

# **RADIATING GROWTH - The Influence of Laser Light on Tomato Plants**

## **LOG BOOK**

November 26th 2024

- Spoke with my mum's friend, Michelle L, who is chemical engineer and has experience with judging science fair events in USA
- Things we talked about:
  - What should i measure - height, number of leaves, size of leaves, days to sprout, number of leaf sets
  - Amount of laser exposure
  - Things to consider in the analysis
    - Is there too much or too little water
    - Is there too much or too little light
    - Where should i measure from to ensure consistency - maybe a grid behind the set up to ensure consistent measurement
    - At what frequency should i measure
    - What type of seeds - sunflower, beans, corn, tomato

November 27th 2024

- Spoke with my dad's friend, Helen M who is a retired teacher and avid gardener
- Found out that Tomato seeds might be a good choice to grow as part of the experiment as they germinate quickly in her experience
- SHe also gave advice on grow lights and type of tomato seed to get

November 28th 2024

- Meeting with my mentor teach Mr Tailor
- Talked about adding an additional variable on top of laser exposure to the seeds
  - 0, 1 and 3 laser exposures to the seeds
  - 1 and 3 laser exposures to the plant compared to the seeds with and without exposure to laser

December 8th 2024

- Read some research articles
- Worked on my big question and hypothesis

December 9th 2024

- Attended a science fair meeting at school held during lunch
- Looked online at what is needed for the CYSF Ethics form
- Worked on lists for equipment needed and variables

December 15th 2024

- Worked on the CYSF Ethics and Due care form (Form 2A) and emailed Mr tailor to review my document

December 16th 2024

- Submitted the CYSF Ethics and Due care form (Form 2A) through the online portal

December 19th 2024

- Received email confirmation that the CYSF Ethics and Due care form (Form 2A) was accepted

December 20th 2024

- Worked on finalizing the experimental procedure, including the schedule of events as a table format

December 24th 2024 (Day 1)

- Day 1 of experiment / first day of laser exposure for Group 3

December 26th

- Chatted with our family friend Edward M who is a community market gardener in New Zealand as he successfully grows a variety of fruits and vegetables each year in their small town
- Gained insights into soil preparation, watering, grow lights, stages of growth

December 27th 2024 (Day 3)

- Second laser exposure for Group 3

December 30th 2024 (Day 7)

- Third laser exposure for Group 3
- First/only exposure for Group 2
- Planting for all 5 Groups:
  - Labelled pots according to group number
  - Measured out 65g of soil per pot
  - Added 60ml of water to each pot via syringe
  - Planted tomato seeds in each pot to a depth of 6mm, then covered the seed

December 31st 2024 (Day 8)

- Watered each pot with 20 ml of water via syringe

January 1st 2025 (Day 9)

- Watered each pot with 20 ml of water via syringe

January 3rd 2025 (Day 11)

- Watered each pot with 20 ml of water via syringe

January 5th 2025 (Day 13)

- Watered each pot with 20 ml of water via syringe

January 7th 2025 (Day 15)

- Watered each pot with 20 ml of water via syringe

January 8th 2025 (Day 16)

- Watered each pot with 20 ml of water via syringe
- Set up grow lights as we have tomato plants that have sprouted
- Recorded plant numbers that had sprouted and did initial measurements (measurements will be taken every 3 days)

January 9th 2025 (Day 17)

- Recorded plant numbers that had sprouted and recorded their initial sprout height

January 10th 2025 (Day 18)

- Recorded plant numbers that had sprouted and recorded their initial sprout height

January 11th 2025 (Day 19)

- Recorded plant numbers that had sprouted and recorded their initial sprout height
- Took height measurements of all seedlings

January 12th 2025 (Day 20)

- Recorded plant numbers that had sprouted and recorded their initial sprout height
- Watered each pot with 20 ml of water via syringe

January 13th (Day 21)

- Checked to see if the remaining 4 seeds had sprouted
- Worked on making tables and starting to explore data points on graphs

January 14th (Day 22)

- Took height measurements of all seedlings
- Watered each pot with 20 ml of water via syringe
- Took Seedlings from Group 4 and Group 5 to LEP and performed the first post germination laster under the operation of RC, ensuring all safety measures implemented

January 15th (Day 23)

- Checked to see if the remaining 5 seeds had sprouted and recorded initial sprout height

January 16th (Day 24)

- Checked to see if the remaining 4 seeds had sprouted
- First true leaves seen! Noted all seedlings with true leaves and measured the height (including the stem) and the size of the true leaves

January 17th (Day 25)

