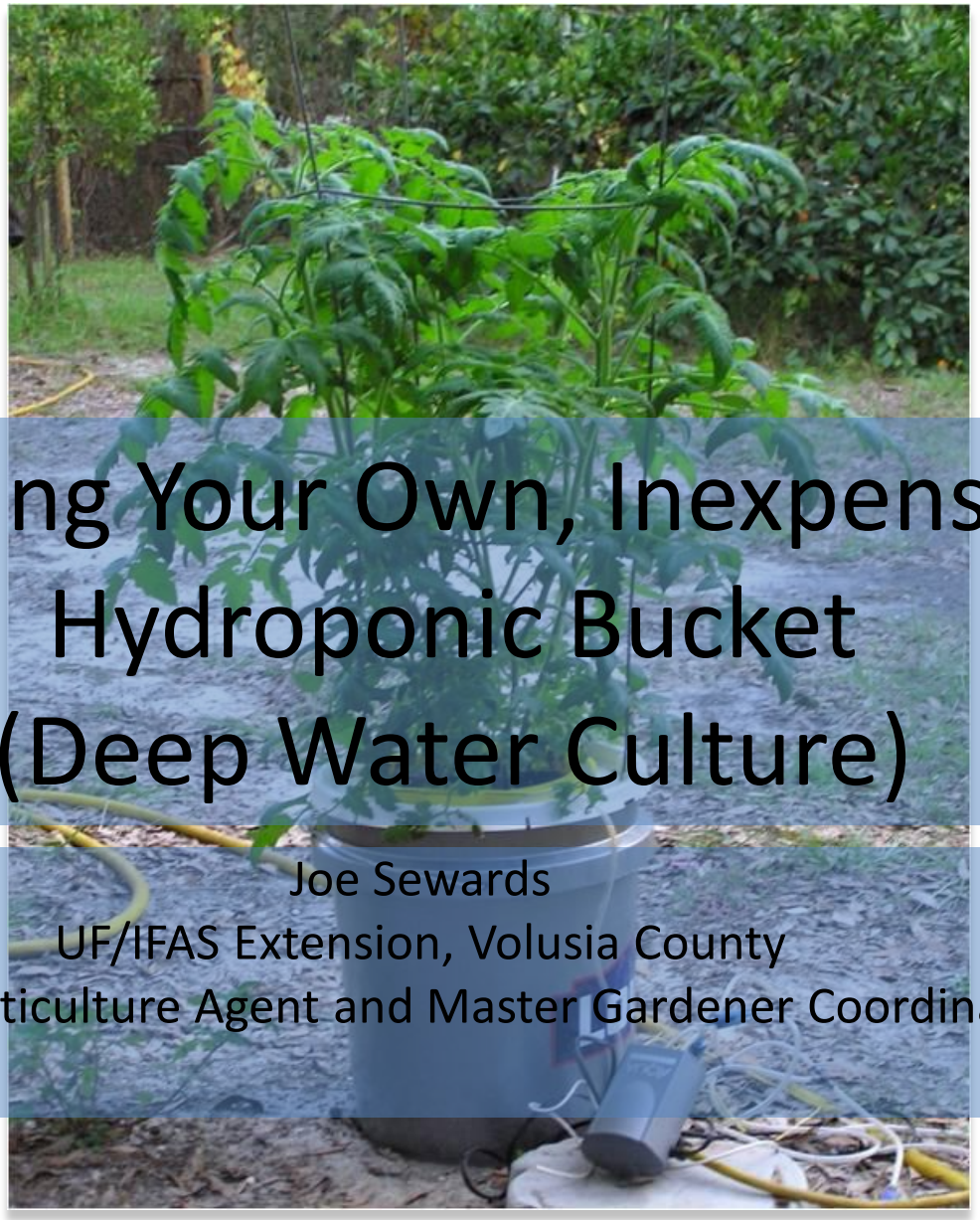

Making Your Own, Inexpensive Hydroponic Bucket (Deep Water Culture)

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Before We Begin!!

- The information given today should be beneficial to the gardening enthusiast who wishes to try hydroponics as a hobby. Commercial production of vegetables utilizing hydroponic techniques is complicated and should be employed by only the most competent grower. Commercial growers should refer to Florida Cooperative Extension Service Bulletins specifically developed for the hydroponic industry.

