PNW 454

Characteristics of Potato Varieties in the Pacific Northwest

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A Pacific Northwest Extension Publication
Idaho ◆ Oregon ◆ Washington

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Introduction

Farm-gate value of potatoes in 1991 in the three Pacific Northwest states was more than $1 billion. Of the 418 million hundredweight of potatoes produced in the United States in 1991, 53 percent was grown in the Pacific Northwest as was almost 60 percent of fall production. The success of the Northwest potato industry is due to a combination of ideal environment, advanced production methods, and aggressive marketing.

Production Areas:

Potato production in Idaho is almost exclusively limited to the Snake River plain of southern Idaho, with the heaviest concentration in the eastern part of the state. The length of the growing season depends largely on local elevation and ranges from 90 days in the east to 180 days in the west.

The major production area in Oregon is the Columbia Basin in the north-central part of the state. Secondary production areas include Malheur County in the extreme east, central Oregon, and the Klamath Basin. The length of the growing season ranges from 120 days in the central and Klamath areas to more than 180 days in Malheur County and the Columbia Basin.

Production in Washington is largely located in the Columbia Basin of the south-central part of the state. Small production areas also are located on the eastern slope of the Cascades and in the coastal region north of Seattle. The length of the growing season in most areas is more than 150 days.

Utilization:

Sixty-three percent of Northwest production is used for making frozen processed products, including french fries. Other uses include table stock (22%), seed (6%), potato chips (1%), and other (8%). Potatoes are harvested beginning in July and ending in November. Long-term storage makes potatoes available throughout the year. A high percentage of early harvested potatoes are sold for table stock.

Varieties Produced:

Russet Burbank is the most widely grown potato variety in the Pacific Northwest, accounting for 78 percent of planted acres in 1992. However, Russet Burbank's share of planted acres is considerably lower than it was a few years ago due to the availability of some excellent new varieties and to a slow shift in industry needs toward earlier production and freedom from internal tuber defects. Other varieties being produced on a significant scale are Shepody (7% of planted acres in 1992), Russet Norkotah (4%), Ranger Russet (1%), and Frontier Russet (1%). A few additional varieties are important to the industry but are grown on too few acres to be listed separately in statistical publications. These include Atlantic, Gemchip, NorKing Russet, Norchip, and Norland. A detailed description of each variety follows.

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Origin

Year:	1976
Breeder:	R. E. Webb
Organization:	USDA, Maine, Florida, New Jersey
Parents:	Wauseon x Lenape
Selection Number:	B6987-56

ATLANTIC

Botanical Description

Plants: Medium to large, upright, open; stems with purple pigmentation; nodes slightly swollen; wings conspicuous.

Leaves: Closed, large, medium green; terminal leaflets ovate; primary leaflets in three pairs; secondary leaflets numerous, small.

Flowers: Numerous, medium sized, light red-purple.

Tubers: Round to oval; eyes few, of medium depth; skin scaly, buff colored; flesh white.

Sprouts: Purple, pubescent.

Agronomic Description

Maturity: Medium.

Yield/Grade: Medium to high with a high proportion of U.S. No. 1's.

Fresh Appearance: Not applicable.

Adaptation: Adapted to most potato growing areas.

Dormancy: Short.

Common Defects: Hollow heart, brown center, internal brown spot, shatter bruise.

Internal Quality: High specific gravity, low sugar content after 50°F storage.

Utilization

Direct delivery and stored for chipping.

Disease Reactions

Susceptible to:	Most common potato viruses, Verticillium wilt, foliar early blight, common scab, storage rots.
Resistant to:	Golden nematode, potato virus X, leafroll-induced net necrosis.

Management

Seed:	Store at 38° to 40°F. Plant at 6- to 8-inch spacing in seed areas, 9- to 11-inch spacing in commercial areas.
Irrigation:	Avoid overwatering late in the season.
Nitrogen Fertilization:	Similar to requirement of Russet Burbank in short-season areas; use 10 percent less in long-season areas. Petiole nitrate-N critical levels have not been established.
Other Nutrients:	Similar to requirements of Russet Burbank.
Herbicide Tolerance:	Moderately susceptible to metribuzin; no problems have been reported with other herbicides registered for use in potatoes.
Storage:	Not recommended for storage for chipping due to storage rot problems. If storing, do so at 50° to 55°F. Sprout inhibition is required after 2 to 3 months. Chemical treatment for storage rots may be advisable.

