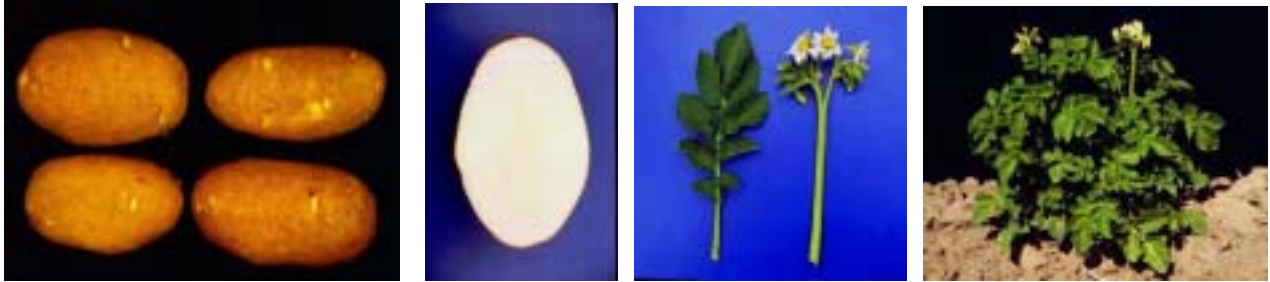


Cultural Management of Bannock Russet Potatoes

Stephen L. Love, William H. Bohl, Dennis Corsini, Jeffery C. Stark, Nora Olsen, Joe Pavek, and A. Mosley



Bannock Russet was released in 1999 from a cross between A75175-1 and A75188-3 (Fig. 1) 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 and resistance to most field diseases. This publication provides management guidelines for producing high-quality Bannock Russet potatoes in southern Idaho. Growers should adapt this information to their own situations as experience dictates.

Field Selection and Preparation

It is not recommended that Bannock Russet be planted the year immediately following alfalfa. Late mineralization of nitrogen from the alfalfa will result in excess nitrogen availability, delaying maturity of an already late-maturing variety making it difficult to mature the tubers.

Bannock Russet is resistant to verticillium wilt and other early die diseases, therefore it will not respond to

soil fumigation as do susceptible varieties. Plant this variety in fields that have not been fumigated because the money spent on fumigating will not be returned in increased profits.

Seed Management and Planting

Follow sound seed storage and handling practices (see PNW 248, Potatoes—Influencing Seed Tuber Behavior, CIS 1031, Potato Seed Management: Seed Size and Age, and CIS 974, Potato Seed Management: Seed Certification and Selection). Store seed at 38 to 40°F. Bannock Russet tubers have long dormancy, therefore, may emerge slowly. To encourage rapid emergence warm seed tubers before cutting to 50°F for 1 to 3 weeks.

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 and has a tendency to produce an excess of oversized tubers. It will benefit from a closer seed-drop spacing than is normal for Russet Burbank, especially in the growing areas that traditionally produce high yields (Table 1). Planting depth should be approximately 5 inches as measured from the top of the seed piece to the top of the hill.

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 need is based on potential yield. In shorter season seed areas, the nitrogen can be applied all preplant. In commercial production areas, nitrogen should be split-applied preplant and during the growing season.

It is extremely important to avoid late applications of nitrogen (after July 31 in most Idaho growing areas). Nitrogen applied late in the season, even small amounts, will delay maturity sufficiently to cause vine killing and tuber maturity problems.

All N Applied Preplant—Obtain a soil test to a depth of 12", representative of the intended production field. Use

Table 4 to predict potential yield until experience provides better estimates. An historical average yield for Russet Burbank can be used as an estimate of Bannock Russet's potential yield. Use Table 5 to determine the amount of nitrogen to apply and apply the entire amount prior to or at planting.

Seasonal N Applications—Obtain a soil test and use Table 5 to determine the amount of preplant N to apply. Prior to or at planting, apply 40 to 45 percent of the total seasonal N requirement indicated in Table 5. Do not make additional N applications until tubers begin setting. Additional N should be applied during the early bulking season with the last application being made no later than July 31.

