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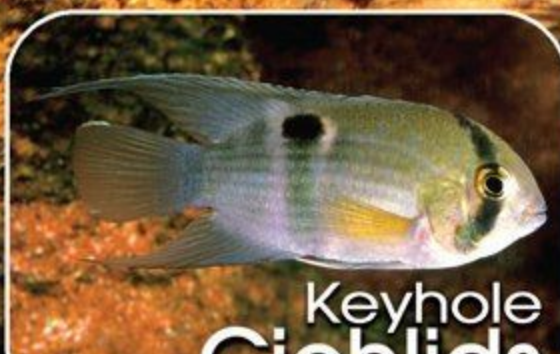
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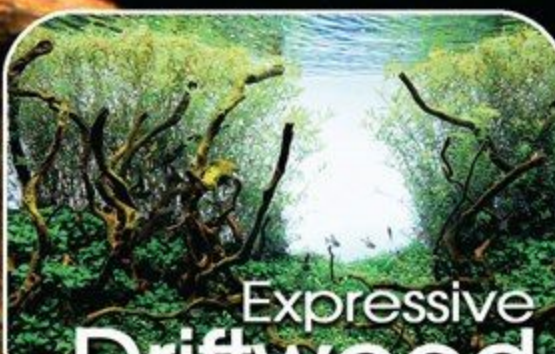
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\* Villa, B. Rico, Le Coz, J. R., Mingant, C., and Robert, R. (2006). Aquaculture. 256, 377-388.



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The majestic fish on our cover this month is one of the aptly named royal plecos, specifically the Peruvian green royal pleco *Panaque titan*, also known as L418. The genus *Panaque* contains some of the most beautiful and sought-after pleco species, and while they are not for an average community aquarium, many people are willing to set up a 6-foot or larger tank to be able to keep these large, regal, wood-eating catfish. Read Mark Denaro's "Royal Plecos" (p. 66) to learn all about these fish and their requirements. **Photograph by Leighton Lum**

Our cover photo is available for your wallpaper and/or screensaver in the downloads section of [tfhmagazine.com](http://tfhmagazine.com).

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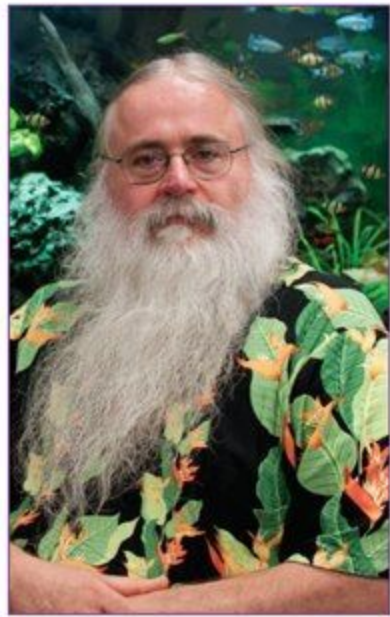
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## editor's note

**W**hat makes a fish popular? One factor is coloration, and many colorful small fishes are as popular today as they were half a century ago. Another appeal is behavior, a major draw for cichlid lovers, who are drawn to those fishes' legendary personalities. Ease of keeping is always important; species that are easy for anyone to maintain usually remain very common in dealers' tanks. As just one example, all these factors together—color, behavior, and hardiness—are behind the lasting popularity of marine clownfish.



Tsing Mui

Then there's the allure of novelty. New species in the hobby typically get a burst of attention but remain popular only if they are attractive outside of being new. Sometimes a species enjoys periodic popularity, falling in and out of fashion as newcomers to the hobby discover them anew. And since a fish cannot become popular if no one knows about it, any fishes that need to be special ordered will only be familiar to those who know enough to do so.

That's where *TFH* comes in. We publish material about all types of fish—long-popular bread-and-butter species, once-common-now-rare species, brand-new and scarcely known species, and everything in between.

This month we have an article that discusses the Atlantic chalk bass, a marine fish that should be much more popular than it is (p. 76) and another that covers a fish that has been a particular favorite of mine for years and that remains pretty much on the fringes of popularity, the keyhole cichlid (p. 58).

What about popularity based on catchability? Zachary Piso relates a tale of a classroom aquaponics project (an aquarium filtered using terrestrial plants) populated solely with tropical fish caught by students in a nearby stream—in Costa Rica (p. 86).

Would you pay \$50 or \$100 for a pleco? Some aquarists gladly spend even more than that for an especially sought-after animal. Mark Denaro gives us an overview of an extremely popular group of these catfish: the royal plecos (p. 66).

A few aquarists I know have made the pilgrimage to Singapore for the biennial Aquarama convention, but most of us have to rely on others' reports on this Mother of Fish Shows. Abhijit Mitra chronicles his family trip to Aquarama this past May (p. 62). Maybe his experiences will encourage you to start planning for 2013!

As usual, the space here is insufficient to cover all that we've packed into this issue of the magazine, so make sure you don't miss a single page of this month's exciting and informative issue—enjoy!

  
David Boruchowitz  
Editor-in-Chief  
Tropical Fish Hobbyist

## reader's forum

### Better Betta Advice

Excellent and responsible betta care advice, Mark ("Splendid Bettas," *TFH* October 2011, by Mark Denaro). I agree about the temperature. Lots of folks tell me their betta is sluggish and boring. Warming up the water a few degrees can be the difference between night and day.  
Nippyfish.net • via tfhmagazine.com

### Tanked Interview

This is my new favorite show!  
Carlos Walter Pereyra • via Facebook

I think *Tanked* is a great show, but while they create some really awesome tanks, they would probably benefit from having a specialist. Someone who knows nothing about fish and sets up a tank on their own could end up with a real disaster on their hands. I hope someone helps them make these key adjustments so the show can go even further and help people who are interested in the hobby get started.

Ellen Piazza • via tfhmagazine.com

### Keeping Eartheaters

Interesting article ("A Survey of Eartheaters," *TFH* September 2011). Since returning to the hobby, I've tinkered with the idea of keeping a few.  
Bobby Ratliff • via Facebook

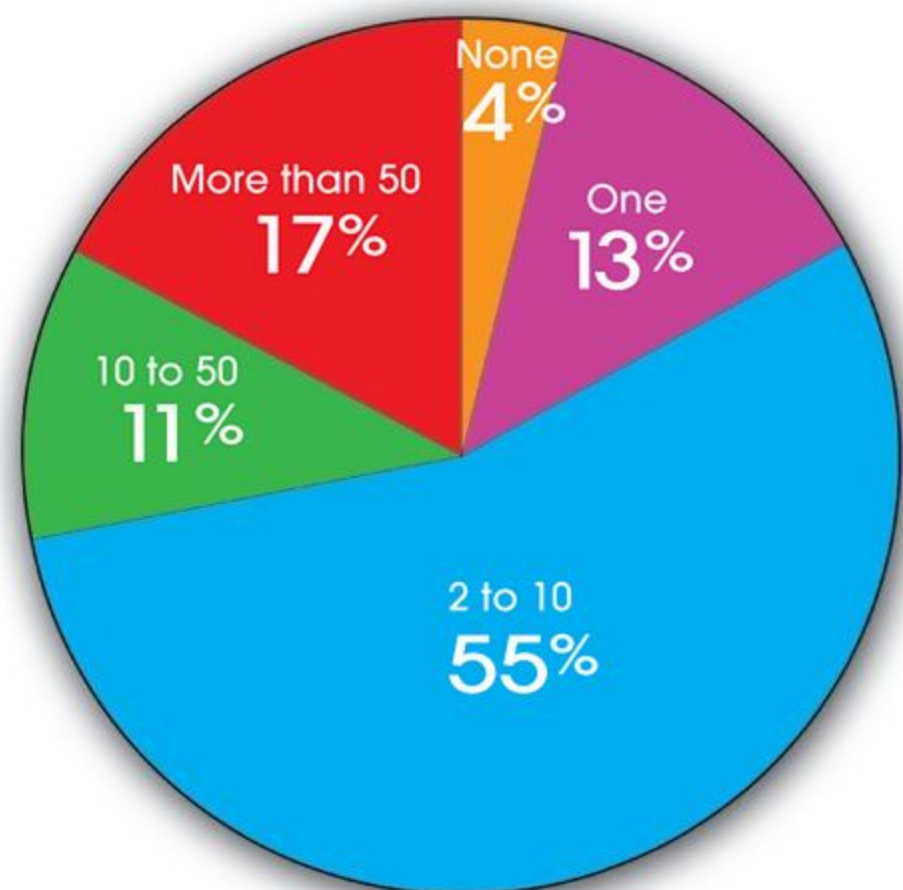
The author (Radek Bednarczuk) has been dealing with some very interesting topics. I like his work, and geos are great!

Robert Slaton • via Facebook



### TFH Facebook Poll:

How many species of fish have you successfully spawned?



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**takashi  
amano**

was born in 1954 in Niigata, Japan. He has explored the remote jungles of South America and Africa during his distinguished career as a prizewinning nature photographer and author. His research into tropical fish husbandry and aquatic plant cultivation led to his developing the aquatic plant layout method "Nature Aquarium," which combines his extensive experience in the observation of nature and his unique sense of beauty. In 1993 Mr. Amano established Aqua Design Amano Co., Ltd., where he serves as president and CEO.



**mark  
denaro**

has been keeping freshwater aquariums since 1970 and marine aquariums since 1976. He currently operates Anubias Design ([www.anubiasdesign.com](http://www.anubiasdesign.com)), an aquarium and terrarium design, installation, and maintenance company serving southeastern Pennsylvania and importer/online retailer of new, rare, and interesting freshwater fishes, invertebrates, and plants. A former president of the International Betta Congress, Mark's primary interests are anabantoids, cichlids, and planted aquariums.



**edward a.  
jackson**

is known by his middle name Adam. He was born and has lived in Southern California his entire life, and he has a natural affinity for swimming and marine life in his pedigree. Adam has experience in aquatic husbandry—he began in the freshwater aquarium hobby as a child with his parents and started in the marine aquarium hobby from age 13 on his own. Adam's main area of study has focused around sociology and law. He can be reached through [www.wetwebmedia.com](http://www.wetwebmedia.com), where he has participated as a member of Bob Fenner's expert crew. He can also be reached through his email [EAdamJackson@me.com](mailto:EAdamJackson@me.com) or on [twitter.com @AdamJacksonUSA](https://twitter.com/AdamJacksonUSA).



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was trained as an economist at Princeton University. He served as a Peace Corps volunteer in Mauritania and works in international agricultural development. He worked for 20 years on projects to enhance food production in Africa and Asia. He has lived in Burkina Faso, Chad, Madagascar, and Egypt, and has worked in over 20 African countries. Lawrence takes advantage of his work-related travel to marvel at indigenous tropical fish. He keeps and breeds African fish and has a particular interest in cichlids.



**dr. kochi  
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works as a senior scientist and researches captive breeding (natural and induced) of marine ornamental fishes. Dr. Madhu worked in the marine research laboratory of the Central Agricultural Research Institute in Andaman and Nicobar Islands during 1996 to 2005 and surveyed the coral reef fishes. He is a recipient of the NATCON Young Scientist Award. Dr. Madhu presently works as a mariculture scientist at the Central Marine Fisheries Research Institute (CMFRI) in Kochi, India, and can be contacted via email at [kmadhu30@rediffmail.com](mailto:kmadhu30@rediffmail.com).



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works as a marine fishery scientist. Her scientific research is mainly focused on larval rearing, juvenile production of marine ornamental fishes, and live feed culture. She served in the Andaman and Nicobar Islands as a fishery scientist from 1995 to 2005. She is fond of underwater photography and videography of reefs and captive production of larvae and juveniles of coral reef fishes. Dr. Madhu is now working as a mariculture scientist at CMFRI and can be contacted at [rema.madhu@rediffmail.com](mailto:rema.madhu@rediffmail.com).



**abhijit  
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is interested in all kinds of fish, especially fishes from South and Southeast Asia and all kinds of livebearers. What has fascinated Abhijit since childhood is the biodiversity of our very special planet. A frequent traveler, he is extremely concerned about conservation issues and is associated with different conservation and pet organizations. For the last few years, he has been trying to see how the pet hobby and ecotourism can help in conservation by spreading interest, awareness, creating a captive gene pool, etc.



**zachary a.  
piso**

has a degree in Environmental Studies and Philosophy from Allegheny College. He explores the use of sustainable technology such as aquaponics as pedagogical tools. His research benefits from his lifelong exploration of natural biotope aquariums and the symbiotic relationships between the animals, plants, and bacteria within. Currently Zach is assisting in plans that focus on watershed restoration as a tool for civic engagement.



**kevin  
thurston**

has been in the hobby for 46 years. He managed a pet shop fish department in college while getting a BS degree in fisheries biology with an emphasis in ichthyology, aquaculture, fish nutrition, and fish diseases. He operated a wholesale tropical fish business and has been active in local societies. He maintains an interest in all kinds of fish, especially the rare and unusual.



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## Masked Angelfish

The masked angelfish *Genicanthus personatus* is a rare and beautiful species that is endemic to Hawai'i. Not often seen in the wild or in the hobby, it is a good candidate for the aquarium because it only reaches 8 inches in length.

Like many of its swallowtail angel congeners (fellow members of its genus), this species displays a marked sexual dichromatism (different coloration for male and female). This is a male, but females are white, with a prominent black mask (the source of its "masked" name) and the same black in the caudal fin that males display.





# Q&A freshwater

## Q Red Cabomba Died

I've been in the aquarium hobby for many years, but I'm just starting to get my feet wet with live plants. My tank is 40 gallons and houses one male and three female swordtails. Water values are as follows: temperature 78°F, pH 7.6, hardness 12 dH. The lights are the normal fluorescent tubes that came with the aquarium hood. The only plants I've tried so far are jungle vals and red Cabomba, both of which my dealer assured me are beginner-friendly and would do okay under normal lighting. The jungle vals are doing great and spreading, but the Cabomba died within a few weeks. Is this plant more delicate than I was led to believe, or am I doing something wrong?

Karen Vincent  
White Plains, New York

A I think the problem is simply that, contrary to your dealer's advice, one of the plant species you've selected is not compatible with your water and lighting conditions. While your current conditions (hard, alkaline water and relatively low lighting) are just fine for jungle val *Vallisneria spiralis*, they don't suit red Cabomba, which I presume to be Cabomba furcata. *C. furcata* favors bright lighting and softer, more acidic water. Also, I would disagree with your dealer's statement that this species is particularly beginner-friendly. It actually has a reputation for being somewhat difficult to maintain.

Keep in mind that, just as with selecting fish, it's important to research the specific care requirements of aquarium plants and limit your choices to species that will thrive under the conditions you're able to provide.

## Q Overfeeding vs. Underfeeding

What's worse for fish, overfeeding or underfeeding? And is it possible to overfeed live foods, such as brine shrimp?

Gerald Kellerman  
via email

A I would say that far more fish are lost to overfeeding than to underfeeding. Not only does overfeeding directly lead to potentially fatal health problems in fishes (e.g., fatty liver disease), but any food left uneaten in the tank also severely degrades water quality as it decomposes, potentially overwhelming the biological filter and causing the pH to plummet. Of course, an overfed tank with lots of rotting food scattered about provides the perfect environment for harmful bacteria and fungi to thrive. Besides, what most people would consider underfeeding is probably just about the right amount in most cases. Fish in the wild can't expect food to rain from the heavens as it does in an aquarium; they have to exert a lot of energy to acquire it, and they're generally capable of enduring long stretches without it.

As far as live foods are concerned, it certainly is possible to overfeed them as well. Consider your example of live brine shrimp. If you feed more than necessary, the fish will likely glut themselves, which isn't good for them (remember, most fish will keep eating as long as food is available whether it's in their best interest or not—just as I will when pizza is introduced to my environment), and those shrimps that aren't eaten will soon die as a result of being in fresh water. Then they'll begin to decompose and degrade water quality just as fresh, frozen, or dried foods will.

## got a question?

Send your questions about the freshwater side of the aquarium hobby to "Q&A," T.F.H. Publications, P.O. Box 427, Neptune, NJ 07754, or submit via e-mail to [editor@tfh.com](mailto:editor@tfh.com). For answers to more time-sensitive questions, opinions on your setup, or just to converse with like-minded members of the aquarium community, please visit the TFH Forum at [forums.tfhmagazine.com](http://forums.tfhmagazine.com).



## Q *Pelvicachromis taeniatus* and Rift Lake Salts

My local fish store has the African cichlid *Pelvicachromis taeniatus* for sale, and I'd really like to get a pair. Am I correct in assuming that this species needs very hard, alkaline water like most African cichlids? My water leans more soft and acidic (dH 5 and pH 6.8), so I would need to amend it. Online, I've seen various commercial salt mixes formulated for African cichlids as well as inexpensive do-it-yourself recipes. Do you recommend one over another?

Steve Roemer  
via email

**A** As for salt mixes, you can get excellent results from either proprietary or do-it-yourself salt mixes, but the truth of the matter is, based on the pH and hardness values you've listed, you should not amend your water parameters in any manner in order to keep *Pelvicachromis taeniatus*. While this species does hail from Africa, it's not one of the Rift Lake cichlids (i.e., those found in Lake Tanganyika or Lake Malawi), which demand very hard, alkaline water.

In fact, a dH of 5 and pH of 6.8 fall right within the acceptable ranges for this West African species, so you can safely introduce a pair to your aquarium (assuming any other livestock in the tank is compatible, of course) without worrying about the addition of salts.

## Q Feeding the Bottom Feeders

I have a 60-gallon bow-front tank containing five rosy tetras, five diamond tetras, five silver hatchetfish, three 3-lined cory catfish, and one striped Raphael catfish. My question is about the catfishes. How can I be sure they're getting enough to eat?

Whenever I feed the tank, it seems that very little food actually reaches the bottom of the tank where the catfish can get it. Also, the Raphael catfish, which was added most recently, never seems to come out at all, unless he comes out when I'm not around, so I can't say for sure that he has been eating anything.

Ben Sellers  
Salt Lake City, Utah



■ *Cabomba furcata* requires bright lighting and soft, acidic water to thrive.



■ *Pelvicachromis taeniatus* is an African cichlid, but it does not require hard, basic water like Rift Lake cichlids and instead prefers soft, acidic conditions.

**A** You definitely have an active group of top-water and mid-water feeders, so I'm not too surprised that your bottom-feeding catfishes are getting slim pickings. You might need to try target feeding your catfishes. One method you can try is to feed your top- and mid-water species normally and then, while they're distracted, slurp some food and aquarium water (mixed in a cup or dish) into a clean turkey baster and squirt it right in front of your catfish. Or, you can use a section of PVC pipe to deliver sinking food directly to the bottom.

The reason you're not seeing much of your striped Raphael catfish *Platydoras costatus* is because it's a nocturnal species, so this secretive behavior is perfectly normal. To make sure it's getting plenty to eat, it's a good idea to offer some sinking food shortly after lights out, when it's naturally accustomed to foraging.

## Q Holey Elephantnose!

I love unusual fish, and my fish store has an awesome-looking one called an elephantnose that I'm considering buying. When I was looking

Andrzej Zabawski

Ted Judy





Andrzej Zabawski

do I need to know in order to care for it properly?

Tammy West  
Oakland, California

**A** This is one of those situations where a common name can create misunderstandings. The trunk-like protuberance on the elephantnose, most likely *Gnathonemus petersii*, is not actually a nose as we understand it. This highly sensitive appendage is actually used for rooting around in soft, mucky substrates for prey items. The hole you observed just above the “nose” is probably actually the fish’s mouth. Between the mouth and the eyes are the nostrils.

To keep *G. petersii* successfully in captivity, provide a fine sand substrate, dim lighting (this species is nocturnal), and lots of plants and cover. Given this species’ subdued lighting requirement, plants that will thrive in low-light schemes, such as Java fern, Java moss, Anubias, and Vallisneria, are your best option. *G. petersii* is best kept singly in a 55-gallon or larger tank, though it may be possible to keep a group in a very much larger system with ample hiding places. Suitable water parameters are a pH between 6.0 and 8.0, dH between 5 and 19, and temperature in the upper 70s to lower 80s. Small worms, crustaceans, and insects are appropriate food items.

**Q Fish Vaccines?**

I’m wondering, is it possible to vaccinate fish against common diseases? If so, is it being done anywhere?

That would seem to be a great benefit to our hobby and the aquarium industry.  
William Lang  
via email

■ The elephantnose *Gnathonemus petersii* uses the tube-like appendage below its mouth to sift through substrate for food.

the specimen over, though, I noticed that it has a hole just above the nose where the nose meets the fish’s body. Is this normal (nostrils maybe?) or do you think it’s been injured? It doesn’t look infected or anything. If I do decide to buy the elephantnose, what

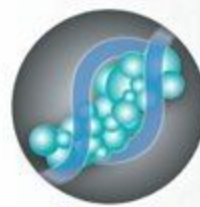


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**A** It is possible to vaccinate fish against certain common diseases, and this is now being practiced with various fish aquacultured for food, such as salmon, trout, catfish, and tilapia, as well as with pond fish, such as koi. To the best of my knowledge, however, vaccination is not widely practiced with common tropical aquarium fish, though research is ongoing in this area. Fish vaccines can be administered by injection, orally (mixed with food), or via dips or baths. Furunculosis, vibriosis, streptococcosis, and koi herpes virus are just a few examples of diseases for which vaccines have been developed. These are not, however, common aquarium diseases.

## **Q Opaline Gourami Aggression**

**Q** I just started a new freshwater aquarium after being away from the hobby for about 20 years, and I'm not off to a very good start. I'm trying to replicate an aquarium I had as a child, which was a 20-gallon tank housing two opaline gouramis. My memory of the original pair is that they got along perfectly and kept me entranced for hours with their delicate beauty, but the pair I just bought for the new system (same size tank as before) are fighting like cats and dogs! One relentlessly chases the other and bites its fins every time it comes out from behind a plastic plant in the back right-hand corner of the tank. Why is this pair behaving so differently from the ones I had before? Do you think they'll eventually learn to get along after they establish who's boss?

Josephine Kunkle  
via email

**A** My guess is that both of the opaline gouramis *Trichogaster trichopterus* you had as a child just happened to be females, whereas the pair you have now consists of either one male and one female or two males. You can tell the males from the females by the male's longer, more pointed dorsal fin. Females of this species generally coexist peacefully with one another, but keeping more than one male to a tank virtually assures never-ending territorial squabbling, especially in smaller systems. Keeping one male with one female isn't much better, either. In that case, the male will constantly harass the female, either in an attempt to spawn with her or to drive her out of his territory. And, I'm afraid this aggravating behavior is not going to stop.

If it turns out you have two males, you'll either have to remove one and keep the other by itself or replace both with females. If you have a male and a female, your options are to either return one or the other (keeping only one) or replace the male with a female. If your tank were significantly larger, a third option would be to add a few more females in order to diffuse the male's aggression over a larger number of specimens. But in a 20-gallon tank, this technique simply isn't practical.

## **Q Rams Died in Acclimation**

**Q** Today I bought a male/female pair of *Mikrogeophagus ramirezi* for my 20-gallon tank, and both died while I was acclimating them. I floated their bag in the aquarium (with the lights turned off to avoid overheating) and began adding small amounts of water from my aquarium to their bag every five minutes. In between water additions, I walked away from the tank for a few minutes and came back to find both fish dead. What could have happened? I researched their needs



MP. & C. Piednoir

■ To ensure having a peaceful group of opaline gouramis *Trichogaster trichopterus* in a small tank, you should not include any males.

ahead of time, so I'm fairly certain that my water conditions are right in line for rams. The pH is 6.0, the hardness is 12, and the temperature is 80°F.

Rich Timmins  
Washington, D.C.

**A** I can only speculate that there must have been a considerable difference in some aspect of water chemistry between your tank and your dealer's tanks. The values you've provided are certainly appropriate for rams, but *M. ramirezi* is extremely sensitive to fluctuating water conditions and any sudden or precipitous change in pH, hardness, temperature, dissolved pollutant levels, or other parameters—even for the better—can prove deadly

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Ted Judy

■ It is imperative to keep water conditions steady for ram cichlids *Mikrogeophagus ramirezi*, as they are largely intolerant of fluctuating parameters.

to them. You might want to contact your dealer and ask if he or she can provide these values so you can compare them to yours and determine whether that's the problem.

Another possibility is that some sort of toxin was introduced to the rams' shipping

bag at some point during the acclimation process. Common examples include soap or lotion residue on your hands, or a chemical aerosol sprayed in the same room. Apart from that, I can't really think of anything that would kill your rams so rapidly, so these two

possibilities are a good place to begin your detective work.

## Q Earthworms for Aquarium Fish

I'm an avid fisherman, and after my fishing excursions, I usually have several of the earthworms I use for bait left over. Is it safe to feed these worms to the fish in my aquariums so they don't go to waste? I mostly have larger South American cichlids, but I've also got a tank dedicated to smaller tetras.

John Brice

Marietta, Georgia

A Earthworms are an excellent source of nutrition for aquarium fish. They can be fed whole to your cichlids or chopped into smaller pieces to fit the tetras' mouths. So, feel free to feed them to your fish. The only caveat I would add is that it's a good idea to allow the worms to purge their insides of soil before offering them, just on the off chance that any contaminants are present in the soil. To achieve this, all you have to do is place the worms in shredded, moistened newspaper for a day or two prior to feeding. 🐛

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# Q&A saltwater

## Q Sleeper Goby Sandstorm

I have a 125-gallon reef tank with a 4-inch-deep bed of fine live sand. I recently added a yellow-headed sleeper goby to the tank to keep the sand bed stirred. It's doing a great job of that, but it's also doing something I hadn't anticipated—creating little sandstorms with its constant sifting. Will this pose a problem for my invertebrates?

Brian Lambert  
via email

All that particulate matter liberated into the water column through the sand-sifting behavior of your yellow-headed sleeper goby *Valenciennaea strigata* could be problematic under certain circumstances. For example, if it's turning your water cloudy, it can limit the amount of light that reaches your photosynthetic invertebrates, potentially to their detriment. Also, if the debris is constantly settling out of the water column onto your invertebrates, it might irritate their tissues and discourage them from expanding fully. However, you should be able to mitigate both of these problems with sufficiently robust and appropriately directed water movement, which will help rid the corals of any settled debris and keep it in suspension so it can be filtered out.

## Q Bubble in U-Tube

I have a 75-gallon reef aquarium with a 10-gallon sump underneath that contains my heater and protein skimmer. The tank was not pre-drilled for overflow pipes, so water is fed to the sump through a hang-on overflow box with a U-shaped siphon tube. This system has worked just fine for several years, but recently I've noticed that a marble-sized bubble keeps forming in the siphon tube. I can usually get the bubble to clear by raising and lowering the

tube several times, but I don't understand why air is getting trapped in the tube. I'm worried that if I'm not around to clear the bubble, it will eventually get so big that the siphon will break and, with no water reaching the sump, the return pump will be exposed to air and burn out. I haven't changed anything in my setup for a long time, and I'm not noticing an unusual amount of bubbles in the aquarium. Can you offer any explanation for why this is happening, and what I can do to prevent it?

Greg Hilton  
via email

From my experience, this usually happens when the flow of water either upstream or downstream from the siphon tube is restricted and slows down for some reason. As a result, the water flowing through the tube slows to the point that tiny bubbles are no longer swept through easily and begin to accumulate in the tube and form a larger bubble—usually right near the top of the tube.

So, what could be causing the water flow to slow down? There are several possibilities. If you have a prefilter sponge or sock located just past the siphon tube, that's the first thing I'd check. It may be time to replace it, or it just might be clogged with debris and in need of a good rinsing. Then, inspect the overflow chamber itself. Oftentimes algae will build up and partially restrict the slots that allow water to enter the chamber. Give these slots a good brushing with a short-bristled aquarium brush or toothbrush. And don't forget to clean the U-tube itself. It may have algae building up on the inside surface and causing resistance. Also, check the mouth of the pipe or tube that drains water from the overflow down into the sump to make sure it's not getting clogged with algae or other gunk. A long-bristled aquarium brush can be used to dislodge this material. If tough growths of coralline algae are causing obstructions or restrictions on any of these

## got a question?

Send your questions about the saltwater side of the aquarium hobby to "Q&A," T.F.H. Publications, P.O. Box 427, Neptune, NJ 07754, or submit via e-mail to [editor@tfh.com](mailto:editor@tfh.com). For answers to more time-sensitive questions, opinions on your setup, or just to converse with like-minded members of the aquarium community, please visit the TFH Forum at [forums.tfhmagazine.com](http://forums.tfhmagazine.com).



components, you can soak them in white vinegar to dissolve it.

If cleaning the overflow doesn't solve your problem, you'll need to turn your attention to the return pump and the hose or pipe connected to it. If the pump isn't functioning at peak efficiency, disassembling it and cleaning its components (including soaking them in vinegar to eliminate coralline buildup if necessary) might restore it to normal function. Or, it might be time to invest in a new return pump. Also make sure that no algae or gunk has accumulated on the inside of the return hose/pipe or in the nozzle that discharges water back into the aquarium.

This may sound like a lot of steps, but it's very likely that this methodical approach will solve your problem.

## Q Cardinalfish Group

I want to introduce a group of cardinalfish to my 90-gallon FOWLR (fish-only-with-live-rock) tank, but I can't decide which species to go with. Right now, it's a tie between the Banggai cardinalfish and the pajama cardinalfish. Would you recommend one over the other?

Gloria Lucas

Trenton, New Jersey

A I think I can break that tie easily enough. When it comes to keeping a group successfully, you'll likely have much better luck with the pajama cardinalfish *Sphaeramia nematoptera* than with the Banggai cardinalfish *Pterapogon kauderni*. Multiple specimens of *S. nematoptera* will usually coexist peacefully provided the tank isn't too small (your 90-gallon should be fine), all of the specimens are similar in size, and all are introduced simultaneously. *P. kauderni*, on the other hand, usually won't get along well in conspecific groups with the possible exception of those kept in very large tanks.

If you do choose to purchase a single Banggai cardinalfish, make sure it's a captive-bred specimen. The natural range of *P. kauderni* is extremely limited, and collection pressures can easily push this species to the brink of extinction in the wild. The good news is that the Banggai cardinalfish breeds readily in captivity, so there's really no need to purchase wild-caught specimens.

## Q Wet-Dry Filter and Nitrate

I have been using a wet-dry filter with plastic bioballs on



Andrzej Zabawski

■ Sand sifters like the yellow-headed sleeper goby *Valenciennaea strigata* may create miniature sandstorms, but these can be counteracted through ample, directed water movement.



Ernie Hounshell/Shutterstock

■ Pajama cardinalfish *Sphaeramia nematoptera* come highly recommended for their ability to form peaceful groups.

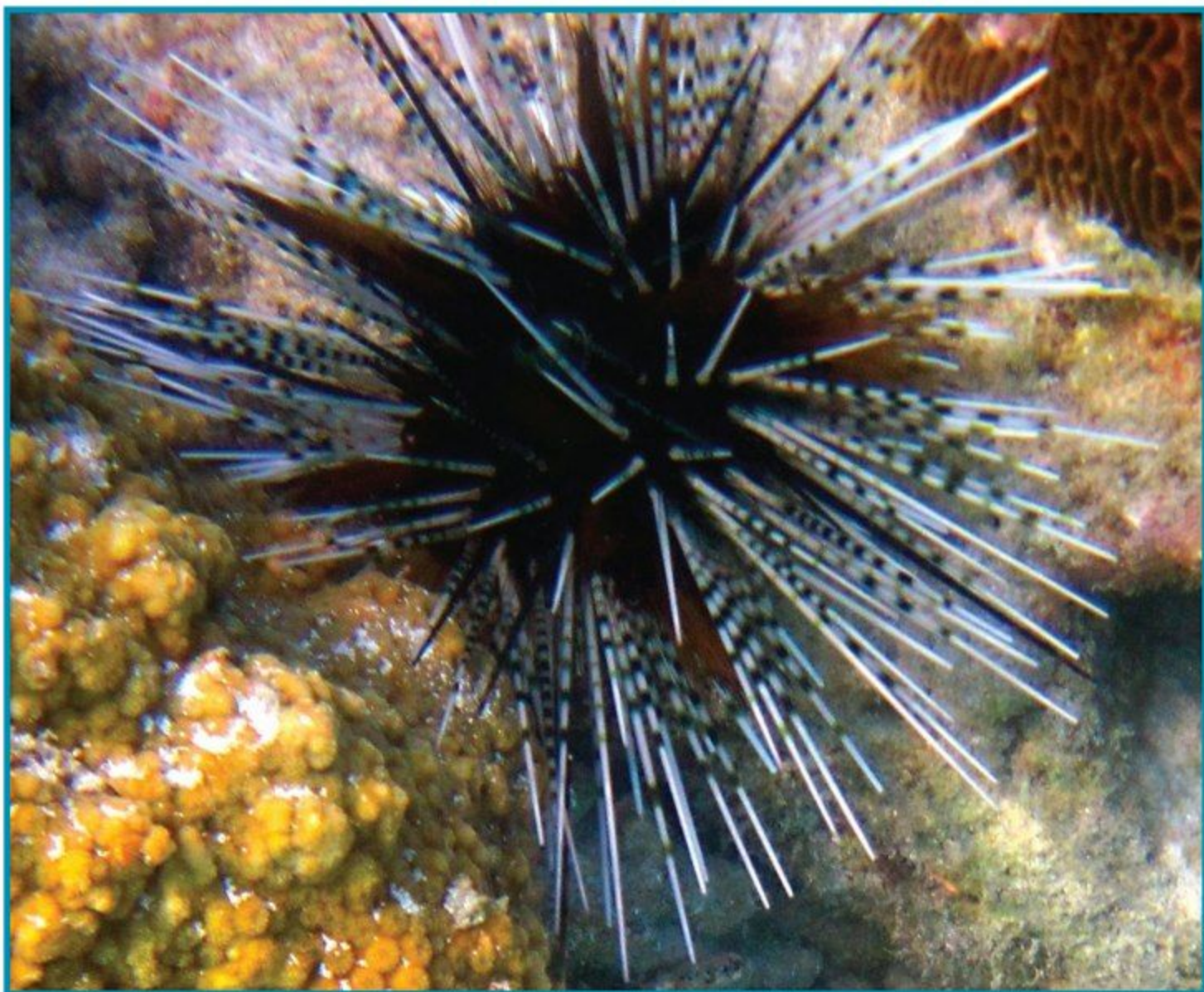
my 55-gallon reef tank for almost 10 years now. Several acquaintances and fellow members of my aquarium club are telling me that I should remove the bioballs from the filter chamber because they can cause the nitrate level to skyrocket. Are they right about that? For all these years, I haven't had any difficulty keeping the nitrates at zero through regular water changes.

