

The Aquatic Gardener

Journal of the Aquatic Gardeners Association, Inc.

Volume 21 Number 3

Jul – Sept 2008



Cichlid-forum.com
The most visited and popular cichlid site on the web!

Flora Sun® overall user rating 9.63

Hongli
 "Best T8 plant bulb you can buy"
 What a difference it made adding one of these to my planted tank. I had 3 tubes and added a Flora Sun for the fourth and it was a 100% increase in growth. You can't go wrong with these bulbs.



Ultra Sun® overall user rating 9.67
 mbunakeith

"best bulb I have found"
 I bought a couple for my large cichlid tank and I really like the color and look of the bulb. They don't have any harsh blues or greens. Very even light that my plants love. They are pretty spendy compared to other bulbs, but no other bulbs are this nice in my opinion.

Ocean Sun® overall user rating 10.0
 Ji@nBing

"Great bulb!"
 When I was setting up my 90 gallon, I was debating between these and the Coralife's. After debating for a while, I went with these, and I'm glad I did. I use this with Zoo Med's Coral Sun bulb, and I've never been happier with my lighting. Very nice bulb that is bright, but not too bright and really brings out their colors.



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Contents

Aquatic Plant News.....6
 Interzoo 2008 – small is beautiful..... 10
Hydrocotyle sibthorpioides 18
 Nature Aquarium for *Cyprinids* 22
 Thailand—In Search of *Cryptocoryne albida*..... 30
 My Big Aquarium..... 37

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AGA Purpose

- to disseminate information about aquatic plants
- to study and improve upon techniques for culturing aquatic and bog plants in aquariums and ponds
- to increase interest in aquatic gardening
- to promote fellowship among its members

Web Site www.aquatic-gardeners.org

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Other Countries:

1 yr \$23 2 yr \$44 3 yr \$63

(Includes airmail for TAG)

Membership includes 4 issues of this periodical each year. To join or renew, please go to www.aquatic-gardeners.org/member.html or mail a check or money order (in US funds) to AGA Membership PO Box 51536 Denton TX 76206 USA. Payments to the AGA are not deductible as charitable contributions for US Federal income tax purposes.



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Cover photo by Karen Randall of blooming *Cryptocoryne albida*.

Aquatic Gardeners Association 2008 Convention Nov. 14 - 16 in Atlanta!

Wanna see Takashi Amano demonstrate an aquascape? Are you dying to meet Loh "Moss Guy" Kwek Leong's famous Professor Tan live and in person? Would you like to learn how to reproduce aquatic plants via tissue culture from the comfort of your living room? How about jetting off on a collecting trip to Thailand?

Would you like to see all this AND MORE in one fabulous weekend?

The AGA is proud to announce that the 2008 Aquatic Gardeners Association Convention will be held the weekend of **November 14-16, 2008**, at the **Atlanta Sheraton**, within walking distance of the Georgia Aquarium for Friday morning's Field Trip (\$23.50, optional).

We have a great **speaker** line-up:

Takashi Amano: aquascaping lecture and demonstration
Professor Benito Tan: aquatic mosses
Dr. Michael Kane of the University of Florida: tissue culture
Jeff Senske: space/design and the aquarium
Greg Morin, CEO of Seachem: TBA, but it's bound to be good
Karen Randall: collecting in Thailand

Friday night will include the return of **The Iron Aquascaper**, sponsored by Aquarium Design Group. Watch two masters go at it in a head-to-head competition using only the aquaria and plants given to them.

Saturday night will feature our **banquet** and 2008 International Aquascaping **Contest awards**. Sunday, spend your hard-earned cash on the largest aquatic-plant **auction** in the US. Find some new species, load up on something you haven't seen in a while, or sell your own plants.

Between talks, chat with fellow hobbyists and speakers. After the evenings' events, kick back and enjoy a free snack or beverage in the **Hospitality Suite**.

Costs: Registration \$59 Registration+Banquet \$99 Guest Banquet \$40
Hotel: \$109 per night, please register through the hotel link at :
www.aquatic-gardeners.org/convention.html. The cutoff date to receive the convention room rate is October 15th.

More information will soon be posted on the web site, on the forum, and sent directly to your e-mail Inbox. See you in Atlanta Nov. 14-16!

All Plant-Heads — All Weekend! AGA'08!

The Aquatic Gardeners Association 2008 Convention



November 14-16

Visit
www.aquatic-gardeners.org

Aquatic Plant News

Wilma Duncan & The Cause

If you haven't heard of Wilma Duncan and her charity, "The Cause" then you are either very new to the hobby or you live in a cichlid cave! Wilma Duncan has been serving the hobby since the early 1990s, donating fish, plants and related equipment to children, the elderly and the disabled. Naturally there has been a huge demand, and as the requests grew so did the need for financial support.

Friends suggested that she file for non-profit status so that she could apply for grants and corporate funding. After considerable thought she began a long and expensive process to reach 501(c) 3 status. This was accomplished in early 2008.

They now have some exciting and expanded goals. The Cause will continue to provide much-needed aquarium items to individuals, but also educational material on all aspects of aquarium keeping. They will work with all levels of government to provide information to the public via educational seminars on the role of invasive and non-invasive species of aquarium fish, fauna and flora that exist in our ecosystems.

You can visit Wilma's web site at www.wilmasthecause.org. Printed information is also available to any

local club that wants it. Just send an e-mail with a snail mail address to thecause.cause@yahoo.com.

AGA Member Opens New DIY Online Store

Jeremy Harper has started a new business, called Oregon Aqua Design. It will fill a much-needed niche in the aquarium hobby: Do-It-Yourself parts. This store is for people who want to buy a hard-to-find item, but don't want to buy a caselot of 25 when they only need one, or pay US \$22 shipping for a \$3 part. Says Jeremy in a recent e-mail, "What gave me the idea for this was a DIY reactor design. It called for 2" clear PVC. Although regular PVC would have worked, I loved the way it looked with clear PVC. Well, no one will sell 1 foot of clear PVC, only 10 feet.

"Since I couldn't find a retailer, I became one! I looked at all the stuff I wanted for my projects. Some items were cheap, but the company requires a minimum quantity or huge shipping charges. So I figured I could take the hit on shipping and resell items in quantities and at prices people could handle."

Jeremy is also putting together "kits" for common DIY projects and has new items coming in all the time. Check out the web site at www.oregonaquadesign.com.

Aquatic Plant Central Sold to CrowdGather, Inc.

Aquatic Plant Central (www.aquaticplantcentral.com) was sold in June 2008 to CrowdGather, Inc. Previous owner and long-time AGA member Art Giacosa stated that work responsibilities had prevented him from maintaining APC as it needed, and sponsorships rarely covered the expenses.

When asked for comment, Art said, "The site is currently owned by CrowdGather, a good company dedicated to forums and with a very active and knowledgeable staff. They are doing many improve-

ments to APC on the backend and updating some of our features, such as the Fertilator. I think it's a good fit for the site to take it to the next level.

"At the end of the day, APC is what it is because of its super dedicated admins and moderators and, of course, its wonderful members. Who owns it is really almost irrelevant. As long as someone who cares keeps the servers going, the community is what matters most."

