

KTS Boosts Potato Yields

Colorado researcher explores the role of potassium thiosulfate in potato production.

Summary: Experiments during the 1995 growing season (initially begun in 1994) showed that applications of potassium thiosulfate resulted in significant increase in total yield and percent tubers in the 4 to 10 oz range. Though the results were positive, the need for K and its role in Colorado potato production has yet to be fully explored. A 1996 on-farm study will compare biweekly application of KTS from planting to vine death to no supplemental K in any form.

Managing K throughout the growing season—to the same extent that nitrogen is currently managed—has not been an option for potato growers in the San Luis Valley of Colorado. Thus, a study was undertaken in 1995 by our San Luis Valley Research Center to evaluate potassium thiosulfate (KTS) as a source of potassium in potato production. Location of the study was a grower's 120-acre farm in the San Luis Valley. Although temperatures over the course of the growing season were slightly below normal, conditions were good for potato production, and no technical problems occurred during the study.

Double-digit jumps

Potential variations in soils across the grower's field notwithstanding, yield responses in our initial trials clearly indicate KTS was advantageous to potato production in the San Luis Valley. Note how yield in the 4-10 oz tubers jumped 37 percent when KTS was applied, compared to check (Figure 1). Total yield also compared favorably in Figure 2, jumping 14 percent when compared to check. A significant reduction in yield occurred, however, when KTS was applied to U.S. #2 grade tubers. Percent stand and U.S. #1 grade tubers, as well as specific gravity, were unaffected by KTS.

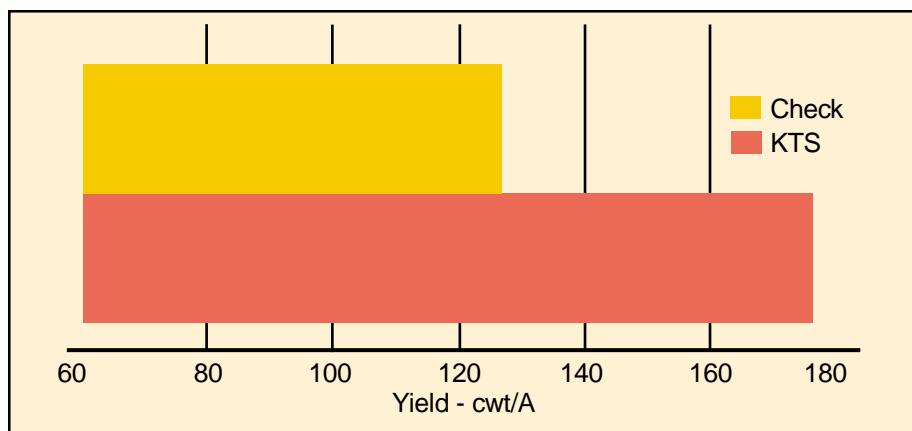


Figure 1. Effect of KTS on potato yield (4-10 oz. tubers), Zink, Colorado State University, 1995.

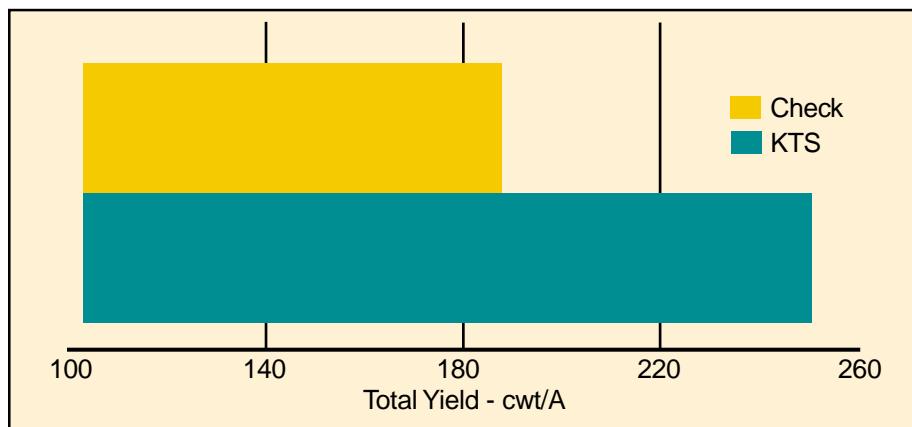


Figure 2. Effect of KTS on total potato yield, Zink, Colorado State University, 1995.

