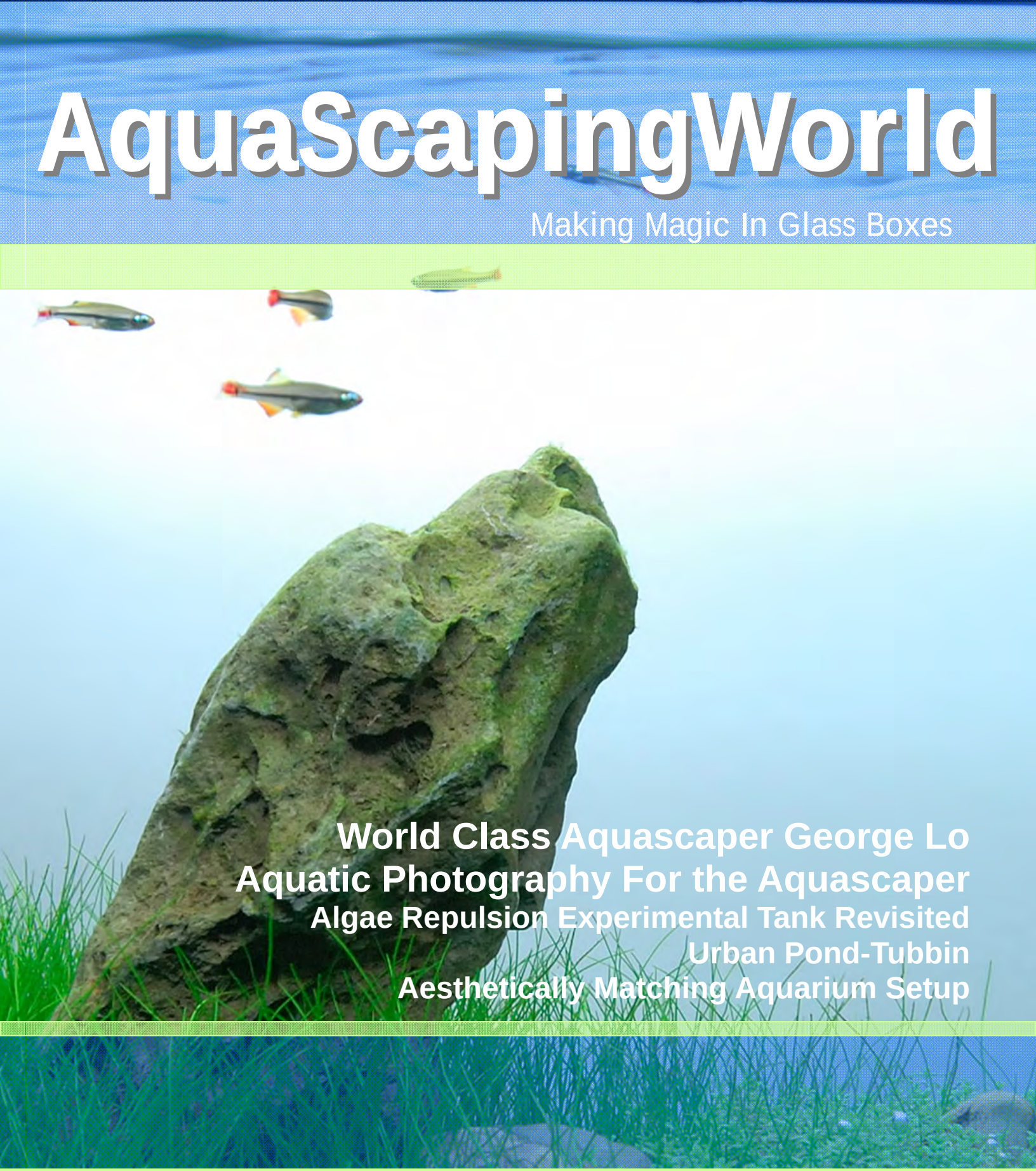
# AquaScapingWorld

Making Magic In Glass Boxes



## World Class Aquascaper George Lo
## Aquatic Photography For the Aquascaper
## Algae Repulsion Experimental Tank Revisited
## Urban Pond-Tubbin
## Aesthetically Matching Aquarium Setup

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VOLUME 1, ISSUE 4
JUNE 2008

# Letter from the Editor

**Inside our June Issue!**

Summer is here, and so is our June Issue!

Our special treat this month is an in-depth interview with professional aquascaper, George Lo. He shares with us his aquascaping philosophies, experiences, and some of his favorite aquascapes.

This summer season perhaps try something a little different. How about creating a little magic outside? This month, Liz Marchio shows us exactly how to create an urban pond, while inspiring us with some helpful tips and photographs of what can be accomplished.

For those who want to focus on "creating magic in glass boxes" indoors, there are fantastic tutorials inside that will help you along. Most notably, Roy Deki kicks off the tutorials with a discussion on the types of aquascaping materials available to hobbyists. You can use your newfound knowledge to develop a hardscape that will capture the attention of any of your houseguests. In a few months, you might have an wonderful scape like our June Aquascape in Focus, "Broken Stone Garden," which illustrates a way to use large stones effectively in a layout.

But that's not all! Get those digital cameras out because once you're done reading this month's aquatic photography tutorial you'll be taking photographs like a pro. You don't even need to have an expensive camera!

So, whether it's inside or outside, have a great time with your aquascaping adventures this month!

*John Nguyen*
Editor in Chief
AquaScaping World Magazine

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# A Beautiful Aquascape

## Starts with an aesthetic

# Matching Aquariu


By Kristoffer Willerslev Jørgensen

Having a visually appealing rimless aquarium on a nice stand is just one piece of your aquarium setup that adds to the aesthetic feel of our aquascapes. A large part of our aquarium setups consist of technical equipment, such as lighting fixtures, filtration plumbing, and $CO_2$ equipment. Technical equipment can affect the overall visual impression of the whole aquarium setup if the equipment does not match the design of the tank and the stand. Like choosing the right plant species that complement each other in an aquascape, it is important to select equipment parts that fit the look of your stand and aquarium.

Today various types of inlet/outlet glass pipes, $CO_2$ glassware and smoothly designed lighting pendants can be bought. The well-known style of ADA gives an approach to aquarium design with well-made glassware to match everything but your paycheck. Thus, we must sometimes use knockoff brands and other products to imitate the minimalistic style. This gives everyone a chance to make their own ADA-style setup and have a stunning setup in their own living room.

I have chosen to make a stand for my rimless 60x30x36 cm tank, similar to the ADA wood stand. You can read more about this in ASW's April 2008 Issue.


Keep things out of sight! A stand is a great place to hide equipment.

## Lighting Equipment

For lighting my aquarium, I have chosen a 3 x 24W T5 fluorescent pendant, which has a simple aluminum profile that does not draw attention to itself (important since we want the viewer's focus to be on our aquascape). The pendant can be raised by its wires, making it easy to raise the lights and still have illumination while doing maintenance work inside the tank. For mounting the pendant, I have chosen two small wall brackets in the same color as the wall. The bolts in the end of the wire allow the pendant to be raised with ease and without the use of any tools. This part of the setup can be a difficult choice and it's mostly a choice of personal taste.

I have chosen a combination of three types of fluorescent tubes:

- In the back, I have chosen a 10,000 Kelvin tube to give a bright, strong light. This, combined with the reddish color from the Grolux, makes a good combination and raises the intensity of blue and red wavelengths which are beneficial for the plant photosynthesis.
- The Sylvania Grolux gives a reddish-warm glow suited to bring out the red colors of plants and fishes. This tube is placed in the center.
- In the front, I have chosen a daylight tube called LifeGlo II. It has a rating of 6700 Kelvin and a strong peak in the green area and has the highest lumen intensity of the three. This combination gives a full spectrum of light, matching sunlight, and should bring out the best colors from the plants and fishes.

## C02 Equipment

The $CO_2$ system consists of the Ferplast pressure reducer for disposable bottles, set to a fixed working pressure of 1 bar. I have used a single manometer to view bottle pressure so I can see when its time to change the bottle. The disposable bottles don't take up much space and is easy to change. I have an electronic valve turned on and off by a timer to shut of $CO_2$ at night. This saves $CO_2$ and makes sure that the $CO_2$ level does not rise to a critical level doing night.

There are many types of $CO_2$ tubing on the market but the only kind suited for $CO_2$ is PVC or PU tubing since it does not let the $CO_2$ pass thought the sides. Regular air tubing in silicone will allow $CO_2$ to escape and waste the $CO_2$. I have chosen a knockoff Rhinox beetle counter since it gives a good easy reading of the $CO_2$ flow and also looks nice with the glass spiral $CO_2$ diffuser on the inside.

For distribution I have chosen a 3cm glass ceramic diffuser to give me a large surface area for the $CO_2$ to dissolve though. A check valve placed before the beetle counter makes sure that the backpressure doesn't empty the water into the electric valve.

## Aquarium Filtration

Filtration is done by an Eheim Ecco 2232 with Ehfimech, a fine and a course filter sponge. I have chosen a set of 12mm Flo in/outlets connected with clear PU hoses, and placed them so that current flows towards the diffuser and down. This makes sure that the $CO_2$ is distributed evenly and doesn't rise to the surface.

