



Florida Small Farms and Alternative Enterprises CONFERENCE

Hydroponics 101





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For more information on Small Farms, visit our website at:
<http://smallfarms.ifas.ufl.edu> or contact your local County Extension Agent.

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hy•dro•pon•ics -

Cultivation of plants in nutrient solution rather than in soil.

From the Greek words:

“hydro” meaning “water”

“ponos” meaning “working”

*Natalie's
pet peeve!*

There is no
“F”

hydro-fonics is not a word!!

KEVIN'S PET PEEVE?

**“No Sir, we are not growing “Weed”, “Pot”,
“Grass”, “Mary Jane” or any other illegal
substance!!**

Why hydroponics?

1. Saves space
2. Saves water
3. Eliminates many problems with soil: insects, diseases, poor quality or nutrient content
4. Fewer chemical inputs (pesticides, herbicides, fungicides)
5. Automatic feeding and no weeding
6. Plants can grow faster
7. It's clean and it's COOL!

Hydroponics 101

Part 1:

- **Media**
- **Systems**
- **Nutrition and Delivery**
- **Structures**

Part 2:

Demonstration Stations 1-4

No DIRT?

No PROBLEM!



MEDIA

Media: Coconut Coir or Fiber



Media: Perlite



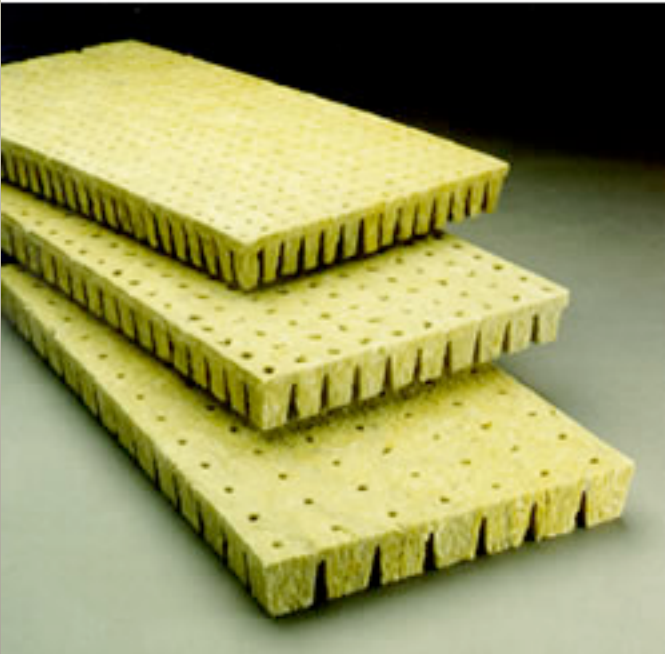
Media: Pine Bark



Media: Vermiculite



Media: Rockwool



Media: Sphagnum Peat



Media: Clay Pellets



Media: Other Options

- Sand
- Sawdust
- Rice hulls
- Peanut hulls
- Gravel
- Polystyrene packing peanuts

