

Research Report 1999

Susie Thompson, Ph.D., Research Horticulturist
Coleen Golden, Research Associate

Colorado State University
San Luis Valley Research Center
Center, Colorado

1999 ALPHA PRODUCTION SCENARIO TRIAL

Researchers: Susie Thompson, Research Horticulturist, Rob Davidson, Extension Seed Potato Specialist, and Coleen Golden, Research Associate, Colorado State University, San Luis Valley Research Center, Center, CO 81125

Location: San Luis Valley Research Center, Center, CO

Objective: To investigate different production scenarios aimed at producing a maximum yield and percentage of tubers 25-60 mm.

Acknowledgements: We gratefully acknowledge the cooperation and support of the San Luis Valley Research Center Committee and the CPAC (Area II). The aid of Jose DeHerrera, Justin Fricke, Ty Hemmerling and Kevin Sanderson was much appreciated.

Cultivar: Alpha

Treatments:

1. Precutting
2. Chitting
3. 6 inch within-row spacing
4. Defoliation, 50% after tuber initiation (7/22)
5. Excessive nitrogen, 80 lbs./acre after tuber initiation 9/23
6. GA treatment, Early Harvest PGR applied at 3.5 oz./acre @ tuber initiation and 2 weeks later (7/23 and 8/3)
7. Early kill
8. Full season

PLOT INFORMATION:

Planting Date: May 11
Plot Design: Randomized complete block
Plot Size: 25 feet
Within-Row Spacing: 12 inches
Row Spacing: 34 inches
Replications: 4
Irrigation: Solid set sprinkler, rate based on ET
Fertilizer: 90 lb./acre N, 100lb./acre P, preplant
Herbicide: Dual Magnum and Matrix (6/7)
Fungicide: Bravo Weatherstik (7/9, 7/16, 7/30, 8/6), Quadris (7/23), Dithane DF (8/13, 8/20)
Vine Kill: Sulfuric Acid applied on September 1
Harvested: Two-row digger, picked up by hand, September 17 and 20

DATA:

Yield: 1-25 foot plot per replication, expressed as cwt./acre
Grade: By hand; tuber count, percent and weight of tubers under 25mm, 25-40 mm, 40-50 mm, 50-60 mm, over 60mm and culls

Table 1. Agronomic evaluations, yield and grade for Alpha grown under eight production scenarios, 1999.

Production Scenario	Vine Size ¹	Vine Maturity ²	Stems per plant	Tubers per plant	Growth Cracks ³	Second Growth ⁴	Total Yield	cwt./acre & %					Culls
								<25 mm	25-40 mm	40-50 mm	50-60 mm	>60 mm	
Precutting	4.0 a	4.8 a	4.8 abc	12.7 a	4.8 a	3.3 a	379 a	1 b	46 bc	142 a	104 a	69 ab	17 ab
								0	12	38	27	18	4
Chitting	4.0 a	4.5 a	5.9 a	11.1 ab	4.8 a	3.8 a	331 a	1b	43 bc	95 bc	111 a	73 ab	8 b
								0	13	28	34	22	2
6" within-row spacing	4.0 a	5.0 a	4.3 bc	8.3 c	5.0 a	3.8 a	384 a	4 a	104 a	127 ab	109 a	33 cd	7 b
								1	27	33	29	8	2
Defoliation	3.5 a	4.8 a	5.0 abc	9.7 bc	5.0 a	3.8 a	234 b	2 b	60 bc	85 c	54 b	24 a	9 b
								1	25	37	23	11	4
Excess Nitrogen	4.0 a	5.0 a	5.6 ab	11.4 ab	4.8 a	3.5 a	316 a	1 b	45 bc	111 abc	101 a	41 bcd	16 ab
								0	14	36	32	12	5
Gibberelic Acid Treatment	4.0 a	4.8 a	4.3 bc	10.7 ab	5.0 a	3.5 a	325 a	2 ab	51 bc	97 bc	98 a	64 abc	13 ab
								1	17	31	29	19	4
Early Vine Kill	-	-	3.6 c	11.1 ab	4.8 a	3.5 a	232 b	1 b	64 b	102 bc	38 b	20 d	7 b
								1	27	45	16	8	3
Full Season	4.0 a	5.0 a	4.8 abc	11.1 ab	5.0 a	3.5 a	350 a	1 b	43 bc	114 abc	109 b	69 ab	15 ab
								0	13	33	31	19	4
Mean	4.0 a	4.8 a	4.7	10.8	4.9	3.6	322	2	54	108	93	52	12
LSD (cc=0.05)	0.4	0.5	1.5	2.4	0.5	0.6	70	3	28	35	38	33	11