Mark Cole  
via email

A As regular readers of this column are aware, my philosophy in situations like this is, "If it ain't broke, don't fix it!" There's no

question that wet-dry systems are highly efficient biofilters, prompting some to argue that they can do their job too well and actually function as a nitrate factory, which would be problematic in a reef system where even low nitrate levels are undesirable. But if your current water-change regimen is doing a good job of keeping the nitrate level under control and all your animals are thriving, I see no compelling reason to start tinkering with a system that's working for you. If nitrate starts to climb in the future, you might consider removing the bioballs as part of the solution. Just be sure to do so very gradually to avoid disrupting your biological filter and causing a much bigger problem—spiking ammonia.





Vlad61/Shutterstock

■ Despite their spiky, daunting visage, *Diadema* urchins do not usually pose much of a threat to fish and other tank inhabitants.

and crannies can suddenly make their presence known (and surprise the heck out of the hobbyist) for months—or even years—to come. Your stowaway sea urchin, possibly a *Diadema* species, was likely much smaller when you introduced the live rock. That, coupled with its nocturnal feeding habits, would explain how it managed to evade detection for so long.

As for whether or not you should remove the urchin, I would weigh out the pros and cons first.

The urchin doesn't really pose a significant threat to your fishes. However, if there happens to be a lot of aggression among them, it is possible for a fleeing or pursuing fish to dash into the spines and injure itself. You'll want to keep a close eye on your specimens—especially that purple dottyback, presumably *Pictichromis porphyrea*, and, potentially, the clownfish—for aggressive behavior.

As far as your soft corals are concerned, the main problem is that there is the potential for the urchin to dislodge and topple them as it grazes on the live rock. You can mitigate that risk somewhat by making sure they're firmly secured in appropriate positions on the live rock. A little reef-safe epoxy can be helpful in this regard. Also, keep in mind that really fleshy corals (e.g., large-polyp stony corals) can be punctured by those sharp spines as well as toppled. Of course, those needle-like spines can inflict a serious puncture wound on an unwitting hobbyist as well. You'll want to be very cautious when working in the aquarium.

Another possible deal breaker when it comes to this type of urchin is its potential adult size. Some *Diadema* species grow upward of 2 feet, making them unsuitable for a tank the size of yours. Then again, many reach a more manageable adult size. Since we don't know which species you have, it's impossible to estimate how large it will ultimately get.

Your best bet right now might be to take a wait-and-see approach. That is, leave the urchin in place for the time being and enjoy it, but be prepared to remove it if it becomes troublesome in any way.

## Q Surprise Sea Urchin

I started up a 46-gallon bow-front reef tank seven months ago after keeping freshwater tanks for 15 years. All is going well, but the other day I noticed something unusual—a black longspine urchin about the size of a ping-pong ball, which I didn't put in the tank. I guess it came in on my live rock somehow, but how it did that and went undetected so long I don't get. Anyway, is this something I should remove from my tank?

I've done some research in advance, and there seems to be both pros and cons to keeping them. I'm mainly worried about my fish and soft corals. I have two pajama cardinals, two green chromis, a clownfish, a yellowtail damselfish, a purple dottyback, a watchman goby, a pistol shrimp, and fire shrimp, along with several soft corals.

Thanks for your help. Your magazine is a great resource.

Randy Sowinski  
Royal Oak, Michigan

A Thank you for your kind comment! One of the more intriguing aspects of live rock is that organisms concealed within all those nooks

## Q Cleaner Shrimp Compatibility

Hi, I'm a 13-year-old aquarist, and I've kept my 46-gallon reef aquarium for a year now. It's currently stocked with two ocellaris clownfish, two pajama cardinalfish, one yellow tang, a sand-sifting goby, five turbo snails, a blood shrimp, a rosebud anemone, and an array of healthy soft and hard corals, such as a moon, brain, colt, torch, and toadstool leather,



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plus more! The aquarium has 90 pounds of live rock and has ample cover, nooks, and crannies. Currently, the only shrimp in the aquarium is a blood shrimp, but after reading "A Look at the Cleaner Shrimps" by James Fatherree (TFH August 2011), I am now interested in adding a skunk shrimp to my reef aquarium. Can you please tell me your opinion on whether I could keep the skunk and the blood shrimp in the same tank, or would it cause problems?

Noah Ray  
Ontario, Canada

**A** Combining a blood shrimp *Lysmata debelius* and skunk cleaner shrimp *L. amboinensis* is probably best described as hit or miss. I've kept both species over the years but never together in the same tank, so I can't comment on their compatibility from personal experience.



Andrzej Zabawski

■ Skunk cleaner shrimp *Lysmata amboinensis*; the possibility of aggression cannot be ruled out between different *Lysmata* shrimp species.

What I've gleaned from other hobbyists is that some have kept these two shrimp species together with no compatibility issues whatsoever, while others report problems with aggression between them. No doubt, factors such as aquarium size (there seem to be fewer compatibility problems in larger tanks), access to food (sometimes fishes and other tank inhabitants eat all the food before the shrimp can get any, so they turn on each other), and the varying temperaments of individual specimens would enter into the equation. Dissimilar size between specimens (one shrimp being significantly larger or smaller than the other) might also be a factor when compatibility problems develop.

Also, on an unrelated note, you should be aware that your yellow tang *Zebrasoma flavescens* will eventually reach a length of

about 8 inches and will require a much larger aquarium—approximately twice the size of your 46-gallon.

## Q Sayonara, Cyanobacteria!

My 30-gallon nano reef is being overrun by disgusting, slimy red algae, and I don't know what it is or

what to do about it. Do you know of a critter I can put in there that will eat this stuff? This is my first reef aquarium, and it's very discouraging to see nothing but red slime everywhere! Any advice you can provide on how to get rid of this stuff will be greatly appreciated. Thanks in advance.

Donnie Bauman  
via email

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Mark Smith

■ Common names can sometimes be tricky and quite misleading, as illustrated by the chocolate tang *Acanthurus pyroferus*, which often does not display the general shade of brown you'd expect from its moniker.

**A** The red, slimy stuff in question is, no doubt, cyanobacteria, also known as blue-green algae. This irksome form of bacteria thrives in systems with an excessive level of dissolved organic compounds and can be very stubborn once it gets established. Also, cyanobacteria often appear in newly established systems as part of a natural progression of algae forms. In that case, the problem usually resolves on its own provided good maintenance practices are implemented and overstocking and overfeeding are avoided. But if that doesn't seem to be the case in your situation, you'll need to attack the problem aggressively and on several fronts.

As far as cyanobacteria-eating critters are concerned, don't expect to resolve

your problem that way. I'm not aware of any organism that will eat cyanobacteria in sufficient quantities to bring a major outbreak under control. Instead, you'll need to address the source of the outbreak—the dissolved organic compounds.

Toward that end, you'll need to step up your water-change regimen. Twice-weekly changes of around 25 percent would be a good starting point. Be sure to use water that has been purified via reverse osmosis or reverse osmosis/de-ionization for water changes and top-offs to eliminate the possibility of adding nitrate or phosphate to the system via your source water. If you're not currently using a protein skimmer or the skimmer you are using doesn't seem to be doing the job, invest in one or upgrade

to a more powerful unit and make sure it's adjusted properly. The use of activated carbon in the system to adsorb dissolved organic compounds can be helpful as well.

When performing water changes, try to siphon out as much of the cyanobacteria as possible. Rocks that are overgrown with the slimy stuff can be removed from the display tank, brushed clean in a separate bucket filled with aquarium water, and then returned to the system.

A 30-gallon aquarium is very easy to overstock/overfeed, so you'll need to consider whether your bioload is just too great for your system and adjust accordingly. Also, cyanobacteria tends to thrive in areas of slack current where detritus accumulates, so you'll need to evaluate the water circulation in the system to make sure that brisk, turbulent water flow is reaching all areas of the tank.

Rest assured these steps will bring your cyanobacteria outbreak under control. Just don't expect it to disappear overnight.

## Q Chocolate or Mimic Tang

While looking over the fish at my local aquarium store, I came across one called a chocolate tang. That name confused me because the fish was bright yellow! The sales person also told me that it's sometimes called the mimic tang, but he didn't know which fish it's supposed to mimic. Can you tell me how it got these names?

Paul Fojtik  
via email

**A** The tang you saw was probably *Acanthurus pyroferus*, a species that is commonly sold as either the chocolate tang or the mimic tang. The "chocolate" designation comes from the adult coloration of this species, which is more of a golden brown (and, to my way of thinking, not really all that chocolate-like). The specimen in your local fish store was probably still exhibiting juvenile coloration (or one variation of it, anyway), which is bright yellow with blue around the eyes and on the gill cover. Specimens in this color phase are said to mimic the lemonpeel angelfish *Centropyge flavissima*, but this species' juvenile coloration can vary to mimic other *Centropyge* species as well.

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## Q Live Rock and the Environment

Does the collection of live rock have a negative impact on the environment? I'm considering getting some for the reef aquarium I'm in the process of setting up, but I don't want to harm the reefs just so I can have a pretty tank.

Rudy Ramirez  
via email

**A** If you purchase your live rock from a reputable dealer, you can be reasonably certain that it was collected sustainably. When harvesting live rock, the collectors don't chisel, break, or blast the pieces from the larger structure of the reef, as one might assume. Rather, they gather already loose pieces that have broken off the reef due to natural influences, such as storms. Also keep in mind that you always have the option of purchasing aquacultured live rock, which is essentially terrestrially mined limestone that has been placed on the ocean floor long enough to become live, i.e., home to a variety of crevice-dwelling and encrusting organisms.

## Q Why No Water Parameters?

While researching saltwater fishes and invertebrates in beginner aquarium books, I noticed that the authors often omit details like proper pH, hardness, and water temperature for the different species. On the other hand, it seems this information is almost always provided in literature about freshwater fishes. Why is that?

Monique Partridge  
Cincinnati, Ohio

**A** Whereas freshwater species are collected from a highly diverse range of aquatic environments, which can differ markedly in their water chemistry and temperature, most of the marine fishes and invertebrates available in the aquarium trade are collected on or around the Earth's tropical coral reefs, which, generally speaking, have highly uniform water conditions. Hence, water parameters that suit a specimen collected in, say, the tropical western Atlantic will be just fine for a specimen collected in the Indo-Pacific region.

Of course, there are always exceptions. For instance, specimens collected in the Red Sea are accustomed to a significantly higher

salinity level than those collected elsewhere in the world. Also, certain subtropical species (requiring cooler water temperatures), e.g., the Catalina goby *Lythrypnus dalli* and the peppermint shrimp *Lysmata californica*, are sometimes sold in shops alongside tropical species despite the fact that they can't tolerate tropical temperatures for long. Again, these are exceptions to the norm, but they do

reinforce the point that it's always important to research the care requirements of a species before buying.

Most of the aquarium literature I've read does list appropriate water parameters for tropical marine organisms, but to avoid redundancy, this information is usually provided in a section of the book or article dedicated to water conditions, not in each species account. 🐠



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## Taking Aquarium Nutrition to the Next Level





# ask jack

## Dear Jack,

I have been having success with my discus. My question to you is about krill, which some aquarists feed their expensive Japanese goldfish. Is this a food I should feed my discus?

Dale Broussard  
Bellingham, Washington

## Dear Dale,

Yes, by all means, include krill *Euphausia* spp. in the diet of your discus. I'm surprised about your comment concerning krill for goldfish; I didn't know that krill should play a part in goldfish food.

Krill is an excellent food for most any tropical fish, including your discus. I've written about krill in the past and find it superior to other seafood for tropicals. The protein in krill has a higher nutritional value than *Artemia* in any form, and it is included in a number of tropical fish formulas, although in lesser amounts due to its cost.

Several years ago, I had 10 pounds of fresh krill air-expressed to me in dry ice to experiment with in our discus food formulas. We included *Spirulina* to the formula and found that the food was taken well by the young discus. You probably know this better than I do, but the fresh krill that comes from your general area is not available at all times of the year. A few ounces of the krill I received went to the microwave to be crisped like a cracker. It was delicious! It really tasted somewhat like salmon pâté.

## Dear Jack,

Here in San Antonio, Texas, we have a number of pet or aquarium shops that usually carry discus. But if you were to visit

these shops, you would find very few that had quality, outstanding discus. Is this the case in other parts of the country?

José Medina  
San Antonio, Texas

## Dear José,

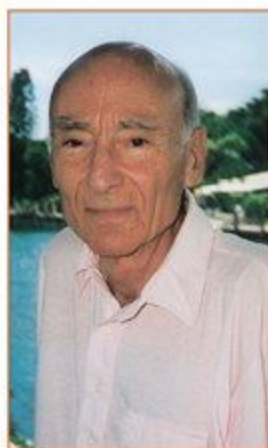
When I have the time to visit aquarium shops in the United States, I can generally find discus of excellent quality. I have found that, in a number of cases, there will be one or two shops that truly specialize in quality discus and devote a major part of the store to them.

We all know that discus require a temperature of 82° to 86°F, and many shops maintain the discus at the same temperature as all the tanks. This is generally about 75°, which is much too low for any discus to thrive in. The discus arrive at the aquarium shops heavily stressed out and put in the 75° water.

Under optimum conditions, the new discus will be placed in their own tanks. However, what if the fish are, upon arrival, placed in tanks with other fish? When this happens, the unfortunate discus find themselves in a community tank with substandard water temperature.

Situations such as this are almost a guarantee of failure for the shopkeeper, as well as for the discus. If the keeper loses 15 to 20 percent of the new discus, his profit is either lost or severely damaged. But by allotting sufficient square footage to properly display the discus, he will, without question, realize his profit. There can be no better advertisement for any aquarium shop than to have at least one extra-large aquarium housing large, quality discus—and of course, a number of small tanks for the saleable discus.

Jack Wattley is worldwide the most recognized name in discus breeding. Breeder, judge, collector, scholar, Jack is the foundation on which modern discus keeping has been built. He has been sharing his experience and knowledge—and the discus he breeds—with aquarists throughout the world for decades, and just one of his many awards was his recent Lifetime Achievement award from the ACA. Long past the age at which most people retire, he still serves as ambassador of discus and goodwill across the planet.



## jack wattley





Cynoclub/Shutterstock

■ Discus tanks should receive water changes regularly.

Many of the aquarium shops in Europe, as well as in Asia, do have arrangements such as these, especially in Japan.

### Dear Jack,

In your trips to Colombia, South America, have you ever done any discus collecting in areas where the Revolutionary Armed Forces of Colombia (FARC) is active? I'm not planning a trip to Colombia, but I know that you have been in the country in your quest for discus.

Frank Marando  
Omaha, Nebraska

### Dear Frank,

Yes, I've been to a number of areas in Colombia that have FARC frentes (fronts). However, in the areas where I was unsuccessful in locating discus—on the tributaries of the Vaupés River near the border with Brazil—the FARC was not too active at the time.

More time was spent in Colombia looking for the *Dendrobates* dart frogs—again in a few FARC areas. All of my discus ventures were made alone, as well as a few of the frog trips, but some of these included friends.

On several of these trips, in departamentos (departments) of Valle, Chocó, and Valle del Cauca, the local campesinos (peasants) warned us not to proceed any farther than where we were at that moment. FARC had been in the immediate area the previous night.

I've read William Rempel's book *At the Devil's Table*, and it is an excellent review of the underground activity in some parts of beautiful Colombia.

### Dear Jack,

You write frequently about the importance of water changes in discus tanks, and I've been making changes of approximately 100 percent each month. But after I make these changes, the fish refuse to accept the food for nearly a week. In one of your articles, you wrote of Asian discus breeders making changes of 90 percent. What must I do?

Meg Treester  
Akron, Ohio

### Dear Meg,

You have given me no information

regarding the tank conditions, although I don't believe I need any. Your fish show no interest in their food after the water changes of nearly 100 percent.

Let's assume you're making the water change, and the water entering the tank has a pH of 6.5. Your aquarium water has not been changed for four weeks, during which time the 6.5 pH water has slowly been changing its composition. Organic waste has brought about a large pH drop, all of which is certain to make the before and after water completely different, thus affecting the fish and their feedings. Discus will thrive with very large water changes, but only if the new water is similar in chemistry to the old water. The more often you change water, the more similar it will be.

In our discus hatchery, we make certain that 40 percent of the water is changed each day. In some of the discus hatcheries in Bangkok and Penang, daily water changes can reach 90 percent each change! For many people water changes two or three times per week of approximately 30 to 35 percent work well. 🐟





# cichlid world

## Cichlids and Swords

A criticism of cichlids occasionally given by the uninitiated is that they cannot live with other types of fish. Hogwash! All wild cichlid populations are only one part of a dynamic community of many types of fish. Knowing the role a cichlid plays in its ecosystem will tell you a lot about how it will behave in an aquarium with tankmates. Some cichlids are specialized fish predators and are not good choices for tanks that will hold bite-size fish. Others are brutally aggressive and will kill just about any tankmate. If we ignore those two genres of cichlids, we are left with hundreds of species that are suitable for community aquariums.

Cichlid enthusiasts often describe tankmates as either “dithers” or “targets.” A dither fish is a species added to the tank to make a shy fish more comfortable. Dwarf cichlids generally benefit from the presence of a dither. A target is a fish placed into the tank to diffuse the aggression of the cichlids toward other cichlids. Dithers and targets are a great topic all by themselves (which I will write about soon), but this column is not about those types of tankmates. This is about my experiences trying to model a river habitat in Mexico, which is home to communities of fish that most aquarists would not think of as compatible: cichlids and swordtails.

### Combining Cichlids and Swords

At the most recent American Cichlid Association convention (hosted by the Capital Cichlid Association in July, 2011), some of our generous donors from the Florida Tropical Fish Farms Association sent us some very colorful swordtails (*Xiphophorus* tank strains) to auction for the ACA’s research funds. If I had a dollar

for every time I heard, “Hey, what’s with all the feeders?” the ACA could fund twice as many grants as we do. I smile and nod, taking it all in good fun, as I know that there are many aquarists who have already figured out that swordtails and Central American cichlids are made for each other—literally. They have evolved side by side in the streams for millions of years.

My first introduction to cichlids and swords came from Rusty Wessel, who has traveled and collected extensively in Central America. Rusty has a spectacular fish house, and almost all the aquariums with the cichlids he has brought back from his trips are housed with *Xiphophorus* species he collected at the same time. When you talk with Rusty it can be hard to pinpoint what interests him more, the cichlids or the swords. One of the best presentations he gives at club events includes video of swordtail species living side by side with cichlids in fast-flowing streams. Those clips are mesmerizing, and they influenced me to try a cichlid and sword aquarium of my own.

### Río Tamasopo Biotope

#### CHOOSING FISH

The first step in building this display tank was to decide upon the types of cichlids and swordtails to use. The first task was to list the fish species available to me that would fit easily together into a 75-gallon tank. I soon discovered that the limiting factor in this project would be the livebearers. Most of the cichlids of interest are readily available from either hobbyists or dealers who specialize in New World cichlids. The wild-type swordtails, however, are pretty much limited to

Ted Judy is an aquarist with over 25 years of fishkeeping and breeding experience. He is a generalist who enjoys all types of fish, from anabantids to tetras, and always finds plenty of space in his fishroom for species from West Africa—especially the dwarf cichlids. Ted is currently a member of the Board of Trustees of the American Cichlid Association, and is an active member of the Milwaukee Aquarium Society. Ted also maintains the websites [www.tedsfishroom.com](http://www.tedsfishroom.com) (his personal site) and [www.forum.apistogramma.com](http://www.forum.apistogramma.com) (a community site dedicated to dwarf cichlids).



tedjudy

photographs by the author



hobbyists' tanks, and getting enough to populate a large community proved to be a challenge.

No matter how hard we try to make a biotope aquarium as realistic as possible, there is really no way to recreate the wild habitat exactly. The impossible factor is space: A 10,000-gallon aquarium is still smaller than a pool in a river, and fish will behave very differently in the small confines of a 75-gallon aquarium. A cichlid that does not regularly chase down and eat swordtails in the wild may give in to the temptation to tear into a flashy tail that runs in front of its face every 20 seconds. And no matter what the volume of water is, very small fish equal food. In the confined space of an aquarium, the bite-size morsels have little chance of evading predation.

The swordtail species that were readily available to me were *X. cortezi*, *X. nezahualcoyotl*, *X. birchmanni*, and *X. montezumae*, all of which are found in the headwater streams of the Río Pánuco Basin on the Atlantic side of central Mexico. The cichlids from the same drainage include *Herichthys bartoni*, *H. carpintis*, *H. labridens*, *H. pantostictus*, *H. steindachneri*, and *H. tamasopoensis*.

The only specialized piscivore in the list is *H. steindachneri*, so that species was out. *H. bartoni* has the reputation of being very, very aggressive, so I eliminated it as a possibility because I wanted to keep a group of cichlids in the tank. *H. labridens* was a possibility because it is primarily a mollusk feeder and not overly aggressive, but the males grow larger than what I wanted. *H. carpintis* is very colorful, but it is an omnivore that also grows larger than what I wanted, so it was out of the running too. *H. pantostictus* is small enough, but it will take small fish as food and comes from more coastal regions on the Río Pánuco Basin (even from slightly brackish water), where the swordtails that interest me are not found.

That left *H. tamasopoensis*, a wonderfully small and peaceful species that dines primarily on plant matter. It is found in the Río Tamasopo, a headwater stream that is also home to a very colorful spotted variety of the monster swordtail *X. montezumae*. Perfect! A Río Tamasopo biotope it would be.

I did not hesitate in obtaining the fish for the aquarium. *X. montezumae* are hard to buy as adults, so I started purchasing as many juveniles as I could find. I accumulated about 25 fish sized from 1- up to 3-inch young adults and set them up in a 55-gallon tank to grow. Before long the



■ *Herichthys tamasopoensis* were chosen for a cichlid and swordtail tank because of their relatively nonaggressive nature.



■ With their spotted pattern, *Xiphophorus montezumae* match well visually to *H. tamasopoensis*.

colony was reproducing, so by the time I was ready to set up the biotope tank, I had about 100 swordtails to stock it with.

The *H. tamasopoensis* came from an online retailer who specializes in Central American cichlids. I got lucky and small fish were available right away, so I purchased eight 1-inch fry and set them up in a 30-gallon quarantine tank to grow out a bit while I set up the display tank.

### SETTING UP THE TANK

I filter all my aquariums in the fishroom with matten filters, which are open-cell foam walls on one end of the tank. The usual method of moving water through the filter wall is to use lift tubes to push water from behind the foam to the top of the tank. This would not provide enough flow to truly match the biotope, which has a raging current. To simulate that rapid water, I cut a hole in the center of the foam wall and set a 2400-gph circulation pump into it. The result is a fantastic river aquarium with current so strong the fish have to work to move about, just like they do in the wild.

The substrate is about 10 pounds of white silica sand, which would be enough to cover the bottom of the tank with a

½-inch layer of sand if there were no current, which pushes the sand around until it piles up in small eddies and behind rocks to create a very natural look. The Río Tamasopo is very rocky, so I piled about 100 pounds of large, flat, round cobbles on the bottom. The pile takes up about ¾ of the bottom space, but the highest point in the pile is only 12 inches off the substrate, which leaves most of the water column in the tank open for the swordtails.

The display is lit by two 48-inch T8 florescent bulbs (6700K color temperature) set on a timer that give the tank direct light for six hours a day. I want a nice layer of algae to grow on the surfaces of the rocks. Both the swordtails and cichlids will graze on that growth, supplementing their diet and letting them use feeding behaviors they would use in the wild. The Río Tamasopo is a cool-temperature high-country stream, so I left a heater out of the equation.

### A FANTASTIC DISPLAY

I set the display up and left the lights on 24 hours a day for two weeks to establish the algae growth. The first fish to go into the aquarium were three dominant males and fifteen females of the *X. montezumae*. I let





■ Cichlids and swordtails housed together can provide a highly interesting dynamic.

them have free run of the tank for two weeks before adding all eight of the *H. tamasopoensis*, which were now all 2 inches long and happy to be getting into a larger tank.

The cichlids immediately disappeared into the rocks where they set up territories and found refuge from the current. I did not feed the fish for a week, which forced

them into foraging for algae on the rocks. Once they were comfortable with being out and about searching for food, I started regular feedings of a vegetable and spirulina-based flake food. Both the swordtails and cichlids are vegetarians, so there is no need for meaty foods at all.

This biotope has been running now for 12 months, and all the fish, now adults, are still cohabitating without any problems. The current takes its toll on the swordtails, however, because they are almost constantly moving. The first swordtails I put in became very thin and fell victim to the opportunistic cichlids, so I replaced them with more that I had grown outside of the display tank. Now I rotate big females in and out of the biotope, which allows them to give birth outside of the tank (fry born in the tank do not survive). Male swordtails seem to handle the current just fine, and they put on an incredible show when they display at each other and defend small territories on top of the rocks.

When the *H. tamasopoensis* matured I ended up with six males and two females, so I removed the largest and smallest male to make room in the tank and hopefully take some pressure off of the smaller females. The cichlids spend almost all of their time in the rocks, popping out to grab food or flare at each other. I have never seen one actively chase a swordtail.

As of the writing of this article, the cichlids have not yet had a successful spawn. Some fry have been produced a few times, but the parents have not been able to raise them for more than a couple of days. I suspect that the current is a part of the problem. In the river, the parents have more space to find sheltered places. I am not too concerned about raising any fry yet, however, and once the fish are fully mature, I will remove a pair to another tank to get a good batch of fry to raise out and spread around.

I have really enjoyed my Río Tamasopo biotope aquarium, from its planning stages to where it is today. I am fascinated by the community interactions between fish, and this display lets me observe the relationship between two very different species, a cichlid and a swordtail, in a habitat as close to the wild as I can make it. I have plans for other cichlid and swordtail tanks too, but the problem is always the same: lots of great ideas, not enough tank space. 🐟

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# the planted tank

## Personalizing the Planted Tank

**P**lanted aquariums are great, but what do you put in them besides plants? Oftentimes, an aquarium can acquire a rather haphazard look. New aquarists see decorations and plants that they like and add them to the aquarium. These are all very nice in and of themselves, but without planning there's no unity; the result is simply a bunch of pretty things in the fish tank. It doesn't have to be like that. The possibilities for artistic creativity in the planted aquarium are almost endless. When deciding on a theme, people often opt for a natural underwater design, but almost any idea can be adapted for the aquarium.

After deciding on a theme or design, the items used to convey that will need to be chosen. And you've got a lot to choose from—just be sure they won't deteriorate in the water or leach damaging chemicals. The easiest, most commonly used, and often least likely to cause problems are rocks, wood, aquarium decorations, substrates, and the plants themselves, but don't be afraid to decorate your aquarium with items not on that list.

When planning your aquarium, also consider that even a large aquarium is actually a pretty small space. To help keep it looking less cluttered, restrict yourself to just a few types of decorations. Then only use either a few small versions of the item or one larger version. I personally have a lot of clutter in almost every area of my life, so I need to constantly force myself not to clutter my tanks. If you like clutter, feel free to add a few more things, but for a cleaner and more controlled look, less is often more, and some control will usually give better results.

There are many items used to create these looks or themes. Some represent natural elements, used to evoke a mood or feeling. Some items used in the aquarium

are miniaturizations of real or imagined items used to create a scene or tell a story. Sometimes unusual or playful items are used.

### Rocks

I usually don't use a lot of rockwork in my aquariums; I really love plants. To me, rocks are taking up space that could be used for growing more plants. My rock discrimination shouldn't dissuade anyone else from using them, however. Rocks can be beautiful and striking additions to the aquarium, and they work very well for invoking different looks.

The rocks can be heavy, massive, and rugged, with jagged edges representing mountains or canyons. They can also be smooth and rounded, having been eroded and smoothed over time with water, sand, and other rocks. Their colors can be light or dark; most rocks naturally come in a wide range of brown, tan, gray, white, black, and red.

The tanks I've used the most rockwork in were generally for cichlids that preferred living in rockwork. I've also used quite a bit of rocks in the first tank I set up to use yeast-generated CO<sub>2</sub>. I wanted the tank bottom to slope down from the back to the front to add depth. I used some rocks I had collected on a long-ago vacation to help hold it up. These were mostly reddish colored and made a pretty dramatic contrast to the green plants.

Rocks don't have to be used in the traditional way in an aquarium either. A friend of mine keeps a lovely collection of rocks displayed in her aquariums. The rock collection was given to her by a departed friend and is a very nice collection in and of itself. She keeps the rocks displayed at the bottom of her planted aquariums. She obviously does a good job of keeping the rocks clean, as they always look wonderful

Rhonda Wilson has a lifelong interest in all things aquatic and started keeping aquariums at age six. She has a fishroom with about 80 planted tanks. Rhonda has read TFH since the mid-70s, and she co-authored the TFH book *The Simple Guide to Planted Aquariums*. Active in local and national aquarium groups for over 16 years, including as the past chairman of the American Livebearer Association, she now maintains a forum on her website at <http://naturalaquariums.com>.



rhonda wilson  
photographs by the author



in her photographs. There are even rocks with crystal formations. It's a very nice and unique way of displaying the rock collection.

## Wood

Wood in the aquarium can often depict a dead fallen tree or tree stump. This is done with larger pieces. They can convey the strong, heavy feeling of a fallen giant, now home to the denizens of the deep. Smaller sticks more often are representative of the branches of a fallen tree, light and more numerous. Medium-sized pieces of wood placed upright can represent piers of a dock. Forking branches can look like trees flooded in a body of water. If moss grows on the tops, they can look like trees full of green foliage. Some of these creations remind me of Dr. Seuss's Truffula Trees in *The Lorax*.

I recently redesigned my living room's 50-gallon tank and took out the smaller branches that had previously been growing flame moss, and replaced them with one very large piece of wood that looks like a huge tree trunk in a lake.

The wood used doesn't have to be real wood. Real wood does look nice and I use it more often than plastic branches, but the plastic kind has some real advantages. It won't swell and break your aquarium, which I've had real wood do, it won't leach tannins (or hopefully anything else into your water), and it won't degrade over time, at least not nearly as quickly as real wood.

If using real wood, I would usually advise that it be purchased at a pet retailer. It is possible to use wood you've found, which can certainly be a fun project if you plan ahead, but usually it's easier and there are a lot less opportunities for problems if purchased wood is used.

## Other Ornaments

Decorations don't have to look natural—they can also create miniature scenes or be whimsical. I have a few different little items in several of my aquariums. Some are ornaments from my childhood, some have come in with used aquariums, and some were purchased because they appealed to me on the shelf.

The ornaments from my childhood include a ceramic rock formation. It looks like something from the Painted Desert or Grand Canyon areas, though it has faded a lot over time. I also have a hollow



■ An example of what may occur when little thought is put into the planning of a setup.



■ Rocks are a largely popular and trouble-free element that can be added to a tank for definition and appeal.

plastic log and pirate ship skeleton in an aquarium, but these are totally covered with moss, so I'm not sure if they count.

I have a large ceramic castle that I purchased in the 1970s when I was in grade school. I display it with a ceramic bridge that came to me with another used aquarium. These are both in a metal-framed, 15-gallon aquarium with rice fish. Moss and giant hygros are the predominant plants, though there is also some *Marsilea*.

I have ceramic Japanese village pieces. These were intended for what is probably my favorite aquarium, even though I still haven't set it up. It's a tall, narrow, metal-framed vintage aquarium with its original hood. I found it in a thrift store. Inside the aquarium was an interesting mix of gravel, marbles, broken glass, and odds

and ends. The village was included. The background was a very faded homemade collage of two different Japanese garden prints. I still have it, too. I haven't resealed the tank yet and thus haven't set it up, even though I've had it for several years.

Another piece I enjoy that's just sitting in the middle of an otherwise rather average-looking planted aquarium is a small white frog fountain. I found it in a craft store and thought it was cute, so I bought it for my aquariums. Even really unusual things can be used to decorate an aquarium.

I featured a tank I created last year with clear glass goblets filled with clear marbles (*TFH* April 2010). Other unusual items can be used in the aquarium as long as they are safe, can withstand water, and won't leach hazardous chemicals into the aquarium.

## Plants

Plants have many different looks and can evoke different responses. Soft, cushioned dark mosses look a lot different than bright, thin, spiked hair grass, even though both are quite suitable as a carpeting plant in the aquarium. A combination of different plants is often used, and height, color, and shape contrast are taken into account. Impressive plants can be the focal point of the aquarium. These are generally plants with unusual or strong shape or color. Sometimes a group of plants is the focus of the piece, or what the group represents, such as a hidden forest cove or a bright and sunny meadow.





■ With the proper planning, tank elements will come together gracefully and result in compelling, visually balanced layouts.

Plants are usually the main focal point of a planted aquarium, but they can just as easily be used as a background to other ornaments. They may even be the most used element, such as a landscape with a carpet of a single species of plant such as *Riccia* or moss, but the focal point could be rockwork, interesting driftwood, or even a sunken Atlantean city.

### Bottom Covering and Background

The bottom covering of the aquarium is often a background to the theme. It plays a large part because it occupies so much of the space available. The visible covering can be a substrate, usually gravel or sand, but it can also be fully planted so the actual substrate

is hidden. And which plant is chosen, if such a covering is used, will also lend its characteristics to the feeling of the whole.

The background also covers a lot of space, but it is usually not the focal point of the aquarium. It usually is meant to be just the background. There are photographs printed on water-resistant paper often sold for background use. Patterned, prismatic, or other papers can also be found. I prefer a simple black background; I just get black poster board at an office or craft store and cut it to size. While it's not water resistant, there really doesn't seem to be much water splashing at the back of my aquariums, so I haven't encountered problems. They last me for years.

Aquarium designs can portray a fallen tree, a path through the woods, an abandoned castle, or almost anything the aquarist can dream up. Don't be afraid to experiment—do what you feel or like. The worst that can happen is you won't like the results, which would only lead to the fun of planning a new creation and attempting to bring it into reality. 🐟



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# adventures in aquascaping

## An Aquascaping Challenge: A Layout for Fancy Goldfish, Part 1

Over the years in my work as an aquascape designer, I have had the privilege of being able to create a huge variety of different layouts covering virtually every style and genre. Being truly passionate about *all* types of aquaria—from biotopes and live planted tanks to reefs, paludariums, and even the tasteful use of artificial decor—has been a source of inspiration for new designs. There remained one style that I had never been able to successfully produce, however: the fancy goldfish aquarium.