CrowdGather, Inc. owns a large group of forums that cover a wide variety of interests. Visit their web site at www.crowdgather.com. 🌿



Pittsburgh Area Planted
Aquarium Society
(PAPAS)

Monthly meetings
Plant auctions

www.homeofpapas.org



AGA Bookstore!



The Aquarium Plant Handbook

From Oriental Aquarium, this 185-page full color book is more than double the size of Oriental's two previous "catalogue" books, features additional photographs and text descriptions of most aquarium plants, and an introduction by Takashi Amano. A great value for a reference book! \$25
Non-AGA Members add \$5.



Ecology of the Planted Aquarium, 2nd. Ed.

This 194-page, hardcover book by Diana Walstad presents useful information on the interaction of plants with bacteria, algae, etc. Figures, tables, and references are taken directly from the scientific literature. Questions and Answers and an easy-to-read text apply the scientific information to keeping a low-maintenance aquarium. **AGA exclusive!** All copies sold via the AGA are autographed by the author. \$30
Non-AGA Members add \$5.



The Aquatic Gardener & Planted Aquaria Back Issues

Missed out on a great article? Want to see last year's AGA aquascaping winners or convention highlights? In the AGA Bookstore you can order all recent color back issues of TAG.

In addition, the AGA has acquired the remaining stock of Dave Gomberg's *Planted Aquaria* magazine (*PAM*) and is offering it as part of our back issue sales.

The Aquatic Gardener Vol. 17 #1, #2, #3, #4, Vol. 18 #2, #3, #4, Vol. 19 #1, #2, #3, #4, Vol. 20 #1, #2, #3, #4, Vol. 21 #1, #2.

Single Issue \$6 (Specify #)

6+4 Issue Special \$40—All 6 issues of *PAM* plus 4 random *TAG*s.

Planted Aquaria #3, #4, #5, #6, #7 and #8. Single Issue \$3 (Specify #)

Ordering/Shipping Information for Books & Back Issues—Prices include shipping within the USA. Place your order at the AGA web site online at www.aquatic-gardeners.org/bookstore.html, or to order by mail send check or money order payable to AGA with your order to [REDACTED]

Please allow 2 – 4 weeks for delivery. Items are normally shipped within 1 week of payment.

2008 AGA INTERNATIONAL AQUASCAPING CONTEST

The Aquatic Gardeners Association is looking for aquascapes for its 2008 International Aquascaping Contest.

Time to tidy up the tanks, finish growing and grooming the plants before you snap the pictures and enter them in the contest to share with aquatic gardeners and artists around the world!

The contest, which opened on July 15th, is intended for aquatic gardeners from the novice to the expert and will showcase the many styles represented worldwide. Entry of aquascapes can easily be done online as in previous years.

Ribbons and prizes will be awarded to the winners. Winning aquascapes will be presented at the awards banquet at the 2008 AGA Convention in Atlanta, Georgia.

The deadline for entry is September 15, 2008. The fee is \$5.00 USD per entry payable online by paypal or credit card, or by mail via check (US bank) or money order. Please see the AGA website for the rules and details.



| showcase.aquatic-gardeners.org |

Interzoo 2008 – small is beautiful

Ole Pedersen. Photos by the author unless otherwise noted.

Interzoo is Europe's largest pet fair. It is held every second year in May in the fantastic surroundings of Nuremberg, Bavaria in Germany. Unfortunately, the fair is not open to the public and thus, I think it is worthwhile to report on what is hot and trendy in the aquarium hobby as seen from Europe. In short, the trend is going in the "nano" direction, so small is beautiful!

None of the companies to which I refer in this article are really big players on the American market, but I believe that trends in our hobby are worldwide. With

the internet it is difficult to control the development in the market and I will bet my last dollar that nano tanks are mushrooming everywhere in the world, if not already, then within the next couple of years.

Fortunately, the nano trend fits nicely with another hot trend—shrimps! I saw shrimps in Nuremberg that I have never seen before. One of them was the new white-dotted cardinal red shrimp from Sulawesi. It has not yet been scientifically described, but according to shrimp experts in University of Humboldt in Berlin, it will be



A brand new shrimp from Sulawesi in Indonesia that has not been scientifically described yet. It is less than 20 mm long but still the most eye-catching creature you could possibly keep in a nano tank. The tentative scientific name is *Caridina dennerli* named after the German company Dennerle.

named *Caridina dennerli* after one of the biggest German companies in the aquarium business, Dennerle. This creature is truly fantastic and I hope it will prove easy to breed or it could easily become extinct because I believe the demand

for it will be enormous.

So how do the companies deal with this nano and shrimp trend? Tropica Aquarium Plants, for example, built a whole wall with nano layouts designed by Jan Ole Pedersen. Like other stuff he



Three very different tanks presented at Tropica's booth at Interzoo 2008. **Top:** This tank is approximately 3.5 liters [1 gal.]; for comparison, note the Amano shrimp in the lower right. **Middle:** This aquascape is truly fantastic—only 6 liters and yet, a fabulous feeling of horizontal depth in this tank. It is fitted with a nice CO₂ injection kit from AquaArt in Poland. For perspective, there is an Amano shrimp in the lower left corner. **Bottom:** A 420-liter [110 gal.] beauty; I did not see any other tank matching this masterpiece at the fair. All aquascapes were designed by Jan Ole Pedersen, Tropica.

designs, these were different from most other nano tanks at the fair. Tropica's nano tanks were generally elongated, shallow but with great horizontal depth providing a 3D effect, which otherwise can be difficult to obtain in these nano tanks. However, not everything in Tropica's booth was nano. They launched a new sales display for potted plants that holds 240 pots of aquarium plants, nicely presented by a gentle slope allowing the display to be observed from all sides. The sales display tank is fitted with T5 lighting and pH-controlled CO₂ injection so that the plants can be stored under optimum conditions for a longer time in the shops. The design is Danish and the technique is German: a strong combination.

Aquastabil provided the aquarium, the cabinet and the Effectline lamp hovering over this beautiful aquarium plant nursery, whereas JBL provided the huge external filter and the CO₂ injection set.

JBL of Germany was one of the few companies that had not gone totally small and made everything nano. Conservative, you may say? Yes, but they had focused on the other part of the trend—the shrimps. JBL was the first company to develop custom-made food for shrimps and crayfish. When crustaceans started invading our tanks, people soon realized that feeding high-protein fish food to these modest creatures often resulted in fast growth. But the growth exceeded the natural turnover

rate of the exoskeleton resulting in “skin problems” and infections that could not be treated. JBL is known for their strong relationship with science and they teamed up with leading European crustacean experts to develop suitable shrimp and crayfish diets. They came up with the best crustacean food on the European market characterized by low content of animal protein, but high in plant protein, and with the correct amount of minerals needed to support the growth of the exoskeleton. The food is also rich in detritus, which is the natural diet for most crayfish and many shrimps.