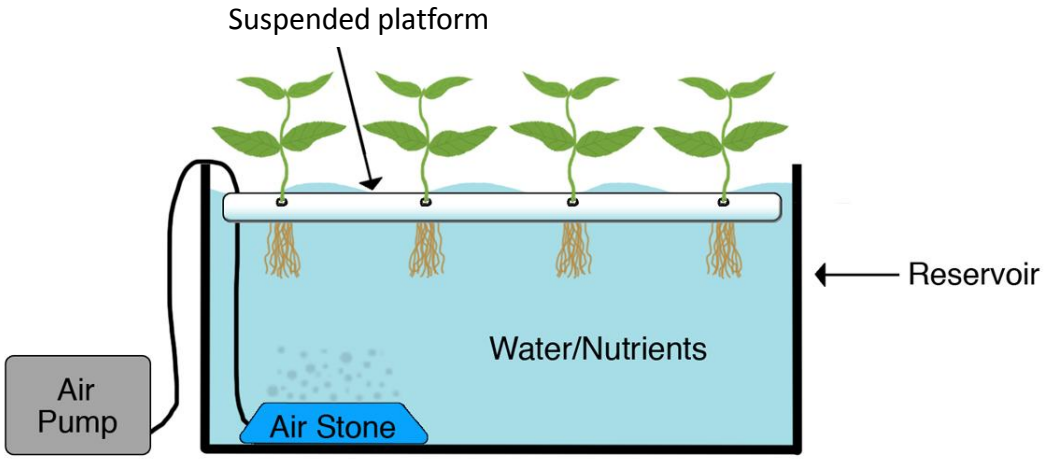
What is Hydroponics?

- Growing plants without soil is often called hydroponics. The name implies that the plants are grown in water containing dissolved nutrients. However, pure water culture is only one of the many methods employed.
- All of the other methods might simply be grouped as "soilless" culture, which would include sand culture, gravel culture, and culture utilizing other inert media substrates such as perlite, expanded clay pellets, coconut coir,pine bark and/or vermiculite.

Deep Water Culture

- **Deep water culture** (DWC) is a hydroponic method of plant production by means of *suspending* the plant roots in a solution of nutrient-rich, oxygenated water

Deep Water Culture (DWC)



- The system consists of a container with a lid, a container with holes in the bottom, inter media for support, air pump, airline, and an air stone.

DWC

- This type of hydroponic system is suitable for more “long-term” crops such as:
  - Tomatoes
  - Peppers
  - Eggplant
  - Cucumbers
  - Squash
  - Beans
  - Etc

DWC

- Traditional methods favor the use of plastic buckets with the plant contained in a net pot suspended from the center of the lid and the roots suspended in the nutrient solution.
- An air pump powered aquarium airstone oxygenates the nutrient solution.
- If sufficiently oxygenated, the plant roots can remain submerged indefinitely.

DWC

- Plants absorb vastly more oxygen directly from the air than from the oxygen dissolved in water.
- Deep water culture allows plant roots to absorb large quantities of oxygen while also allowing the uptake of nutrients.
- This leads to rapid growth throughout the life of the plant.

Building Your Own DWC Bucket

Supplies list:

- ✓ 5 gallon bucket with lid (usually sold separately)
- ✓ 6 inch (+/-) pot
- ✓ Long-fibered sphagnum moss
- ✓ Either gravel, marbles, clay pellets, perlite etc.
- ✓ 4-leg tomato cage
- ✓ Small Air tubing
- ✓ Aquarium pump
- ✓ Air stone
- ✓ 20-20-20 water soluble fertilizer with minor elements
- ✓ Epsom Salts (or Magnesium sulfate)
- ✓ Drill
- ✓ ¼” drill bit
- ✓ 1” hole saw
- ✓ Jigsaw
- ✓ Pliers

Bucket with lid

Set tomato cage on lid and mark (approximately) where legs are with an indelible marker

Using a ¼” drill bit, drill holes where legs were marked on the lid

Mark a hole, 6” in diameter in the lid

Mark another, smaller hole, off to the side of the larger hole. This will accommodate the air tube and make it easier to add water /fertilizer solution when needed.

