



Effects of root cages attached to floating rafts in an aquaponics deep-water system on available dissolved oxygen

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Project Summary

This project investigated the effects of root cages attached to floating rafts in a deep-water aquaponics system on available dissolved oxygen (DO).

Background

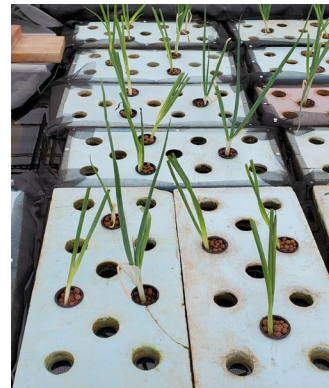
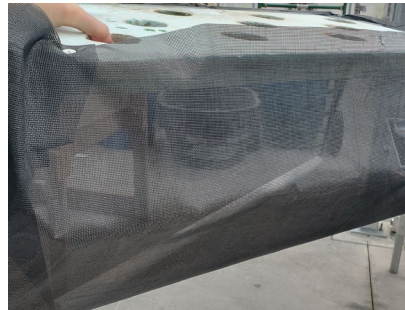
In deep-water aquaponics systems much of the systems space is occupied by the plant's roots. This space cannot be utilized to grow fish because the fish will eat the roots of the plants, harming the plants and leading to a decrease in plant production. If a cage is attached around the roots, then the fish will not be able to eat the roots and fish can be grown around the root cages. This allows more and/or different species of fish to be grown at the same time, resulting in an increase in fish and plant production. Material selection can be an important consideration in the design of this kind of system - it could cause a decrease in dissolved oxygen levels which would have a negative impact on the plant growth. Our objective was to determine the effect of shade screening on dissolved oxygen.

Methods

Shade screening was attached to the top of rafts containing green onion plants to create cages. The cages were made at a depth of 6 inches and 12 inches in triplicate for each material. Two rafts were used as a control and were left without cages, creating 14 rafts in total. DO was measured for 5 consecutive days around the same time of day.

Materials used:

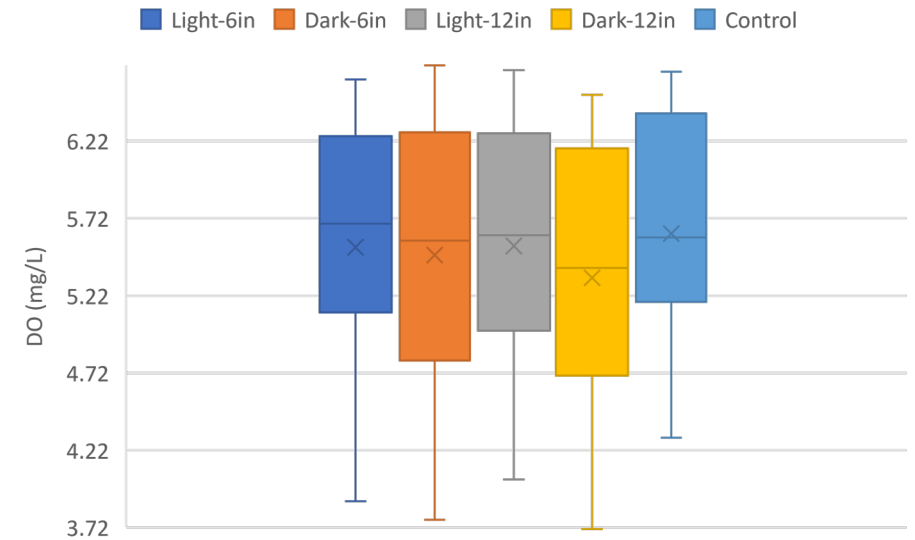
- shade screening, two different weights
- expanded polystyrene rafts
- plastic dry wall anchors
- exterior wood screws
- PVC pipe



Outcomes

DO is not altered by root cage depth. DO levels are affected by the material of the cage and location of raft in tank. The heavier darker shade material rafts had less DO levels than the lighter fabric.

DO Levels Over 6 days



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