**GET
GROWING!**

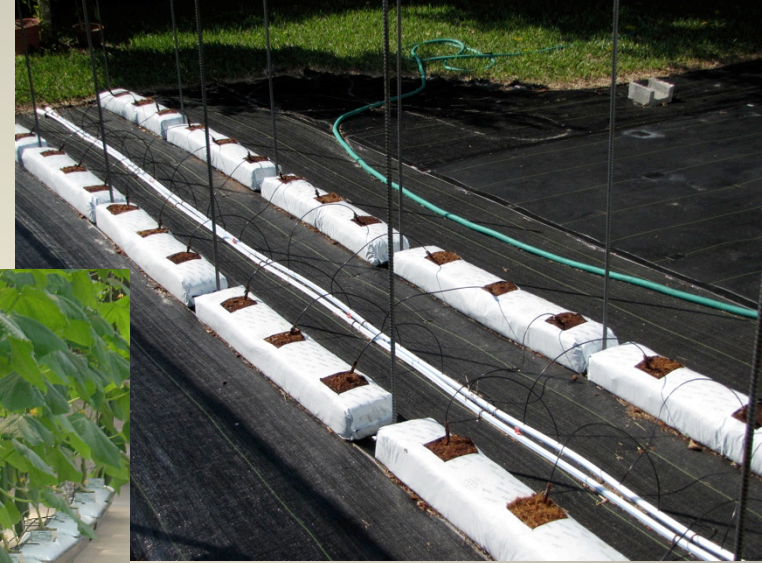


SYSTEMS

Systems: Vertical Towers



Systems: Lay Flat Bags



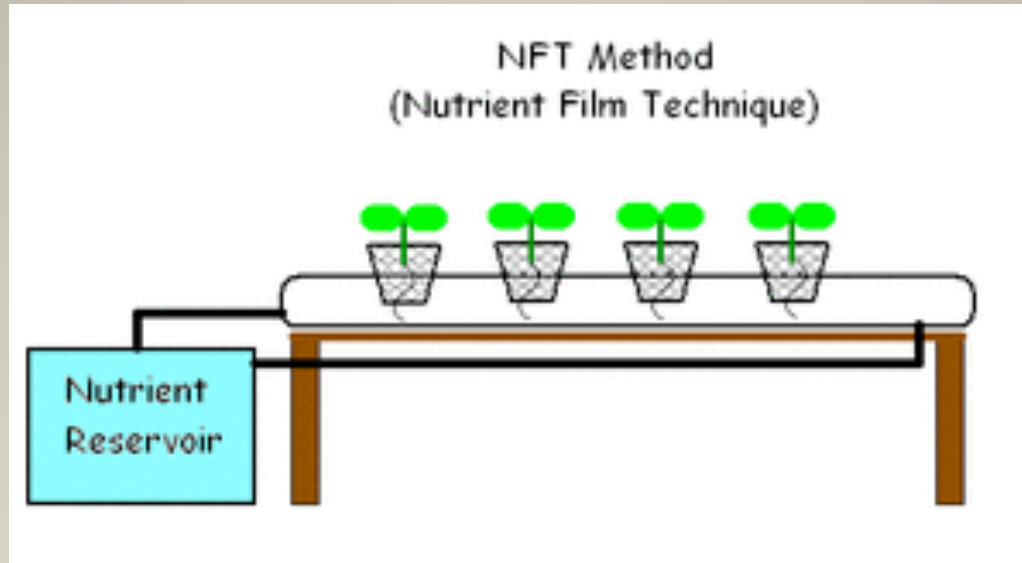
Systems: Ground Bags or Pots



Systems: Reservoir Containers



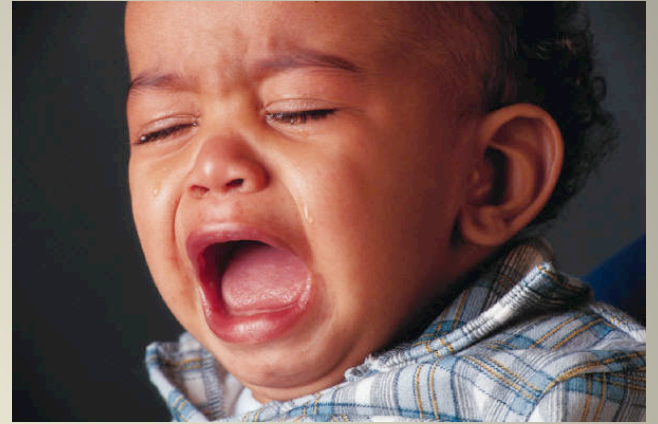
Systems: Nutrient Film Technique



Systems: Water Culture



**MOM! What's
for dinner?!**



NUTRITION

16 ELEMENTS OF PLANT NUTRITION

The Majors:

- Nitrogen
 - Phosphorus
 - Potassium
 - Calcium
 - Magnesium
 - Sulfur
- } “N-P-K”

The Minors:

- Iron
- Copper
- Zinc
- Chlorine
- Manganese
- Boron
- Molybdenum

“Environmentals”

- Oxygen
- Hydrogen
- Carbon

Making it Easy: Pre-Mixed Nutrients

VERTI-GRO

SOLUBLE
HYDROPONIC NUTRIENT

NET WEIGHT: 25 lbs. (11.35kg)

GUARANTEED CHEMICAL ANALYSIS

8 - 15 - 36

(with trace minerals)

