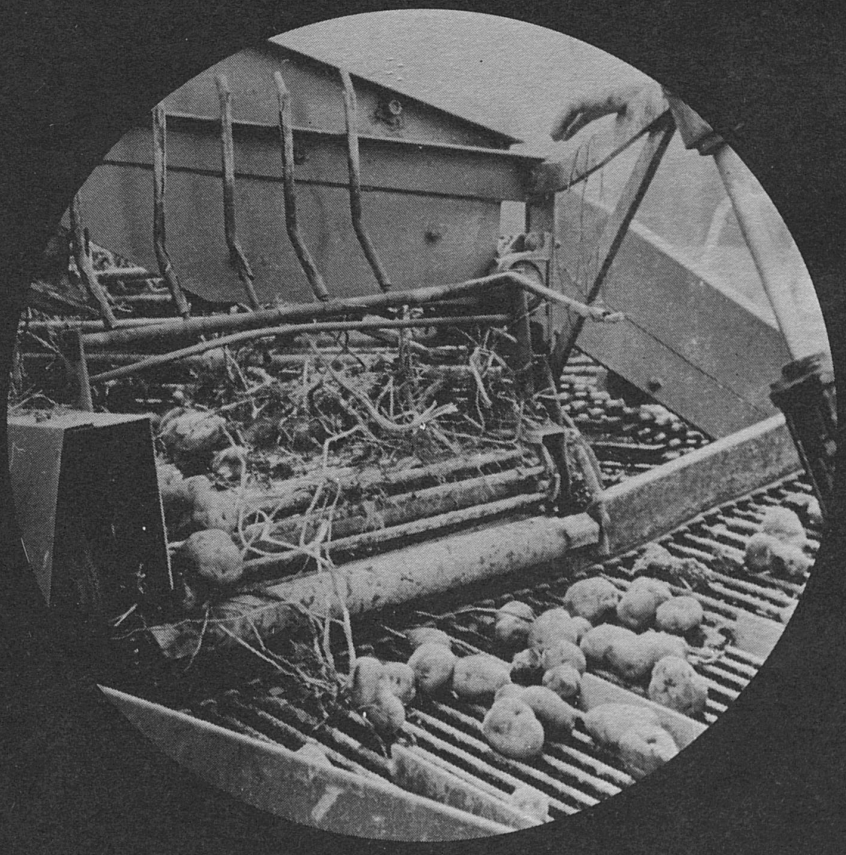
Kentucky Chipping Potato Research-1977



C. R. Roberts

Progress Report 231

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*By C. R. Roberts**

Communication with seven potato chip company representatives within the boundaries of Kentucky and in adjoining states has indicated that there is a good potential for the production of potatoes in Kentucky for chipping purposes. The potato chip processing companies in Kentucky and nearby states begin hauling potatoes in early summer from Florida and southern Alabama and purchase from the more northern states as the season progresses. Kentucky fits into the production and marketing program for such processing plants for a 6-week period, July 15 to the end of August. The total economic potential to Kentucky farmers from potatoes grown for potato chip purposes would seem to be more than 1 1/4 million dollars annually.

To take advantage of this opportunity, farmers need to know the most suitable varieties that will produce high quality chips and, also, give the highest yields. The objectives of this work presented in this report were:

(1) To evaluate 13 potato varieties for yield and chipping qualities, and

(2) To determine the effects of two sources and two levels of potassium on yield and chipping quality.

The potato varieties were evaluated at four locations in the state, as shown in Table 1. The potassium experiment was conducted at the University of Kentucky, Lexington (Table 2).

EXPERIMENTAL METHODS

Cut seed of 13 potato varieties were planted 12 inches apart in rows 42 inches apart at all locations except Bowling Green where the rows were spaced 32 inches apart and the seed pieces 12 inches apart in the row. Each variety planted at the University of Kentucky (Lexington) was replicated three times in a randomized-block design. Guard rows surrounded the planting. The data presented are the averages from all three replications of each variety. The seed potatoes were planted by hand at the University of Kentucky and covered by a tractor cultivator. The planting at Bowling Green was an observational trial (not replicated) and the seed planted by hand.