### A Surprising Challenge

When pondering the reasons for my lack of success (or even attempts) with goldfish, it became clear why it proved so challenging. It was not a matter of confidence in my ability to keep the fish themselves. In fact, being a real lover of goldfish and koi, I had studied extensively the ins and outs of proper care and even considered myself reasonably knowledgeable in a practical sense, though my actual experience was limited.

One of the greatest challenges I discovered during my years in the aquatics retail business was the difficulty in simply acquiring quality specimens in the first place. I learned quickly that, as is true with many types of specialty fish, the very best rarely even made it to the United States.

Beyond that, goldfish in particular had a stronger likelihood of coming in with a wider range of health problems that required an ample knowledge of how to diagnose and treat them. The ultimate high overhead cost of quality fancy goldfish simply made them an unwise choice for the average retail store owner to carry.

Fast forward almost 20 years later. After a long career in the aquarium industry

meeting and making connections with so many people, I was eventually led to finding very high quality sources for domestically bred fancy goldfish of virtually every type. But one problem remained—one that, for me, was an even bigger deal to conquer. Ultimately, I lacked a clear vision for the type of aquascape I wanted to create for the artful display of fancy goldfish.

My desire to meld a proper environment with a visually effective design had given rise to many possibilities, but none that I could settle on. Mike Senske—my brother, business partner, and truly world-class aquascape designer—had done a layout for goldfish years ago that we receive inquiries about to this day. It was simple and effective (two qualities I hold dear), but it did use some artificial plants.

He kept goldfish in aquariums with hardy live plants like *Anubias* and Java fern, but over time the plants suffered. Eventually these less-than-ideal combinations ended the same for him as I see them ending for others: The fish are fairly healthy and the plants are not *dying*, but neither are all they could be if kept under better specific conditions. And in the case of the plants especially, after some time they were never at a level of presentation that we found acceptable, and especially not at a level that one of our maintenance clients would approve of.

So I was determined to create a layout that was simple, replicable, and provided the right environment for goldfish, and one that did not involve live plants nor artificial plants for that matter. These criteria led me back to my old freshwater favorite: the hardscape-only design. But what materials? What type of rock? Could a little driftwood be used? And what about substrate: light,

Jeff Senske is a co-founder of Aquarium Design Group along with his brother Mike, and the two are internationally known for their aquascaping talents. The Houston, Texas firm specializes in custom aquarium design and service as well as providing media content (photography and video) for the aquarium industry.



jeffrey senske  
photographs by the author





■ This popular aquascape from 2003 by Mike Senske of Aquarium Design Group was a good attempt and worked visually, but issues arose over the long term that the author wants to improve upon with his new layout.

dark, fine, coarse? I had some research and experimentation ahead for sure.

## Choosing a Substrate

The issue of substrate was the most perplexing for me initially. I remembered the nice goldfish layout Mike had done, which used small river stones that were much larger than typical aquarium gravel. Over time this was difficult to clean, as too much uneaten food would fall into larger spaces where the fish could not forage. It looked great and kept in with the overall theme of smooth river stone/dark moon stone types of aquascapes, but was not ideal on all fronts. We also found that darker and black varieties of goldfish were a bit lost among all the dark stones.

Most all other standard-colored fish really popped against that darker setting, but in this new aquascape I wanted to be able to showcase any type of goldfish, including the pandas, grays, and blacks. Additionally, the brighter, cleaner look I was after started to make it clear that a lighter substrate would indeed be the preferred option.

My personal preference was generally for finer-grained sandy substrates, especially in hardscape-only layouts. But with goldfish, I had a natural concern about the fish ingesting the sand and that leading to constipation and other possible digestive issues. In researching this question, I was not all that surprised to find differing opinions. One camp suggested that the ingestion of a sandy substrate could actually be beneficial, while another said it could indeed cause problems. The concerns were generally less with the fish swallowing the substrate and



■ Hakkai-seki stones were initially considered but later deemed unsuitable due to their dark color and very strong details.

more with the long-term viability in terms of qualities like not turning anaerobic and ease of regular maintenance, however.

I knew water quality (which is important in any aquarium, of course) would be of special consideration with high-quality goldfish, so I wanted a substrate that could be vacuumed easily; finer sands tend to be siphoned out with the water when using a traditional gravel vac. After assessing several contenders, I settled on a product I had used often in the past for its sand-like texture and grain that also happened to be large enough to vacuum. Coupled with its bright, clean look and consistent coloration, the substrate issue seemed solved.

## Other Hardscape Items

Further research made it clear that, given the wide variety of goldfish types I wanted to keep, most driftwoods would not work well. The idea was to avoid anything

pointed or with edges upon which the fish could scratch or harm themselves.

It occurred to me that there were certainly rock types that could be problematic too, but overall the potential to find suitable driftwoods. Somehow stones just seemed inherently appropriate, probably due to the imagery of goldfish in ponds, Asian gardens, and the like where stones play such an important role in the overall atmosphere.

Some of my early ideas used stones we acquired from Japan that are commonly featured in Takashi Amano's brilliant *iwagumi* layouts. *Seiryu-seki* stone was one such contender, as was *ryouh-seki* and *manten-seki* stone. But the best pieces generally possessed sheer edges and points that concerned me.

My attention turned to my prized set of *Hakkai-seki* stone (gathered at Mount Hakkai in Niigata, Japan) that I had been



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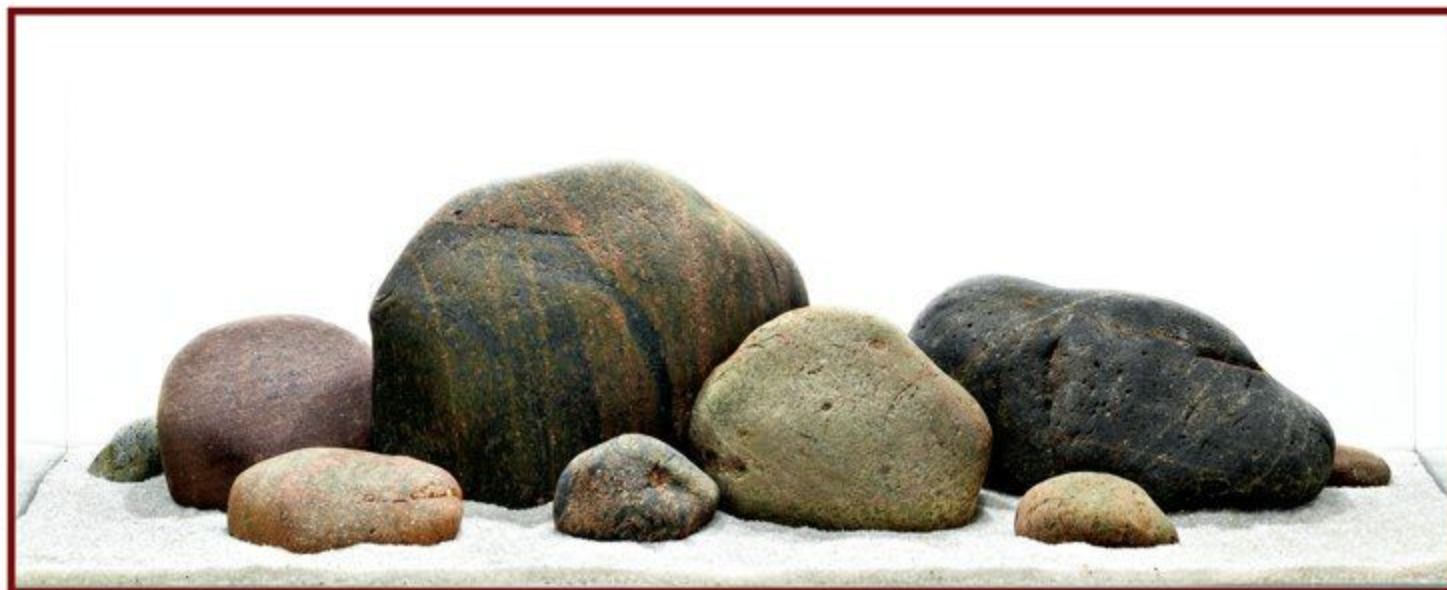
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photo by Jay Luto



■ The delicate nature of the river stones made things more challenging, but the author ultimately decided on a pleasing configuration.

fortunate enough to receive from Mr. Amano himself. Being for the most part smooth, and very much resembling prized stones one might see in an ancient Japanese garden, I was for a brief time sure that these were the rocks to use. However, as is so often the case when conceptualizing a new aquascape, I eventually decided against using the *Hakkai-seki* stone. Many reasons came to mind, but foremost I think I feared the impending wrath from the throngs of insulted planted tank and Nature Aquarium enthusiasts who would surely blast me for using this precious aquascaping material with fancy goldfish! But kidding (somewhat) aside, I felt the *Hakkai-seki* stone was too dark and actually possessed *too much* character for this layout. I wanted the goldfish to play the lead role and the stones to provide a neutral (yet slightly varied in terms of color) backdrop.

The ubiquitous, smooth river stone—available in probably every landscape/rock yard in the country—emerged as a highly likely candidate. But having worked with these stones a great deal in the past, I knew that a layout where they were the lone material was indeed challenging. Compositionally, the smooth, round character of classic river stones made them difficult to work into pleasing arrangements. With some plants added or simply as support material, they were fine. But when alone atop a clean, bright substrate, it is safe to say I had my concerns about being able to pull off something effective.

A trip to my favorite rock yard was as fruitful as I expected. I cannot remember a time when these rocks were not available in every size from near gravel up to 100-plus-pound boulders. With the tank being 24 inches tall, a larger stone or two would be necessary, but I also wanted to retain maximum swimming space for the goldfish. Keeping a good deal of surface area exposed so the fish could easily forage and to facilitate

the frequent cleaning of the substrate was paramount as well. For the large stones, I looked for those with a flat bottom. This is usually either a natural feature or a place where the stone has been broken. Either way, it provides a means to prop the stone up, thus giving it height and a natural posture without having to use a smaller stone to support it. Stones with this feature usually require a little digging, but they can be found.

In regard to the other features of the stones, I was after an overall lighter, more neutral appearance coupled with sufficient variation in size. The idea was to avoid too much detail, though. Big, round, overt shapes and a minimalistic feel became the clear path as I delved deeper into the aquascape. This would not only provide a complementary backdrop for the shapes and behavior of fancy goldfish but also keep things more open and easy to clean—points I continued to come back to. I did not want to have to rearrange too many detail stones after several days of fish foraging or a good gravel vacuuming.

## Pulling It All Together

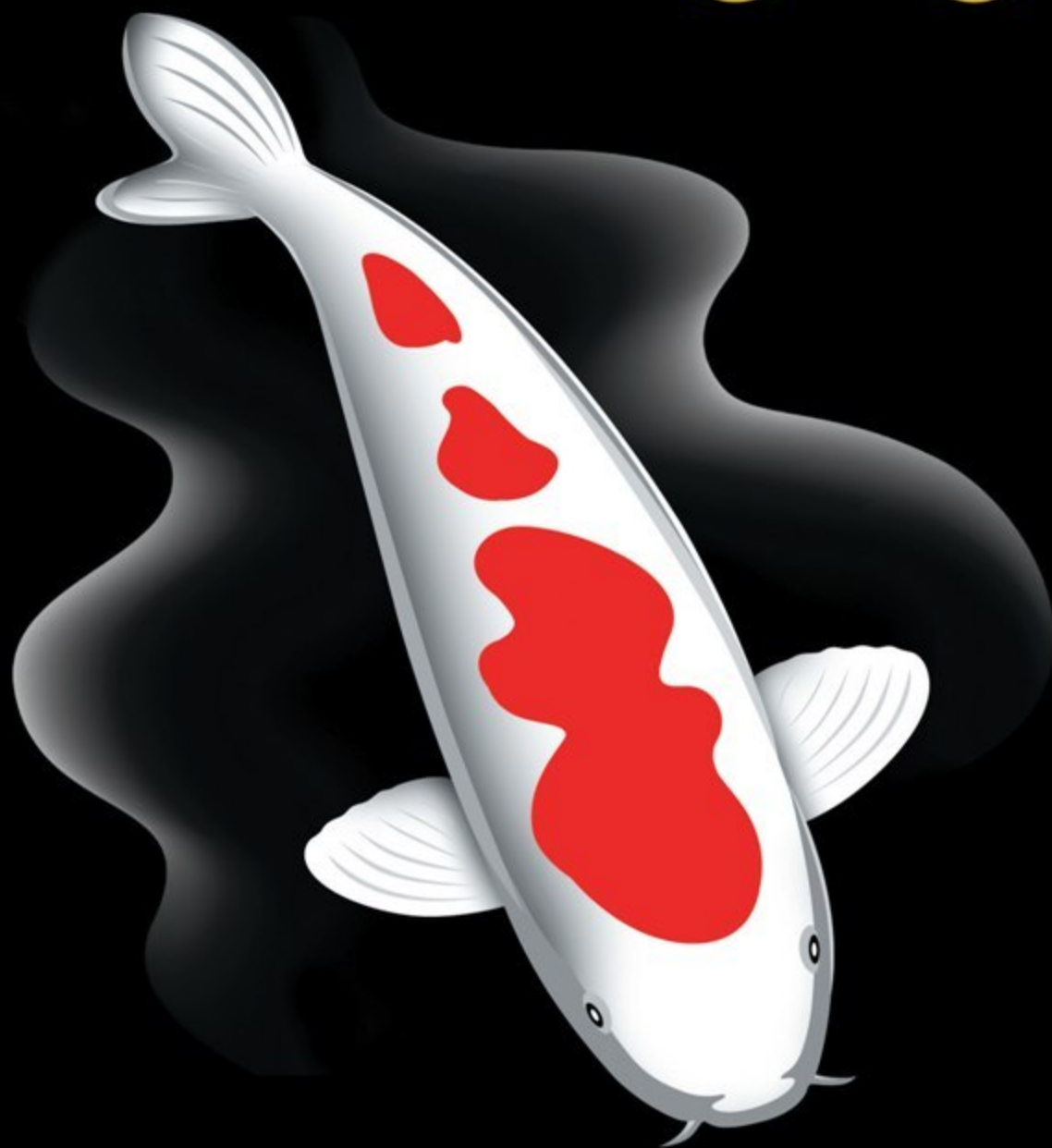
Much to my pleasure, the aquascape came together relatively easily. I figured this would be one of those layouts that would either take very little effort for me to be happy with, or would require hours of reworking over and over again because it was not a very good idea to begin with! In the end, the hardscape was very much in line with my vision.

I started to get really excited about the arrival of the fish, all of which were coming direct from a breeder in Hawai'i who on his website shows not only sample fish, but several images as well as a video clip of the actual fish you are purchasing. I felt that finally there was a guarantee of quality, healthy goldfish without heroics and massive ambulatory care. A fish long coveted and an aquascape that seemed out of reach was shaping up to become a reality. 🐟

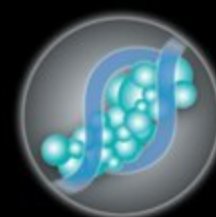




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# import report

## Zebra Eel *Macrognathus zebrinus*

The increase in aquarium fish exports from Burma (Myanmar) in the last few years has been a real boon for the hobby. A number of new species have been introduced, and others that were only sporadically available in the past have become more regularly available. The zebra eel *Macrognathus zebrinus* is one of the latter. As this is probably my favorite of the eels in the hobby, I think that is a very good thing. One of the things that really appeals to me with this species is the finnage. I like the real distinction between the caudal and the other fins, as well as the body pattern. Of course this is not a real eel, but one of a group of eel-shaped fish known as spiny eels. These are relatives of rainbowfish, seahorses, and killifish, not eels.

*M. zebrinus* can grow up to 18 inches in the wild. It is generally imported for the trade at a size of 4 to 6 inches, making it suitable for the mid-sized or larger aquarium. While not a very effective piscivore, I would not trust the zebra eel with small fish, so a bit of care should be exercised when choosing tankmates. Watching them track down small live food can be rather amusing, as they will get up into the water column to catch things like daphnia or mosquito larvae. They also seem to really enjoy blackworms. They will burrow into the substrate, so no blackworms or tubifex worms will ever be safe from them. That said, they do not require live foods to do well in the aquarium and will accept flakes and most sinking pellets that are appropriately sized to their mouths.



Stan Sung

They get along quite well with each other and will do well either individually or when kept in a school. They're adaptable across a broad range of water conditions and can be kept with everything from Asian or South American community tank fish to Rift Lake cichlids. Like all eel-shaped, bottom-dwelling fishes, they are accomplished escape artists, so the aquarium should be well covered. If you're looking for something a bit out of the ordinary to add to your tank, try one or a group of *M. zebrinus* the next time you see them. I'm sure you won't be disappointed.

## Hingemouth *Phractolaemus ansorgii*

The hingemouth *Phractolaemus ansorgii* is the only member of the family Phractolaemidae. This interesting species is occasionally imported from the Democratic Republic of the Congo, formerly known as Zaire, where it inhabits the Congo River Basin. Its natural range also includes Nigeria and Benin, where it lives in the Warri and Niger River systems. Its natural range includes soft, somewhat acidic water and hard, fairly alkaline water, so it should adapt readily to most aquarium conditions. The swim bladder can function as lungs, allowing it to survive in water with very low dissolved oxygen levels.

Mark Denaro has been keeping freshwater aquariums since 1970 and marine aquariums since 1976. He currently operates Anubias Design ([www.anubiasdesign.com](http://www.anubiasdesign.com)), an aquarium and terrarium design, installation, and maintenance company serving southeastern Pennsylvania, and importer/online retailer of new, rare, and interesting freshwater fishes, invertebrates, and plants. A former president of the International Betta Congress, Mark's primary interests are anabantoids, cichlids, and planted aquariums.



mark denaro

photographs by the author except as noted

The hingemouth is cosmopolitan in its feeding habits, which also helps it survive in situations where other fish will not fare well. Its diet includes plants, algae, detritus, small fish, the scales of larger fish, small crustaceans, and the appendages of larger crustaceans. In the



aquarium, it will attack most worms with gusto and also greedily accept flakes, pellets, and frozen foods. The mouth is protrusible and can almost form a short trunk.

*P. ansorgii* grows to approximately 8 inches in length, though it is usually exported at a size of 2 to 4 inches. Adult males can be distinguished by the presence of four tubercles around the eyes and spinules (minute spines) on the caudal peduncle. This species will thrive best in a biotope aquarium set up with a soft sand substrate and decorated with driftwood and rocks to provide hiding places. Dim lighting is best, and tough-leaved plants such as *Anubias* that can survive in low light would be most appropriate.



## *Tilapia snyderae*

*Tilapia snyderae* is a native of Lake Bermin in Cameroon, where it feeds on algae, detritus, diatoms, and occasionally sponges. This species grows to about 3 inches in length in the aquarium. Several color forms exist in nature, but there is some

doubt as to whether they are distinct or an indication of status within the population. West African cichlid authority Anton Lamboj in *The Cichlid Fishes of Western Africa* (Birgit Schmettkamp Verlag, 2004) has reported that the more aggressive, dominant individuals display

the red and black pattern illustrated here and that individual fish can change color from this pattern to a greenish-brown back with a reddish to copper underside or a pale brown back with a silvery-gray underside.

*T. snyderae* can begin breeding at about an inch in length. While the species is a substrate spawner, it prefers to spawn in a protected spot and will occasionally spawn in a cave. Broods can range from 10 eggs for young pairs to 70 eggs for larger, older pairs. Both parents participate in brood care. The wrigglers are usually moved to a pit dug in the substrate. Coarse sand works very well as a substrate for this species due to this behavior. Plants should not be included in the aquascape unless they are intended as a temporary addition because they will generally be eaten. The diet should be varied with a high percentage of algae- and vegetable-based foods. Fry will accept newly hatched brine shrimp when they become free-swimming and are easily raised.



## *Julii Cory Corydoras julii*

The true *Corydoras julii* is very rare in the hobby. The fish that is typically sold as the julii cory is *C. trilineatus*. The two species are similar in appearance, but there are some ways to easily identify them. *C. julii* is covered in small spots, while *C. trilineatus* sports a pattern that can best be described as small squiggly lines. Both species display a mid-body bar that runs forward from the caudal peduncle. This bar is longer on *C. trilineatus* than it is on *C. julii*. *C. trilineatus* has a broad distribution and is exported from Peru, Colombia, and Brazil. *C. julii* is found only in the lower Amazon region and reaches the trade via exports from Belém in eastern Brazil.

*C. julii* is only rarely available and then only during the dry season. *C. julii* grows to just over 2 inches in length. It is typical of the genus in terms of behavior and care, but spawnings in the aquarium are rare. Ian Fuller reports a spawning on his website ([www.corydorasworld.com](http://www.corydorasworld.com)) in which approximately 50 eggs were laid on the glass in the corners of the tank near the surface early in the morning. Ian conditioned the breeders on a diet of flake, pellet, and granular foods supplemented with a once-weekly feeding of live foods, including bloodworms, daphnia, tubifex worms, whiteworms, and finely chopped earthworms.



Blackworms are not typically available in England, but through personal conversations with Ian, I know that he prefers tubifex worms to blackworms. Still, blackworms may be an option here in the United States. My best experiences with live foods for Corydoradinae catfish have been with homegrown tropical redworms. This is a species smaller than the typical American earthworm and is easily cultured.



## Upturned Jaw Catfish *Belodontichthys dinema*

**B**elodontichthys *dinema*, commonly known as the upturned jaw catfish or Borneo sheatfish, is an interesting species for the hobbyist who can provide for its needs. This member of the catfish family Siluridae is an obligate piscivore, so the ability



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to provide a regular source of healthy feeder fish is the first consideration that must be taken into account before acquiring this species.

The second consideration is adequate housing. This species grows to a length of at least 24 inches and may reach 40 inches, so extremely large tanks are a necessity. On the rare occasions that *B. dinema* is imported, it is usually at a size of 2 to 4 inches, so smaller tanks can be used initially, but solid plans should be in place to properly house the fish prior to purchase.

The Borneo sheatfish will eat any fish that fits into its mouth, so tankmates must be chosen with great care and a species tank is preferred. An aquascape consisting of large open areas for swimming along with a few hiding places with dim lighting is ideal. *B. dinema* will not bother plants, so plants can be added if the lighting is adequate. Large specimens of various *Anubias* species typically work quite well. *B. dinema* is adaptable across a range of water conditions, but the ideal conditions are a pH of 6.0 to 7.0 with moderate hardness and a temperature in the upper 70s. Adequate and powerful filtration, coupled with plenty of water changes, is a must, as this species is sensitive to any deterioration in water quality.

*B. dinema* is a powerful swimmer that can also jump impressively, so a tight cover is necessary, weighted down for larger specimens. They will eat each other if the size difference is great enough, but they seem to do best when kept in a group. The upturned mouth and impressive dentition lead to a very unusual mode of feeding in which it lunges upward to catch its prey. *B. dinema* migrates in nature, but it is not known if it migrates to spawn or if it follows a food source. They swim upstream in the dry season and downstream into the flood plain in the rainy season. 🐟



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# going nano

## A South American Planted Nano

**A**quarium manufacturers these days are really cranking out some fabulous, small-sized, all-in-one specialty systems. My example this month is a 30-liter (almost 8-gallon) one designed for a planted display. This system comes boxed with a tank, lighting, and filtration, but—as they say on late-night TV ads—“Wait, there’s much more!” The kit also includes a very nice bell-type carbon dioxide system, plant substrate, planting tongs, a plant-growing supplement, aquatic plant care guide, and even a gorgeous, integral, three-dimensional rock background! You do have to invest in an aquarium heater, but the setup comes with an alcohol-based thermometer.

Aquarium plants (as long as they are true aquatic species) aren’t hard to keep; it’s just that it is quite easy to leave out an essential element required for their care. This unit does an excellent job of providing all the essentials at an attractively low price.

The particular setup I’m looking at this month is again at Aquatic Warehouse in San Diego. Their intent with this one is to show an archetypical Dutch planted system. At the time of this writing, it has been set up for about a month and already shows prodigious growth.

### Tank

The aquarium is constructed of glass, with the front panel being heat bent. Its overall dimensions are 11<sup>4</sup>/<sub>5</sub> inches long, 11<sup>4</sup>/<sub>5</sub> inches wide, and 13<sup>3</sup>/<sub>4</sub> inches high. There is a glass cover included as well to limit evaporation, keep CO<sub>2</sub> and the livestock in, and to keep dust and other things out.

### Filtration and Circulation

The kit includes an internal power filter. This is really a nice unit, with a spray bar discharge that greatly reduces carbon dioxide loss through surface disruption and provides for a good overall turnover of the system’s water.

### Carbon Dioxide System

CO<sub>2</sub> is generally the rate-limiting aspect of photosynthesis. Without it the plants are slower to take up the nutrients, which could fuel an algae bloom. All commercial aquatic plant growers utilize carbon-dioxide infusion systems, so their importance shouldn’t be slighted. The nano system that I am looking at includes a pressurized source of CO<sub>2</sub> gas, tubing, adjusting valve, and a bell-type diffusion apparatus. This last item is considered an older style, but it is still excellent in its application.

The carbon dioxide is fed manually into an inverted hopper, and as it is needed, the gas goes into solution as carbonic acid. This approach to feeding CO<sub>2</sub>, as opposed to bubbler types of infusion, provides enough CO<sub>2</sub> without the expense of controllers and monitors. During the dark phase (lights out) of photosynthesis, there’s no need or desire to add carbonic acid (which could possibly drive down the pH to dangerous levels). The system here will not cause the pH to plummet.

### Lighting

The provided fixture is a compact fluorescent bulb of 13 watts, sufficient for most plant species characterized as requiring medium-intensity lighting.

Bob Fenner is an aquatic Renaissance man. His professional life has included jobs in tropical fish retailing, wholesaling, collection, photography, research, aquarium maintenance, and writing, while he is an accomplished freshwater, marine, and reef aquarist, and an authority on aquatic plants and ponds as well. Bob is a frequent speaker at national and local aquarium society events, a long-time TFH and Microcosm author, and the expert the experts go to for advice. For more from Bob, visit [www.wetwebmedia.com](http://www.wetwebmedia.com).



bob fenner

photographs by the author



## Livestock

Aquatic Warehouse has their unit very nicely stocked with an outstanding Endler's and guppy cross called "king tiger," a trio of *Corydoras adolfoi*, a nice male dwarf South American cichlid triple red *Apistogramma cacatuoides*, and a lone pitbull oto *Parotocinclus jumbo*, and let's not forget to mention the captive-bred golden rabbit snails.

The king tiger guppies are, of course, only one of dozens of strains available on the market currently. These have proven to be very sturdy crosses, much harder than commercially produced fancy guppies, which have been line bred for many generations.

Adolfo's *Corydoras* hail originally from the Rio Negro in Brazil and now have been successively bred in captivity for several generations. Like many cories that are popular with hobbyists, they prefer lower temperatures, in the middle to upper 70s F. Now that it is being captive bred, this species no longer has a restricted range of lower pH and water hardness, but still Adolfo's catfish is not as tough nor prolific a breeder as the bronze cory or other common cory species that frequent the hobby.

The cockatoo dwarf cichlid *Apistogramma cacatuoides* continues to become more popular than the mainstay ram *Mikrogeophagus ramirezi*. Both are from South America. As with the Adolfo's cory, the cockatoo has become more and more facile in adapting to captive conditions, now readily breeding in many places' municipal water and being kept just fine without resorting to creating very soft and acidic water conditions for the fish. Because this tank has so little space, only a solo male (no females) is present. To keep the sexes together and breed these fish calls for a 20-gallon tank set up with a flowerpot or coconut shell cave.

The pitbull oto is not as aggressive as its canine namesake can be, but it does have its eyes mounted up higher on the head like the dog breed. This oto has proven to be better suited to aquarium conditions and is a more productive algae eater than the common *Otocinclus*. What's more, it does fine just being kept singly.

## Other Stocking Possibilities

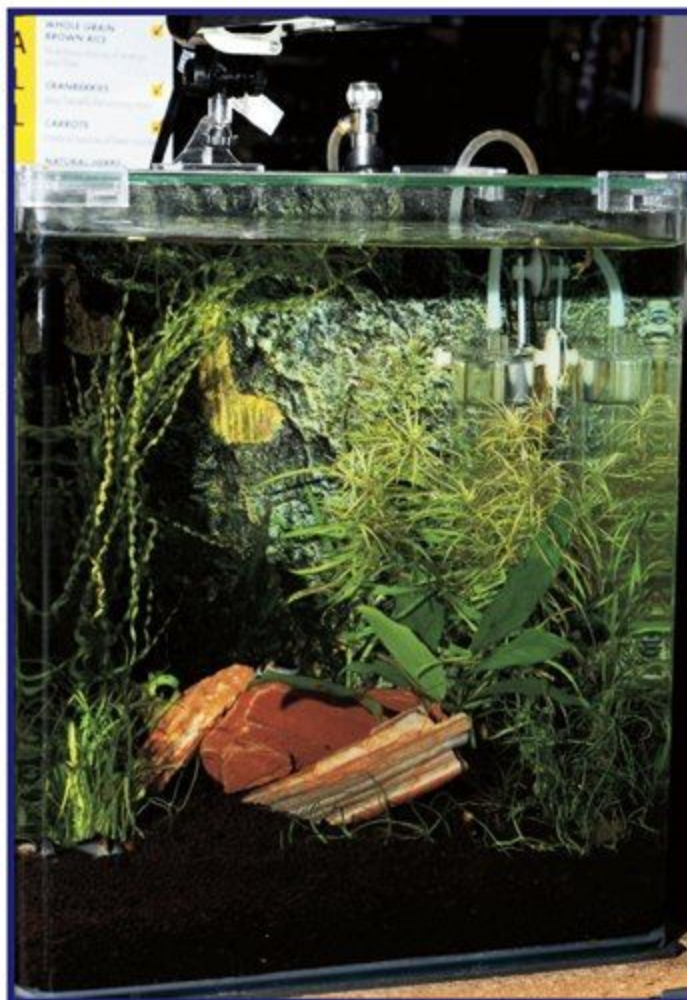
Although specifically designed for aquatic gardening, this small system could certainly be stocked with any number of small freshwater species, with or without plants, or made into a mini-reef.



■ *Anubias minima* thrives in this planted nano, complete with a CO<sub>2</sub> system.



■ *Corydoras adolfoi* grace the substrate.



■ The South American-inspired setup was built from a nano package that includes everything a hobbyist needs to assemble a lush aquascape.

## Decor

The polystyrene-based background is mounted inside the tank and is of very low density. I strongly encourage the use of aquarium-intended silicone adhesive to securely mount the background to the inside rear glass. This will prevent problems with it floating up and interfering with the cover and the light.

The included 2 kilograms (4½ lbs) of plant-nourishing substrate is decorative, attractive, and functional. You can, of course, substitute your favorite plant substrate. Whatever you settle on, do thoroughly rinse the substrate and leave it soaking a good day ahead of placing any live plants in it.

## Other Suggested Gear

Unless you're in a setting with unusually stable temperature year round, you'll need to procure a thermostatic heater; 50 watts will do.

If you plan on keeping rapidly growing aquatic plants for any period of time, I'd invest in more CO<sub>2</sub> cartridges. The pressurized disposable cartridges, 20 and 88 grams, are sold in three-packs, and there are alternative sources. As with hard drive capacity, larger is better in CO<sub>2</sub> storage availability.

## Maintenance

Cleaning the lid is done on an almost daily basis, as this setup is in a working fish store. Water that has been preconditioned from reverse osmosis supplies made on-site and rendered to a pH of 6.8 is half changed out on a weekly basis. The livestock is fed twice daily—flake foods in the morning and a mix of frozen/thawed meaty foods in the afternoon.

The kit comes with a one-ounce bottle of liquid plant food supplement.

## Warranty

To their credit, the manufacturer of this setup does warrant this unit in terms of defects in materials and workmanship for two years.

## A Beautiful, Functional Nano

This kit is very similar to another winner, the nano shrimp unit we looked at in a modified marine application in the September 2011 issue. Both are well-thought-out and complete, ready-to-go, out-of-the-box arrangements. 🐟





# the reefer

## Quarantine, or Else!

For years I quarantined everything that was going into my aquariums, but eventually I got lazy. I stopped quarantining some things, and then I paid the price—twice. With that said, this month I want to discuss the reasons why we need to quarantine things, how to do it properly, and what happened in my case. You'll see why you (and I) shouldn't get lazy.

To start, when I'm speaking of quarantine, I'm not talking about taking something sick out of your aquarium and separating and treating it away from everything else. Instead, I'm talking about keeping any new additions in a separate tank for some time before adding it to your aquarium, whether it looks like it has any problems or not. This gives you some time to see if any problems arise with any new livestock before adding it in with all the rest of your animals.

### The Purpose of Quarantine

Quarantining beforehand means that anything considered a problem can be addressed in a separate tank of much lower volume before it has a chance to spread to your other livestock. A quick example would be keeping a new fish in a quarantine tank long enough to be sure it doesn't have ich *Cryptocaryon irritans*, velvet *Amyloodinium ocellatum*, or any other communicable disease or parasites before adding it to your aquarium and risking the lives of all the other fishes.

Setting up a separate tank just for quarantining may sound like a hassle, but it's worth it! First of all, you can obviously decrease the odds of introducing anything into your tank that you don't want in your aquarium, which is the main purpose. But it's also a good idea because if anything does show up, you can treat it in a smaller volume of water rather than use much larger doses of medications in a larger aquarium system.

For that matter, many of the most effective treatments for common problems with fish can't be used in a reef aquarium at all. For example, I think most people will agree that using copper is the best way to treat for ich and velvet, but copper can't be used in a reef aquarium because it will kill a variety of invertebrates, including corals. Therefore, it's far better to eliminate such things before they ever get into your aquarium in the first place. And again, if treated in a small quarantine tank, you'll need less copper, and can better observe the livestock being held too.

### Setting Up a Quarantine Tank

It's not that difficult to set up a quarantine tank, either. For reef aquarium fishes, you'll need a small tank—20 gallons is typically fine unless it's for relatively large fishes—with some type of lighting on it. No need for high-output (expensive) lights, though, as a single incandescent bulb like those used over most small freshwater aquariums will do. It will also

James Fatherree, MSc has had more than a quarter century's experience with aquariums of all kinds and has been deeply involved in the reef hobby for more than a decade. His background includes diving, collecting, and photography, and he has worked in the trade on both retail and wholesale levels. With all this experience, he has seen his share of aquarium disasters, both natural and manmade, making invaluable his insights on how to save your tank during a crisis.



james fatherree  
photographs by the author



need some sort of biofiltration, such as a power filter filled with ceramic media that, when not in use, can be kept out of sight in a sump or behind some rock in your aquarium. And, it might need a small powerhead for increased water circulation and maybe a small heater.

