

# Management Recommendations for Umatilla Russet

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## Introduction

Umatilla Russet was named by Oregon and jointly released by Oregon, Washington, Idaho and the ARS/USDA in the spring of 1998. It was tested as AO82611-7, an Oregon selection from an Aberdeen ARS cross between Butte and A77268-4 performed by Dr. J.J. Pavek.

## Plant and Tuber Characteristics

Compared to Russet Burbank, Umatilla vines are slightly smaller and produce a distinctively rounded canopy. Flowers are sparse and vary in color from whitish lavender to reddish-purple with the darker phase predominant. White-flowered mutants apparently occur on rare occasions. Umatilla averages slightly fewer stems/plant than R. Burbank and vines mature slightly earlier.

Umatilla tubers tend to be slightly larger (Table 1), blockier, more russeted, darker, and more shallow-eyed than Russet Burbank (Table 4, 5). Umatilla is much less susceptible to second growth and other external defects;

however, tubers are sometimes tapered toward the bud end in some locations. Umatilla is susceptible to shatter and pressure bruise and appears to be slightly more susceptible to blackspot bruise than Russet Burbank but relatively resistant to hollow heart, brown center, and internal brown spot; second growth has occasionally been reported.

## Yield and Gradeout

Umatilla total yields range from 8% below to 5% above Russet Burbank. U.S. No. 1's average 15 to 25% higher than Russet Burbank, depending on local conditions, because of better tuber uniformity (Tables 1,2,3).

## Processing and Culinary Quality

Umatilla Russet is an excellent choice for frozen processing. Tuber specific gravity is consistently higher and more uniform than Russet Burbank and fry color is lighter from both 40F and 50F storage (Table 1). Fry color holds up well throughout the storage season with good sprout control. Umatilla fry

color within tubers tends to be more uniform than Russet Burbank. Taste panel tests have rated flavor and texture of Umatilla to be at least as good as or better than Russet Burbank.

Umatilla Russet typically has dextrose and sucrose levels similar to those of Russet Burbank, slightly higher protein and vitamin C levels and lower total glycoalkaloids (Table 8).

### **Seedpiece Spacing**

Umatilla tubers are only slightly larger than those of Russet Burbank. Therefore, spacing recommendations for R. Burbank should generally work well for Umatilla. Specific spacing requirements will depend on local growing needs and intended crop use. Long growing seasons generally require relatively close spacing to combat increased tuber size. Seed growers typically use closer spacing than commercial growers in order to produce smaller, more desirable seed.

### **Fertilization**

Tuber yield potential, growing conditions and irrigation methods strongly influence nitrogen requirements. Trials at the Klamath (short season), Ontario (long season, heavy soils), and Hermiston (long season, light soils) experiment stations using typical production and irrigation regimes showed yields to level off at about 150, 200, and 240 lbs./acre of nitrogen, respectively. Russet Burbank responds very similarly. It appears, therefore, that R. Burbank nitrogen recommendations will generally work well for Umatilla Russet.

Information on Umatilla response to phosphorus and potassium rates is not yet available. We suspect that typical Russet Burbank rates should work well for Umatilla.

### **Irrigation**

Umatilla responds well to irrigation regimes developed for Russet Burbank. Tubers are

generally quite resistant to sugar-ends. Umatilla is much less susceptible than Russet Burbank to tuber shape and physiological problems induced by moisture stress.

### **Pest and Disease Control**

Umatilla has shown useful resistance to late blight tuber infection in Corvallis field trials (Table 7). It also appears to be: resistant to metribuzin injury, common scab and net necrosis from PLRV; moderately resistant to *Verticillium* wilt and PVY; susceptible to *Fusarium* dry rot and bacterial soft rot; moderately susceptible to early blight; and very susceptible to potato leafroll virus (PLRV) (Table 6).

Although Umatilla is resistant to visible net necrosis, cooked fries from leaf-roll infected tubers may produce brown strands reminiscent of the disorder. Despite resistance to net necrosis, good aphid control is recommended to prevent the spread of viruses to other varieties.

