

# Cultural Management of Bannock Russet Potatoes

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Bannock Russet was released in 1999 by the USDA, Agricultural Research Service, and the Agricultural Experiment Stations of Idaho, Oregon, and Washington. It is a late-maturing, oblong russet variety with excellent fresh-pack and processing qualities. Bannock Russet has resistance to verticillium wilt and other early-die diseases and is resistant to PVY.

This publication provides management guidelines for producing high-quality Bannock Russet potatoes in southern Idaho. Because it is not possible to discuss all possible growing environments, growers should adapt this information to their own situations as experience dictates.

## Field Selection and Preparation

Bannock Russet should not be planted in a field that was in alfalfa the previous year. Late mineralization of nitrogen from alfalfa will result in excess nitrogen availability, which will delay maturity of an already late-maturing variety, thus making it difficult to mature the tubers.

Bannock Russet is resistant to verticillium wilt and other early-die diseases. Therefore, it will not produce a yield response that results from soil fumigation, as do susceptible varieties. Unless fumigation is needed to control nematodes, plant this variety in fields that have not been fumigated because the money spent will not be returned in increased profits.

## Seed Management and Planting

Use sound seed storage and handling practices that promote good seed health. Store seed at 38° to 40°F. Bannock Russet tubers have dormancy about equal to or slightly shorter than Russet Burbank, however, Bannock Russet tends to emerge slowly after planting. To encourage rapid emergence, warm seed tubers to 50°F for 1 to 3 weeks before cutting.

Optimum seed size is 2.5 to 3.0 ounces. Bannock Russet, like Russet Burbank, can have problems associated with Fusarium dry rot and late blight tuber rot. Use a seed piece treatment that will help control these seed piece decay problems.

Bannock Russet sets relatively few tubers per plant, therefore it has a tendency to produce many oversized tubers. Consequently, it will benefit from a closer seed piece spacing than is normally used for Russet Burbank. Growers must consider that end use of the tubers influences seed spacing (Table 1). In growing areas that traditionally produce higher yields, use a closer seed piece spacing to minimize the number of oversized tubers produced. Planting depth should be approximately 5 inches as measured from the top of the hill to the top of the seed piece.

## Fertility

No research information is available concerning Bannock Russet's phosphorus, potassium, or micronutrient requirements. Follow recommendations developed for Russet Burbank potatoes. See Tables 2 and 3 for recommended application rates based on soil tests.

Bannock Russet will produce maximum yield and quality with lower amounts of nitrogen than required for Russet Burbank. Crop nitrogen need is based on poten-

Table 1. Within-row seed piece spacing and seed needed per acre for Bannock Russet potatoes.

Market class	Seed piece spacing <sup>1</sup> (inches)	Seed per acre <sup>2</sup> (cwt)
Seed	6 to 7	45 to 39
Fresh	8 to 10	34 to 27
Frozen processed	9 to 11	30 to 25

<sup>1</sup>Recommendation based on a 36-inch row width.

<sup>2</sup>Based on a 2.5-ounce average seed piece size, but does not take into consideration seed cutting waste.

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**Table 2. Preplant phosphorus (P) fertilizer recommendations for Bannock Russet potatoes, based on recommendations developed for Russet Burbank.**

Soil test P (0 to 12 inches)	Percent free lime			
	0	4	8	12
(ppm)	(lb P <sub>2</sub> O <sub>5</sub> /acre)			
0	320	360	400	440
5	240	280	320	360
10	160	200	240	280
15	80	120	160	200
20	0	40	80	120
25	0	0	0	40
30	0	0	0	0

Apply an additional 40 to 80 pounds P<sub>2</sub>O<sub>5</sub>/acre as a starter at planting for soil test P levels below 30 ppm.

Add 25 pounds P<sub>2</sub>O<sub>5</sub>/acre for each additional 100 cwt/acre above 400 cwt/acre.

Petiole phosphorus concentrations should be kept above 0.22 percent through tuber bulking.