## Semi-Automatic Water Changing System

Just after the outlet of the filter I have placed a T-pipe and two shutoff valves. This will function as my semiautomatic water change system. When the valves are shut to the outlet and open to the other pipe it will use the filters pump to empty the tank fast. When the filter is stopped and the valve is shut for the outlet of the filter, an external pump can fill the tank with clean water from a reservoir. All I have to do is to mount a hose from my drain and water reservoir and open/shut the valves. This function makes water change easy and fast, and does not require me to pour water into the tank and possible disturb the aquascape.

## Automatic Fertilizer Dosing System

As a last function I have chosen an automatic dosing system, the Aqua Medic SP3000 dosing pump combined with an electronic timer. This will dose a solution containing both micro and macro fertilizer every day following the estimative dosing index. All I have to do is carefully watch plant growth and add supplementary fertilizers when needed.

An automatic fertilizer dosing system removes the daily fertilizing maintenance requirements for a successful planted aquarium. I do not have to worry if I miss a day of dosing. This way I can focus on the overall appearance of the aquascape and not worry about the technical aspects or be disturbed by any equipment spoiling the look of the setup.

*DIY ADA Stand*

*Glass Diffuser and Bubble Counter*

*CO2 Tank and Regulator*

*Water changer and Fertilizer Autodoser*

# Urban Ponding—Tub

# Water G

Summer is here!
Time to Get a
Tubbin!


# bbin'
# Gardens

**By Liz Marchio**

Living in an apartment or condominium certainly can be advantageous. I'm happy just not having to maintain a lawn! I do, however, yearn for a little slice of my own outdoor area from time to time. With spring fever hitting hard, desire for the outdoors starts to peak! So, what's one to do living the city life with no outdoor world to call your own? You create it! I'm going to show you how to create your own small water garden, perfect for patios or even a sunlit balcony!

## The Container

First and foremost, there are space and size limitations with every water garden, whether they be in a tub or a full-blown pond. It is necessary to use a container as large as possible in order to maintain the plant and animal life for the season. As with aquariums, the larger the container, the more stable the temperature and water chemistry. Tubbin' is all about simplicity and having "oops! room" by way of extra water volume to insure your endeavor isn't in vain.

In order to house small fish species, twenty gallons or more is ideal, depending on the species of choice of course. We use a seventy-gallon Rubbermaid resin tub. Personally, I would not do any outdoor fish keeping under fifty-gallons, but that can be difficult for most people due to the outdoor space they are working with. If this is the case, experimentation is the only way to figure out exactly what your limitations are.

There is an option to go "fishless". Keep reading for more information.

**First Rule of Tubbin'**
This one is for the First Keeper. The Bigger the Better!

## The Fish

Again, this project is all about simplicity. The number and types of fish you can keep in an aquarium will not be able to convert to outdoor living. There are, of course, modifications available to every project to suit different needs, but simplicity is the rule! *Plecostomas*, loaches and other current-loving fish will not be good choices. The ideal fish choices are those fishes that can tolerate stagnant conditions. Ideally those fish that thrive in these conditions are a great starter species. Labyrinthfish, such as small gourami species, paradisefish, bettas, and some ctenapoma species are all fantastic choices. Keep in mind that tubbin' is a whole new world of fish keeping! You won't be looking in at your fish from the side anymore but peering down into the water's surface. You may not even SEE your fish for days! So don't buy the most expensive color variant or species of betta you can find. The great thing about labyrinthfish is that they almost all build bubble nests on the water's surface! The fish may not be visible, but their unique behaviors will be! Although I am partial to labyrinths as good starter species, there are a few more good choices I'd like to note:

- Small, hardy tetra species; splash tetras would be a good experimentation!
- Small* Danio species
- Algae eating shrimp species.
- Dwarf cichlids – *Pelvicachromis*, *Mikrogeophagus*, hardy *Apistogramma* species.
- Livebearers; swordtails, hardy guppy variants, Endler's livebearers.
- Barbs - I always see tub-raised rosy barbs at fish auctions!
- Killiefish - a great choice.
- Feeder goldfish- great for kids, but need to be wintered indoors in a species specific aquarium (i.e. not a bowl).

**Inappropriate but tempting species you may think of trying:**

- Loaches - need more water current.
- *Plecostomas* - need more water current.
- Catfish- need more water current.
- Neon or cardinal tetras- not hardy enough to take temperature and water quality swings.
- Larger danios - they jump really well.
- Koi - remember these are carp and get large. They are also great jumpers.
- Mollies - need warmer water and higher pH than other livebearers.

See the "fishless" idea list below as well!

## The Plants, with Fish and Without

This is, hands down, the best part of water gardening. I always feel a sense of pride seeing a small starter clipping or seed grow into a thriving, robust

specimen. Tubbin' is a great way to experiment with emersed growing techniques or to grow out some light-loving submerged plants in order to bring them in during the winter months.

### A Few Choices

**Fishless:** Sometimes maintaining fish in every container you set up just isn't feasible or maintainable. There is the option of tubbin' with only plants. This is much easier and still very rewarding. Some things I've done in the past are:

- Setting up a sealed ceramic pot for a species of marginal plant such as taro or irises. These grow well with appropriate lighting and nutrient addition and their containers only need be topped-off due to evaporation.

**Second Rule of Tubbin'**
The smaller and hardier the fish species, the better!

- Setting up a sealed ceramic pot and growing submerged plants out as emersed. This is a fun experiment with Amazon sword plants, since there are so many variants to try. You'll be amazed at what these look like out of the water! Again, top-off only.

- Using a low-rise pot (squat, but with a lot of surface area) to grow dwarf cattails and parrots feather. The contrast looks great and when we did this project, there were amazing amounts of natural fauna growing and populating the tub! This also needs to be topped-off.

- My last project was last year's container where I grew *Phyllanthus fluitans* ("Red Root Floater") and a collected species of *Potamogeton*, which I found in a roadside ditch near my home. Due to being more sensitive plants, this tub could not dry out and needed to be topped-off more often.

**Fish Tub:** if you're interested

This ceramic tub was completed in 2007, and contains a collection of *Phyllanthus fluitans* ("Red Root Floater") and a collected species of *Potamogeton* found locally. Both species of plants required the tub to have the maximum amount of water or else they would dry out.

in keeping fish in your tub garden, first make sure the animals can be housed in your container appropriately. If you aren't sure, use the ASW forums to ask.

A few of my past projects in a 70-gallon Rubbermaid resin tub are listed to stimulate some ideas. The tub is plumbed with a quick-draining system in order to do water changes quickly, as needed, and to tear down the tub quickly in the winter. This is connected to a standpipe that acts as an overflow in case of heavy rain. That way the fish down wash out! This also serves as a surface skimmer and a lawn-watering device! Doing some planning in these regards have made my tubbin' quite easy! Also, my tub always receives about 5-6 hours of full morning sun. Don't forget to plan your tub according to available light!

**Third Rule of Tubbin'**
Fishless systems are easier, but may require more maintenance!

My Past and Current projects:

- 2006: *Lotus Nelumbo 'Momo Botan'* – a day blooming dwarf lotus was our focal point plant. It puts up floating leaves and then standing leaves. After the first few standing leaves, with enough sunlight, the flowers begin to come up. The first few are usually weak, but the following are spectacular. That year we housed *Danio feegradei.* As soon as I put them in, half of them jumped out! I ended the season with 1-2 left out of 10. This year, I lost some fish, but still resolved to try again next year! (see photo 2 "2006 tub))
- 2007: *Nymphaea zenkeri* "Red" – The red tiger lotus was last year's focal point plant. I've kept tiger lotus in

This tub created in 2006, developed nicely, but had problems with fish jumping out.



Designed last year, this tub was one of the most successful ever. It contained swarms of breeding Endler's Livebearers and a group of Lotuses that bloomed wonderful pink flowers.

aquariums for years and have to say keeping one "naturally" was a fantastic experience. The emersed leaves were amazingly sturdy and beautiful and the flowers were spectacular. (see photo 4 "red tiger flower") This experience is the reason why I suggest emersed experimentation! That year I grew out a pair of *Pelvicachromis humilis* "Liberia Red" with a swarm of Endler's livebearers. The Pelvics did well, no spawns, but built pits and valleys in the mud (very cool!). The Endler's did well, and I still have the group. Other plants included *Lotus Nelumbo 'Momo Botan'* again, and *Phyllanthus fluitans* (Red Root Floater). This was a successful tubbin' year!

- 2008: This summer, I'm definitely trying the Red Tiger Lotus again. You can't beat a cheap water garden plant! Also, looking to grow *Salvinia oblongifolia* and *Azolla* (which always seems to find its way into our tubs eventually anyways!). The fish are the hardest part to decide upon. There's thought to growing out some *Melanotaenia parva* (Dwarf Flame Rainbowfish) or conditioning/breeding a new wild-type livebearer we recently got, *Xenotoca melanosoma*. I am also going to collect some wild plants, *Equisetum scirpoides*, the dwarf horsetail rush and a *Potamogeton* species from a local waterway. Those will go into my emersed ceramic pot.

