LogBook - Hydroponics

Definitions:

Nov/4 - What is hydroponics?

↳ hydroponics is a soilless gardening method, using nutrient enriched solutions.

Nov/4 Cont. - hydroponic methods - Deep water culture vs. Kratky ~ DWC has aeration and continuous solution refill, while Kratky has no refill, and receives oxygen as the solution level decreases.

↳ I chose DWC as it has more action and more oppurtunities for an interesting topic.

Nov/4 Cont - Original Idea - To test 3 Brands of hydroponic solution

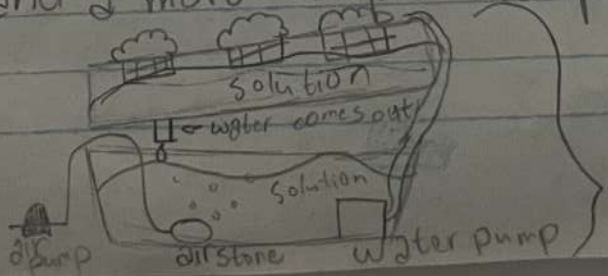
↳ Searched most popular solutions → searched General Hydroponics and Fox Farm

↳ One Problem → Too expensive! ↩

Nov/14 - What growth factors to observe in hydroponics crop

↳ Height, leaf health, stem quality, leaf count

Nov/23 - Root rot - can it happen in hydroponics (yes), NFT (Nutrient Film Technique) for hydroponics - another method → I stuck with DWC as NFT has more pumps and a more complex setup.



Nov/23 - 3 variables (controlled)

- the type of hydroponic method affects the growth rate.
- the crop growing (some plants grow faster/slower than others)
- the artificial light colour they grow under - some colours promote growth more than others.

Nov/25 - Researched potential plants to grow

- I settled with basil -> grows fast, easy to measure height, can adapt to minor mistakes

- Looked at General Hydroponics to see some more prices. - Expensive
  - I decided to make homemade solutions instead
  - researched ideas on how to make DIY solutions. (only a few)

Nov/29 - Researched more videos & what to buy
- Also looked at how to make a hydroponic system (DWC)
- Looked at NPK Soluble fertilizer (Nitrogen, Phosphorus, Potasium)

Dec/6 - Looked at some brands to see where I can get NPK hydroponics soluble fertilizer.
- found something called compost tea nutrient solution.
- Manipulated variable: variation of homemade hydroponic solution (mineral vs compost tea)
- Ingredients to make solution

Rough Hypothesis forming for Science Fair Proposal

Dec/7 - Researched about compost tea - Leave finished compost/worm castings in a mesh bag and let it soak in water for 24-48 hours. Add epsom salt to the water before letting the bag soak.
- Search hydroponic medium + ph paper
↳ Forming materials & procedure

Dec/18 - Researched safety consideration of the materials.

Dec/24 - How to use Rockwool
↳ What is it? / How many seeds should I put in it/ How deep should I put the seeds in?
- How to use the air pump → setting / ratio?

Jan/1 - Made background research slides
Research micro + macro nutrients

Jan/2 - Found out about something called EC - The measurment of conductivity within the solution - measurment of nutrients in the water.
- Made the whole shopping list & found all the stores.

Jan/3 - Went to as many stores - got hardware took the whole day

Jan/4 - Went to remaining stores - got everything but NPK & Calcium Nitrate.

Jan 14 - Set up DWC's (cut holes, rockwool, etc)

Jan 16 - Made shopping list for item I did not know about ~ peat moss, ph down, stronger air pump)

Jan 17 - Found all remaining item stores, researched pH, lots of graphs I can make, growth factors in terms of visual, and changed plant to mint for faster growth.
- Also ordered NPK + Calcium Nitrate off Geckogrow.
- Point: LRSF is on Jan 30, so I falling behind! I need to start growing!