TOTAL NITROGEN (N)	8.00%
Nitrate Nitrogen (min.)	7.50%
Ammoniacal Nitrogen (max.)	0.50%
Urea Nitrogen	0.00%
Available Phosphoric Acid (P ₂ O ₅)	15.00%
Soluble Potash (K ₂ O)	36.00%
Total Magnesium as (Mg)	0.02%
Water Soluble Magnesium as (Mg)	0.02%
Boron as (B)	0.05%
Copper as (Cu)	0.03%
Iron as (Fe)	0.40%
Total Manganese as (Mn)	0.05%
Soluble Manganese as (Mn)	0.05%
Molybdenum as (Mo)	0.01%
Zinc as (Zn)	0.03%

DERIVED FROM: Potassium Nitrate, Potassium Phosphate, Ammonium Phosphate, Magnesium Sulfate, Boric Acid, Sodium Molybdate, Copper, Iron, Manganese, and Zinc with EDTA Chelate.

INSTRUCTIONS: Use 7-9 ounce of dry fertilizer per 100 gallons of water. Dissolve completely. Use only as recommended. Refer to separate fertilizer mixing instructions for specific use with hydroponic growing systems. **Must be used with Calcium Nitrate (Greenhouse Grade) and additional Magnesium Sulfate (Epsom Salts).**

Formulated Especially for:

VERTI-GRO, INC.
Summerfield, FL 34491
1-800-955-6757



Getting It Right: Balancing pH

pH – What is it?

The scale goes from 0 to 14.

Below 7 is acidic. The pH of lemon juice is about 2.

A measure of how acidic or basic a substance is.

7 is considered neutral. The pH of water is 7.

Above 7 is basic. The pH of ammonia is 11.



Most plants prefer a pH around 5.0-7.0

Getting It Right: Measure of Nutrient

Too little?



Too much?

Waste of \$\$\$

Just right!!



Getting It Right: Measure of Nutrient

TDS meter (Total Dissolved Solids)

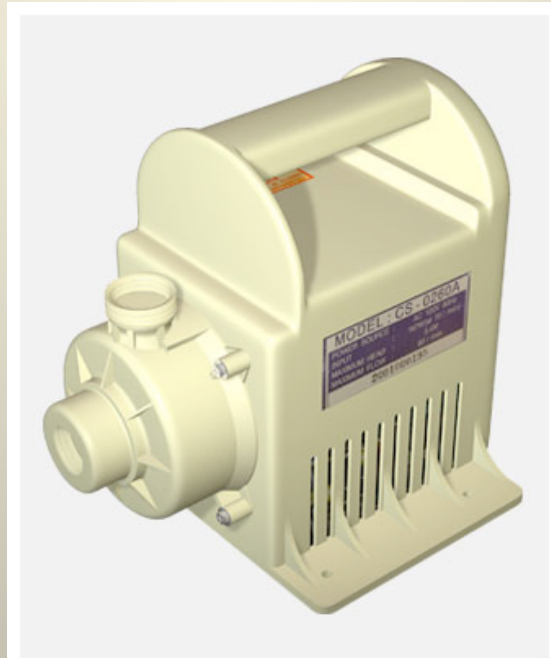


EC meter (Electrical Conductivity)

