

# Growing using hydroponics in the Northeast<sup>©</sup>

S. Weinstein<sup>a</sup>

Connecticut Hydroponic Farm & H2O Farm, 929 Boston Post Road, Gilford, Connecticut 06437, USA.

## INTRODUCTION

Hydroponic is a very broad field with a number of growing options and adaptations. Essentially there are two generally accepted concepts that are different but with a number of hybrid adjunct developments with each of these. Although many of the hybrid systems are "one of a kind" they almost always are related to either deep pond or NFT systems.

This examination of hydroponics is undertaken with the following objectives:

- Wholesale sales of one or two crops.
- High quality produce compared to the existing hydroponic crops available.
- Consistency of the product.
- Reasonably fast maturing from seed to harvest.
- As much control as possible for the avoidance of insects and disease.
- Production from seed to harvest with minimum labor cost.
- A crop that would lend itself to our regional climate (in my case that means the Northeast of the United States).
- Using as much of my own existing equipment and greenhouse as possible and producing as much of our crop (lettuce) with the strongest profit possible.

## CONNECTICUT HYDROPONIC FARM & H2O FARM

I had purchased and installed ebb and flow tables for our five greenhouses and had grown annuals flowers for 2 years using this equipment. Based on the geographic area that we are located the competition in the annual flower trade is fierce. Our market for sales was only our own garden center in an economy that was becoming very weak and unreliable. The ebb and flow tables we installed included automatic vents in conjunction with a weather station for all five greenhouses.

Realizing that the flower market was very competitive with many wholesalers, and with the large number of wholesale growers, it was possible to buy the flowers that we grew for close to the cost we had for growing our own. The period of time that we could use this equipment for annual flower growing was limited to 9 months. With both these factors in mind, I started to investigate the possibility of using this equipment for another type of growing that would allow us to use the equipment for 12 months in a less competitive market.

## Our hydroponic system

I explored the concept of using this equipment for hydroponic lettuce production although the depth of the tables was less than recommended in other deep-water technology. Through our experimentation we realized that the root development didn't affect plant top growth whether it was a deep water environment where the root developed downward or grew wider in a shallower pond environment.

We decided to move forward with one greenhouse for lettuce production using all eight tables that were 5×40 ft. We used Styrofoam "rafts" with both 4 in. spacing on one table and 8 in. spacing on the other seven tables (Figure 1).

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<sup>a</sup>E-mail: [stephen1643@icloud.com](mailto:stephen1643@icloud.com)



Figure 1. Our production system.

We initially tried as many selections of lettuce that were recognizable by the buying public. We found that the best crop was the bibb lettuce (*Lactuca sativa*) because it had the shortest growing period from seed to harvest. It also developed best in the cold climate here in the northeast.

### **1. Aphid problems.**

We did find that aphids were an issue with most of the types we experimented with. Because we are producing organically we didn't want to use pesticides but found this almost impossible. We then researched the possibility of finding a bibb lettuce selection that was aphids resistance. We were able to find a bibb selection from Europe.

### **2. Bolting problems.**

Our next challenge had to do with “bolting.” Since bolting is the premature production of stems and flowers before the crop is harvested.

This was a difficult problem at the beginning of our production with the butterhead bibb selection. It seems that the warm temperatures caused some of our lettuce to bolt well before it was harvestable size. I looked for a selection that were historically free from early bolting and we were able to find a bibb lettuce seed type that was both aphids resistance and had almost no bolting before it reach harvest size.

I was concerned that the seed that was aphids resistant came from Europe. Since lettuce from Europe is smaller in head size to lettuce produced here in the USA. I was concerned that the marketability of this selection would be smaller than the current competition here in the USA.

We have found to our surprise that this selection has grown to size equal to the lettuce available on the market today and most of the time larger; therefore, increasing the marketability of our production. This new selection has helped our production; our pack-out rate has improved to between 90 to 95%.

### **3. Lettuce seed germination problems.**

The germination of our seeds was a challenge. There are several options for propagation of our pelletize seeds, including rock wool, Oasis®, and a range of growing media with nutrients (we found field soil not usable). We have found that Oasis was the best with the highest germination yield for our lettuce seed and we have increased the time in the nursery

from 10 days to 2 weeks. This extra time in the nursery gives the seedling additional growth.

#### **4. Production.**

We transplant the seedlings to net cups and into 4-in. spaced rafts for 2 weeks; in our 5 ×40 ft tables we can place 2000 heads. After 2 weeks, we transplant to 8-in. rafts for 2 week until harvest (Figure 2). This system has allowed us to increase our production by 35% in our existing greenhouses.



Figure 2. Our final production ready for market.

We are able to produce 2,500 to 3,000 heads ready for market weekly at an average price of \$1.35 to \$1.50 per head. Our labor is based on three individuals at 35 h weekly with one of these individuals driving for deliveries for 10 h weekly. We have found that our largest costs are as follows: the clear clam shell for each head and the harvest and packing time.

We feel that part time growing of hydroponic produce in the greenhouses when the greenhouses are not being used for flowers is counter-productive to the development of a hydroponic business. In a wholesale environment where the client is looking for consist weekly produce and strong quality with the same consistency.

#### **CONCLUSION**

In conclusion it is possible to convert existing greenhouses to hydroponic growing. Anyone doing this should identify the market they would like to service and rehab their existing greenhouses or purchase new ones.