But there shouldn't be any aragonite/calcite/dolomite substrates in the quarantine tank, as some medications (copper in particular) will react with them. This means no limestone base/live rock, either. However, there should be somewhere for fishes to hide, so you can add some plastic plants, pieces of slate, an upside-down opaque plastic bowl with a hole cut in the side, some pieces of PVC pipe, or something like that. It's also a good idea to cover three sides of the tank with a plastic background to keep stress at a minimum while the fish becomes acclimated to tank life.

## Proper Quarantine Procedure

I keep all fishes in such a tank for at least one week, usually two. I've heard of some folks recommending a month, but in my experience two weeks has been plenty of time for anything problematic to show up. I feed them well during this time and do frequent water changes, which are easy considering the volume. Of course, if any signs of illness appear, I attack the problem immediately. This works, and I literally can't remember the last time I had a sick fish in one of my aquariums, though I know it has been over 11 years.

In the case of corals and other invertebrates, you can use an even smaller tank if you choose, but it will need some brighter lights. They don't necessarily have to be as bright as what is on your aquarium, but they certainly can't be a single incandescent bulb either. You won't be using any copper with invertebrates, so you can skip the biofilter and just use a small piece of base rock taken from your aquarium. You should also add a small powerhead for good circulation.

You will certainly need to pay attention to water quality, and add calcium, etc., just as you would with any reef aquarium. Frequent water changes are also a good idea during this time, as are regular inspections with a magnifying glass to look for any signs of trouble before they get big enough to see without one. Again, two weeks of this should be plenty of



■ The author's 10-gallon coral frag quarantine tank includes a piece of base rock in the corner, a pump for water flow, and a small LED fixture for lighting. All invertebrates spend time here before going into the main aquarium.



■ These larger, light-brown flatworms on a mushroom coral are unlike the acro-eating flatworms the author encountered in his tank because the acro-eating flatworms are incredibly small and clear, making them practically impossible to spot.

time, and if anything does show up but you take action immediately, you can usually fix the problem with minimal or no losses.

## My Mistake

Okay, to finish up, I'll tell you about what happened to me when I didn't

quarantine, just in case you might think the process is too much trouble. Again, for many years I quarantined everything, but at some point I decided that if I got a piece of coral from a hobbyist's supposedly healthy aquarium, there really shouldn't be any need to. Murphy's Law proved me wrong, though.



A few years ago, while visiting for a conference, I was given a few frags from a couple of hobbyists' aquariums and brought them home. They seemed perfectly healthy, as did the aquariums they came from, so I skipped the quarantine tank and added them directly to my 125-gallon reef. But within a few days, I noticed that a few corals were

losing patchy areas of tissue, and it didn't take long to realize that this was only happening to various species of *Acropora*.

It got worse quickly and rapidly spread to other corals. I broke off and pulled out a couple of specimens and looked at them with a lighted magnifying glass. I couldn't find anything, so I talked to a

couple of experts on this sort of thing, and they verified my fears: It was acro-eating flatworms, which are tiny and clear, meaning you're not likely to see them.

The treatment for acro-eating flatworms is a dip using a product that contains melaleuca. It's very effective, but should be used in a small container of water rather than in the aquarium itself. It would have been an easy fix if I'd caught this in a quarantine tank and dipped the corals before putting them in my 125, but I didn't and the flatworms apparently spread all over the place before I noticed any problems. I ended up having to remove every single *Acropora* specimen from the aquarium (about 30) and giving all of them a dip to get rid of the pests.

I would have had to set up another big tank to hold all of them at the same time, which wasn't an option, so I had to try to remount them in their original spots as best as possible. That worked okay for some, but others didn't want to re-grow over the damaged areas at their bases and had to be pruned down to the healthy branches and sort of restarted.

This took many hours and was very, very frustrating to say the least. I didn't get all of the flatworms the first time, either. Apparently some of them were still in the aquarium or somehow managed to survive the dips, as a couple of specimens started losing tissue again. I wound up having to pull them out a second time, re-dip them, and re-remount them. I was ready to start pulling my hair out at this point, but the second round of dipping seemed to finally get the job done. Again, it could have all been avoided if I'd quarantined those few frags.

In case you're wondering, yes, one of the people who gave me the frags had a full-blown outbreak shortly after my visit and had to do the same thing I did.

## The Second Time Around

I thought that this was certainly a rare case of bad timing, as I was given the frags in a window of time between the hobbyists adding some corals to their own tank and having their own outbreak, so I ended up making the same sort of mistake again. At this point I had decided that I would skip quarantining any corals but would give all of them a

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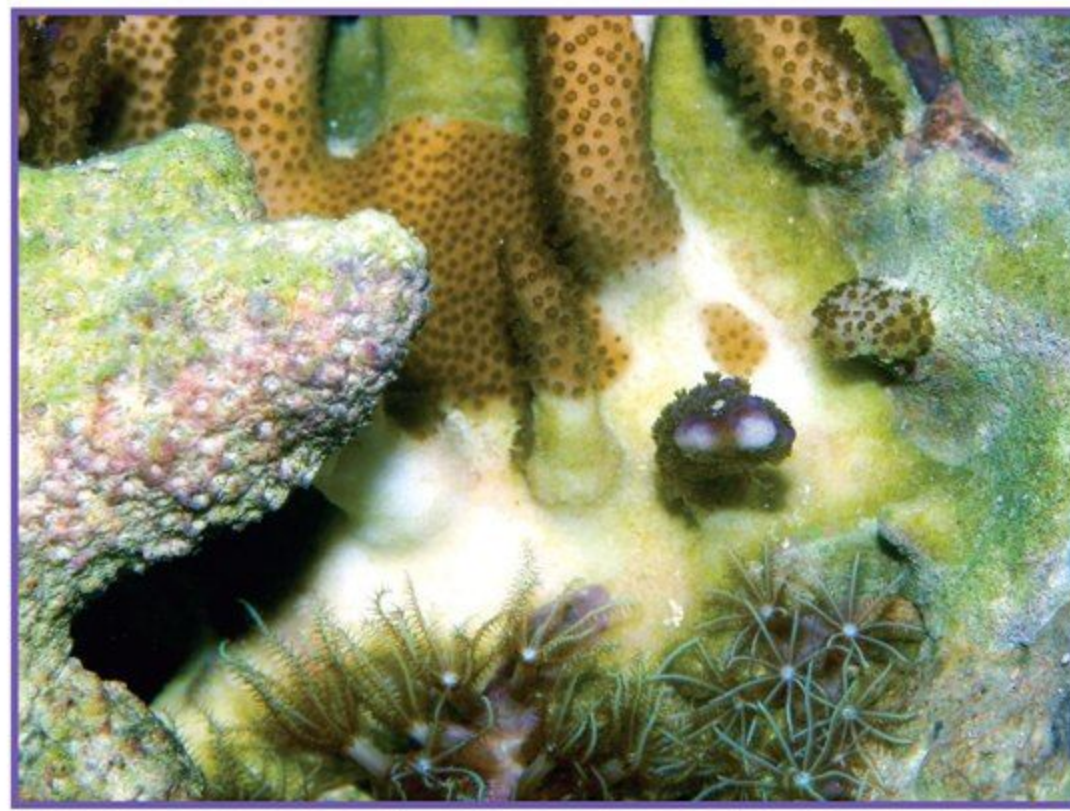
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■ Monti-eating nudibranchs, seen here swarming over the coral, are fast reproducers and eaters.



■ Seen here halfway through the onslaught, a colony of *Montipora digitata* was devastated by monti-eating nudibranchs.

dip using melaleuca and another popular coral dip to rid them of anything unwanted. But that didn't work, either.

Just last year I bought a few more frags, and this time I dipped all of them twice, regardless of the type, in the two products designed to clean them up. However, as I learned, some corals (such as *Montipora*) produce so much mucus when handled that the dips can be ineffective. The mucus can cover up anything small on the corals and acts as a shield of sorts. So despite my caution, I still managed



■ A lighted magnifying glass is a great tool for inspecting corals like this one, shown to be clear of parasites.

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to introduce some monti-eating nudibranchs to my 55-gallon tank. They also reproduce quickly and can devastate a *Montipora* specimen in a day or two when they get going. There's nothing you can add to your reef aquarium to safely get rid of these, either.

They're small, but you can easily see them with a magnifying glass. Removing some of the affected colonies was not an option, so to get rid of them I had to spend every morning going over each *Montipora* specimen with a pointed wooden stick about half the diameter of a pencil and spearing/squishing any visible nudibranchs. I did this again every night after getting home from work, too. I also added a yellow coris wrasse, which will eat them if it can find them. With all this effort, they finally seemed to completely disappear after about two weeks. This wasn't fun at all, and for the last time, things could have been dealt with easily in a quarantine tank. Convinced now? I am. 🐡



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# fish of the month

## *Arothron nigropunctatus*

(BLOCH & SCHNEIDER 1801)

(Tetraodontiformes,  
Tetraodontidae)

**Common Names:** Black spotted puffer, blackspotted toadfish, brown puffer, dogfaced puffer, hush puppy puffer

**Type Locality:** Tranquebar, India

**Range:** Widespread in the Indo-Pacific: East Africa to Micronesia and Samoa, north to southern Japan, south to New South Wales

**Taxonomic Troubles:** Originally described as *Tetrodon* (*Tetraodon*) *nigropunctatus*. You may also see it referred to as *Arothron citrinellus*.

**Size:** 33 cm (13 inches).

**Preferred Water Chemistry:** Tropical marine.

**Difficulty:** A hardy species, provided its accommodations are sufficient for its size and its maintenance is appropriate for its special needs.

**Tank Setup:** As a dedicated feeder on *Acropora* tips and other corals, this is *not* a reef-safe fish! It will dine on just about any invertebrate. It is fine for a fish-only tank with tankmates of suitable size and aggressiveness, and it is quite the star in a single-specimen aquarium. The most important consideration is tank size—absolute minimum would be 4 feet long and at least 100 gallons. Filtration, skimming, and water changes must all be oversized. Puffers are popular because of their cute faces and endearing interactions with their owners, but many species get too large for typical home aquaria.

**Feeding:** A predator on invertebrates, especially mollusks and crustaceans. Also feeds on algae. As with all puffers, proper diet is



Keri Wilk

needed to keep the ever-growing beak (“teeth”) worn down; hard food items—crab legs, mussels, whole unpeeled shrimp, etc.—should comprise the bulk of the menu. It will eat small fish that, in the confines of an aquarium, it can catch, but fish are not its natural prey and will cause health problems if fed regularly.

**Description:** A highly variable species, ranging from blue to grey to white to yellow, always with black spots. Specimens may darken or lighten in color due to environmental stimuli, and individuals may drastically change coloration during their lifetime.

**Breeding:** Not reported in captivity. It is often found in pairs on the reef.

**Notes:** Shy and unaggressive for a puffer. A nocturnal hunter, it will tend to hide away during the day, but like all puffers it will quickly learn that you mean *food*. Be prepared for all the puppy-dog tricks and begging this group is famous for. As a heavy-bodied predator, this fish has a large appetite and produces copious nitrogenous wastes. Care must be taken to maintain water quality. Like all puffers, this fish will inflate with water when threatened. If it is netted and lifted out of the water, it will inflate with air, which can prove fatal. Always move a puffer by catching it in a bag or a rigid container and lifting it from the tank in that volume.





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■ The clearly defined open space in the center and the framework of branch wood renders a strong sense of depth in this layout.

# Expressing Depth Using Open Space and Driftwood

Takashi Amano    photographs by the author • translated by Tomoko Schum

**E**xpressing a sense of depth and power by creating an open space among the wall of aquatic plants is a basic concept for creating a composition in the Nature Aquarium. Since an aquarium is generally longer than it is wide, it is difficult to express a sense of depth and power unless special attention is given to doing so. If aquatic plants are planted without a plan, the finished aquascape will look like a wall of aquatic plants, and the aquascape will begin to look cramped as the plants grow.

The Nature Aquarium style places great importance on the composition of a layout in order to express a sense of depth and render power to an aquascape. The sense of depth is strengthened if an open space is created

intentionally by making a path in such a way that the space appears to become narrower toward the rear of the aquarium. Additionally, creating open spaces on both sides of a bush of aquatic plants in order to make the bush appear as though it is protruding forward will add power to a layout. An aquarium can be made to look deeper than its actual dimension by taking advantage of an optical illusion in this manner.

## Using Driftwood as a Guide

It is difficult to create or maintain such a composition with depth using aquatic plants alone. Rocks and driftwood are used as composition materials in addition to aquatic plants to produce such a layout.

Driftwood, in particular, is useful not only as the framework of a composition, but also as a guideline for trimming aquatic plants. Driftwood allows you to define an open space in a layout and express a sense of depth, while also restricting growing stem plants from expanding sideways. It can also accentuate the path in a composition with the line it creates. One example of such a layout is one in which driftwood branches are arranged in a radial fashion beginning in the rear center of an aquarium and radiating toward the front to express the wide expanse of open space.

The layout in this article was produced in an aquarium that is 90 cm (3 feet) long and 60 cm (2 feet) tall, using branch wood as a composition material. The open space





■ The substrate was sloped steeply from front to back and raised especially high on the sides. Many *manten-seki* stones were placed around the driftwood to retain this slope.



■ The appearance of the layout right after planting aquatic plants. Although only three types of aquatic plants were used in this layout, a sense of depth is expressed by taking advantage of the characteristics of these plants.



■ Trimming was done when the plants grew to a certain level. A pair of special scissors with curved tips makes it easy to trim *Glossostigma*.

in the center and the way the path is cut toward it are important aspects of this type of composition. The path can be adjusted with the slope of the substrate and the placement of driftwood. Taking advantage of this extra-tall aquarium, the substrate is laid with a great slope and the soil is mounded high in the left and right rear of the aquarium. The height of the slope can be seen easily from the side of the aquarium.

The framework of the composition was created by placing branch wood on this substrate. The tall mounded substrate can lose its shape gradually if left alone. Therefore, properly sized *manten-seki* stones were placed over the steeply sloped area of the substrate to retain the substrate in order to prevent collapsing over a long period of time. Since branch wood tends to float easily before it becomes waterlogged, placing *manten-seki* stones over the base of the branch wood

also has the added benefit of keeping it from floating.

## Adding Aquatic Plants

Next comes the planting of the aquatic plants. This is an important step for defining an open space and the composition of a layout as well. The background of this layout is planted with *Rotala* sp. "Ceylon," which is tolerant of repeated trimming and easy to maintain the defined open space





■ This is a layout that takes advantage of the outlines of branch wood. A side view of the aquarium reveals the substrate was mounded high in order to emphasize a sense of depth.

with. The branch wood in the midground as the framework of the layout keeps *R. sp. "Ceylon"* from spreading toward the front, and it also serves as a useful guideline for trimming.

In addition, the triangular space in the center, which leads the viewer's eyes from the foreground toward the back, is planted with

## DATA

**Aquarium:** Cube Garden W90 x D45 x H60 cm  
**Lighting:** Solar Solar I (NAG-150W-Green) x 3 units, turned on for 10 hours per day over two 90H aquariums  
**Filter:** Super Jet Filter ES-1200 (Bio Rio M, NA Carbon)  
**Substrate:** Aqua Soil Amazonia, Power Sand Special L, Bacter 100, Clear Super, Penac W/for Aquarium, Penac P, Tourmaline BC  
**Additives:** Brighty K, Green Brighty STEP2  
**CO<sub>2</sub>:** Pollen Glass Beetle large 30, 3 bubbles per second via CO<sub>2</sub> Beetle Counter (using Tower)  
**Aeration:** For 14 hours after the light is turned off using Lily Pipe P-4  
**Water Change:** 1/3 once a week  
**Water Quality:** Temperature 25°C (77°F), pH 6.8, TH 20 mg/l  
**Aquatic Plants:** *Rotala sp. "Ceylon"*, *Glossostigma elatinoide*s, *Anubias barteri* var. *nana* "petite"  
**Fish/Invertebrates:** *Hyphessobrycon megalopterus*, *Otocinclus sp.*, *Caridina japonica*

Note: The hardware itemized above represents the author's specific choices; equivalent results may be obtained with other equipment and accessories—Eds.]

*Glossostigma*, which is also tolerant of repeated trimming and can easily be maintained at a short height. Since *manten-seki* stones are placed in the midground to retain the substrate, the commonly used aquatic plants that take root in the substrate cannot be planted. Therefore, some *Anubias nana* "petite" was attached to small stones and placed among the *manten-seki* stones and at the base of the driftwood. *A. nana* can be grown in such places because it has the ability to attach itself to rocks and driftwood with its roots. The family of *Anubias* is sciophytic (grows well in low light) and grows relatively slowly. These plants can be maintained easily without a lot of care. *A. nana* "petite" in particular is small and can produce a natural-looking midground without interfering with the lines formed by branch wood.

This layout, which not only accentuates a sense of depth but also is very easy to maintain, was built by creatively laying the substrate, arranging the composition materials, and planting the aquatic plants in the manner described above. 🐟



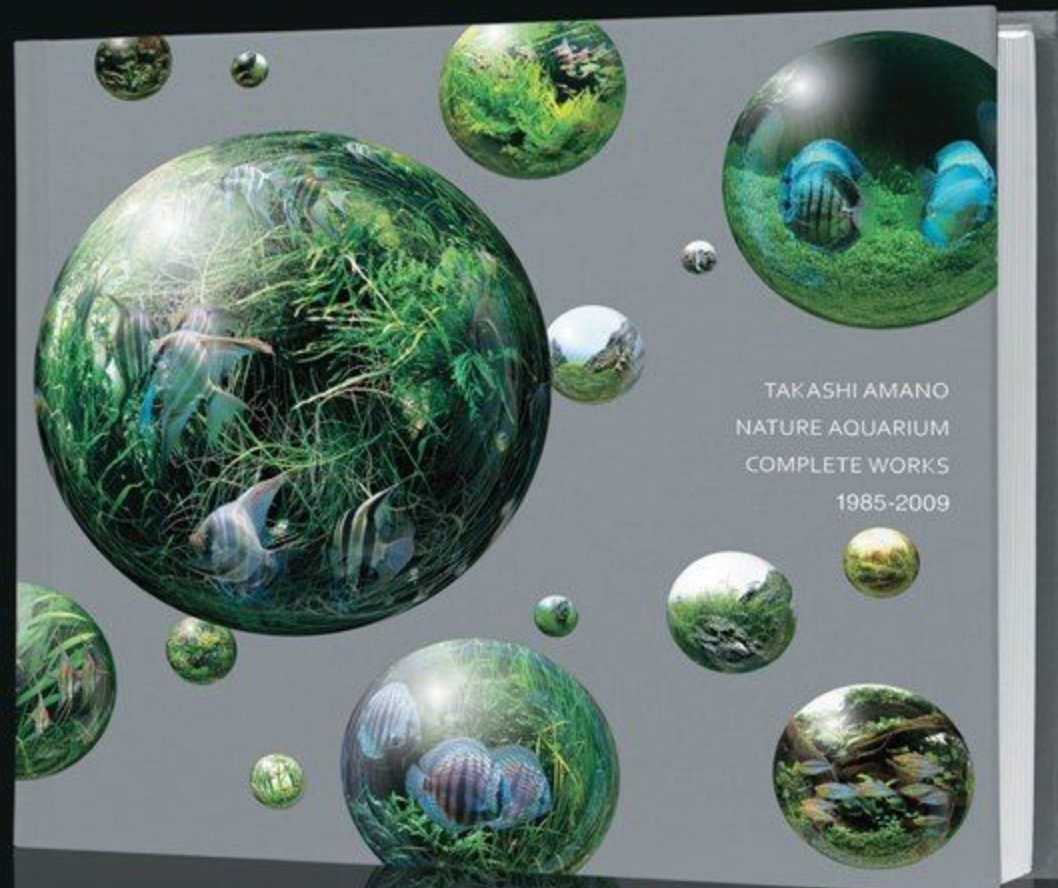
# Aquatic Inspiration at Your Fingertips

***Nature Aquarium:  
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1985–2009***

Takashi Amano

ISBN: 9780-7938-0649-2

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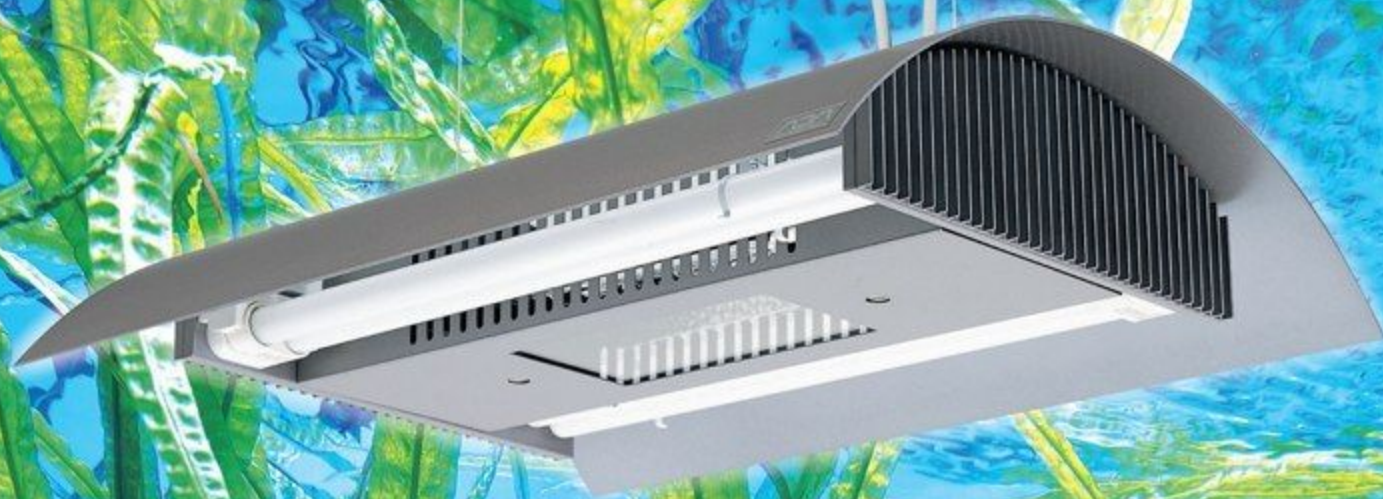


***Nature Aquarium: Complete Works 1985–2009*** showcases the spectacular designs of aquarium innovator Takashi Amano. Inside are more than 200 photos of his lush aquascapes—perfect inspiration for you to try your hand at creating your own. Each photo is accompanied by a full list of the equipment, plants, animals, and water chemistry used to create it. Along with the fantastic images of nature aquariums, Mr. Amano includes entertaining and insightful essays on his design philosophy that will stimulate any aquarist's creativity. This beautiful volume is sure to find a welcome spot in your aquarium library or on your coffee table.



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Lighting is very important for growing healthy aquatic plants. However, red lights used for growing terrestrial plants is ineffective for aquatic plants because red light is unable to effectively penetrate water. On the other hand, blue light transmits very well under water. The reason everything looks blue under water is simply because water acts as a filter to remove the red light and only bluish light can be seen. Therefore, in order to provide light effectively for aquatic plants, it is necessary to use lamps equipped with the blue spectrum. Based on this idea, Aqua Design Amano developed the world's first fluorescent lamp, designed for growing aquatic plants in collaboration with Matsushita Electric Industry Co., Ltd. By focusing on the spectrum of blue light, we were able to promote optimum photosynthesis in aquatic plants while also brightening the colors of both plants and fish. This light was the foundation for all Nature Aquarium lighting, and would lead to the refined development of the Grand Solar. This is indeed, an idealistic light for the Nature Aquarium.

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■ Keyhole cichlid *Cleithracara maronii*.



# Keyhole Cichlids

Arthur Masloski photographs by MP. & C. Piednoir





■ Keyhole cichlids are perfect for planted community tanks.

**F**or cichlid hobbyists scanning the tanks of their local fish store, choosing what species they want can be difficult. Shelves are lined with a wide range of species, from oscars, convict cichlids, and firemouths to their African counterparts the peacocks, haps, laprologines, and mbuna, among others. These species are all well and good, though if you're looking for something small and peaceful, you might be hard pressed to find it.

But there is one drab little cichlid that, if seen, should definitely be considered, and that species is the keyhole cichlid *Cleithracara maronii* from the Orinoco River Basin of South America. The keyhole cichlid is a small and peaceful species that was once among the most abundant cichlids in pet shops, but it has since become scarce with the proliferation of larger, more colorful and aggressive species.

If you are lucky enough to be able to acquire these gems, you won't be disappointed. They present the cichlid hobbyist with a refreshing change from the usual large and aggressive species so prevalent today, and are also a great centerpiece fish for a community or planted setup.

## Description

Unlike most cichlids currently available in the hobby, the keyhole is a relatively

small species. The males only reach about 4 inches, and the females stay generally smaller. They are short and round with an egg-like shape and rounded forehead. Though somewhat drab in coloration, the dark bands that run through the eyes and the keyhole splotch on their sides contrast beautifully with their creamy, golden-brown coloration, giving the fish a very striking appearance. Though the dark spot on the side of the fish can resemble a keyhole, it varies with individuals and in many may only appear as a black spot. Keyhole cichlids are also known for generating a mottled pattern, especially when stressed.

Though many say the sexes are difficult to distinguish, the male is typically larger and seems to have a much more elongate shape and less roundish look than the female. Males also typically have longer, more pointed tips on the dorsal and anal fins.

## Naming

First described in 1881 by Austrian zoologist Franz Steindachner, the keyhole cichlid was initially classified in the genus *Acara* but later switched to *Aequidens* and finally *Cleithracara*, its current genus, of which it is the sole species. The first part of the genus name is derived from a Greek word meaning "lock" in reference to the species' common name. The second part,

acara, is the South American Guarani people's word for a cichlid. The species name refers to the Maroni River, which is where the species was first described.

## Temperament and Behavior

Perhaps the most appealing aspect regarding keyholes is their temperament. As far as cichlids go, they are quite peaceful. A breeding pair will defend their offspring, but they don't endlessly harass tankmates, and their relatively small mouths mean that most community fishes won't be eaten. If you are looking for a cichlid for a community setup, keyholes might just be what you're searching for.

The species tends to be shy as well. When kept alone they're often skittish and hide a lot, but that is characteristic of many cichlid species when they are kept alone. The addition of open-water schooling fish helps bolster their courage and gives them a sense of security. Once they do get over their initial shyness, they are just as personable and fun to watch as their larger cousins. Mine are often up front and center in the aquarium watching whatever it is I'm doing and eagerly anticipating their next meal. Once feeding time comes around, they'll even eat right out of my hand.





■ *C. maronii* has an understated beauty.

## Care and Requirements

Able to adapt to a wide range of water conditions, keyholes are easy cichlids to keep. A temperature between 72° and 80°F is ideal, and pH is not an issue as long as extreme highs and lows are avoided. As for the aquarium itself, a pair of keyholes can live comfortably in a setup between 15 and 20 gallons, and a tank of 29 gallons is excellent for a breeding pair with offspring.

They also do well in community setups. Possible tankmates include cory catfish, medium-size tetras and barbs, and other peaceful small or mid-size cichlids. Even large, peaceful species such as severums may work well, but avoid aggressive species of any size. In my experience they do best in the company of other fish; the constant movement of other species provides confidence and helps bring this otherwise shy species out into the open.

Hiding places also should be abundant. Rocky structures, driftwood, and plenty of plants—fake or alive—help the fish feel more comfortable. Foods should include high-quality flake foods or small cichlid

pellets supplemented with various frozen and freeze-dried foods. Mine even appreciate the occasional treat of dried algae.

## Breeding

Keyholes are well known for their readiness to breed. This is not only what made them so popular years ago but is also what likely led to their more recent decline in availability, as hobbyists sought out other more difficult species. If you do obtain a pair of these fish and wish to spawn them, there is very little you should need to do—just give them plenty of water changes and a varied diet that includes live or frozen foods. Temperature should be kept high, at around 80°F.

When mature and ready to spawn, keyholes will pair up and clean off a flat surface such as a rock or the glass itself. The female will lay about 300 eggs, and both parents will care for the eggs and young. New parents are known to eat their first few clutches but will quickly spawn again shortly after. A pair is often so skittish that they never successfully hatch their eggs, but the spawn can be incubated artificially.

Newly hatched fry can be sustained on a diet of newly hatched brine shrimp and/or commercial fry foods.

## Obtaining Keyholes

Though not as abundant as they once were in the hobby, they are still relatively easy to find and are generally inexpensive. If you have trouble locating these fish in pet shops, try asking the store owner if they can special order the species. If that does not work, there are places online that sell these peaceful little fish.

## A Great Little Cichlid

If you are looking for a great little community fish full of personality or want something different from the large and aggressive cichlids so abundant in the hobby, the small and peaceful keyhole is the fish for you. Hardy, adaptable, and easy to breed, these little guys offer up a refreshing change from the usual. If you run across these cichlids in your fish shop, make sure you give them a try. You won't be disappointed! 🐟





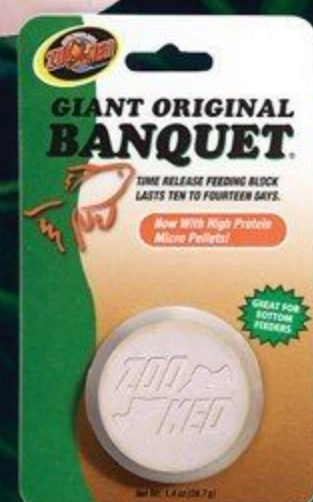
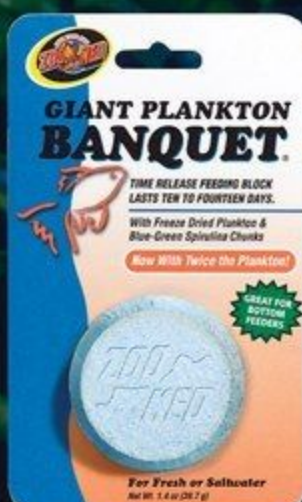
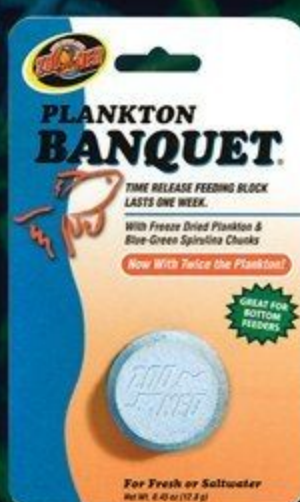
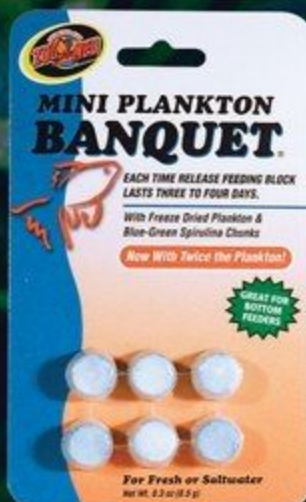
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Abhijit Mitra

# Aquarama 2011

photographs  
by the author

■ Coral tanks comprised some of the most visually impressive displays at the Aquarama aquarium show in Singapore.

**T**he 12<sup>th</sup> biennial Aquarama took place in Singapore from May 26 to 29, 2011. I was expecting a huge aquarium show, but what I actually experienced was almost unbelievable. The pet affair was a blast from the get-go and was definitely the biggest I have ever encountered. Thursday, Friday, Saturday, and Sunday were the trade show and speeches, followed by an absolutely stunning field trip through some of the most amazing fish farms in Singapore on Sunday.

Thursday and Friday were for trade professionals only, but the show was open to everyone Saturday and Sunday. I arrived at around 10 a.m. on Thursday and was immediately hit by shock after I got my badges and realized that sandals weren't allowed. Fortunately, my hotel was not far and I was able to return quickly with proper footwear. This initial inconvenience melted away in a second once I entered the huge hall.

## Inside the Hall

A fish business from Taiwan displayed spectacular freshwater nano tanks with some of the prettiest and tiniest shrimps (Amano, wine, King Kong, cherry, etc.). These also included a variety of small fishes: neon and cardinal tetras, killifishes like *Epiplatys annulatus*, lampeyes, rainbow tetras, dwarf gouramis, and rasboras. There were additionally some apisto species appropriately featured in Java moss or *Riccia* settings.

There were two country pavilions for Taiwan and Singapore, which were both very good with lots of freebies, such as the colorful fish posters of wild bettas, fancy guppies, and freshwater shrimps from the Singapore pavilion. Also impressive were multiple shops from Indonesia, Malaysia, and Thailand, which all had very interesting stuff like picture directories with details of all the fish farms.

There were a few themes that really dominated this year's show, such as the

nano concept (especially freshwater, though there were a few marine nanos), planted aquaria, arowanas, and to some extent bettas, as well as equipment and gadgets. These themes, however, were not the whole show by any means.

## Special Favorites

I first have to mention the institute from Taiwan that is keeping and breeding *Triops*, or tadpole shrimps, which are considered living fossils. Their lineage reaches back to the Carboniferous Period over 300 million years ago, but they have a lifespan of only 90 days. I was really interested to get some, but unfortunately none were for sale at the time.

Then there was the stall with the freshwater stingrays, which were completely black with striking white dots. These spectacular, selectively bred livebearing stingrays are still pretty pricey, but I heard from some breeders from Thailand that as newer variations are produced, the slightly older ones with excellent coloration



become cheaper, and prices will come down considerably as the trend continues.

Next to mention is one of my favorites, the Betta Club of Singapore. This modest yet extremely knowledgeable group of people had some of the rarest and most cherished wild bettas, and they were selling them at very reasonable prices—bigger species like *Betta macrostoma* pairs were going for 70 SGD (about \$60), with smaller species like *B. brownorum*, *B. albimarginata*, and *B. channoides* pairs going for 50 SGD (about \$40). Some species were kept in the stall in a way that made them hard to see, but no matter which species you asked about, they seemed to have it in stock. It was quite an experience to find some of my old favorites right here at Aquarama.



■ The verdant glow of many breathtaking planted setups amplified the show's atmosphere.



■ Shimmering schools of cardinalfish also drew impressive crowds.

The guppy club of Singapore was another interesting stall I encountered on my way to the competitions. They had a very detailed booklet of the genetics of fancy guppy breeding.

## Competitions

The first competition held was for freshwater nanos, and this section was totally dominated by Dennerle GmbH from Germany. Each was different and strikingly beautiful; some had a lush forest look while others looked more like a sandy desert.

