

INTRODUCTION

Sufficient irrigation water has become an issue in most irrigated potato growing regions. As world population rises, demand for water has grown, and droughts have become more common. The need to boost crop production through innovative approaches cannot be overemphasized. Plant biostimulants are fertilizing products able to stimulate plant nutrition processes regardless of the nutrient content, with the aim of improving nutrient use efficiency, tolerance to abiotic stress such as less irrigation water availability, or availability of confined nutrients in the soil or rhizosphere.

Studies have revealed that some plant biostimulants can help potato crop during water stress, increasing potato growth parameters, tuber production and water use efficiency (Selim et al. 2012, Alenazi et al. 2016). However, other researchers, such as Suh et al (2014) found that some plant biostimulants have no clear promotional effects on tuber growth. El-Zohiri and Asfour (2009) reported that the beneficial effects of plant biostimulants depended on concentration of product and potato cultivar used. Sarhan (2011) combined two commercial products and found that the synergistic effect of the two biostimulants increased potato yield by more than 29%, when compared to the untreated control. APSA-80, Nutriplant AG, and Nutriplant SL are new fertilizing substances that have emerged on the market.

STUDY OBJECTIVE

To Evaluate the response of Russet potato to application of APSA-80, Nutriplant AG and Nutriplant SL, under reduced irrigation water use.

MATERIALS AND METHODS

Study Site: Colorado State University's San Luis Valley Research Center.

Potato Cultivar Used: Russet Norkotah 296

TREATMENTS

Seven Treatments were evaluated with each treatment replicated four times.

Treatment 1: 100% irrigation (full irrigation) – Control (T1).

Treatment 2: 100% irrigation with application of 30 oz/ac. of APSA-80 (T2).

Treatment 3: 100% irrigation with application of 30 oz/ac. of APSA-80 + 2 foliar applications of 14 oz./ac. each of Nutriplant AG (T3).

Treatment 4: 100% irrigation with application of 30 oz/ac. of APSA-80 + seed treatment with 8 fl. oz./ton of Nutriplant SL (T4).

Treatment 5: 100% irrigation with application of 30 oz/ac of APSA-80 + 2 foliar applications of 14 oz./ac each of Nutriplant AG + seed treatment with 8 fl. oz./ton of Nutriplant SL (T5).

Treatment 6: 25% less irrigation water with application of 30 oz/ac of APSA-80 + 2 foliar applications of 14 oz/ac each of Nutriplant AG + seed treatment with 8 fl. oz./ton of Nutriplant SL (T6).

Treatment 7: 15% less irrigation water with application of 30 oz/ac of APSA-80 + 2 foliar applications of 14 oz/acre each of Nutriplant AG + seed treatment with 8 fl. oz./ton of Nutriplant SL (T7).

