Hydroponics 101
The 2012 Educational Program Committee is pleased to share conference educational materials with you under the condition that they are used without alteration for educational and non-commercial use only. All materials are protected by copyright law. The authors kindly request their work is properly cited, including the date of publication.

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

For inquiries about this topic, please contact:
Danielle Treadwell, Educational Program Chair.
Phone: (352)-273-4775
E-mail: ddtreadw@ufl.edu

Suggested Citation: Author Full Name. Title of Presentation or Handout. 2012 University of Florida-IFAS and Florida Agricultural and Mechanical University-CAFS Florida Small Farms and Alternative Enterprises Conference. July 27-29, Kissimmee, FL.
hy•dro•pon•ics -

Cultivation of plants in nutrient solution rather than in soil.

From the Greek words:

“hydro” meaning “water”
“ponos” meaning “working”
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

NFT Method
(Nutrient Film Technique)

Nutrient Reservoir

[Images of plants and a greenhouse]
Systems: Water Culture
MOM! What’s for dinner?!

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)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NITROGEN (N)</td>
<td>8.00%</td>
</tr>
<tr>
<td>Nitrate Nitrogen (N)</td>
<td>7.60%</td>
</tr>
<tr>
<td>Urea Nitrogen</td>
<td>0.69%</td>
</tr>
<tr>
<td>Ammonium Nitrogen (max.)</td>
<td>0.50%</td>
</tr>
<tr>
<td>Available Phosphoric Acid (P2O5)</td>
<td>15.00%</td>
</tr>
<tr>
<td>Soluble Potash (K2O)</td>
<td>36.00%</td>
</tr>
<tr>
<td>Total Magnesium as (Mg)</td>
<td>0.52%</td>
</tr>
<tr>
<td>Water Soluble Magnesium as (Mg)</td>
<td>0.52%</td>
</tr>
<tr>
<td>Boron as (B)</td>
<td>0.06%</td>
</tr>
<tr>
<td>Copper as (Cu)</td>
<td>0.03%</td>
</tr>
<tr>
<td>Iron as (Fe)</td>
<td>0.40%</td>
</tr>
<tr>
<td>Total Manganese as (Mn)</td>
<td>0.05%</td>
</tr>
<tr>
<td>Soluble Manganese as (Mn)</td>
<td>0.05%</td>
</tr>
<tr>
<td>Molybdenum as (Mo)</td>
<td>0.01%</td>
</tr>
<tr>
<td>Zinc as (Zn)</td>
<td>0.03%</td>
</tr>
</tbody>
</table>

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 separator fertilizing 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.
Summersfield, 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.**

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

**A measure of how acidic or basic a substance is.**

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

**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!!