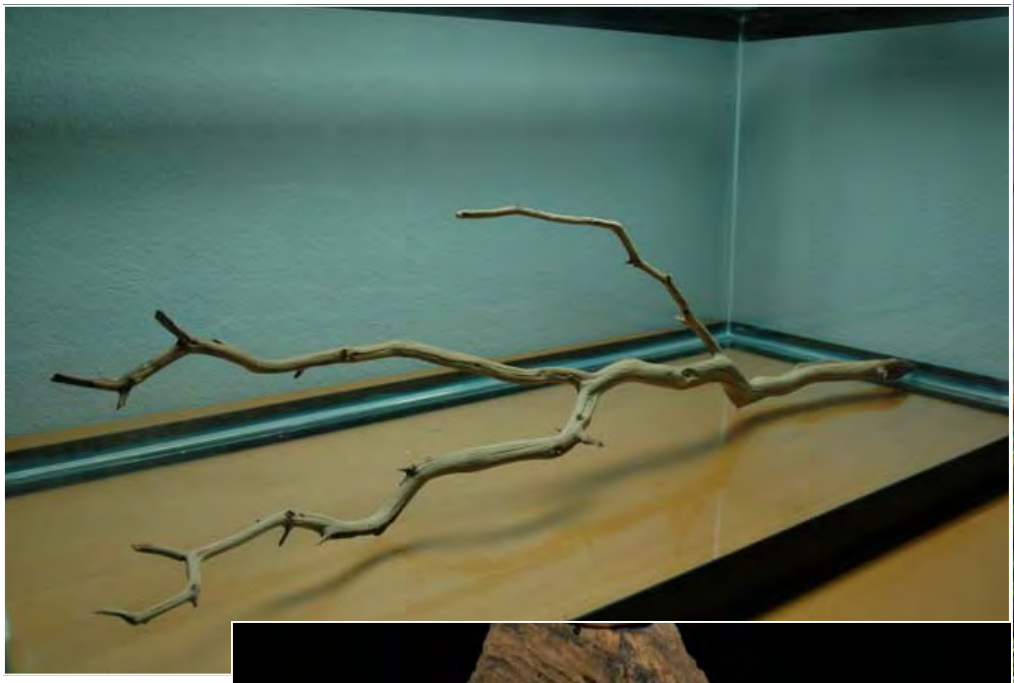
A few other plants to consider keeping:

- *Salvinia* species (any and you can do more than one!)
- *Pista stratiotes*, water lettuce; there's a dwarf variety too.
- *Ludwigia sedioides*; mosaic plant- this is an awesome looking floating plant.
- *Nymphoides* and *Nymphaea* species- make sure they are tub-appropriate in size! Some get HUGE!
- Water sprite, *Ceratopteris pteroides*.
- Sword plants, *Echinodorus sp.*; can be submersed or emersed.
- *Hydrocotyle species*; will grow in and out of water!
- Stem plants in general make interesting experiments for tubbin'.

There are many other plants that would be worthwhile to try outdoors as well. Make sure that if you try something new and are successful, pass that information onto others. The wonderful thing about aquarium/pond keeping is the opportunity to experiment, break new ground, and help others achieve success. With that in mind, always remember the fourth and final rule of tubbin'.

**Final Rule of Tubbin'**
Always pass on what you've learned and enjoyed to someone else!

# Design Attractive Aquas
# with Stone and D



# scaping Layouts Driftwood

**By Roy Deki**

Photo by Nicolas Guillerman

Find out how stone and wood can enhance your layout

Lay out materials are one of the most important aspects of aquascaping. Materials such as stones and pieces of driftwood help create a more natural scene inside a planted aquarium. The type, shapes, and placement of the these materials can evoke moods and feelings for the observer. The combination of wood with rock or simply using one or the other can greatly improve your aquascape.

**Aquascaping with Driftwood**

Take care when choosing your wood, as you do not want it to overpower the aquascape by being out of scale. Many aquarists will use blocky forms of Malaysian driftwood, while others may use manzanita branches depending upon the look they are trying to achieve. When choosing branchy type wood, the diameter of the branches should be in scale with your aquarium. You do not want too thick or too skinny of wood but rather a mixture of diameters relative to the size of your aquarium. When selecting your branches, make sure to get as much branching, twisting or curving as possible. This will help add character to your aquascape.

(Top) Malaysian wood with Seiryu-seki stones.
(Bottom) Manzanita branches with Seiryu-seki stones.

Have an abundance of wood to choose from and don't hesitate to break or cut you branches to fit into a particular spot. The tips of these branches should always be broken and not cut. Having a smooth 90 degree cut at the end of your branches can take away from the natural appearance you are trying to obtain. Once you have collected more than enough wood, you should take the time to prep it before using it in your tank.

Manzanita branches are very popular in our hobby, because of the cost, density and character these branches possess. Before using this type of wood you will need to soak them until they sink on their own. This soaking plays two parts. The first is to leach out as much tannins as possible. I use an extra bathtub in my house to soak this type of wood. I will fill the tub up with hottest water possible and submerge the branches by placing rocks on top of them. I will change the water out every other day, re-filling the tub with hot water. This allows the pores of the wood to open and the leaching of tannins will happen quicker. Typically, I will soak the wood for about a month, although two weeks should be enough. By this time, most of the tannins are removed and the wood will be water logged and sink on their own.

Malaysian wood is another popular choice among aquarist. The benefit of this wood is that it is so dense that it will sink when completely dry. The bad thing about this type of wood is that it is loaded with tannins. Soaking them in hot water is a must before using them in your tank. The larger the piece the longer it will leach tannins. I have had large pieces leach enough tannins to make my tank appear as if it was filled with iced tea; only to stop after about 8 months of weekly water changes. Buy used pieces of Malaysian driftwood from other hobbyists and you can skip the soaking part.

ADA Old Black wood is one of the most desirable types of wood for some aquascapers. ADA Old Black wood is collected from South America, along the central parts of the Rio Negro (black river) deep in the Amazon. It is very dense and will sink naturally on its own. Unlike the other types of driftwood discussed, ADA old black wood doesn't leach any tannins and therefore no pre-soaking required. ADA Old Black wood are some of the most interesting pieces I have every seen. The cost of this wood ($12 or more per lb) is cost prohibiting for most of hobbyists but, can be well worth the try in a smaller tank.

As I mentioned earlier, try to have several wood pieces to select from before beginning your aquascape. I have seen many people aquascape with only three to five pieces, only to be frustrated with the lack of arrangement possibilities. You have very little options when you



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(Top) Manzanita branches with “Rip-rap” stones from a rock and landscape supply store.
(Bottom) Seiryu-seki stones with beautiful texture and rock veins.

Locally collected lava rock from Arizona.

use too few branches. Give yourself more options, and besides the remaining wood will already be soaked and the tannins removed for a later project.

**Rocks and Stones**

One of the most important things to remember is to use the same type of rock in your aquascape. I have often seen two or three types of rocking in one aquascape and it only makes me frown. The lack of continuity in the stones is enough for me to overlook the rest of the aquascape.

There are far too many different types of rocks that are used in aquascaping to mention them all. Some of the most desirable are Seiryu-seki stones, Shou stones, Ryuoh stones, and Maten stones. These are all imported from Japan so the cost can be quite significant. This prohibits many aquarists from purchasing and enjoying the incredible beauty of these stones.

The most commonly used are those that are collected in and around various locations. I have gone on a couple of "rock hunting trips" myself. I once purchased some very interesting lava rock from another hobbyist only to have later found the exact rocks here locally in Arizona. So get out there and hunt for rocks! It will be well worth your time and effort. Another source for rocks can be your local rock and landscape supply store. I have used a rock from such a retail outlet called "rip-rap". It comes in various colors and also seem to buffer my RO water to a kh of 4-5. That's a huge benefit to me because I use 100% RO in all my scapes. No matter where you get your rocks, remember to get plenty. Just like wood, it always better to have options when placing these rocks in you tank. Lastly, don't forget larger rocks are great materials to start with too. These rocks can be broken by a well placed chisel and a hammer, just be sure to wear eye protection.