Monitor petiole nitrate concentrations throughout the season. See Table 6 for optimal petiole nitrate concentrations for each growth stage. Bannock Russet's seasonal petiole nitrate profile differs substantially from Russet Burbank's. Consequently, critical concentrations of petiole nitrate at any given time during crop growth will also differ. During tuber set and early bulking, optimal petiole nitrate concentration for Bannock Russet is similar to that for Russet Burbank. However, in the latter half of the bulking season and through senescence, the optimum petiole nitrate concentration is much lower. By mid-August petiole nitrate concentration should be allowed to decline to around 5,000-8,000 ppm. By the end of August, it should decline to 2,000 to 5,000 ppm. **Maintenance of higher petiole nitrate levels will reduce yield, decrease tuber solids, and create difficulty with vine-kill and 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 for longer periods.

Bannock Russet is susceptible to shatter bruise caused by very hydrated (crisp) tubers. Shatter bruising can be minimized by proper post-vine kill water management. Maintain available soil moisture above 65 percent until vine kill, then allow soil moisture to fall to approximately 55 percent available. A preharvest irrigation should be applied a closely to harvest as possible (2 to 3 days) in order to avoid completely rehydrating the tubers. Bannock Russet is not as susceptible to blackspot as Russet Burbank, therefore, harvesting tubers partially dehydrated will not accentuate this problem.

Weed Control

Bannock Russet is tolerant of metribuzin (Sencor) applied at labeled rates (see CIS 291, Metribuzin for Weed Control in Potatoes). No injury has been observed as a result of any other herbicides that are currently registered for use on potatoes. The most critical period for weed control for Bannock Russet is prior to 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 growers' ability to produce quality seed.

Use certified seed to reduce problems with virus diseases, bacterial ring rot, and blackleg. Bannock Russet and Russet Burbank have similar susceptibilities to storage diseases. 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 best available harvesting techniques to minimize shatter bruising and storage practices to encourage rapid wound healing.

Bannock Russet is susceptible to root-knot nematodes and corky ringspot. Avoid planting in (or treat with fumigant) fields with a history of nematodes. Bannock Russet is resistant to early dying caused by Verticillium wilt.

The foliage of Bannock Russet has similar susceptibility to late blight as that of Russet Burbank. Standard recommendations for fungicide applications should be followed. 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 (University of Idaho Late Blight Action Plan).

Vine Kill and Harvest

Depending on end use, monitor tuber size and kill the vines when the proper 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 can skin easily, therefore, this time period is needed to allow the tuber skins to mature.

Bannock Russet is susceptible to shatter bruise. Follow the recommendations discussed in the section on irrigation above. Also, employ all proven bruise prevention practices during harvesting and handling including digging with proper soil moisture, keeping all belts

and chains fully loaded with potatoes (time harvester), and adjusting equipment to eliminate bruise points.

Storage

Store only healthy potatoes that are relatively free of handling injury. Fusarium dry rot can be a problem in storage if the tubers are immature or damaged. Bannock Russet has a similar dormancy period as Russet Burbank, approximately 120 days at 45°F.

For potatoes held for processing, use storage temperatures and conditions recommended for Russet Burbank. Potatoes held longer than 3 months at 45°F will need a chemical sprout inhibitor applied.

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

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

¹Recommendation based on a 36-inch row width.

²Based on a 2.5-ounce average seed piece size.

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) (ppm) | Percent free lime | | | |
|--|--|-----|-----|-----|
| | 0 | 4 | 8 | 12 |
| | ----- (lb P ₂ O ₅ /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 of P₂O₅/acre as a starter at planting for soil test P levels below 30 ppm.

Add 25 pounds P₂O₅/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) (ppm) | Yield goal (cwt/acre) | | | |
|--|--|-----|-----|-----|
| | 300 | 400 | 500 | 600 |
| | ----- (lb K ₂ 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.

