

Evaluating Greensprouting Pre-Planting Treatment Methods to Increase Seed Potato Yields and Crop Performance

Melissa Boersema, Ben Sklarczyk, Alison Sklarczyk

Abstract

Seed potato minitubers were subjected to one of two “Greensprouting” pre-planting procedures. They were then planted according to standard practices and samples were harvested by hand at the end of the season in order to establish the optimal method of Greensprouting necessary for maximum yield potential of the seed potato crop.

Methods

Two treatment procedures were established in order to identify an optimal method of “Greensprouting”. Method 1 was accomplished by removing hydroponically produced minitubers from a 35° storage environment four weeks before planting, then placing them in indirect light at 70°. Method 2 was accomplished by removing minitubers from a 35° storage environment four weeks before planting, then placing them in a dark room with 95% relative humidity at 68°. After one week the seed potatoes were moved under continuous direct artificial light in 95% relative humidity at 62°. They were maintained in this environment for three weeks. Control minitubers of the same age, variety, and size profile were stored at 35° until three days prior to planting, at which time they were moved to a 70 degree space with indirect lighting.

Minitubers were gently rotated every three days to ensure adequate airflow and light distribution throughout the seed. Visible short, green sprouts developed over time in both Method 1 and Method 2, indicating that the seed pieces had broken dormancy and were ready to be planted.

Minitubers were planted in a replicated randomized block design. Trials were planted and maintained under diverse growing conditions at the discretion of the on-site farm managers including fields in Newberry, Michigan and Grenora, North Dakota.

Results

Lady Liberty

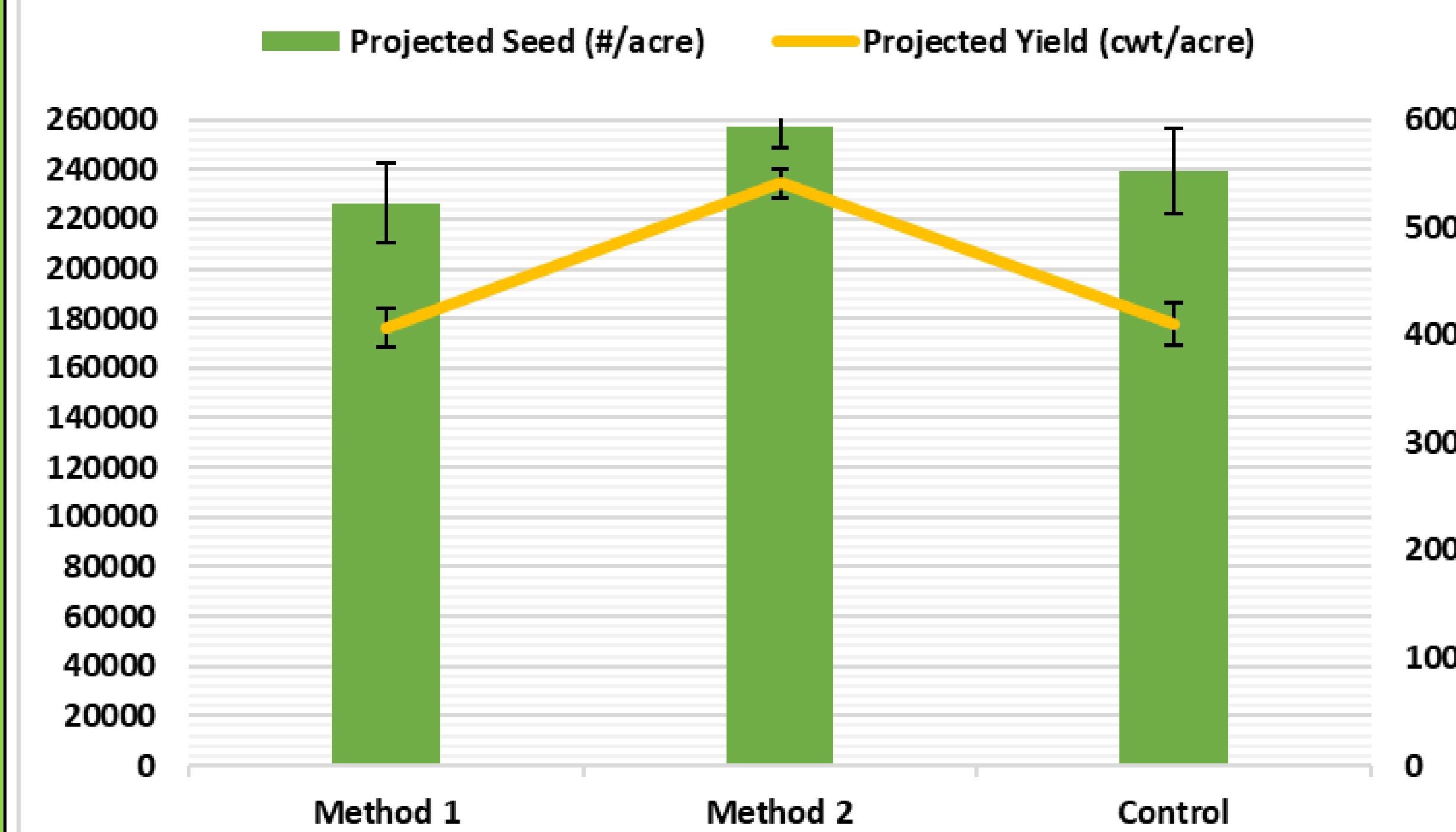


Figure 1: For variety Lady Liberty, Method 2 was found to yield superior seed numbers harvested, as well as highest overall mass.

