

## **Classic Russet Potato Yield and Quality in Response to Vine Kill Timing and Soil Moisture Prior to Harvest**

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**Introduction:** Classic Russet is a recently released fresh market variety with higher yield potential, improved disease resistance, and lower input requirements compared to Russet Norkotah. On the flip side, Classic Russet is more susceptible to shatter bruise, white-knot bruise, and blackspot bruise. These bruise problems have limited grower adoption in Tulelake. Recommendations to minimize Classic Russet bruising issued by the breeders include: completing N fertilizer applications 30 days prior to harvest, allowing at least 21 days after vine kill prior to harvest, and gradually reducing available soil moisture (ASM) to 65% during the last couple of weeks prior to vine kill to achieve medium tuber turgidity at harvest.

This study evaluated how vine kill timing and soil moisture influence Classic Russet bruising under Tulelake growing conditions. Tuber yield and tuber defects were evaluated at harvest. Blackspot and white-knot bruise were evaluated post-harvest by hand-peeling tubers after 55 days in storage at 40 degrees F. Vine kill treatments included rolling vines and then spraying them with a desiccant 5, 4, and 3 weeks prior to harvest. Irrigation treatments included keeping soil on the drier side, (60 to 65% Available Soil Moisture ASM), and wetter side (75 to 80% ASM) between vine kill and harvest. Soil moisture was monitored using water-mark sensors placed 9 and 12 inches deep in potato hills.

### **Trial Information**

<b>Location:</b>	IREC, Tulelake, CA
<b>Soil Type:</b>	Tulebasin mucky silty clay loam with 4.2% organic matter
<b>Planting Date:</b>	May 14, 2013
<b>Harvest Date:</b>	October 2, 2013
<b>Harvest Pulp Temperature:</b>	55 degrees F
<b>Irrigation:</b>	Solid-set sprinklers
<b>Plot Size:</b>	2 rows (6 ft) wide by 30 ft long

<b>Vine Kill:</b>	5 week prior to harvest-August 28, 2013; 4 week prior to harvest-September 4, 2013; 3 week prior to harvest- September 11, 2013
<b>Days to Vine Kill:</b>	5 Week prior to harvest- 104 days, 4 week prior to harvest- 110 days, 3 week prior to harvest- 117 days
<b>In-Row Seed Spacing:</b>	10.0 inches
<b>Number of Replications:</b>	4
<b>Fertilizer per Acre:</b>	139 lbs N, 40 lbs P2O5, 100 lbs K2O, 36 lbs S
<b>Seed Treatment:</b>	Agri-Fill Premium Fir Bark Dust, Maxim 4FS
<b>Weed Control:</b>	Cultivation, Prowl, Outlook, Roundup (pre-emergence) and Matrix (post-emergence)
<b>Fumigation:</b>	Fall-applied Vapam
<b>Insecticides:</b>	Admire Pro (in-furrow) and Movento
<b>Fungicides:</b>	Quadris (in-furrow), Quadris and Bravo Weatherstik
<b>Vine Kill Method:</b>	Rolling vine and two applications of Reglone spaced 7 days apart

### **Results**

Waiting to kill potato vines 3 weeks before harvest produced higher total yield, US #1 yield, and tuber size compared to killing potato vines 5 weeks before harvest in 2012, but soil moisture and vine kill treatments had little influence on potato yield in 2013 (Table 1). Keeping soil moisture wetter and delaying vine kill had a tendency to increased yield and tuber size in 2013, but the differences in treatments were not statistically significant.

Killing vines 5 weeks before harvest decreased blackspot bruise, white knot bruise, and skinning compared to killing vines 3 weeks before harvest in 2012. Maintaining soil moisture near 80% ASM decreased blackspot bruise compared to the drier soil moisture treatment (65% ASM) in 2012. Classic Russet had a high incidence of shatter bruise, blackspot bruise, and white knot bruise in 2013, but bruising incidence and severity did not differ between treatments (Table 2).

**Table 1: Influence of Vine Kill Date and Irrigation after Vine Kill on Classic Russet Yield at IREC in 2013**

		Tuber Yield (cwt/acre)							Total	Tubers/ Plant	Avg Tuber Size (oz)	% Stand
		U.S No. 1's (cwt)										
		Total 1's	12-16 oz	8-12 oz	4-8 oz	<4oz	>16oz	Culls & 2s				
Soil	75 to 80% ASM at harvest <sup>a</sup>	335	48	132	134	33	22	36	418	5.8	7.15	93
Moisture	60 to 65% ASM at harvest	314	46	111	146	41	10	33	391	6.3	6.59	87
	95% Confidence interval	NS	NS	NS	NS	NS	NS	NS	17	NS	NS	NS
Vine Kill	5 Weeks Before Harvest <sup>b</sup>	305	49	127	121	35	8	31	379	5.5	6.97	92
	4 Weeks Before Harvest	328	58	115	141	33	13	33	402	5.8	6.93	92
	3 Weeks Before Harvest	325	53	137	125	39	10	29	402	5.8	6.89	92
	95% Confidence interval	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

<sup>a</sup> After vine kill, soil moisture was maintained at different Available Soil Moisture (ASM) levels until harvest. Soil moisture treatments were only evaluated for the 4 week after vine kill timing.

<sup>b</sup> 5 week before harvest vine kill was 8/28/2013; 4 week before harvest vine kill was 9/4/2013; 3 week before harvest vine kill was 9/11/2012. Harvest date was October 2nd.

Reglone was used to kill vines. Reglone was re-applied 7 days after initial application in all plots to assure complete vine kill.

**Table 2: Influence of Vine Kill Date and Irrigation after Vine Kill on Classic Russet Bruising at IREC in 2013.**

		Shatter	Shatter	Cull	Ruptured	Blackspot Bruise		Blackspot Bruise		White Knot Bruise		White Knot Bruise		
		% Incidence <sup>1</sup>	Bruise Severity <sup>2</sup>	% Incidence <sup>3</sup>	Lenticil Severity <sup>2</sup>	Skinning Severity <sup>2</sup>	% Incidence <sup>1</sup>	118 Day	% Incidence <sup>1</sup>	118 Day	% Incidence <sup>1</sup>	118 Day	% Incidence <sup>1</sup>	118 Day
Soil	75 to 80% ASM at harvest <sup>a</sup>	48	4.13	9.3	3.63	4.13	40	30	3.88	4.05	21	25	4.25	3.85
Moisture	60 to 65% ASM at harvest	63	3.50	8.3	3.63	3.50	43	19	3.88	4.15	14	23	4.56	3.83
	95% Confidence interval	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vine Kill	5 Weeks Before Harvest <sup>b</sup>	68	3.25	8.7	3.38	4.00	34	33	4.38	3.48	18	25	4.44	3.15
	4 Weeks Before Harvest	65	3.63	8.7	3.75	4.00	41	33	3.81	3.40	25	29	4.19	3.47
	3 Weeks Before Harvest	61	3.25	7.4	3.75	3.63	38	35	4.00	3.52	25	34	4.06	3.15
	95% Confidence interval	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

<sup>1</sup> 20 tubers per plot were evaluated for bruising. Shatter, Ruptured Lenticil, and Skinning were evaluated at harvest. Blackspot and Whiteknot were estimated

55 and 118 days after storage at 40 degrees F. Potatoes were hand-peeled before estimating Blackspot and Whiteknot Bruise. Pulp temperatures were 55 degrees F at harvest.

<sup>2</sup> 1 to 5 severity scale, 5= no incidence/least severe.

<sup>3</sup> Percent of tubers from each plot.

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