¹ Vine size – scale 1-5, 1=small, 5=very large.

² Vine maturity – scale 1-5, 1=early, 5=late.

³ Growth cracks – scale 1-5, 1=severe, 5 =none.

⁴ Second growth – scale 1-5, 1=severe, 5 = none.

1999 BORON RESPONSE TRIAL

Researchers: Susie Thompson, Research Horticulturist, Colorado State University, San Luis Valley Research Center, Center, CO, Jessica Davis, Extension Soil Specialist, CSU, Fort Collins, and Coleen Golden, Research Associate, CSU, San Luis Valley Research Center, Center, CO 81125

Location: San Luis Valley Research Center, Center, CO

Objective: To evaluate the impact of boron fertilization rate on Russet Norkotah and Russet Nugget potato cultivars on soils with boron levels below the critical level.

Acknowledgements: We gratefully acknowledge the cooperation and support of U.S. Borax, the San Luis Valley Research Center Committee and the CPAC (Area II). Additionally, the aid of Jose DeHerrera, Justin Fricke, Ty Hemmerling and Kevin Sanderson was much appreciated.

Cultivars: Russet Norkotah
Russet Nugget

Treatments: 0 lbs. boron/acre
1 lb. boron/acre
2 lb. boron/acre

PLOT INFORMATION:

Planting Date: May 18
Plot Design: Factorial split plot
Plot Size: 4 rows x 20 feet
Within-Row Spacing: 12 inches
Row Spacing: 34 inches
Replications: 3
Irrigation: Solid set sprinkler, rate based on ET
Fertilizer: 90 lb./acre N, 100lb./acre P, preplant
0, 1, or 2 lbs./acre liquid boron broadcast, preplant
Herbicide: Dual Magnum and Matrix (6/7)
Fungicide: Bravo Weatherstik (7/9, 7/16, 7/30, 8/6), Quadris (7/23), Dithane DF (8/13, 8/20)
Vine Kill: Sulfuric acid applied on September 1
Harvested: Two-row digger, picked up by hand, September 29

DATA:

Yield: Two center 20 foot rows per plot, expressed as cwt./acre
Grade: By hand; tuber count, percent and weight of tubers under 4 oz., 4-6 oz., 6-12 oz., over 12 oz., US No. 2's and culls.
Quality: Evaluation of blackspot bruise using the abrasive peel method, shatter bruise using a bruise chamber, and specific gravity using the weight-in-air/weight-in-water method.

Table 1. Effect of boron rate on vine and tuber traits, 1999.

Clone	Boron Rate	Vine Size ¹	Vine Maturity ²	Stems/ plant	Tubers/ plant	Second Growth ³	Hollow Heart %	Internal Pinking %	Black-spot ⁴	Shatter ⁵	Specific Gravity ⁶
R. Norkotah	0	2.0	3.0	3.3	6.1	5.0	3	10	2.6	2.6	1.0747
	1	1.7	2.3	4.3	5.7	4.3	3	0	2.8	2.6	1.0725
	2	2.0	2.3	3.4	4.8	5.0	0	3	2.1	2.7	1.0762
	Mean	1.9	2.6	3.7	5.5	4.8	2	4	2.5	2.6	1.0745
R. Nugget	0	4.0	4.7	2.9	9.3	5.0	0	3	2.5	3.4	1.0910
	1	4.0	4.3	3.0	8.7	4.3	0	3	2.6	3.0	1.0932
	2	4.0	4.7	3.6	10.1	4.3	0	3	2.5	3.2	1.0921
	Mean	4.0	4.6	3.2	9.4	4.6	0	3	2.5	3.2	1.0921
Mean		2.9	3.6	3.4	7.5	4.7	1	4	2.5	2.9	1.0833
LSD ($\alpha=0.05$)		0.2	0.6	0.5	0.6	0.6	3	6	0.5	0.4	0.0035
	0	3.0	3.8	3.1	7.7	5.0	2	7	2.5	3.0	1.0828
	1	2.8	3.3	3.7	7.2	4.3	2	2	2.7	2.8	1.0829
	2	3.0	3.5	3.5	7.5	4.7	0	3	2.3	3.0	1.0841
	Mean	2.9	3.6	3.4	7.5	4.7	1	4	2.5	2.9	1.0833
LSD ($\alpha=0.05$)	0.3	0.7	0.6	0.7	0.7	4	4	0.6	0.5	0.0043	