The plantings on the McGlasson and Bledsoe farms were done by machine with fertilizer and soil insecticide being applied at planting time. These were grown as observational plantings. Insects and diseases were controlled with approved chemicals.

At harvest time 25 pounds of each variety from each location was taken to the Frito Lay Potato Chip Plant in Louisville where the quality of the chips was determined.

Two forms of potassium, potassium chloride (KCl) and potassium sulfate (K_2SO_4,) were each applied at two different rates as shown in Table 2, to determine if the type of fertilizer used had any effect on chipping quality and percent solids. Each treatment was replicated three times in a randomized-block design. The Kennebec variety was planted in this experiment.

*Extension Specialist, Vegetable Crops, Kentucky Cooperative Extension Service.

TABLE 1.—LOCATION OF POTATO VARIETY PLOTS.

Plot Location	Planting Date	Soil Test Results	Fertilizer Applied	Harvest Date
University of Ky. Fayette County, Lexington	April 13, 1977	Ph 6.2 P - 113 lbs/acre K - 301 lbs/acre Ca - 2100 lbs/acre Mg - 167 lbs/acre	104 lbs N/acre 127 lbs K/acre	Aug. 5, 1977
Les McGlasson Farm Boone County, Hebron	April 14, 1977	Did not analyze soil	120 lbs N/acre 240 lbs P_2O_5/ acre 240 lbs K_2O/ acre	Aug. 9, 1977
Lem Bledsoe Farm, Gallatin County, Warsaw	April 27, 1977	Did not analyze soil	50 lbs N/acre 200 lbs P_2O_5/ acre 200 lbs K_2O/ acre	Sept. 15, 1977
Warren County Extension Service, Bowling Green	April 15, 1977	pH 6.1 P 11 lbs. K 229 lbs.	65 lbs N/acre 260 lbs P_2O_5/ acre 260 lbs K_2O/ acre Sidedressed with 200 lbs N/acre when tubers beginning to set.	Sept. 5, 1977

TABLE 2.—POTASSIUM FERTILIZER EVALUATION.

Plot Location	Planting Date	Soil Test Results	Fertilizer Applications	Harvest Date
University of Kentucky Lexington	April 26, 1977	pH 6.7 P 57 lbs/acre K 214 lbs/acre Ca 2870 lbs/acre Mg 194 lbs/acre	250 lbs K/A as potassium chloride (KCl) 250 lbs K/A as potassium sulfate (K_2SO_4) 415 lbs K/acre as potassium chloride (KCl) 415 lbs K/acre as potassium sulfate (K_2SO_4)	Aug. 17, 1977

RESULTS AND CONCLUSIONS

Variety Evaluation

Yields of each variety are expressed in hundredweight per acre, and the yield data from the various locations are shown in Tables 3, 4, 5, 6. Highly significant differences between varieties are evident in Table 3. Differences are also very evident between varieties in specific gravity (percent solids) color, undesirable color, and defects.

Yield data indicate that yields of more than 300 100-pound bags per acre of potatoes are attainable with some varieties. The FL 910 and FL 795 varieties, on the whole, produced potatoes with the best color, fewest defects, highest specific gravity (percent solids), and good yields. Other varieties such as Kennebec and Atlantic produced excellent yields but showed more defects when the potatoes were chipped. The Atlantic variety produced a potato of high percent solids and may have some potential.

TABLE 3.—YIELD AND QUALITY RESULTS—UNIVERSITY OF KENTUCKY, LEXINGTON.

