

Potato Agronomy Update: Summary of 2013

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Overview of Topics

- Variety trial
- Sustainable production of Trailblazer and ND8068-5Russ
- Off-label use of Matrix
- Dicamba Residues in Seed

Variety Trial



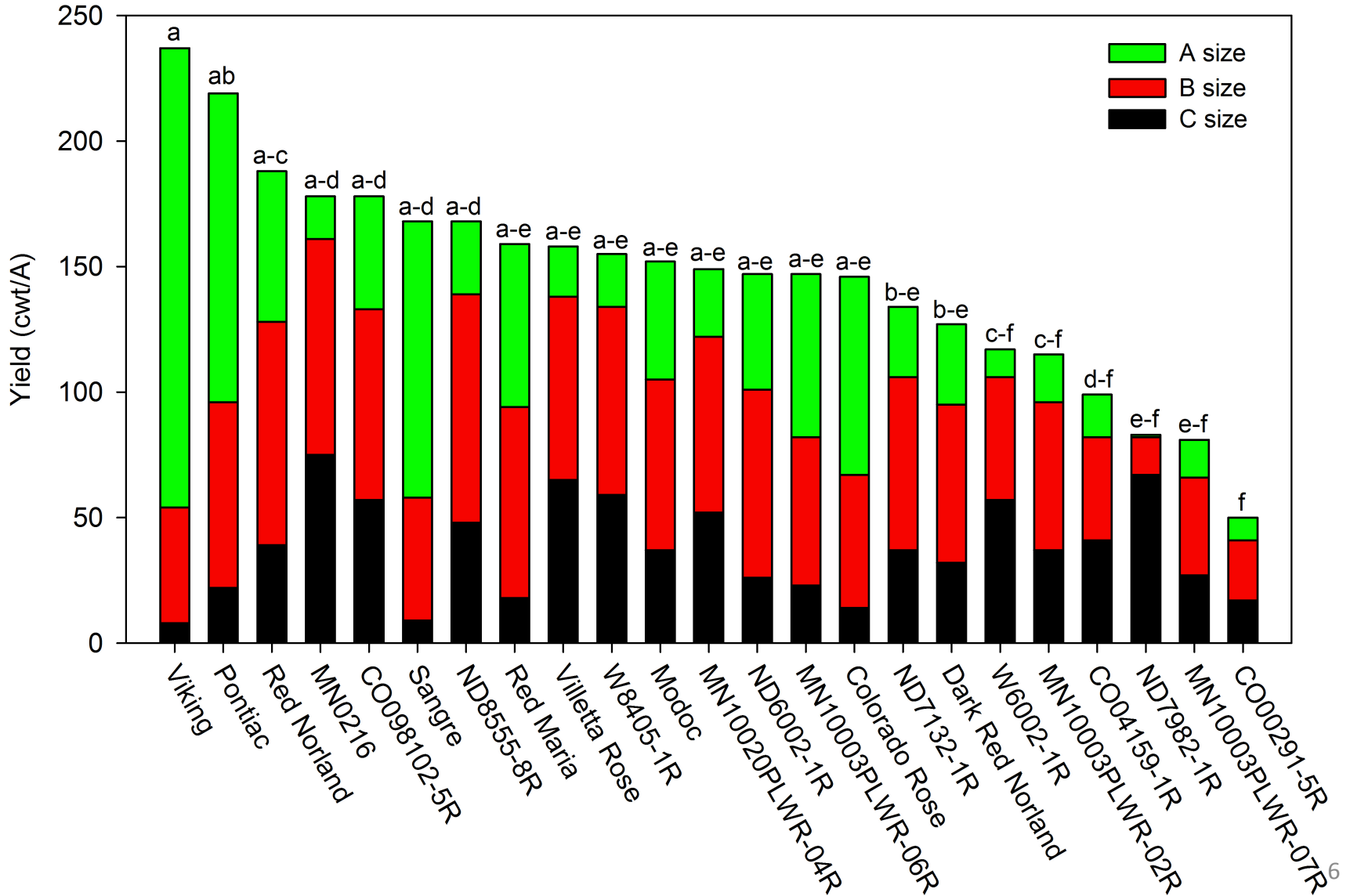
Variety Trial Procedures

- Location: Crystal, ND
- Planting date: 24 June 2013
- Within-row spacing: 9 inches
- Treatments: 23 red-skinned and 6 yellow-skinned cultivars
- Harvest: 17 October 2013

Red-skinned Cultivars

- CO00291-5R
- CO04159-1R
- CO098102-5R
- Colorado Rose
- Dark Red Norland
- MN0216
- MN10003PLWR-02R
- MN10003PLWR-06R
- MN10003PLWR-07R
- MN10020PLWR-04R
- Modoc
- ND6002-1R
- ND7132-1R
- ND7982-1R
- ND8555-8R
- Pontiac
- Red Maria
- Red Norland
- Sangre
- Viking
- Villetta Rose
- W6002-1R
- W8405-1R

