Klamath Experiment Station, Frontier Russet requires a medium planting density and high nitrogen rate.
**A74212-1 (Century Russet)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Class</strong></td>
<td><em>Full season fresh market russet</em></td>
</tr>
<tr>
<td><strong>Parentage</strong></td>
<td><em>A6789-7 x A6680-5</em></td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td><em>USDA-ARS, Aberdeen, Idaho, selected by Oregon Agricultural Experiment Station</em></td>
</tr>
<tr>
<td><strong>Released</strong></td>
<td><em>Pending</em></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><em>Blocky to long</em></td>
</tr>
<tr>
<td>Tuber Shape</td>
<td><em>Shallow</em></td>
</tr>
<tr>
<td>Eyes</td>
<td><em>Light russet</em></td>
</tr>
<tr>
<td>Skin Color</td>
<td><em>White</em></td>
</tr>
<tr>
<td>Flesh Color</td>
<td><em>Large, upright</em></td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Yield</td>
<td><em>Consistently very high</em></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td><em>Lower than Russet Burbank, higher than Norgold Russet</em></td>
</tr>
<tr>
<td>Maturity</td>
<td><em>Similar to Russet Burbank, requires longer period after vine desiccation to achieve skin set</em></td>
</tr>
<tr>
<td>Disease Reaction</td>
<td><em>Highly resistant to verticillium wilt and PVX; moderately resistant to common scab and foliar early blight symptoms; susceptible to tuber infection by early blight; highly susceptible to fusarium dry rot</em></td>
</tr>
<tr>
<td>Physio Disorders</td>
<td><em>Resistant to growth cracks, second growth and hollow heart; seldom exhibits other internal problems</em></td>
</tr>
<tr>
<td>Storability</td>
<td><em>Susceptible to storage diseases following damage at harvest, medium dormancy</em></td>
</tr>
<tr>
<td>Consumer Quality</td>
<td><em>Good boiling and baking quality, will not process well for fries</em></td>
</tr>
</tbody>
</table>

**Remarks**

*A very high yielding full season russet, light net may be inadequate in organic soils, susceptible to harvest damage*

**Local Experience:**

A74212-1 has been grown commercially in the Klamath Basin for three years. In several cases seed decay problems have resulted in poor stands and production of large tubers. Vines are difficult to kill and excessive harvest damage has occurred when crops were harvested too soon after vine killing. Because of bruising, fusarium dry rot has been a serious problem with storage of crops harvested prematurely. In spite of these problems, commercial yields have been very high.

In eight years of trials at Klamath Falls, A74212-1 has consistently produced the highest total and marketable yields of all russet types tested. On Tulelake’s organic soils, tuber yields have also been consistently very high but skin russetting has at times been too light for the russet market.

The most serious deficiency of A74212-1 is the susceptibility to tuber damage in harvesting and handling. All aspects of crop management that affect damage susceptibility require careful attention. Tuber size is probably the most important factor that can be managed. In three years of trials at Klamath Falls, high planting density and low to moderate nitrogen fertilization rates have consistently resulted in high yields with a minimum percentage of excessively large tubers. Early planting, split applications of desiccants, a minimum delay of three weeks from topkill to harvest, and extreme care in harvest and handling will minimize tuber damage. Precutting and suberization of seed for a minimum of seven to ten days has reduced seed piece decay and associated problems. Crops stored for seed or fresh market may benefit from the use of a fungicide at storage loading.
A7411-2

Market Class
Parentage
Origin
Released

*Full season processing russet
*Butte x A6595-3
*USDA-ARS, Aberdeen, Idaho
*Pending

Description
Tuber Shape
Eyes
Skin Color
Flesh Color
Plant

*Long to very long, tending to thin
*Medium deep
*Medium russet
*White
*Large, spreading

Characteristics
Yield
Specific Gravity
Maturity
Disease Reaction
Physio Disorders
Storability
Consumer Quality

*Medium in US '1's, high total
*Medium to high
*Late, similar to Russet Burbank
*Immune to PVX; resistant to verticillium wilt, early blight and net necrosis caused by PLRV; susceptible to common scab
*Resistant to sugar end and hollow heart; more susceptible to black spot bruise than Russet Burbank
*Good, slightly shorter dormancy than Russet Burbank
*Excellent fry quality with high solids, low sugar level, and few sugar ends under stress

Remarks

*Tuber type has been too long and thin for an attractive fresh market pack in Klamath Falls; acceptable for fresh market in Tulelake Basin but not better than Russet Burbank

Local Experience:

A7411-2 has not been grown commercially in the Klamath Basin. Results of processing trials in the Treasure Valley area of Malheur County and Western Idaho will probably determine whether this selection is named and released or discarded.

