

3. Replace the Vortex sprayer in the system cover. Plug in the motor.

*If the motorized sprayer stops unexpectedly, immediately:*

1. Check that the power cord is properly plugged in and there is power to the socket.
2. Unless the motor can be restarted within a few minutes, add enough nutrient solution, or plain water, so that the bottoms of all growing cups are submerged. This will prevent crop loss.
3. If the problem seems to be in the motor, contact your retailer or General Hydroponics.

Plants, like all living organisms can be infected with a variety of diseases. The best way to avoid sick plants is to maintain clean conditions and correct environmental factors (light, temperature, humidity, ventilation, etc.) for a given crop. Start with clean seeds and cuttings. If you suspect plant disease, consult a good guide or call your county agricultural agent.

#### **RainForest Accessories**

General Hydroponics offers the following accessory and replacement products for use with your RainForest system:

- CocoTek liners & caps
- Lid insert kits
- Controller for multiple module systems
- WaterFarm modules for larger plants
- Nutrient chemicals in small and large quantities
- pH test kits, pH control solutions
- Growing cups and covers
- Hydroton
- Pump rebuild kits

#### **We Value Your Opinion**

Thank you for selecting the RainForest modular hydroponic system. Your satisfaction, and your opinions about our products, matter a great deal to us. Please send us any comments or suggestions about how we can improve our product line. If you wish to be on our mailing list (to receive information about new products), please send us your name and address.



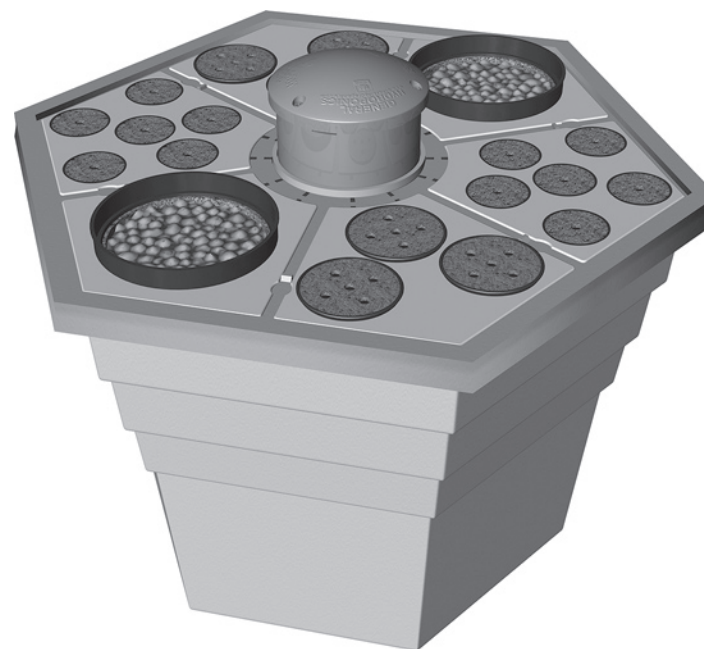
[www.generalhydroponics.com](http://www.generalhydroponics.com)

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 **GENERAL  
HYDROPONICS®**  
Bringing Nature and Technology Together

