

ND8068-5Russ 2018 Research Results

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The breeding process for potatoes takes a long time, typically 10 to 15 years. However, after new varieties are released potato growers often do not understand how to best grow them because every potato variety responds differently. Potato breeders work diligently to develop new potato varieties that have desirable traits to improve sustainable production of potatoes. These traits can include resistance to specific pests, improved nutrient use efficient or desirable quality attributes to name a few.

Often, new potato varieties can be a challenge to grow because of the great diversity of potatoes. Typically, a new variety is not grown the same way as a stand variety. The challenge is learning how to best grow new varieties to meet yield and quality goals, or to understand what benefits a new variety provides and be willing to accept lower total yield with higher quality. Many potato growers have tried to adopt new cultivars with some success, but they often lack the time and ability to conduct quality scientific studies because their focus is on commercial production.

Because of this situation, we set out to develop variety specific management practices for advancing selections from the NDSU breeding program. We hope this information will assist with the release and adoption of new varieties. In 2018 a trial was established at the Oakes Irrigated Research Center near Oakes, ND. We planted Russet Burbank (our control) and the advanced selection ND8068-5Russ on May 16 and harvested on September 6, 2018. The focus of this study was on nitrogen timing and rates. The nitrogen rates were 150, 200 and 225 lb N/a. We applied varying rates of ESN and Urea at hilling and followed these with foliar applications of 25-0-0-4.

The 2018 growing season was a bit challenging because of hot temperatures in May and June. This may have affected the early growth, tuber set and tuber growth. Overall yields were less than expected. ND8068-5Russ is an early maturing russet potato that is not expected to have extremely high yield because of the early maturity. It would be a good replacement for something like a Shepody. In this one-year study, we found that yields were similar across treatments. What stood out was in the percent of tubers >6 oz, the treatment of 225 lb N/a with 25 lb N/a as ESN + 130 lb N/a as Urea at hilling, where 77% of the yield was > 6 oz and it had the highest numerical total yield of 328 cwt/a and marketable yield 296 cwt/a (Table 1 and 2). The higher amounts of nitrogen early in the season tended to result in a higher yield. While the opposite was true for Russet Burbank that had the highest numerical yield and marketable yield when treatments of nitrogen on Russet Burbank were 150 lb N/a applied primarily as a simulated fertigation. Keep in mind this is only one year of work and environmental conditions vary from year to year.

These results are somewhat expected. Typically, early maturing varieties need more nitrogen early in the season to assist with rapid canopy growth and earlier tuber bulking. ND8068-5Russ

responded well to high nitrogen rates, early in the season. Future studies should focus on higher nitrogen rates applied early in the growing season.

Table 1. Nitrogen treatments and timings on ND8068-5Russ and Russet Burbank and plant stand and stem number at Oakes, ND in 2018.

Treatment	Cultivar	AMS	10-34-0	ESN	Urea	25-0-0-4	25-0-0-4	25-0-0-4	25-0-0-4	25-0-0-4	Total N	Potato stand	Stem number	Stems/plant	
		5/16/18	5/16/18	5/16/18	5/16/18	7/2/18	7/13/18	7/23/18	7/31/18	8/6/18		6/29/18	6/29/18	6/29/18	
lb N/a											lb/a	number/a		number	
1	ND8068-5Russ	11	29	0	0	22	22	22	22	22	150	11,253	22,264	1.98	a*
2	ND8068-5Russ	11	29	25	25	12	12	12	12	12	150	11,374	20,207	1.77	ab
3	ND8068-5Russ	11	29	0	0	32	32	32	32	32	200	11,616	19,058	1.65	ab
4	ND8068-5Russ	11	29	25	50	17	17	17	17	17	200	11,162	19,511	1.77	ab
5	ND8068-5Russ	11	29	25	90	14	14	14	14	14	225	10,890	16,789	1.53	b
6	ND8068-5Russ	11	29	25	130	6	6	6	6	6	225	10,255	17,515	1.71	ab
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7	Russet Burbank	11	29	0	0	22	22	22	22	22	150	12,947	26,983	2.09	
8	Russet Burbank	11	29	25	25	12	12	12	12	12	150	12,796	25,592	2.00	
9	Russet Burbank	11	29	0	0	32	32	32	32	32	200	11,979	26,227	2.20	
10	Russet Burbank	11	29	25	25	22	22	22	22	22	200	11,979	26,499	2.21	
11	Russet Burbank	11	29	25	50	17	17	17	17	17	200	12,614	27,044	2.15	
12	Russet Burbank	11	29	25	90	14	14	14	14	14	225	12,161	26,136	2.16	
13	Russet Burbank	11	29	25	130	6	6	6	6	6	225	12,826	23,595	1.84	

*Different letters indicate significant differences between treatments within a cultivar according to Tukey pair-wise test at $p=0.05$.

Table 2. Graded yield of ND8068-5Russ and Russet Burbank growing in Oakes, ND in 2018.

Treatment	Cultivar	Total N lb/a	<4 oz	4-6 oz	6-10 oz	10-14 oz	14 oz	cwt/a		US1 > 4oz	US2 > 4oz	%				
								Total	Total Marketable			>6 oz	>10 oz			
1	ND8068-5Russ	150	37	46	118	59	7	b	267	230	225	5	b	69	ab	24
2	ND8068-5Russ	150	43	52	103	41	27	ab	267	223	215	9	b	63	ab	24
3	ND8068-5Russ	200	42	71	112	46	15	b	286	244	231	13	b	61	b	22
4	ND8068-5Russ	200	31	49	122	69	29	ab	299	268	243	25	ab	73	ab	32
5	ND8068-5Russ	225	40	56	96	62	37	ab	291	250	230	21	ab	66	ab	32
6	ND8068-5Russ	225	32	41	114	75	66	a	328	296	237	60	a	77	a	42
7	Russet Burbank	150	60	90	157	78	36		421	362	292	69	ab	64		27
8	Russet Burbank	150	89	128	130	38	10		395	306	238	68	ab	45		12
9	Russet Burbank	200	98	109	127	40	8		382	284	240	44	b	45		12
10	Russet Burbank	200	103	103	126	53	18		403	300	249	50	ab	48		17
11	Russet Burbank	200	85	109	120	50	20		383	299	236	62	ab	50		19
12	Russet Burbank	225	52	85	141	65	36		379	327	228	99	a	64		27
13	Russet Burbank	225	53	92	127	61	35		368	315	269	46	ab	61		27

*Different letters indicate significant differences between treatments within a cultivar according to Tukey pair-wise test at p=0.05.