- Checked to see if the remaining 4 seeds had sprouted and recorded initial sprout height
- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves
- Watered each pot with 20 ml of water via syringe
- Took Seedlings from Group 5 to LEP and performed their second post germination laster under the operation of RC, ensuring all safety measures implemented

January 18th (Day 26)

- Checked to see if the remaining 3 seeds had sprouted
- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves

January 19th (Day 27)

- Checked to see if the remaining 3 seeds had sprouted
- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves

January 20th (Day 28)

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves
- Watered each pot with 20 ml of water via syringe

- Took Seedlings from Group 5 to LEP and performed their third post germination laster under the operation of RC, ensuring all safety measures implemented

January 21st (Day 29)

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves

January 22nd (day 30th)

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Transferred data point from the tables to the Google sheet tracking seedling growth; made new tables to show the day we initially saw true leaves and their size for comparison; made another graph using the seedling growth

January 23rd (day 31)

- To my surprise one of the seeds that had not sprouted finally did - 4h!
- Watered each pot with 20 ml of water via syringe
- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Some seedlings have additional true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves

January 24th (day 32)

- Check to see if any additional seedlings have true leaves

January 25th (day 33)

- Check to see if any additional seedlings have true leaves

January 26th (day 34)

- Watered each pot with 20 ml of water via syringe
- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Some seedlings have additional true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves

January 27th (day 35)

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves

January 28th (day 36)

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Watered each pot with 20 ml of water via syringe
- Mapped out some possible layout designs for my trifold

January 29th

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves

January 30th

- Check to see if any additional seedlings have true leaves

January 31st

- Check to see if any additional seedlings have true leaves,
- Watered each pot with 20 ml of water via syringe
- Went to the hardware store to check out paint colours so that I could paint my trifold so that it is not white
- Painted my trifold

February 1st

- Check to see if any additional seedlings have true leaves, measured the height (including the stem) and the size of the true leaves
- Took measurements on all seedlings: height, height of true leaves, number of true leaves, size of true leaves

February 2nd

- Created tables and added data in Google Sheets so that I could work out averages and use the information to create graphs
- Created the letters for my title using stencils
- Cut tomato shapes out of felt as part of my trifold decorations
- Emailed Mrs McNeil to ask some questions regarding the CYSF

February 3rd

- Updated some of the graphs
- Worked on taking the results from the tables and graphs and working on the discussion

#### February 4th

- Printed out some photos of the experiment and cut them to size
- Worked on the interactive stages of growth wheel
- Cut the image of a laser out of felt
- Continued to work on discussion section

#### February 5th

- Emailed Mr Taylor to see if has had time to read over my experiment
- Finished the interactive stages of growth wheel
- Wrote the conclusion for the experiment
- Began proof reading and updating sections of the experiment

#### February 6th

- Continues to proof read and update all experimental elements in preparation for printing
- Saved all results tables and graphs as pdf files in preparation for printing

#### February 7th

- Saved remaining sections as pdf files ready to be printed
- Went to Signal Hill library to print out all sections, graphs and tables for my trifold
- Cut out each section ready for the red backing paper

#### February 9th

- Glued cut out sections onto red backing paper and cut them down to size ready for my trifold
- Placed everything on my trifold to make sure it fits and ready to be glued on
- Glued title onto the trifold

#### February 10th

- Glued everything onto my trifold ready for the OHS science fair
- Emailed Mrs McNeil to confirm mum can help me with drop off at school tomorrow morning

#### February 11th

- OHS School science fair

#### February 12th

- Received great news! I was selected to represent my school at the CYSF

February 19th

- Picked up my new trifold from school

February 27th

- Met with my teacher to receive feedback from our OHS science fair
- Wrote a new section to be included on my trifold describing the type of laser used and the settings

March 2nd

- Painted my new trifold ready for the CYSF

March 4th

- Re-formatted trifold sections ready for printing (increased the font size and changed to a landscape orientation)

March 5th

- Created the letters for my title using stencils

March 7th

- Went to Signal Hill library to print out all sections, graphs and tables for my trifold

March 9th

- Cut out each section ready for the red backing paper
- Glued cut out sections onto red backing paper and cut them down to size ready for my trifold

March 10th

- Ensured my basic project information was up to date and accurate on the CYSF website during a OHS science fair meeting
- Printed out some photos for my trifold at London Drugs after school

March 12th

- Uploaded my experimental sections to the CYSF web site



March 15th

- Went to Signal Hill library to re-print some sections as they did not cut properly with the paper trimmer
- Placed everything on my trifold to make sure it fits and ready to be glued on
- Glued title onto the trifold ready for the CYSF
- Glued all sections onto my trifold ready for the CYSF