# RainForest

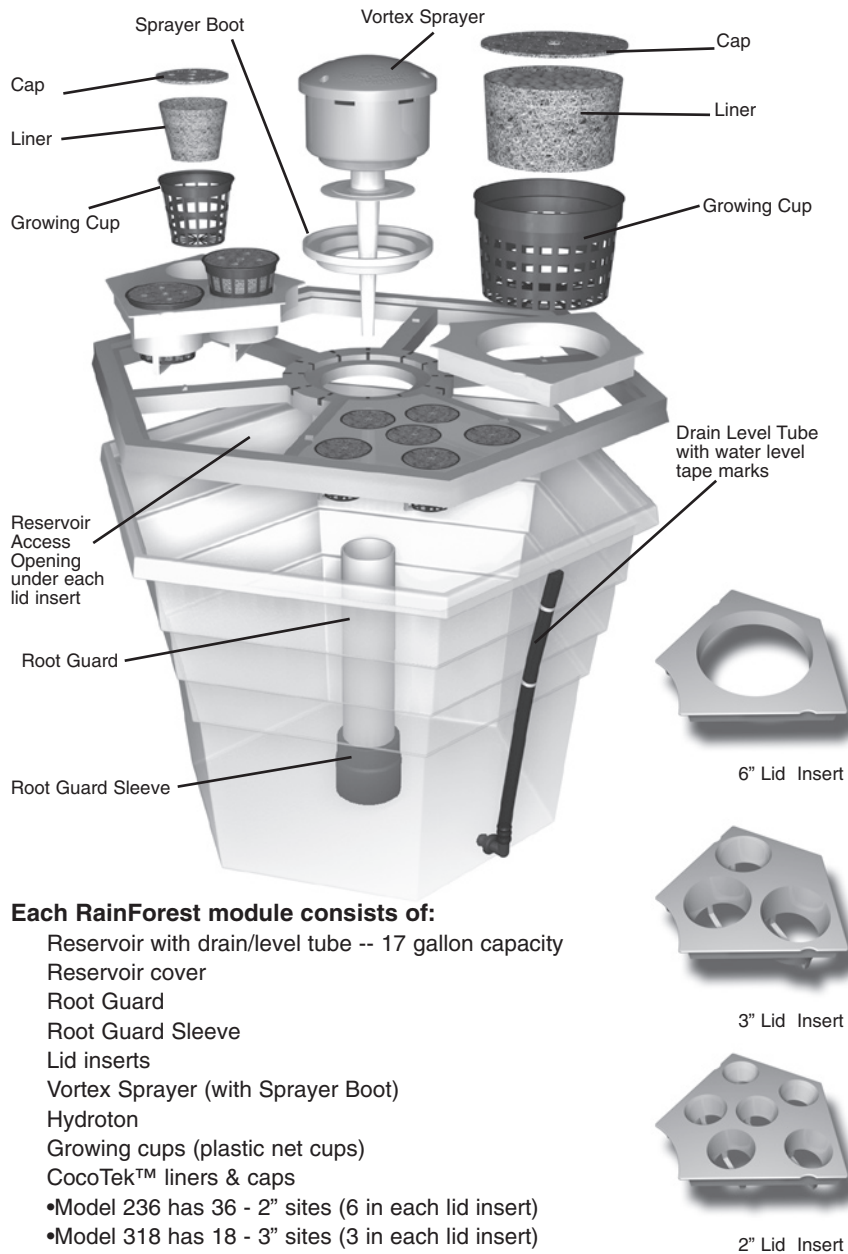
**Modular Aeroponic System Models 66, 318 & 236**



**The RainForest System** allows you to rapidly root cuttings and germinate seeds. You can raise small plants to maturity in the RainForest, or start your plants in the RainForest and transplant them to your garden or to another hydroponic system such as the General Hydroponics WaterFarm.

You will be amazed by the kinds of plants that can be propagated from cuttings using the RainForest. These include fruit and nut trees, ornamental shrubs, vegetables, and flowers -- many of which have never been propagated by cuttings before. Of course, easily-propagated plants will root quickly and grow phenomenally in the RainForest.

The RainForest secret is the patented aero-hydroponic method of delivering the nutrient solution. Oxygen-charged nutrient solution is sprayed through the air onto the cuttings, seeds, and newly formed roots. This oxygen-rich nutrient solution constantly circulates within the RainForest reservoir, so that much more oxygen reaches the root boundary zone than with other hydroponic systems. The roots absorb optimal levels of both oxygen and nutrients, so that the entire plant thrives.