# Professional Aquas

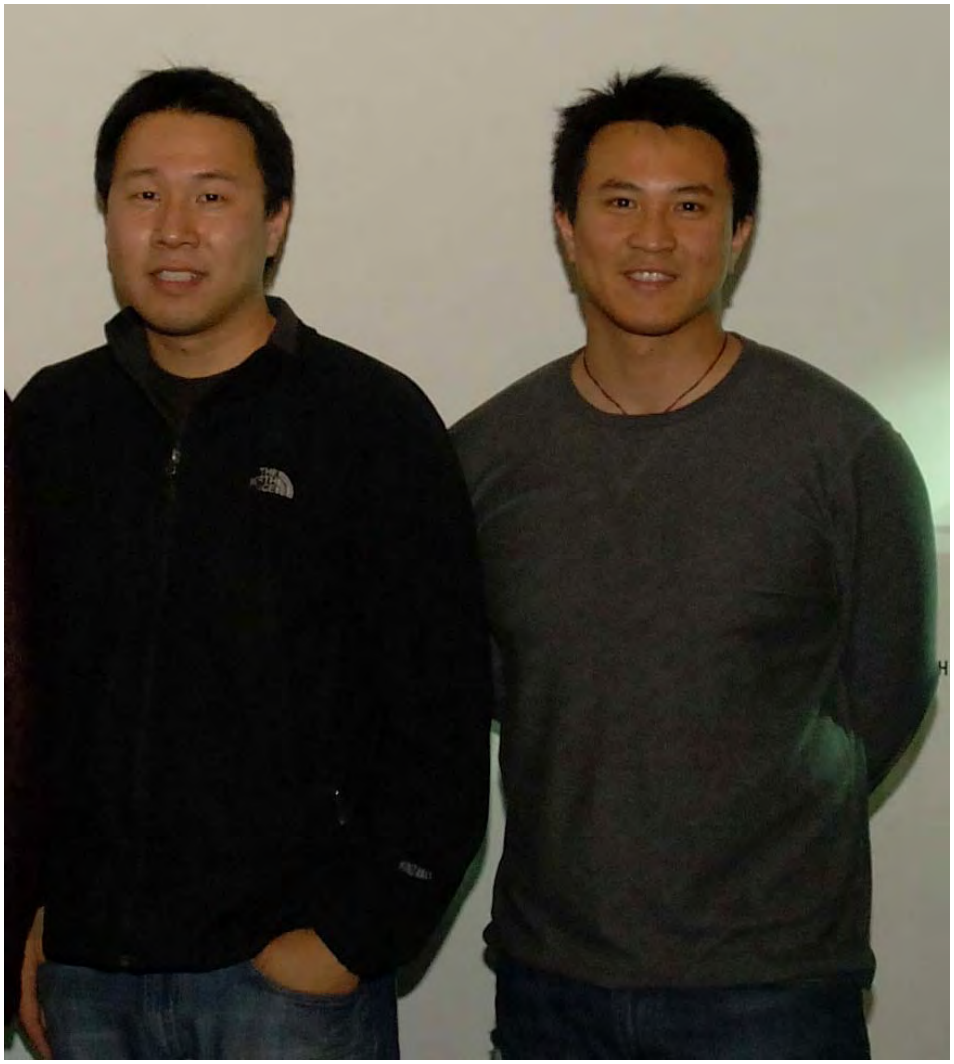
## Successful Entrepren

# George L

George Lo has over 10 years of aquascaping experience and produces world class aquascapes.

# caper
# neur
# o

One of the premier aquascapers in our hobby, ASW gets a one-on-one with George Lo (far right). He is the co-owner, with his brother Steven, of AquaForest Aquarium in San Francisco, California. A true hobbyist-oriented entrepreneur and an expert in the Nature Aquarium Style, George Lo is a regular speaker on aquascaping and planted aquarium topics across the world.



World class Aquascapers and businessmen, Steven and George Lo (left to right respectively).

**George, please tell us more about yourself.**

**A:** I was born and raised in Taiwan. My family immigrated to Toronto, Canada when I was 13 years old. We lived in Canada for about four years and decided to come to America when I was 17 years old. I graduated from San Francisco State University with a Bachelor of science degree in Cell and Molecular Biology. I have always been interested in nature, especially nature surrounding water. When ever I see a pool of water or a small stream flowing by, I would always take a closer look and try to see if there are fish or aquatic plants living in it.

I have always kept fish since I was little but I can not remember exactly when I started. I remember that I had a small plastic container that I kept a few feeder gold fish in it when I was 10 years old and I wanted to put some aquatic plants in it because the image of fish and plants always goes together for me. However, I couldn't find any aquatic plants at that time so I decided to pulled out some plants growing in my mom's garden and put it into my little aquarium. As soon as I put in the plants, I saw tiny oxygen bubbles started coming out of the plants and was totally amazed by the "phenomenon". Since then I would always try to keep plants with fish.

I really got into seriously planted aquarium when I was 18 years old when I saw Mr. Amano's book of Nature Aquarium World in Boarder's bookstore. I was shocked by the beautiful pictures of Nature aquariums created by Mr. Amano in the book. Since then, I started and began my journey in creating Nature aquarium style planted aquarium.

**Q: Wow, many people can probably relate to becoming inspired by the Nature Aquarium World Books. How did you know you wanted to follow this style which you have been doing for over ten years?**

**A:** The images in Amano's Nature Aquarium World sunk deeply into my mind when I first saw them. I have always liked keeping plants with fish, however, I was never satisfied by the look of my planted aquarium and always thought they should look more natural but did not know how I could make them look more natural. And Mr. Amano's creations of Nature Aquariums gave me the answers and directions on how I could make my aquariums look more natural. This is the main reason why I decided to follow Mr. Amano's Nature Aquarium Style.

**Q: Can you remember when you first time met Takashi Amano, the man who inspired you?**

**A:** I first met Mr. Takashi Amano on my first trip to the ADA Nature Aquarium party in year 2004. I placed 56 when I enter the contest for the first time and received an invitation from ADA to the party. When I first met Mr. Amano I did have a little "star" stuck and was a bit

90p showcased in the Yerba Buena Center of the Arts Museum in San Francisco

nervous, however, it soon went away because of his friendliness, humorous, and straight forward character.

**Q: What aquascapers do you look up to or find inspiration from?**

**A:** There are many other aquascapers that I look up to and find inspirations from. I don't recall many of their names, but I have learned a lot from a Taiwanese aquascaper Chan Shih Hsien, who's work placed 2nd in the 2007 ADA Aquatic Plants Layout Contest. Another Taiwanese aquascaper Lin Yu Chen, who's work ranked 117 in 2007 ADA aquatic plants layout contest also gave me a lot of inspirations. Mr. Lin owns a shop that also specialized in Nature Aquarium style and has many amazing display tanks in his shop. Oliver Knott's work also provided me a lot inspirations in the creativity aspect. His work is top notch in terms of plant health and originality.

**Q: How hard do you think it is to aquascape? Does aquascaping skill come naturally?**

**A:** In my opinion, aquascaping is not easy. It's not just about placing the stones and driftwood in positions that will look good, an aquascaper also need to have a good understanding of different growth patterns and growth conditions that plants require. One of the most important elements in aquascaping is to be able to anticipate what your aquascape will look like when plants grow out.

I do not believe that some people naturally have aquascaping talent. To aquascape, one needs to have a very good understanding of the characteristic growth pattern of plants and also have a good understanding of maintaining a planted tank and these knowledge does not come naturally. It needs to be learned and acquired. I believe what makes an aquascaper good is his/her passion for the hobby.

**Q: What was one your greatest challenges in the hobby?**

**A:** One of the greatest challenges that I have faced

was that we were invited by the Yerba Buena Center of the Arts museum in San Francisco to display one of our planted tanks in our store in the museum for two months. It was challenging because we had to move our 90P (50gallon) show tank to a different location. We had to make sure that the aquascape did not get moved or destroyed during the transportation. Also, the museum is open to public daily so another challenge that we faced was to keep the tank in it's optimum condition at all times.

**Q: How many tanks do you have at your home? How often do you do maintenance on them?**

**A:** I have 8 tanks at home and we have around 76 tanks in our store. Usually I do maintenance once a week on our show tanks. It consist of scraping the glass, water change, and sometimes triming the plants or cleaning the filter.

**Q: Do you encounter algae issues?**

**A:** Yes I do have algae problems. There are different ways to combat algae, but I think the best way to combat algae is to prevent it. I like to combat algae in a more natural way, instead of using chemicals. A few things that I do is using a lot of algae eating creatures such as Amano Algae eating shrimp, Siamensis Algae Eating fish, and Otocinclus.

Also, starting with a lot of plant mass in the aquarium with healthy growing plants seemed to be very effective in controlling algae.

Another element that I think is important is filtration, I normally use double the recommended filtration flow that is stated on the filter packaging. For example, if the filter is made for 40 gallons, I use it on a 20 gallon tank, and

Cube Garden 120P 120x45x45cm

sometimes I use two filters.

I think the biggest challenge to a new aquascaper is algae control. That is a common problem I found in most beginners.

**Q: How do you feel about Dutch Style Aquariums compared to the Nature Style?**

**A:** Dutch Style Aquariums have a different design concept and Stem plants are used commonly in Dutch Style Aquarium. I have never attempted to create a serious Dutch Aquarium myself, however, that is something I would like to try someday because I am a fan of growing stem plants.

**Q: Where do you see Aquascaping going in the next 10 years?**

**A:** I see a great potential of different aquascaping style going in the next 10 years. New materials and technology is becoming more and more available allowing more new designs. For example, natural materials like driftwood or rocks are irregular in shapes and sizes which can be combined with more and more new varieties of plants becoming available to the hobbyists each day. The possibilities and aquascaping potential are infinite.

**Q: Do you feel today's aquascapers are becoming repetitive and unoriginal?**

**A:** In my opinion, I see a lot of new and creative aquascapes either on online forums or in contests. I think creativity is a very important element in aquascaping. However, as I remember from one of my science professors in school, who said "In science one needs to be able to think different in order to make new discoveries.

But before that happens, one needs to first learn the basic fundamentals thoroughly and acquire as much basic skills as possible." So I would suggest beginner hobbyists to acquire the basic fundamentals of aquascaping skills first before trying to create a new style.

**Q: What advice can you give a new aquascapers?**

**A:** The most important element to having a successful aquascape is being knowledgeable about the different growing patterns of aquatic plants and keeping them growing healthy. I would suggest to the asipiring hobbyist to read as much information about growing different plants and learn about their growth patterns. Also, get close to nature as often as possible and observe how plants grow or how rocks and driftwoods are positioned in natural environment.

**Q: Your brother, Steven, is deeply involved in planted tanks too. I have to ask, who is the better aquascaper?**

**A:** I think I am a better aquascaper, but my brother thinks he is the better one, ha!

**Q: George it's been a pleasure getting to know you better. You have a what are your aquaria aspirations for the future?**

**A:** I am always learning and trying new techniques to aquascape or to maintain my tanks, or finding different combinations of plants that will look good in an aquascape. My current goal is to try and find plants that will look good and require as little maintenance as possible, and combine it with aquascaping techniques so that the tank requires as little maintenace as possible, trimming in particular!

