

## NITROGEN, PHOSPHOROUS, POTASSIUM AND SULFUR EFFECTS ON YIELD OF SWEETPOTATO

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**ABSTRACT:** A sulfur (S) nutrient trial was conducted at a producer location (Danny Clark Farm) on a Faulkner silt loam soil in Northwest Chickasaw County, Miss. The trial was developed to compare recommended N-P-K to no N-P-K and S at three rates on sweetpotato development. Although no statistical differences were found, the data from this trial indicates a trend that N-P-K is needed to enhance the production of US No. 1 and total marketable roots. The addition of S by over the top application early in the growing season did not increase marketable yield. The higher rates of S actually tended to reduce the marketable yield of sweetpotato.

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**KEYWORDS:** secondary nutrient, sulfur, sweetpotato

**MATERIALS AND METHODS:** A sulfur (S) nutrient trial was conducted at a producer location (Danny Clark Farm) on a Faulkner silt loam soil in Northwest Chickasaw County, Miss. Soil nutrient content in the trial area was determined by previous grid sample soil tests in 2001. An area of the field that was deemed low in S was sampled again in the spring of 2002 to confirm a deficiency. Standard production practices were employed in the field with the exception of fertilizer and insecticide. Field preparation included disk, chisel plow, disk, and hip. The trial was a split plot randomized complete block design with three replications. The main plot factor consisted of soil test recommended 50-100-100 lb/ac N-P-K and no N-P-K. Subplot factor consisted of three S rates 5 lb ai/ac (low), 10 lb ai/ac (recommended), and 15 lb ai/ac (high). An additional check treatment of no S was included for comparison.

Planting occurred on June 6 and all treatments were applied on June 17, eleven days after transplanting (DAT). Soil samples were taken prior to treatment application from each main plot (data not shown). Main plot treatments were applied by hand to the assigned plot areas. Subplot treatments were applied over-the-top using a three-row backpack CO<sub>2</sub> sprayer. All treatments were incorporated using a Liliston rolling cultivator. At each of the three leaf sampling periods 40, 61, and 88 DAT, thirty leaves from fifth leaf below the last unfolded leaf were taken from each subplot for analysis (data not shown). At each date, hyper-spectral data was taken from 350 to 1000 nm wavelengths to determine reflectance using a hand held spectroradiometer among the treatments (statistical analysis on going). Yield data was collected from 4 m of a single 1 m row with a small chain type sweetpotato digger 105 DAT. Harvested roots were graded according to

the National Sweetpotato Collaborators group standards. After grading, roots were weighed, counted, and converted to bu/ac and number/ac format.

**RESULTS AND DISCUSSION:** Interactions between the main and subplot factors were not found at the 95 percent confidence interval. While there were no differences found in the measure of root number and yield, due to the application of the recommended N-P-K fertilizer, all yield grades were numerically higher for the fertilized treatment with the exception of the jumbo grade (Table1).

There were differences found in canner number and yield for the subplot treatments (Table 2). Canner yield was higher, 150 bu/ac and 138 bu/ac, for the 0 and 5 lb S/ac rates, respectively, as compared to the recommended and high rates, 82 and 87 bu/ac, respectively. The recommended 10 lb S/ac rate had a lower canner root number/ac than the check or the low 5 lb S/ac rate.

The data from this trial indicates a trend that N-P-K is needed to enhance the production of US No. 1 and total marketable roots. The addition of S by over the top application early in the growing season did not increase marketable yield. The higher rates of S actually tended to reduce the marketable yield of sweetpotato.

**COOPERATORS:** Dr. Michael Kenty, Helena Chemical company.

**Table 1.** Sweetpotato mean yield and root set of N-P-K from 3 replications, across sulfur treatments in 2002.

Treatments	US No. 1		Canner		Cull		Jumbo		Total Marketable	
	Bu/ac <sup>Z</sup>	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac
50-100-100 N-P-K	347 a <sup>Y</sup>	18560 a	132 a	18240 a	204 a	12880 a	29 a	560 a	509 a	50240 a
0-0-0 N-P-K	236 a	12185 a	100 a	14757 a	200 a	13606 a	31 a	676 a	367 a	41225 a

<sup>Z</sup> Bu/ac= # of 50 lb bushels per acre.

<sup>Y</sup> Means within a column followed by the same letter are not significantly different by Fishers' protected least significant difference (LSD) ( $P \leq 0.05$ ).

**Table 2.** Sweetpotato mean yield and root set among sulfur treatments from 3 replications, across N-P-K treatments in 2002.

Treatment	US No. 1		Canner		Cull		Jumbo		Total Marketable	
	Bu/ac <sup>Z</sup>	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac	Bu/ac	Roots/ac
0 lb ai/ac	251 a <sup>Y</sup>	13200 a	150 a	20387 a	226 a	13933 a	37 a	880 a	439 a	48400 a
5 lb ai/ac	305 a	16867 a	138 a	19947 a	176 a	10853 a	30 a	586 a	473 a	48253 a
10 lb ai/ac	282 a	14227 a	82 b	11587 b	222 a	17013 a	47 a	880 a	412 a	43707 a
15 lb ai/ac	309 a	16133 a	87 b	13493 ab	183 a	11293 a	6 a	146 a	404 a	41067 a

<sup>Z</sup> Bu/ac= # of 50 lb bushels per acre.

<sup>Y</sup> Means within a column followed by the same letter are not significantly different by Fishers' protected least significant difference (LSD) ( $P \leq 0.05$ ).