**Each RainForest module consists of:**

- Reservoir with drain/level tube -- 17 gallon capacity
- Reservoir cover
- Root Guard
- Root Guard Sleeve
- Lid inserts
- Vortex Sprayer (with Sprayer Boot)
- Hydroton
- Growing cups (plastic net cups)
- CocoTek™ liners & caps
- Model 236 has 36 - 2" sites (6 in each lid insert)
- Model 318 has 18 - 3" sites (3 in each lid insert)
- Model 66 has 6 - 6" sites (1 in each lid insert)

**Optional RainForest System Controller**

General Hydroponics™ offers an optional system Controller™ that automatically maintains the level of the nutrient in many interconnected RainForest modules. This option is perfect for large-scale growing, since it eliminates the need to monitor each module separately.

**MAINTAINING YOUR RAINFOREST**

**Maintain the Solution Level**

Nutrient solution is lost through evaporation and plant transpiration. Large, fast-growing plants can lower the reservoir solution level very quickly so you should check the reservoir daily, or use a controller.

Always maintain the nutrient solution at a level between the upper and lower mark on the drain/level tube. Under warm, dry conditions, add plain water as needed to maintain the correct solution level; under cool, humid conditions, add very mild nutrient solution instead. Stir well and adjust the pH level whenever you add water or solution to the system.

**Completely Replace Nutrient Solution**

You should completely replace the nutrient solution at least once a month. If nutrient use exceeds 1 gallon/day in the RainForest, drain and replace the solution every two weeks. If nutrient use exceeds 2 gallons/day in the RainForest, replace the solution once a week.

**Transplant Your RainForest Plants**

You can grow fast-growing crops such as lettuce to maturity in the RainForest. Some other kinds of plants, such as Ficus benjamina, will live happily for years in a RainForest system.

Other large or long-lived plants can be started in the RainForest and then transplanted to the ground or to an WaterFarm unit (a General Hydroponics unit specifically designed for use with large, long-lived plants).

When transplanting, carefully separate or cut apart tangled roots. If there is a large root system, do not try to salvage the cup. For short-lived plants, such as annuals, transplant the plant in its cup. For plants whose enlarging roots might be choked by the cup, cut the cup apart and remove it from the roots in sections.

**Clean the System Between Crops**

In between crops, drain and dismantle the RainForest system. Thoroughly clean the reservoir, drain/level tube, cups, lids, spinner, and Hydroton with a dilute chlorine bleach solution (1/2 cup/gallon). Rinse well and reassemble. This disinfects the system and reduces the rate of algae buildup and disease. *Note: Do not remove spinner from motor shaft.*

**Troubleshooting**

From time to time, you may need to clear nutrient deposits or bits of plant matter from the sprayer holes. To do this:

1. Turn off the system and remove the motorized sprayer from the cover.
2. Spray clogged holes with pressurized water until debris is removed.

- As your plants grow, maintain the appropriate level of nutrient solution in the reservoir (14 to 16 gallons). Keep the nutrient level at the upper mark on the drain/level tube until multiple roots have developed that hang down below the growing cup. Once roots are well developed, you may safely allow the nutrient level to drop as low as the lower mark on the drain/level tube. See *Maintaining Your RainForest* for details.
- After the cuttings have developed roots, add Hydroton to the cups to help support the plants. Be sure to wash and soak the Hydroton before adding them to the cups (see *Equipment Assembly* for details).

The Hydroton serve primarily as a mechanical support. If you expect to transplant your cuttings, you may prefer to not use Hydroton at all.

### To start Seeds in the RainForest:

Always use fresh, clean seeds that are free of disease and/or soil contamination

- Fill each growing cup almost to the top with Hydroton that have been washed and soaked overnight in tap water.
- Place seeds on the Hydroton as you would plant them in the ground. Cover the seeds with a layer of Hydroton.

Most seeds prefer to be planted one Hydroton diameter below the surface. Larger seeds may prefer to be planted deeper, smaller seeds closer to the surface. Place very small seeds on a tiny piece of fine nylon netting, or other non-absorbent support, just under the surface of the Hydroton.