**Table 3. Potassium (K) fertilizer recommendations for Bannock Russet potatoes, based on recommendations developed for Russet Burbank.**

Soil test K (0 to 12 inches)	Yield goal (cwt/acre)			
	300	400	500	600
(ppm)	(lb K <sub>2</sub> O/acre)			
25	550	600	650	700
50	450	500	550	600
75	350	400	450	500
100	250	300	350	400
125	150	200	250	300
150	50	100	150	200
175	0	0	50	100

Petiole potassium concentrations should be kept above 7 percent through tuber bulking.

tial yield. In shorter-season seed-growing areas, nitrogen can be applied all preplant. In commercial-production areas, split-apply the nitrogen with part preplant and the remainder during the growing season as discussed below.

It is extremely important to avoid late-season nitrogen applications—after July 31 in most Idaho growing areas. Even small amounts of nitrogen applied late in the season will sufficiently delay plant maturity enough to cause problems with vine killing and tuber maturation.

**When all Nitrogen is Applied Preplant**—Obtain a soil test to a depth of 12 inches that is representative of the intended production field. Use Table 4 to predict potential yield in your area until experience provides a better estimate. Your historical average yield for Russet Burbank can be used to estimate the potential yield for Bannock Russet. Use Table 5 to determine the amount of nitrogen recommended and apply the entire amount before or at planting.

**Table 4. Potential yield of Bannock Russet in southern Idaho.**

Growing area	Potential yield <sup>1</sup>
	(cwt/acre)
East <sup>2</sup>	300 to 400
Central	400 to 500
West	500 to 600

<sup>1</sup>Due to the variability of conditions within each growing area, a range of potential yields is given. If yields in your locale are traditionally lower or higher than yields in most other locales within the area, determine your potential yield from the corresponding end of the range.

<sup>2</sup>East includes all of the upper Snake River Plain south and west to American Falls and all high-altitude seed areas.

**Table 5. Total nitrogen (N) fertilizer recommendations for Bannock Russet potatoes. Application rates include preplant and seasonal applications.**

Soil test N <sup>1</sup> (0 to 12 inches)	Yield goal (cwt/acre)			
	300	400	500	600
(ppm)	(lb N/acre)			
0	120	160	200	240
5	110	150	190	230
10	100	140	180	220
15	80	120	160	200
20	70	110	150	190
25	60	100	140	180
30	50	90	130	170
35	40	80	120	160
40	20	60	100	140

<sup>1</sup>Soil test N = Nitrate-N + Ammonium-N.

Add 15 pounds N/acre for each ton of grain straw residue up to 60 pounds N/acre.

**When Seasonal-Nitrogen Applications are Made**—Obtain a representative soil sample to a depth of 12 inches of the intended production field. Use your historical average yield for Russet Burbank to estimate the potential yield for Bannock Russet, or use Table 4 to predict a potential yield in your area until experience provides a better estimate. Before or at planting, apply 40 to 45 percent of the total seasonal nitrogen requirement indicated in Table 5.

Do not make additional nitrogen applications until tubers begin setting. Apply additional nitrogen during the early-bulking season with the last application no later than July 31.

Monitor petiole nitrate-N concentrations throughout the season. Table 6 lists optimal petiole nitrate-N concentrations for each growth stage. Bannock Russet's seasonal petiole nitrate-N nitrogen profile differs substantially from Russet Burbank. Consequently, critical concentrations of petiole nitrate-N at any given time during crop growth will also differ.

During tuber set and early bulking, optimal petiole nitrate-N concentration for Bannock Russet is similar to

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**Table 6. Sufficiency range of petiole NO<sub>3</sub>-N for Bannock Russet during different growth stages.**

Growth stage	Description	Sufficiency range <sup>1</sup> (ppm)
I	Emergence through tuberization	20,000 to 22,000
II	Tuberization	18,000 to 20,000
III	Early tuber bulking	11,000 to 16,000
IV	Late tuber bulking	5,000 to 10,000
V	Maturation (after Aug. 10)	2,000 to 6,000

<sup>1</sup>See CIS 743, *Tissue Analysis—A Guide to Nitrogen Fertilization for Russet Burbank Potatoes*, for petiole sampling techniques.

Russet Burbank. However, in the latter half of the bulking season and through senescence, the optimum petiole nitrate-N concentration for Bannock Russet is much lower. By mid-August petiole nitrate-N concentration should be allowed to decline to around 5,000 to 10,000 ppm. By the end of August, it should decrease to 2,000 to 6,000 ppm. Maintaining higher petiole nitrate-N levels will reduce yield, decrease tuber solids, make vines difficult to kill, and delay tuber skin maturation.