The shrimps need a home—the nano tank and all its associated technique. Dennerle, unfortunately absent in America, provides tanks,

lighting, CO₂ injection kits, pumps and filters, and heaters all made or modified for the nano tank. Their nano tanks are produced by a Taiwanese company that apparently produces most of the nano tanks on the European market. Basically, they are all made from three pieces of glass: the bottom, the back and then, in one piece, the front and the two sides which are made of bended glass. This construction method provides an exclusive look because there are no visible junctions seen from the front. Some of these tanks are fitted with a glass lid to reduce evaporation and formation of mineral deposits on the glass. Dennerle's CO₂ injection kit is, however, 100% their own product and it is nice. It comes in



Far Left: The Tropica Aquarium Plants booth at Interzoo 2008.

Left: Their new sales display tank for potted plants, so that the plants can be stored under optimum conditions for a longer time in the shops.

two versions; one with and one without a solenoid valve. But both models are small and beautifully designed— something you do not mind placing next to your nano tank right on the desktop. I found the internal filter and the heater less attractive. I believe the company needs to work a bit more on these items before they meet the design standard of the CO₂ injection system. And it is very much about design because the nano tanks are too small to hide the equipment; it is constantly visible and thus, it must be presentable. I was surprised that no companies offered “external” heaters in the form of heat mats used in terraria. These low-voltage mats are simple place beneath the tank and if needed, a small external

sensor could be used to control the temperature to a preset set-point.

The Italian ELOS is the Bang & Olufsen within the aquarium hobby. Some may argue that Amano's Aqua Design holds that position but they were not present at Interzoo so I could not tell. ELOS had also gone nano although not quite as small as most other companies (see Box 1). But ELOS had a state-of-art LED lamp for nano tanks and I was exited with the design and its fantastic output. LED lamps are based on light-emitting diodes rather than glowing filaments or gas. They are small and thus, perfectly fitted for nano purposes. However, their individual light emission is low and thus, they are placed in clusters to provide

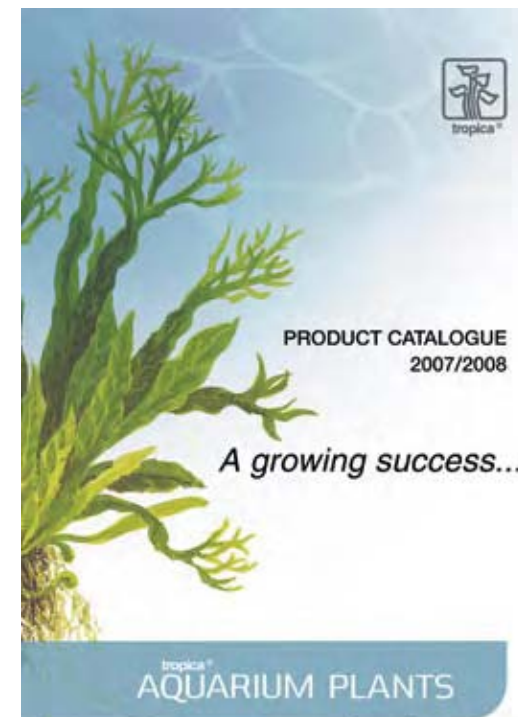
Right: Dennerle's 25 L [6.6 gal.] nano tank fitted with their new nano CO₂ injection system (the small aluminum cylinder) with pressure reducer and solenoid valve.

Below: A whole new line of custom-made food for shrimps and crayfish.



The Amazon in your living room...

You have the dream, Tropica turns it into reality. We import plants from all over the world – from the rain forests of Brazil to the watercourses of New Zealand. So no matter whether you are looking for attractive ornamental plants or compact foreground plants, plants on stone or rooted plants, we have what you want. There are countless options and only your imagination imposes limits on what you can achieve in your aquarium. This catalogue takes you on an inspiring journey to the underwater world of aquatic plants so you can create your own Amazon at home. Have a great trip!



Microsorium pteropus "Windelov" 008B

PRICE GROUP- POT 9 AquaDecor

GENUS	Phragmites
COMMON	Water
HEIGHT	10-20 cm
WIDTH	10-15 cm
TEMPERATURE	18-24°C
PH	6.5-7.5
GH	1-4
GH	1-4
GH	1-4
GH	1-4

LIGHT: LOW ●●●● HIGH ●●●●

GROWTH RATE: SLOW ●●●● FAST ●●●●

MAINTENANCE: EASY ●●●● DIFFICULT ●●●●

Microsorium pteropus "Windelov" is a patented variety of Microsorium pteropus, named after Tropica founder Holger Windelov. Its long branched leaf tips make it one of the most beautiful aquarium plants. A hard and easy plant for both beginners and the more experienced. Best results are obtained by planting it on a stone or fine soil. If planted in the bottom the horizontal rhizome must not be covered. This plant is not eaten by herbivorous fish.

Nesaea crassicaulis 003B

PRICE GROUP- POT 5

GENUS	Littoralea
COMMON	Water
HEIGHT	30-50 cm
WIDTH	40 cm
TEMPERATURE	22-24°C
PH	7-7.5
GH	5.5-6.5
GH	5.5-6.5
GH	5.5-6.5
GH	5.5-6.5

LIGHT: LOW ●●●● HIGH ●●●●

GROWTH RATE: SLOW ●●●● FAST ●●●●

MAINTENANCE: EASY ●●●● DIFFICULT ●●●●

Nesaea crassicaulis is a beautiful and highly recommended aquarium plant, although it has high demands for light. It has red-brown, organic coloured leaves. Grows best in soft and slightly acidic water. Make sure the lower leaves get sufficient light, otherwise they will die off. This plant is similar to Microsorium sp. and is often mistaken for them. But in the aquarium it can be recognized by its yellow-green stems. Easy to propagate by side shoots or cuttings, which can be cut off and planted in the bottom.

Monosolenium tenerum 002C

PRICE GROUP- POT 7 AquaDecor

GENUS	Monosolenium
COMMON	Water
HEIGHT	2-3 cm
WIDTH	2-3 cm
TEMPERATURE	18-24°C
PH	6.5-7.5
GH	1-4
GH	1-4
GH	1-4
GH	1-4

LIGHT: LOW ●●●● HIGH ●●●●

GROWTH RATE: SLOW ●●●● FAST ●●●●

MAINTENANCE: EASY ●●●● DIFFICULT ●●●●

Monosolenium tenerum is an attractive, decorative and easy grown plant. Leaf colours range from green to yellow and orange and sudden shades depending on growth conditions in the aquarium. The stems keep their intense red coloring, something that can also be seen when the plant is grown in a vase. Compared with Nesaea crassicaulis (Tropica No. 003B), Nesaea crassicaulis has narrower leaves and its colour is more uniform. The recommended planting Nesaea in the mid-ground of the aquarium as a contrast to the tall green background plants. Particular capsules should be used to strengthen the plant and emphasize its colour.

Nesaea pedicellata 003C

PRICE GROUP- POT 6

GENUS	Littoralea
COMMON	Water
HEIGHT	30-40 cm
WIDTH	10-20 cm
TEMPERATURE	22-24°C
PH	6-7
GH	5.5-6
GH	5.5-6
GH	5.5-6
GH	5.5-6

LIGHT: LOW ●●●● HIGH ●●●●

GROWTH RATE: SLOW ●●●● FAST ●●●●

MAINTENANCE: EASY ●●●● DIFFICULT ●●●●

Nesaea pedicellata is an attractive, decorative and easy grown plant. Leaf colours range from green to yellow and orange and sudden shades depending on growth conditions in the aquarium. The stems keep their intense red coloring, something that can also be seen when the plant is grown in a vase. Compared with Nesaea crassicaulis (Tropica No. 003B), Nesaea crassicaulis has narrower leaves and its colour is more uniform. The recommended planting Nesaea in the mid-ground of the aquarium as a contrast to the tall green background plants. Particular capsules should be used to strengthen the plant and emphasize its colour.