Jan 18 - Researched about pH ~ pH down & natural substitutes for the organic tea.
- Switched to mint ~ grow faster!
- Created rough background reasearch slides
- Found cheap but accurate EC meter.
→ Importance of pH in hydroponics

Jan 11 - Have all materials! Started brewing compost tea.

Jan 13 - Compost tea looks clear - why?
- Discovered many negative factors - bucket must be food grade! No sunlight allowed! Not enough food, 1 more pump!!
→ Good for sources of error
- Must restart brew - but no food grade bin → used white garbage bag to line bucket
→ added little more syrup (maple)
→ kept in dark with pillowcase on top

Jan/15

Set up everything. Was going to write but recorded the video b/c too long to write.

- set up lights for 3 hours
  - ↳ Only had one so set up in the middle
    - ↳ finally! Growing time!

Jan/16

- Extreme wilting - why?
- Researched - Loss of water through transpiration
- Plant cannot absorb much water ~ big leaves = bad → stripped 2 biggest leaves & hope it solves the problem

Jan/17

- Just like magic, the plants are not wilting!
  - ↳ Transpiration loss was right!

Observation: Compost leaves were not wilting as much → could this be from the extra air??

Jan/17-19

- (Rest time to fully recover)

pump airstone w/ter pump)

Jan/20

- Not growing ~ why?
MANY sources of error
- Used gap method - this is for roots not cuttings!
- need air stones for efficient D.O
- Covered window w cardboard to block sunlight for unfair light advantage
- Must set up light now
  - ↳ need 1 more lamp
- Water adjusments: 3 cups for each DWC

Mineral	Organic
pH = 5.8 - 6.0	pH = 5.8 - 6.0
temp = 20.8°C	temp = 21.5°C
µs/cm = 1122	µs/cm = 396

why is µs/cm so different & is temp different b/c of more sunlight?

Graphs I should make:

(cm) Average height → P1 - 5.5 | P2 - 6 | P3 - 4.5 | P4 - 6.5
P5 - 6.5 | P6 - 7 | P7 - 5.6 | P8 - 6

mm Root growth → All = 0 mm

- Ec
- pH
- Temp

→ should convert to mm later to visualize possible growth

- MUST CATCH UP!!

Jan/21
- Structure failure in the stem of plant 5- trimmed but now really short (must keep in mined if mineral "wins")
- P1) 5.5 | P2) 6 | P3) 5 | P4) 6.5
- P5) 3.5 - P6) 7.0 | - P7) 5.0 | P8) 6

MEC	OEC
1136 µs/cm	414 EC
Temp 20.8°C	Temp 20.1°C
PH 5.8 - 6.0	PH 5.8 6.0

Jan/22
P1) 5.6 | P2) 6.4 | P3) 5.7 | P4) 6.7
P5) 3.5 | P6) 7.2 | P7) 5.6 | 6.3

MEC	OEC
1150 µs/cm	µs/cm -420
Temp: 21.1	Temp: 20.1
PH: 5.8	PH: 5.8

Jan/24

P1) 6 P2) 7 P3) 6.3
P4) 7.1 P5) No data - root rot - dead
P6) 7.6 P7) 6.2 P8) 7.5

M	O
PH - 5.9	PH - 5.9
Temp - 21.3°C	Temp - 21.2°C
EC - 1196 µs/cm	EC - 428 µ/cm

Made my BG slides - (good copy)

Jan/25
- Longer "Nighttime" & no measurments for "no-disturbed root + leaf growth"

Jan/26 P1) 6.1 P2) 7.0 P3) 6.4 P4) 7.2
P5) - P6) 7.2 P7) 6 P8) 7

M	O
PH - 5.9	PH - 5.8
Temp - 21.3	Temp - 21.3
EC - 1216	EC - 436

→ Why shorter measurments - Stems 'relaxed' w no light to reach for

Jan/27) P1) 6.3 P2) 7.2 P3) 6.5 P4) 7.2
P5) - P6) 7.7 P7) 6.5 P8) 7.1

- Finishing trifold today.