Growing Produce In A Floating System

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Growing vegetables in floating systems is a viable alternative to soil production. By focusing on crops with short roots, the floating system offers the opportunity to grow continuously throughout the year. Studies conducted by the University of Arizona conclude that by using a simple system, in one production period growers can produce around 1,400 high quality heads of lettuce obtaining high prices in the market.

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A Deep Flow Hydroponic System (DFHS) allows the grower to produce leafy vegetables with the roots completely submerged in water. The grower applies the nutrients before submerging the transplants, which are held upright in Styrofoam boards. Because the plant roots are submerged they're able feed on the nutrients in the water during their growth stages until harvest, which is approximately five weeks after planting for lettuces.

Beginning Production

First off, you're going to need a container to fill with water. You can choose to use either a flat or deep container depending on the space you'll need for your plant roots. Myles Lewis, a graduate with a BA and MS from the University of Arizona and founder of Arizona Vegetable Company, recommends using white containers, or buying black ones and painting them white.

In his presentation during a guided tour through his production area during the Annual Greenhouse Production and Design Short Course, Lewis explained the importance of using pelleted seeds and transplants with a polymer binder: "Pelleted seeds are five times more expensive than non pelleted seeds, however, the difference is that with pelleted seeds I achieve up to 99 percent germination each and every time the plant is grown under good conditions. In regards to the substrate that holds the transplant, there are some that contain a polymer binder that maintains form under the water, which prevents the system from clogging."

Nutrient Application

"Macro and micro nutrients like to work together. If you apply them together in low volumes of water they'll precipitate out of the solution forming gypsum rock at the bottom of the tank," explains Lewis.

According to Lewis, you can prevent this by storing and mixing the nutrients separately. For example, you can begin by adding the first nutrient mix when the tank is a quarter of the way full and the rest of the nutrients when

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the tank is half way full. The same technique applies to liquid nutrient solutions.

“The most important thing is to mix the nutrients well—you want to achieve a good distribution. For example, if you’re mixing liquid acid, acid is heavier than water, and if you don’t mix it well it’s going to sit at the bottom of the tank causing a pH of 1 at the bottom of the tank and a pH of 7 throughout the rest of the tank. That’s not good for the plant.”

Another example is copper application. Given its weight, it’s important to mix it well with the water, which will turn it green temporarily until it fades completely.

“It’s best to add the nutrients while you’re filling the tank instead of filling the tank then adding the nutrients later, since nutrients displace water. Adding them at the end will flood the tank with nutrients,” Lewis states.

After you’ve added the nutrients it’s important to apply the Styrofoam covers immediately because algae can form in as quickly as 24 hours.

Biological Control

“After placing the transplants in the covers, I don’t touch them until they’re ready to harvest. Each time my hands don’t touch the transplants it’s one opportunity less to contaminate the product,” Lewis comments. In addition to providing the plants a sterile environment it’s critical to use sticky yellow and blue traps to attract pests, to keep the greenhouse at a constant temperature of 70°F, and also to use fans to protect the plants.

“By using fans, two things are happening: one is that I’m blowing away insects that can’t fly against the current created by the fan, keeping them away from the production system, and the second is that one of the most common physiological problems is tip-burn, a calcium deficiency, which can be remediated by applying air to the stomata zone.

Lewis explains that when the climate is too humid, the

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plants can't breathe and as a result can't move calcium and water through their systems, which causes death. When you apply air, that air disrupts the humidity of the environment causing plant transpiration. "At that moment you'll see the plants begin to grow a little faster."

Satisfying The Local Market

One of the advantages of this simple production system is that it allows the grower to adapt their offering according to market needs. Among the most commonly grown vegetables in this type of system are mustard, red onions, scallions, cabbage, basil, watercress, and some cut flowers.

The system offers growers the opportunity to harvest and sell specialty lettuces with their roots still intact at market, obtaining a higher price than other lettuces. Depending on the crop, you can achieve a harvest in 3 to 5 weeks, however, if you're growing different crops, you need to keep in mind that those crops will attract different pests according to the preferences of the pests.

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michael uzquiano · July 1, 2013 at 5:56 pm

Growing Produce in a Floating System sounds great but the author failed to tell us about the structure, the pool; that is, size, depth, filtration and circulation of the water. and if were to do this inside one of our greenhouses, how do we go from one crop in containers to one swimming in water?

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