Box 1—

How big is a nano tank?

This is a tricky question and I have not been able to provide an unambiguous answer by researching the Internet or enquiring among hobby experts. Obviously, there is no lower limit and Amano has played with tanks down to 1 or 2 liters but I have seen tanks down to 100 mL. Tropica's AquaCube is about 5 liters whereas the ELOS cubes

presented at Interzoo in Nuremberg were 64 liters [17 gal.]. Personally, I would not regard the latter a nano tank but some people do so let us not be too strict on definitions. Rather than size, perhaps a better criterion to describe nano tanks is to include all the external things that are an integral part of the nano trend, i.e. small-size lamps, CO₂ injection kits, pumps and filter and heaters—all made smaller and with nice designs so that they become integral parts of whole nano world experience.

Courtesy of Fluval



A 30 L nano tank with CO₂ injection. CO₂ injection is absolutely necessary if you want to grow difficult and demanding plants such as *Pogostemon helferi*, but it is not needed if you stick to mosses, *Anubias*, *Microsorium* or other slow-growing plants.

enough light. Also, I found the color temperature a bit too cool but that is basically a matter of taste. The design was beautiful and the light emission fantastic. I am sure that LED lamps are the future because they can be made compact and use much less energy than high pressure halide lamps, glow lamps or fluorescent tubes.

Apart from LED lamps, it is difficult to predict what the future will bring. Will the nano and shrimp trend last? Maybe and maybe not. Nano tanks look so beautiful and maybe they can attract people to our hobby who would not be inclined to set up a 350 L [92 gal.] tank in the living room, but a nano tank on the kitchen table would be alright. But because the nano tanks are small, it is difficult to achieve a good ecological balance so they need constant attention and

frequent water changes. I wonder whether they will be so attractive to a large audience when people realize that these tiny tanks are not self sustainable.... In contrast, shrimps are probably here to stay. They come in such diversities and many are easy to breed. Many of them you do not have to feed because they graze on algae that are always present to some extent in any tank. In a forthcoming issue of *TAG*, we will take a systematic look at these creatures and evaluate their use in algal control.

The Author

Ole is associate professor at the University of Copenhagen where he teaches aquatic ecology and researches all aspects of ecology and physiology of rooted aquatic plants. In addition, he has worked as Tropica's webmaster since 1995. 🌿

Stay in Touch!

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membership@aquatic-gardeners.org

or write to:

**AGA Membership
PO Box 51536
Denton, TX 76201**

Don't forget to renew your AGA membership! The note printed on *TAG*'s envelope will tell you how many issues of *TAG* you have left on your membership. Renew at www.aquatic-gardeners.org/membership.html or send a check/money order to the address above. Membership rates, with discounts for multiple years, are printed on page 3.

Hydrocotyle sibthorpioides

Cavan Allen

I enjoy collecting, obtaining and evaluating potential aquarium plants to such a degree that I rarely end up with anything resembling an aquascape. More often, I have what looks to the untrained eye like a motley assortment of stems. Through the years, I have found a few plants that are very much to my liking and inspire me to actually put something together that looks presentable every once in a while.

One of those plants is *Hydrocotyle sibthorpioides*. Although it has been in the hobby for quite some time, I don't think that it has ever gotten the attention it deserves. It is, therefore, my solemn duty to stick up for the underdog and present this outstanding plant.

The related (and edible) *H. leucocephala* has long enjoyed a place in the hobby due to its uniqueness and ease of growth. *H. sibthorpi-*

oides is considerably more demanding but arguably more desirable when its positive attributes are taken into consideration. It is, quite simply, stunning to behold when at its best. What starts out as a tangled

clump of stems weighted down with a stone or other heavy object blossoms into a self-contouring carpet. Alternatively, it may be placed among driftwood branches or other midground hardscape

materials and allowed to cascade downwards. It has a solid rate of growth, but is not a weed. There are a few other plants with similar properties, but the delicately scalloped, nickel-sized leaves of an attractive shade of green not seen among other plants in the hobby along with a propensity to form large oxygen bubbles on the top of the leaves really put this species over the top. It is a superb accompani-

Tim Gross



Cavan Allen



The carpeting effect of *Hydrocotyle sibthorpioides* is stunning.

ment to red plants like *Ludwigia arcuata*.

Unfortunately, it really must be seen in person to be fully appreciated. For anyone who would like to try growing it, I say this: Don't skimp on anything! Above all else, it needs light. Lots and lots of light. It may survive under average aquarium lighting but will remain smaller and scrawny. Under good power compact, T5 or metal halide illumination, it will reach its full potential. Other than that, there's not much to be said about its care. Levels of carbon dioxide and fertilizers (both macro and micro) commensurate with lighting intensity will ensure success.

H. sibthorpioides is quite adaptable and has no trouble whatsoever when it is grown emersed. In such a state, it does not retain the distinctive submersed coloration but instead grows darker green, somewhat worthy of admiration. It would therefore be well suited to open top tanks or emersed displays. Emersed propagation often occurs without assistance, though with lower productivity than when the seeds are

collected and sown. The small white flowers, which pop up abundantly outdoors, precede small clusters of green fruit. When they have started to darken and brown slightly, they may be collected and gently poked into soft and moist soil. Given some time, many seeds germinate and without much difficulty, grow into mature plants. Emersed growth is distinctly faster than submersed growth, and so *H. sibthorpioides* may be propagated thusly when larger quantities are needed or when the plant is not currently being used in an aquascape. Like many other aquarium plants, it may be easily 'stored' above water for future use.

Cavan Allen



Growing *H. sibthorpioides* emersed is easy, and faster than submersed growth.

Native to tropical Asia, *H. sibthorpioides* has been widely naturalized the world over, even in many wet places in the United States. If none can be readily obtained through trade, keep an eye out for it on your next collecting trip and consider utilizing it in your next 'scape'. It's a keeper! 🌱



Maintenance Stand Clear type-A
Aqua Design amano new item



Maintenance Stand Clear

Improve the whole scene of your aquascape,
and appreciate the beauty of Nature Aquarium Goods.

101-216 Maintenance Stand Clear Type A
with enough storage space for a larger CO₂ tank
Size : W300 x D200 x H700mm

101-217 Maintenance Stand Clear Type B
with 2 shelves for storing small accessories
Size : W300 x D200 x H700mm



101-212 Maintenance Stand I
Size : W166 x D151 x H333mm



Metal Hook Stand
101-209 for Green Brighty Series 500ml
101-210 for Green Brighty Series 250ml

* The image of Maintenance Stand Clear – Type A shown is a prototype of the product.
Its design and specification may change without notice.

* Metal Hook Stand is available for tanks 6mm or less in thickness.



Nature Aquarium for *Cyprinids*

Takashi Amano. Translated by Tomoko Schum. Photos by the author.