Russet Burbank

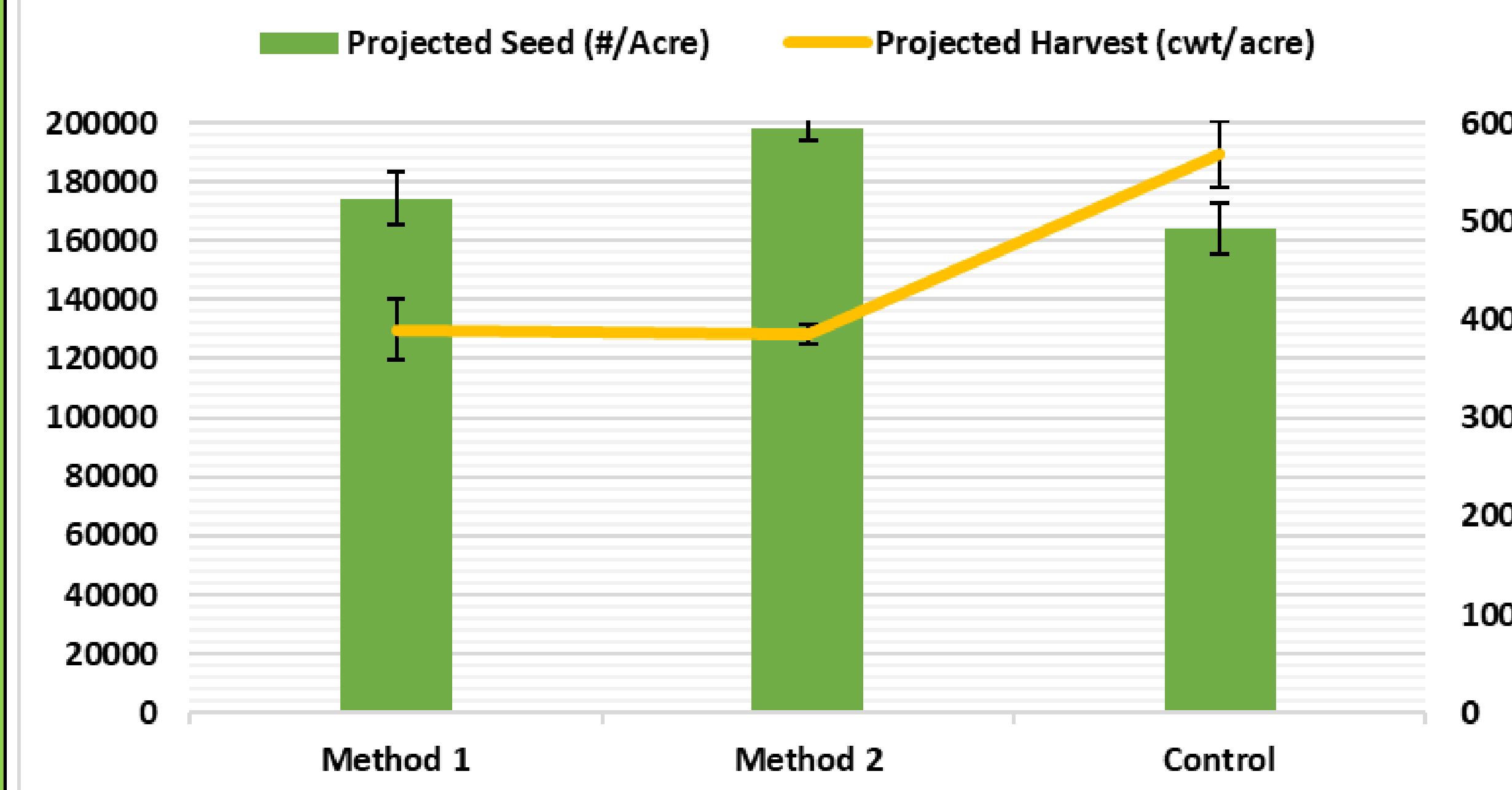


Figure 2: In the variety Russet Burbank, Method 2 yielded highest seed numbers, while the greatest mass was harvested from Control.

