The College of Agricultural Sciences

A NEW METHOD OF STRAWBERRY PRODUCTION?

Production of Strawberries on Raised Structures in a Coco-coir or Peat Substrate Mix.

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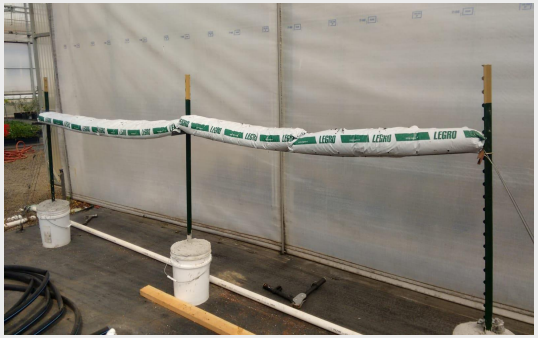


Images 1-3: These are the final three structure designs of the raised structures. The above structure is designed for grow bags while the other two structures to the left are designed to hold gutters with pots.

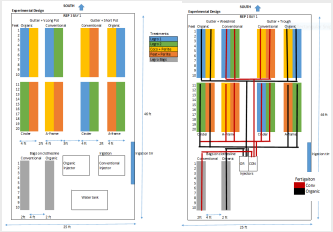
THE HISTORY OF STRAWBERRIES IN OREGON:

Oregon has historically had a strong influence in strawberry production. This dates back to the Native Americans who gathered strawberries throughout the Oregon coast and Cascade Mountains to 1846 when a nursery man from New York travelled west bringing with him a hardier strawberry variety well suited to Oregon's mild climate. By the 1920s Oregon was producing strawberries form hood river to Gresham and throughout the rich Willamette Valley. Oregon has also been instrumental in strawberry research since 1911 when the USDA—Agricultural Researcher Services (USDA—ARS) strawberry breading program was established in Corvallis Oregon in conjunction with Oregon State University (OSU). This relationship has continued to this day as Dr. Bernadine Strik, Professor of Horticulture at OSU, and Dr. Chad Finn, a research geneticist for the USDA—ARS, work collectively to develop better berry crops for the Pacific North West. (Oregon Strawberries)

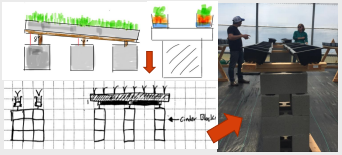
THE IMPORTANCE OF CONTINUING RESEARCH:

Although Oregon has a historically strong fresh strawberry market in recent years California has been out competing Oregon by a large margin. In 2004 California's yield was four times that of Oregon for fresh market production (Commodity Profile: Strawberries). For Oregon to compete with California, growers need new affordable and innovative technologies to produce reduced costs, higher quality yields and increased efficiency. This project is designed to test a fresh market production system with high yield per acre and ergonomically beneficial harvest system through the use of dense planting systems and raised structures. Raised Structures have been found to be ergonomically beneficial and more efficient for harvesting (Rowley, et al). Despite the ergonomic benefits of raised structures and efficient harvests the cost of construction and management is not always out weighed by the increased yield (Rowley, et al). That is why this project also aims to design low maintenance structures at a low cost. More technologies like these could help Oregon growers stay competitive in today's fresh strawberry market.

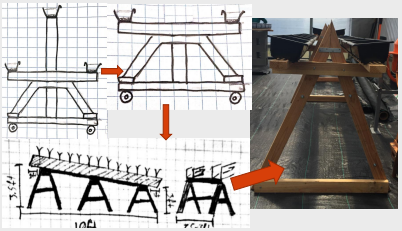
THE DESIGN PROCESS:



The Experimental and Irrigation Design



Cinder Block Design Progression



The A-Frame Design Progression

METHODS

This study is designed to take place over multiple seasons in a retractable roof greenhouse in Aroura OR. Bareroot plants grown in plugs in a greenhouse, for up to 6 weeks, will be used as a planting stock. Three different structure deigns were built in a block system; one structure was designed specifically for grow bags with a lower planting density for separate observation. There are three treatments: 1) Fertigation (Organic, Conventional), 2) Substrate (4 different ratios of coco coir to perlite and peat to perlite), 3) Pot type (long and shallow or short and deep). These pots will be arranged in in gutters set at a pitch angle for drainage. Two of the substrates are premixed and were donated by Legro, a company that has ben producing substrates since the 1920s. The other two substrates will be mixed by us at ratios of 40% coco coir to 60% perlite and 70% peat to 30% perlite. Harvest is expected to start 4-8 weeks after planting. Plots will be harvested two times weekly. Runner and old leaf data will be collected once monthly, along with brix.

AKNOLLEDGMENTS:

I would like to thank:

E.R Jackman Friends and Alumni, My Mentors, Javier Fernandez-Salvador , Erica Chernoh and Christina Walsh, OSU Branch Experiment Station NWREC, and The College of Agricultural Sciences for the wonderful opportunities that have brought me here today. I would also like to thank Legro and PlantLogic for their generous donations to the project.

WORKS CITED:

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Boriss H (2006). Commodity Profile: Strawberries https://aic.ucdavis.edu/profiles/Strawberries-2006.pdf. Accessed 16 Oct 2019

Rowley, D., Black, B.L., Drost, D., Feuz, D., 2010. Early-season extension using June-bearing "Chandler" strawberry in high-elevation high tunnels. HortScience 45, 1464–1469.

WHAT DID I GET OUT OF THIS PROJECT?

In short, I learned to be flexible. This was not my initial project. I was previously assigned to a project in cover cropping with a field experiment. Due to the historical flooding in Corvallis this past year my primary research focus was moved to the raised substrate production project. Just this factor in my research experience showed me that with research you have to be flexible and adjust to the circumstances that are presented, such as unpredictable environmental factors. During this project this happened regularly, partially because this is a preliminary study that as far as my mentors and I are aware has not been done before in this fashion. I used the lesson of flexibility constantly throughout the project, as I worked through many iterations of the structural, irrigation and experimental designs.

During this project I learned a lot about the process of designing an experiment including accounting for all variables, treatments, and controls as well as choosing the appropriate system of randomization. I also quickly discovered how many factors go into the design and implementation of an experiment, especially as I worked to develop a timeline and budget. While designing the raised structures I also had to take into account the costs of the structures. Along with cost we had to account for the feasibility of the structures, such as man power required to build and move the structures, the sunlight availably with stacked vertical systems and so on. These factors led to many different iterations of the designs and a few that got thrown out completely. Eventually my mentors Javier, Erica and I ended on my final two designs, an A-Frame design and a cinderblock tower design, both of which were simple, cheap and structurally sound enough to build quickly with a small team and hold the weight of the plants, substrate and irrigation system.

Image above: Team photo for all research projects with Javier
Image right: me demonstrating an organic field management technique for strawberries

This project also allowed me to get hands on experience with the design and implantation of a drip irrigation system. I designed the irrigation system for my project but did not reach the stage of installation. However, my mentor had multiple projects with various other student researchers allowing me to work with them in the implementation of a field drip irrigation system to gain experience.

Due to environmental factors the project is scheduled to start planting and data collection Fall 2019. Due to this Javier decided to have me manage the data collection and field management of two other projects. This allowed me to gain experience in the data collection process and the maintenance of an agricultural field. The specific data collection methods I worked with were yield by mass, cull and marketable produce distinction, crown diameter data and brix for the fruit.

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