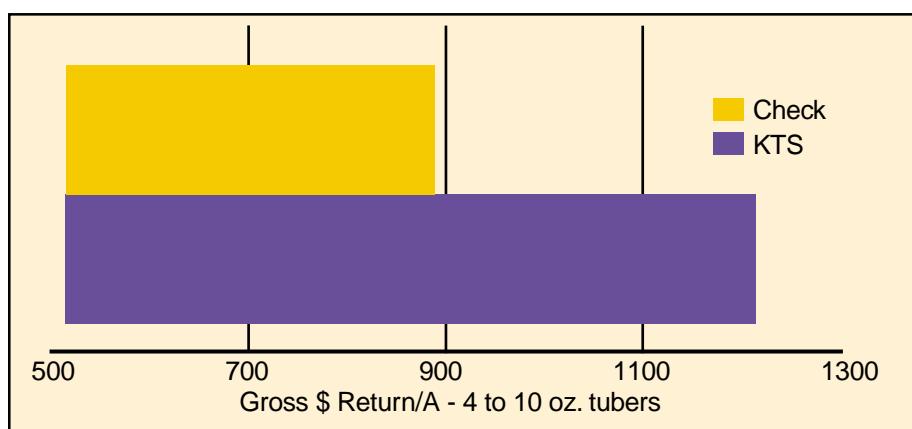


Figure 3. Effect of KTS on gross dollar return on potatoes, Zink, Colorado State University, 1995.

Economics promising

As shown in Figure 3, gross dollar return on 4 to 10 oz tubers is a clear indication that investment in KTS applications can be worth every penny. The yield improvement produced by KTS in the grower's potato fields increased gross dollar return \$329/A when compared to check. Return on investment like this has the potential of paying handsomely where it ultimately counts: the grower's bank account.

Management critical

The cultivar we picked was Russet Norkotah, a short-season variety with a small, shallow root system. The cultivar requires high levels of fertility, coupled with critical nutrient and water management. A carefully established protocol was followed in managing this field trial.

Trial design. The center pivot test field was divided into three areas for different treatments:

- On one half of the circle, KCI was banded below the seed at 56 lbs/A as a total K recommendation
- On inner half of other half of circle, one half of K recommendation was banded as KTS (28 lbs/A) at planting, followed by four sprinkler KTS applications at 13, 11.3, 7.9, and 9 lbs/A.

- On outer half of other half of circle, the total K recommendation was banded as KTS at planting, followed by the same four sprinkler applications.

The four sprinkler applications above began on July 6 at tuber initiation (38 days after planting), and continued on July 17, August 1 and August 18.

Soil samples were collected and analyzed before planting to determine nutrient levels.

Planting took place on May 15, 1995. Plant spacing was 12 inches. Row spacing was 34 inches.

Fertilizer was applied at planting at the following lbs/A rates: N, 200; P, 40; 5, 40; and Zn, 3.5. Post planting applications took place through the sprinkler at the following lbs/A rates: N, 21, 21, and 8.6; and 5, 9.2, 7, 5.4, and 6.5.

Petiole samples for nutrient analysis were collected on July 11, July 20, August 1, and August 16.

Pesticides were the herbicide Turbo applied by ground, plus the fungicide Super Tin.

Harvest began on September 25 and was completed in three days. Yield estimates were based on four truckload samples within each treatment area.

During the harvest operation, the number of row feet to fill each sample truck was recorded, and the trucks were weighed. While unloading each sample truck, random tuber samples were collected to determine size and quality. Samples were graded by hand.

More work needed

The need for K and its role in potato production has yet to be fully explored. Sustaining a balanced, readily available nutrient supply to the potato plant shows potential as an untapped means of expanding yields and improving disease control. KTS may be the tool that is needed to achieve this.

An on-farm study this year will compare biweekly application of KTS from planting to vine death to no supplemental K in any form. This will test the prevailing philosophy that Colorado soils intrinsically have sufficient K for potato production, and demonstrate the flexibility and efficacy of KTS.

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