¹ Vine size – scale 1-5, 1=small, 5=very large.

² Vine maturity – scale 1-5, 1=early, 5=late.

³ Second growth – scale 1-5, 1=severe, 5= none.

⁴ Blackspot bruise – scale 1-5, 1=none, 5= severe.

⁵ Shatter bruise – scale 1-5, 1=none, 5= severe.

⁶ Specific gravity determined by weight-in-air, weight-in-water method.

**CULTIVAR SPECIFIC
MANAGEMENT PROFILES**

RUSSET NORKOTAH
RUSSET NORKOTAH – SELECTION 3
RUSSET NORKOTAH – SELECTION 8

Prepared by Susie Thompson, Ph.D. and Robert D. Davidson, Ph.D., Department of Horticulture & Landscape Architecture, San Luis Valley Research Center, Colorado State University

This profile was developed for production in the San Luis Valley. While some guidelines may be appropriate regardless of growing area, fine-tuning for specific production locales is recommended.

Russet Norkotah is an early maturing cultivar released in 1987 by North Dakota State University (APJ 65:597-604, 1988). Primary use is for the fresh market, and it is particularly suited for baking. It is widely adapted in North America and performs very well in the San Luis Valley. In order to address the weaknesses of standard Russet Norkotah including a high requirement for nitrogen fertility and weak vines, Dr. David Holm began a concerted effort in 1991 to identify superior genotypes able to withstand stress situations more favorably. After several years of evaluation, two lines stood out in offering advantages in reduced nitrogen requirements and in stress situations.

Vine maturity of Selection 3 is later by about seven days when compared to the standard. Vine maturity for Selection 8 is early, although intermediate between the standard and Selection 3. Application for U.S. Plant Variety Protection has been made for the two selections (Colorado Russet Norkotah Selection 3 - PV#9800256; Colorado Russet Norkotah Selection 8 - PV#9800255).

Plant/roots: Plants emerge quickly with a medium, slightly upright vine and white flowers. Selection 3 vines are medium to large, and more upright than those of the standard or Selection 8. Selection 3 blooms more heavily than the standard and the flowering period is longer. All have a determinate growth habit. Root systems for standard Russet Norkotah and Selection 8 tend to be shallow and concentrated. Selection 3 has a medium sized root system. The selections are not as susceptible to hail damage as standard Russet Norkotah, and will demonstrate some recovery following such an event.

Tubers: Tubers have white flesh, are long and blocky with medium to heavy russet skin. Eyes are shallow, numerous and well distributed. Specific gravity levels are medium (1.080). Although not considered a processing cultivar, Russet Norkotah will fry directly from the field.

Yield potential: Yield potential varies from 450 cwt per acre to 500 cwt plus, with proper management. All produce a high percentage of US No. 1 tubers.