## Irrigation

Bannock Russet will use more water than Russet Burbank during the season. Maintain available soil moisture above 65 percent throughout the growing season. The additional water needed by Bannock Russet should be applied by irrigating more frequently rather than applying more at each irrigation.

Bannock Russet is susceptible to shatter bruise caused by very hydrated (crisp) tubers. Proper post-vine kill water management can minimize shatter bruise. Maintain available soil moisture above 65 percent until vine kill, and then allow soil moisture to decrease to approximately 55 percent available. Apply a preharvest irrigation about 2 or 3 days before harvest to avoid completely rehydrating the tubers. Bannock Russet is not as susceptible to blackspot bruise as Russet Burbank. Therefore, harvesting tubers partially dehydrated will not accentuate this problem.

## Weed Control

Bannock Russet is tolerant of metribuzin applied at labeled rates. No injury has been observed resulting from the application any herbicides currently labeled for use on potatoes. The most critical time for Bannock Russet weed control is before row closure. Bannock Russet produces a relatively large vine and will successfully compete with most mid- to late-season weeds.

## Diseases

Bannock Russet is immune to PVY and field tolerant to most other viruses. This should increase seed grow-

ers' ability to produce quality seed. Use certified seed to reduce problems with virus diseases, bacterial ring rot, and blackleg.

Bannock Russet has susceptibilities to storage diseases similar to Russet Burbank. Susceptibility of Bannock Russet to shatter bruise may result in increased susceptibility to *Fusarium* dry rot problems. To avoid dry rot and related rotting problems in storage, use all harvesting and handling techniques that minimize shatter bruising, and use storage practices that encourage rapid wound healing.

Bannock Russet is susceptible to root-knot nematodes and corky ring spot. Avoid planting in fields with a history of nematodes, or treat the field with a fumigant. Bannock Russet is resistant to early dying caused by verticillium wilt.

Bannock Russet is moderately resistant to early blight and typically will not need to be treated with fungicide to manage this disease.

The foliage of Bannock Russet has similar susceptibility to late blight as Russet Burbank. Use the same fungicide application recommendations for Bannock Russet as for Russet Burbank. Tubers of Bannock Russet are susceptible to late blight tuber rot and should be carefully monitored in the field and in storage.

If late blight has been found in the field, it is essential to continue fungicide applications until the vines, including stems, are completely dead. This will reduce inoculum that may increase tuber late blight infection. When late blight is present during the growing season, prepare tubers for harvest and storage as per University of Idaho recommendations.

## Vine Kill and Harvest

Depending on end use, monitor tuber size in the field and kill the vines when the desired tuber size has been achieved. Otherwise, kill vines at least 21 days before the intended harvest date to allow time for tuber maturation and skin set. The vines of Bannock Russet are difficult to kill and the tubers skin easily, therefore, this time period is needed to allow the tuber skins to mature.

Bannock Russet is susceptible to shatter bruise, therefore growers should follow the recommendations in the "Irrigation" section. Also, employ all proven bruise-prevention practices at harvest and while handling. Dig tubers with proper soil moisture, adjust harvester conveyor speeds in relation to harvester ground speed, keep the conveyors fully loaded with potatoes, and adjust equipment to eliminate bruise points.

## Storage

Store only healthy potatoes that are relatively free of handling injury. Bannock Russet appears to be more susceptible to dry-rot decay compared to Russet Burbank. Therefore, additional attention to proper tuber maturity,

hydration and handling will decrease the chance of a Fusarium dry rot problem in storage. Depending on the year, Bannock Russet has a dormancy period of approximately 120 to 140 days at 45°F, which is similar to or slightly shorter than the dormancy period of Russet Burbank.

When storing Bannock Russet potatoes for processing, use storage temperatures and conditions recommended for Russet Burbank. In general, Bannock Russet produces a lighter fry color and has a lower glucose concentration compared to Russet Burbank at 45°F. Apply a chemical sprout inhibitor to potatoes held longer than three months at 45°F.

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