In general, pest and disease control recommendations for Russet Burbank will work even better with Umatilla.

### **Vine Killing and Harvest**

Thorough vine kill, good tuber skin set and bruise free harvest/handling methods will help assure success. Umatilla Russet is susceptible to *Fusarium* dry rot and bacterial decay caused by mechanical injury.

### **Storage**

Umatilla Russet has a shorter storage dormancy than Russet Burbank and will require sprout control if stored beyond January. Untreated Umatilla tubers stored at 45F at the Hermiston Agricultural Research and Extension Center typically produce sprouts up to 3 inches long by mid-March while Russet Burbank tubers are just beginning to “peep”.

**Related References:**

1. Rykbost, K.A., and J. Maxwell. 1995. Potato cultivar response to seed spacing and nitrogen fertilizer rates. Crop research in the Klamath Basin, 1994. Oregon State University AES Special Report 949.
2. Shock, Clint, Erik Feibert, and Monty Saunders. 1994. Irrigation management for potato varieties: Variety tolerance to deficit irrigation. Oregon State University AES Special Report 936. pp. 70-81.
3. Shock, Clint, Erik Feibert, and Monty Saunders. 1995. Cultural practices for new potato varieties. Part I. Irrigation management for potato varieties: variety tolerance to deficit irrigation. Oregon Potato Commission, 1994-1995 Research Progress Reports: pp 112-120.
4. Shock, Clint, Erik Feibert, and Monty Saunders. 1995. Cultural practices for new potato varieties. Part I. Nitrogen fertilization for potato varieties grown under sprinkler irrigation, 1994 trial. Oregon Potato Commission, 1994-1995 Research Progress Reports: pp 112-120.

Table 1. Yield and quality characteristics of Umatilla Russet, Russet Burbank, and Russet Norkotah in Western Regional Trials, 1989 - 1991<sup>1</sup>

Entry	Year	Yield, cwt/a					% US No. 1	Oz./Tuber	Fry Color <sup>2</sup>	Spec. Grav.
		Total	US No. 1 4-12 oz	US No. 1 >12 oz	US No. 1 Total	<4 oz				
AO82611-7	89	468	250	103	353	NA	75	NA	1.8	1.084
	90	537	318	61	379	113	69	6.0	1.6	1.087
	91	472	288	67	355	54	75	5.8	1.1	1.087
	Avg.	492	285	77	362	84	73	5.9	1.5	1.086
R. Burbank	89	476	227	67	294	NA	61	NA	1.9	1.081
	90	489	235	43	278	112	56	4.5	1.9	1.076
	91	463	249	45	294	72	63	5.9	1.3	1.080
	Avg.	476	237	52	289	92	60	5.2	1.7	1.079
R. Norkotah	90	386	244	46	290	81	71	5.0	2.6	1.067
	91	325	219	38	257	25	79	5.5	2.0	1.074
	Avg.	356	232	42	274	53	75	5.3	2.3	1.071

<sup>1</sup> Locations: California, Colorado, Idaho, New Mexico, Oregon, Texas, Washington

<sup>2</sup> Values based on: 0.0 = light; 4.0 = dark

Table 2. Yield and quality characteristics of Umatilla Russet, Russet Burbank, and Russet Norkotah in Oregon Statewide Trials, 1988 - 1997<sup>1</sup>

Entry	Total	Yield, cwt/a				US No. 1	Oz./Tuber	Fry Color <sup>2</sup>	Spec. Grav.
		US No. 1	US No. 1	US No. 1	<4 oz				
AO82611-7	519	297	107	404	61	78	7.3	0.8	1.084
R. Burbank	515	278	55	333	85	65	6.5	1.0	1.081
R. Norkotah	407	249	83	332	50	82	7.1	1.3	1.070