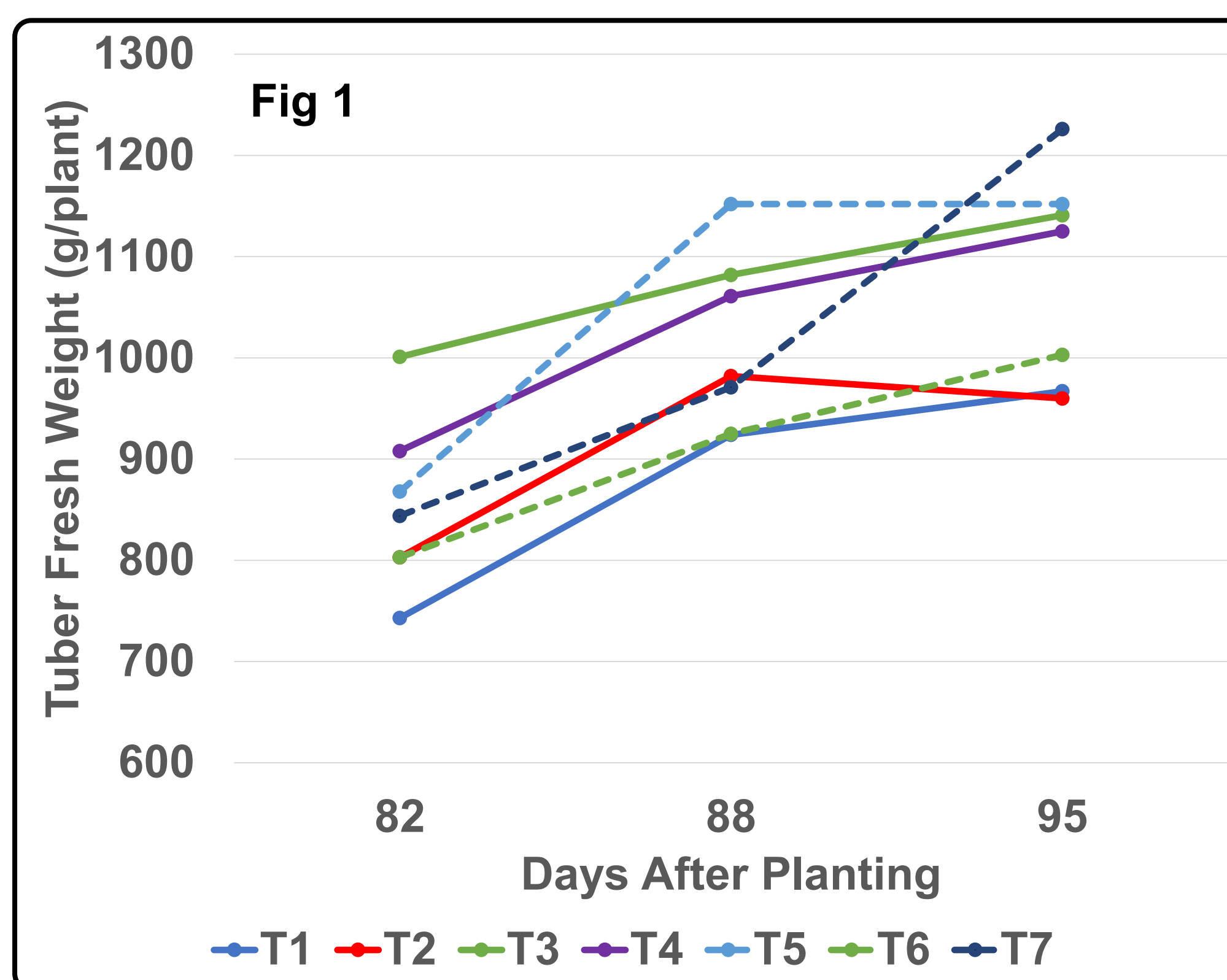


PLATE 1. POTATO UNDER CENTER PIVOT IRRIGATION

RESULTS AND DISCUSSION

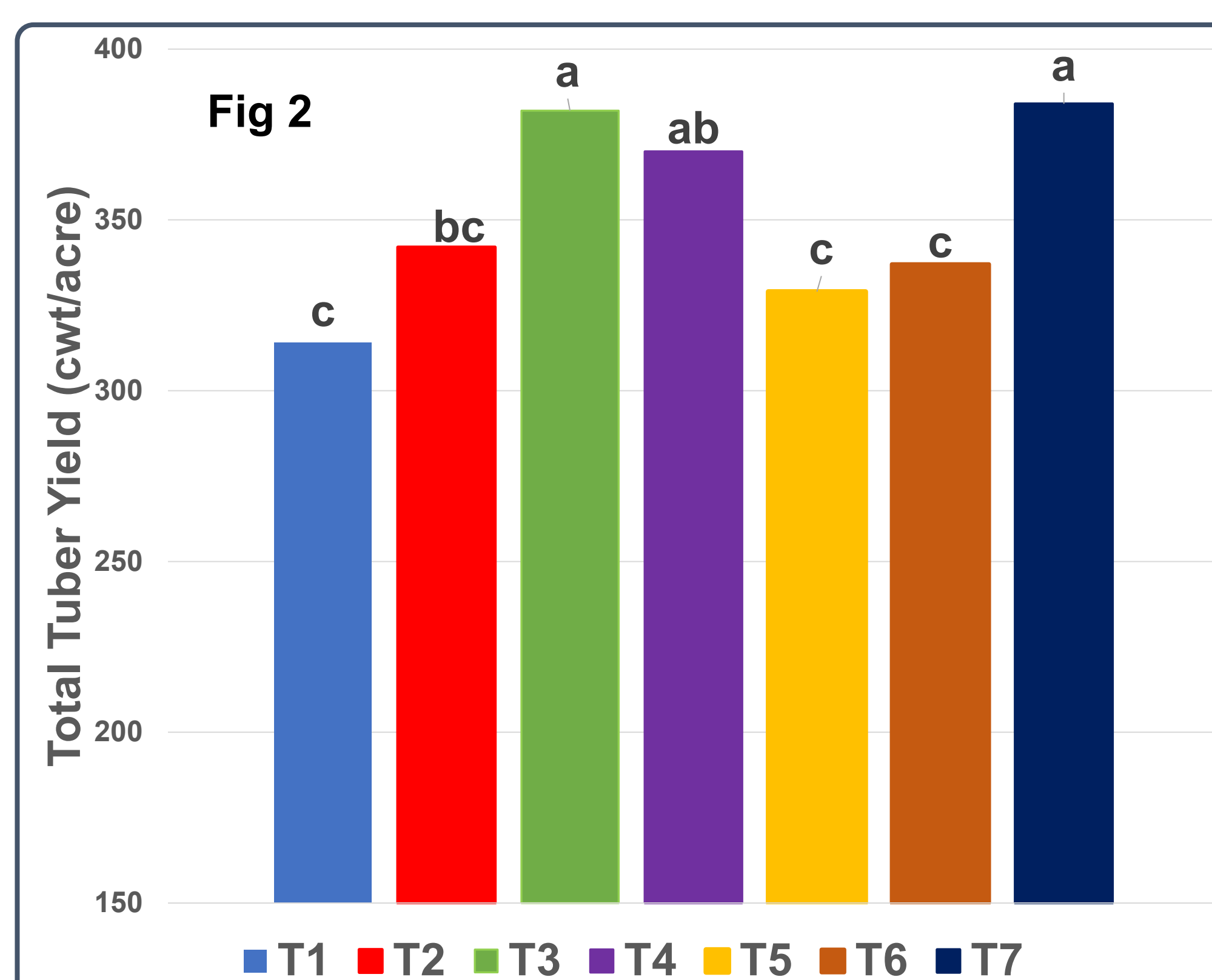
Tuber Bulking:

100% irrigation with application of APSA-80 + Nutriplant AG (T3), or application of APSA-80 + Nutriplant SL (T4), or application of APSA-80+ Nutriplant AG + Nutriplant SL (T5) enhanced early tuber bulking and increased tuber bulking from 82 days after planting (DAP) to 95 DAP (Fig 1). Reducing irrigation water by 15% and applying APSA-80+Nutriplant AG+Nutriplant SL enhanced early tuber bulking and maximized tuber bulking at 95 DAP. Tuber bulking increased by 8%, compared to T3, T4 and T5 combined, and by 27%, compared to the control treatment (T1) at 95 DAP (Fig 1).