Next was the planted aquaria competition, which included many tanks that seemed to be strongly influenced by the Amano style. The one that drew me the most was the third-prize winner, which had a stunning red theme rather than the usual green of the others. The use of *Riccia* was the most striking and creative piece in these aquariums.

Following this, I looked up and saw a stunning display of small glass boxes on the back wall. I got closer and saw that this was the *Betta splendens* competition consisting of different selectively bred varieties of Siamese fighting fish such as giant, black, crown, double tail, and half moon. The only disappointing aspect was that there were only males, as a section of female bettas would have added more glamour and completeness.

Up next was the marine competition, which offered stunning collections of soft and hard corals and anemones, including some of my favorites like brain corals. The fish displayed in these tanks were very diverse, some of which also happened to be close to my heart, such as multiple types of cardinalfish (mainly Banggais and pajamas), hawkfish, mandarins, and different types of gobies and shrimps, as well as blue tangs.

After the saltwater contest, I came to the main fish competition aisles and encountered tanks that housed mighty arowanas. Red, silver, and white, they all showed great colors, row after row. The scale of the arowana competition was literally jaw dropping.

Next came the discus competition, which again featured many different color patterns. Each had its own category and prize, along with a grand prize for the overall winner of the discus section. This was followed by gouramis, which included some really rare types; cichlids such as angels and apistos; livebearers, with one particularly stunning display of fancy guppies from complete black to albino red veiltail to scissortail to cobra; and goldfish, which were again divided into many categories like the guppies, discus, and arowanas. There were also barbs, tetras, and catfishes (primarily *Corydoras* and loricariid species).

## The Presentations

Now that I had seen most of the show, I moved my attention to the speeches, which were really interesting and enlightening. I was most impressed by "Trends in Breeding Marine Aquarium Fish: Where Are We Today and Where Do We Need to Be," by Matthew Wittenrich of the Florida Institute of Technology. This is a fascinating but challenging topic to most fishkeepers, but Matthew very quickly made us understand the difference between demersal and pelagic spawners. We could realize that most of the success in marine fish breeding is among the demersals (58 out of 60), whose fry are a lot bigger and more developed at birth than pelagic ones, so feeding them is easier.





■ *Triops*, also known as tadpole shrimps, are hundreds of millions of years old, but each individual animal only lives a couple of months.

Mathew's research focuses on these pelagic spawners, and the biggest problem, of course, is feeding the larvae. One important approach is to study their gut content in the wild and raise those live foods in captivity. Also important are things like container shape, volume of water flow, etc. The good news is that people are raising copepods, which are the natural food for a lot of these pelagic babies. But then again, out of these many copepods, each species might be eating one or two selected ones based on their mouth size.

In another speech, Julian Sprung was, as usual, very interesting and entertaining with his topic that connected the hobby to other aspects of life. Also notable was Dr. Mini Sekharan's "A Profile of the Indian Ornamental Fish Industry with Special Focus on the Concerns of the Key Players." This presentation was very touching and down to earth, and it revealed fascinating insights like a little village near Chennai (Madras) full of aquarium fish vendors, collectors, and breeders, including one who first bred *Puntius denisonii* in captivity.

It was very nice to see among the presenters Dr. Ng Heok Hee, a very well-



■ Exhibiting beautiful iridescence, goldfish reminded floor goers why they are staples of the freshwater hobby.

known name to lovers of Asian fishes, especially catfishes.

## Going Public

The first two days definitely gave me ample opportunity to take good photographs with fewer crowds in front of the displays, as well as to hear some excellent speeches and come to know some great fish people, and above all to see some amazing fishes.

It was now Saturday, and with the event being open to public, the crowd was a few times larger. I also had my family with me, so my approach was much more casual. It was another very interesting day. Some of the highlights were finding a poster of all ornamental fishes of India from the one and only Indian stall, and buying my first fishes in the show—a pair of *Betta brownorum* and *B. albimarginata*.

Speech-wise, the tadpole shrimp one was interesting, but what drew me the most was the talk by Dr. Nuno Simões, "The Biology of Seahorses and Its Implications for Aquarium Keeping." Dr. Simões told us that enriching the newly hatched brine shrimp with DHA, keeping them in green water with proper salinity, and using a circular chamber to prevent gas bubble disease increases baby seahorse survival to near 100 percent.

I was already completely content with the show and in my heart knew this was the best fish conference ever, offering maximum variety and quality at an affordable price.

So when I went back early Sunday morning for the field trip, I did not have much of an expectation or agenda. But although I thought it would simply be a relaxing bonus, it turned out to be much more.

## The Field Trip

One thing that impressed me was the number of countries the attendees of this trip came from. Before it even started, I was talking to folks from the Philippines, Japan, Norway, Israel, and Thailand. Right around 9:20 a.m., two buses left from the Suntec Convention Center for the northwest part of Singapore and the Lim Chu Kang Farms.

Our first destination was Raffles Arowana Pte Ltd. The first thing we saw was a tank featuring a foot-long father swimming along with his whole clutch of close to twenty 2- to 3-inch fry, some of which still had yolk sacs. The farm seemed huge, with its impressive amount of land for outdoor tanks and indoor facilities. The most interesting display was two males that were anesthetized and had their babies taken out. Within 30 minutes, they were taken back into their fathers' mouths.

The next stop was Apollo Aquarium Pte Ltd, a guppy and tetra farm. This place was unique, having huge vats full of neon tetras. Some of them also had plecos. This was an outdoor-type facility where the fishes are kept as a first quarantine. Toward the back I saw honey gouramis, lots of guppies, lots of



botia loaches, as well as dwarf puffers and many other interesting species in a fairly basic setup.

From there we went to Apollo's Export Centre, a truly high-tech facility. The owner explained the setup to us in detail. Their researchers have come up with a very accurate way of measuring nitrogen compounds in the water, which is always a big challenge. Packaging the fish for shipping is mechanized, from moving the fish through cleansing baths to being machine packed. They are also experimenting packing the fishes in cooled water (20° to 22°C [68° to 72°F]) with Japanese microbubble technology, where each bubble in the bags contains ozone and oxygen. The aim is to make the rate of the bacteria growth so slow that fishes can remain in that bag for 60-plus hours. They have achieved up to 72 hours, and if they can go up to 80 hours, they will be able to reach many more marketplaces in the world. Also notable is that they are trying to do condensed packing through this, which means freight will be less for the same amount of fish. This is extremely important, as freight is what mainly raises costs in the aquarium fish industry and jacks up fish prices.

We then went to the fish house, which was simply unbelievable considering the condition, variety, and number of fishes. Strict hygiene is maintained with proper temperature, separate nets for each tank, overall cleanliness, etc. The tanks also have very specific architecture with stainless steel and PVC pipes, which helps in infection control. Despite the prevalent reputation of Singapore guppies, their guppies are free of any contamination.

Our next destination was a marine farm, Coral Farm Aquaristic Pte Ltd. This is another unbelievable place with a magical collection, and it appeared to have every type of major reef fish or invertebrates. From pink and yellow frogfish to moray eels to octopus—you name it, they had it.

The next stop was also our lunch stop. Qian Hu Corporation is an ornamental fish company so big that it is listed in the stock exchange. Their collection is all open for sale to the public and really contained some of my hot favorites, like the little sparkling or croaking gourami and adult-size clown loaches. I will definitely revisit this place again. The lunch was also sumptuous and appetizing. Here I met my old friend, a serious birdkeeper/breeder, Debashish



■ Always striking, the emperor angelfish *Pomacanthus imperator* had no problem attracting attendees.

Mukherjee, a dentist from Calcutta, India, who is also interested in fishes. All through the conference I missed my friend Andrew Rao from Calcutta, who was my guide for collecting fish in Bengal (TFH Magazine October and November 2006), so running into Debashish and his friend helped fill the void.

The next and last stop was Sanyo Aquarium, which is a futuristic export facility of the highest order. They have a very scientific way of building the tanks. Also notable is their control of bacterial growth by providing water ditches that wash the tires of incoming trucks.

## Sunset

The sun was setting, and we were on our way back to the Suntec Convention Centre. During the return trip we listened to a speech on nano aquariums by Stefan Walter, who was very informative and enjoyable with his dry German humor. Meeting up with my family, I rushed in for a last glimpse of the magnificent convention. Last but not least, I paid another visit to the Betta Club to grab a pair of *Betta channoides*.

Singapore is arguably becoming the aquarium hobby center of the world. Located in one of the most biologically



■ Freshwater Nano Tank 1st-Prize winner; contests are a very exciting part of the Aquarama experience.

diverse spots right in the middle of the Indo-Pacific, this area features a majority of marine trade animals and a significant portion of freshwater ones. Thus, Singapore has a big location advantage. The clean, modern, efficient infrastructure and the equatorial climate also aid in its becoming the ornamental fish capital of the world.

Aquarama is over, but it got me started on my fish hunts during my stay in Singapore...and maybe beyond, into wild collection and farm trips to Thailand, Malaysia, and Indonesia! 🐟



■ Royal pleco *Panaque nigrolineatus*.

Mark Denaro

# Royal Plecos

**T**he genus *Panaque* includes a number of species that are sought after by aquarium hobbyists. These range from the clown pleco *P. maccus* to the blue-eyed pleco *P. suttonorum*, which was previously thought to be extinct in the wild but is now being imported again at very high prices. Of particular interest to aquarists are *P. nigrolineatus* and several related species collectively referred to as royal plecos. These large, boldly patterned fish are quite popular in the hobby, and most of the information presented about royal plecos is applicable to the other members of the genus *Panaque* as well.

## A Regal Lineup

As with humans, the vast majority of plecos are neither regal nor royal, so consequently, you may be wondering which plecos are royal. The fish considered to be the original royal pleco, *P. nigrolineatus*,

has been imported since the early 1980s—before the explosion in popularity and availability of loricariid catfish—so it is a venerable, familiar species to long-term hobbyists. It was originally described based on specimens collected in Venezuela and Colombia, but closely related forms are wide-ranging with many of the best-known L numbers (loricariids that have not yet been given a scientific name are given an “L” designation) coming from eastern Brazil.

*P. nigrolineatus* is sold as L27a or L190. L27, the gold-line royal pleco from the Rio Tapajós, previously thought to be a regional variant of *P. nigrolineatus*, was described as *P. armbrusteri* in 2010. The royal plecos from the Rio Tocantins and Rio Xingú should be referred to as *P. cf. armbrusteri* at this point, indicating that they seem to be a color form of *P. armbrusteri*. Subsequent study may

determine that these are valid species in their own rights. They are both sold as L27b in the trade, so it is important to learn the collection location prior to purchase if you want to know for sure which one you are getting.

The thunder-line royal pleco is sometimes sold as L27 or L27c and may be the most strongly patterned and visually appealing of the royal plecos. The Colombian L191 is similar in appearance to the previous two species and has not yet been scientifically described. It is typically imported as a juvenile, at which time it sports a white band in the caudal fin, leading to one of its common names, the white-tailed royal pleco. It is also sometimes called the dull-eyed royal pleco. L330, another Colombian species, is referred to as the spotted royal pleco or the watermelon pleco, and is generally known as *P. cf. nigrolineatus*.



The Peruvian royal pleco *P. titan*, known as L418, the Peruvian green royal pleco, or the champupa pleco, has a juvenile pattern very similar to that of L191, but the adult is much more drably colored. It inhabits the Napo River drainage in Peru and Ecuador. The papa royal pleco, L90, also hails from Peru. It develops very long extensions from the top and bottom of the caudal fin, making it one of the more striking royal plecos. The third member of the Peruvian contingent is the black royal pleco *P. schaeferi* or L203, which also has a white area in the caudal fin in juveniles but a less distinct pattern on the body than the other royals. It has the distinction of being the largest member of this group, growing to approximately 24 inches in length, which gives rise to its other common name of Volkswagen pleco, while the other species and variants generally max out in the 15- to 16-inch range.

## Feeding Habits

Royal plecos and other *Panaque* species have evolved to feed on submerged wood and the various organisms and detritus present on the wood. Their teeth are shaped almost like a woodworker's tool or can be described as spoon-shaped. They are larger at the tip than at the base. The dentition, combined with the strong maxillary (jaw) muscles enables these fish to scrape wood in the wild and in the aquarium.

On the surface, it seems very simple to say that these fish eat wood as a large part of their diet. The reality, though, is that they are feeding on the wood and everything that comes with it, including bacteria and fungi that are working to break it down. These play a key role in the diet and should not be overlooked. They may also feed on plant and other detritus that is present on the surface of the wood.

These factors should all be considered when planning a menu for these fish. Driftwood should certainly be present and available, and several different types of driftwood should be included in the aquarium, as some are more easily ingested than others. In addition, a broad range of other foods should be offered. Royal plecos will eat algae-based foods such as wafers and flakes but will also accept meatier foods in the form of pellets, tablets, wafers,



■ The thunder-line royal pleco, also sold as L27 and L27c, is famed for its beautiful pattern.



■ The Peruvian green royal pleco *P. titan* hails from Peru and Ecuador.

frozen, and flakes. Offering a varied diet is one of the real keys to success over the long haul with royal plecos.

## Aquascaping

Because the fish will rasp any wood present in the aquarium and need that in their diet, driftwood should be the primary focus of the aquascape for royal plecos. They will almost always prefer to hang out on or under driftwood, so the addition of lots of wood is beneficial to the fish and should be aesthetically pleasing to the aquarist.

One issue to beware of when creating a habitat that includes a lot of wood

is the creation of dead zones in the tank where there is little or no water flow. Because these are fish that grow large and produce copious amounts of waste, excellent filtration is a must. High flow, efficient power filtration is best. Supplementing the filtration with the addition of one or more powerheads will help to avoid any dead zones if they are carefully positioned. Powerheads will also help to keep waste and detritus in suspension long enough for the power filters to remove them.

Creating a jumble of driftwood that represents a point in a river where fallen trees have collected will help to





Leighton Lum

■ The papa royal pleco develops extensions on the top and bottom of the caudal, making it one of the more striking species in the trade.

provide hiding spots for more than one fish if you intend to keep a group. The royals don't tend to hang out in open-ended caves like their smaller brethren *Hypancistrus* spp., so the addition of clay caves is not necessary. They have a bad habit of rasping holes in plant leaves, so plants should probably be left out. Similarly, they will rasp holes in plastic or silk plants too, and their ingestion of these pieces can lead to intestinal blockages and other issues, so artificial plants should also be avoided.

### Setting Up a Royal Pleco Tank

By not using plants, it is possible to use lower lighting levels, which will make the plecos more comfortable and therefore more active, so you'll get more enjoyment from watching the tank. Despite the fact that many of the royals come from soft, acidic water, I have universally found that they do better in basic, moderately hard water in the aquarium.

If your water source is soft and acidic, you can buffer the pH and add to the hardness by adding a mesh bag filled with aragonite to one of your filters. If this doesn't work in your power filters, you can always add a box filter filled with aragonite and hide that somewhere in a rear corner behind some driftwood. Depending on the type of driftwood you are using, the tannins released may cause the pH

of the tank water to drop precipitously when lots of wood is used, so adding some aragonite is probably a good idea in general for this setup. The problem of tannins lowering the pH can actually get worse over time because their scraping of the wood will continuously expose new layers of driftwood to the tank water, so the wood will continue to release tannins.

Regular partial water changes are a must for these fish: 25-percent weekly water changes along with vacuuming the substrate and siphoning out any debris that may be stuck on the wood is a good basic maintenance plan. Temperatures should be in the upper 70s to low 80s F.

Due to their large adult size, the ideal aquarium for royal plecos will be at least 125 gallons and preferably larger. I prefer to use tanks that are at a minimum 24 inches from front to back so that even full-grown fish will have room to turn around. That said, many royal plecos can be purchased at sizes of 2 to 4 inches, so it is possible to start them out in tanks as small as 40 gallons. The breeder tanks that are 18 inches front to back work well for these smaller specimens. If you do start with a smaller tank, remember the size that these fish can reach and be sure that you can adequately house them as they grow. It is not fair to the fish to keep it in a tank that is too small and in which it may barely be able to move.

### Tankmates

Since these catfish have a low daytime activity level, adding some other fish to the tank will provide more movement and will add visual interest for the observer. Tankmates need to be matched well to complement the plecos, so give this some real thought prior to making a purchase. One factor to consider is the level in the water column that the potential tankmates inhabit. The plecos will spend their time on the substrate or on the driftwood and will occupy the lower levels of the aquarium, so think in terms of fish that will be active higher in the water rather than those that hug the substrate.

Adding other species that tend to hide a great deal will not add anything to the overall visual effect of the aquarium, so active species are preferred. Royal plecos and many other loricariids can be easy targets because they are relatively slow moving. Therefore it may seem obvious, but fish that have a tendency to nip fins should be avoided. Species that do best in brightly lit, heavily planted tanks are also poor candidates.

### TETRAS

Assuming that the choice will be made from species that come from the same geographical areas, mid-sized to larger tetras are probably the best choices. Species that will work particularly well include the various *Hemiodus* and *Chalceus* species. These are peaceful, active fish that grow to



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Hristo Hristov

■ The teeth of royal plecos are specially shaped for scraping the surface of submerged wood.



Hristo Hristov

■ The gill covers of royal plecos are easily identified by their distinctive spines.

3 to 8 inches in length, making them well suited to the larger aquaria that should be used for the royals. Both of these genera are accomplished jumpers, so their tanks must be tightly covered.

*Moenkhausia agnesae* is harder to find but would make a wonderful addition to the royal pleco aquarium. This mid-water schooling tetra is deeper bodied than members of the two previous genera and is attractively patterned.

#### OTHER CHARACINS

The various headstanders of the genera *Abramites*, *Anostomus*, and *Chilodus* are

also good choices. Of these, *Abramites hypselonotus*, the marbled headstander, is a particular favorite of mine.

Because plants should not have been included as part of the aquascape, various silver dollars are also potential tankmates. If you choose to add silver dollars, be careful to ensure that the plecos get enough food, as the silver dollars will relish the food fed to the plecos. Feeding the plecos at night after all the lights are out, including the room lights or just prior to turning out the room lights, can give them the upper hand in finding the algae and vegetable-

based foods that the silver dollars might find more easily in brighter light. Obviously, your choices are not limited to these species but include most of the characins and related families.

#### CICHLIDS

A number of cichlids are suitable as well, but many of them may pose some difficulties at spawning time when they may attempt to keep the royals out of their territories and away from their eggs and fry. Still, as long as they are not particularly aggressive, things should work out okay and the royals may well get a free meal of eggs or wrigglers, as the parents may not be able to push them away.

One cichlid that works particularly well is the festivity *Mesonauta festivus*. It is peaceful and active up in the water column rather than near the substrate like most other cichlids. Angelfish also work well, with a preference for wild angels. Domesticated angels will spawn too frequently, and their territoriality at these times can be a nuisance. Wild angels are seasonal spawners and don't spawn as readily as their tank-raised cousins, so they are a better choice. Wild angels also display more complex behavior than the average domesticated strain.

#### PREDATORY FISH

Another option will be to add predatory species so that each species can be fed specifically and the hobbyist will not need to be concerned about more active fish getting the lion's share of the food intended for the royal plecos. While their inactive nature violates my previous advice, a group of leaf fish *Monocirrhus polyacanthus* would work very well in a setup such as this—but remember that leaf fish are very challenging and almost impossible to wean off a diet of small live fish.

#### A Royal Display

Next time you are trying to decide how to stock a large aquarium, be sure to consider adding a little pomp and circumstance to your life by trying your hand with some royal plecos. If you're looking for something a little different from the typical community tank, this group will reward your decision with interesting patterns and behavior. 🐟



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# Catching Fish

■ Some curious onlookers joined the author's companion Wolfgang to help catch killies and baby cichlids in a swampy branch of the river.

## in the Kafue River

Lawrence Kent

photographs by the author



**Z**ambia is in the heart of southern Africa, situated just west of Angola, east of Malawi, north of Zimbabwe, and south of Tanzania and the Democratic Republic of the Congo. Most aquarists who visit the country head straight to its northern province to visit Lake Tanganyika, famous for its wide diversity of endemic cichlids, many of which have become mainstays in the aquarium hobby.

My visit to Zambia was different. It was for work—a corn breeders' conference in the capital Lusaka—and I didn't have enough time to make the 600-mile trek to see the famous lake in the north. Instead, I made use of my only free afternoon, a Sunday, to travel 35 miles south of Lusaka to the Kafue River to see what tropical fish might happen to live there. The Kafue is not as big or famous as the Zambezi River, which also passes through Zambia on its way to Victoria Falls, but it's a significant river and easy to reach.

I traveled with a German crop breeder named Wolfgang, who told me he'd never caught a fish in his life, despite several fishing trips back home in Europe. Our taxi took us past corn farms, sweet potato fields, and little mud huts before we reached the bridge that crosses the river. We pulled over and parked in a dirt lot. Nearby was a snack bar with dozens of Zambians drinking beer and soda, enjoying a lovely Sunday afternoon by the riverside. A group of girls carrying enamel bowls approached us and asked if we wanted to buy something delicious, pulling back the burlap covers to reveal piles of dead fish that they called tilapia. These deep-bodied fish were big and meaty, with dusky red fins and pink bellies. They were almost certainly the pink bream *Sargochromis giardi*—not an aquarium species, but probably tasty. Our driver bought some for his family.

### Just Small Stuff

I took my bucket and seine net out of the trunk and started to look for the right spot. The river itself was too big and deep to use this type of net effectively, so we needed to find a smaller branch or swamp. It didn't take long until we found one 100 yards upstream. At its intersection with the main channel was a traditional fisherman sitting in a dugout canoe. "What have you caught?" I asked.

"Nothing, just small stuff," he replied. I love it when fishermen say that, because it usually means they have the types of fish that aquarists like. He handed me a small plastic bag.



■ The author caught fish in Zambia's Kafue River that ranged from tilapia to tetras.



■ Hand-netting brought forth killies that were likely mesh-scaled topminnows *Aplocheilichthys hutereaui*.

I pulled out the fish one by one, all of them cichlids. They were alive, but barely. The first was about 9 inches long, olive green, with red margins on its dorsal and caudal fins. To identify it, I consulted the field guide that I'd brought along with me. At first I thought the fish was the green bream, but upon closer examination of its anal fin, I noticed it had the rows of pink eggspots with orange centers characteristic of the Kafue bream *S. mortimeri*. This species is found in both the Kafue and the Zambezi river systems. It is a maternal mouthbrooder.

The second cichlid was more beautiful, with a turquoise face, yellow operculum, and olive-yellow flanks crossed by seven vertical bars. Its caudal fins were black with long elegant extensions. I wasn't sure if it was a rainbow bream *S. carlottae* or a banded tilapia *Tilapia sparrmanii* because these two fish have similar descriptions, and both have been

reported to live in the Kafue. Later I emailed a photo to African cichlid expert Ad Konings who said, "Looks like *Tilapia sparrmanii*, but I'm no specialist in extra-lacustrine [non-lake] cichlids." I think his guess is likely better than mine. *T. sparrmanii* stays relatively small and probably would make a good aquarium fish.

The third fish was, for me, the most interesting, because it looked like a member of the *Harpogochromis* genus, one of the genera of cichlids found very far away in Lake Victoria, where I've collected before. It had the same torpedo-like body, predatory look, and huge open mouth. What was it doing here?

Later that day I emailed a photo of the fish to Greg Steeves in Texas, who is a specialist in the haplochromine family of cichlids to which *Harpogochromis* belongs. Greg wrote back quickly, explaining that I'd misidentified the fish—it was most likely a *Serranochromis*





■ The author decided this was a Kafue bream *Sargochromis mortimeri* on the basis of its rows of pink, orange-centered eggspots.



■ The weedier sections of the Kafue River hid *Brycinus lateralis*, silvery tetras offering a nice combination of black and yellow.

species. I studied my book, counted the spines in the fish's dorsal fin, noted its straight head profile, and decided it was most likely *S. macrocephalus*, also known as the purple-face largemouth. According to Skelton, this cichlid preys on small fish, including mormyrids and barbs, which it takes at the river's bottom. It can reach a foot in length.

## Into the Weeds

It was time to wade into the swampy river branch and try out the seine. I hesitated briefly because of my concerns about schistosomiasis (a disease that can be contracted in Africa's stagnant water) but soon was thigh-deep in the water, holding one side of the 10-foot seine while Wolfgang held the other. The deep mud made it difficult to move quickly, but we were able to hold the bottom part of the net down on the substrate while sweeping it through the weeds. Three Zambians jumped in and helped. Within a few minutes we were catching dozens of little fish, which I put into a bucket on the bank.

Once we had enough, I moved some of the fish into a small glass photo tank that

I'd set up on a cinder block wall near the river. Most of the fish were very young cichlids, only ½ inch long, but identifiable as tilapines because of the telltale tilapia spot on the base of their dorsal fins. Because they were so young, I couldn't tell if they were *Tilapia sparrmanii* or maybe *T. rendalli*, both of which are found in the Kafue. I considered bringing a few home so I could raise them up large enough to identify their species, but unfortunately the four I put into breathable bags perished within a few minutes.

Wolfgang used a small hand-net to scoop a second group of fish out of the bucket and deposit them into the photo tank. These appeared to be some sort of killifish. Each was only an inch long, with a translucent yellowish body and iridescent blue reflections emanating from its scales. The upper irises of this fish's eyes were turquoise blue, like those of a lampeye.

With the help of a friend in St. Louis, Mike Hellweg, we later identified these killies as the mesh-scaled topminnow *Aplocheilichthys hutereaui* or a very similar

undescribed species *Aplocheilichthys* aff. *hutereaui*. Sooty pigment on the edges of this fish's scales give it a faint mesh or chain-link appearance, which in combination with its eyeshadow and an iridescent spot behind its operculum give the fish a handsome, but not spectacular, look. Mike explained that the males have yellow fins while the females have clear ones. The two pairs that I bagged up and brought home are currently in a tank in my basement, hopefully laying eggs.

## Under the Bridge

Our new Zambian friends suggested we try a different spot, so we walked under the bridge and waded into the Kafue itself. We could only venture about 8 feet from the bank before the river became too deep for us to stand. We could see green cichlids swimming among the rocks near our feet, probably more Kafue bream or banded tilapia, but they were too clever to be netted. A crowd of 25 Zambians gathered on the bridge to look down on our activities, laughing with glee each time we stumbled and slipped in the river.

We gave up on the open water of the main channel and started sweeping our seine through the weedy area adjacent to the bank. This resulted in the capture of an African walking catfish *Clarias* sp. and a handful of interesting tetras.

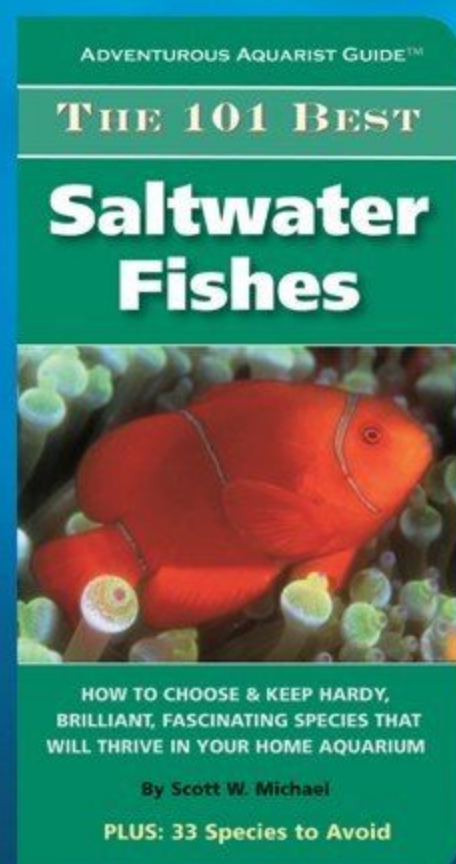
African tetras are generally not as colorful as their South American counterparts and are less common in the aquarium hobby. Congo tetras and jellybean tetras are two exceptions. The ones we caught were a species known as the striped robber *Brycinus lateralis*, which to my knowledge is not yet available to aquarists in the United States. These tetras were silvery in color with yellow adipose fins and deeply forked tails adorned with a distinctive black dash surrounded by a yellow cloud. I bagged up a couple of small ones, hoping they might be a pair.

It was time to go. Our legs were covered with insect bites and cuts from sticks in the weeds, but we were happy with our brief adventure. We paid a few tips and drove back to Lusaka. As we got out of the taxi in front of our hotel, a scientist from the corn breeders' conference spotted Wolfgang and asked if he had caught any fish. "Nothing, just small stuff," said Wolf, winking and smiling with satisfaction. 🐟

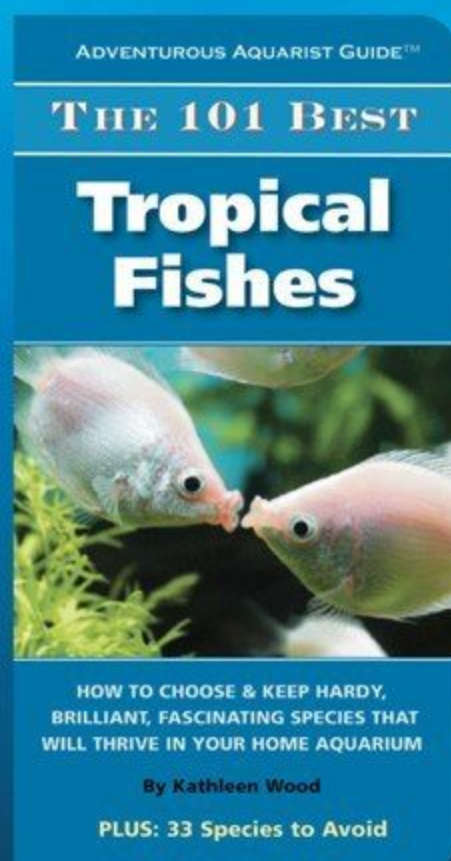


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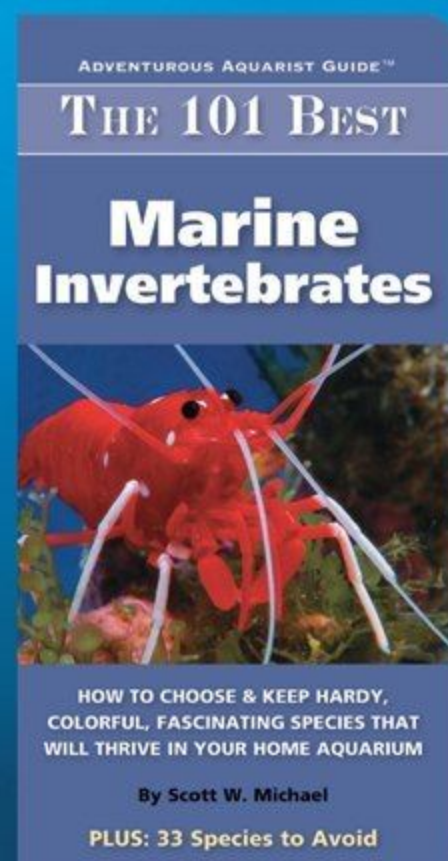
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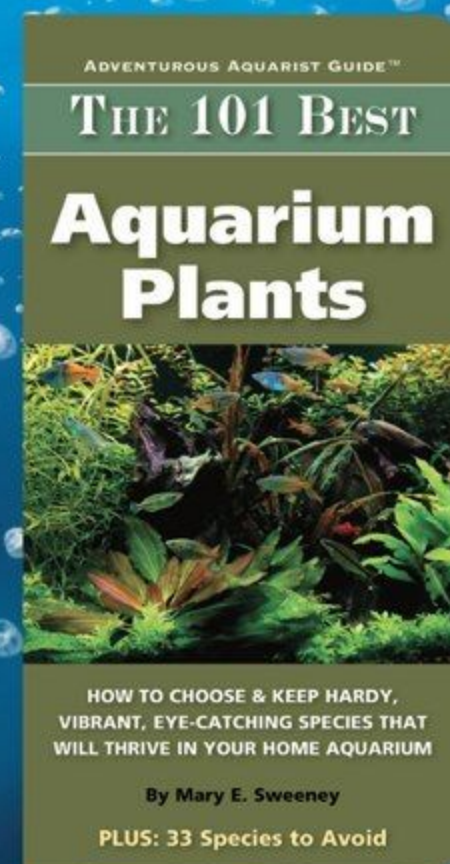
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# The Atlantic Chalk Bass



## *Serranus tortugarum*

**Edward A. Jackson**

Dave Reubush

**T**he end of 2010 marked my tenth year in the hobby, and even in that relatively short time, I've seen an enormous amount of positive change and advancements in all aspects of the hobby and trade. From the wider implementation of macro-algae refugiums to the employment of more energy-efficient lighting systems such as LEDs, plus the continued advancement of aquaculture—even with animals many believed were impossible to raise in captivity—these advancements have made our hobby more ecologically sound and self sustaining.

There are, however, some bad practices that continue to trend despite widely available information.

It amazes me that certain animals still remain staples in the trade. For example, amateur aquarists are still regularly dabbling with the likes of Moorish idols, cleaner wrasses, and *Goniopora* spp. The list could go on to the point that it depresses me, so I won't continue.

Likewise, I am also amazed that certain animals that are prime candidates for the ornamental trade—both because they can be collected in a sustainable manner and

that they tend to succeed in aquariums—continue to remain on the fringes of the hobby. While a cynical person might accuse suppliers of greed, I believe this is more an issue of ignorance than one of maliciousness, even if economics play a role.

Many aquarists do not know what animals are most appropriate for their tanks and therefore do not request them from their retailers. This creates a vicious supply-and-demand cycle where importers continue to order less-than-ideal choices from exporters because the demand remains for them. In short, your local dealer does



not stock animals because people do not ask for them, and because of the lack of knowledge among consumers, people don't know to ask for them because they never see them. See the problem here?

One ideal species that in my experience continues to suffer from this unfortunate conundrum is *Serranus tortugarum*, the chalk bass. It's attractive, small, easy to collect, a good shipper, a hearty eater of most prepared aquarium fare, compatible with a multitude of other fish and invertebrate life, and vastly underutilized in our hobby. (A note to significant others: It's pretty cheap too!)

## In the Wild

A decidedly Atlantic species, the chalk bass has a wide distribution in that ocean, hailing from Florida's eastern coast to the Bahamas, Virgin Isles, even Honduras, though its largest populations are in



Dave Reubush

■ The small size and resilience of chalk bass make them a great choice for beginning fishkeepers.



Dave Reubush

■ Chalk bass are relatively shy upon introduction, but proper feeding and subdued lighting will persuade them to come out into the open.