<sup>1</sup> Locations: Hermiston, Powell Butte, Klamath Falls, Ontario

<sup>2</sup> Values based on 0.0 = light, 4.0 = dark

Table 3. Physiological defects in Umatilla Russet and Russet Burbank in Tristate Trials, 1988<sup>1</sup>

Entry	Loc.	Internal Defects <sup>2</sup>				External Defects <sup>3</sup>		
		HH	BC	IBS	Sugar Ends	K	GC	SB
		-----%-----				-----Rating Scale <sup>4</sup> -----		
AO82611-7	ID	5.0	0.0	0.0	4.0	4.0	4.8	2.8
	OR	0.0	0.0	3.0	0.0	----	5.0	5.0
	WA	4.0	0.0	0.0	----	3.0	3.0	5.0
	Avg.	3.0	0.0	1.0	2.0	3.5	4.3	4.3
R. Burbank	ID	5.0	2.0	0.0	38.0	4.0	4.2	2.6
	OR	11.0	21.0	0.0	0.0	----	5.0	5.0
	WA	6.0	4.0	5.0	----	3.0	3.0	5.0
	Avg.	9.0	9.0	2.0	19.0	3.5	4.1	4.2

<sup>1</sup> Locations: Aberdeen, ID; Hermiston, OR; Othello, WA

<sup>2</sup> HH = Hollow Heart; BC = Brown Center; IBS = Internal Brown Spot

<sup>3</sup> K = Knobs; GC = Growth Cracks; SB = Shatter Bruise

<sup>4</sup> Scale: 1 = Severe, 5 = none

Table 4. Morphological characteristics of Umatilla Russet, Russet Burbank, and Russet Norkotah in Western Regional Trials, 1989 - 1991<sup>1</sup>

Entry	Year	Vine Size <sup>2</sup>	Vine Mat. <sup>3</sup>	Stems/ Hill	Tuber Shape <sup>4</sup>	Degree Russ. <sup>5</sup>	Skin Color <sup>6</sup>	Eye Depth <sup>7</sup>
AO82611-7	89	3.6	2.9	-----	4.0	3.4	4.0	3.5
	90	3.5	3.3	2.6	4.3	3.8	4.5	3.8
	91	3.9	2.6	2.6	4.3	3.2	4.0	3.3
	Avg.	3.7	2.9	2.6	4.2	3.5	4.2	3.5
R. Burbank	89	3.6	2.9	-----	4.3	3.3	4.0	4.0
	90	3.7	3.4	3.1	4.4	3.4	4.3	3.3
	91	3.9	3.0	2.5	4.4	3.2	4.0	2.7
	Avg.	3.7	3.1	2.8	4.4	3.3	4.1	3.3
R. Norkotah	90	4.0	1.9	2.7	4.0	3.8	4.0	-----
	91	3.3	1.1	2.6	4.3	4.2	4.0	3.3
	Avg.	3.7	1.5	2.7	4.2	4.0	4.0	3.3

<sup>1</sup> Locations: California, Colorado, Idaho, New Mexico, Oregon, Texas, Washington

<sup>2</sup> Vine Size: 1.0 = small, 5.0 = large

<sup>3</sup> Vine Maturity: 1.0 = early, 5.0 = late

<sup>4</sup> Tuber Shape: 1.0 = round, 5.0 = long, narrow

<sup>5</sup> Russetting: 1.0 = light, 5.0 = heavy

<sup>6</sup> Skin Color: 2.0 = white, 3.0 = buff, 4.0 = brown, 5.0 = dark brown

<sup>7</sup> Eye Depth: 1.0 = deep, 5.0 = shallow

Table 5. Morphological Characteristics of Umatilla Russet, Russet Burbank, and Russet Norkotah in Oregon Statewide Trials, 1989 - 1991<sup>1</sup>

