

Evaluation of Transplants using PlantTape Automated Transplanting System

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Location of Work: M3 Ranches, Inc. – Woodland, California

Budget Total - \$5,000

Project Year – March 2023 to September 2023

Statement of the Problem and Significance:

Pepper root system can develop differently due to different cultural practices. When peppers are planted in soils directly by seed, the plant will develop a tap root system with secondary and primary roots developing as it continues to grow. Peppers that are planted in a greenhouse in tray sizes 338 up to 450 cells per tray for 50-60 days will develop a fibrous root system due to the tap root burning off in the greenhouse.

Objective:

The prime objective in 2023 was to grow peppers plants using PlantTape, a company owned by Tanimura & Antle, and compare root development to transplants that are commercially grown in California.

Procedure:

M3 Ranches, Inc. was selected to grow the trial which is located in Woodland, California. The variety Huntington, which is a bell pepper cultivar, was selected for the program. The pepper seed was pelleted before being applied in the greenhouse. The purchase of pelleting is to singulate seeds for the planting procedure in the greenhouse. Headstart Nursery in Gilroy, California was used to grow the plants. There are only a select few greenhouses in the state that are used to plant in PlantTape and grow in their houses. At 35 days, plants were pulled from greenhouses and sent to the field in Woodland. A total of 19,910 plants were supplied for the project. PlantTape supplied the specialized planter to plant the peppers. Beds were set up at 60 inches from one center of furrow to the next. Two lines of peppers were planted on each bed, 12 inches apart in the plant row. A total of 0.86 acres were planted which amounted to

15,000 plants in the field. The trial was located toward the middle of the of the field. The field variety was also planted on the same day as the PlantTape trial on May 24, 2023. Most PlantTape plants displays cotyledon leaves and one to two sets of true leaves at planting.

Evaluation of the plants took place August 3, 2023. Healthy plants from the field and trial were dug up by shovel, tops were pruned, and remaining plant material was evaluated and brought back to office to naturally dry for display at later date.

Budget: \$5,000 was approved for project

Expenses:

Headstart Nursery

\$1875.00 – Pepper Seed (already pelleted) and growing of plants

\$796.00 – Freight

\$225.00 – Natural Gas Surcharge

\$191.00 – Fuel Surcharge

\$3,087.00 – Total

Rent for land - \$0.00 – Donated by M3 Ranches, Inc.

Cost of Growing Plants in Field – Donated by M3 Ranches, Inc.

Transplanting Expenses - \$0.00 – Donated by PlantTape

Conclusion:

Root growth, specifically diameter of the roots was a noticeable difference between the PlantTape and field variety. Plants from the PlantTape trial did show noticeable increase sizes in secondary root production. An average of two larger sized roots were notable. Plant roots from the field variety did not display larger roots as the trial. Depth of Roots were also increased vs the field variety due to the larger roots that were produced in the trial.

An observation with this trial would be to use sprinklers immediately after transplanting the PlantTape since the PlantTape plugs were planted very close to the surface of the bed. Beds need to be bed shaped to a very flat surface. Depth of Plants were only 2 inches and many of the plugs were exposed at soil level or slightly covered. Attempts were made to immediately saturate the entire bed utilizing the underground drip tape. The irrigation system could not cover the complete bed and therefore many plants died or were severely stressed.

More research needs to be conducted to properly plant and grow peppers using PlantTape.



Height of PlantTape plants after transplanting. Notice top of PlantTape material at soil level.



Transplant plug close to surface of bed.



Transplant plug planted firmly in soil. Root development happening one week after transplanting.



Left of Center bed is PlantTape Trial. Right of Center bed is field variety.



Trial length at this stage was 300 ft long. You can see where there was plant mortality due to the lack of moisture right after planting.



Example of stressed plant due to minimal moisture after planting.



PlantTape root development. Notice an average of two larger roots on plants.



Field variety root development. A fibrous root system where there were no predominant roots developed.