Caribbean reefs. It has a wide distribution within the reef as well, inhabiting depths of 35 to 1310 feet. They are typically found in close association with the benthic regions of the reef and substrate, not too often daring into open space due to their diminutive size and quickly retreating from would-be predators into the nearest possible crevice or empty seashell.

While singular specimens are seen, they are social animals typically occurring in loose groups or schools with a distinct pecking order. *S. tortugarum* is synchronously hermaphroditic, meaning

they maintain both male and female reproductive organs simultaneously, but as far as we know they cannot self fertilize. This species is a zooplanktivore, though larger specimens have been known to consume crustaceans that they could fit whole in their mouth. Mature adults can reportedly reach a maximum size of just 3 inches in the wild, though 2 inches is much more common.

The appearance of this fish varies greatly depending on the type of lighting it's viewed under and its environment, as its pigmentation changes slightly to help

camouflage the animal. Typically they are a vibrant blue to turquoise, with the dorsal divided by black or burgundy stripes.

## Selection

This is an extremely resilient animal that is highly suitable in adapting to captive environments, and healthy specimens have very little trouble doing so. Once they've overcome the shock of the initial transition and their natural predisposition to be reclusive, they should quickly begin accepting prepared foods. I would wait until this animal has been in a dealer's tank for upward of two weeks to be safe, as those that succumb to the rigors of poor collection should be expunged from the group by that point. Avoid specimens that are emaciated or have visible contusions and injuries. Also be sure to ask your dealer to offer it food in your presence, and shun those specimens that seem uninterested.

If you plan to keep more than one *S. tortugarum* in your display, it's best to purchase them in groups of three or five that were collected together. They should be quarantined together and added to the display simultaneously to avoid aggression and rejection.

## Captive Care

### ACCLIMATION

It's quite normal for *S. tortugarum* to be reclusive when first added to the home aquarium, retreating into whatever





Bob Fenner

■ The pigmentation of *S. tortugarum* may change depending on lighting and other environmental conditions.

shelter you make available to them. You can encourage them into the open by utilizing a subdued lighting scheme initially and offering live *Artemia* or mysids to encourage natural feeding behavior. Chalk basses are also very likely to jump during this initiatory phase to new surroundings, so you may want to consider employing a hood or cover at least for the first few weeks.

### HABITAT

*S. tortugarum* and members of the *Serranus* genus generally make great additions to biotopic displays of the tropical Atlantic. Their relatively small size makes them ideal for smaller or even nano marine aquaria—if keeping a lone specimen. If you plan to keep them as a group, allow 15 to 20 gallons per individual. Providing protection via some form of shelter, preferably live rock and larger seashells, is a must for the chalk bass in order for them to thrive. While you should keep a regular regime of water changes and utilize other forms of nutrient export such as a protein skimmer, established *S. tortugarum* are typically very tolerant of water quality that temporarily lingers outside of proper parameters, making it ideal for beginners.

### FEEDING

*S. tortugarum* will readily accept a wide variety of prepared captive fare.



Bart Hazes

■ *S. tortugarum* are often incompatible with other members of its genus, but they will get along with other similarly sized, unaggressive fish species.

Being mainly zooplanktivores, they will prey on the naturally occurring live microfauna found in most reef displays or aquariums employing the use of live rock. A variation of finely chopped meats of a marine origin should also be offered, including but not limited to mysis, krill, squid, as well as other bivalve and crustacean meats. Established specimens should eventually accept more convenient dried fare, as well as pellets and flakes with high protein content.

### DISEASE/INJURY TREATMENT

Like their other larger cousins within the family Serranidae, this species is hardy and resilient against most protozoal diseases and bacterial infections. When you quarantine before introduction to the main display, add PVC pipe or some other form of inert shelter during their stay.

### COMPATIBILITY

Excluding conspecifics and congeners (members of the genus *Serranus*), chalk bass are compatible with a wide array of other fish. Of course, you must avoid tankmates that will consume or harass them. This includes all predators such as lionfish, triggers, and larger basses. In close quarters (smaller aquaria), aggressive damsels, including clownfish, should be added with extreme caution. On the other hand, *S. tortugarum* is safe with sessile invertebrates and larger crustaceans, but

hungry or curious adults may attempt to consume smaller shrimp like the anemone shrimp *Thor amboinensis*.

### Ask for a Sea Bass

Easily attainable if you know to ask for them, these miniature sea basses are a great addition for veteran and first-time aquarists alike. One of the more obvious examples of animals underrepresented in the ornamental trade, the lack of promotion given to the chalk bass is frustrating as nails on a...well, you get the idea! 🐟



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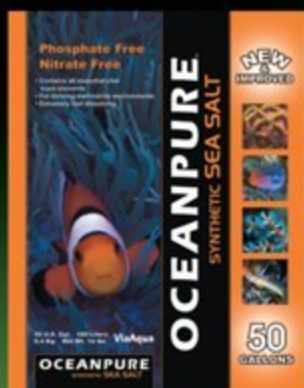


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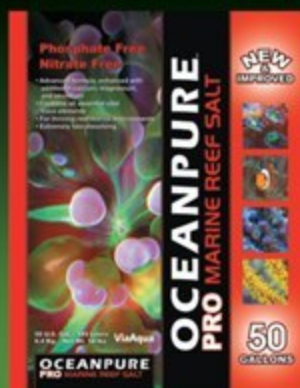
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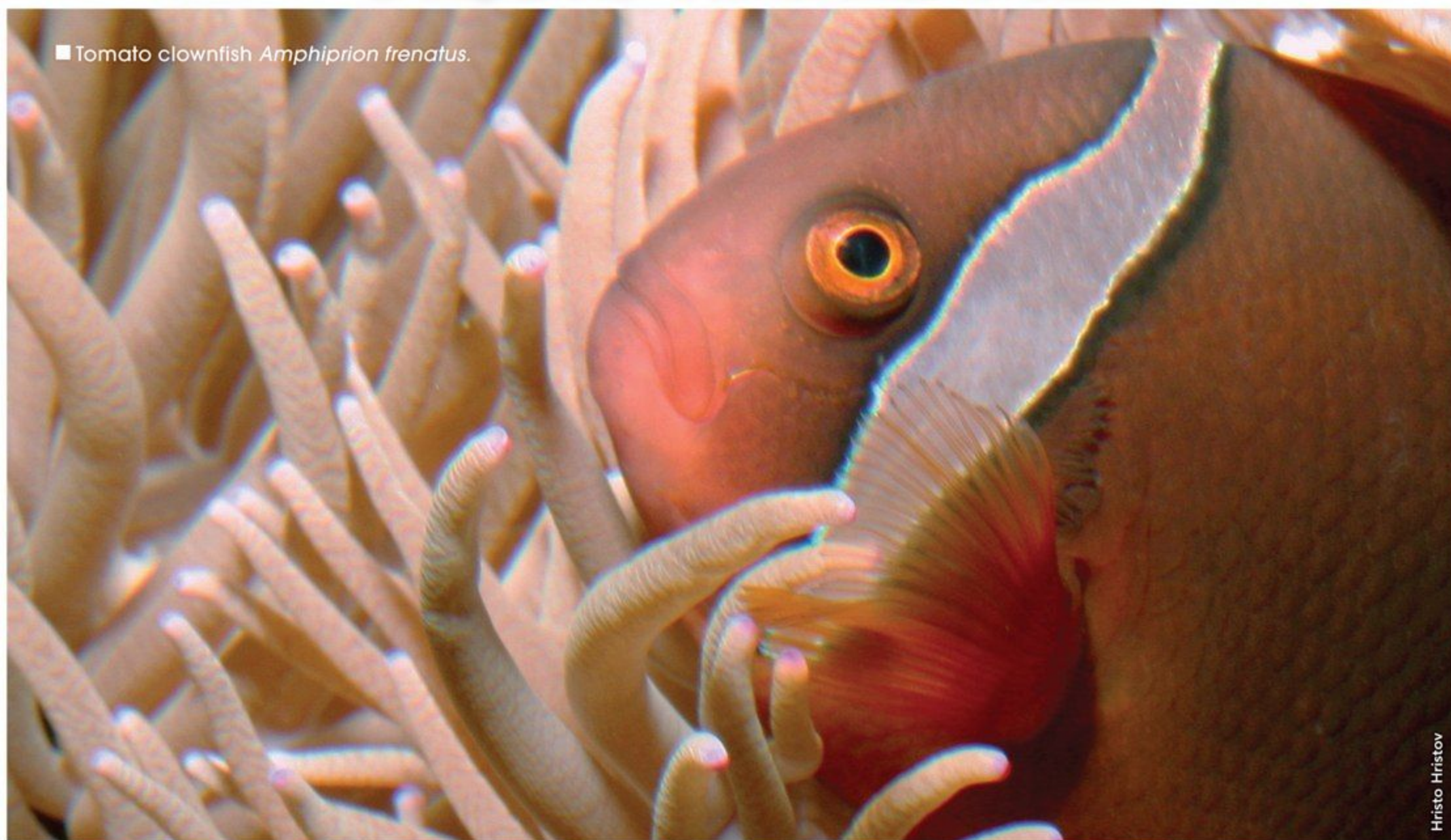




Aquarium Science:

# Captive Breeding of Tomato Clownfish *Amphiprion frenatus*

Kochi Madhu, R. Madhu, G. Mathew, and T. Retheesh  
photographs by the authors except as noted



**A***mphiprion frenatus* (Pomacentridae, Amphiprioninae) is commonly called the tomato clownfish because of its attractive, bright, tomato-red coloration. The fish shows variation in the banding pattern between the juvenile and adult stages. The adult is tomato red in color with a black patch on the sides (generally seen in females) and one white vertical stripe just behind the eyes, joined over the head. The juveniles are dark red with three vertical white bands on the head, body, and tail, and they have black pectoral fins.

Being protandric hermaphrodites, the females of this species are larger, from 120 to 140 mm (4¾ to 5½ inches). Males are much smaller, usually less than 70 mm (2¾ inches), and a brighter red than females, with brilliant white stripes.

They are very hardy and easy to feed, as they accept a variety of foods, thus making them a great choice for aquarists. This is one of the most attractive and popular species among marine ornamentals. In nature the fish usually lives in symbiotic association with the bulb-tipped or purple base sea anemone *Entacmaea quadricolor* and the beaded sea anemone *Heteractis aurora*. Where *E. quadricolor* is absent, they are also

occasionally found in finger anemones *H. magnifica*, corkscrew tentacle sea anemones *Macrodactyla doreensis*, and Haddon's sea anemones *Stichodactyla haddoni* (Madhu and Madhu, 2000). Both are reported to have wide distribution from the Ryukyu Islands to Malaysia and Indonesia, from the Indo-Pacific to Oceania (Allen, 1972; Fautin and Allen, 1997).

In India this species is abundant in the shallow coral reef ecosystem of the Andaman and Nicobar Islands situated in the Bay of Bengal (Talwar, 1990; Madhu and Madhu, 2000, 2007). At present, the trade depends on wild-caught *A. frenatus*, and as a result wild populations of this



species are subject to decline. Our effort was to determine protocols for commercial breeding and juvenile production sufficient to meet the demand. We succeeded with pair formation, broodstock development, and breeding of *A. frenatus*, and juveniles are being produced in the marine hatchery of the Central Marine Fisheries Research Institute (CMFRI), Kerala for supplying breeders at the national and international levels.

### Transportation and Acclimation of Live Specimens

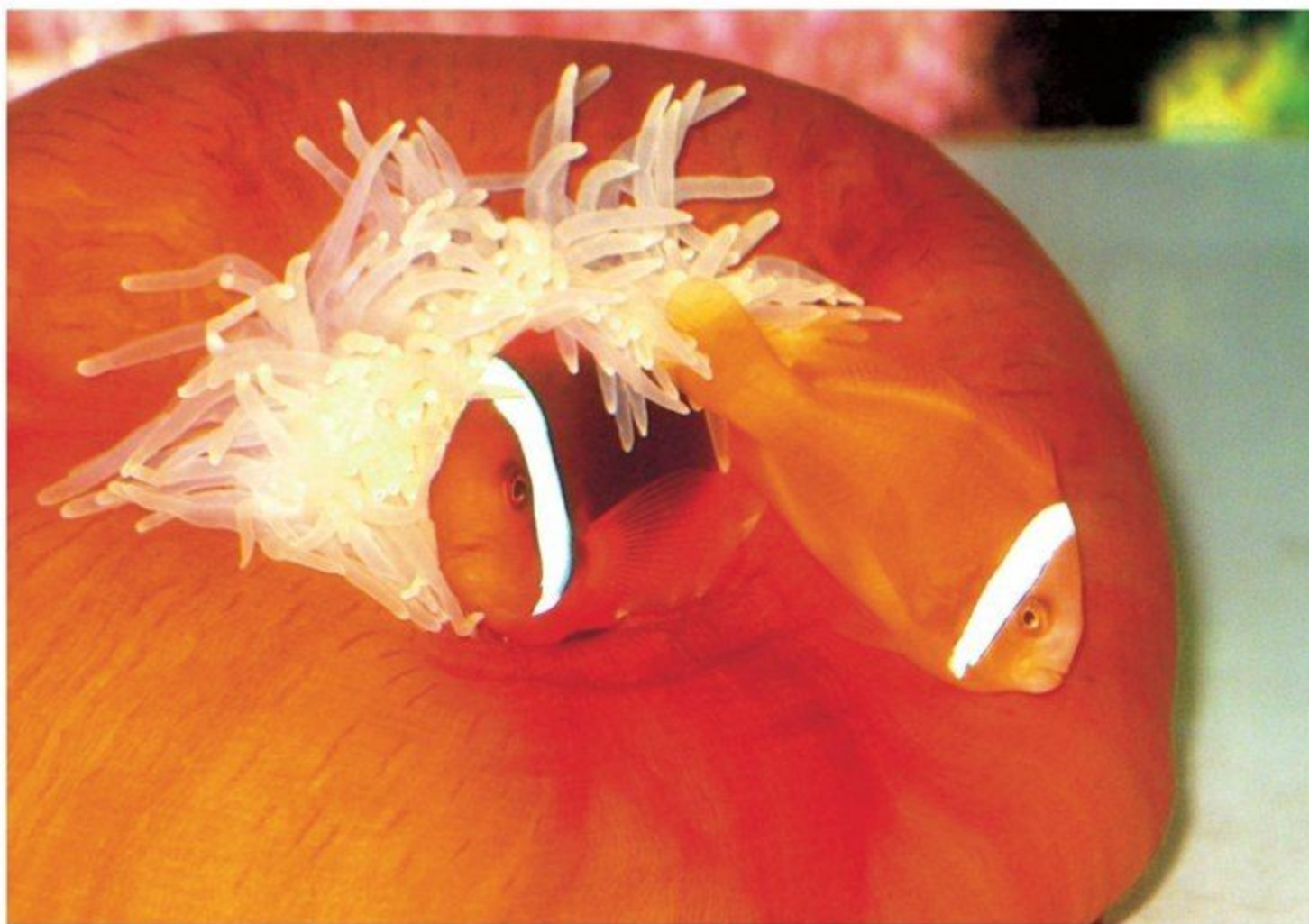
Subadult females (90 to 110 mm [3½ to 4¼ inches]) and males of *A. frenatus* (40 to 50 mm [1½ to 2 inches]) were collected from the coral reef ecosystem of the Andaman and Nicobar Islands and transported to the marine hatchery of the CMFRI. The fishes and anemones were packed and transported separately, and all specimens were acclimated in the hatchery for a period of two weeks in 500-liter (130-gallon), fiberglass-reinforced plastic (FRP) tanks in a transparent-roofed hatchery where an incident light intensity of 2500 to 3000 lux was available.

The fishes and anemones were fed two times per day with wet feeds such as shrimp, green mussel, and clam at the rate of 10 percent of their body weight. The water was replaced with filtered seawater at a rate of 25 percent daily. After acclimation, different age groups were sorted for pair formation experiments.

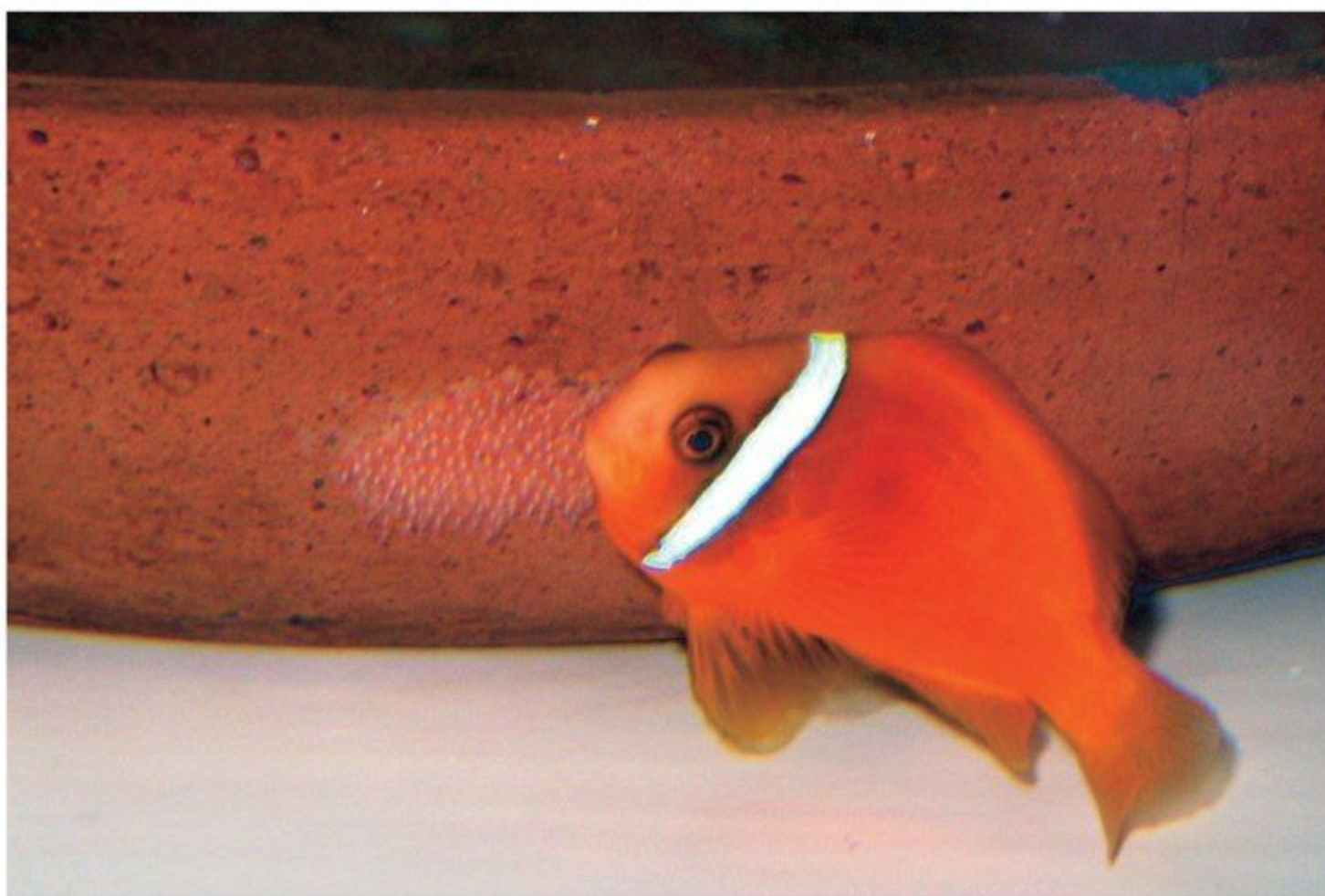
### Development of Breeding Pairs Through Pair Formation

The breeding pairs were developed through pair formation experiments. For this, five to six juveniles of different sizes were reared in 500-liter (130-gallon) FRP tanks along with one host sea anemone, *H. magnifica*, to mimic the natural environment and also to reduce aggression.

The fishes and anemones were fed two times per day with wet foods as during quarantine, and they were also provided live foods like rotifers *Brachionus plicatilis* and newly hatched *Artemia* nauplii. All the tanks were fitted with biological filters, and the temperature was maintained between 27° to 29°C (81° to 84°F) by using aquarium heaters. Tanks were monitored with thermal sensors around the clock.



■ A captive clownfish pair and a sea anemone *Heteractis magnifica*.



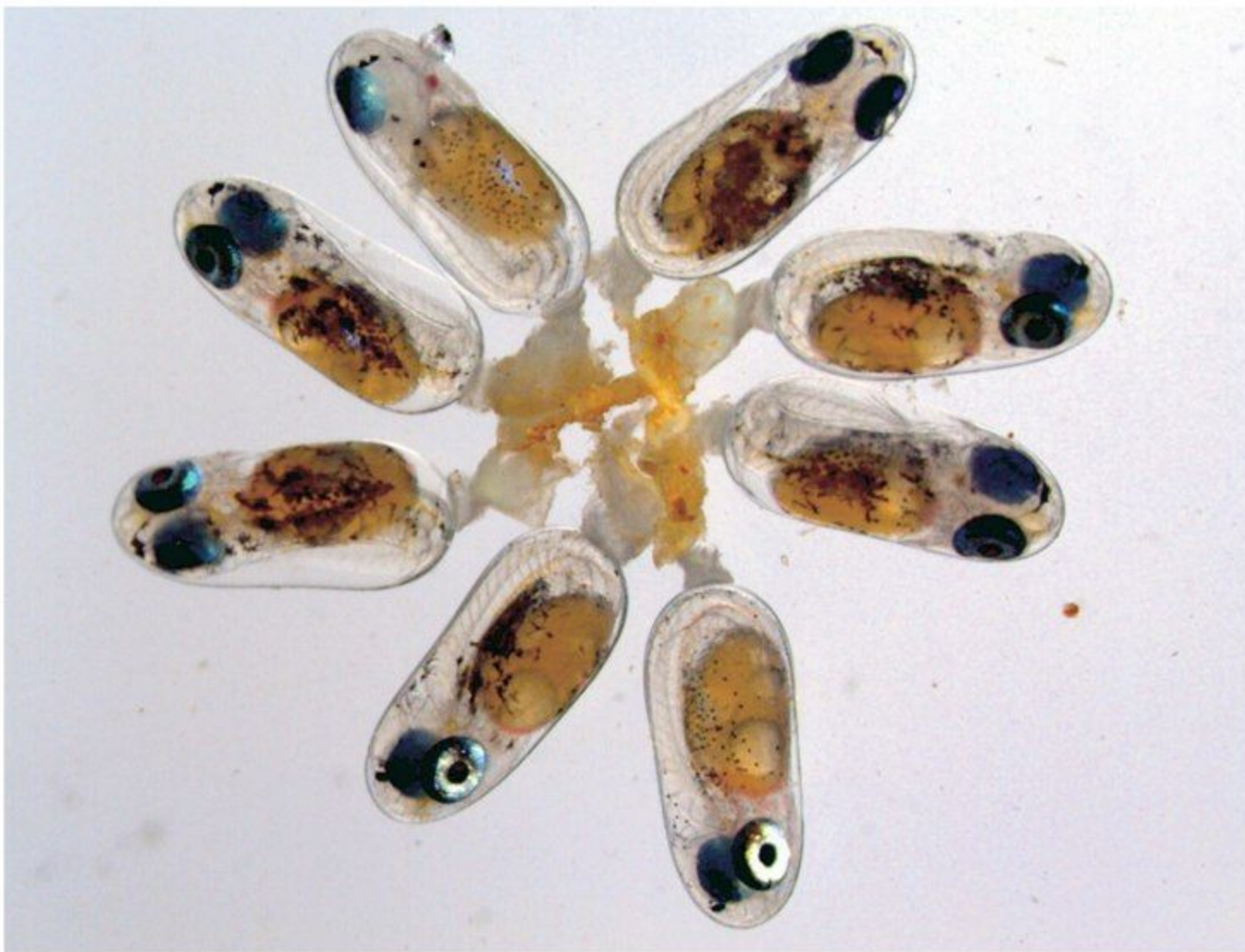
■ Egg masses were laid on the side of pots.

The other environmental parameters were salinity 32 to 34, dissolved oxygen 4.6 to 6.2 ml/l, pH 8.0 to 8.5, and photoperiod of 12 hours of light and 12 hours of darkness. Once a week, 25 percent of the water was changed. After a rearing period of three to five months, one pair in each tank grew ahead of the others and became the monogamous pair. The standard length of the (presumptive) female varied between 100 to 130 mm (4 to 5 inches) and that of the (presumptive) male varied between 55 to 60 mm (2 to 2¼ inches).

### Broodstock Development

The pairs were then transferred to separate 500-liter (130-gallon) glass aquaria for broodstock development and provided with the sea anemones *H. magnifica*. The broodstock fish were fed with wet foods such as mussels, shrimp, fish eggs, and clam meat at the rate of 10 percent of their body weight, split into four feedings per day. They were also provided live food: adult *Artemia* and rotifers enriched with vitamins, minerals, and fatty acids.





■ Developing embryos inside the egg capsule on the sixth day of incubation.

Conditions were maintained as during pair formation, and the water was recirculated with the aid of a filter system to ensure sufficient water movement and good water quality. Each broodstock tank was provided with tiles and clay pots for egg deposition. This also enabled us to transfer the egg clutches to hatching tanks without problem.

## Spawning Behavior and Breeding

Within four to six months of rearing in broodstock tanks, the pairs successfully bred. A few days prior to spawning, the male selected a suitable site near the sea anemone and cleared off the algae and debris with its mouth. On the day of spawning, both the parents spent considerable time cleaning the site, which indicated that spawning would occur within a few hours.

There were 200 capsule-shaped eggs in the first spawning at 9:00 a.m. on October 7, 2009, and the spawning lasted for about 1½ hours. All the subsequent spawnings took place during the daytime between 6:00 a.m. and 3:30 p.m. The elliptical eggs were typically laid on the surface of a clay pot, and each egg adhered to it with a stalk. The newly laid eggs were bright red for the initial two days, and as the embryos developed they turned black on the third to fifth days. They later turned silvery, due to



■ A microscopic view of a fully developed embryo at 168 hours, just before hatching.

the color of larvae's large eyes, on the sixth and seventh days of incubation. Egg size ranged between 1.2 and 3.0 mm in length with a width of 0.8 to 1 mm.

In subsequent spawnings the pairs laid a greater number of eggs, between 250 to 600 eggs per spawning, and spawning was achieved every 15 to 30 days, giving an average of 1.8 spawnings per month per pair. Hoff (1996) similarly reported for 27.2 spawnings per year (2.3 nests per month) for *A. frenatus*, and the number of eggs per nest varied between 309 and 551, totaling 3708 to 6612 eggs per pair per year.

## Parental Care

The parents were allowed to remain in the tank until hatching. Both the parents carefully looked after the eggs

during the daytime, and this involved two basic activities: fanning by fluttering the pectoral fins and mouthing to remove the dead eggs and dirt, but no nocturnal care was noticed. The male assumed nearly all responsibility of caring for the eggs and spent a higher percentage of time at the nest than the female, which increased gradually up to 70 percent of time as the day of hatching approached.

## Hatching and Larval Rearing

On the final day of incubation (which lasted 168 hours), the developing embryo occupied the entire space in the egg capsule, and wriggling movement was noticed. On the expected day of hatching (the seventh day), two hours before sunset, the eggs, along with substratum, were transferred from the parental tank to hatching tanks of 100 liters (26 gallons) and provided with complete darkness to accelerate the hatching.

At the temperature we maintained, the hatchlings emerged on the seventh day of incubation, and peak hatching took place shortly after sunset, between 6:30 and 7:30 p.m. Soon after completion of hatching, light was provided using a (40W) bulb 30 cm (12 inches) above the water surface. Microalgae *Chlorella marina* and *Nannochloropsis oculata* were added to the larval tank in 1:1 proportion at  $1.5 \times 10^6$  cells/ml.

The newly hatched, free-swimming larvae measured  $2\frac{1}{2}$  to  $4\frac{2}{5}$  mm in length, and each had a transparent body, large eyes, visible mouth, and a small yolk sac. The mouth gape of the newly hatched larvae ranged from 300 to 365 microns. However, the size of the larvae also varied depending upon the health, size, and previous breeding experience of the breeding pair and their environmental parameters. Fautin and Allen (1997) also reported that the number of eggs produced and the fecundity and size of the larvae in clownfishes vary depending upon the size, age, and previous experience of the females and the fertility of the couple.

## Feeding Schedule

From the first day onward, the larvae were fed with a mixed culture of microalgae ( $1.5 \times 10^6$  cells/ml) and super-small rotifers *Brachionus plicatilis* (6 to 8 per milliliter) up to the tenth day. From the eleventh day onward the larvae were weaned onto



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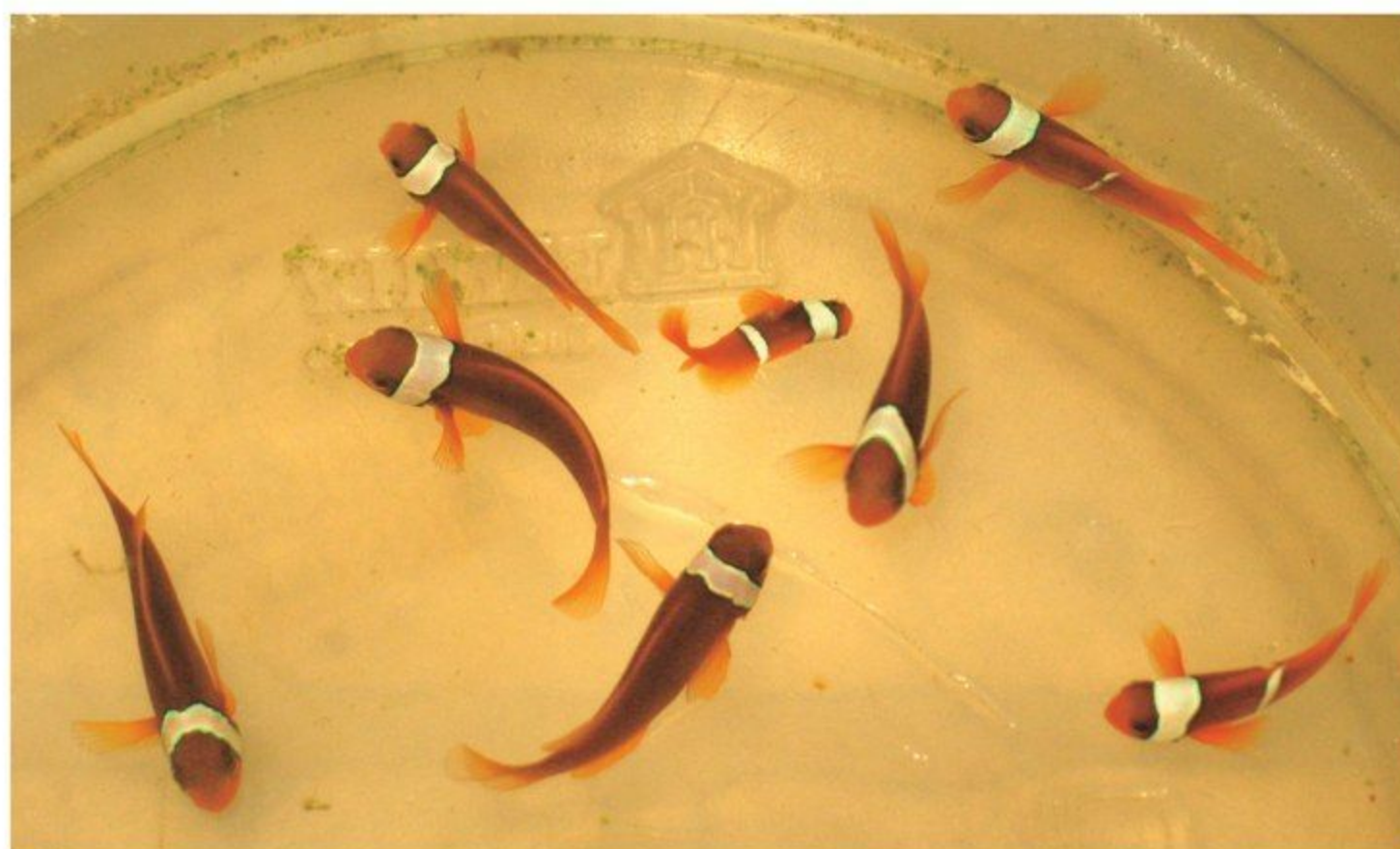
■ A microscopic view of a newly hatched larva.

newly hatched *Artemia* nauplii (4 to 6 per milliliter) along with rotifers (6 to 8 per milliliter) and a mixed culture of microalgae ( $1.5 \times 10^6$  cells/ml). On the fifteenth to seventeenth day post hatch, the larvae were fed only with newly hatched artemia nauplii (4 to 6 per milliliter) and a mixed culture of microalgae.

The larvae were purely transparent for the initial three days and became black on the fourth day onward. The first sign of reddish pigmentation appeared at 10 days post hatch. On the fifteenth to seventeenth day post hatch, the size of the juveniles ranged between 10 and 12 mm, and all attained bright reddish color. At this point, most of the fry resembled juvenile fish and began to shift from partially pelagic to epibenthic (living near the surface of the water to living on the surface of the substrate) and started eating minced shrimp, fish flesh, mussel meat, clam meat, and formulated diets. Twenty-five percent of the water was replaced with filtered seawater daily. With this feeding schedule and management of environmental conditions, there was an 85- to 90-percent survival rate for each spawning.

### Banding Pattern and Growth

A feeble white opercular (gill) band appeared on the twelfth to fourteenth day, a feeble middle band was noticed on the seventeenth to twentieth day, and a faint caudal band developed on the twenty-fifth to thirtieth day post hatch. Most of the hatchery-produced juveniles attained adult coloration and banding



■ One-year-old hatchery-produced juveniles.

pattern within 30 days post hatch. The three bands are seen during the juvenile stage. In the subadult stage, the tail band completely disappears and the middle band fades. In the adult stage, the fish possess only a single broad white cross band on the head near the eye.

The body is usually black on the sides with a reddish snout, belly, dorsal fin, and tail. The juveniles attained lengths of 30 to 40 mm ( $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches) six months after hatching, and lengths of 60 to 70 mm ( $2\frac{1}{4}$  to  $2\frac{3}{4}$  inches) after a period of one year of growth. As the juveniles were very aggressive, they were culled to different groups of 15 to 20 per 250-liter (65-gallon) tank with an anemone. On attaining a size of 30 to 40 mm ( $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches), 50 to 100 juveniles were stocked in one-

ton FRP tanks fitted with biological filtration and provided with three to five sea anemones per tank to ensure maximum survivability. The juveniles produced are supplied to aquarium traders and hobbyists through the sale counter opened at the Agricultural Technology Information Centre (ATIC) of CMFRI, Kochi.