Cube Garden 180P  180x60x60cm

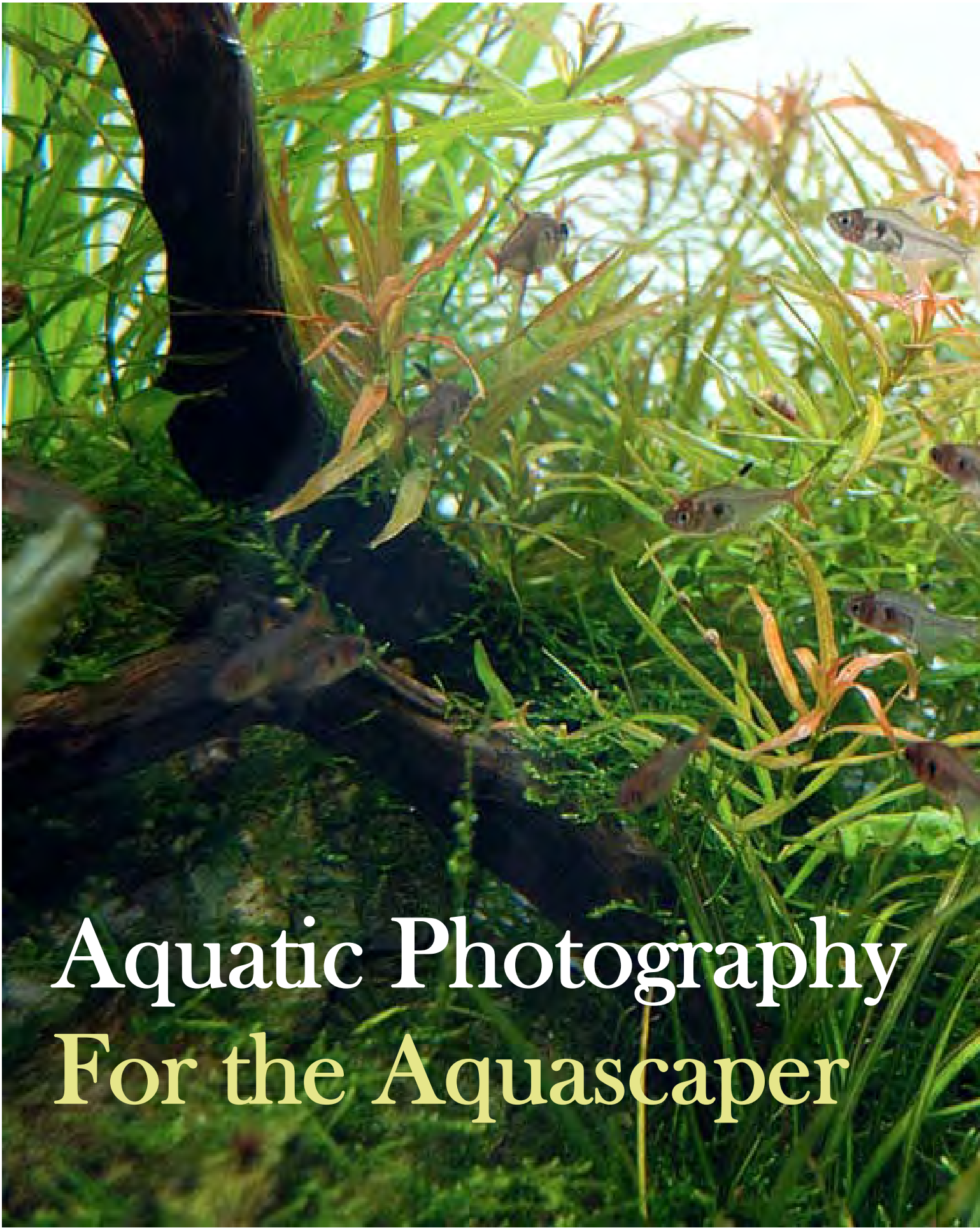
I hope to introduce the planted aquarium hobby to as many people as possible, because I personally think it is an amazing and enjoyable hobby. One can learn so much from it about nature and life. I hope one day the planted aquarium hobby in America will be as popular as they are in Asia or Europe.

**Additional Notes:**
George and Steven Lo operate AquaForest Aquarium in San Francisco, CA, specializing in ADA products. You can visit their online store at www.aquaforestaquarium.com.

Cube Garden 60P (60x30x36cm)

Cube Garden 60P (60x30x36cm)


ADA Mini-M:36x22x26cm



# Aquatic Photography For the Aquascaper

By Jason Baliban

We spend a lot of time and effort to get our layouts to look just the way we want them. When that time finally comes, we want to capture them in that moment of time with a photograph that conveys our hard work, creativity, and skills. With a couple key points, we can easily improve our skills, no matter the quality of our camera.

Photography in itself is an art. Many people devote their lives to it. This obsession is something that can be combined with aquascaping to create stunning results. As with any hobby or devotion, our layouts cost great amounts of time and money. Unfortunately, many of us do not have much money left over to buy professional-level photography gear or time to devote to learn the art.

Many of us are left to capture our layouts with amateur cameras, such as Point-and-

Shoot cameras, and minimal know-how. Below I will cover two settings that are available on almost all Point-and-Shoot cameras. These settings, once understood, will allow you to create pictures that tell truer stories of your layouts.

**White Balance (WB)**

White balance is simply the adjustment of Red, Green, and Blue to create the "correct" depiction of white. Our human eye will adjust this automatically. For example, when you are home at night and have regular lights on, white appears white. However, when we take a photo inside with regular light (no flash), we end up with that familiar yellow image...we all know the ones. Film cameras used filters on the lenses to handle these color cast problems. With the invent of the digital camera, we can do this with a touch of a button.

Most digital cameras have an Auto White Balance setting (AWB). This is the most common WB when we use our cameras in the most common setting, AUTO. AWB simply means that our cameras will choose the correct WB for us. Our cameras have little computers in them that evaluate points in the scene and make a "guess" about the white balance. Most of our cameras do a very good job in most situations. Your camera may take pictures that look natural to you when your subject is in sunlight or on a cloudy day. However, your camera may have weak areas. For example, most cameras still get incandescent (indoor) light wrong, leaving you with the "yellow inside shot." Another weak area might be fluorescent. This weakness leaves shots taken in fluorescent light looking too green. Unfortunately, this exact weakness affects us aquarists, as our lighting is often fluorescent.

Our cameras know they won't get it right all the time, so they allow us to choose from preset WB settings. These help when our camera doesn't figure it out correctly. Some of these presets include Cloudy, Day Light, and Fluorescent. We often have to resort to these settings to get our tanks to look the same in pictures as they do when we look at them with our eyes.

White balance is a matter of taste. Back to our "yellow inside picture" example, while a camera can be set to make a picture taken with normal indoor light look very accurate with whites, to many of us it may look too "cold" because we are used to the subtle warm yellow that we have seen in inside pictures throughout our lives. As with bulb choice in our aquarium lighting, WB is very much a matter of taste.

**Exposure**

Exposure is a simple concept to understand. Our cameras create pictures by allowing light to shine on a sensor for a moment of time. The sensor then converts that light into digital information that is stored. The longer the light shines on the sensor, the brighter the picture. If the source is bright, the moment of time can be shorter, still giving the sensor enough light to make the picture. If the source is dimmer, the moment will have to be longer to give the sensor enough light.

The ability to control the moment of light is accomplished by the camera shutter. The shutter can open and close as fast as 1/8000 of a second in some cameras to handle very bright situations. The shutter can also stay open for 30 seconds or more in very dim (almost dark) situations.

Our cameras will automatically pick a shutter speed for us. Similar to AWB, our camera takes samples of our scene and "guesses" the best shutter speed to create a picture that is exposed correctly. The camera's computer has many templates in its memory to determine the subject of a picture and how best to expose it. Unfortunately, aquariums are not in these templates, so it will often "guess" wrong and overexpose our pictures (making them too bright).

Our cameras provide us with a way to adjust the exposure in an easy way. This process is called exposure compensation. It is usually measured in +/-. Some cameras use 1/3 to express this variance, or +2/3 for example. While other cameras simply use whole numbers, -3 for example.

**Application - WB**

We will use my "Without Boundaries" layout for our subject. I will show you how changing the WB and exposure will affect the look of our photograph. We will start with WB, picking our preference, then move on to exposure.

I am using a Canon Point-and-Shoot camera. I am omitting directions on how to actually change the WB and exposure settings. All cameras are a little different and will require you to read your manual to understand how to change the settings.

The following are five shots using the same exposure (shutter speed) but with different WB.

**AWB** – In this case my camera did a pretty good job of picking the right WB. If anything, the color tint is a little green.

**Cloudy Preset** – You can see that this emphasized the yellow tint. This makes the picture appear warmer. If you can imagine a cloudy day, the color cast is often blue (or cold). The added yellow will warm up the color. This WB would be good for bulbs above 8000k.

**Daylight Preset** – This is a nice WB for this tank. I think that many would find this pleasing. It is a little warm for my taste, but I can understand many feeling great about this color.

**Tungsten Preset** – Also called incandescent, this WB will add a lot of blue. It is designed to be used inside where the lights are very yellow and warm. Remember our inside yellow pictures? Try taking a few shots inside at night with this setting. You will see that the whites are much more balanced. This WB is too blue for my taste.

**Fluorescent Preset**– This setting cuts the greens just a bit, as fluorescents have spikes in greens. This is the WB I choose to move forward with.

***Tip:*** Use a tripod whenever you shoot an aquarium. If you do not have one, find something steady to rest your camera on.