A7411-2 has been included in several trials at Tulelake and Klamath Falls. Yields and specific gravity have generally been high. It has an attractive, medium heavy net and has not exhibited internal defects. However, in both years of Klamath Falls trials, tubers have been excessively long and thin with a relatively high percentage downgraded to US '2's for poor shape. This may have been due to mild water stress.

In a number of research trials at Tulelake and Klamath Falls, high marketable yields have been achieved with cultural practices consistent with the management of Russet Burbank. In one yield experiment optimum yields were obtained with medium plant density and nitrogen rates. A7411-2 is more sensitive than Russet Burbank to root-knot nematode tuber blemish.
Red LaSoda

Market Class
Red-skinned, fresh market

Parentage
Mutation of LaSoda (Triumph x Katahdin)

Origin
*U.S.D.A., South Dakota

Released
*Around 1952

Description
Tuber Shape
*Round to oval, large tubers are rough
Eyes
*Deep
Skin Color
*Light red
Flesh Color
*White
Plant
*Large, spreading

Characteristics
Yield
*Very high
Specific Gravity
*Medium, higher than most reds
Maturity
*Mid-season
Disease Reaction
*Susceptible to blackleg, common scab, fusarium dry rot, late blight, PLRV, PVX and PVY; moderately susceptible to verticillium wilt
Physio Disorders
*Very deep eyes in large tubers; a little tendency for off-types; susceptible to hollow heart and internal necrosis
Storability
*Color fades in storage, medium dormancy
Consumer Quality
*Good boiling

Remarks
*A light red variety with extremely high yields but poor appearance, tendency for over-sizing, and light color out of storage

Local Experience:

Red LaSoda has been the standard red-skinned variety in the Klamath Basin over many years. Yields are consistently very high. Skin color is fair at harvest but fades in storage. Deep eyes and a tendency for large tuber size and hollow heart detract from its marketability.

Red LaSoda has been included as a standard variety in red variety trials at Tulelake and Klamath Falls. It is consistently very high in yield and higher than other red-skinned varieties in specific gravity. Tuber size has been excessive in most cases. To achieve acceptable size for table markets a very high planting density is required. Only modest nitrogen rates are required. It is important to deplete available nitrogen in late season to force maturity and reduce the risk of physiological disorders. Red LaSoda is quite tolerant of metribuzin.
Sangre

**Market Class**
*Red-skinned, fresh market*

**Parentage**
*Viking x A6356-9*

**Origin**
*U.S.D.A. Aberdeen, Idaho, Colorado State University Experiment Station and University of Idaho*

**Released**
*1982 (American Potato Journal, Vol. 59, No. 9)*

**Description**
- **Tuber Shape**: *Oval*
- **Eyes**: *Shallow*
- **Skin Color**: *Red, slightly russetted*
- **Flesh Color**: *White*
- **Plant**: *Medium, spreading, slow emergence due to long dormancy*

**Characteristics**
- **Yield**: *Medium, significantly lower than Red LaSoda*
- **Specific Gravity**: *Low*
- **Maturity**: *Medium, tubers size rapidly*
- **Disease Reaction**: *Resistant to tuber net necrosis; moderately resistant to early blight tuber rot; susceptible to early and late blight, and verticillium wilt*
- **Physio Disorders**: *Rarely exhibits second growth, growth cracks, or hollow heart*
- **Storability**: *Stores very well, long dormancy, red color fades but not as quickly as Red LaSoda*
- **Consumer Quality**: *Excellent boiling and baking quality*

**Remarks**
*A good storage red with smooth tubers and more marketable tuber size and color than Red LaSoda, but with lower yields*

**Local Experience:**
Commercial experience with Sangre is very limited in the Klamath Basin. Sangre is lower in yield than Red LaSoda but more versatile in cooking quality, better in appearance, and better in storability with less waste in peeling due to a smooth, shallow-eyed tuber.

