



Aquaponics and Basil Plant Density

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Learning about
Aquaponics and
water chemistry.

Getting Ready

Introduction/Background

Aquaponics is the combination of aquaculture and hydroponics that uses water from a fish tank to provide nutrients to plants in a soilless environment. Aquaponics uses no fertilizers, less water, and higher plant densities than traditional agriculture, however little information is available on optimal plant density for Aquaponics. The purpose of this study was to find out the optimal density for basil production at a given level of nitrates (aka number of fish).



Catching the Goldfish to
go in the tank.

The author getting Basil
ready for the study.



Waiting for Nitrate
levels to rise.



Building with my
amazing mentors.



Growth stage after
transplantation.



The Research

Beginning



20cm 16cm
8cm 12cm



Experimental Design/Procedure

We attempted to control or measure all the other variables to consider, as to isolate the variable of distance between plants. The water flow was spread through the plant bed through a manifold and placed on the opposite side as the bell syphon to attempt to evenly spread the nitrates. The plant clippings were taken from various mothers and mixed within the samples. In traditional horticulture, it is recommended that basil be planted 10 to 12 inches apart, which converts to 25.4 to 30.48cm. Due to limited space in my plant bed, I started with the plants at 20cm. I placed the basil plants 20cm, 16cm, 12cm and 8cm apart. I put them in rows, drew a diagram and assigned each plant a number for documentation purposes. Plastic sheeting was utilized to maintain the distance between plants, and net pots were used to place the plants. I placed the plants when the nitrates level reached 110ppm (parts per million). Then I trimmed them down to two nodes and began the study, with all the plants starting about the same size. I took photos to document overlap and competition for light, as well as color, height, width and other variables.

Middle



20cm 16cm

8cm 12cm



Results/Conclusions

Preliminary Results

The preliminary results are observational. It appears as though the 8cm sample is beginning to crowd and this density will not allow for full maturation of the basil plants (Fig C). Clearly the 20cm sample, even with the 2 disqualifiers, appear to have plenty of room to reach full maturation (Fig A). It is possible that at 12cm, the basil plants will be too crowded to fully mature, but it appears as though at 16cm the plants will be able to reach full maturation as well at the given density (Fig D and B). At this time, merely based on observation, it would have to be concluded that 16cm or 20cm would be the optimal density for growing basil plants in an aquaponic system (Fig A and B). Final analysis will be performed for mean plant size and mean plant dry biomass weight among the spacing trials that will allow for a qualitative comparison of each treatment for developing final conclusions for the study.



Figure A



End



Figure B

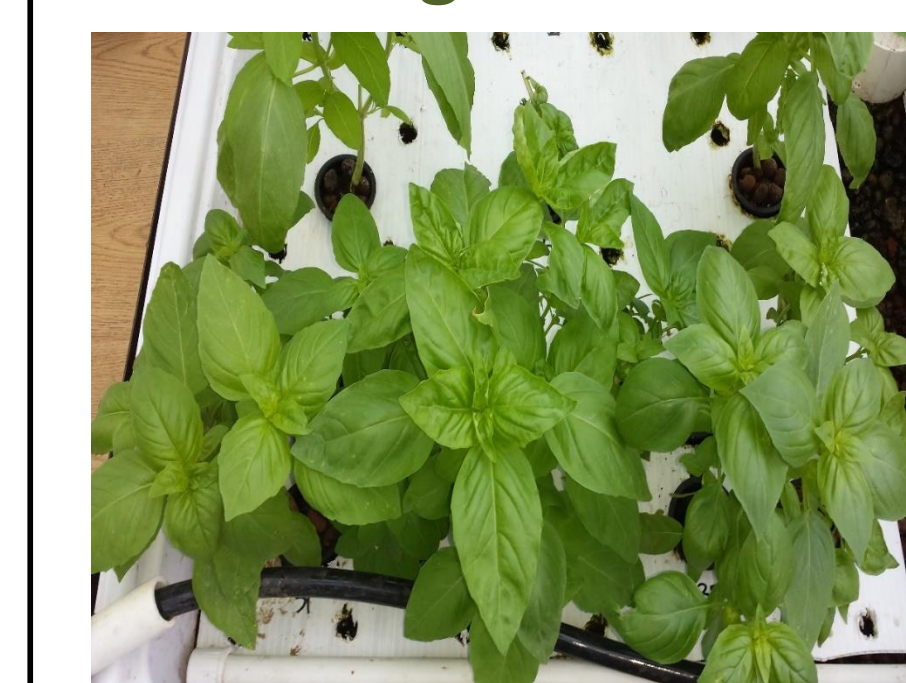


Figure C

20cm 16cm



Figure D



8cm 12cm



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