Origin

Year:	1990
Breeder:	J. J. Pavek
Organization:	USDA, Idaho, Washington, Oregon, Colorado
Parents:	A66102-16 x Wn330-1
Selection Number:	A74114-4

FRONTIER RUSSET

Botanical Description

Plants: Medium to small, upright, compact; stems with red-purple pigmentation; nodes swollen; wings conspicuous.

Leaves: Open, medium sized, medium green; terminal leaflet elliptical-ovate; primary leaflets in four pairs; secondary leaflets few, small.

Flowers: Few, small, white.

Tubers: Oblong, cylindrical; eyes shallow, intermediate in number; skin medium russet; flesh white.

Sprouts: Dark red-purple, pubescent.

Agronomic Description

Maturity: Medium-early.

Yield/Grade: Medium yielding with a high proportion of U.S. No. 1's.

Fresh Appearance: Good.

Adaptation: Adapted to both irrigated and dryland conditions in the northern United States.

Dormancy: Long.

Common Defects: Growth cracks, internal brown spot.

Internal Quality: Medium specific gravity, medium sugar content after 45°F storage.

Utilization

Early direct delivery or stored for fresh market and to be processed into french fried and dehydrated products.

Disease Reactions

Susceptible to:	All common potato viruses and foliar and tuber early blights.
Resistant to:	Common scab, storage rots; moderately resistant to leafroll-induced net necrosis.

Management

Seed:	Store at 38° to 40°F; plant at 6- to 7-inch spacing in seed areas, 8- to 10-inch spacing in commercial areas. Final depth 8 to 9 inches from the seed piece to the top of the hill.
Irrigation:	Avoid overwatering late in the season.
Nitrogen Fertilization:	Requires 10 percent less than Russet Burbank in short-season areas, 10 to 20 percent less in long-season areas. Apply most nitrogen early in the season. Use a critical petiole nitrate-N level of 17,000 ppm.
Other Nutrients:	Similar to the requirement of Russet Burbank.
Herbicide Response:	Resistant to metribuzin; susceptible to postemergence applications of Prowl. No problems reported with other herbicides registered for use in potatoes.
Vine Killing/Maturation:	Schedule vine-kill to avoid an excess of oversized tubers. Spray vines 17 to 21 days before harvest.
Storage:	Storage temperature for potatoes intended for frying must be above 47°F. Sprout inhibition will be required when storing longer than 4 to 5 months.

Origin

Year:	1989
Breeder:	J. J. Pavek
Organization:	USDA, Idaho, Washington, Oregon, Colorado
Parents:	BR5960-9 x ND5737-3
Selection Number:	BR7093-24

GEMCHIP

Botanical Description

Plants: Medium to large, upright, spreading; stems nonpigmented; nodes slightly swollen; wings inconspicuous.

Leaves: Closed, large, dark green; terminal leaflets ovate; primary leaflets in four pairs; secondary leaflets numerous, large.

Flowers: Few, medium sized, white.

Tubers: Round to oval, slightly flattened; eyes shallow, intermediate in number; skin white; flesh white.

Sprouts: Red-purple, slightly pubescent.

Agronomic Description

Maturity: Late.

Yield/Grade: High yielding with a high proportion of U.S. No. 1's.

Fresh Appearance: Not applicable.

Adaptation: Adapted to most potato growing areas in the United States.

Dormancy: Medium.

Common Defects: Occasional deep bud end, occasional hollow heart, shatter bruise.

Internal Quality: Medium specific gravity, low sugar content after storage at 50°F.

Utilization

Direct delivery and stored for chipping.

Disease Reactions

Susceptible to:	All common potato viruses, common scab, tuber early blight.
Resistant to:	Verticillium wilt, foliar early blight.