Red-skinned Potato Yield



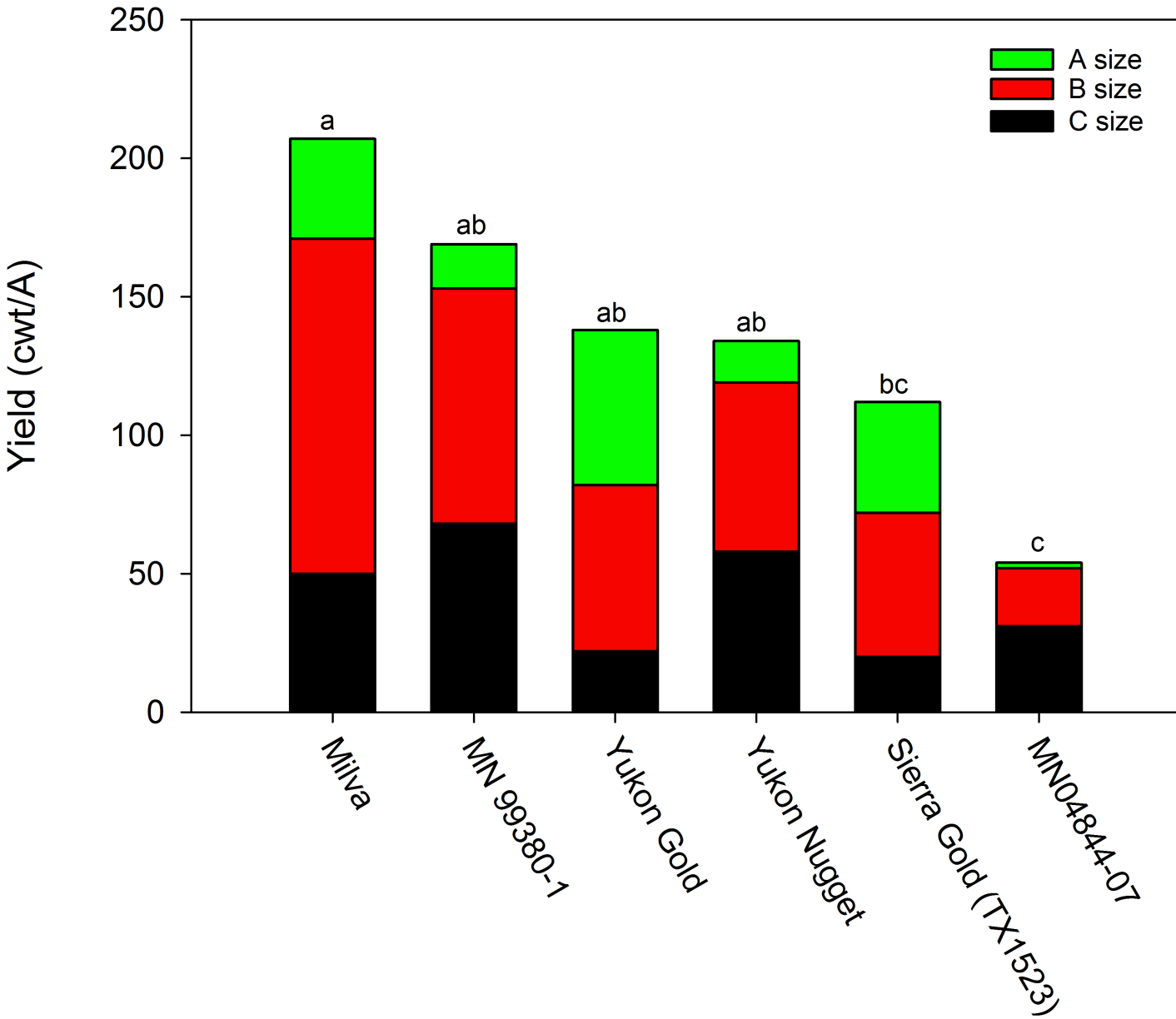
Red-skinned Tuber Yield

- Viking, Pontiac, and Sangre had a similar amount of A sized tubers (110-183 cwt/A).
- B sized tubers were similar across cultivars (40-90 cwt/A), except CO00291-5R and ND7982-1R had fewer B sized tubers than the other cultivars.

Yellow-skinned Cultivars

- Milva
- MN04844-07
- MN 99380-1
- Sierra Gold (TX 1523)
- Yukon Gold
- Yukon Nugget

Yellow-skinned Potato Yield



Yellow-skinned Tuber Yield

- A sized tubers were highest with Yukon Gold, Milva, and Sierra Gold (36-56 cwt/A).
- B sized tubers were similar for all cultivars, except MN04844-07 had fewer B-sized tubers.

Variety Trial Summary

- Growing conditions were difficult in 2013.
- Further research will help define which cultivars can withstand the environmental conditions in the Red River Valley from year to year.
 - We would like to bring new cultivars to the trial
- Pressure bruising testing is currently ongoing.