### Works Cited

- Allen, G. R. 1972. *The Anemonefishes: Their Classification and Biology*. T.F.H. Publications, Inc. Neptune City, NJ. 288 pp.
- Fautin, D. G. and G. R. Allen. 1997. *Anemone Fishes and Their Host Sea*

*Anemones*. Western Australian Museum. Perth, Western Australia. 160 pp.

Hoff, F. H. 1996. *Conditioning, Spawning and Rearing of Fish with Emphasis on Marine Clownfish*. Aquaculture Consultants. Dade City, FL. 212 pp.

Madhu, R. and K. Madhu. 2000. "Anemone Fishes in Andaman and Nicobar Islands". Leaflet. CARI, Port Blair, Andaman and Nicobar Islands, India.

Madhu, R. and K. Madhu. 2007. "Occurrence of Sea Anemonefishes and Host Actinian in Andaman and Nicobar Islands." *Journal of the Marine Biological Association of India*. 49(2):118-126.

Talwar, P. K. 1990. "Fishes of Andaman and Nicobar Islands: A Synoptic Analysis." *Journal of the Andaman Scientific Association*. 6(2):71-102.



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# AQUAPONICS IN COSTA RICA: COLLECTING FOR THE CLASSROOM BIOTOPE



■ Students from Costa Rica's Green Valley School gather enthusiastically around the aquaponics system the author helped them design for their classroom.

## ZACHARY A. PISO

PHOTOGRAPHS BY THE AUTHOR EXCEPT AS NOTED

**I** first visited Costa Rica more than 10 years ago as a 12-year-old traveling with his family, and I must admit that I scarcely remember the trip. I was fortunate to have parents who appreciated the outdoors, and rather than spend our vacation sunbathing on white sand, we instead opted for the natural wonders that the country boasts.

Costa Rica is truly the golden child of sustainable development, and it seems that the entire economy is dedicated to ecotourism once you escape the metropolis that is San José. Even only 20 km (10 miles) from the nation's capital, the development seems harmoniously nestled into the Central American rainforest. And during my second trip, the one recounted here, I would be in one of those adjacent communities known as Atenas.

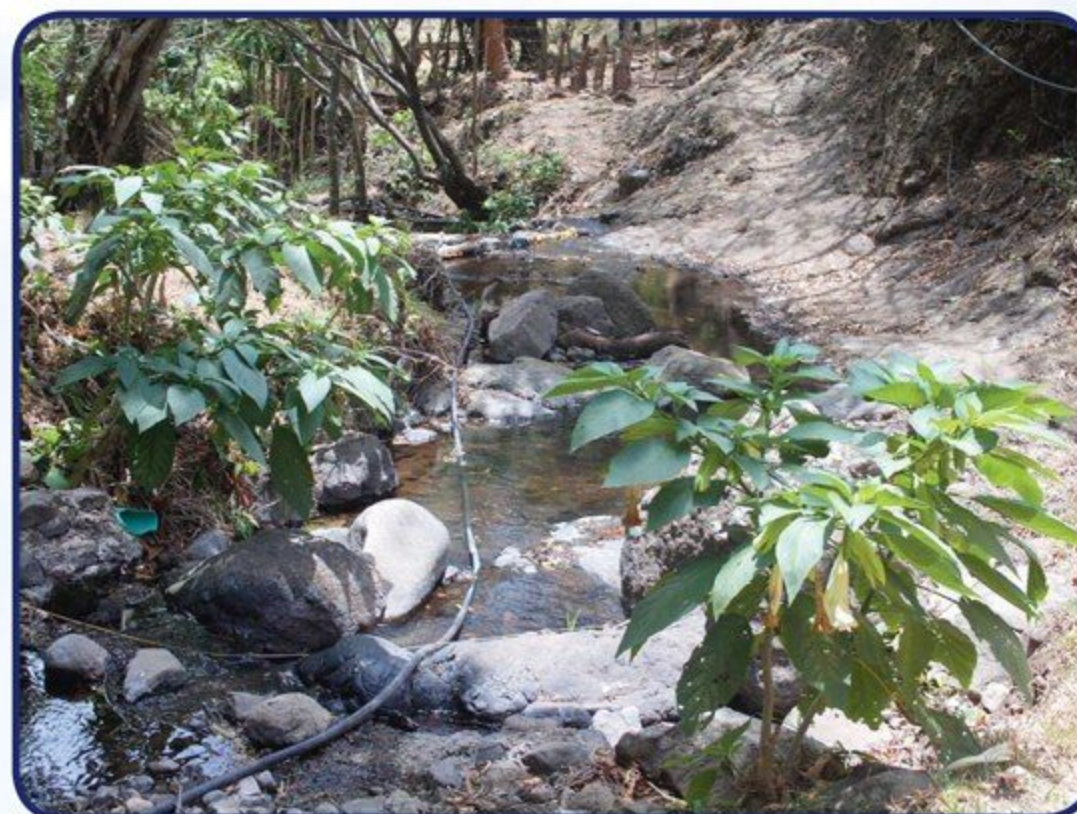
What I do remember about my first stay was not something I did, but something I could not do. Already captured by the lure of aquarium keeping, I had high ambitions of at least catching and releasing some freshwater gems. Yet once I cascaded down to the shoreline of a forest stream—much to the frustration of our bus driver, whose rapid-fire Spanish registered with me as having something to do with snakes—I realized that my tightly packed luggage had one glaring omission: I did not bring a net.

Darting between the rocks of the stream swam a bustling community of cichlids, drawn out from their crevices by the dithering of schooling livebearers. While I watched as the cichlids tended to their fry, I lamented my packing blunder. Later I would catch a small knifefish who had suffered the misfortune of choosing a pool that





■ Students are taken out to the local woodland area to survey its biodiversity.



■ A local stream provided a bounty of aquatic wildlife that included cichlids and livebearers.

was cut off from the drying stream, as well as a handful of livebearers that swarmed the irrigation ditches of the local coconut farms. But without a net, and without the confidence of our tour guides, I spent most of my time away from the riffles and pools. Someday, I decided, my return to the country would include the tools of the aquarist.

## An Invitation to Costa Rica

So when my professor and long-time employer Dr. Jim Palmer invited me to join him as a volunteer teacher at a Costa Rican school, my first thoughts should not have fallen on fishkeeping. Yet it was only after celebrating my redemption that I considered the privilege of such a journey. After working throughout my college years as an intern for Creek Connections—a program that works with schools in the western Pennsylvania and New York areas to monitor local waterways—I would have an opportunity to foster a rather unique relationship with a small school in Costa Rica known as the Green Valley School.

Years prior, my professor had forged a partnership with the school's impressive founder and principal, who had started the school after the parents of her then-preschool class insisted that she continue to teach their children. Now, the Green Valley School and Allegheny College have built a relationship around the protection of aquatic ecosystems, and Jim is a bit of a celebrity when he returns to teach a water-based curriculum to first graders through graduating seniors. The most desired course, however, takes the students out of the classroom and out to a local streamside to explore the chemistry and biodiversity of their local watershed. Each class begged to earn that honor this year, but because of funding limitations, only the sophomores would be able to join us.

My job, and likely the reason that I was invited, was to dampen the disappointment by installing an aquarium at the school. Certainly, most of us aquarists will admit that the task of putting together a healthy aquarium does not warrant a trip to a tropical paradise, and so my ascent from casual hobbyist to professional consultant required a number of intermediate steps.

By 12, I had already developed my central interest in aquarium keeping—the art of building a biotope aquarium. Now, I will admit that those earliest attempts did not deserve the designation, and I will also admit that biotope aquariums rarely attain the aesthetics of Amano-style planting, but there is a certain satisfaction from

building a representative ecosystem. My friends and I prided ourselves for simultaneously running biotopes from all of the continents, save Antarctica, and by the end of my heyday, I had contracted an incurable case of multiple-tank syndrome. Once I got to college, however, I was forced to settle for one aquarium—and a few more when the resident advisor lost his zeal for punishment.

I struggled with withdrawal until I had the opportunity to work with a relatively new technology known as aquaponics. For those who are unfamiliar, aquaponics combines aquaculture with hydroponic plant growth, creating the sort of symbiotic relationship that exists in a planted aquarium. Water high in nitrates would flood through the roots of our vegetables and herbs, slaking their need for nutrients while filtering the water for optimal fish growth. By graduation I had developed a curriculum around aquaponics and installed aquaponic systems throughout northwest Pennsylvania. My professor asked me to join him to Costa Rica to set up a small demonstration system in their school, and I was happy to oblige.

## Goals for a Classroom Aquarium

My goals for the system were both simple and self-serving. Rather than rely on store-bought fish, we would choose fish and invertebrates from the local ecosystem, coupling several potential lesson plans into one classroom focus. We would be using an aquarium of around 15 gallons—I should concede that I never bothered to measure the volume when the husband of a teacher brought in a handmade tank to donate. The only fish that I'd worked with in a system that small were goldfish, and when we took the temperature of some water samples that had been sitting in the sun, I conceded that 88°F was hardly suited for coldwater species.

No, tropical fish would be best, and Costa Rican species offered the safest bet for withstanding Costa Rican climate. Now, while Atenas might approach discus-oriented heat, it does so with a gentle breeze and not a hint of humidity. Not long ago, the town had been declared “the greatest climate in the world” by *National Geographic*, and the hand-painted signs at the entrance of the town prevented anyone from forgetting that great honor. Forced to cope with the endless winter of my college town, I was enthusiastic to set up a system where sunlight would not be the inescapable shortcoming.





Rhonda Wilson

■ *Brachyrhaphis holdridgei* are endemic to Costa Rica and are known for their brilliant breeding coloration.

## To the Headwaters

After a couple days of sightseeing and working with a few of the less fortunate classes that would have to wait before their turn out to the river, I watched as the tenth graders sang songs while they awaited the arrival of their field trip buses. I think it is probably a common misconception that children surrounded by rainforests would have spent plenty of time exploring nature, but I am certain these students were no more familiar with the denizens of their backyards than their Pennsylvanian peers. Their excitement betrayed that the foray would be far from routine, and by the time we arrived at the sampling site, they were already squirming about the prospect of sorting through aquatic macroinvertebrates.

The featured activity of Creek Connection, regardless of country, was the collection and identification of aquatic nymphs, which serve as a strong indicator of watershed health. While our test kits would register any glaring problems in a stream—high nitrates or phosphates, low dissolved oxygen, awry pH—indexing aquatic macroinvertebrate species offered a more subtle evaluation. We were bound to discover some fish species as the bycatch of our kick nets, and planned to save the better specimens for the aquaponics system back at school.

Here is where the story deviates from the expected narrative. Despite an admirable history of environmental preservation, Costa Rica's rural communities are complete with their share of blemishes. We would be visiting the headwaters of the Río Grande de Tárcoles, which represented the only water source in the area that is safe to use as drinking water. In order to preserve the health of the water source, local landowners had formed a committee that would monitor the health of the stream and report any egregious misconduct.

When the bus let out and the 15 sophomores filed toward the stream, an official-looking man greeted us with an expressionless stare, but to my relief, the once-blank face gave way to an enthusiastic expression as we explained Green Valley's interest in the tributary. While the concern for safe drinking water was enough to form an organization, the limited funding prevented consistent testing and monitoring. Creek Connections has often served as

a volunteer force to collect data and make quality parameters publically available online, and interested students might fulfill the same civic duties for the Río Grande de Tárcoles.

## An Unfortunate Surprise

I am saddened to report that the headwaters needed the protection. Even by the standards of the American rust belt, the stream was littered with warning signs. Although I was impressed by the degree of self-sufficiency on display by the local farmers, I knew that the stream would not endure the unimpeded assault by their livestock. Along several stretches of the stream, the normally rich riparian zone was cleared away for pasture, or for planting grasses that would later serve as bedding or food.

But the most bizarre infringement upon the stream was the assemblage of hoses anchored in the riffles, which fed irrigation systems and drinking water supply lines for the adjacent households. I very much doubt that the piping necessarily jeopardized the health of the stream, for in fact such an intimate connection to the environment probably fostered the grassroots efforts to preserve its health. Coupled with the livestock and clear cutting, however, the hosing was just another indication that the stream was at risk. Our guide from the water protection council informed us that they held no authority to prevent any of these assaults, and would instead rely on informing and informally chastising the offenders.



■ *Brachyura* spp. crabs collected would serve as the aquaponics system's cleanup crew.

## A Surviving Stream

Fortunately, our testing suggested that the stream had so far withstood most of this adversity, and our kick nets came back full of macros. Of particular interest were the aquatic crabs that appeared to replace crayfish as the dominant freshwater crustacean in the watershed. As a recent collector of whatever invertebrates the fish trade had to offer, I look forward to an aquarium hosting these *Brachyura* spp. crabs alongside nerite snails and dwarf crayfish. For now, I would have to settle with collecting a couple and including them in Green Valley's Costa Rica biotope aquarium,

where they would serve as a great cleanup crew.

One of the goals of an aquaponics system is to make sure that all of the inputs are made available to the plants in the form of nitrates in the water column. Uneaten fish food, as well as discarded plant matter, would serve these crustaceans well. The problem would be finding suitable fish species to feed in the first place.

As soon as we had set down our testing equipment, I had ducked out of my teaching responsibilities in order to survey the sampling site, this time with a net firmly in hand. What I soon discovered, and what I think many aquarists often forget, is that aquatic habitats are home to more than just fish.

Given the swift descent of the headwaters, the flow of the stream was characterized by deep pools separated by miniature waterfalls. And these waterfalls served as barriers for most fish species to re-colonize their niche after the rainy season washed most inhabitants downstream. What had come to replace fish as the dominant aquatic vertebrate were tadpoles of the species *Mixophyes iteratus*, or the giant barred frog.



A net full of leaf litter would return five to ten tadpoles for every one fish, and the only fish species to successfully navigate the rapids was a small livebearer species of subtle but attractive coloring—*Xenophallus umbratilis*. The livebearers and tadpoles were having their fill of aquatic macroinvertebrates, including stonefly and mayfly nymphs, usually strong indicators of ecosystem health. And of course, aquatic insects preyed on the tadpoles and less agile fish, and we collected a number of large hellgrammites and predacious diving beetles. But because most of these insect species, as well as the amphibious tadpoles, spend only part of their lives underwater, they would not make for great choices in the aquaponics system.

On the way out of the stream, we decided to try one more sampling site, this time only a few meters away from one of the livestock crossings. Again I would forge ahead and wield my hand net, and again it would come up with nothing but leaf litter and tadpoles. I had heard that during years prior, the class had shrieked when their kick net came up with an unexpectedly large catfish, and I hoped to find such a bottom dweller to complement the crabs.

This time, I would find what I was looking for. As I assisted the students while they developed their kick-net skills, I watched as a catfish was pushed from his roost out into the yellow mesh, and I urgently commanded that we had to pull the net up and out of the water. A few tries later, we caught another of the catfish; both were about 3 inches long and had some resemblance to the popular and ubiquitous pictus cats of the pet shops back home. Two of these fellows would make a fine team for the 15-gallon aquarium, and they were tossed in with the fish and crabs to bring back to the school.

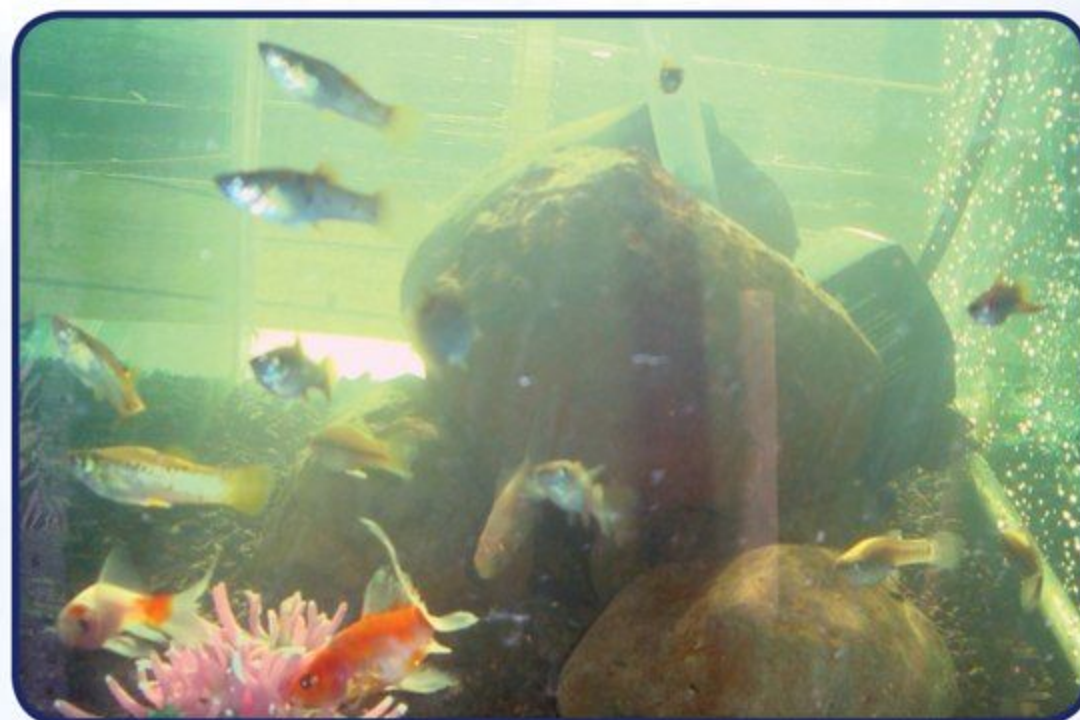
## Adding More Fish

I hoped to stock the aquarium with only the fish from this expedition, but the teachers wanted to add more, and quite honestly the plants would need the extra nutrients. So over the next couple of days, I stopped by the occasional creekside to scoop up some fish. To my dismay, I never found a stream teeming with Costa Rican natives, and the most colorful specimens were the now ubiquitous *Poecilia reticulata*—guppies. Mixed in with these livebearers were a couple of intriguing natives known as *Brachyrhaphis holdridgei*, which combined well-outlined scales with subtle coloration on the dorsal and adipose fins. Probably thwarted by the dry season, I struggled to find any males in the brilliant yellow breeding coloration of which they are capable.

I had to cut the scouting short when, despite my best efforts, I slit my hand open in an obviously polluted stream. Ordinarily, such a setback would be cause for little concern, but the particular stream we were fishing was known to transmit dengue fever, and I wasn't in the mood for prolonged illness. Besides, I was pulling up mostly guppies, and I knew they were ultimately from south of the Panama Canal. And the guppies were hardly the sole invaders of the peaceful country.

I had hoped to find a smaller species of cichlid to keep in the school aquarium, something of a centerpiece fish that would offer some behaviors worth teaching about. But the only cichlid I could find, stocked throughout most of the private ponds in the Central Valley, was the aquaponics-favorite tilapia. Now, we can debate the propriety of non-native species in a biotope aquarium—after all, these fish are now part of these ecosystems—but the rapid growth of these African cichlids precluded them from a 15-gallon aquarium. That is why they are great for a commercial aquaponic project, but unfit for all but the most ambitious classroom.

Now, aquascaping an aquaponics system is not for those with a taste for aesthetics. Except for some of the most rigid biotope systems,



■ Though diminutive in size, the aquaponics system is remarkable for its natural filtration methods. (Note: The teachers decided to add goldfish to the tank.)

most of us rely heavily on the colors and textures of aquatic plants. Yet neither the streams we had searched nor the typical aquaponics system featured aquatic plants, although I did come across some moss species that would excite the nano enthusiast. I was forced to rely on wood and rock, and tinkered with the layout until the last moment before I left the nation. The schools of livebearers looked good swimming between the wiry branches, and I could rest assured that the plants above would receive the full share of nitrates.

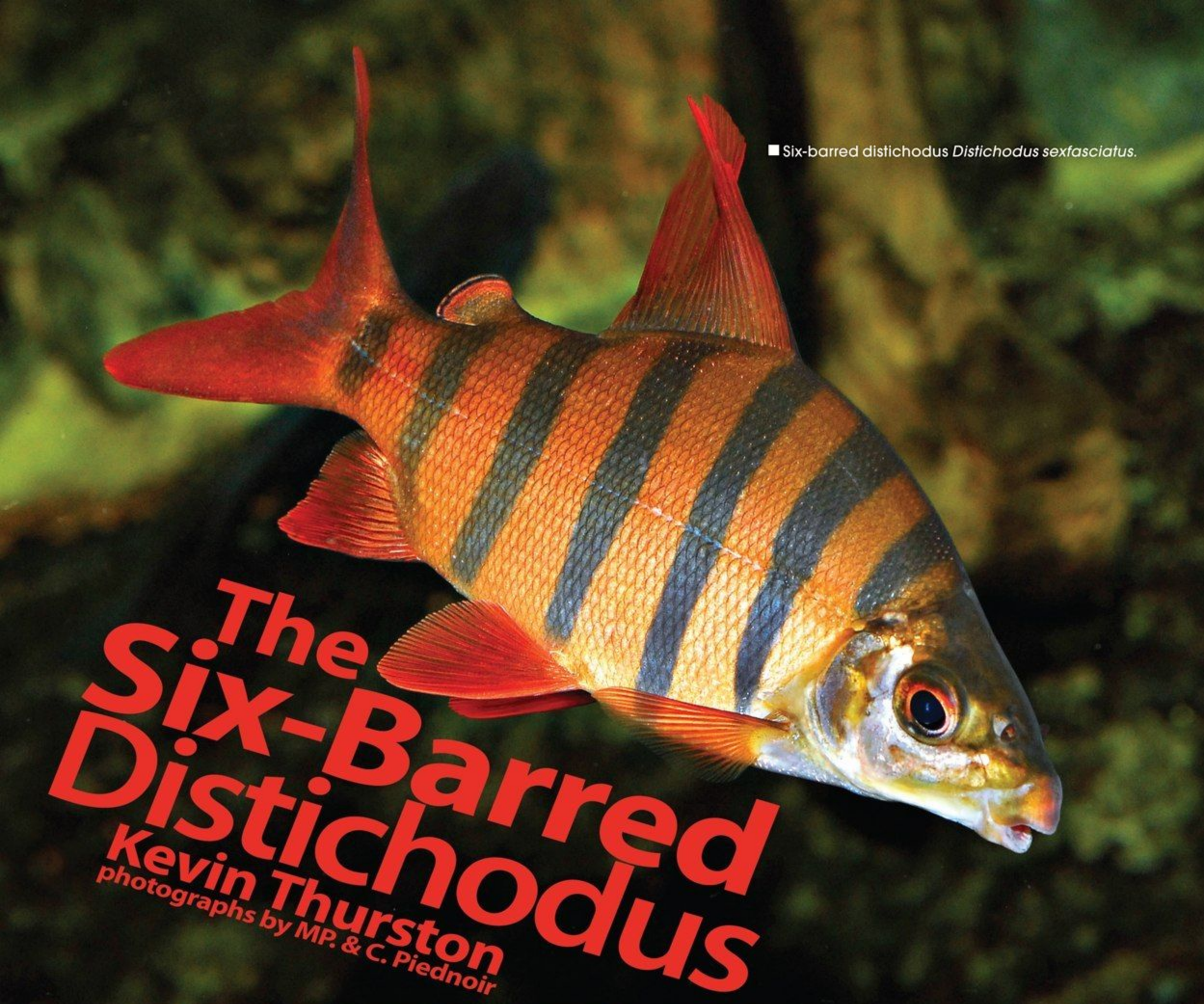
## Training Future Aquarists

I spent a couple days teaching the students about the routines of aquaponics care. The system revolves around the nitrogen cycle, and I knew that I would not be around by the time the nitrifying bacteria first cycled the tank. But armed with a handful of Creek Connections test kits, the students began to understand the logic of system thinking. They knew that when the nitrates were too high, they would need to add more plants to the growth tray, and when the nitrates fell back to zero, they could add a couple more fish.

One student asked if we could keep 100 fish, but because 100 was likely the highest number he knew in English, I assumed he really wanted to know the carrying capacity for the system. After some prompting, the group in charge of monitoring dissolved oxygen remembered that the fish breathe oxygen just like we do, and that once the DO dropped beneath a comfortable level, they would have to send a couple of their native pets back to the stream. Without prompting, the class celebrated the catfish and crabs as important bottom feeders that would play the role of cleaners in their aquatic community.

Aquaponics systems usually take a while to reach a stable equilibrium, and I expect that these fourth graders will hit their share of snags before the aquarium settles in. Hopefully they will avoid those catastrophes that have taught us all, and learn from the little mistakes that they encounter along the way. Yet with their new understanding of systems thinking, and their intuitive grasp of the small changes that can push their system in the right direction, I hope that they are more prepared than the average amateur fishkeeper. With a good sense of how an ecosystem like their biotope aquarium works, they can be among the Costa Rican citizens that form environmental organizations and protect their local streams. I will say that after seeing their wonder and energy working with their classroom aquarium, I now know why our guide to the headwaters was so encouraged that our school wanted to learn about the local watershed. 🐟





■ Six-barred distichodus *Distichodus sexfasciatus*.

# The Six-Barred Distichodus

Kevin Thurston  
photographs by MP. & C. Piednoir

**W**hen I was a young aquarist back in the 1960s, the pet stores carried little paperback booklets that sold for less than a dollar. This was when cory cats sold for 49 cents—more than the cost of a gallon of gasoline! When a neighbor was quitting the hobby, she gave me a stack of aquarium-related booklets that I was pleased to add to my collection. One was just a picture book of various aquarium fish that contained a nice photograph (taken by Gene Wolfsheimer) of a fish identified as *Distichodus sexfasciatus*—the six-barred distichodus. I was very impressed with that photo and was determined to own the

fish someday, but it wasn't until 1982 that I actually saw one firsthand.

## Background

*D. sexfasciatus* is a characin that comes from the Congo River drainage, Angola, and the swampy drainage area of Lake Tanganyika. The fossil record suggests that the genus *Distichodus* was more widely distributed through Africa in the late Miocene to Pleistocene period (Stewart, 2001). According to Jacques Géry (and fishbase.org), they belong to the family Citharinidae, subfamily Distichodontinae, while others consider the subfamily to be a full family.

From the hobbyist perspective it is probably well thought of as one of those big tetra-type fish, like pacus. It is a beautiful fish with a color pattern suggestive of clown loaches and tiger barbs. There are six black bars on a red-orange body. Larger specimens have a faded red color on the body with bars that have a slightly greenish tinge and a red tail. When fully grown, the fish becomes totally gray.

There is a very similarly colored *Distichodus* sp., *D. lusosso*, which can be readily distinguished by its concave head shape. Outside of that, I've read that *D. lussoso* tends to have slightly higher counts for fin rays, scales, and bars.



I find the body shape of *D. sexfasciatus* to be more aesthetically pleasing than that of *D. lusosso*, so I've never kept *D. lusosso*, but the literature suggests that what applies to *D. sexfasciatus* also applies to *D. lusosso*, with the exception that *D. lusosso* does not get as big.

When viewed from the side, *D. sexfasciatus* appears to be a particularly robust fish, but when viewed from the front they seem fairly delicate due to being laterally compressed, nearly as thin proportionally as a discus or freshwater angelfish. The contrast can be surprising when seen for the first time.

### Obtaining *Distichodus sexfasciatus*

*D. sexfasciatus* can occasionally be found in stores these days, usually at a size of about 2 to 3 inches. Their cost is generally not prohibitive compared to some of the higher-priced freshwater fish. They are not commercially bred, and a lot of the price comes from the cost of shipping from Africa. Congo River fishes are generally more commonly available in Europe. Occasionally one might find a larger specimen in a store that was traded in by a customer.

The booklet I had as a kid listed the size for these fish at 10 inches, but modern sources report their size to be anywhere from 14 to 40 inches. Early reports were certainly skewed by the premature deaths of specimens kept in aquaria that were too small.

Generally people purchase a 2- to 3-inch fish from the store and put it in a reasonably sized tank; something in the range of 75 gallons would be the minimum I'd recommend. The fish begins to grow at an alarming rate until it reaches a size of about 8 to 11 inches, at which point the growth rate slows substantially. At this size the color in the body will have faded a little, maybe taking on a slightly greenish sheen in the bars, and the tail will still be bright red. As I mentioned earlier, they will turn completely gray when they reach their full-grown size. Such change in color is not unusual for *Distichodus* spp., as similar color changes for *D. schenga* and *D. mossambicus* (two species that are just about never seen in the hobby) have been observed.

I've only ever seen one *D. sexfasciatus* that had grown large enough to have turned completely gray. It was in a pet shop in a



■ Juvenile *D. sexfasciatus*; six-barred distichodus are capable of growing over 3 feet long, so a tank of adequately large size is of immediate importance.

custom-built tank that probably held about 400 to 500 gallons. My first impression was that this can't be the same fish, but the distinctive body shape confirmed its identity. The fish was completely gray with no hint of any bars. The gray was a dull, ugly gray, with no reflectivity or shine at all. The fish was somewhat larger than the big pacus that were in with it, and it was probably pretty close to 40 inches.

### Feeding

So what do these fish eat? One of the clues to being able to tell what a fish eats is the proportional distance from the mouth to the anal fin. If the distance is long, it indicates a long digestive tract and that the fish probably has plant matter in its diet, since plants are more difficult to digest and require a longer digestive tract. *D. sexfasciatus* has a long digestive tract and is known to eat plant matter. It also eats worms and crustaceans, and its subterminal (under-the-snout) mouth indicates it is probably also a detritivore.

In the aquarium, I haven't been able to find anything they won't eat. They will greedily consume flake, pellet, freeze-dried, and frozen foods. In nature they opportunistically eat fruits and seeds. I haven't noticed that diet has much of an effect on their colors. I think that since they consume such a wide variety of foods, they will get what they need to maintain their color no matter what individual food items are added.

Since they are herbivores, many have been concerned about keeping them in a planted tank. I'm not very good with plants, so I generally don't keep them in planted tanks, but I did it once with a tank that was set in front of a window. Because of the bright light from the window, the plants grew very quickly and I never noticed any plant damage from being nibbled by the fish. I never saw the *D. sexfasciatus* eating the plants, and if it did, the plant growth probably exceeded the destruction. I also think that the fish preferred the foods that were offered instead of the plants. Based on my experience, it is therefore possible to keep six-barred *Distichodus* in a planted tank, but it is a very risky thing to do.

Incidentally, that fish was about 12 inches long and was probably the most colorful one I've ever had. That may have had to do with the lighting and abundant cover, but it may also be taken as a contradiction of what I wrote previously about color and diet. I can't be sure.

### Behavior

What about behavior? The booklet I had said they were peaceful. Others have claimed that they were downright aggressive. Aggressive behavior has been documented and compared to cichlids (Baute and Poncin, 1993). When the little ones first show up in stores, they have a tendency to have some fin damage inflicted by fights among themselves that occur in holding tanks. In the wild they





■ Six-barred distichodus are able to tolerate a wide range of water parameters and accept a varied diet.

school together at this size. I've seen small ones trying to integrate into a school of clown loaches and, as they get bigger, start nipping at the clown loaches' fins and later ignore them altogether. I had one once that hid from everything all the time, which was highly unusual, as they usually roam the tank in a very confident manner.

I believe a lot of the issues about aggression correlate to the size of the tank they are kept in—the bigger the tank, the less of a problem. In fact, I've never had an instance where a *D. sexfasciatus* did any more damage than a nipped fin or a few missing scales, but others report that they are real monsters. I've also never kept them in a tank smaller than 90 gallons.

As I was preparing this article, a friend asked me to take two large ones from him because their mere presence was interfering with the courtship of some *Aristochromis christyi* in the tank. These two fish are about 17 inches long and were showing some scale damage, presumably from the *A. christyi*. I put them in the same tank. Soon afterward, one of them started bullying the other and I had to move one to another tank. There is a much smaller *D. sexfasciatus* in that first tank, and that fish was completely ignored by the big bully fish.

There are a few things that can be inferred from this experience. One is that behavior is variable depending on tankmates in the aquarium. The presence of the *A. christyi* and their courtship may have interfered with the aggression of the *D. sexfasciatus* that later became a bully toward the other, making it possible to keep more than one in the same tank. While I now have a very large and a relatively small *D. sexfasciatus* in the same tank with no problems, I do not recommend keeping more than one per tank.

I've observed similar issues with large fish in that they may be aggressive toward each other and fish as large as themselves, but at the same time they are very tolerant of fish that are smaller than themselves. I've never lost a *D. sexfasciatus* due to aggression from tankmates, and they seem to be able to take care of themselves even among large, aggressive cichlids. Many aquarists have kept them in Rift Lake cichlid tanks, as demonstrated by my friend with the *A. christyi*.

## Water Conditions

What about the water conditions in those cichlid tanks? *D. sexfasciatus* is found in Lake Tanganyika in the swampy drainage areas but never in the high-pH

parts of the lake. It is more commonly known from the Congo River, which suggests the soft acidic water of the jungle stream. Experience shows that it is very tolerant of a wide range of water chemistry values, since it has been kept in the hard, alkaline water of the Rift Lake cichlids as well as soft, acidic waters. I don't think there is a hard-and-fast rule for water conditions; if you've got other tropical fish thriving in your water, *D. sexfasciatus* should do well in that water too.

## Spawning

Spawning has never been achieved in captivity and probably never will be due to the problems of size and compatibility. Although they school together as youngsters, they don't get along in captivity, and they don't get along well as adults. There is also the problem that, like other large characins, they probably go through some sort of migration before spawning that can't be duplicated in captivity. Of course, with the work being done with hormone treatments, it is entirely possible that they will be commercially produced one day.

## Space Is Key

So should you acquire a *D. sexfasciatus*? I would say yes, but only if you have the tank space available now. I strongly discourage people from buying a fish that will outgrow their tank space with the idea that they are planning on getting a large tank later. Wait until you get that large tank, and make sure you have room in it for a fish that will grow to 3 feet or more. While *D. sexfasciatus* may have certain drawbacks as an aquarium fish, I find that the pros outweigh the cons. It is a beautiful fish that draws comments from even those who are not normally interested in fish.

