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HYDROPONICS

Hydroponics means "water working."

It is a method of raising plants without relying on soil for food, water and anchorage.

Nutrient minerals in the form of soluble salts are dissolved in water and fed to the plants by means of pumps and timers. This solution drains back into a tank for reuse over and over. You would think that things could be controlled with such precision that it would be tantamount to simply manufacturing food by the clever use of science (especially chemistry), and to some extent that is true, but like most manufacturing processes this requires almost total control. So, unless you are willing to invest in costly energy and equipment, including greenhouses that can be cooled as well as heated, water heaters and chillers, carbon dioxide pumps, air pumps to supply oxygen to the solution, strong grow lights (for winter use), computers that decide when to inject nutrients into the solution when needed, humidity control, and a means to exclude airborne pests, then you are ready for some real challenges.

I decided to try to grow hydroponically without most of this fancy stuff by growing only during the season that was normal for the particular plant I was trying to grow. These are some of the things I have learned the hard way.



During hot and windy periods, plants need lots of moisture in relation to nutrients in order to cool themselves. If the chemicals are mixed into the water at too rich a blend, plants will be shocked and begin to wilt. If you correct the mixture in time, fine, but the effort is more art than science.

In order to reduce the risk of the fertilizer solution getting out of balance, I simply discharge the old solution and replace it with fresh every 10 days or so. I am not sure the fertilizer salts I buy are correct anyway except for the assurance by the manufacturer. The lack of a tiny amount of one necessary trace mineral can make the plant fail. It is recommended that the fertilizer formula be adjusted between the initial growth stage and the blooming/fruiting stage. If you compound your own mixtures you can do this, but I have not reached that stage yet. Most

vegetables like to grow in slightly acid conditions. I catch and use rain water which is naturally 5.8 PH and is relatively mineral free. Our raw ground water is slightly alkaline. The PH can be adjusted by adding acid to lower it or baking soda to raise it. It is simple to measure the PH with litmus paper.

Electrical conductivity, which can be measured with a small instrument, indicates ionization of elements and tells you parts per million of the total elements dissolved in water. The EC of our raw rain water is 75. The EC of our raw ground water is 575. I have no way of telling what mix of minerals they contain because it would take very sophisticated and expensive equipment to determine that. The total recommended EC varies with different plants, and ranges from 1000 to 3500. It is easy to mix the solution to suit the plant's EC needs simply by adding more or less fertilizer salts. Getting the EC right does not guarantee that the mix of elements is right. Each element in the fertilizer ionizes at a different rate, but the plants will take what they need. Of course, too much of one element can tie up other elements and make them unavailable to the plant.

I like to experiment. Needless to say this leads to a lot of failures, but they are, at least educational failures. Thomas Edison once said of his failures that he had discovered many things that did not work, but even that was useful knowledge. My best efforts so far have been with tomatoes, eggplants and basil.