Management

Seed:	Store at 38° to 40°F; plant at 6- to 7-inch spacing in seed areas, 9- to 10-inch spacing in commercial areas.
Irrigation:	Plan for significant water use until vine-kill.
Nitrogen Fertilization:	Requires 10 percent less than Russet Burbank. Responds to seasonal applications, but petiole testing is unreliable. Base rates on crop yield and avoid excessive or late-season applications.
Other Nutrients:	Similar to requirements of Russet Burbank.
Herbicide Tolerance:	Moderately susceptible to metribuzin; no problems reported with other herbicides registered for use in potatoes.
Vine Killing/Maturation:	Plan timely vine-kill to induce complete maturity. Chemical vine-killing may be difficult if the vines are green.
Storage:	Store at 50° to 55°F for chipping. Sprout inhibition will be required after 3 months.

Origin

Year:	1968
Breeder:	R. H. Johansen
Organization:	North Dakota
Parents:	ND4731-1 x M5009-2
Selection Number:	ND5899-1

NORCHIP

Botanical Description

Plants: Medium sized, upright, compact; stems nonpigmented; nodes nonswollen; wings inconspicuous.

Leaves: Closed, large, light green; terminal leaflets ovate, broadly acuminate; primary leaflets in three to four pairs; secondary leaflets few, small to medium sized.

Flowers: Few, small, white.

Tubers: Round to oblong; eyes intermediate in number, of medium depth; skin smooth, white; flesh white.

Sprouts: Red-purple, pubescent.

Agronomic Description

Maturity: Medium.

Yield/Grade: Medium yield with a medium to high proportion of U.S. No. 1's.

Fresh Appearance: Not applicable.

Adaptation: Adapted to most potato growing areas in the northern United States.

Dormancy: Short.

Common Defects: Growth cracks, irregular shapes, hollow heart, internal brown spot, deep fold in bud end.

Internal Quality: Medium specific gravity, low sugar content after 50°F storage.

Utilization

Direct delivery or stored for chipping.

Disease Reactions

Susceptible to:	All common potato viruses, foliar early blight, Verticillium wilt.
Resistant to:	Common scab.

Management

Seed:	Store at 38° to 40°F; plant at 7-inch spacing in seed areas, 9- to 10-inch spacing in commercial areas.
Irrigation:	Avoid overwatering late in the season.
Nitrogen Fertilization:	Similar to requirements of Russet Burbank in short-season areas; use 10 percent less in long-season areas. Critical petiole nitrate-N levels are not well established under irrigated conditions.
Other Nutrients:	Similar to requirements of Russet Burbank.
Herbicide Tolerance:	Slightly susceptible to metribuzin injury; no problems reported with other herbicides registered for use in potatoes.
Storage:	Store at 50° to 55°F if intended for chipping; sprout inhibition required after 2 to 3 months; chemical treatment for storage rots may be required.

Origin

Year:	1985
Breeder:	R. H. Johansen
Organization:	North Dakota
Parents:	Nooksack x ND9567-2
Selection Number:	ND388-1Russ

NORKING RUSSET

Botanical Description

Plants: Medium to large, upright, compact; stems red-purple; nodes swollen; wings conspicuous.

Leaves: Open, large, medium green; terminal leaflets ovate; primary leaflets in three to four pairs; secondary leaflets numerous, large.

Flowers: Few, red-purple, large.

Tubers: Oblong, slightly flattened; eyes few, shallow; heavy russet skin; flesh white.

Sprouts: Purple, pubescent.

Agronomic Description

Maturity: Medium-early.

Yield/Grade: Medium yielding with a high proportion of U.S. No 1's.

Fresh Appearance: Good.

Adaptation: Adapted to the irrigated areas of the northwestern United States.

Dormancy: Medium.

Common Defects: Misshapen tubers, hollow heart, internal brown spot.

Internal Quality: Medium specific gravity, medium sugar content after storage at 45°F.

Utilization

Early direct delivery or stored for fresh market or for processing into french fried and dehydrated products.

Disease Reactions

Susceptible to:	All common potato viruses, foliar early blight, soft rot.
Resistant to:	Common scab, leafroll-induced net necrosis.