Sustainable production of Trailblazer and ND8068-5Russ



Procedures

- Location: Becker, MN
- Cultivars: Russet Burbank, Dakota Trailblazer, and ND8068-5Russ
- Irrigation: 50, 75, and 100% irrigation
- Planted: 10 May
- Harvested: 12 September

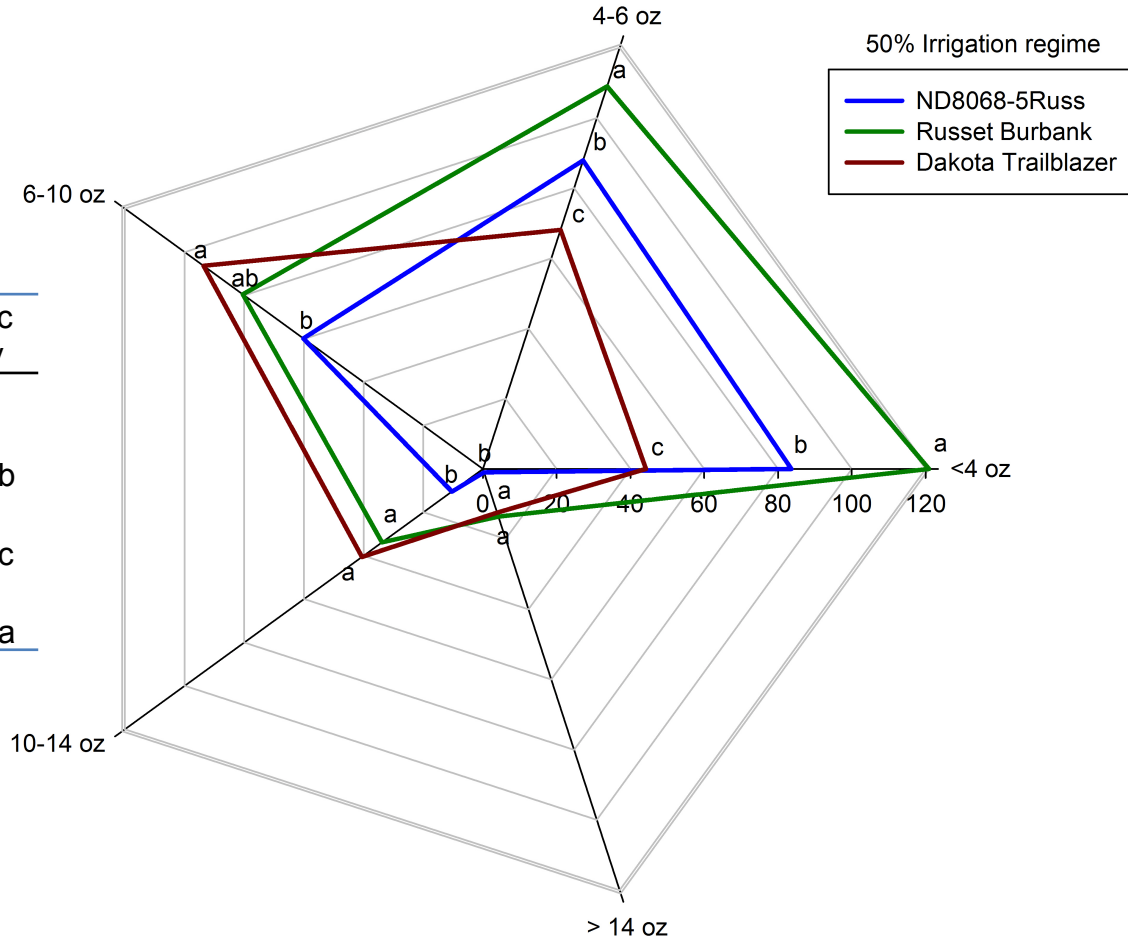
Precipitation & Irrigation

Total amount of moisture, through precipitation and irrigation on potatoes in 2013 in Becker, MN.

Irrigation regime	Precipitation	Irrigation	Total moisture	Percent of total moisture
	inches			%
100	7.68	11.8	19.48	100
75	7.68	8.98	16.66	85
50	7.68	6.55	14.23	73