In red-skinned variety trials at Tulelake and Klamath Falls in 1988 and 1989 Sangre and Red LaSoda produced similar yields of US #1's under 10 ounces. Red LaSoda produced much higher yields of larger tubers. Tuber appearance was much better for Sangre. Management studies have not been done on red-skinned varieties in the Klamath Basin. However, observations on performance in variety trials suggest a modest to low nitrogen rate and a narrow seed spacing would be appropriate. The timing of top desiccation is critical to achieve optimum production of small tubers.
Redsen

Market Class
*Early red-skinned, fresh market

Parentage
*ND8978-3R x ND9403-20R

Origin
*North Dakota Agricultural Experiment Station

Released
*1984 (American Potato Journal, Vol. 61, No. 9)

Description

| Tuber Shape | Round to oval |
| Eyes | Shallow |
| Skin Color | Smooth, thin bright red |
| Flesh Color | White |
| Plant | Small, upright |

Characteristics

| Yield | Low to medium, high percentage of small tubers |
| Specific Gravity | Low |
| Maturity | Very early |
| Disease Reaction | Resistant to late blight race O, common scab and silver scurf; susceptible to most other diseases; quite susceptible to bruising and storage rot |
| Physio Disorders | Very sensitive to metribuzin; relatively free from hollow heart and other internal or external disorders |
| Storability | Poor due to susceptibility to skinning, bruising, storage rots, and short dormancy |
| Consumer Quality | Excellent for baking, fair boiling, may exhibit after-cooking darkening when boiled after prolonged storage |

Remarks
*Very attractive red with ideal tuber size, extreme care in handling required

Local Experience:
Commercial experience with Redsen in the Klamath Basin is very limited. One field grown in 1989 produced a relatively low yield but an exceptionally high quality crop which was successfully marketed directly from the field. At least one serious storage breakdown has occurred in a small commercial lot grown and stored locally.

Redsen has been evaluated for two years in red-skinned variety trials at Tulelake and Klamath Falls. Its appearance has been outstanding at both locations. Yields have been relatively low. However, a high percentage of the crop occurs in the high value size range. Susceptibility to metribuzin and damage at harvest have been noted as significant limitations. Cultural management data has not been obtained. In view of tuber sizing characteristics, Redsen would require lower plant densities than Red LaSoda or Sangre to achieve appropriate size.
Dark Red Norland

Market Class
Parentage
Origin
Released

*Early red-skinned, fresh market
*A selection by Stan Barret (Texas) from Norland (ND626 x RedKote)
*North Dakota Agricultural Experiment Station
*Not officially released to date

Description

Tuber Shape
Eyes
Skin Color
Flesh Color
Plant

*Medium oblong
*Shallow
*Smooth, red to deep red
*White
*Medium, spreading

Characteristics

Yield
Specific Gravity
Maturity
Disease Reaction
Physio Disorders
Storability
Consumer Quality

*Medium
*Low to medium
*Early mid-season
*Highly resistant to PVA; moderately resistant to common scab, PVY, and PLRV
*No noteworthy problems
*Fair, medium dormancy
*Fair quality for boiling and baking

Remarks

*A deep red with high proportion of tubers in marketable size range

Local Experience:

Dark Red Norland has not been grown commercially in the Klamath Basin. In two years of trials at Klamath Falls and Tulelake it has produced moderate yields with a high percentage in the desirable size range. Color is not as good as Redsen or Sangre, but much better than Red LaSoda. Its early maturity, smooth shape, good size distribution, and overall appearance may justify a commercial scale evaluation. Based on local observations to date, a medium plant density and a low nitrogen rate seem appropriate for Dark Red Norland.
Atlantic

Market Class: *Round white chipper
Parentage: *Wauseon x B5131-6
Origin: *USDA, Beltsville, Maryland, and Florida, Virginia, New Jersey, and Maine Agricultural Experiment Stations.

Description
- **Tuber Shape**: Oval to round
- **Eyes**: Shallow
- **Skin Color**: Buff with scaly net
- **Flesh Color**: White
- **Plant**: Large, upright with large leaves

Characteristics
- **Yield**: High
- **Specific Gravity**: High
- **Maturity**: Mid-season to medium late
- **Disease Reaction**: Immune to PVX and tuber net necrosis caused by PLRV; resistant to late blight race O, golden nematode race A and pink eye; moderately susceptible to common scab; susceptible to fusarium dry rot and leak
- **Physio Disorders**: Susceptible to internal necrosis in sandy soils during very hot growing conditions, especially near harvest and hollow heart in large tubers
- **Storability**: Retains chipping quality out of long term storage; medium dormancy
- **Consumer Quality**: Excellent chip quality and good fresh market quality

Remarks
- A high yielding chip variety with excellent quality and multiple disease and pest resistance

Local Experience:
Commercial experience with Atlantic in the Klamath Basin is limited to a few crops produced for chipping and delivered directly from the field. Hail damage and other extenuating circumstances affected these crops to the extent that an assessment is not justified.