Variety	Yield, Cwt/Acre	Specific Gravity	Color	Undesirable Color	Defects
Kennebec	346 *a	15.0	53	38	22
Fl-910	305 a b	17.4	65	6	4
Atlantic	295 a b c	17.2	63	13	12
Norchip	290 a b c	15.5	65	6	5
FL-857	284 a b c	15.0	62	9	14
FL-96	270 b c	15.6	59	16	8
FL-795	255 b c	16.5	65	6	4
Superior	255 b c	14.3	54	35	19
Katahdin	239 b c	14.8	61	13	6
FL-162	224 c	15.6	64	9	6
FL-657	222 c	13.7	65	4	3
Lachipper	212 c d	14.2	60	16	8
FL-282	151 d	14.5	62	11	16

*Lower-case letters (a, b, c, d) beside the yield data column indicate Duncan's multiple range groupings of treatments which do not differ significantly at the 5 percent level.

TABLE 4.—YIELD AND QUALITY RESULTS—McGLASSON FARM, HEBRON.

Variety	Yield, Cwt/Acre	Specific Gravity	Color	Undesirable Color	Defects
Atlantic	331	15.1	66	4	8
FL-795	327	15.2	66	4	3
Kennebec	319	13.8	63	8	6
FL-657	314	13.1	66	5	5
Norchip	296	14.0	66	5	4
FL-96	287	13.2	66	5	8
FL-910	277	15.5	64	5	5
FL-162	257	13.4	61	13	8
Superior	253	13.0	63	7	16
FL-282	249	16.4	66	5	12
Katahdin	202	14.5	62	11	16
FL-857	194	14.6	65	5	4
Lachipper	180	12.5	61	9	11

TABLE 5.—YIELD AND QUALITY RESULTS—LEM BLEDSOE FARM, WARSAW.*

Variety	Yield, Cwt/Acre	Specific Gravity	Color	Undesirable Color	Defects
FL-282	105	15	63	8	10
FL-795	102	14.2	66	3	5
Atlantic	100	15	67	3	3
Superior	98	12.6	63	5	10
FL-657	90	12	65	3	6
FL-96	61	13	67	3	7
FL-162	48	12	67	4	7
FL-857	46	12	65	6	5

*Yield data were extremely low for all varieties because of very poor growing conditions. Five varieties are not shown because the yields were so small.

TABLE 6.—YIELD AND QUALITY RESULTS—WARREN COUNTY EXTENSION PLOT, BOWLING GREEN.*

Variety	Yield, Cwt/Acre	Specific Gravity
Atlantic	409	16.75
FL-282	409	16.1
Kennebec	335	15.2
FL-795	322	16.6
FL-96	317	15.2
Katahdin	317	14.3
FL-910	312	17.5
FL-657	312	12.1
FL-857	306	15.3
Superior	306	13.3
Norchip	304	15.5
Lachipper	301	15.
FL-162	269	13.2

*Specific gravity (percent of solids) was the only quality criterion obtained from the varieties in this plot.

Effect of Potassium Fertilizer

Yield, specific gravity and quality of potato chip data are shown in Table 7. The yield was increased at 415 pounds actual K per acre with both the sulfate and muriate forms of potash, over the check plot; however, the data were not significantly different when analyzed statistically. There were no significant differences in chip color or defects between the potatoes grown under different potassium levels and different sources of potassium.

TABLE 7.—YIELDS AND QUALITY RESULTS FROM DIFFERENT RATES AND SOURCES OF POTASSIUM FERTILIZER.

Fert. Treatment	Yield Cwt/Acre	Specific Gravity	Color	Undesirable Color	Defects
415 lbs/A, K as KCl	320 NS	12.8 NS	63.0 NS	6.66 NS	8.66 NS
415 lbs/A, K as K_2SO_4	316	13.8	63.3	5.00	8.00
250 lbs/A, K as K_2SO_4	308	14.5	62.6	5.33	9.66
Check (no K)	276	13.4	62.0	7.33	12.00
250 lbs/A, K as KCl	259	13.0	62.6	6.66	9.66

NS - Non-significant statistically at the 5-percent level.

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