GROWING SEASON MANAGEMENT

Pre-planting considerations: Tubers have medium dormancy. Some producers have indicated that Selection 3 has slightly longer dormancy than the standard. Whole or cut seed

is acceptable, however, cut seed may be preferred as the increased stem number aids in limiting oversized tubers late in the season. Tuber size is also controlled through closer within-row seed spacing. Avoid prolonged warming of seed to minimize excessive sprouting and physiological aging (no more than two weeks at 60 F). Precutting may age seed physiologically, as well, but research in Colorado indicates this may not be a significant problem if proper storage conditions after cutting are utilized. Avoid planting seed in cool soils, since delayed emergence may aggravate *Rhizoctonia* stem canker and result in reduced fertilizer uptake. Plant 4 to 6 inches deep in a broad, well-shaped hill to minimize late season greening. Selection 3 will perform better at the deeper planting depth.

Fertility: Apply total fertilizer in the range: N(210-230#), P(120-200#), K(0-40#) for standard Russet Norkotah. Performance of Selection 8 has been maximized with applications in the range: N(160-180#), P(120-170#), K(0-40#). For Selection 3, applications in the range of: N(130-150#), P(100-150#), K(0-40#) are suitable. Pre-plant N applications are critical for the early vine growth necessary to support maximum yields, particularly for standard Russet Norkotah (110-140#). This should be reduced to a range of 80-100# for the selections. Sprinkler applied N should be in the range of 90 to 100# for the standard, 80# for Selection 8, and 40-70# for Selection 3. All may benefit from applications at a rate of 7-10# per application, but not exceeding 20# per application. High N rates will delay tuberization of Selection 3 resulting in misshapen tubers, skin-set problems, etc. under short growing seasons. Performance in alkali soils is reduced for the standard.

Irrigation: The interval at the maximum ET is approximately 2.5 days. Drought tolerance of Selection 8 is similar to the standard. However, due to a larger vine, but similar rooting characteristics, producers may prefer to shorten the interval to 2 days and decrease application rates slightly to match ET, in order to avoid moisture stress. The selections may require prolonged irrigation later in the season, when compared to the standard due to slightly later vine maturity, however, once vine senescence has begun, water needs must be monitored closely. Producers should strive to avoid late season over-watering, since it creates ideal conditions for expression of many diseases such as blackleg, pink rot and leak. The selections may display tuber malformations, skin set problems, and deep eyes if irrigation is erratic, temperatures are extremely high, or nitrogen fertility excessive.

Pest Control

Weeds: The selections compete better with weeds than standard Russet Norkotah. No sensitivities to major potato herbicides have been demonstrated by the standard, or the selections.

Insects: Standard insect control measures are suitable, however timing and rotation of pesticides are important due to preference by aphids and virus spread. It is especially important to continue applications into late season for the selections since vines remain succulent and green longer than the standard.

Fungicides: Three to five fungicide applications may be necessary to control foliar early blight for standard Russet Norkotah. Due to the later maturity, susceptibility to foliar early blight and Verticillium wilt are slightly less for the selections when compared to the standard.

Tuberization/bulking: Tuber set is light to medium and high in the hill. Greening may be a problem without proper hill conformation. Tuber bulking occurs in a short interval during early to mid-season at an extremely rapid rate. Russet Norkotah is moderately resistant to blackspot bruise. The selections are somewhat susceptible to growth cracks, deep eyes, misshapen tubers and hollow heart if not appropriately managed. Physiological pigmentation (internal purpling) may appear in tubers of all if proper planting depths, hill conformation and sound nitrogen fertility management are not adhered to.

Vine Kill: Average days from planting to vine kill are 95 to 110. Unlike standard Russet Norkotah, vine kill may be required for the selections. Adequate skin set occurs in 14 to 21 days. Tubers may become excessively large late in the season, so close monitoring is warranted by early August.

STORAGE MANAGEMENT

Russet Norkotah and the selections generally have few storage problems. However, leak, pink rot, blackleg and silver scurf may become serious when proper field and storage management are not practiced. Russet Norkotah is not considered a long-term storage cultivar. Due to a propensity for pressure bruise and blackspot bruise development, consider marketing prior to March 1. A note; some producers feel that they may be able to store Selection 3 slightly longer due to stronger dormancy.

DISEASE REACTION

Potato early dying, caused by *Verticillium dahliae* is a problem in some years, but can be easily confused with natural vine senescence. It is not as prevalent for the selections when compared to the standard. Soil-borne diseases such as leak, pink rot and silver scurf can be quite common and serious.