In research trials at Tulelake and Klamath Falls, Atlantic has performed very well with high yields and very high specific gravity. In 1988, one of the hottest growing seasons on record, Atlantic did not exhibit tuber necrosis, which has been a serious limitation for the variety on the eastern seaboard. Avoiding moisture stress late in the season appears to be a key to avoiding internal necrosis. Hollow heart has been observed, but confined principally to very large tubers. In a chipping trial at Klamath Falls in 1988, Atlantic exhibited the highest incidence of corky ring spot among ten lines evaluated. It also experienced some common scab. Atlantic is moderately sensitive to metribuzin injury.

In seed spacing and nitrogen rate trials at Klamath Falls in 1988 and 1989, Atlantic performed best at medium plant density and a medium nitrogen rate.
| **Market Class** | *Round white, chipper* |
| **Parentage** | *BR 5960-9 x ND 5737-3* |
| **Origin** | *USDA-ARS, Beltsville, Maryland and Aberdeen, Idaho and Idaho, Washington, Oregon and Colorado Agricultural Experiment Stations* |
| **Released** | *1989* |

**Description**
- **Tuber Shape**: *Round to oblong*
- **Eyes**: *Shallow, very well distributed*
- **Skin Color**: *White to light tan*
- **Flesh Color**: *White*
- **Plant**: *Medium, spreading*

**Characteristics**
- **Yield**: *High*
- **Specific Gravity**: *Medium, between Norchip and Atlantic*
- **Maturity**: *Medium late*
- **Disease Reaction**: *Resistant to verticillium wilt; susceptible to common scab*
- **Physio Disorders**: *Susceptible to hollow heart in large tubers*
- **Storability**: *Good, long dormancy with low sugar accumulation*
- **Consumer Quality**: *Good chipping quality from field or storage*

**Remarks**
* A very high yielding variety with good chipping quality

**Local Experience:**
Gemchip has not been grown commercially in the Klamath Basin. Testing at the Tulelake and Klamath Experiment Stations has shown Gemchip to be a very high yielding variety with a high percentage of US #1 tubers, with excellent tuber smoothness and shape. In Klamath Falls experiments, Gemchip yields have consistently exceeded Atlantic's by nearly 100 cwt/acre of US #1's. Limited data suggests medium planting density and medium nitrogen rates produce optimum yield and quality for Gemchip. Cultural management suitable for Atlantic is appropriate for Gemchip.
### Shepody

<table>
<thead>
<tr>
<th>Market Class</th>
<th><em>Long white, suitable for fresh market and processing.</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td><em>FS8080 x Bake King</em></td>
</tr>
<tr>
<td>Origin</td>
<td><em>Agriculture Canada, Fredericton, N.B.</em></td>
</tr>
<tr>
<td>Released</td>
<td><em>1980 (American Potato Journal, Vol. 60, No. 2)</em></td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Tuber Shape</th>
<th><em>Long to slightly oblong</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td><em>Moderate depth, few, uneven distribution</em></td>
</tr>
<tr>
<td>Skin Color</td>
<td><em>White to light buff</em></td>
</tr>
<tr>
<td>Flesh Color</td>
<td><em>White</em></td>
</tr>
<tr>
<td>Plant</td>
<td><em>Medium, slightly upright with large leaves and pale color</em></td>
</tr>
</tbody>
</table>

**Characteristics**

<table>
<thead>
<tr>
<th>Yield</th>
<th><em>Medium</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td><em>Medium</em></td>
</tr>
<tr>
<td>Maturity</td>
<td><em>Similar to Kennebec, bulks rapidly</em></td>
</tr>
<tr>
<td>Disease Reaction</td>
<td><em>Moderately resistant to net necrosis from PLRV, rhizoctonia, fusarium, and early blight; susceptible to PVS, PVX, PVY, PLRV, pink eye, pink rot, verticillium wilt and late blight; very susceptible to common scab and powdery scab</em></td>
</tr>
<tr>
<td>Physio Disorders</td>
<td><em>Resistant to growth cracks; experiences some roughness and off-types; can develop hollow heart in very large tubers; very susceptible to metribuzin injury</em></td>
</tr>
<tr>
<td>Storability</td>
<td><em>Stores well, medium dormancy</em></td>
</tr>
<tr>
<td>Consumer Quality</td>
<td><em>Excellent boiling, baking, and french fry quality</em></td>
</tr>
</tbody>
</table>