Management

Seed:	Store at 38° to 40°F. Plant at a 7-inch spacing in seed areas, 9- to 11-inch spacing in commercial areas.
Irrigation:	Avoid overwatering late in the season.
Nitrogen Fertilization:	Requires 10 percent less than Russet Burbank in short-season areas, 20 percent less in long-season areas. Apply most nitrogen early in the season. Critical petiole nitrate-N levels have not been established.
Other Nutrients:	Similar to the requirements of Russet Burbank.
Herbicide Tolerance:	No problems reported with herbicides registered for use in potatoes.
Vine Killing/Maturation:	When good skin set is required, kill vines 17 to 21 days before harvest.
Storage:	Store at 45° to 47°F when intended for french frying. Sprout inhibition required after 3 months.

Origin

Year:	1957
Breeder:	R. H. Johansen
Organization:	North Dakota
Parents:	Redkote x ND626
Selection Number:	ND2906-1R
	(Note: A mutant with dark red skin was selected in Nebraska in 1964 and called Red Norland)

NORLAND

Botanical Description

Plants:	Small to medium sized, upright, open; stems nonpigmented; nodes slightly swollen; wings conspicuous.
Leaves:	Slightly closed, medium sized, dark green; terminal leaflets ovate, broadly acuminate; primary leaflets in three pairs; secondary leaflets numerous, large.
Flowers:	Few, medium sized, dark red-purple.
Tubers:	Round to oval; eyes of medium depth, intermediate in number; skin light red (medium red for Red Norland); flesh white.
Sprouts:	Dark red, slightly pubescent.

Agronomic Description

Maturity:	Very early.
Yield/Grade:	Medium to low yielding with a high proportion of U.S. No 1's.
Fresh Appearance:	Fair to good (excellent appeal for Red Norland).
Adaptation:	Adapted to most growing areas in the northern United States.
Dormancy:	Short.
Common Defects:	Occasional growth cracks, internal brown spot.
Internal Quality:	Low specific gravity, high sugar content after storage at 40° to 45°F.
Utilization	Early direct delivery for fresh market.

Disease Reactions

Susceptible to:	All common potato viruses, Verticillium wilt, foliar early blight.
Resistant to:	Common scab.

Management

Seed:	Store seed at 38° to 40°F. Plant at 7-inch spacing in seed areas, 9- to 10-inch spacing in commercial areas.
Irrigation:	Avoid overwatering late in the season.
Nitrogen Fertilization:	Requires 10 to 20 percent less than Russet Burbank in short-season areas, 20 to 30 percent less in long-season areas. Apply most nitrogen preplant or as early split applications.
Other Nutrients:	Similar to requirements for Russet Burbank.
Herbicide Tolerance:	Susceptible to metribuzin; no problems reported with other herbicides registered for use in potatoes.
Storage:	Not recommended for marketing from storage.

Origin

Year:	1991
Breeder:	J. J. Pavek
Organization:	USDA, Idaho, Washington, Oregon
Parents:	Butte x A6395-3
Selection Number:	A7411-2

RANGER RUSSET

Botanical Description

Plants: Medium sized to large, spreading, open; stems slightly pigmented; nodes nonswollen; wings conspicuous.

Leaves: Open, medium sized, medium green; terminal leaflets ovate, acuminate; primary leaflets in three pairs; secondary leaflets few, small.

Flowers: Numerous, medium sized, red-purple.

Tubers: Long, slightly flattened; eyes of medium depth, intermediate in number; medium russet skin; flesh white.

Sprouts: Red-purple, pubescent.

Agronomic Description

Maturity: Late.

Yield/Grade: Medium to high yielding with a medium to high proportion of U.S. No. 1's.

Fresh Appearance: Good.

Adaptation: Adapted to the irrigated potato growing areas of the northwestern United States.

Dormancy: Short.

Common Defects: Misshapen tubers, growth cracks, blackspot bruise.

Internal Quality: High specific gravity, medium sugar content after storage at 45°F. Resistant to most internal defects.

Utilization

Direct delivery or stored for fresh market or for processing into french-fried and dehydrated products.