- Insert the cups firmly in the holes in the reservoir cover. Cover any unused holes in the reservoir cover to retard water loss.
- Place the RainForest in a warm, well-lit location.

Seedlings generally develop faster if the nutrient is warm (75-80 F); keep the RainForest in a warm room or place the reservoir on top of a small electric heating pad. Place the RainForest in bright, indirect sunlight -- or use color-corrected, or sun light simulating, lamps placed close to the RainForest reservoir.

- If using artificial lights, set the light timer to simulate a normal day/night cycle. If using a motor timer, connect and set the timer. Plug in the sprayer motor.

When sprouting seeds, it is preferable (but not required) to have the RainForest motor cycle 1-hr ON/1-hr OFF, 24 hrs/day. Once seedling roots extend through the bottom of the cups and into the nutrient solution, you can use any of the timing options described under *Cuttings*: step 6.

- As your plants grow, maintain the appropriate level of nutrient solution in the reservoir (see *Maintaining Your RainForest* for details).

## EQUIPMENT ASSEMBLY

- If you are starting seeds, soak the Hydroton overnight in plain water to "condition" them. Then rinse thoroughly to remove any sand or other small particles.

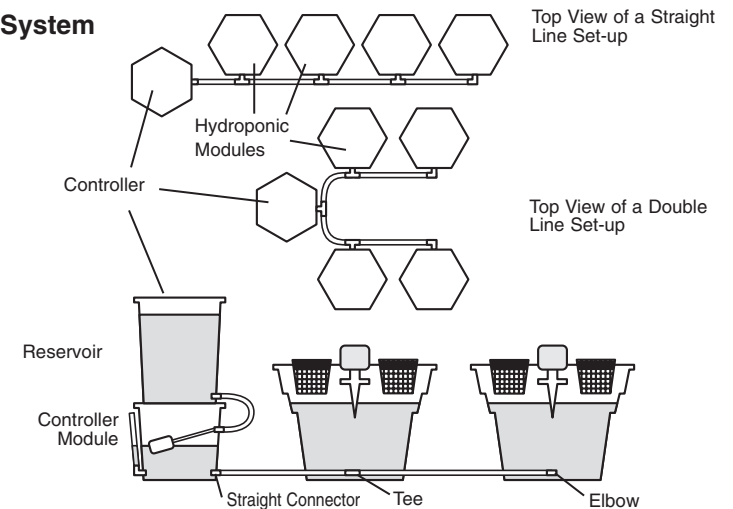
If you are starting cuttings, it is better not to add Hydroton to the cups till roots have begun to form on the cuttings. If you plan to transplant the cuttings, you may prefer to grow them totally without Hydroton.

- Rinse any dust or debris out of the system parts.
- On the side of the reservoir, snap the clip into the hole that is directly above the grommet.
- If you are using a Controller, connect the reservoir to the Controller (see the instructions provided with the Controller) and proceed to step 6 below.

If the reservoir is not being connected to a Controller, insert the rigid end of the elbow for the drain/level tube through the grommet into the reservoir (you may have to gently rock and twist the drain/level tube as you push in order to get the tube through the grommet).

- Gently push the upper part of the drain/level tube into the stud.
- Add the nutrient solution and adjust the pH as described under *The Nutrient Solution*.
- Put the lid on the reservoir and insert the motor in the lid. Briefly plug in the motor to be sure the power source and motor are operational (the sprayer should deliver a strong spray into the "air gap" where the growing cups normally hang). Unplug the motor.
- Plant your RainForest as described under *Planting Your RainForest*.

### Controller System



## THE NUTRIENT SOLUTION

The Model 318 RainForest reservoir holds approximately 16 gallons when filled to the upper mark on the drain/level tube, the lower mark indicates approximately 10 gallons, do not allow the level to fall below the lower mark. You can mix the nutrient solution in the reservoir or another container.