**Remarks**

*A mid-season long white with excellent quality for fresh market and processing. Rapidly becoming the industry standard for early processing. Has replaced Russet Burbank for a portion of processing out of storage in the East. Requires careful management.

**Local Experience:**

Shepody has not been grown commercially in the Klamath Basin. In research trials at Klamath Falls, it has produced higher yields of US #1’s than Russet Burbank. Response to seed spacing and nitrogen rates has been consistent with experience in the Eastern U.S. and Canada. With tuber set in the range of five to eight tubers per hill, Shepody requires a medium planting density for table or processing crops. Shepody requires less nitrogen fertilizer than Russet Burbank. A moderate N rate is appropriate for mid-season production of table or processing crops.

Shepody has poor eye distribution in large tubers. Blind seed pieces can reduce stand. Over 12 oz. tubers should not be used for seed unless hand cut. Seed pieces less than 1.5 oz. should be avoided, and average seed size should be at least 2 oz. Precutting and suberization of seed will result in more uniform emergence.

Shepody is very sensitive to metribuzin and very susceptible to common scab and powdery scab. Scab infected seed and fields with a history of scab should be avoided. Irrigation management to prevent excessively dry or wet conditions at, and following tuber initiation, will reduce the risk of scab infection. Over irrigation in late season may result in pink eye or pink rot. Shepody tubers set high in the hill. Building a large broad hill, and rolling prior to harvest will reduce greening and risk of frost damage to exposed tubers.
## Yukon Gold

<table>
<thead>
<tr>
<th>Market Class</th>
<th>*Mid-season yellow-fleshed fresh market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parentage</td>
<td>*Norgleam x W5279-4</td>
</tr>
<tr>
<td>Origin</td>
<td>*Agriculture Canada and the University of Guelph, Guelph, Ontario, Canada</td>
</tr>
<tr>
<td>Released</td>
<td>*1980 (American Potato Journal, Vol. 58, No.5)</td>
</tr>
</tbody>
</table>

### Description

- **Tuber Shape**: *Oval to round*
- **Eyes**: *Shallow, pink*
- **Skin Color**: *Light yellow or buff, finely flaked*
- **Flesh Color**: *Light yellow*
- **Plant**: *Medium to small, erect*

### Characteristics

- **Yield**: *Medium to high, high pack-out*
- **Specific Gravity**: *Medium to high*
- **Maturity**: *Mid-season to medium early*
- **Disease Reaction**: *Moderately resistant to PLRV and mild mosaic; moderately susceptible to common scab and PVY*
- **Physio Disorders**: *Very smooth; susceptible to black spot and pressure bruise*
- **Storability**: *Stores fair, medium dormancy; susceptibility to black spot and other bruising has led to some heavy storage losses*
- **Consumer Quality**: *Very good boiling and baking quality, has been used for french fires from the field, does not chip*

### Remarks

*Agromonically an excellent variety, very attractive, flesh color a little light for the yellow-flesh market*

### Local Experience:

Yukon Gold was grown commercially in the Klamath Basin for the first time in 1989. Yields were medium with a high percentage of US #1’s. Market demand was very limited but acceptance of those shipped has been good. Demand appears to be better for Yellow Finn which has darker yellow flesh color. Market establishment will be imperative for success of any yellow-fleshed variety.

Yukon Gold has been evaluated in Klamath Falls and Tulelake research trials for two years. Its yield, appearance, and quality have been good at both locations. In one year of evaluation, optimum yields and tuber size were observed at a high plant density and a relatively low nitrogen rate. Lower plant density or higher nitrogen rates resulted in excessive size.
DISCLAIMER: Mention of specific potato varieties does not constitute a recommendation by Oregon State University or the University of California and does not imply approval to the exclusion of other suitable varieties. Varietal performance and management requirements observed in the Klamath Basin may not be representative for other production areas with different soil and climatic conditions.