Disease Reactions

Susceptible to:	Leafroll virus, common scab, Fusarium dry rot, root-knot nematode.
Resistant to:	Potato virus X, potato virus Y, Verticillium wilt, foliar early blight, leafroll-induced net necrosis.

Management

Seed:	Store at 38° to 40°F. Plant at 7-inch spacing in seed areas, 9- to 10-inch spacing in commercial areas. Avoid conditions that result in sprouting or aging before planting.
Irrigation:	Similar to requirements of Russet Burbank. Maintain high soil moisture through vine kill and harvest.
Nitrogen Fertilization:	Requirements similar to those of Russet Burbank. Responds to seasonal applications. Use critical petiole nitrate-N levels of 17,000 ppm.
Other Nutrients:	On some soils, higher rates of potassium may reduce blackspot bruise.
Herbicide Tolerance:	Resistant to metribuzin; no problems reported with other herbicides registered for use in potatoes.
Vine Killing/Maturation:	Plan timely vine-kill to avoid excessive size and to properly mature tubers.
Storage:	Store at 45° to 47°F when intended for french frying. Maintain high humidity. Sprout suppression will be required after 2 to 3 months.

Origin

Year:	Around 1915
Breeder:	Luther Burbank bred the original white-skinned Burbank variety around 1880. Lou Sweet, a Colorado grower, selected a russetted mutant around 1915.
Organization:	Private
Parents:	Mutant of Burbank, open-pollinated selection from Early Rose

RUSSET BURBANK

Botanical Description

Plants:	Medium to large, spreading, open; stems with slight red pigmentation; nodes slightly swollen; wings inconspicuous.
Leaves:	Open, medium sized, medium green; terminal leaflets elliptical-ovate; primary leaflets in three to five pairs; secondary leaflets few, small.
Flowers:	Medium in number, medium sized, white.
Tubers:	Long, slightly flattened; eyes numerous, of medium depth; medium russet skin; flesh white.
Sprouts:	Red-purple, pubescent.

Agronomic Description

Maturity:	Late.
Yield/Grade:	Medium to high yielding with a low proportion of U.S. No. 1's.
Fresh Appearance:	Good to excellent.
Adaptation:	Adapted to irrigated potato growing areas in the northwestern United States.
Dormancy:	Long.
Common Defects:	Second growth, growth cracks, internal brown spot, sugar ends, occasional hollow heart, blackspot bruise.
Internal Quality:	Medium specific gravity, medium sugar content after storage at 45°F.

Utilization

Direct delivery or stored for fresh market or for processing into french-fried and dehydrated products. The industry standard for french-fried products.

Disease Reactions

Susceptible to: All common potato viruses, leafroll-induced net necrosis, Verticillium wilt, foliar early blight.

Resistant to: Common scab.

Management

Seed: Store at 38° to 40°F. Plant at 7- to 9-inch spacing in seed areas, 9- to 12-inch spacing in commercial areas.

Irrigation: Maintain soil moisture at or above 65 percent of available soil water throughout early growth and tuber bulking.

Nitrogen Fertilization: Responds to split or seasonal applications. Use a critical petiole nitrate-N level of 15,000 ppm.

Other Nutrients: Low phosphorus levels may reduce tuber russetting.

Herbicide Tolerance: Resistant to all herbicides registered for use in potatoes.

Storage: Store at 45° to 47°F if intended for french frying. Sprout suppression will be required after 3 to 4 months.

Origin

Year:	1987
Breeder:	R. H. Johansen
Organization:	North Dakota
Parents:	ND9526-4Russ x ND9687-5Russ
Selection Number:	ND534-4Russ

RUSSET NORKOTAH

Botanical Description

Plants: Small, upright, compact; stems nonpigmented; nodes nonswollen; wings conspicuous.

Leaves: Open, medium sized, medium green; terminal leaflets ovate, acuminate; primary leaflets in three to four pairs; secondary leaflets numerous, large.

Flowers: Few, small, white.

Tubers: Long, slightly flattened; eyes shallow, numerous; medium-russet skin; flesh white.

Sprouts: Red-purple, slightly pubescent.

Agronomic Description

Maturity: Early.

Yield/Grade: Medium to low yielding with a high proportion of U.S. No 1's.