Getting It Right: Nutrient Delivery

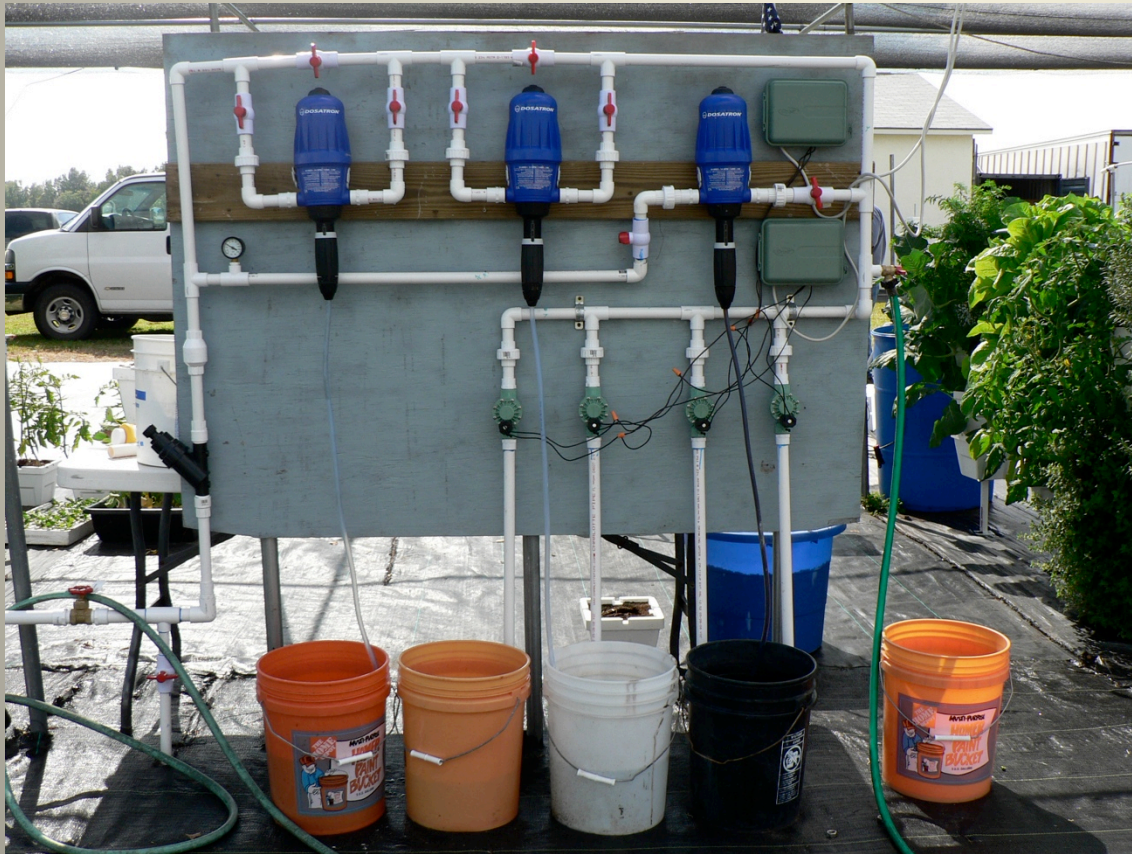


Manual Pumps

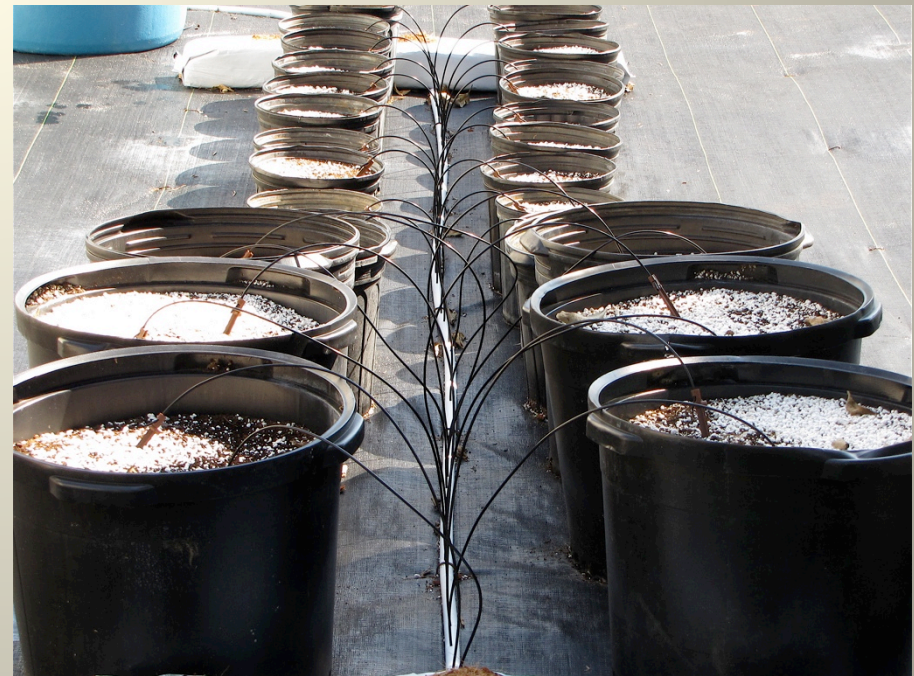


Getting It Right: Nutrient Delivery

Injectors



Getting It Right: Pieces of the Puzzle



**We've Got You
COVERED!**

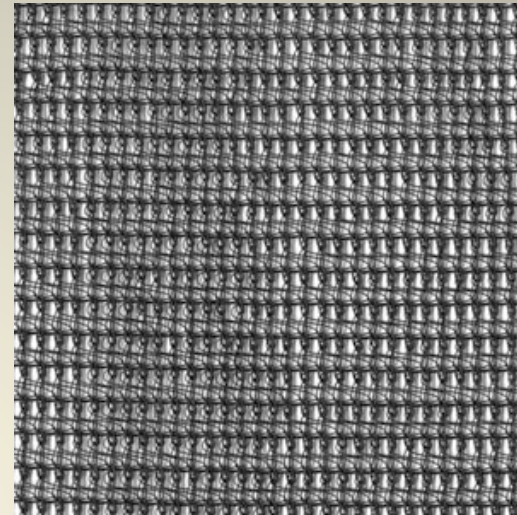
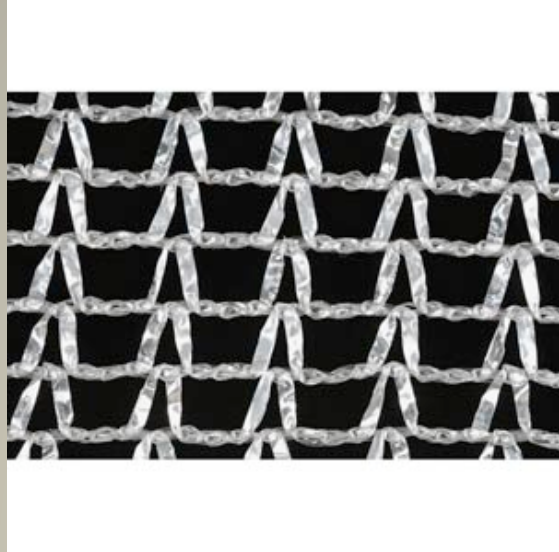


STRUCTURES

Structures: Backyard Hydroponics



Structures: Shade Cover or Houses



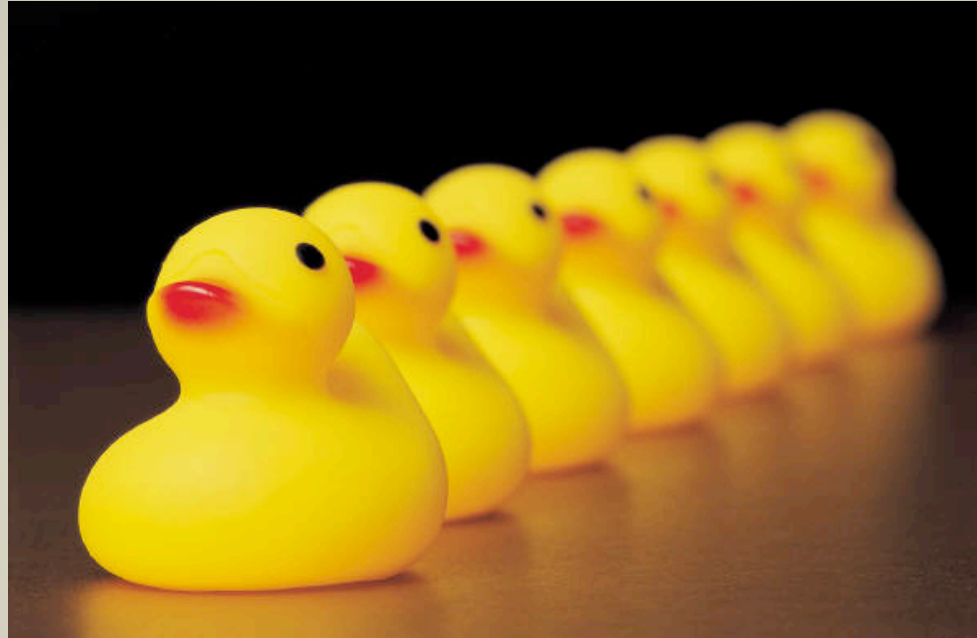
Structures: Hoop Houses



Structures: Greenhouses



Getting Your Ducks in a Row



ASK YOURSELF SOME QUESTIONS:

- Why do you want to grow hydroponically?
- What are your resources?
- What do you want to grow?
- Who will be your “customers”?
- Where can I get more information?

University of Florida/IFAS
Small Farms Academy

North Florida Research and Education
Center- Suwannee Valley in Live Oak



• **Verti-Gro, Inc.** Workshops in Summerfield, FL

• Technical Services from Many Knowledgeable Hydroponics Supply Companies
including **Hydro-Gardens** In Colorado Springs, CO



Happy Growing!!