The main character of a Nature Aquarium is the fish. Although aquatic plants, driftwood and rocks comprise the main part of a layout, the Nature Aquarium is finished only when fish are placed in it. Among the many fish that you can enjoy in a Nature Aquarium such as *Characins* and *Cichlids*, the family of *Cyprinid* is a group of fish with its own unique appeal. In this article, I will introduce a layout method

that brings out the charm of *Cyprinids*.

This layout took a long time until it was ready for a photograph since the growth of *Cryptocoryne balansae* was so slow that it did not match the timing for photo opportunities of the other aquatic plants. However, the layout became that much more mature in appearance, resulting in a stronger natural feel. This seems to be an aquascape meant for *Cyprinids*.



Aquascape 1 Data

Aquarium: Cube Garden Clear W180 x D60 x H60 cm [W71 x D24 x H24 in.]
 Lighting: Green Glow/604 (NA lamp 20W x 4) x 6 units, turned on for 10 hours per day
 Filter: External filter (Bio Rio, Tourmaline F)
 Substrate: Aqua Soil, Power Sand Special L, Bacter 100, Clear Super, Tourmaline BC, Penac W/for Aquarium, Penac P
 CO₂: Pollen Glass Beetle Series 50, 5 bubbles per second via CO₂ Beetle Counter (using Tower/20)
 Aeration: 14 hours after the light is turned off using Lily Pipe P-6
 Additives: Brighty K; Green Brighty STEP2; Green Gain
 Water change: 1/3 once a week
 Water quality: Temperature: 24°C [75°F]; pH: 7.0; TH: 10 mg/l; NO₂: < 0.02 mg/l; NO₃: < 1 mg/l; COD: 4 mg/l

Aquatic Plants

Eleocharis acicularis
Cryptocoryne petchii
Cryptocoryne wendtii (Mi Oya)
Cryptocoryne pontederiifolia
Cryptocoryne wendtii 'Green'
Cryptocoryne walkeri var. 'Lutea'
Cryptocoryne beckettii
Cryptocoryne balansae
Fontinalis antipyretica

Fish

Trigonostigma heteromorpha
Rasbora bankanensis
Rasbora einthovenii
Rasboroides vaterifloris
Rasbora caudimaculata
Puntius cumingi
Otocinclus sp.
Crossocheilus siamensis
Caridina multidentata

Aquascape 1: The Charm of a Community Tank & How to Mix Cyprinids

The *Cyprinid* family has many subfamilies. Not only do their sizes and colors differ, but the way they swim and their personalities are also different. We must take these differences into consideration when selecting fish for a community tank.

In a community tank, the largest fish often becomes the main feature. If you choose an aggressive type of fish, other smaller types will be bullied. Since the family of *Rasbora* tends to be peaceful, it is easy to use as the main fish in a community tank. Although some *Rasbora* have subdued colors, they are a safe choice since they do not detract from a natural feel as compared to flashy fish. Even if they are plain, they command a presence in high numbers. Because of their peaceful nature, it is possible to put many *Rasboras* in an aquarium.

Fish in the *Puntius* family may attack each other when they mature. Their sexual differences become pronounced as well. Even

if they are fine when young, they require special attention since they become aggressive as they color up and become beautiful. It is alright to have a small number of them in a layout with plenty of hiding places for weaker individuals. Although it is possible to lessen their aggressiveness by keeping them in a very high numbers and diminishing their territorial behavior, *Puntius* are rather bulky and a large number make a layout appear congested.

Since fish in the *Danio* family are fast swimmers and make an aquascape appear busy, they are typically not kept by themselves. However, they can add to the natural feel in a community tank by their very movement that is different from that of other fish.

Fish in the small *Boraras*, *Micro Rasbora* and *Sundadanio* families are suitable for small community tanks. Since fish in *Chela* families such as Hatchet Chela swim in the upper layer, they are easy to use when mixed with fish that inhabit other layers. The metallic colors of *Inlecypris* and *Balirius* contrast well with other fish.



The Orange Fin Scissor Tail Rasbora is large but peaceful. Although its colors are subdued, other *Rasbora* and *Puntius cumingi* already add brightness to the aquascape. Its size and colors are balanced and it goes well with the aquascape.



Aquascape 2 Data

Aquarium: Cube Garden Clear W90 x D45 x H45 cm [W35 x D18 x H18 in.]
 Lighting: Solar I (NAMH-150W) x 3 units shared over two 90H aquarium, turned on for 10 hours per day
 Filter: Super Jet Filter ES-1200 (Bio Rio, NA Carbon)
 Substrate: Aqua Soil, Bright Sand, Power Sand Special L, Bacter 100, Clear Super, Tourmaline BC, Penac W/for Aquarium, Penac P
 CO₂: Pollen Glass Large Series 30, 3 bubbles per second via CO₂ Beetle Counter (using Tower/20)
 Aeration: 14 hours after the light is turned off using Lily Pipe P-4
 Additives: Brighty K; Green Brighty STEP2
 Water change: 1/3 once a week
 Water quality: Temperature: 25°C [77°F]; pH: 6.8; TH: 20 mg/l; NO₂: <0.02mg/l; NO₃: <1mg/l; COD: 4 mg/l

Aquatic Plants

Marsilea drummondii
Eleocharis vivipara
Microsorium sp.
Riccia fluitans
Fontinalis antipyretica

Fish

Trigonostigma heteromorpha
Otocinclus sp.
Caridina multidentata

Aquascape 2: A Layout for Harlequin Rasbora

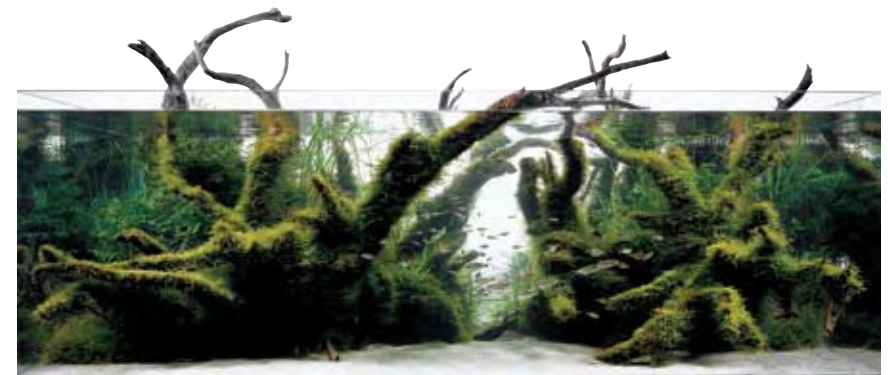
Rasbora heteromorpha is the most popular cyprinid. The beauty of these fish is exceptional when they are kept in an aquatic plant

layout. This layout is put together by arranging driftwood into a mound and planting aquatic plants with a serene appearance. The distinctive color of *Rasbora heteromorpha* stands out in contrast.

Aquascape 3: A Deep Aquarium With Driftwood

Many *Cyprinids* are strong swimmers that love current. This aquarium is twice as deep from the front to back as the standard 180 cm aquarium. This can afford a

large swimming space even when big driftwood branches are arranged. Since a relatively strong flow of water is returned from the overflow type filtration system, it is suitable for fish that love current.