## Application – Exposure

Again, you will need to run through your instruction manual to determine how to change the Exposure Compensation settings.

Now that I have chosen my WB, I will now select the proper exposure compensation. As you can see, my camera's Auto exposure made our photo too bright: the darks are too bright and the brights are overexposed (making them appear white and washed out). In this case I know to add – (negative) exposure compensation, but lets run through both the +/-, going three steps up and six steps down. You will see that the extremes of both are unusable, but they may help those who have cameras that pick more extreme exposures automatically.

**+ 3 (also +1.0 in 1/3 increments):** over-exposed… If your picture looks like this, apply negative exposure compensation.

**+ 2 (also +0.7 in 1/3 increments):** over-exposed… If your picture looks like this, apply negative exposure compensation.

**+ 1 (also +0.3in 1/3 increments):** over-exposed… If your picture looks like this, apply negative exposure compensation.

**Auto:** over-exposed… If your picture looks like this, apply negative exposure compensation.

**Now we will do the negative.** This is also a matter of taste, so we'll pick one later.

**-1 (also -0.3 in 1/3 increments)**

**-2 (also -0.7 in 1/3 increments)**

**-3 (also -1.0 in 1/3 increments)**

**-4 (also -1.3 in 1/3 increments)**

**-5 (also -1.7 in 1/3 increments)**

**-6 (also -2.0 in 1/3 increments)**

**Photo Taken with a Canon Powershot SD850 IS.** Exceptional quality photos can be captured even with a general use like this $200 camera.

**Photo taken with Nikon D80.** This professional quality camera maintains the renders colors better then the cheaper Canon Powershot.

Jason Baliban's "Without Boundaries"

As I said, this is a matter of taste, but I think that -3 (-1 in 1/3 increments) is the best looking.

This picture is great, and it captures the look of my tank as I saw it. Many of you have Photoshop, and there are a few things you can do to enhance the picture.

The top most picture on the next page shows what the tank looks like with a little "Burning" for the background, and finer sharpening. As you can see, this picture is a great representation of the tank. I think many would be surprised to know that the picture was taken with a $200 camera.

To exemplify this further, the bottom photo is the same shot taken with a Nikon D80, a camera that costs five times more. As you can see, there really isn't much difference. The most noticeable difference is with the highlighting. You can see that the highlights in the Point-and-Shoot final are more washed out and white, while the D80 maintains the color a bit more. The reason for this is the size and quality of the sensor. This difference allows the D80 camera to handle the dynamics better.

**Now You're Ready!**

I hope this article has helped you master your camera just a bit more, allowing you to get closer to capturing your layouts in a manner that is consistent with your vision. As with most things, WB and exposure are a matter of taste. The key is to experiment, and follow your vision and tastes.

These are just two small adjustments and bits of knowledge that go into creating beautiful pictures of our layouts. In the future I hope to explore other areas such as supplemental lighting and aperture.

For more articles by Jason Baliban, please visit www.projectaquarium.com

# Aquascape In Focus:

## Broken Stone Gar

An Int

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## erview with Pedro Pinto

**Broken Stone Garden is an aquascape that is truly rustic in its layout and roots. This rimless planted aquarium showcases a simple, natural beauty from its thriving *Glossostigma elatinoides* foreground to the beautiful algae covering the rock garden. The aquascaper behind this masterpiece, Pedro Pinto, provides us a closer look at his planted aquarium and the inspiration that started it all.**

Pedro Pinto poses next to his aquascaping piece *Broken Stone Garden*.

**Q: Tell us a about yourself. When/How did you get started in planted aquariums?**

**A:** I'm Pedro Pinto I'm 23 years old and currently finishing the degree in Geology in the Faculty of Sciences of the University of Lisbon. Besides aquariums I also have a great passion for motorcycles and tennis. I got into the world of aquariums not long ago. I guess it was in February 2005 when I bought one of those small betta display tanks but it didn't keep me satisfied for long.

My first experience with aquatic plants came with a 60cm aquarium that I found in my grandmother's garage. At the time I found it amazing that I could actually make the plants grow and didn't care much about the layout. A few months after i began paying more attention to the general look of the aquarium as I joined some forums and met some aquascapers. After some extensive research I set up a 130m (March 2006) tank and that was my first true planted aquarium and also my first experience in international contests (ADA 2007). It was a simple Iwagumi layout but it helped me learning the basics of aquascaping.

**Q: Let's jump right into your scape. Tell us more about your feature "Broken Stone Garden".**

**A:** This aquarium was set up in the middle of January 2008 and it's still a work in progress. For this layout I wanted to give the impression of a rock worn and broken by natural processes as it happens in nature. I positioned the plants to give the impression of them adapting to whatever space there is available for them to grow.

Starting with the background there is a mass of *Hemianthus micranthemoides* with some spare *Eleocharis vivipara* to break some of the monotony. I planted *Rotala rotundifolia* just to give it a little bit of orange. In the front, I have three species of plants: *Glossostigma elatinoides*; *Hemianthus micranthemoides*;

*Broken Stone Garden* started as a few large pieces of rock. The largest rock was broken to accommodate the size of the aquarium and scape.

This is the result of breaking the largest of the rocks. It now forms the basis of the *Broken Stone Garden* Aquascape.

One of Pinto's past driftwood layouts.

and *Eleocharis minima*. I like to mix them because they harmonize each other and give it the feel that they are actually competing for the control of the substrate.

Surprisingly my biggest challenge with this layout came from the equipment. I have a 3x24W T5 HO light (wich for this tank size is pretty good) but for a while I had problems with Glossostigma growing up and *Hemianthus micranthemoides* just not growing dense. I added an extra 40W PLL light wich quickly took care of it and now it's goind really well. It's my first experience with T5 lights and so far I'm not that pleased. Until now I had just used PLL lights in my aquariums and it has worked fine so I might just go back to using them.

**Q: What is something special that we should know about the aquascape that is not necessarily obvious?**

**A:** Well surely the title "Broken Stone Garden" has a special meaning. Initially this layout was meant to be in a triangular shape with a large rock as a centre piece. During the planning I found that the main rock was just too large and tried to reshape it resulting in me breaking it into two smaller pieces which actually worked far better than the original one. The title of the aquascape "Broken Stone Garden" seem to fit nicely.

**Q: How often you do regular maintenance?**

**A:** My basic maintenance consists of a weekly water change of 50%. I'll supplement fertilizers twice a week adding the usual proportions of nutrients (10ppm of NO3, 18ppm of K, 2ppm of PO4, plus trace elements and iron). For CO2 injection, I have it adjusted for 1 bubble/second. I don't have a schedule for trimming I just do it when I feel the harmony is being lost.

**Q: Algae can become a big issue for many hobbyists. How have you managed to overcome algae?**

**A:** I usually don't have any problems with algae. Neither in the initial steps of the aquarium nor on the rest of the layout's duration. I don't use fertile substrate, and dose very little amounts of nutrients in the first few weeks of the layout. The reason that I don't like to use fertile substrates it that I prefer to have a tighter control over the amounts of nutrients on the water. During the initial stages, I also keep a shorter light period, 6 hours.

**Q: How do you choose your plant species and fish for a particular scape?**

**A:** Both fish and plants must be chosen accordingly to the general guideline of the aquarium. After deciding what type of layout I want to create I spend a lot of time looking at photos of other layouts analysing how this or that plant suits my idea. After setting up the layout I start thinking about the fish for it. Depending on whether I want give the impression of a luxurious and vibrant nature or a balanced and quiet landscape I tend to look not only for colour and shape of the fish but also at their behaviour.

In one of my past layouts of driftwood and ferns I chose *Hemmigramus hyanuary* because they are a quite active fish and suited very well to the dancing *Cyperus helferi* in the background, although their coloration is not that intense.

Definitely my favorite fish is the *Paracheirodon simulans* with its simplicity and grace. A fish that I also like a lot and use very often is the *Aplocheilichthys normani*. I used both of them in my first Iwagumi layout and in my current layout.

**Q: Describe how you come up with your aquascaping layouts.**

**A:** All my aquascapes start in a piece of paper. I prefer to sketch a few variations of the same idea with several plant combinations to see which one works best. Once I decide how it will be I start by trying a simple arrangement of the hardscape with few details and let it rest for a few days until it grows on me (or not). When working with rocks I try to place them so that it creates the impression of a larger rock being weathered and breaking into smaller ones.

As for driftwood layouts I prefer the feel of an old tree decomposing and opening up but transmitting an impression of water flow so I usually place pieces of wood in a radial arrangement with a specific dominant orientation.

**Q: After creating an aquascape that is so beautiful when do you decide to take it down?**

**A:** Most of the times it's when I have a new idea that I just can't wait to try. As my experience grows and my confidence matures I am now trying to experience layouts for longer times where I can sit back and enjoy my work. At the same time, I like to see how long my original idea holds, and what planted aquarium develops into.

**Q: Aquascaping is challenging. You clearly have a good grasp on the concepts, what advice can you give to fellow aquascapers?**

**A:** Usually aquascaping is not hard for me because I spend a lot of time working on my ideas and planning the layout in my mind.

I believe that great things are achieved with great effort and surely it helps very much to have a natural artistic talent but I think it comes mainly from a great passion for aquascapes, hard work and last but not least a lot of hours studying and analysing the work of great aquascapers (I would guess much like in art classes).