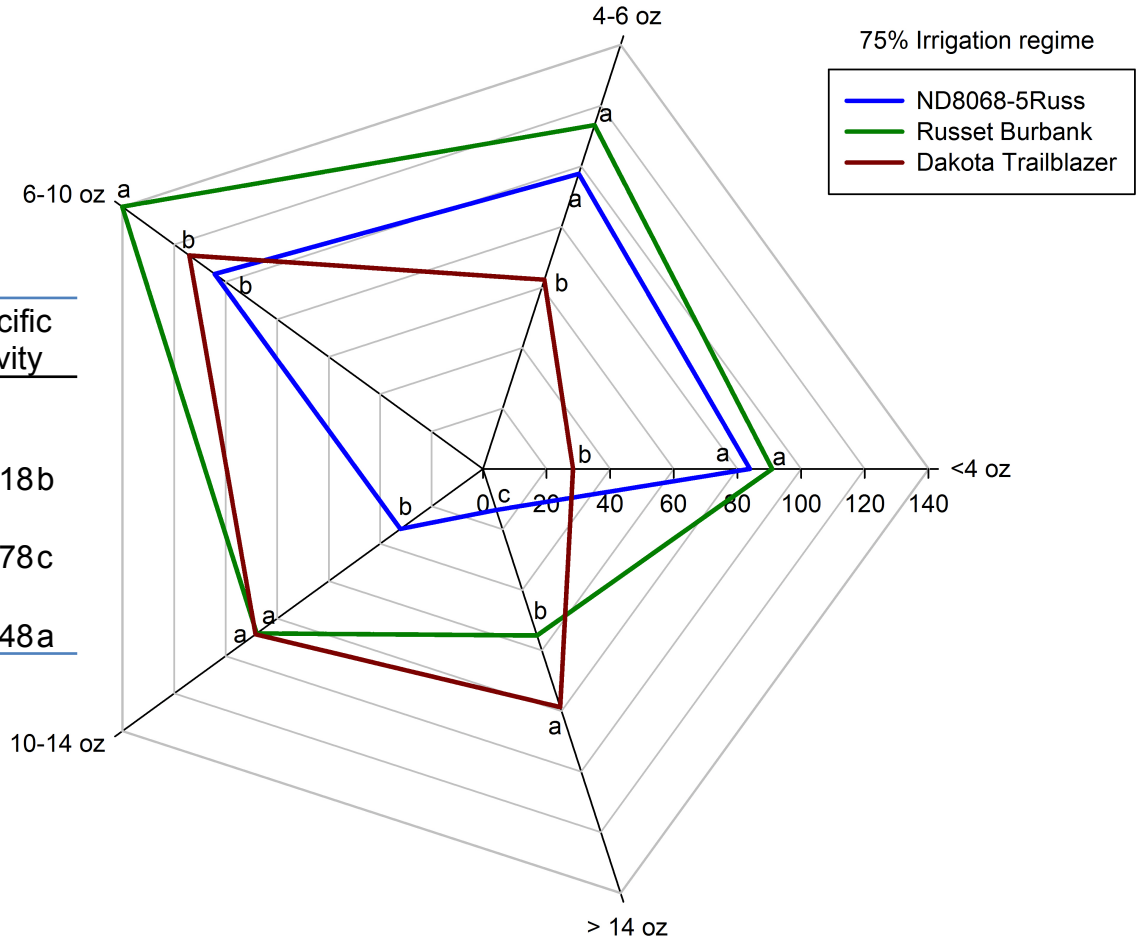
Yield at 50% Irrigation

Cultivar	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
ND8068-5				
Russ	161b	29b	4b	1.0894b
Russet Burbank	237a	34b	12ab	1.0820c
Dakota Trailblazer	215a	57a	20a	1.1035a