Aquascape 3 Data

Aquarium: Cube Garden Clear W180 x D120 x H60 cm [W71 x D47 x H24 in.]
 Lighting: Grand Solar I (NAG-150W-Green Lamp x 6, NA Lamp Twin 36 x 12), turned on for 10 hours per day
 Filter: Original overflow filter (NA Carbon, Bio Rio)
 Substrate: Aqua Soil, Rio Negro Sand, Power Sand Special L, Bacter 100, Clear Super, Tourmaline BC, Penac W/for Aquarium, Penac P
 CO₂: Injected directly into the motor head in filter sump at the rate of 6 bubbles per second via two CO₂ Beetle Counters (using Tower/20)
 Aeration: 14 hours after the light is turned off using Lily Pipe P-6
 Additives: Brighty K; Green Brighty STEP2; Green Brighty Special Shade
 Water change: 1/3 once a week
 Water quality: Temperature: 25°C [77°F]; pH: 6.8; TH: 30 mg/l; NO₂: < 0.02 mg/l; NO₃: < 1mg/l; COD: 4 mg/l

Aquatic Plants

Bolbitis heudelotii
Cryptocoryne petchii
Cryptocoryne wendtii 'broad'
Cryptocoryne wendtii (Mi Oya)
Cryptocoryne albida
Cryptocoryne wendtii 'TROPICA'
Cryptocoryne pontederiifolia
Cryptocoryne retrospiralis
Fontinalis antipyretica

Fish

Barilius pulcher
Puntius pentazona rhomboocellatus
Rasbora bankanensis
Puntius sp.
Otocinclus sp.
Crossocheilus siamensis
Caridina multidentata



A Large Aquarium Brings Out the Charm of Cyprinids

Bigger aquariums are always better for keeping fish. Having a

spacious swimming space and adequate current is especially desirable for strong swimmers like *Cyprinids*. A large aquarium can realize such

an ideal environment.

A large aquarium provides a comfortable environment for fish. This applies to not only large fish but also small fish as well. The natural environment that fish come from is far greater in comparison to an aquarium. A bigger aquarium is better to make an aquarium environment just a little closer to such an environment. Although this overflow type aquarium, which is set up in the Nature Aquarium Gallery, has the same length as a

standard 180 cm aquarium, its width is twice as large as a standard one. The extra aquarium capacity provides adequate swimming room for active swimmers like *Barilius*. A stronger output from its filter provides adequate current as well. Fish can maintain a muscular, firm body under these conditions. Intricately arranged large driftwood branches provide a perfect hiding place for timid *Puntius*. The bush formed mainly by *Cryptocoryne* may remind *Cyprinid* fish of their native home. 🌿



Photos this Page: Fishes swim around, feed well and develop fit and firm bodies in a large aquarium. Their silver scales contrast well with the tranquil green colors of Willow Moss, ferns and *Cryptocoryne*.

Thailand

In Search of *Cryptocoryne albida*

Karen A. Randall. Photos by the author.



In March of 2008, Christel Kaselmann and I traveled to southern Thailand with the intent to visit a number of different biotopes and study the plethora of plant species to be found there. We had a “wish list” of plants that we hoped to find and photograph in the wild, and although we didn’t find every one, we saw an astounding number of species in an area that, geographically speaking, was really quite small.

Obviously, anyone traveling in Thailand who has an interest in aquatic plants wants to find *Cryptocoryne*. We were lucky enough to find several species, but in this article, I’d like to limit the discussion to one particular species, *C. albida*.

We had been in Thailand for several days, had visited a number of beautiful biotopes and had found and photographed a number of interesting plants. While we knew that *Cryptocoryne albida* had been found in a number of locations in

this part of Thailand, we had yet to come across it. But we had stayed mostly near the coast so far, and it was time to head inland a bit. The next stop on our itinerary was the spectacularly beautiful Khao Sok National Forest. This park covers over 738 sq. kilometers [285 sq. miles]. The terrain includes spectacular limestone outcroppings, caves and many waterfalls set in the rain forest. The approach to the park is via a narrow, steep, winding road with breath-taking scenery.... It was hard to keep our eyes on the road, which was a little scary when we were just learning to drive on the “wrong” side of the street!

The reason we went to this park was to find a particular waterfall that we had been told about, covered in *Microsorium*. It turned out later that we were in the wrong park, but it was a mistake we were both glad to have made as it gave us a chance to see some spectacular

scenery, as well as the opportunity to find some interesting plants!

We arrived at park headquarters in mid-afternoon. No one had heard of the specific waterfall we were looking for, and we found that the nearest waterfall inside the park was 3 kilometers [2 miles] from the entrance. Some of the others were a full day’s hike into the forest! Our time in Thailand was limited, so we decided to visit only this closest waterfall, called Wing Hin, and hoped we might see *Microsorium* there. Because we knew we would be hiking a distance, we took only a minimum of photography equipment with us, just our small cameras, with plastic bags in case we needed to wrap them up quickly in a sudden rainstorm.

Heading out of the parking lot, we crossed a concrete bridge spanning a wide, rocky stream on the way to the trail head. As we approached, we realized that the

“grass” around the rocks on the edge of the stream was not grass at all, but *Cryptocoryne albida*. We were excited by our find, but pressed for time, as we needed to get to the waterfall and back out before nightfall. I love wildlife, but neither of us was thrilled with the idea of being out in an area inhabited by tigers, leopards and sun bears after dark! We could visit the *C. albida* again in the morning.

A 3 kilometer hike to the waterfall might not seem like that much, but when it is 90°F [32°C], 90% humidity, and the path climbs steeply up and down a number of times before you reach your destination, it can feel like a *very* long way! But the rain forest was beautiful, and we enjoyed the hike. As in most rain forest areas, the animals are not easy to see, even if you know they are there. We were very happy to see a gibbon swing through the trees above us as we walked.



Cryptocoryne albida growing under the bridge inside Khao Sok National Forest.

About half way to the waterfall, we found a small trickle of water coming down the steep mountainside, and much to our delight, had our first look at *Microsorium pteropus* in the wild. There wasn't a lot of it, but it gave us hope that when we found the "big" waterfall, we would also find more *Microsorium*. Such was not to be. When we finally reached the "waterfall," we found that Wing Hin was more of a cas-



C. albida growing amongst the boulders at the Wing Hin waterfall.

cade through boulders than a true waterfall. But ... what a glorious cascade! The sun was low in the sky, and though we found no *Microsorium*, there were thick, lush stands of *C. albida* growing between and around the bases of the boulders. It was a truly beautiful sight. The number of plants at the entrance to the park paled in comparison to these massive stands.