Because it hasn't been that long since I began aquascaping, I still feel very close to beginner problems and sometimes I too feel overwhelmed with the huge number of plant species available when it comes do make decisions. The main problem I think is to know what works and what doesn't.

I find that newcomers tend to stick with very geometrical layouts (a flat area on the front with low growing plants and a curtain of stem plants in the background) and have a hard time when they try to harmonize it. That's why I think it's important to expose themselves to many influences to start forming their own ideas and developing a critical opinion so they don't feel marvelled whenever they look at just any aquascape.

The hobby is definitely spreading as the equipments get more affordable and more people take interest in it. A lot of ideas have been explored to exhaustion but as long as there are new ones coming in it will surely be an extremely beautiful and attractive hobby.

**Q: What's in stored for the aquascaping future of Pedro Pinto?**

**A:** I hope I continue to improve my technique and get involved in more projects. Currently I also have a coldwater tank with a bed of river rocks and nymphaeas and a paludarium. I'm planning to set up a nano planted aquarium but I'm still gathering the equipment.

In the future I'd like to try more U-shape Iwagumis, because so far I've been doing mostly island shaped scape. I also want to explore more on those deep jungle driftwood layouts with ferns and mosses. For my next layout I'd like to create something that resembles a fallen tree being overwhelmed by low growing plants.

A small school of *Aplocheilichthys normani* swim actively in the current.

# Broken Stone Garden

**Dimensions:** 60x30x35cm
**Volume:** 63 liters
**Light:** 3x24W T5 HO
**Photoperiod:** 10 hours
**Substrate:** Akadama Special 30 Liters
**Filtration:** Eheim 2213
**Fertilizer:** Step 2, Bright K, ECA, Phyton-Git, Green Gain
**CO2:** Pressurized w/ glass diffuser at approx. 2 bubbles per second.

**Plant List**
*Hemianthus callitrichoides*
*Paracheirodon simulans*
*Glossosigma elatinoides*
*Aplocheilichthys normanii*
*Eleocharis minima*
*Eleocharis acicularis*
*Eleocharis vivipara*
*Rotala rotundifolia*
*Hemianthus micranthemoides*

**Fauna**
*Aplocheilichthys normanii*


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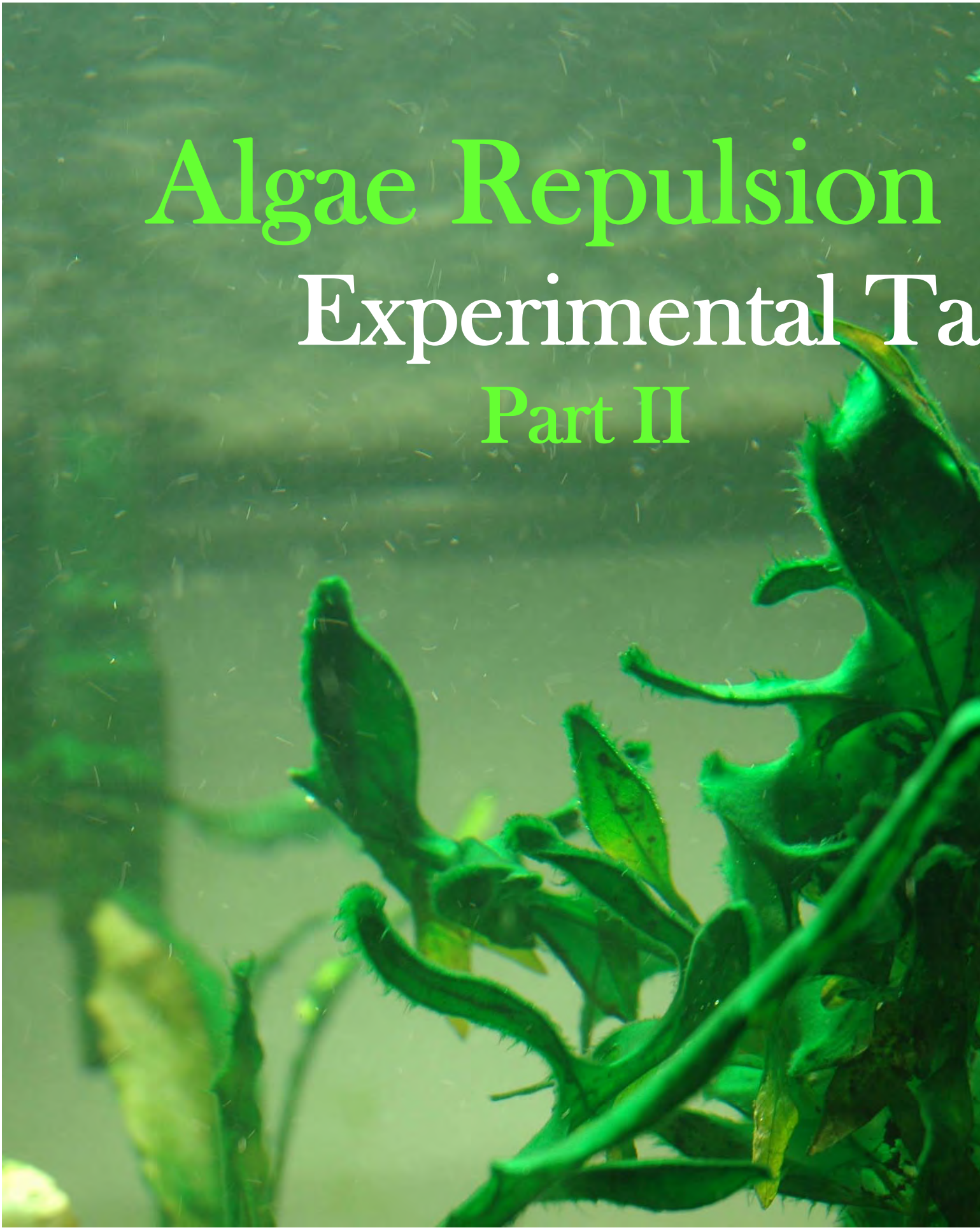
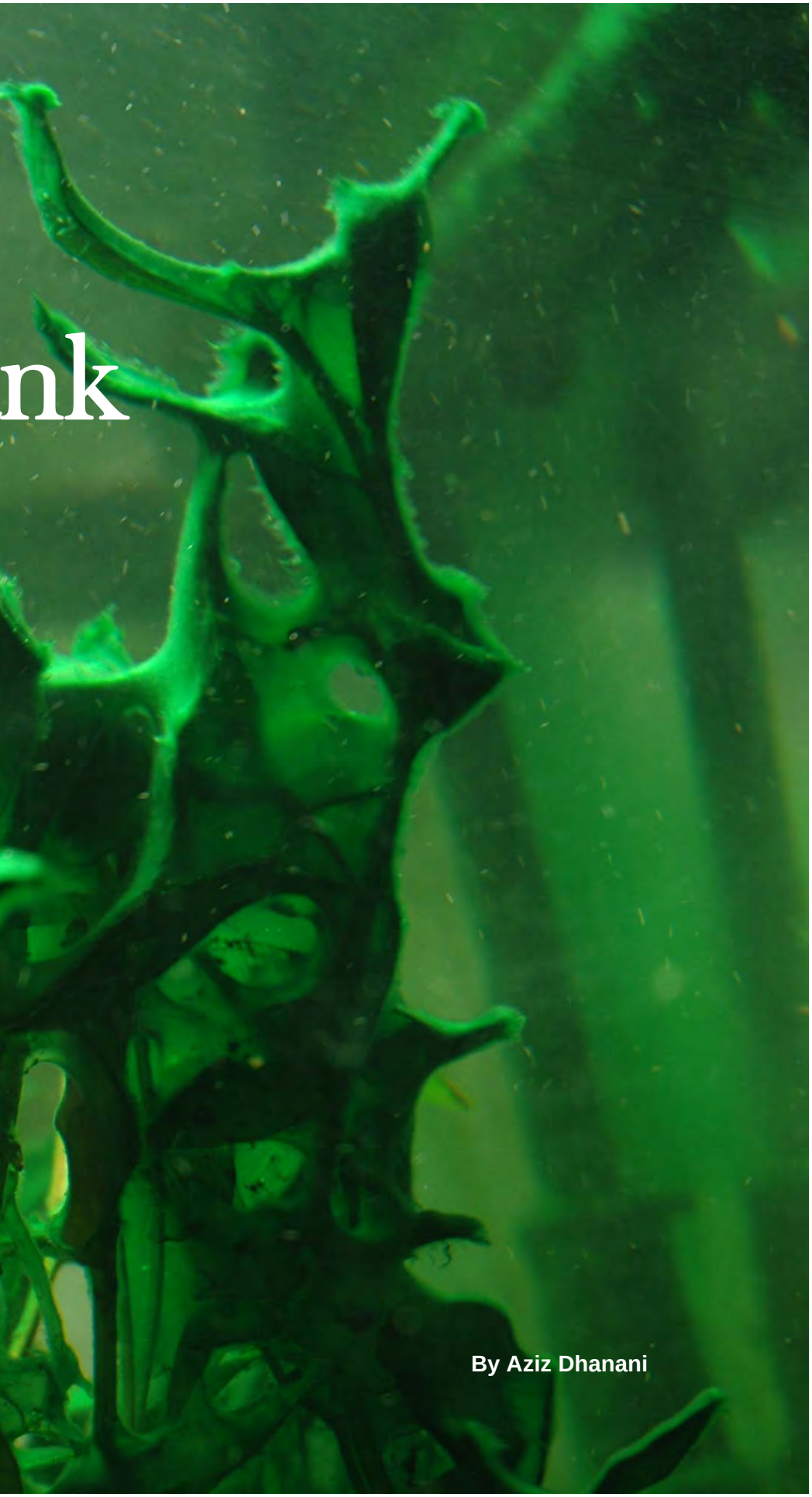


# Algae Repulsion

## Experimental Ta

## Part II



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By Aziz Dhanani

As readers recall in the the March 2008 Issue (Methods to Prevent Algae), I attempted to set up a 10 gallon tank and implemented controversial anti-algae measures to determine whether there was any merit to these measures. Some of these measure included using moss balls to soak up nutrients, noon burst lighting, and Eigera densa as a chemical agent. While the tank held up well and remained relatively algae free for 6 months, I was rather surprised and caught off guard with the developments that ensued after 6 months. During the 6 months, the fish remained relatively healthy, the plants continued to do well, the water remained crystal clear, and what algae was mainly confined to blue green algae, which I eradicated early on and residual green spot algae which remained on a few anubias leaves and cardamine leaves.