Bacterial ring rot symptom expression is erratic and may be difficult to see under some circumstances for Russet Norkotah. Symptoms can be mild and tend to appear only after vines begin senescing (90+ days after planting). Expression for the selections is adequate and similar to the standard. Reaction to PVY infection is mild to latent. Infected plants are difficult to detect early in the growing season, but usually become somewhat more detectable as the plants age. Yield losses due to PVY will be in the 30-40% range for individual plants based on research conducted in the Pacific Northwest and in Colorado. Expression of symptoms may be delayed for the selections when excessive N is applied.

Toxic seedpiece decay syndrome is characterized by severe plant wilting just prior to tuberization, when the plants are switching from seedpiece nutrition to the root system. Plants appear windburned with dehydrated leaf margins in the upper canopy. A light brown, jelly-type rotted mass is all that is left of the seedpiece and brown streaks may be visible in the lower stem. Normally the plant recovers within a couple of weeks. This problem may be present when early season wet conditions are linked with warm weather. Toxic seedpiece decay syndrome is rarely seen in the selections.

Field

Foliar early blight	Susceptible - Moderately susceptible for the selections
<i>Verticillium</i> wilt	Susceptible - Moderately susceptible for the selections
Blackleg	Susceptible
Seedpiece decay	Susceptible
Leafroll virus	Susceptible
Leafroll net necrosis	Resistant
PVY	Susceptible, latent reaction possible
PVX	Susceptible
Common scab	Moderately resistant
Powdery scab	Resistant
Bacterial ring rot	Susceptible
Late blight	Susceptible

Storage

Tuber early blight	Moderately resistant
Bacterial soft rot	Susceptible
<i>Fusarium</i> dry rot	Susceptible
<i>Pythium</i> leak	Susceptible
Pink rot (<i>P. erythroseptica</i>)	Susceptible
Silver scurf	Susceptible
<i>Rhizoctonia</i> scurf	Moderate

Disease reaction ratings = susceptible, moderately susceptible, moderate, moderately resistant and resistant.

Spring 1999

YUKON GOLD

Prepared by Susie Thompson, Ph.D. and Robert D. Davidson, Ph.D., Department of Horticulture & Landscape Architecture, San Luis Valley Research Center, Colorado State University

This profile was developed for production in the San Luis Valley. While some guidelines may be appropriate regardless of growing area, fine-tuning for specific production locales is recommended.

Yukon Gold is an early maturing cultivar, released in 1980 by Agriculture Canada, University of Guelph and the Ontario Ministry of Agriculture (American Potato Journal 58:241-244, 1981). Yukon Gold was tested as G666-4Y. It is the result of a cross between Norgleam and W5279-4. Yukon Gold is an attractive, yellow-fleshed, potato cultivar. Primary use is for the fresh market. It is particularly suited for baking, salad and soup. Yukon Gold may process if fried directly from the field, but not following cold storage. It is widely adapted in North America and performs very well in the San Luis Valley.

Plant/roots: Plants emerge quickly with a medium, upright vine, and a slight tendency to spread as maturity approaches. Vines exhibit a purplish pigmentation, particularly in lower foliage. Flowers are pale, red-purple and not overly abundant. Yukon Gold has a determinate growth habit. The root system is somewhat compact.

Tubers: Tubers have light yellow flesh, are round to oval, smooth and slightly flattened, with pale yellow skin. Eyes are shallow, pink and tend to be distributed near the bud end. Specific gravity levels are medium (1.080).

Yield potential: Yield potential is medium, with a range of about 380 to 400 cwt. per acre, with proper management. A very high percentage of marketable tubers are produced if high plant density and low nitrogen rates are utilized.