Lid with 6” hole marked

Drill a starter hole to cut the hole for the container

Using a jigsaw or a small keyhole saw, make the hole that will hold the container

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Place container into the 6” hole

Create the smaller hole (can be 1” or more in diameter) that will accommodate the air tube and to fill the bucket as needed

Insert the tomato cage into the holes that were previously drilled

Be sure the legs of the tomato cage touch the bottom of the bucket

Mark the spot on the cage legs with your marker

Remove lid and tomato cage

Slide lid up 1” on the tomato cage

Using pliers, bend each of the legs 90^{o} to the side

Be sure this bend is 1” above the mark you created earlier. Then, bend it back at the original mark so that legs point straight down again. This will create a single unit.

Finished bending the legs

Replace lid and tomato cage on the bucket

Airstones can be found at any pet supply or aquarium supply store

Attach one or two airstones to the air tubing. The tubing and aquarium pump.

Finished bucket

Place container back into lid and put 1-2 inches of long-fibered sphagnum moss in bottom

Begin to fill container with inert media such as pine bark, gravel etc. about 1 inch

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Place your plant into the inert media and finish filling the container. This simply holds the plant upright until it starts to grow

We did two buckets (hence the different color) and this is what the tomato looked like in 3 weeks.

Fertilizer (Nutrient) Solution

- 2 TEASPOONS per gallon of 20-20-20 water soluble fertilizer that contains minor elements
- 1 TEASPOONS per gallon of Epsom Salts (Magnesium Sulfate)
- Brand name not important!
- Keep a 1 gallon jug of fertilizer solution handy at all times to add to bucket when needed.

Home-made Macro-nutrient Solution

Formula for preparing a general purpose nutrient solution (Hoagland).

			Amount for 25 gallons of solution	
Salt	**Grade**	**Nutrient**	**Oz.**	**Level tbsp.**
K phos.(mono-basic)	Technical	Potassium, Phosphorus	½	1
K nit.	Fertilizer	Potassium, Nitrogen	2	4
Ca nit.	Fertilizer	Calcium, Nitrogen	3	7
Mg sulf.	Technical	Magnesium, Sulfur	1½	4

Home-made Minor (trace) Element Solution

Formula for solution providing trace elements.

Salt (Chemical Grade)	Nutrients supplied	Amount water to add to 1 level tsp salt	Amount to use for 25 gal. solution
Boric acid, powdered	Boron	½ gal.	½ pint
Manganese chloride ($MnCl_24H_2O$)	MnCl	1½ gals.	½ pint
Zinc sulfate ($ZnSO_47H_2O$)	Zinc Sulfur	2½ qts.	½ tsp.
Copper Sulfate ($CuSO_45H_2O$)	Copper Sulfur	1 gal.	1/5 tsp.
Iron tartrate (chelated Fe330)	Iron	1 qt.	½ cup
Mo trioxide (MoO_3)	Molybdenum	1 qt.	1 oz.

A Few Hydroponic Suppliers

- **Pentair Aquatic Eco-systems, Inc.** - http://www.PentairAES.com 1-877-347-4788 - net pots, hobby kits, hydroponic supplies.
- **Hydrogardens, Inc.** - http://www.hydrogarden.com 1-800-634-6362 - net pots, hydroponic supplies.
- **Verti-Gro, Inc.** 1-800-955-6757 or 1-352-347-9888 – vertical and other complete hydroponic gardening supplies.
- **CropKing, Inc.** 1-800-321-5656 - hydroponic supplies, hobby greenhouses.
- **Worm's Way, Inc.** 1-800-283-9676 - hydroponic supplies, hobby kits.
- **Future Growing LLC-** http://www.futuregrowing.com- hydroponic growing systems and supplies.
- **Growers Supply, Division of Farm Tek** http://www.growerssupply.com 1-800-476-9715 hydroponic systems and greenhouse supplies.
- *Note: This is a partial list of suppliers of hydroponic materials and supplies. Mention of the above suppliers is not intended to be an endorsement of their product or a preference over other suppliers.*

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