

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. The problems with bruising have limited grower adoption in Tulelake. Recommendations to minimize Classic Russet bruising issued by the Tri-State Breeding Program 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 bruising were evaluated postharvest by hand-peeling tubers after 55 days in storage at 40 degrees F. Vine kill treatments included rolling vines and then spraying them with the desiccant, Reglone 3 or 5 weeks prior to harvest. Irrigation treatments included normal irrigation cut-off at the time of vine kill (65% Available Soil Moisture ASM) and continued irrigation after vine kill to maintain soil moisture near (75 to 80% ASM). Soil moisture was monitored using water-mark sensors placed 8 and 16 inches deep in potato hills.

Trial Information

Location: IREC, Tulelake, CA

Soil Type: Tulebasin mucky silty clay loam with 4.2% organic matter

Planting Date: May 10, 2012

Harvest Date: October 12, 2012

Tuber Pulp Temperature at Harvest: 55-65 degrees F

Fertilizer: 204-68-14-37S; N Management- 50% pre-plant and 50% from tuber initiation until mid-bulking; last N application occurred 61 days before harvest.

Irrigation: Solid-set sprinklers

Plot Size: 2 rows (6 ft) wide by 30 ft long

Trial Information Cont.

In-Row Spacing: 10.0 inches

Row Spacing: 36 inch spacing

Herbicides: Matrix and metribuzin

Insecticides: Admire Pro

Fungicides: Moncut, Bravo Weather Stick and Manzate

Number of Reps: 4 replications

Vine Kill Treatments: 5 week prior to harvest- September 7, 2012; 3 week prior to harvest- September 21, 2012

Days from planting to Vine Kill: 5 Week prior to harvest- 117 days; 3 week prior to harvest- 131 days

Irrigation: Solid-set sprinklers

Results

Soil moisture and vine kill treatments influenced potato yield (Table 1). 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. Allowing Classic Russet to bulk for the two additional weeks increased US #1 yield nearly 150 cwt/A. Maintaining soil moisture near 80% ASM until harvest increased total yield compared to allowing soil to dry to 65% ASM regardless of vine kill date.

Killing vines 5 weeks before harvest decreased blackspot bruise, white knot bruise, and skinning compared to killing vines 3 weeks before harvest (Table 2). Maintaining soil moisture near 80% ASM decreased blackspot bruise compared to the drier soil moisture treatment (65% ASM). Soil moisture did not influence white knot bruising, skinning, and shatter bruise.

In summary, killing potato vines 5 weeks before harvest decreased the severity of blackspot bruise and white knot bruise compared to killing vines 3 weeks before harvest. Unfortunately, Tulalake growers will likely experience significantly lower yield of carton size tubers killing vines 5 weeks before harvest compared to their normal practice of killing vines 3 to 4 weeks before harvest because of Tulalake's short growing season. The yield reduction may not be a problem in other growing areas where weather allows growers to plant earlier or delayed harvest to accommodate the longer vine kill timing. Keeping soil moisture near 75 to 80% ASM until harvest may be another option for decreasing blackspot bruising. Surprisingly wetter soil did not increase the amount of swollen ruptured lenticels, skinning, or shatter bruise in 2012. This trial will be repeated in 2013.

Table 1: Influence of Vine Kill Date and Irrigation after Vine Kill on Classic Russet Yield at IREC in 2012

		Tuber Yield (cwt/acre)										
		U.S No. 1's (cwt)										
		Total 1's	12-16 oz	8-12 oz	4-8 oz	<4oz	>16oz	Culls	Total	Tubers/ Plant	Avg Tuber Size (oz)	% Stand
Irrigation	No irrigation after vine kill ^a	351	62	108	146	48	36	21	419	6.5	6.58	91
	Cut Off Irrigation after vine kill	384	67	128	144	42	46	27	452	6.6	7.22	88
	95% Confidence interval	NS	NS	NS	NS	NS	NS	NS	24	NS	0.02	NS
Vine Kill	5 Weeks Before Harvest ^b	293	26	93	167	58	7	13	364	6.7	5.58	90
	3 Weeks Before Harvest	441	102	142	123	32	74	35	508	6.4	8.21	89
	95% Confidence interval	31	12	17	19	6	13	8	25	NS	0.37	NS

^a At the time vinekill, soil moisture was between 80% and 90% available moisture. Irrigation after vinekill occurred 1 week after vinekill to maintain moisture near 80%.

^b 5 week before harvest vine kill spray date was 9/7/2012. 3 week before harvest vine kill spray date was 9/21/2012. Harvest date was October 12th.

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 2012.

		Shatter		% Blackspot		White		Ruptured		
		Shatter % ¹	Severity ²	Blackspot Bruise ¹	Severity ²	% White Knot ¹	Severity ²	% Total Cull ³	Lenticil Severity ²	Skinning Severity ²
Irrigation	No irrigation after vine kill ^a	89	2.59	50	3.56	24	4.16	5.4	2.75	3.13
	Cut Off Irrigation after vine kill	88	2.75	31	4.25	18	4.31	5.3	3.00	3.28
	95% Confidence interval	NS	NS	18	0.56	NS	NS	NS	0.21	NS
Vine Kill	5 Weeks Before Harvest ^b	88	2.44	34	4.16	9	4.75	4.1	2.97	3.47
	3 Weeks Before Harvest	88	2.91	48	3.66	33	3.72	6.5	2.78	2.94
	95% Confidence interval	NS	0.32	NS	0.45	12	0.49	1.3	NS	0.17

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

55 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.

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

³ Percent of tubers from each plot.

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