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

| Growing area | Potential yield ¹ (cwt/acre) |
|-------------------|--|
| East ² | 300 to 400 |
| Central | 400 to 500 |
| West | 500 to 600 |

¹Due 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.

²East 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 ¹ (0 to 12 inches) (ppm) | Yield goal (cwt/acre) | | | |
|---|-------------------------|-----|-----|-----|
| | 300 | 400 | 500 | 600 |
| | ----- (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 |

¹Soil test N = Nitrate-N + Ammonium-N.

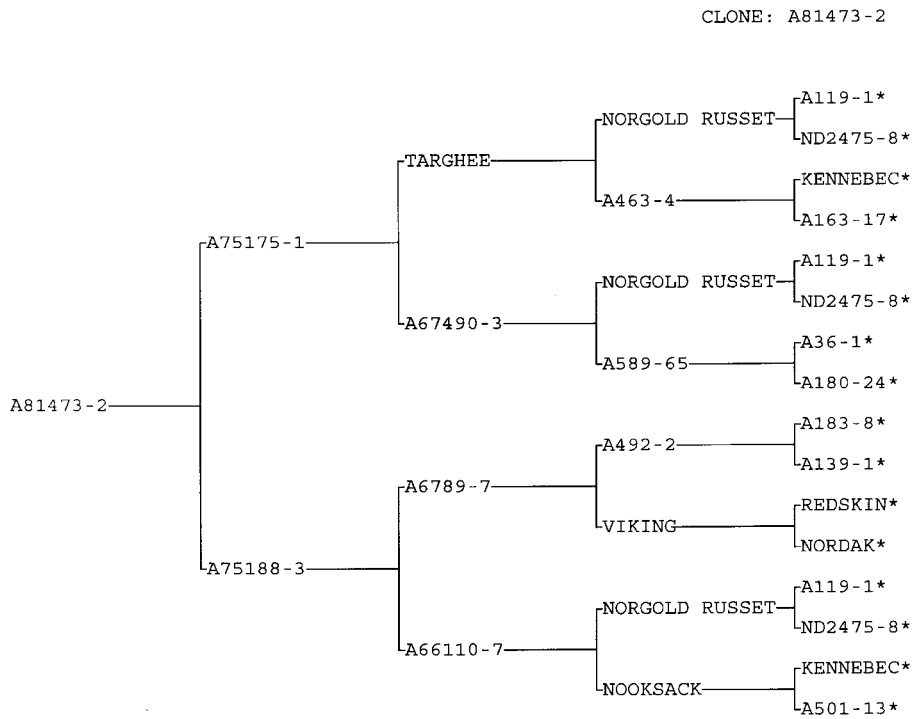
Add 15 pounds N/acre for each ton of grain straw residue up to 60 pounds N/acre.

Table 6. Sufficiency range of petiole NO₃-N for Bannock Russet during different growth stages.

| Growth stage | Description | Sufficiency range ¹ (ppm) |
|--------------|--------------------------------|---|
| I | Emergence through tuberization | 22,000 to 24,000 |
| II | Tuberization | 19,000 to 22,000 |
| III | Early tuber bulking | 12,000 to 18,000 |
| III | Late tuber bulking | 5,000 to 12,000 |
| IV | Maturation (after Aug 10) | 2,000 to 6,000 |

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

Fig. 1. Bannock pedigree



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The Authors

Stephen L. Love, potato variety development specialist and associate research professor, Department of Plant, Soil and Entomological Sciences, Aberdeen Research and Extension Center, Dennis L. Corsini, research plant pathologist, USDA Agricultural Research Service, Aberdeen, Idaho; Jeffery C. Stark, agronomist, Aberdeen Research and Extension Center; and William H. Bohl, extension educator-potatoes, Blackfoot, Nora Olsen, extension potato specialist, Twin Falls.