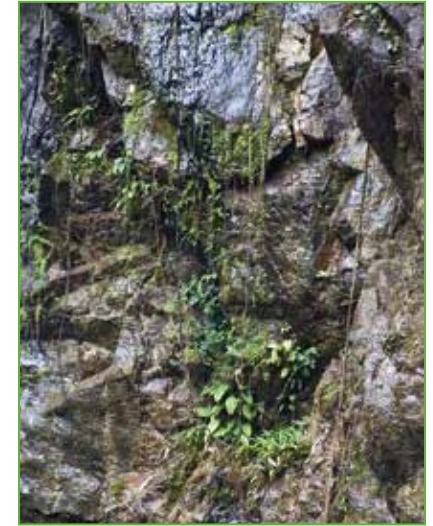
The next day, we left the park behind, but now that we knew what we were looking for, we found *Cryptocoryne albida* in a number of different locations. In many locations, we found the plant in full sun. But we also found it in deep shade, mixed with *Microsorium* at the base of a waterfall, and in one place, even growing out of cracks in the rock face of the waterfall, within the spray zone. Most of the plants we saw were emersed, and many were flowering. However, I would assume that the plants in most of these areas are submersed for at least part of the year, since we were there at the end of the dry season, when water is at its lowest.



Waterfall where we found *C. albida* both at the base and on the rock face as well.

We found the plant only in rocky areas, ranging from the large boulders of Wing Hin, to streams with coarse, pebbly substrate. It was difficult to get the plants out of the substrate without breaking the leaves off above the crown. The crown was often deep under sizeable stones, and the roots went deeper still. It was clear that even when the water was high and the current was rushing over them, these plants could not be pulled loose from among the rocks. They might lose their leaves, but the rosette itself would be safe, protected down deep between the rocks.

In most localities where we found these plants, the water was very soft, ranging from 40–100 micro Siemens. The pH was quite variable, ranging from a low of 5.8 to a high of 7.78. Both the



Closer view of *C. albida* growing on the waterfall.

water and air were quite warm, with the water averaging 78–84°F [26–29°C] while the air temperature was in the low to mid-90s during the day. In the one place that we found the plant growing fully submersed, it was a single, large specimen growing in clear, slowly flowing water. The leaves were a lovely rosy color, and close to 12" long; quite a bit larger than I've ever seen it growing under aquarium conditions.

This species of *Cryptocoryne* comes in two different color varieties; one a bright, grass green, the other a dark brownish red. The interesting thing is that both color varieties are found mixed together, in the same locations. There was no obvious difference in the conditions under which the plants were growing. The inflorescence of both types is the same. Most



Above: Green and red varieties of *C. albida*. **Left:** Red and green forms growing together at the Tam Nam Waterfall.



flowering plants were found in the shade, though we occasionally found them in sunny areas as well.

Cryptocoryne albida has been available commercially for aquarium use for some time. In the

aquarium, this species can be a little pickier than some of the more commonly used *Cryptocoryne* species. It is said to require more light than many species, and certainly, the tank I keep it in does have a fairly high light level. After seeing the way these plants grow in the wild, I now suspect that it would be worth trying these plants in a coarser substrate than we typically use in our aquariums. 🌿



Left: Red form of *C. albida* flowering in shallow water. Most of the flowering plants we found were entirely emerged. **Right:** *C. albida* growing entirely submersed.



Typical biotope for *Cryptocoryne albida*.

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My Big Aquarium

Steen Erik Jansen. Photos by Karen Randall unless otherwise noted.

Editor's Note: While Karen and Christel were visiting Thailand, they were introduced to Steen Jansen. Karen asked Steen to write an article for TAG about his mega-tank. Enjoy!

Background

We are residents of Patong, on the island of Phuket in Thailand. In the spring of 1997, I decided to build a large outdoor aquarium. The tank functions as the end-wall of the carport and is visible from two sides: one inside the carport, the other the terrace between our swimming pool and the house.

On the first attempt, I used only 1½ cm glass, which exploded when the tank was filled. It took six

months to find 4cm thick acrylic to replace it. Even then, the acrylic we could obtain could only be purchased in 2m x 1.65m [6.5 x 5.4 ft.] sheets. As a result, the tank was finished using three sheets on one side and two on the other with support columns in-between. Obviously this was not the optimal solution, but it did function for three years. At that time, I kept big oscars, silver sharks and gouramis, but no plants.

During 2002, the tank started leaking at the seams. An attempt to stop the leak using fiberglass inside went terribly wrong and the acrylic was irretrievably damaged. At that point, I emptied the tank and left it for a year.



Steen gives the size of his aquarium a little perspective. (He has a dive certificate!)

Mr. Suwat

The “Aquascaping Bug” Hits

I first read about aquascaping in the summer of 2003, and found out that we actually had an aquarium shop and an aquatic plant farm here in Phuket that catered to this hobby. I started a “small” 1,500 liter tank (369 gal.) in August of that year. Then during November/December we rebuilt the big tank; installing full sized sheets of acrylic (3.3m × 1.2m). The tank was originally 2m deep and as we considered this too deep for plants we installed a “false” bottom in cement. The various terraces and levels were constructed using bricks and cement, all painted with epoxy. On January 29, 2004 the big day arrived: aquascaping and filling the tank.

The first problem I encountered was water hardness. The KH in the tank was 9° and GH 8°–10° which meant that a lot of the plants simply died. In September we emptied the tank, removed the false bottom and the inside walls and replaced all the sand (which we now suspect contained calcium carbonate) with river sand using only wood for decoration. The hardness came down to KH 3°–4°, GH 4°–6°. I later had to put 10cm of normal sand on top as the river sand was too loose for the plants to root securely.

During this period the next problem had started. Extremely hard green spot algae was growing on the acrylic. Despite almost daily cleaning of up to 4 hours I could not control it. I contacted the Krib

and got in contact with Karen Randall who in turn put me in touch with Tom Barr. I owe Tom a lot as without his very detailed answers and suggestions how to solve the problem I would most probably have closed down the tank and given up.

The Krib:
www.thekrib.com

Tom Barr’s web site:
www.barrreport.com

On Tom’s recommendation, I emptied the tank and gave the acrylic a thorough cleaning (November 22–24), reduced the light by 50% and started adding KNO₃ and KH₂PO₄ together with the micronutrient mix I was already using. It really helped, as the green spot algae reduced in number and became easier to remove.

Even during this period when we experience algae problems, the plants grew extremely well. I had visits by Mr. Holger Windeløv and Mr. Jan Ole Pedersen from Tropica Aquarium Plants in Denmark during 2004 and they really liked both tanks.

On December 26, 2004 the tsunami hit Thailand. We felt the earthquake, but did not suffer any direct damage except for no electricity for a week. This was solved by directing sun into the tanks using mirrors. The plants photosynthesized and all fish and plants



Steens mega-aquarium divides the carport from the pool terrace of his home.

survived. The tank survived another big earthquake in March 2005, but a third on May 19 was one too many. The tank started leaking at the seams (500 liter a day) and on June 2nd we had to give up and empty it.

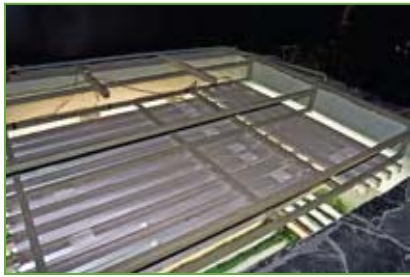
It took several months of investigation, but our insurance company finally agreed to cover the costs. Repair was finished in April 2006. All that remained was a hydro-test of the acrylic scheduled for May 2.

