INFLUENCE OF SOURCE OF POTASH ON YIELD, SPECIFIC GRAVITY, AND SURFACE RUSSETING OF THE RUSSET BURBANK VARIETY IN MAINE

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The origin of the russet skin characteristic of the Russet Burbank potato variety undoubtedly is associated with many different growth factors. Artschwager (1) noted that any seasonal change in tuber growth that affected normal development of the cork cambium tissues also affected the degree of surface russeting on certain potato varieties.

Clark (2) and Stevenson (10) attributed the lack of uniform skin russeting on the russeted varieties in Maine to soil conditions and climatic factors particularly the lack of precipitation during early tuber development.

Mineral nutrition of the Russet Burbank has been reported also to affect russeting of the tubers. Mosher (5), Schoenemann (9), and Ohms (7), report that excess fertilizer nitrogen could reduce the skin russeting of the Russet Burbank presumably by causing some delay in normal tuber maturity. Painter (8), Metzger (4), and Harrington (3), have all indicated that phosphorius improved skin russeting but they do not agree on the effect of potash on the russeting characteristic of the tubers.

During the years of 1956-58, a study was conducted in Maine to determine if source of fertilizer potash could influence skin russeting of the Russet Burbank and thus improve the appearance of tubers packaged for fresh market consumption.

MATERIALS AND METHODS

Russet Burbanks were grown in replicated field plots and fertilized with 150 pounds of nitrogen, 180 pounds of P_2O_5 (78.5 lbs. P), and 200 pounds of K_20 (166 lbs. K) per acre. Chloride and sulfate forms were the sources of potash used. In all cases the fertilizer was placed in two bands about two inches to the side and slightly below the seedpiece level. Seedpieces were planted 16 inches apart in 34-inch rows. Cultural practices, such as cultivation, hilling, insect control, disease control, and vine killing were similar to commercial practices in the area.

At harvest time each plot was harvested and the tubers weighed for total yield. Tuber samples were selected at random from each plot for specific gravity and skin russeting determinations.

Shortly after harvest, specific gravity determinations were made by the air and water method. Tuber samples were also washed and classified for skin russeting. Tubers were separated into percentage categories based on surface area of tubers russeted. Later, to facilitate statistical analysis of the russeting data, a weighted russeting index was computed for each treatment.

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Experimental Results

Data presented in Table 1 indicate that source of potash had no significant effect on yield of tubers of the Russet Burbank. There appears to be a numerical trend for the chloride source of potash to produce higher yields than the sulfate source of potash. The 3-year average of yields, however, indicates that source of potash has negligible effect on yield of tubers.

Table 1.—*Effect of source of potash on yield of the Russet Burbank in Maine.*

1956-58

Source of potash	Yield (cwt./acre) 1956	1957	1958	Average
KCl	329	306	351	329
K_2SO_4	326	295	346	322
L.S.D. (0.05)	N.S.	N.S.	N.S.	N.S.

Effect of potash source on the specific gravity of the Russet Burbank variety is shown in Table 2. These data indicate a trend for sulfate of potash to produce higher specific gravity tubers than potassium chloride.

Table 2.—*Effect of source of potash on specific gravity of the Russet Burbank in Maine.*

1956-58

Source of potash	Specific gravity 1956	1957	1958	Average
KCl	1.078	1.081	1.068	1.076
K_2SO_4	1.080	1.083	1.073	1.079
L.S.D. (0.05)	N.S.	N.S.	0.002	N.S.
(0.01)			0.001	

The 3-year average, however, indicates that there were no significant differences between the average specific gravities. The one and only significant difference between sources of potash and specific gravity occurring in 1958 is unexplainable unless soil moisture conditions, which were exceptionally high, affected potash nutrition of the potato plant.

The effect of source of potash on skin or surface russeting of the Russet Burbank is presented in Table 3. It is quite evident from the data presented that there was (i) a significant increase in surface russeting when the sulfate source of potash was used, and (ii) that the sulfate source of potash significantly improved the overall skin russeting index over the 3-year period of 1956-58.

TABLE 3.—*Effect of source of potash on surface russeting of the Russet Burbank in Maine.*

1956-58

Year and source of potash	Per cent surface russeting Russeting 0-25	26-50	51-75	75-100	index	3 year average
KCl						
1956	58	38	4	....	29	
1957	31	27	25	17	46	
1958	58	23	11	8	34	36
L.S.D. (0.05)					4	
(0.01)					5	
K_2SO_4						
1956	17	17	55	11	52	
1957	11	13	28	48	63	
1958	21	25	21	33	46	54
L.S.D. (0.05)					3	4
(0.01)					4	5

SUMMARY

Potassium sulfate and potassium chloride were compared as a source of potash for growing the Russet Burbank in Maine. Yields and specific gravities were not statistically different for the 3-year period of 1956-58 between sources of potash. Sulfate of potash improved the surface russeting of Russet Burbank tubers significantly when compared with potassium chloride. It appears from the data presented in this paper that for improvement of russeting on Russet Burbank tubers, sulfate of potash should be used as the source of potash in fertilizer used to grow the Russet Burbank in Maine.

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