Fresh Appearance: Excellent.

Adaptation: Adapted to most U.S. potato growing areas.

Dormancy: Medium.

Common Defects: Occasional hollow heart.

Internal Quality: Low specific gravity, medium to high sugar content after storage at 45°F, strong flavor after storage.

Utilization

Early direct delivery or stored for fresh market.

Disease Reactions

Susceptible to:	All common potato viruses, Verticillium wilt, early blight, black dot.
Resistant to:	Common scab.

Management

Seed:	Store at 38° to 40°F; plant at 7-inch spacing in seed areas, 9- to 11-inch spacing in commercial areas.
Irrigation:	Avoid both early season water stress and late-season overwatering.
Nitrogen Fertilization:	Requires 10 to 20 percent less than Russet Burbank in short-season areas, 20 to 30 percent less in long-season areas. Apply most nitrogen early in the season. Avoid periods of nitrogen starvation. Critical petiole nitrate-N levels have not been established.
Other Nutrients:	Similar to requirements of Russet Burbank.
Herbicide Tolerance:	Resistant to metribuzin; no problems reported with other herbicides registered for use in potatoes.
Vine Killing/Maturation:	When possible, allow natural vine senescence.
Storage:	Not recommended for marketing from storage.

Origin

Year:	1980
Breeder:	D. A. Young
Organization:	Agriculture Canada
Parents:	Bake-King x F58050
Selection Number:	F69016

SHEPODY

Botanical Description

Plants: Medium sized, spreading, open; stems nonpigmented; nodes nonswollen; wings conspicuous.

Leaves: Open, large, light green; terminal leaflets ovate; primary leaflets in three to four pairs; secondary leaflets few, small.

Flowers: Numerous, large, light red-purple.

Tubers: Long, flattened; eyes shallow, intermediate in number; skin white; flesh white.

Sprouts: Red-purple, pubescent.

Agronomic Description

Maturity: Medium-early.

Yield/Grade: Medium yielding with a medium to high proportion of U.S. No. 1's.

Fresh Appearance: Fair.

Adaptation: Adapted to potato growing areas of the northern United States.

Dormancy: Medium.

Common Defects: Misshapen tubers, sugar ends.

Internal Quality: Medium to low specific gravity, high sugar content after storage at 45°F.

Utilization

Early direct delivery or stored for processing into french-fried products.

Disease Reactions

Susceptible to:	All common potato viruses, common scab, Verticillium wilt, foliar early blight.
Resistant to:	Leafroll-induced net necrosis.

Management

Seed:	Store at 38° to 40°F; plant at 6- to 7-inch spacing in seed areas, 8- to 10-inch spacing in commercial areas.
Irrigation:	Similar to requirements of Russet Burbank.
Nitrogen Fertilization:	Requires 10 percent less than Russet Burbank in short-season areas, 10 to 20 percent less in long-season areas. Apply most nitrogen early in the season. Allow mild nitrogen starvation just before vine-kill to help increase tuber specific gravity. Critical petiole nitrate-N levels have not been established.
Other Nutrients:	Apply adequate phosphorus to prevent a nitrogen-caused reduction in specific gravity.
Herbicide Tolerance:	Extremely susceptible to metribuzin; no problems reported with other herbicides registered for use in potatoes.
Storage:	Not recommended for marketing from storage unless done so under the direction of the buyer. Maintain the storage temperature at 50° to 55°F. Apply sprout inhibitor after 2 months.

Pacific Northwest Extension publications are jointly produced by the three Pacific Northwest states — Idaho, Oregon, and Washington. Similar crops, climate, and topography create a natural geographic unit that crosses state lines. Since 1949, the PNW program has published more than 400 titles. Joint writing, editing, and production has prevented duplication of effort, broadened the availability of faculty specialists, and substantially reduced costs for the participating states.

Published and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914, by the University of Idaho Cooperative Extension System, LeRoy D. Luft, director; Washington State University Cooperative Extension, Harry B. Burcalow, interim director; Oregon State University Extension Service, O. E. Smith, director; and the U.S. Department of Agriculture, cooperating.

$5.00/$5.00/$5.00 December 1993