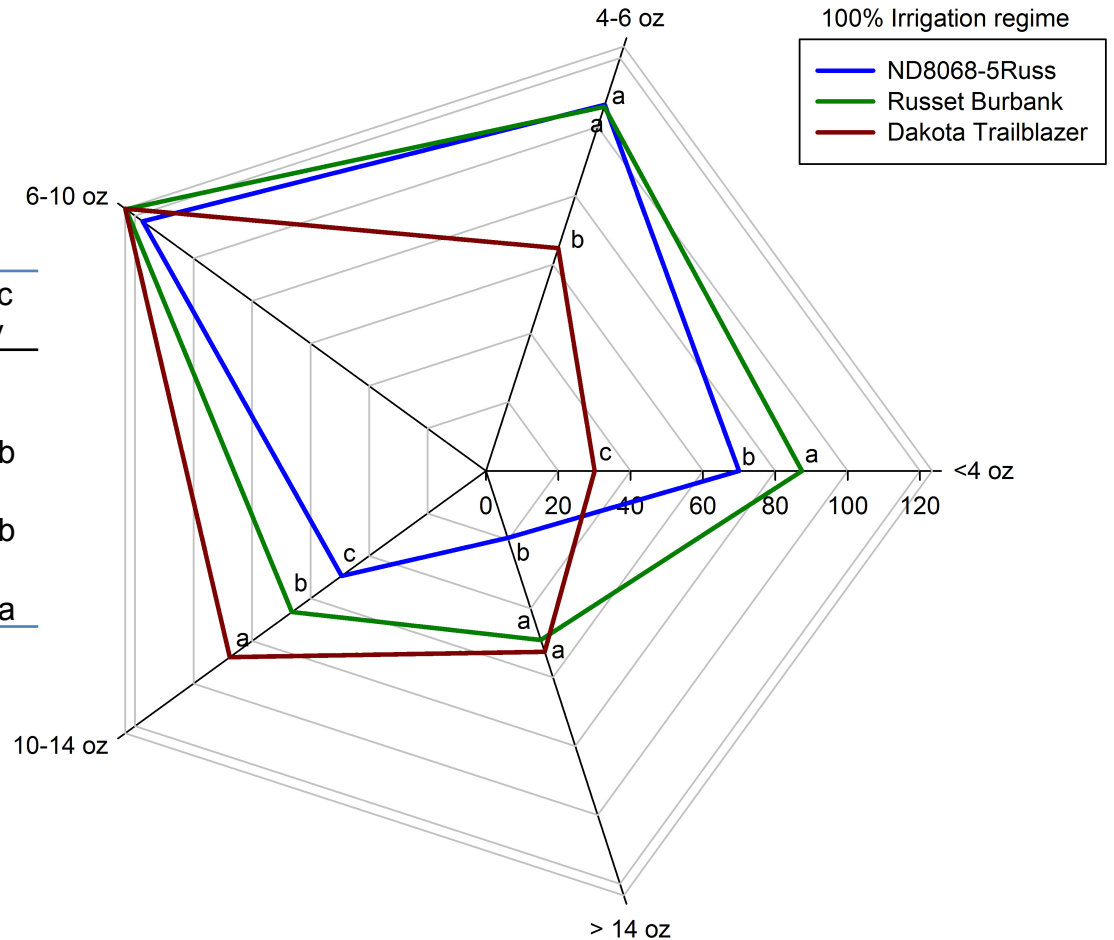
Yield at 75% Irrigation

Cultivar	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
ND8068-5 Russ	248c	45c	14c	1.0818b
Russet Burbank	397a	57b	28b	1.0778c
Dakota Trailblazer	344b	75a	45a	1.0948a



Yield at 100% Irrigation

Cultivar	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
ND8068-5 Russ	291b	50b	18c	1.0742b
Russet Burbank	345a	55b	27b	1.0726b
Dakota Trailblazer	328a	73a	39a	1.0899a

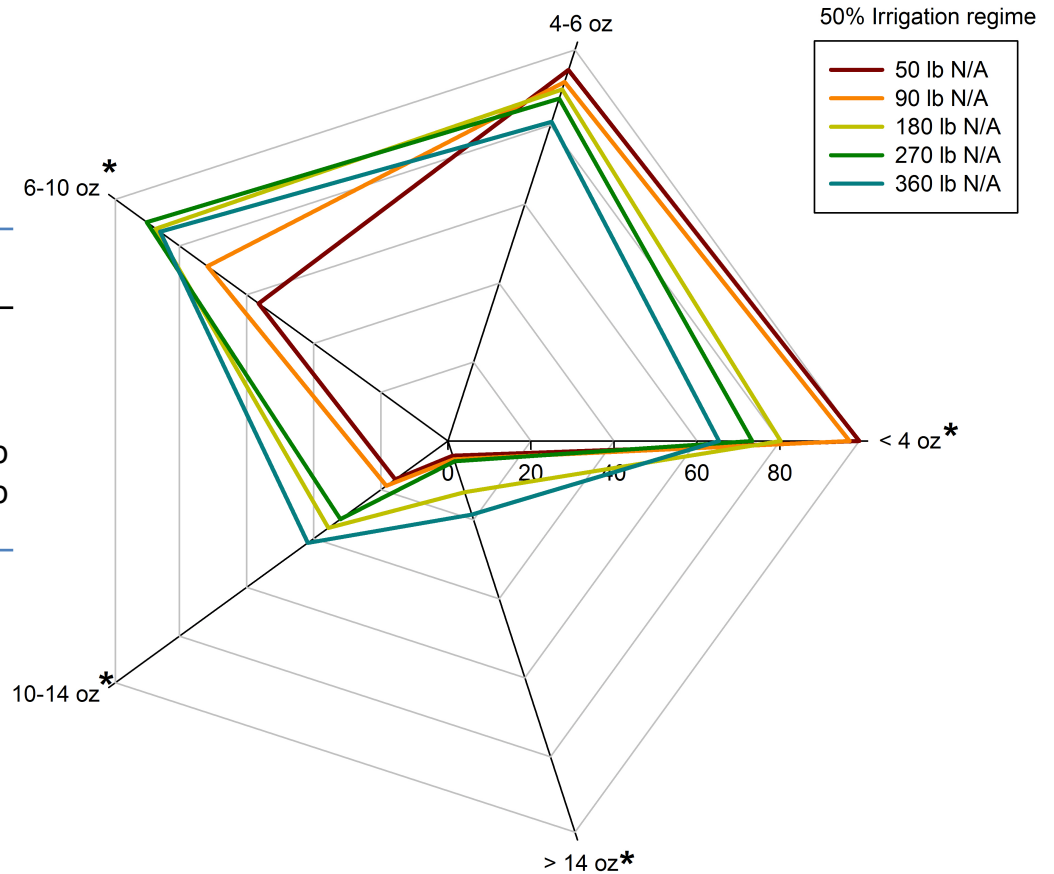


Within Irrigation Regimes

- Russet Burbank had the highest yield at each irrigation regime
- Dakota Trailblazer had the highest percentage of tubers > 6 oz
- Specific gravity was generally highest for Dakota Trailblazer, then ND8068-5Russ, and finally Russet Burbank.