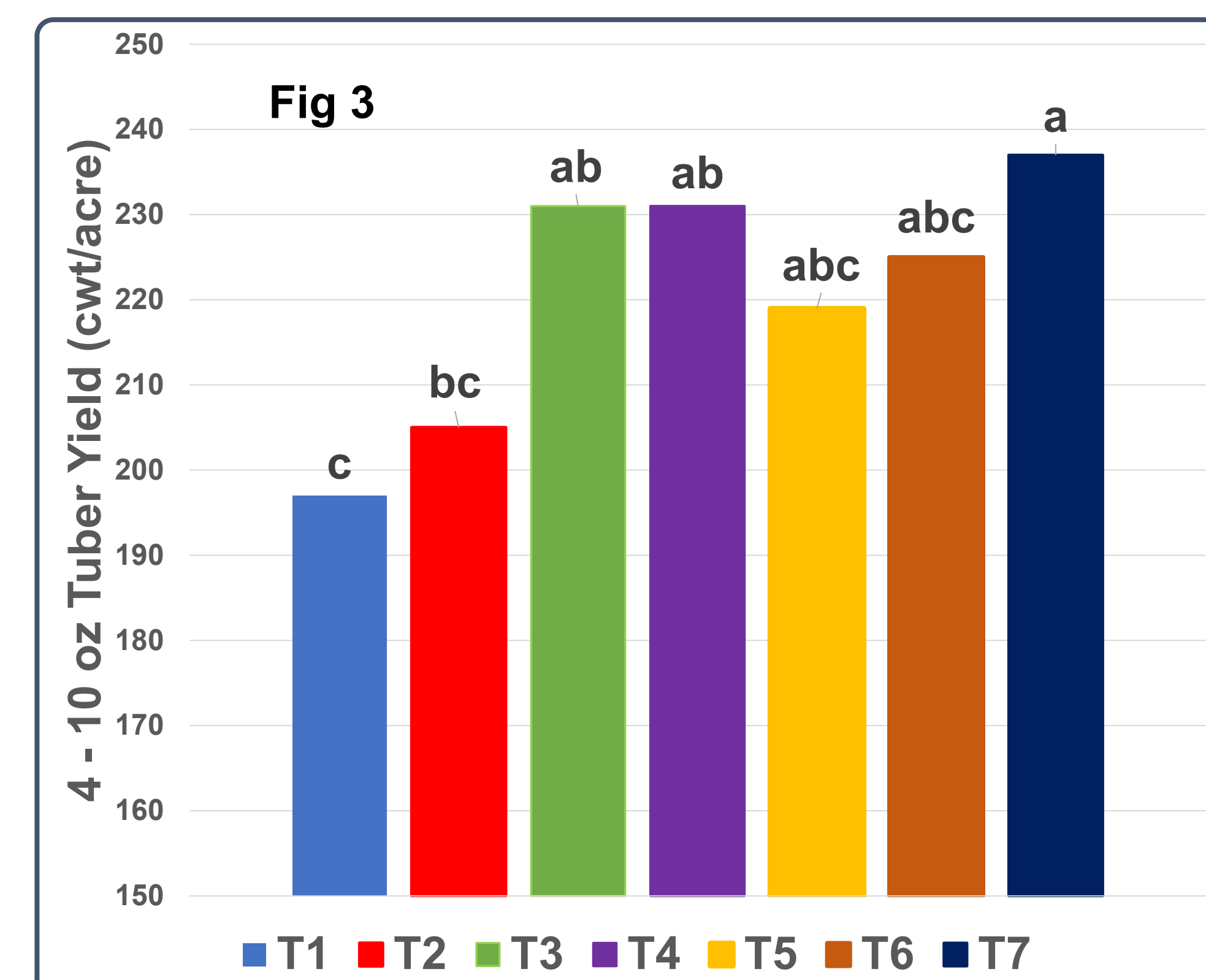
Total Tuber Yield:

Reducing irrigation water by 15% and applying APSA-80+Nutriplant AG+Nutriplant SL (T7), or Applying 100% irrigation with APSA-80+Nutriplant AG (T3), increased total tuber yield by 22% (Fig 2).



Medium Size (4-10 oz) Tuber Yield:

Reducing irrigation water by 15% and applying APSA-80+Nutriplant AG+Nutriplant SL (T7) increased medium size (4-10 oz) tuber yield by 20%, compared to the untreated control (Fig 3).



SUMMARY

Application of APSA-80 + Nutriplant AG + Nutriplant SL enhances early tuber bulking, and increases tuber bulking under 15% water stress.

Results from this study indicate that in regions with scarce irrigation water, potatoes can be profitably grown with the application of APSA-80 + Nutriplant AG + Nutriplant SL in the potato production system.

REFERENCES

- Alenazi M, Wahb-Allah MA, Abdel-Razzak HS, Ibrahim AA, and Alsadon A. 2016. Water regimes and humic acid application influences potato growth, yield, tuber quality and water use efficiency. *Am J Potato Res* 93:463–473.
- El-Zohiri SSM and Asfour YM. 2009. Effect of some organic compounds on growth and productivity of some potato cultivars. *Ann Agric Sci, Moshtohor* 47(3):403–415.
- Sarhan TZE. 2011. Effect of humic acid and seaweed extracts on growth and yield of potato plant (*Solanum tuberosum* L.) Desiree cv. Mesop. *J Agric* 39:19–25.
- Selim EM, Shaymaa IS, Asaad FF, and El-Neklawy AS. 2012. Interactive effects of humic acid and water stress on chlorophyll and mineral nutrient contents of potato plants. *J Appl Sci Res* 8:531–537
- Suh HY, Yoo KS, and Suh SG. 2014. Tuber growth and quality of potato (*Solanum tuberosum* L.) as affected by foliar or soil application of fulvic and humic acids. *Hortic Environ Biotechnol*. 55:183–189.