



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

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| <b>Name(s)</b><br><p align="center"><b>Emily M. Huitt</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Project Number</b><br><p align="right">38029</p> |
| <b>Project Title</b><br><p align="center"><b>The Fungal Effect: Investigating the Effects of Endomycorrhizae Fungi vs. Cow Manure on the Growth of Tomato Plants</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
| <p align="center"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>         My objective is to determine what effect the inoculation of endomycorrhizae fungi on tomato seedlings at the time of planting vs. tomato seedlings grown in cow manure has on both groups with overall growth, taste, drought tolerance, and sustainability of fresh market tomatoes. A bigger tomato plant with a bigger rootmass should grow a stronger plant, able to keep and extract more water and nutrients ultimately leading to increased tomato production.</p> <p><b>Methods/Materials</b><br/>         Endomycorrhizae fungi were inoculated on one-eight pound of tomato seeds and seedling roots were dipped before planting. Control group of cow manure seeds were planted into mixture of cow manure and soil. Seeds were planted in pots in greenhouse with their treatments then seedlings planted outside in 2 groups of 10 rows each 200 plants per row. At 30, 70, and 90 days I measured tomato rootstalks girth and rootballs. At 8 weeks I limited water on half the rows of each treatment to observe the effect of drought tolerance. When the crop matured overall growth and production was determined for each treatment.</p> <p><b>Results</b><br/>         The results of this experiment showed by adding endomycorrhizae fungi at the time of planting seeds and dipping tomato roots before planting had better growth, were disease resistant, had no transplant shock. A stronger compact tomato plant was raised with expanded root system which could absorb more water during a drought year to sustain the plant and fruit. Mature mycorrhizal plants grew an average of 4 1/2 feet tall and produced 30 pounds of fruit per plant verses 18 pounds of fruit from cow manure control group. Cow manure plants were spindly, weak, had many diseases and couldn't sustain the fruit. After limiting water from drought rows for 2 weeks, I observed the inoculated rows had continued to grow, mature, and produce.</p> <p><b>Conclusions/Discussion</b><br/>         My original hypothesis was right in that inoculating tomato seeds and seedlings at the time of planting with endomycorrhizae fungi increased the overall size of the plant, significantly increased crop production and greatly enhanced the plants ability to withstand water deprivation during plant development. Mycorrhizal tomatoes were juicier, disease free, took longer to ripen the plants were loaded with fruit. They produced tomatoes for 80 days verses manure group at 35 days, which wilted and turned yellow. Cow manure had much nitrogen which made plants grow spindly, didn't preserve the moisture.</p> |                                                     |
| <b>Summary Statement</b><br>I tested the effects of endomycorrhizae fungi verses cow manure on tomato plants to see if fresh market tomato production could be increased and become more drought tolerant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |
| <b>Help Received</b><br>My mother provided me with equipment and land to grow my tomato plants on.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     |