Entry	Vine Size <sup>2</sup>	Vine Mat. <sup>3</sup>	Tuber Shape <sup>4</sup>	Degree Russ. <sup>5</sup>	Skin Color <sup>6</sup>	Eye Depth <sup>7</sup>	Size Unif. <sup>8</sup>	Shape Unif. <sup>9</sup>	L/W Ratio <sup>10</sup>
AO82611-7	2.7	3.1	4.4	3.7	4.1	3.8	3.3	3.6	1.82
R. Burbank	2.5	2.9	4.5	3.6	4.0	3.5	3.1	3.1	1.87
R. Norkotah	3.4	2.5	4.4	4.1	4.4	3.8	3.8	4.2	1.74

<sup>1</sup> Locations: Hermiston, Powell Butte, Klamath Falls, Ontario

<sup>2</sup> Vine Size: 1 = large; 5 = small

<sup>3</sup> Vine Maturity: 1.0 = early, 5.0 = late

<sup>4</sup> Tuber Shape: 1.0 = round, 5.0 = long, narrow

<sup>5</sup> Russetting: 1.0 = light, 5.0 = heavy

<sup>6</sup> Skin Color: 2.0 = white, 3.0 = buff, 4.0 = brown, 5.0 = dark brown

<sup>7</sup> Eye Depth: 1.0 = deep, 5.0 = shallow

<sup>8</sup> Size Uniformity: 1.0 = poor, 3.0 = fair, 5.0 = excellent

<sup>9</sup> Shape Uniformity: 1.0 = poor, 3.0 = fair, 5.0 = excellent

<sup>10</sup> Length to Width Ratio: 1.0 = round, 2.0 = long

Table 6. Disease reactions for Umatilla Russet, Russet Burbank, and Russet Norkotah in Western Regional Trials, 1989 - 1991<sup>1</sup>

Entry	Year	Vert. Wilt	Early Blight	PLRV	PVY	Common Scab	Net Necrosis
AO82611-7	89	MS/MS	S/MS	VS	MS	R/MR	MR
	90	MR	MS/MS	----	----	R	R
	91	MR/MR	MR/S	VS	MR	R/MR	R/MS
R. Burbank	89	MS	MS/MS	----	----	R	S
	90	S	S	----	----	R	S
	91	MS	MS	----	----	R	S
R. Norkotah	90	VS	VS	----	----	R	----
	91	VS/VS	VS/VS	S	MR	R/R	R

<sup>1</sup>Field ratings at Prosser, WA and Aberdeen, ID. Where two readings are shown, the second is typically from Aberdeen.

Table 7. Late blight infection under unprotected field conditions at Corvallis, Oregon, 1997

Entry	Foliar Rating <sup>1</sup>	% Tuber Infection <sup>2</sup>	Decay Index <sup>3</sup>
AO82611-7	100.0	2.5	0.5
R. Burbank	93.8	10.0	1.8
Ranger Russet	95.0	42.5	4.8
R. Norkotah	97.5	27.5	4.8
Atlantic	90.0	7.5	1.3
LSD (0.05) <sup>4</sup>	12.9	19.2	3.5

<sup>1</sup>Foliar injury rating: 0 = 0%; 100 = 100% of leaf surface necrotic on 9/4/97.

<sup>2</sup>Percent of tubers showing late blight infection based on 10 randomly selected tubers/plot.

<sup>3</sup>Tuber decay severity rating (including secondary bacterial infection): 1= no infection; 10 = severe infection.

<sup>4</sup>LSD's based on 27 original entries.

Table 8. Relative tuber composition of Umatilla Russet, Russet Burbank, and Russet Norkotah at Aberdeen, Idaho<sup>1</sup>

Entry	% Oven Dried Solids	% DWB			Mg/100 g FWB	
		Dextrose	Sucrose	Protein	Vitamin C	Total Glycoalkaloids
AO82611-7	22.4	0.21	0.58	5.9	22.0	1.1
R. Burbank	22.8	0.21	0.50	4.8	17.7	3.6
R. Norkotah	19.5	0.19	0.18	4.9	21.2	1.9

<sup>1</sup> Data courtesy Dr. Dennis Corsini, ARS/USDA