After 6 months, chaos ensued. There were fish deaths almost weekly and I was unable to pinpoint the cause of them. This was accompanied by the growth of black brush algae. I dosed the tank with Seachem Excel and this cause the blackbrush algae to recede and eventually disappear. However, the fish deaths

**Algae Repulsion Experimental Tank**
**Water Parameter Progression**

| Parameters | Initial Setup July 2007 | Stable Setup for 6 months | Algae Takeover January 2008 |
|---|---|---|---|
| PH | 6.4 | 6.5 | 7 |
| Ammonia (ppm) | 8 | 0 | 0 |
| Nitrites (ppm) | 0 | 0 | 0 |
| Nitrate (ppm) | 0 | 10 | 40 |
| GH (Mg/L) | 80 | 80 | 240 |
| KH (Mg/L) | 10 | 70 | 80 |
| Phosphate (Mg/L) | 5 | 4 | 5 |
| CO2 Levels (ppm) | 30 ppm (as per lime green color of my C02 drop checker) | For the first time there appeared to be a closer match between what the C02 drop checker indicator and the PH/KH CO2 Relationship Charts. Usually the PH/KH Relationship Chart would suggest a C02 level of 11.7 ppm and the C02 drop checker, via lime green color of the drop checker solution, would indicate 30 ppm. This time around the chart suggested 37 ppm vs 30 ppm as per C02 drop checker. | 30 PPM as per lime green color of c02 drop checker. |

continued and green spot algae took the tank by storm. The whole glass was pretty much covered with green spot algae. I was at a loss to pinpoint what was causing this. I was dosing Estimative Index Dosing at the time, there was a UV sterilizer running 24/7 in the tank, the fish were not overfed, I was performing 50% weekly water changes, and trimming plants as required. Water parameters were interesting (see chart).

**Why did Algae Occur?** Cause and effect relationships are difficult to prove anytime you setup a tank without another control tank. Many conclusions can be drawn from the differences in the water parameters. I don't know how much those differences can really be attributed to the tank's demise.

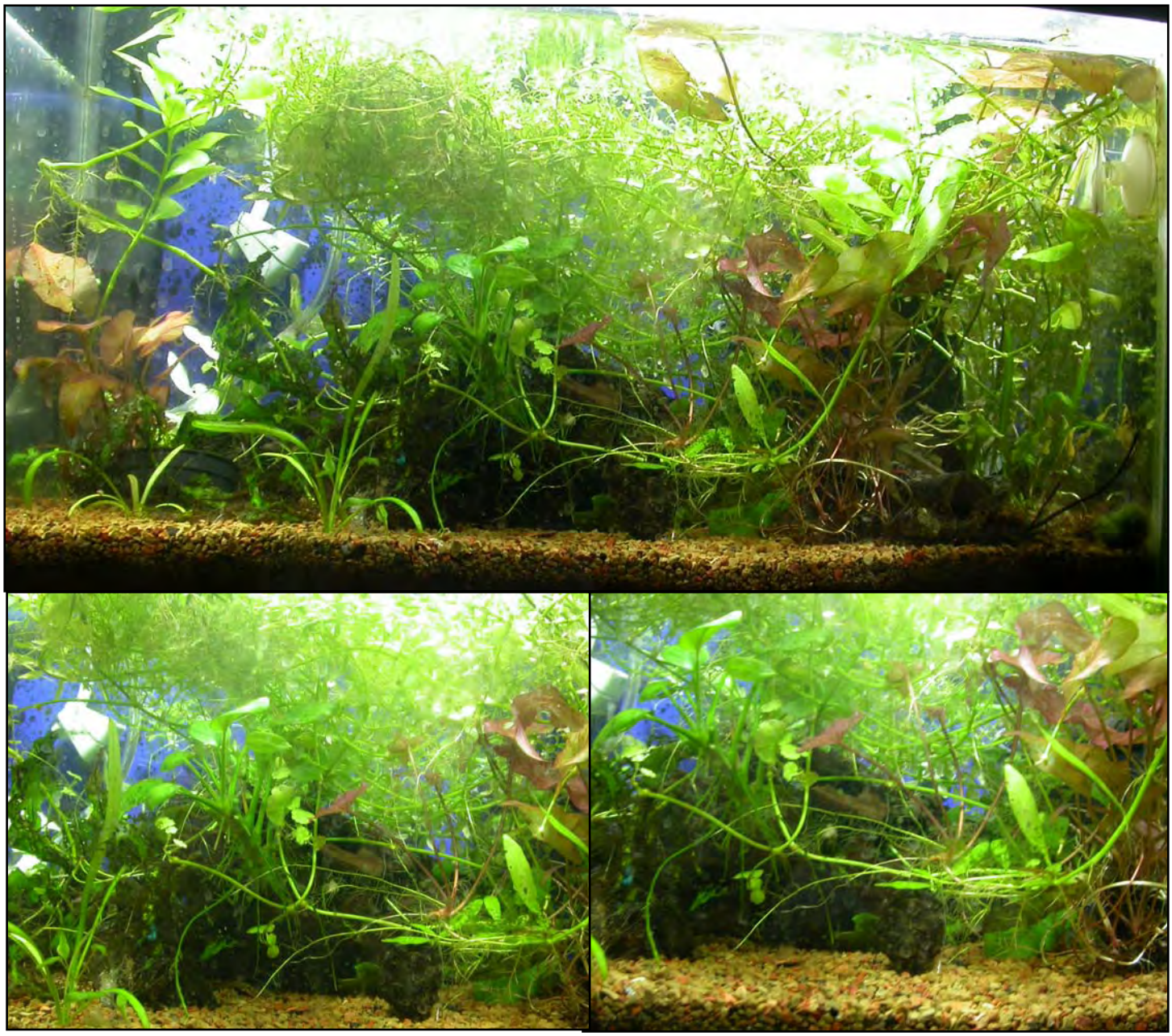
The water parameters would suggest that at the time the tank began to experience problems, PH increased, nitrates significantly increased, GH levels more than doubled, and C02 levels may have been considerably lower. It should be noted that GH levels significantly increased as I was dosing calcium sulphate and magnesium with every 50% water change. The extremely high GH levels would suggest an overdose of calcium sulphate, but again how much of the increase in GH was responsible for the ensuing fish deaths and decline in plant growth is open for debate. What I can tell you is that after that reading, I stopped dosing calcium sulphate and magnesium and the next monthly water parameter test indicated more ideal GH levels.

One thing that I noticed is that the development of the black brush algae and green spot algae appeared to coincide with a major trim of the tank. I had performed a major trim of the Eigera densa and greatly reduced the density of floating plant mass. Later on, I completely removed all the Eigera densa as I wanted to dose the tank with Seachem Excel to eradicate the black brush algae and I knew the plant was known to be sensitive to the effects of Excel and melt, I did not want the tank water to become littered with dying Eigera densa.

By April 22 2008, I was left with one surviving otocat, and one surviving marble hatchet. I was really at a crossroads about what to do next. Given the regular occurrence of fish deaths, I was not sure if the otocat and one marble hatchet would survive. However, I did not have anywhere to put them.

I decided to leave the tank running, but implemented the following remedial measures in the hopes of turning things around.

1. Changed canopy bulbs from 2 15 watt 6500 k compact fluorescent bulbs to 2 10 watt 6500 K compact fluorescent bulbs. The photo-period was kept at 8 hours total, 4 hours on, 2 hours off, and 2 hours on.
2. Added 5 Amano shrimp to help clean up some of the dead plant matter and any dying algae.
3. Double dose of Excel daily



These are pictures of the tank as the tank appears on May 23, 2008. My regret is not taking pictures of the tank when it was at its worst. You never think of taking pictures of your tank when it looks so bad that you are ready to tear it apart. Such a comparison would have made it easier to see and appreciate the vast improvement.

and double dose with every 50% water change.

4. Estimative Index fertilization reduced to a 1/4-1/2 recommended for 10 gallon tank.
5. Added a floating mass of rotala indica stem plants and 2 dwarf tiger lilly bulbs to increase plant density.

Much to my surprise, the green spot algae cleared up within a week of these measures. To date the Amano Shrimp appear healthy and I have not noticed any losses. Sadly though, the marble hatchet died after the last water parameter reading, and the otocat perished a week after that. Again, I am at a loss as to what caused their deaths.

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Aziz Dhanani Personal Site
www.azdhan.googlepages.comthelostworld2


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