GROWING SEASON MANAGEMENT

Pre-plant considerations: Tubers have medium dormancy. Yukon Gold characteristically produces few stems and tuber set tends to be low. Whole or cut seed is acceptable, however, cut seed may increase stem numbers, aiding in limiting oversized tubers late in the season. Eyes tend to be most prevalent on the bud end and often one side of the stem end has no eyes. Eye distribution is light (about 8 per tuber), thus avoid large seed which may result in blind seed pieces or few stems per plant. Tuber size is also controlled through closer within-row seed spacing. Avoid prolonged warming of seed to minimize excessive sprouting and physiological aging (no more than two weeks at 60 F). Precutting may age seed physiologically, as well, but research in Colorado indicates this may not be a significant problem if proper storage conditions after cutting are utilized. Avoid planting seed in cool soils, since delayed emergence may aggravate *Rhizoctonia* stem canker and result in reduced

fertilizer uptake. Plant 4 inches deep in a broad, well-shaped hill to minimize late season greening.

Fertility: Apply total fertilizer in the range: N(120-180#), P(100-200#), K(0-60#). Pre-plant N applications are critical for early vine growth necessary to support maximum yields. This should be in a range of 70-120#, do not exceed 80# on lighter soils. Sprinkler applied N should be in the range of 60-70#. Do not exceed 20# per application.

Irrigation: The interval at the maximum ET is approximately 2.5 to 3 days. Drought tolerance is low. Mid season this cultivar wilts easily. Producers should closely monitor late season irrigation, to prevent creating ideal conditions for expression of diseases such as blackleg, pink rot and leak.

Pest Control

Weeds: Weed competition is moderate for Yukon Gold. It is not sensitive to major potato herbicides.

Insects: Standard insect control measures are suitable, however timing and rotation of pesticides is important due to preference by aphids and virus spread.

Fungicides: Three to five fungicide applications may be necessary to control foliar early blight.

Tuberization/bulking: Tuber set is light to medium (about 7 tubers per plant) and high in the hill. Greening may be a problem without proper hill conformation. Tuber bulking occurs in a short interval during early to mid-season at an extremely rapid rate.

Vine Kill: Average days from planting to vine senescence is 90 to 100. Adequate skin set occurs in 14 to 21 days. Tubers may become excessively large late in the season, so close monitoring of size is warranted by 90 days from planting.

STORAGE MANAGEMENT

Yukon Gold stores well and generally develops few problems early. However, leak, pink rot, soft rot and silver scurf may become serious when proper field and storage management are not practiced. Rough handling may increase the potential for *Fusarium* dry rot infections. Yukon Gold has traditionally not been considered a long-term storage cultivar.

DISEASE REACTION

Potato early dying, caused by *Verticillium dahliae* is a problem in some years, but can be easily confused with natural vine senescence. Bacterial ring rot symptom expression is adequate with symptoms showing within 90 days after planting. Yukon Gold is susceptible to PVY infection and infected plants are easy to detect. However, virus spread is rarely a major problem.

Field

Foliar early blight	Susceptible*
<i>Verticillium</i> wilt	Susceptible
Blackleg	Susceptible
Seedpiece decay	Susceptible
Leafroll virus	Moderately Resistant
Leafroll net necrosis	Moderately Resistant
PVY	Susceptible
PVX	Tolerant/Resistant to mild mosaic
Common scab	Moderately Susceptible
Powdery scab	Susceptible
Bacterial ring rot	Susceptible
Late blight	Susceptible

Storage

Tuber early blight	Susceptible
Bacterial soft rot	Susceptible
<i>Fusarium</i> dry rot	Susceptible
<i>Pythium</i> leak	Susceptible
Pink rot (<i>P. erythroseptica</i>)	Susceptible
Silver scurf	Susceptible
<i>Rhizoctonia</i> scurf	Susceptible

*Disease reaction ratings = susceptible, moderately susceptible, moderate, moderately resistant and resistant.

KEYSTONE RUSSET

Prepared by Susie Thompson, Ph.D. and Robert D. Davidson, Ph.D., Department of Horticulture & Landscape Architecture, San Luis Valley Research Center, Colorado State University.

This profile was developed for production in the San Luis Valley. While some guidelines may be appropriate regardless of growing area, fine-tuning for specific production locales is recommended.

