

The Green Water Machine

The Green Water Machine is a one gallon jar kit that comes with everything you need to make your own live green water. I'm using "Green Water" as an umbrella term for a living culture primarily consisting of multiple species of single cell algae and other infusoria. This kit includes a live green water starter culture that is perishable. It's best to start your green water culture kit within 24 hours or so after receiving it. This kit also comes with enough algae fertilizer/nutrient to make 3 gallons of green water. Algae fertilizer/nutrient and live green water starter cultures are also sold separately at PhillipsFishWorks.com.

This Kit Includes

- (1) 1 gallon glass jar with drilled lid.
- (1) 12 inch rigid air line.
- (1) 4 foot flexible air hose.
- (1) Air control valve.
- (1) 15 ml algae fertilizer/nutrient tube (makes 3 gallons).
- (1) Plastic pipet.
- (1) Bag of culturing salts.
- (1) Live green water starter culture.

How to Use This Kit

- Step 1: Thoroughly wash jar and lid with diluted bleach solution or just warm water. Dry jar and make sure all bleach is thoroughly rinsed.
- Step 2: shake the live green water starter culture in the sealed bag. It can settle during the shipping process. Add starter culture to the jar.
- Step 3: Fill the jar with water to the bottom of the jar shoulder. This water can be bottled spring water, well water or filtered water. Dechlorinated tap water or aquarium water can be experimented with. Ideal water temperature range is 60 - 80 degrees F. Can probably handle cooler or warmer temperatures.
- Step 4: Add 4 ml of algae fertilizer/nutrient to the jar. Use the plastic pipet (included with kit) and fill to the 4 ml line.
- Step 5: Add a small pinch (1/16 teaspoon) of culturing salts to the jar. This is for buffering the alkalinity and adding beneficial micronutrients for the algae. The live green water starter culture that comes with this kit is a freshwater algae. You do not want/need to add marine salt to the culture water to make it into "seawater" . A little pinch of culturing salts will not turn the culture into saltwater.
- Step 6: Hook up air. I would always recommend aeration when growing green water. If air is unavailable then stirring daily with a large spoon or other utensil will be necessary.

The rigid air line feeds through the hole in the jar lid. Attach the flexible air hose to the rigid air line by easily sliding the hose over the line. Place the air control valve in-line with the air pump to control your bubble rate. It is beneficial to have a high flow in the green water culture so lots of air flow is necessary.

- Step 7: Lighting. This living algae culture needs light to grow. This can be as simple as an inexpensive LED Daylight bulb or LED strip shop light in the color temperature range 5000K - 6500K. You'll have to experiment with the on off light cycle and distance from the bulb to the culture water surface. You can start with lights on for 12 to 16 hours a day and place the culture 12 to 20 inches away from the light bulb or strip. You can also have success growing green water with the sun by placing the jar in a south facing window. You will want to experiment with placing the culture in indirect sunlight to full sun.

Harvesting, Maintaining and Resetting

Harvesting. In ideal conditions your green water culture will "mature" in 5 to 10 days. During this time period the greenwater culture should have turned from a very light green to a rich dark green. This color (algae density) can vary significantly depending on the source of light, photo period, temperature and whether or not the algae has settled to the bottom. Now that the culture is "mature" you can use it to feed micro creatures like daphnia, moina, seed shrimp, copepods, fish fry and so many more. This can be done by directly pouring a portion of the green water into your micro creature tank or habitat. You can also turn this "mature" green water culture into a daphnia or moina culture by directly adding a starter daphnia or moina culture to the green water culture. It's always a good idea to save a portion of green water to start a new culture and if you have the space, it's handy to have several cultures around.

Maintaining culture. Personally, I like to think of these green water cultures as "batches" that I'm going to set up, use and then reset. Rather than treating them like "long term" cultures that I have to maintain. As your newly started culture grows it will eventually need more food (fertilizer/nutrient, included with kit). You may need more or less depending on algae density but a good starting place would be 1/4 the starting dose, 10 to 15 days after starting the green water culture. For example, a 1 gallon jar of green water starts with 4 ml of fertilizer/nutrient. After 10 to 15 days you could add an additional 1 ml of fertilizer/nutrient to the culture to feed it. The culture turning extremely yellow can be a sign of not enough fertilizer/nutrients. At this point it would be a good idea to start another separate green water culture or two using the healthy mature culture. Don't wait till the culture is crashing to start your new one.

Resetting. At some point you will have to reset your 1 gallon green water culture. If there is still some green water in the jar for starting the new culture, you will want to temporarily pour that green water into a different container so you can clean the jar before starting the new batch. Cleaning the jar can be as simple as scrubbing with a stiff bristle brush with hot water or soaking in a diluted bleach solution. Be sure to thoroughly rinse the jar of bleach and be aware of any possible chemical contamination risks by using "used" cleaning brushes or rags. After the jar is clean and dry you back up to Step 2 of the "How to Use This Kit" section of these instructions.

Green Water Culture Size to Nutrient Ratios

This kit comes with enough algae fertilizer/nutrient to make 3 gallons of green water. The examples below are a starting guide if you are interested in culturing green water in larger containers. The water to fertilizer/nutrient ratio is 4 ml of fertilizer/nutrient to 1 gallon of water. Algae fertilizer/nutrient and live green water starter cultures are also available separately at PhillipsFishWorks.com.

- 5 gallon tank/bucket. Start with about 4 1/2 gallons of water. Add 20 ml of fertilizer/nutrient and 1/4 teaspoon of culturing salts. Use 1 to 2 liters of live green water to start a 5 gallon culture.
- 10 gallon tank. Start with about 9 1/2 gallons of water. Add 40 ml of fertilizer/nutrient and 1/2 teaspoon of culturing salts. Use 1.5 to 2 liters of live green water to start a 10 gallon culture.
- 20 gallon tank. Start with about 19 gallons of water. Add 80 ml of fertilizer/nutrient and 3/4 teaspoon of culturing salts. Use 2.5 to 3 liters of live green water to start a 20 gallon culture.

Troubleshooting

The goal of this kit is to provide a reliable method for producing green water. It is important to keep in mind that this culture is alive and there are many variables that affect algae growth and the success of this kit. If your newly started green water culture fails to take off and grow, here are a few places to start looking.

- A big variable is what water you are using. This water can be bottled spring water, well water or filtered water. Dechlorinated tap water or aquarium water can be experimented with.
- Lighting should be at the Daylight end of the color spectrum with the lights on for 12 to 16 hours.
- Aeration is best to help keep the algae suspended in the water column. If not using air you will need to stir daily.
- If the culture is turning yellowish/brown, this can be a sign of lacking fertilizer/nutrients. Some can be added to "bring the culture back", if it's not too far gone.
- This culture kit comes with a live green water starter culture. It can't be left in its shipping bag sealed up for prolonged periods of time. It is best to start your green water culture kit within 24 or so after receiving it.

Thank you so much for your support!
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