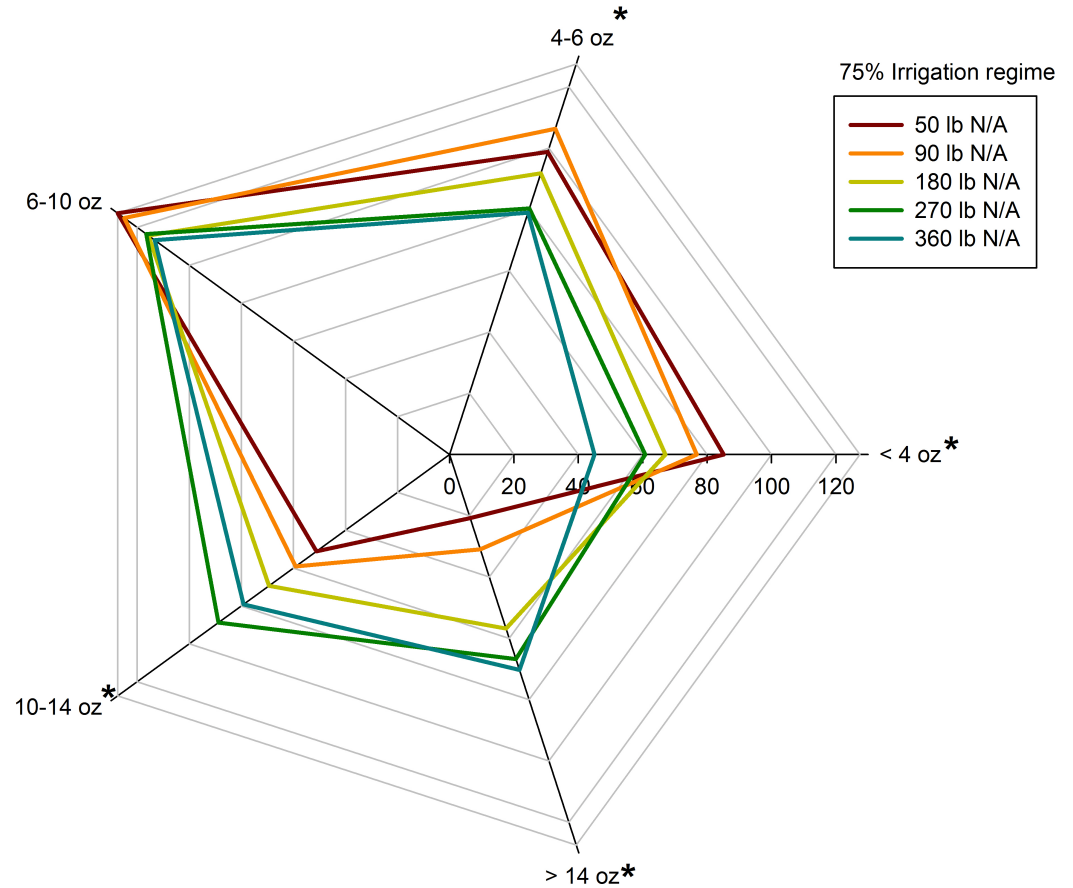
Nitrogen Rates at 50% Irrigation

Nitrogen lb N/A	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
50	170b	28c	7c	1.0944 a
90	186ab	34bc	8bc	1.0932 a
180	231a	45ab	16ab	1.0909ab
270	214ab	45a	13abc	1.0914 ab
360	227a	49a	20a	1.0884 b