Keystone Russet is a very high yielding, medium russet-skinned, fresh market cultivar. Release is scheduled for 1999, by the Colorado and Idaho Agricultural Experiment Stations and the USDA. Keystone was tested as AC83064-1 and is the result of a cross between CalWhite (A76147-2) x A7875-5. It has low specific gravity and attractive tuber type. Plant variety protection is being pursued.

Plants/roots: Emergence is uniform, with a medium-sized, somewhat spreading vine and white flowers. It has a determinate growth habit and a moderate to shallow root system. Tuber initiation and bulking rate are medium.

Tubers: Tubers have white flesh, are oblong to long, with medium russet skin. Eyes are shallow and most prevalent on the bud end. Specific gravity is low (1.078).

Yield potential: Yield potential may exceed 500 cwt. per acre, with a high percentage of US No. 1 tubers produced.

GROWING SEASON MANAGEMENT

Pre-planting considerations: Tubers have a medium dormancy. Whole or cut seed is acceptable. Monitor size of seed, as sparse eye distribution on larger seed may result in "blind" seed pieces and stand problems. A seed spacing of 10 to 12 inches may optimize yield and desired tuber size for the commercial market. Plant this cultivar at about a 5-5.5 inch depth, which will reduce the potential for green tubers.

Fertility: Apply total fertilizer in the following range N(120-140#), P(80-190#), K (0-100#). Fertility needs are very minimal compared to other major russet cultivars. Pre-plant N applications should be in the range of 60-80#. Timing of tuberization is not affected by N applications. Spoon-feed remaining N at the rate of 7-10# per application (do not exceed 20# per application). Skin set may be difficult to achieve if nitrogen levels are high prior to vine desiccation. This may perpetuate skinning and tuber early blight problems in storage. Keystone's performance on alkali soils has been diminished.

Irrigation: Interval at the maximum ET is 3 days. Drought tolerance is moderate.

Pest Control

Weeds: Keystone Russet competes well with weeds. It is sensitive to metribuzin (Sencor, Lexone) applications.

Insects: Standard insect control measures generally are effective but timing and rotation of appropriate control is important due to high aphid preference and virus spread.

Fungicides: Begin application of appropriate fungicides for foliar early blight control when plants are 8 to 10 inches tall, and/or growing degree thresholds are met. This will result in 2 to 5 applications per season. Keystone is susceptible to late blight, thus if the pathogen is present, utilize an appropriately timed preventative program.

Tuberization/bulking: Keystone sets about 7 tubers per plant, and tubers are set in the middle of the hill. Tuber initiation and bulking rate are medium. Heat sprouts may occur when growing temperatures are high. Tubers are moderately resistant to blackspot bruise. Few internal or external defects have been noted during evaluation of this cultivar.

Vine Kill: Average days from planting to vine kill are 115 to 120. Vine killing is required, particularly if nitrogen applications have exceeded requirements. Adequate skin set occurs within 21 to 28 days.

STORAGE MANAGEMENT

Keystone Russet stores well with few problems, however, if tubers are immature or bruised during harvest and handling operations, *Fusarium* dry rot and early blight tuber decay may quickly become problems in storage.

DISEASE REACTION

Overall, disease problems are minimal. Bacterial ring rot foliar expression is adequate with typical symptoms and occurs within 90 days after planting.

Field

Foliar early blight	Susceptible*
<i>Verticillium</i> wilt	Unknown
Blackleg	Susceptible
Seedpiece decay	Susceptible
Leafroll virus	Susceptible
Leafroll net necrosis	Unknown
PVY	Susceptible
PVX	Susceptible
Common scab	Unknown
Bacterial ring rot	Susceptible

Storage

Tuber early blight	Susceptible
Bacterial soft rot	Susceptible
<i>Fusarium</i> dry rot	Susceptible
<i>Pythium</i> leak	Unknown
Pink rot (<i>Phytophthora</i>)	Unknown
Silver scurf	Unknown
<i>Rhizoctonia</i> scurf	Unknown

*Disease reaction ratings = susceptible, moderately susceptible, moderate, moderately resistant and resistant.