### Mild Solution (for seeds, cuttings or delicate seedlings)

Use the following very mild nutrient solution until the cuttings have rooted or the seedlings have grown several sets of leaves.

1. Add distilled, purified, or reverse-osmosis filtered water to the reservoir up to the top mark on the drain/level tube (18 gallons).
2. Add the following nutrients and stir well:
  - 1/4 tsp FloraMicro / gallon of water (4.5 tsps /18 gallons).
  - 1/ 4 tsp FloraGro / gallon of water (4.5 tsps /18 gallons).
  - 1/4 tsp FloraBloom / gallon of water (4.5 tsps / 18 gallons).
3. Adjust the nutrient solution pH to between 5.8 and 6.2 (see instructions with the General Hydroponics Ph Control kit).

### Regular Solution (for mature or very fast growing plants)

Mature or very fast growing plants usually prefer a stronger nutrient solution for optimal growth and maximum yield.

1. Mix the nutrient solution as described above, but use:
  - 1.5 tsp FloraMicro / gallon of water (9 Tablespoons / 18 gallons)
  - 1.5 tsp FloraGro / gallon of water (9 Tablespoons / 18 gallons)
  - 1 tsp FloraBloom / gallon of water (6 Tablespoons / 18 gallons)
2. Adjust the nutrient solution pH to between 5.5 and 6.5 (see instructions with the General Hydroponics Ph Control Kit).

You may want to adjust the nutrient solution to meet your specific needs.

- To enhance vegetative growth, use more FloraGro and less FloraBloom.
- To enhance flower and fruit production, use less FloraGro and more FloraBloom.
- To provide more calcium or iron (for green, leafy vegetables), use slightly more FloraMicro.
- See nutrient bottle labels for additional information.

## PLANTING YOUR RAINFOREST

You can start 1 to 5 (Model 318) cuttings in each RainForest growing cup. If you start several cuttings in one cup, plan to separate them soon after roots have formed and before their roots become tangled. For large plants and plants that you will raise to maturity in the RainForest, use the center hole in the CocoTek cap and start only 1 cutting per cup.

### To start cuttings in the RainForest:

Always use fresh, clean cuttings that are free of disease and/or soil contamination, soft green stems work best; woody stems are slower.

1. Put a cap on each growing cup. Poke a pencil through the holes in each cap to loosen any tight hole flaps.
2. Trim each cutting to the correct length. Each cutting should have a leaf node very near the bottom end of the cutting. Trim so that 3-1/2" of the cutting can extend below the cap (through the bottom of the cup and into the air gap) and a few inches (containing several leaves) can extend above the cover. Remove all leaves from the portion of the cutting that will be below the cap.
3. Insert the cuttings into the cups. Be sure the cuttings are well separated where they pass through the cup bottom. Be sure all cuttings extend at least 1/2" below the bottom of the cup. The first roots will form at the lowest node on the cutting, which **MUST BE ALWAYS SUBMERGED** in the nutrient solution.
4. Insert the cups firmly in the holes in the reservoir cover. Cover any unused reservoir cover holes to retard water loss by spray.
5. Place the RainForest in a warm, well-lit location. The optimum temperature for starting cuttings is 20-25 C (70-75 F). Keep the plants in bright, indirect sunlight or use color-corrected, or sunlight-simulating, lamps placed close to the cuttings (fluorescent lamps are best, if you are using "Metal-halide or High pressure sodium place them well above the cuttings so that they do not burn).
6. If using artificial lights, set the light timer to simulate a normal day/night cycle. If using a motor timer, connect and set the timer. Plug in the sprayer motor. When starting cuttings, the RainForest motor should be ON 24 hours/day. Once roots extend into the nutrient solution, you can use a timer to run the motor intermittently. Set the timer to run the motor through the day and off at night (it should be turned ON for about 1 hour midway through the night).