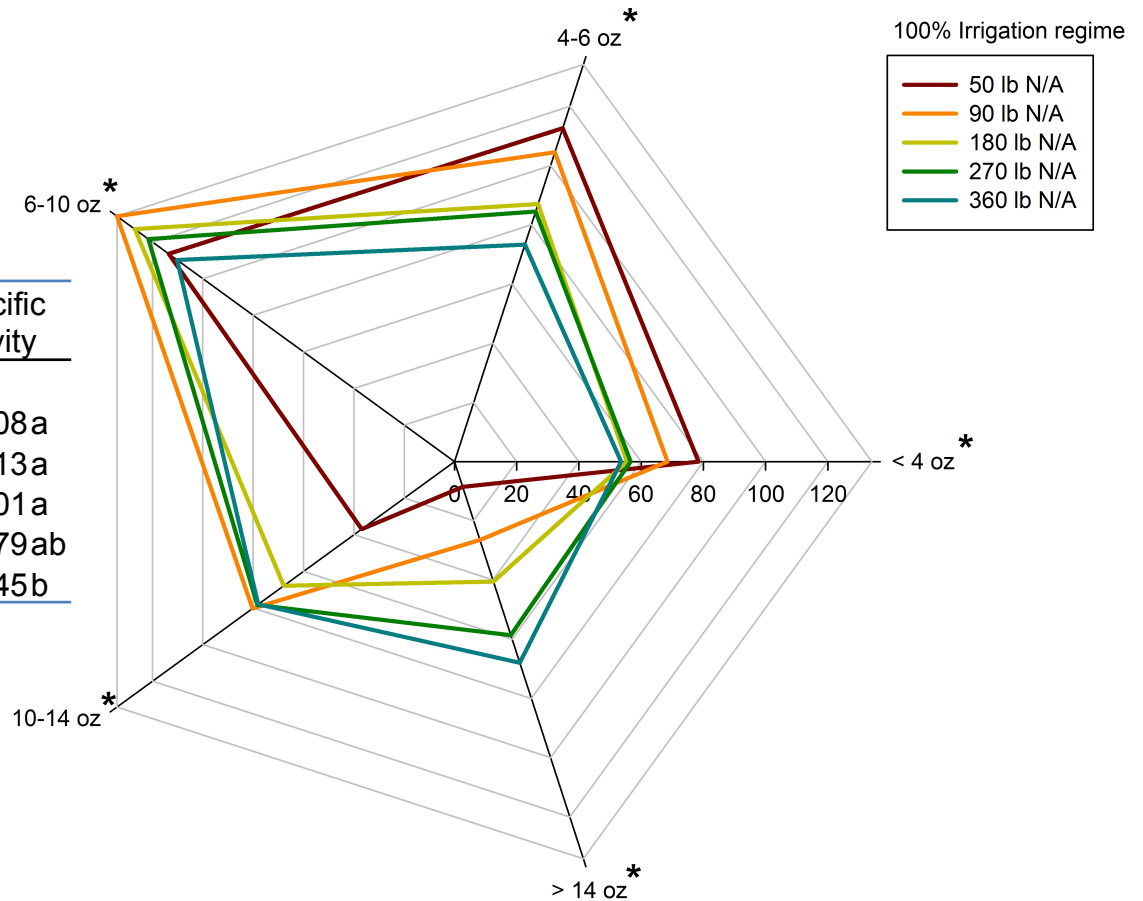
Nitrogen Rates at 75% Irrigation

Nitrogen lb N/A	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
50	298b	52c	19c	1.0881 a
90	321ab	54bc	23bc	1.0876 a
180	334ab	60ab	31ab	1.0843ab
270	352a	66a	37a	1.0834 b
360	342a	66a	36a	1.0814 b



Nitrogen Rates at 100% Irrigation

Nitrogen lb N/A	Total marketable cwt/A	>6 oz %	>10 oz %	Specific gravity
50	272b	45b	13d	1.0808a
90	345a	58a	25c	1.0813a
180	322a	63a	29bc	1.0801a
270	343a	65a	35ab	1.0779ab
360	328a	67a	39a	1.0745b



Effect of N at Irrigation Rates

- More nitrogen resulted in a numerically higher percentage of tubers > 6 oz.
- Lowest yield was a 50 lb N/A, but little response was found from 90 to 360 lb N/A.
- Specific gravity declined as nitrogen rate increased.



Effect of cultivar × nitrogen rate at 100% irrigation rates in 2013 in Becker, MN.

Cult N	0-4 oz	4-6 oz	6-10 oz	10-14 oz	>14 oz	Total	Total			Specific gravity
							marketable	>6 oz	>10 oz	
lb N/a	cwt/a					%				
ND 50	82	104 b	90 b	20	5 e	300 f	218 c	37	8	1.0776
ND 90	73	122 b	106 b	44	14 e	358 c-f	286 bc	46	16	1.0743
ND 180	73	96 ab	134 ab	51	21 de	375 b-e	302 abc	55	19	1.0759
ND 270	65	107 ab	138 ab	79	21 de	410 a-d	346 ab	58	24	1.0743
ND 360	58	104 ab	118 ab	54	36 b-e	361 b-f	310 abc	54	24	1.0692
RB 50	113	137 b	112 b	38	12 e	412 a-d	300 abc	39	12	1.0746
RB 90	98	124 ab	134 ab	81	37 b-e	473 a	375 a	53	25	1.0770
RB 180	72	107 ab	130 ab	67	33 b-e	408 a-d	336 ab	56	25	1.0736
RB 270	79	88 ab	121 ab	63	74 abc	426 abc	346 ab	61	32	1.0694
RB 360	75	73 ab	119 ab	82	90 a	440 ab	365 ab	66	39	1.0684
DT 50	41	97 ab	139 ab	52	9 e	338 def	297 abc	58	18	1.0903
DT 90	35	68 a	162 a	116	28 cde	409 a-d	375 a	74	35	1.0927
DT 180	21	59 ab	117 ab	86	68 a-d	350 def	329 ab	77	44	1.0908
DT 270	26	58 b	106 b	92	80 ab	363 c-f	337 ab	77	48	1.0901
DT 360	27	42 b	93 b	92	78 ab	332 ef	304 abc	79	51	1.0859

^a Abbreviation: Russet Burbank (RB), Dakota Trailblazer (DT), and ND8068-5Russ (ND).

^b Within columns, at each irrigation rate, means followed by the same letter are not significantly different according to Tukey pairwise comparison ($P \leq 0.05$). No letter following a value indicates no difference.