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SILVERTON RUSSET

Prepared by Susie Thompson, Ph.D. and Robert D. Davidson, Ph.D., Department of Horticulture & Landscape Architecture, San Luis Valley Research Center, Colorado State University

This profile was developed for production in the San Luis Valley. While some guidelines may be appropriate regardless of growing area, fine-tuning for specific production locales is recommended.

Silverton Russet is a high yielding, medium maturing, medium russet-skinned, dual-purpose cultivar. The Colorado and Idaho Agricultural Experiment Stations and the USDA schedule release for 1999. Silverton was tested as AC83064-6. Parentage of Silverton is CalWhite (A76147-2) x A7875-5. It has medium specific gravity and attractive tuber type. Plant Variety Protection will be applied for.

Plants/roots: Emergence is rapid. The vine is medium-sized and upright to spreading with white flowers. It has a determinate growth habit and a moderate to shallow root system.

Tubers: Tubers have white flesh, are oblong to long, with medium russet skin. Eyes are shallow and distributed more heavily near the apical end. Specific gravity is medium (1.080).

Yield potential: Yield potential may exceed 400 cwt. per acre, with a high percentage of US No. 1 tubers.

GROWING SEASON MANAGEMENT

Pre-planting considerations: Tubers have a short to medium dormancy. Whole or cut seed is acceptable. Monitor size of seed, as sparse eye distribution on larger seed may result in "blind" seed pieces and stand problems. A seed spacing of 10 to 12 inches may optimize yield and desired tuber size for the commercial market. Plant this cultivar at about a 4-inch depth.

Fertility: Apply total fertilizer in the following range N(180-200#), P(120-200#), K (0-100#). Fertility needs are slightly less when compared to other major russet cultivars, such as Russet Norkotah. Pre-plant N applications should be in the range of 90-100#. Timing of tuberization is not affected by N applications. Spoon-feed remaining N at the rate of 7-10# per application (do not exceed 20# per application). Skin set may be difficult to achieve if nitrogen levels are high prior to vine desiccation. This may perpetuate skinning and tuber early blight problems in storage.

Irrigation: Interval at the maximum ET is 2.5-3 days. Drought tolerance is moderate.

Pest control

Weeds: Competes well with weeds. Silverton Russet is sensitive to metribuzin (Sencor, Lexone) applications.

Insects: Standard insect control measures generally are effective, but timing and rotation of appropriate control is important due to high aphid preference and virus spread.

Fungicides: Frequency of fungicide applications is the same as for other popular russet cultivars. Silverton may be slightly more susceptible to foliar early blight, so adequate protection is warranted.

Tuberization/bulking: Silverton sets about 8 tubers per plant. Tubers are set in the middle of the hill. Tuber initiation and bulking rate are medium. Heat runners may develop if soil temperatures are high during the late vegetative and tuber bulking phases. Silverton is moderately resistant to blackspot bruise.

Vine kill: Average days from planting to vine kill are 115-120. Vine killing is required, particularly if nitrogen applications have exceeded requirements. Adequate skin set occurs within 21 days.

STORAGE MANAGEMENT

Silverton Russet stores well. It is imperative that producers minimize bruising to prevent tuber early blight from developing within the storage. Movement from storage would fit the same window as Russet Norkotah, in terms of marketing.

DISEASE REACTION

Bacterial ring rot foliar expression is adequate and occurs within 90 days after planting.

Field

Foliar early blight	Susceptible
<i>Verticillium</i> wilt	Unknown
Blackleg	Susceptible
Seedpiece decay	Susceptible
Leafroll virus	Susceptible
Leafroll net necrosis	Unknown
PVY	Very Susceptible – Can be latent early season
PVX	Susceptible
Common scab	Unknown
Bacterial ring rot	Susceptible

Storage

Tuber early blight	Susceptible
Bacterial soft rot	Susceptible
<i>Fusarium</i> dry rot	Susceptible
<i>Pythium</i> leak	Unknown
Pink rot (<i>Phytophthora</i>)	Unknown
Silver scurf	Unknown
<i>Rhizoctonia</i> scurf	Susceptible

Disease reaction ratings = susceptible, moderately susceptible, moderate, moderately resistant and resistant.
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