Unfortunately, on April 28–30, a neighbour decided to demolish a three-story house using a back hoe! With a distance of only four meters between the excavation and our property, the damage we suffered from this man-made earthquake was immense. Broken walls, pool, water tanks, terrace—you name

it, more or less everything. The tank survived without damage, but only because it was empty and the acrylic braced with iron bars. It did, however, mean total renovation of our property: another year and a half in which the tank had to stay protected from vibrations.

Finally, in November 2007 we planted and filled the tank. The tank is now running, doing beautifully, and is truly a sight to behold.

On March 24th we had the pleasure of having Mrs. Christel Kasselmann and Mrs. Karen Randall visit during their trip to Thailand. I would like to thank both women for their very positive comments and good advice. The photos included with this article were taken then, and during the following month.



Above: A view of the lights from above. Well, part of them. There are 33 tubes in all. Only about half are on all day.

Left: Steen gives Christel and Karen a behind-the-scenes tour of the filtration and CO₂ systems.

Details of the Tank

Built in cement with 20cm-thick [7.8 in.] walls covered with an arched cement roof. Acrylic (4 cm [1.6 in.] thick) on both sides, with the free view measuring 3.65m x 1.05m [12 x 3.4 ft.].

Inside Measurement

Length 3.65 meters
 Width 1.54 meters
 Depth 1.25 meters (from sand to surface)
 Depth of sand: 0.8 meters
 Water volume: approximately 7,500 to 8,000 liters [2,000 gal.]

Light

19 32W fluorescent tubes from 10:00AM to 10:00PM, 33 tubes from 6:00PM to 9:30PM

Distance to water is 20 cm with four small fans removing the hot air from the lights.

The acrylic is normally protected from direct sunlight with black blinds during the day. The carport



side can be open all day if I want, as the carport itself can be covered with other blinds.

Filtration

Twelve small outlets in the sand lead to a 2½" PVC line that connects to a fiberglass tank in an adjacent room. A ½ horsepower submersed pump (noiseless) pumps the water through a swimming pool sand filter. The inline is divided so that 90% of the water goes directly back. The remaining 10% runs through a CO₂ diffuser (actually two with a back-up of further two so no undissolved CO₂ ever reaches the tank) and then combines back with the main line.

I have used an old Eheim filter combined with a small normal CO₂ diffuser and have to make sure the water pressure does not blow them



Above: The tank from the terrace side. **Below:** The view from the carport side.

to pieces. The CO₂ is controlled by an Aqua Medic PH computer with the electrode measuring the water in the fiberglass tank.

Maintenance

The acrylic is cleaned every four days with a soft 100% cotton cloth (plus some elbow grease!). I go in the full tank, clean the upper part, take out 30–35 cm of water (a water change of approximately 25% = 1,700 liter) and then clean the lower part of the acrylic. There are stepping stones among the plants on the floor of the tank so that I can stand inside it. Should it be necessary I have a full-face mask connected to a dive tank with a 5 meter hose so I can work in the tank even when it is full (I do have

a dive certificate).

We are quite lucky regarding water. We have no supply from outside, but have built five ground tanks with a total capacity of 160,000 liters to catch rain water. During the rainy season, from April to November, the tanks are filled so we have enough to see us through the dry season. On average during the year the KH is 2.5°, GH 3° (due to the cement in the water tanks), but in the rainy season with fresh rain KH is 2°, GH 2°. I keep a pH of 6.5 through CO₂ injection.

Temperature

Temperature is a problem when you have an outside aquarium in the Tropics: 35°C [95°F] is normal in the shade and the water in



A view of that tank from above. Kinda makes you want to dive right in, doesn't it?

the tank on top receives heat from the light and the pump. The water temperature stays between 28°C to 32°C, but I have recently installed a cooling system (May, 2008) that has reduced the temperature by 9°. My aim is a constant of around 26°C [79°F].

Nutrients, etc.

After each water change I add:
 200 cc Colour Plus liquid fertilizer from Phuket Aquatic Plant
 300 cc KNO₃
 300 cc KH₂PO₄
 (I used to add 300 cc fertilizer, but reduced it based on Christel's and Karen's advice. This minimized the algae growth even more and the plants seem fine).

Levels Inside the Tank

As the interior must accommodate viewing from two sides,

we have made three levels inside the tank, with the highest in the middle, also trying to make the two ends high with a low level in the center. Considering the depth of the tank (lowest level 1.25 meter, the second 1.10 meter and third 0.95 meter) the choice of plants is a bit of an experiment.

Plants

On the lowest level:

Heteranthera zosterifolia
Blyxa japonica
Anubias barteri var. *angustifolia*
Echinodorus uruguayensis
Echinodorus barthii
Echinodorus martii
Crinum natans

On the second level:

Ophiopogon japonicus
Heteranthera zosterifolia
Echinodorus barthii

Barclaya longifolia
Vesicularia dubyana
 two unknown mosses
Sagittaria Subulata

On the third level:

Aponogeton crispus
Cyperus helferi
Anubias barteri var. *angustifolia*
Microsorium pteropus
M. pteropus var. *Windeløv*
Ammannia gracilis
Ludwigia inclinata
Bolbitis heudelotti

Fish

20 *Crossocheilus siamensis*, Siamese Algae Eater
 9 *Helostoma temminckii*, Kissing Gourami
 8 *Labeo erythura*, Red-finned shark
 3 *Corydoras* sp.

25 *Hyphessobrycon innessi*, Neon Tetra & *Paracheirodon axelrodi*, Cardinal Tetra
 25–30 (not sure as they breed all the time) *Hyphessobrycon herbertaxelrodi* Black Neon

Although the tank has only been running for six months I have had some of the above fish for seven years (Kissing Gouramis and Red-finned sharks) and four years (Siamensis and Cardinal Tetra). They have survived a change of tank three times and lived in a big bucket for four months! 🌿

Plants/aquascaping and nutrients supplied by Mr. Suwat of Phuket Aquatic Plant, Phuket, Thailand
Steen's Web Site:
www.steentank.co.uk



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Excel Beyond CO₂

Carbon is the backbone of all life. Every organic molecule of every living organism is carbon based. Given this simple fact, it becomes clear why carbon dioxide (CO₂) plays a pivotal role in the planted aquarium. Aquatic plants extract CO₂ from their environment and employ it in a process called photosynthesis. Photosynthesis combines CO₂, water and light energy to produce simple carbohydrates and oxygen (O₂).

Flourish Excel™ is a simple source of readily available organic carbon. Plants use CO₂ to produce longer chain carbon compounds also known as photosynthetic intermediates. Flourish Excel™ does not contain these specific compounds per se, but one that is quite similar. By adding Flourish Excel™ you bypass the involvement of CO₂ and introduce the already finished, structurally similar compounds. It is in its structural similarity that Flourish Excel™ is able to be utilized in the carbon chain building process of photosynthesis. Because Flourish Excel™ is an organic carbon source it does not impact pH.

The use of either CO₂ injection or Flourish Excel™ does not necessarily negate the use of the other. Because the processes of producing photosynthetic intermediates and building onto them occur simultaneously, one can derive a substantial benefit with the use of Flourish Excel™ either alone or in conjunction with CO₂. The combination is particularly ideal for situations where continuing to add CO₂ could result in dangerously low pH levels.