Economic Analysis

Cultivar	Nitrogen rate (lb N/acre)	Average Marketable Yield	Average Gross Returns	Average Net Returns above Operating Expenses
ND	50	218.24	\$1,614.94	-\$29.31
ND	90	285.61	\$2,113.50	\$442.05
ND	180	302.16	\$2,235.99	\$503.34
ND	270	345.87	\$2,559.41	\$765.56
ND	360	309.95	\$2,293.66	\$438.61
RB	50	299.55	\$2,216.65	\$572.40
RB	90	375.20	\$2,776.46	\$1,105.01
RB	180	336.28	\$2,488.50	\$755.85
RB	270	346.46	\$2,563.82	\$769.97
RB	360	365.03	\$2,701.24	\$846.19
DT	50	296.79	\$2,196.24	\$551.99
DT	90	374.91	\$2,774.31	\$1,102.86
DT	180	328.59	\$2,431.55	\$698.90
DT	270	336.57	\$2,490.64	\$696.79
DT	360	304.48	\$2,253.18	\$398.13

^a Abbreviation: Russet Burbank (RB), Dakota Trailblazer (DT), and ND8068-5Russ (ND).

Off Label Matrix Rates



Off Label Matrix Rates

- Micro rate systems using multiple treatments of lower rates on small weeds can improve weed control.
- Matrix and metribuzin rates were switched on protocol – so this study became an oops study – what if you put too much Matrix on your potato crop???

Procedures

- Location: Perham, MN
- Planting date: 24 May 2013
- In-row spacing: 13 inches
- Emergence: 17 June 2013
- Treatment application: June 13 & 25, July 2, 10, 16 with Class Act NG at 2.5% v/v
- Harvest date: 26 September 2013
- All treatments: Applied with a nine-foot CO₂ backpack sprayer calibrated to deliver 15 gal/acre

Crop Tolerance & Weed Control

- There was no crop injury observed from the treatments.
 - Likely because growing conditions were favorable for potato
- Weed control averaged 90-100%.
 - Likely the result of too much rimsulfuron

Graded Yield of High Matrix Rates

Graded yield affected by metribuzin + rimsulfuron on Russet Burbank potato in 2013 in Perham, MN.

Treatment	< 3 oz	3-6 oz	6-10 oz	10-14 oz	>14 oz	Total	#1s > 3 oz	#2s > 3 oz	Total marketable	> 6 oz		> 10 oz	
	cwt / acre										%		
Untreated	49	128	83	24	6	286	237	26	263	b	36	b	9
Matrix 8 oz/a + Sencor 0.1 lb/a	36	147	159	60	12	412	376	40	416	a	56	a	18
Matrix 4 oz/a + Sencor 0.05 lb/a x 2	40	148	156	46	12	403	363	34	397	ab	53	ab	15
Matrix 2.7 oz/a + Sencor 0.03 lb/a x 3	35	131	124	37	11	330	295	36	330	ab	49	ab	12
Matrix 2 oz/a + Sencor 0.02 lb/a x 4	34	119	126	31	11	315	280	46	326	ab	51	ab	12
PRE + Matrix 8 oz/a + Sencor 0.1 lb/a	34	107	135	54	21	342	308	43	351	ab	59	a	19
PRPE + Matrix 4 oz/a + Sencor 0.05 lb/a x 2	32	109	104	48	11	302	270	43	313	ab	52	ab	19
PRE + Matrix 2.7 oz/a + Sencor 0.03 lb/a x 3	34	109	143	49	17	348	314	31	345	ab	60	a	18
PRE + Matrix 2 oz/a + Sencor 0.02 lb/a x 4	30	123	132	37	17	328	298	35	333	ab	52	ab	13

^a Within columns means followed by the same letter are not significantly different according to Tukey pairwise comparison ($P \leq 0.1$).

Dicamba in Potato Seed



Dicamba Residues in Seed

- Glyphosate + dicamba
- What will glyphosate and dicamba do to potato seed?



Dicamba in seed at winter test



DICAMBA PROBLEMS

- Dicamba at 0.67 oz/acre, caused severe bubbling, leaf crinkling, twisting and bending of leaves
- 1-2 stems per seed piece (no multiple stems)
- **Dicamba at 1.3 oz/a seemed to inhibit shoots from forming.**

Table 1. Treatments at Grand Forks in 2013

Treatment	Herbicide	Rate (fl oz/acre)
1	Untreated	-
2	Glyphosate	1.8
3	Glyphosate	3.7
4	Dicamba	0.67
5	Dicamba	1.3

Managing Herbicide Problems

- **Communication** with your staff, neighbors, and local contractors.
- Consider having a **dedicated** sprayer for seed potatoes & ensure that custom applicators are using clean or dedicated sprayers.
- Avoid planting field edges and leave suitable headland or plant **border** crops around potatoes.

Take Home Messages

- There are promising new cultivars
- Dakota Trailblazer had a high percentage of tubers >6 oz in lower nitrogen and water rates
- In the right conditions, too much Matrix does not cause significant problems
- Be aware of dicamba

Thank you!

- Northern Plains Potato Growers
- MN Area II Potato Growers
- JR Simplot
- Susie Thompson, Christian Thill, Gary Secor, Neil Gudmestad, Harlene Hatterman-Valenti, and Carl Rosen

QUESTIONS?



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