Umatilla Russet

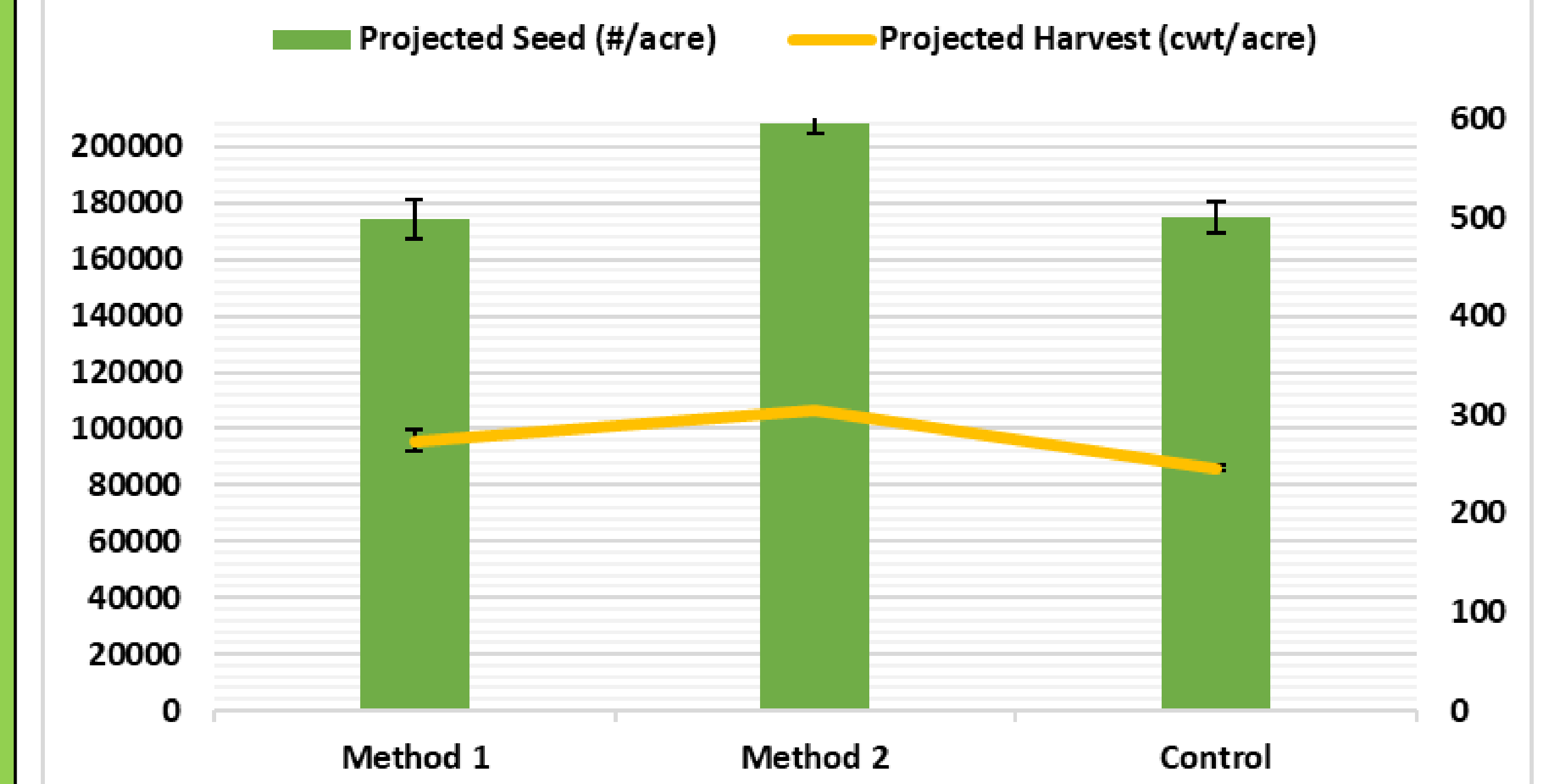


Figure 3: In the variety Umatilla Russet, Method 2 yielded superior seed numbers harvested, as well as highest overall mass.

Conclusions

Overall, Greensprouting minituber seed leads to a statistically significant increase in yield of year one seed potatoes.

For every variety tested, Method 2 produced the greatest number of year-one seed potatoes. Standard deviation for trial results was smallest across the Method 2 data set, implying less variability and a more consistent tuber set and size for the crop as compared to Method 1 and Control. Highest standard deviation was observed in Control, implying additional benefits of crop consistency when Greensprouting, regardless of method utilized.

As previous research supports, Greensprouting practices have the potential to increase year one seed potato yields by up to 200%, depending on the age of the seed and the variety planted. Additionally, Greensprouting has a direct influence on the number and size of the year one seed potato crop produced. Further development may allow growers to adjust seed preparation practices in order to target a specific grade of potatoes.



For more information please contact Melissa Boersema at melissa@ssfseedpotatoes.com or call Sklarczyk Seed Farm (989) 732-5333.

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