## Works Cited

- Baute, P., and P. Poncin. 1993. "Preliminary study of the behaviour of *Distichodus sexfasciatus* Boulenger 1897 in aquarium: ethogram, social behaviour and daily rhythm of feeding activity." *Cahiers d'Ethologie Fondamentale et Appliquée, Animale et Humaine* 12(4):509–518.
- Stewart, K. 2001. "The freshwater fish of Neogene Africa (Miocene–Pleistocene): systematics and biogeography." *Fish and Fisheries* 2(3):177–230. 🐟



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# Behind the Brand: San Francisco Bay Brand & Ocean Nutrition

photographs courtesy of San Francisco Bay Brand



San Francisco Bay Brand and Ocean Nutrition owner Andy Schmidt and his family have an extensive history in the aquatics industry. For San Francisco Bay Brand in particular, it all began with the famous waters below the Golden Gate Bridge.

## A New Type of Food

Back in 1934, the curator of the Steinhart Aquarium in California realized that the live brine shrimp found in San Francisco Bay made an excellent food for fish. Although a few members of the San Francisco Aquarium Society were collecting it on a weekly basis to feed their fish, live brine shrimp was a relatively uncommon food for aquarium fish at the time.

Due to the interest of the Steinhart Aquarium and local aquarium society members, San Francisco Fish Farms began selling live brine shrimp on a commercial basis. Ultimately, San Francisco Fish Farms became a part of the Metaframe group and gained popularity, freezing the live brine shrimp and distributing the frozen food to pet shops across the country.

Parts of the company were later sold off, and San Francisco Bay Brand was purchased by Andy's father, Anton Schmidt, in 1979. Anton moved the company in the direction of creating foods for the aquaculture of human

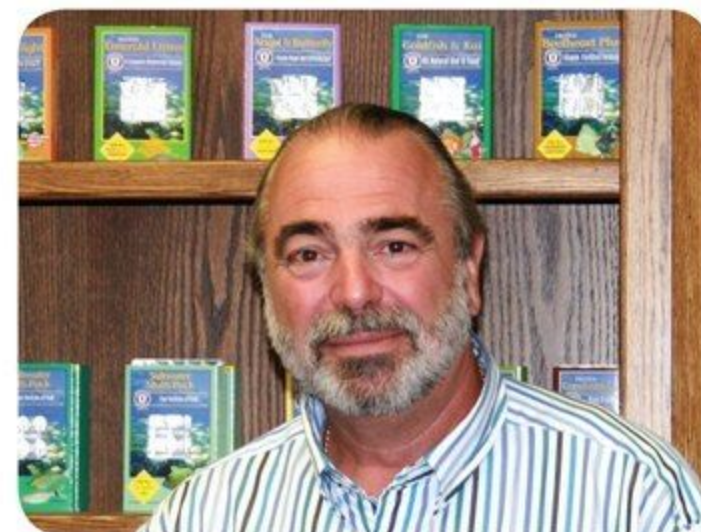
food fish, and made *Artemia* a major part of early aquaculture feeding programs, mainly with the use of eggs (or cysts) for larvae and rearing of fry.

Andy worked on the aquaculture side of the business for a time and described it as being less than glamorous. "Aquaculture had you go down to the coastline in Ecuador and stay in a hotel where you get scorpions in your shoes in the morning, and the next frontiers were India and Vietnam." When he took over the company in 1992, he decided he wanted to be in the pet industry instead.

According to Andy, brine shrimp had gained notoriety, but San Francisco Bay Brand prides itself on the fact that dozens of other new frozen products have helped to grow



■ San Francisco Bay Brand's name harkens back to the company's origins collecting live brine shrimp in the San Francisco Bay.



■ San Francisco Bay Brand and Ocean Nutrition owner Andy Schmidt.

success in the hobby also. One challenge that Andy hadn't anticipated was the difficulty in obtaining these foods over time. Collecting foods to be frozen is hard enough because, according to Andy, you have to go out at the right time of year and collect whatever animal you are looking for, get enough to last a full year, and then properly store it until you are ready to distribute to stores. He also observed that more and more of the habitats animals like brine shrimp live in are being paved over to make room for development, so he has to "go farther and farther to get the same amount."

## Ocean Nutrition

While San Francisco Bay Brand was working on developing frozen foods, Ocean Nutrition was developing formula foods. The company started as a project in Florida for rearing clownfish and needed prepared foods to feed them. That project was furthered when it moved to San Diego and the prepared foods started becoming popular. Ocean Nutrition was born from that, with a product called Formula One. Ocean Nutrition developed flake foods and pellets after new ownership in 2000. Seeing an opportunity to offer both his frozen fare and these prepared foods to a wider segment of aquarium hobbyists, Andy purchased Ocean Nutrition two years ago. The frozen food production will come back to the U.S. starting this spring.

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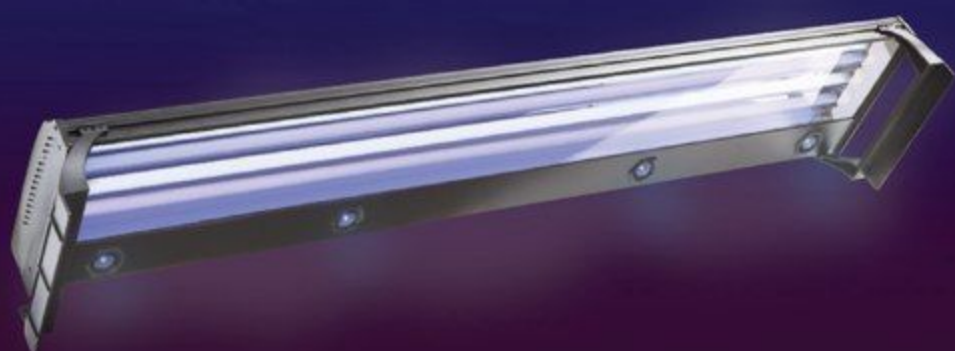




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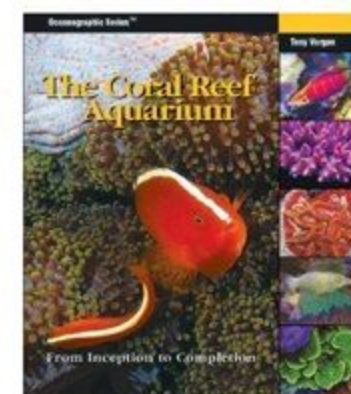
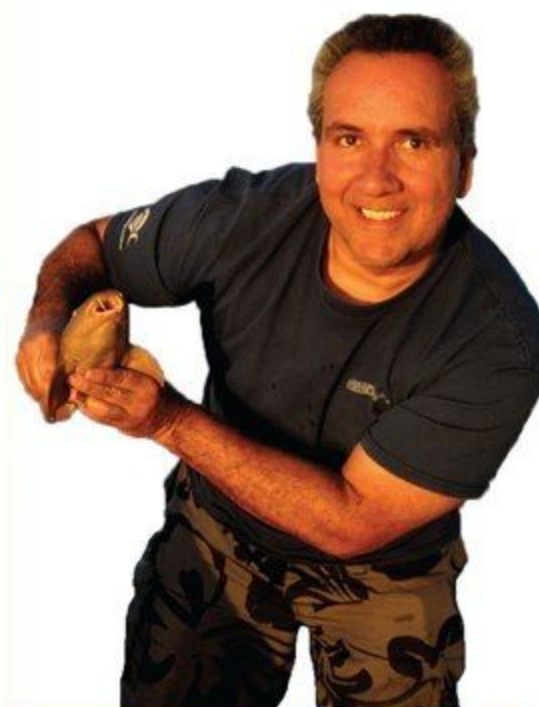
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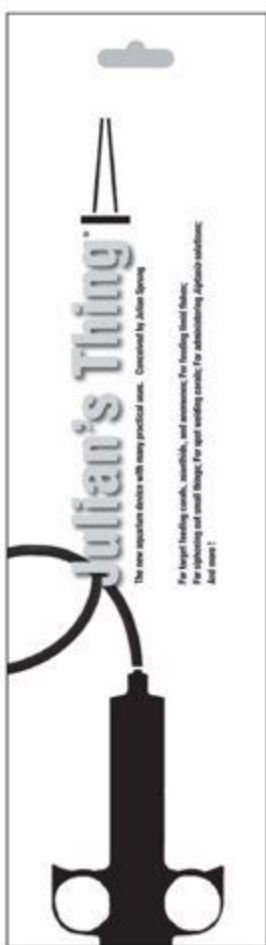
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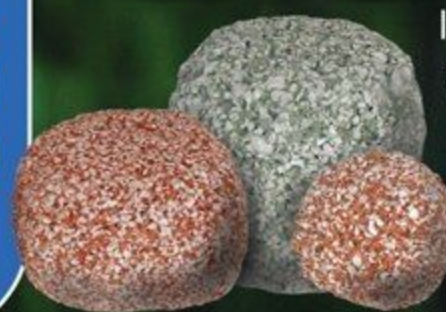
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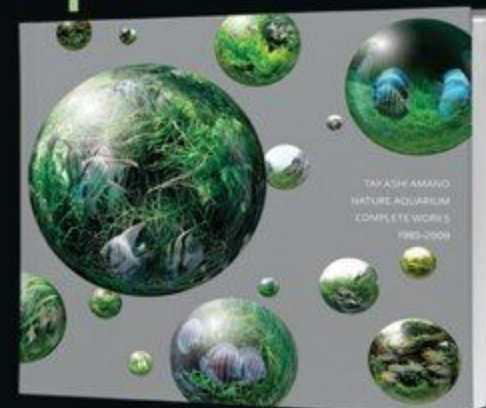
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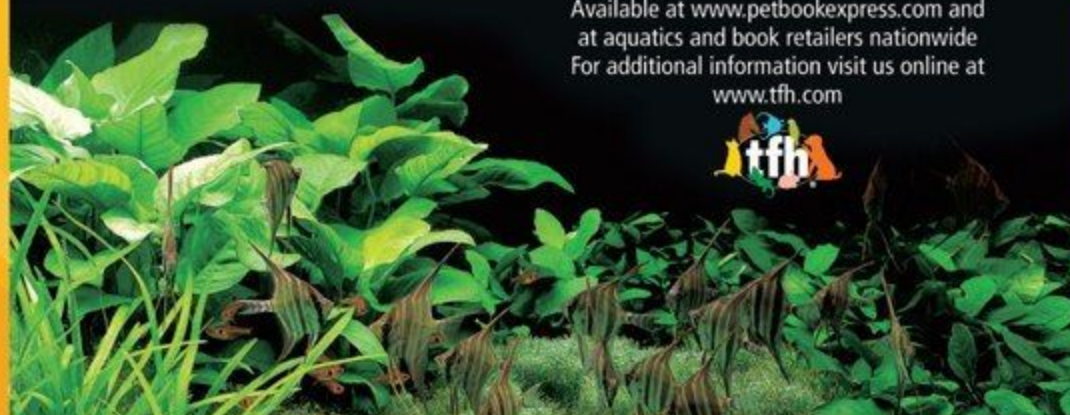
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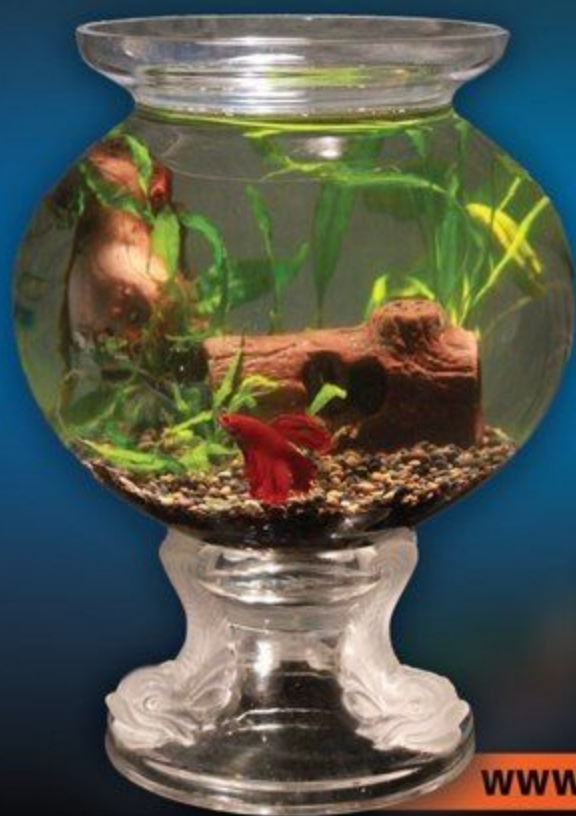




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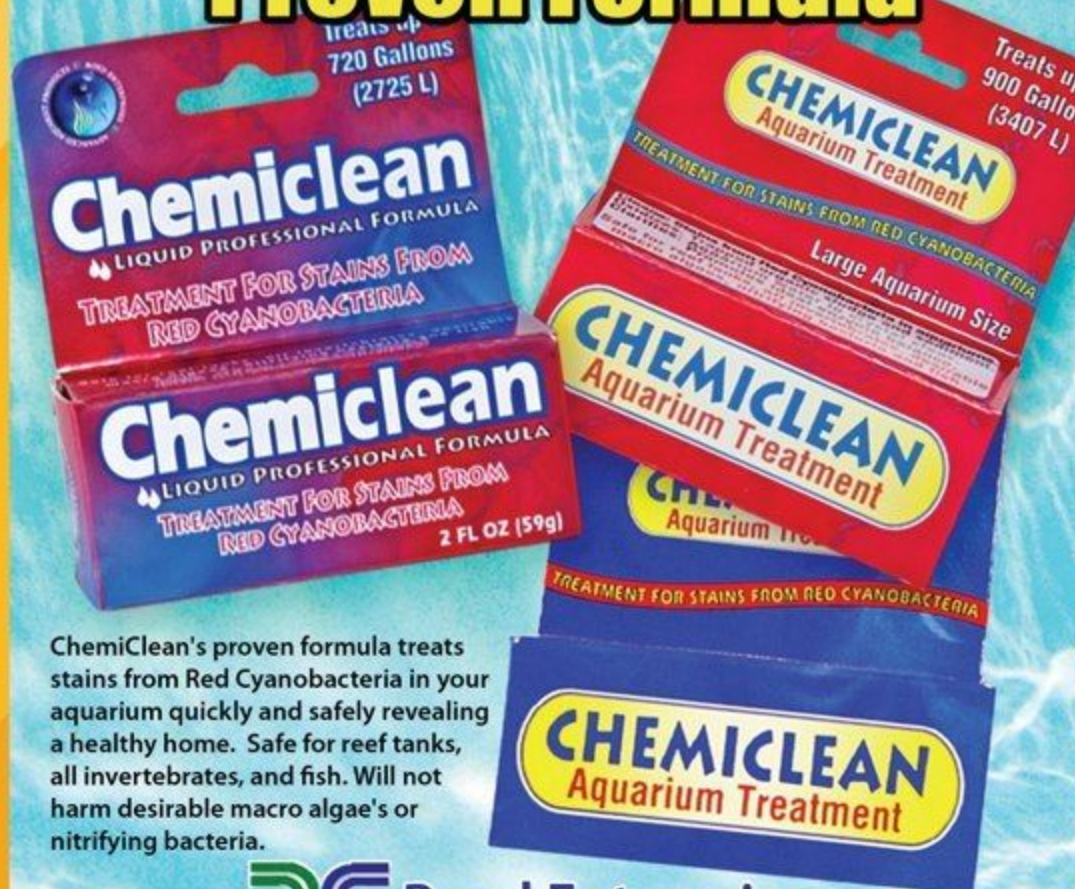


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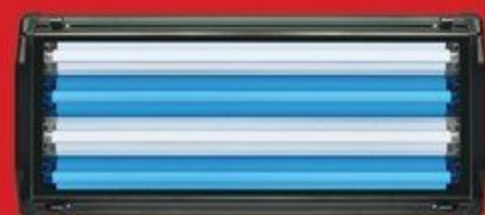
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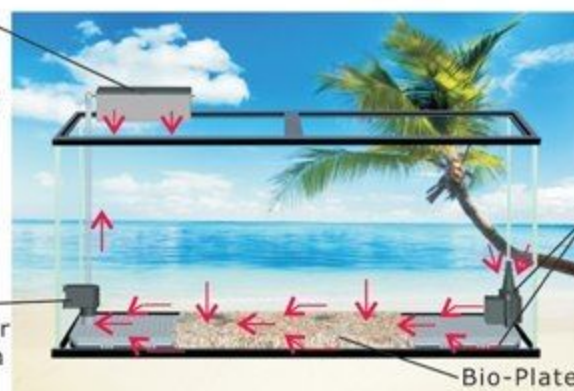
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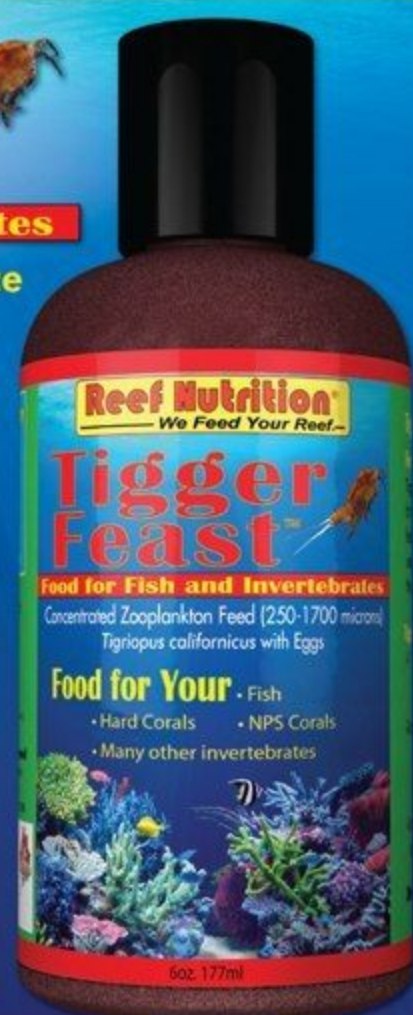


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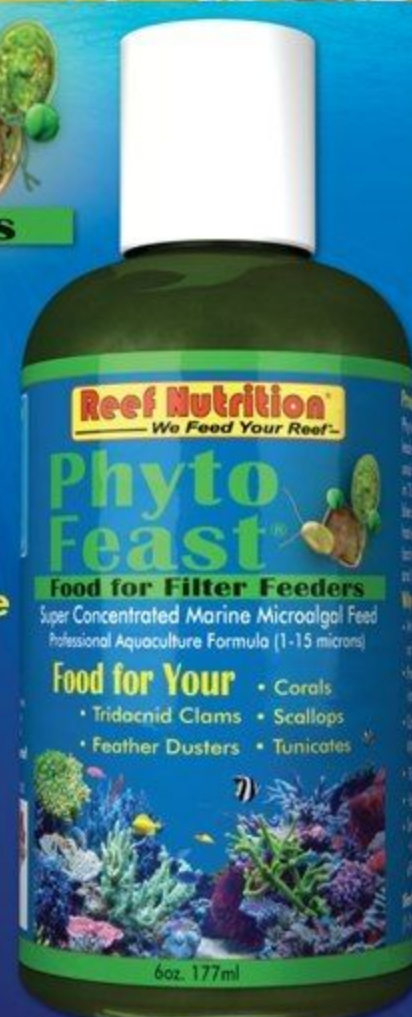
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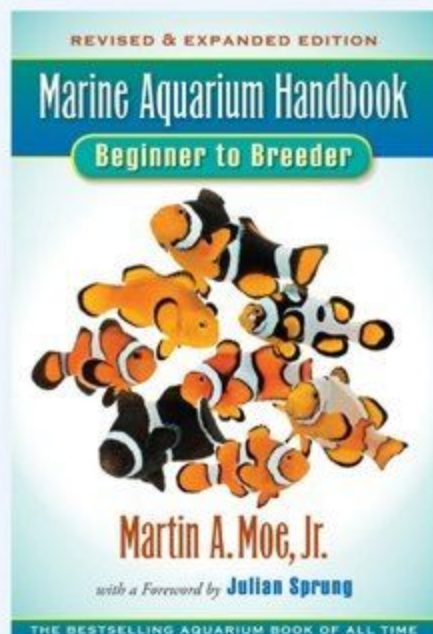
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## in next month's issue...

### electric blue jack dempsey

Jack Dempsey cichlids are a mainstay in the hobby. For those who love the original but are looking for something a lot more colorful and a bit more peaceful, the electric blue Jack Dempsey is the perfect fish for you!



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# meeting place

## events

### October 21-23 • Lyndhurst, New Jersey

The North Jersey Aquarium Society will be holding its Aquatic Weekend 2011 at the Lyndhurst Elks Club in Lyndhurst, New Jersey. The event will feature a vendor expo on Friday and Saturday. Saturday will also feature a fish show, and Sunday will have a giant tropical fish, plant, and dry goods auction. Food and drinks will be available all three days. For more information, visit [www.njas.net](http://www.njas.net).

### October 22-23 • Costa Mesa, California

This year's Reef-A-Palooza (RAP) will be held at the OC Fair & Event Center on October 22 and 23 in Costa Mesa, California. Now in its eighth year, RAP is an indoor marketplace where sellers, exhibitors, and hobbyists of all types can buy, sell, trade, or showcase their products to the marine hobbyist community. Look forward to an enjoyable, positive atmosphere conducive to education and trade of both product and knowledge. Expected are over 70 exhibitors and well over 2000 attendees. For more information, visit <http://reefapalooza2011.org>.

### November 6 • Lyndhurst, New Jersey

The East Coast Cichlids' (ECC) Fall Auction '11 will take place on Sunday, November 6 at the Lyndhurst Elks Club at 251 Park Avenue, Lyndhurst, NJ. Registration is from 9 a.m. to 11 a.m. There will be vendors, food, and plenty of quality fish, plants and dry goods. For more information, visit [www.eastcoastcichlids.org](http://www.eastcoastcichlids.org).

## clubs

### REGIONAL

#### American Cichlid Association

Come join in the largest and most distinguished national organization of the cichlid hobby! Your membership in the American Cichlid Association (ACA) entitles you to six issues per year of our highly acclaimed Buntbarsche Bulletin and access to our online Trading Post, and each July the ACA hosts a fabulous convention not to be missed! Your membership in the ACA will offer so much more, such as participation in the Paul V. Loiselle Conservation Fund, cichlid research through the Guy D. Jordan Endowment Fund, hands-on cichlid conservation through ACA C.A.R.E.S., a speaker program, a Club Liaison Program, special awards, and an up-to-date, informative ACA website at [www.cichlid.org](http://www.cichlid.org)

#### American Killifish Association

The American Killifish Association (AKA) is dedicated to the propagation, study, and conservation of killifish. Enjoy the benefits as a member. Membership is \$26 per year and includes six issues of the Journal of the American Killifish Association and monthly issues of the Business Newsletter, which gives members the opportunity to obtain and sell killifish. Members are also given access to the members-only section of the website. The AKA hosts many events during the year, including the big Memorial Day Weekend convention and affiliate club shows, which occur all year long. Log on to [www.aka.org](http://www.aka.org) for more information.

#### American Livebearer Association

The American Livebearer Association (ALA) offers bi-monthly publications, species maintenance programs, access to various types of livebearers, an annual convention, special publications, slides, and more. For more information, visit [www.livebearers.org](http://www.livebearers.org)

#### The Angelfish Society

The Angelfish Society (TAS) is a collection of angelfish enthusiasts, hobbyists, and breeders who are interested in the advancement of our hobby through improvements in the quality of the fish we keep and breed by employing the standard which this society will develop. TAS is dedicated to the enhancement of the angelfish through high-quality breeding programs using standards established by the society. Informative online chatroom meeting schedules can be found at [www.theangelfishsociety.org](http://www.theangelfishsociety.org). Membership is \$5 annually, which includes the quarterly FinTAStic newsletter.

#### Aquatic Gardener Association

Membership in the Aquatic Gardeners Association (AGA) includes a quarterly journal with informative articles for beginners and advanced hobbyists alike. Dues are \$20 per year (US, Canada, Mexico), \$33 all other countries (multiyear discounts available). For more information see our website, [www.aquatic-gardeners.org](http://www.aquatic-gardeners.org). For a sample copy of The Aquatic Gardener, please send \$6 (US, Canada, Mexico—shipping extra elsewhere) to AGA Bookstore, 2303

Mt. Sinai Road, Chapel Hill, NC 27514, USA.

#### The Canadian Association of Aquarium Clubs

The Canadian Association of Aquarium Clubs (CAOAC) is a non-profit association of aquarium, herptile, and pond clubs from across Canada and New York State. Some of the things we offer are: a national awards program to honor those in member clubs who have achieved success in breeding, plant propagation, or other endeavors related to the hobby; a Fish Rescue Program to help those hobbyists with large or unwanted fish to find new homes for them; and a chance to become involved with people who share similar interests. Please visit our website at [www.caoac.ca](http://www.caoac.ca) for more information.

#### East Coast Aquarium Society

The East Coast Aquarium Society is the largest and fastest-growing aquarium club in Atlantic Canada. ECAS actively promotes and encourages aquatic education of freshwater and marine aquaria, aquatic plants, and other related livestock in a fun and informative learning environment. Benefits and privileges of joining include discounts from sponsors and local vendors, auctions and fish shows, and shopping nights at local fish stores. Members also join programs such as the Breeders Award Program (BAP) and the Horticulturalist Award Program (HAP), which offer hobbyists rewards for species breeding and plant propagation. Also held are monthly socials and chat nights. For more information, visit [www.eastcoastaquariumsociety.ca](http://www.eastcoastaquariumsociety.ca)

#### East Coast Cichlids

East Coast Cichlids is an active and friendly group of hobbyists who support each other in the breeding, raising, and care of all fish (not just cichlids). Fun, monthly events are held and online support is always available. Come see what the "buzz" is about! FREE membership! Join us for fish, fun, and friendship! [www.eastcoastcichlids.org](http://www.eastcoastcichlids.org)

#### Great Lakes Cichlid Society

Join one of the Midwest's top cichlid clubs now celebrating its 20th year in progress. Members come from all states surrounding the Great Lakes area and throughout the nation. The club meets on the fourth Friday of every month, excluding July, 8 p.m. at the Masters Church (771 east 260th St. Euclid, Ohio, 10 minutes east of downtown Cleveland). There are local and national speakers monthly, raffles, breeder award programs, refreshments, and great fish talk. For more information visit [www.GreatLakesCichlidSociety.net](http://www.GreatLakesCichlidSociety.net)

#### International Betta Congress

Founded in 1966, the International Betta Congress (IBC) is a nonprofit worldwide organization promoting the breeding, raising, and study of bettas. IBC actively promotes the selective breeding of various color and finnage strains of bettas through the Sanctioned Show program, where fish are exhibited and

judged in pre-defined classes. Our bi-monthly bulletin FLARE! contains articles written by our members and is geared toward the beginner as well as the advanced hobbyist. We have a June Annual Convention hosted by one or more IBC chapters (smaller local groups of betta hobbyists within IBC). As a member of IBC you can join our members-only forum, a free service where you can send and receive group messages, share photos, access IBC-related files, and much more. For further information visit the IBC official website, [www.ibcbettas.org](http://www.ibcbettas.org)

#### International Fancy Guppy Association

The International Fancy Guppy Association (IFGA) is an organization for guppy breeders and hobbyists interested in breeding and showing fancy guppies. A monthly publication is available and many shows with over 40 color/tail-shape classes are held throughout the country yearly. For more information visit [www.ifga.org](http://www.ifga.org)

#### Mid-Atlantic Cichlid Keepers

The Mid-Atlantic Cichlid Keepers (M.A.C.K.) is a group of amateur aquarists whose main interest is the breeding, raising, and management of cichlids. Monthly meetings are held from September to May on the 3rd Friday of each month, at 8 p.m. (doors open at 7:30 p.m.), in the Springfield Town Hall building, 50 Powell Road Springfield, PA 19064. For further information, email [membership@mackattack.org](mailto:membership@mackattack.org) or visit [www.mackattack.org](http://www.mackattack.org)

#### Mid-Atlantic Koi Club

An active and friendly club for people who are interested in the study and enjoyment of koi, goldfish, and outdoor ponds. Monthly meetings provide a variety of activities, including lectures, pond tours and koi shows, as well as an opportunity to meet other enthusiasts. For information email [members@makc.com](mailto:members@makc.com) or visit [www.makc.com](http://www.makc.com)

#### The Midwest Cichlid Association

The Midwest Cichlid Association (MCA) is a new and exciting organization, dedicated to the promotion of keeping, breeding, and specialization of the cichlid fish hobby. We eat, sleep, and breathe cichlids! If you would like more information about The Midwest Cichlid Association, please email us at [Contact@MidwestCichlid.com](mailto:Contact@MidwestCichlid.com) or visit [www.midwestcichlid.com](http://www.midwestcichlid.com)

#### North American Discus Association

The North American Discus Association (NADA) is a non-profit organization of discus enthusiasts, hobbyists, and breeders. Our goal is to educate the general public, encourage new members, provide information on the hobby, and promote discus at fish shows. We offer a quarterly newsletter. Please visit our website at [www.discusnada.org](http://www.discusnada.org) for more information.

#### The North American Native Fishes Association

The North American Native Fishes Association (NANFA) is a not-for-profit, tax-exempt corporation dedicated to the appreciation, study, and conservation of the continent's native fishes. The organization seeks to increase and disseminate knowledge about North America's native fishes and their habitats, and to promote the conservation of native fishes and the protection/restoration of natural habitats. It also looks to advance the captive husbandry of North America's native fishes for the educational, scientific, and conservation benefits it affords. For more information, visit [www.nanfa.org](http://www.nanfa.org)

#### Northeast Council of Aquarium Societies

The Northeast Council of Aquarium Societies is a group of aquarium societies in the northeast, where

we share information about running an aquarium society and generally bring all members of each of our clubs together. The NEC sponsors an annual general tropical fish convention in March or April each year. [www.northeastcouncil.org/nec/](http://www.northeastcouncil.org/nec/)

#### Northwest Killies Club

The Northwest Killies Club (NWK) is an affiliate club of the American Killifish Association. Our intent is to represent the interests of killifish keepers of the Pacific Northwest and beyond. Membership is open to all. Our members are widely scattered, living in various parts of Oregon, Washington, and as far away as Utah. For that reason, we call ourselves a "virtual club," using e-mail to keep in regular contact and meeting physically only four times a year. We also publish a quarterly newsletter. For more information, visit <http://nwk.aka.org>

#### The Pacific Coast Cichlid Association

Now celebrating its 20th year, the Pacific Coast Cichlid Association (PCCA) meets in San Jose, CA the second Saturday of each month. Meetings feature a presentation (past speakers have included Dr. Paul V. Loiselle and Ad Konings) with an auction and raffle following. For more information, write to: PCCA P.O. Box 28145t, San Jose, CA 95159-8145 or visit [www.cichlidworld.com](http://www.cichlidworld.com)

#### Quad City Fish Keepers

Serving the Mississippi Valley region of Eastern Iowa and Western Illinois. All are welcome from the beginner to the advanced hobbyist, fresh or salt [www.qcfishkeepers.com](http://www.qcfishkeepers.com)

### ARIZONA

#### Arizona Aquatic Plant Enthusiasts

Meets every third Sunday of the month. See forum for additional details. [www.azaquaticplants.com](http://www.azaquaticplants.com)

#### Arizona Rivulin Keepers

Meets monthly (usually on the second Saturday), 7:00 p.m., Denny's Restaurant, 4403 S. Rural Road, Tempe, AZ. [www.ark.aka.org](http://www.ark.aka.org)

#### Dry Wash Aquarium Society

Meets the second Thursday of the month, American Legion Post 105 at 3534 W. Calaver Rd. in Phoenix, AZ at 7 p.m. [www.drywashaquarium.org](http://www.drywashaquarium.org)

### ARKANSAS

#### NE Arkansas Reef Club

Meets irregularly, but always available for online support, especially for beginners, and to share wealth of reefkeeping knowledge. [www.nea-reefkeeping.com](http://www.nea-reefkeeping.com)

#### Northwest Arkansas Aquarium Society (NWAAS)

Contact: 479-756-3112 - Meets the second Saturday of each month, 7 p.m., at the Rogers Police Department Community Room in Rogers, AR. General interest club, everyone welcome! <http://nwaas.com>

### CALIFORNIA

#### California Betta Society

Afternoon meetings on the fourth Saturday of each month. Check website for location and contact information. [www.csbettas.org](http://www.csbettas.org)

#### COAST Club

Meets 1 to 5 p.m., the first Sunday of each month, the Costa Mesa Neighborhood Community Center, Victoria Room, 1845 Park Avenue, Costa Mesa, CA. [www.coastfishclub.com](http://www.coastfishclub.com)

#### LA Fish Fanatics

This freshwater fish club meets in the San Fernando Valley, the last Sunday of each



month. Contact: 818-370-6930 or email [lafishfanatics@hotmail.com](mailto:lafishfanatics@hotmail.com)

### **The Marine Aquarium Society of Los Angeles County**

Meets the second Friday of every month, Denny's Restaurant, 3060 San Fernando Road in the Los Angeles area, 7 p.m. [www.maslac.org](http://www.maslac.org)

### **Sacramento Aquarium Society (SAS)**

Meets on the first Saturday of each month at 7 p.m. at Round Table Pizza (9500 Greenback Lane) in Folsom. [www.sacramentoaquariumsociety.org](http://www.sacramentoaquariumsociety.org)

### **San Diego Marine Aquarium Society**

Monthly meetings are held on the second Wednesday of every month. Visit the website for locations. [www.sdmass.com](http://www.sdmass.com)

### **San Diego Tropical Fish Society**

Meetings the second Sunday of every month, 7 p.m., Room 101 of Casa del Prado, Balboa Park. [www.sandiegotropicalfish.com](http://www.sandiegotropicalfish.com)

### **San Francisco Aquarium Society**

Meetings are 6:30 p.m., the first Friday of every month, and are free and open to everyone. [www.sfaquarium.org](http://www.sfaquarium.org)

### **Silicon Valley Aquarium Society**

Meets every first Saturday, 6:30 p.m., Round Table Pizza, 4302 Moorpark Ave., San Jose, CA (Rt. 280 & Saratoga Ave.). <http://siliconvalleyaquariumsociety.com>

### **Southern California Reef Keepers**

Meets at 2642 Cherry Ave. in Long Beach every 3rd Sunday of the month from 6 to 9 p.m. Contact Tana Hsu at 310-930-5537 or visit [www.scrk.org](http://www.scrk.org)

## **COLORADO**

### **The Colorado Aquarium Society**

General meetings the first Friday of each month, 7:30 p.m., St. James Episcopal Church, 8235 W. 44th Ave., Wheat Ridge, CO.

### **Rocky Mountain Cichlid Association**

Meets September through June, 6 p.m., the second Sunday of the month, the Englewood Recreation Center, 1155 W. Oxford Ave., Denver, CO (1/2 mile south of Hampden and one block east of Santa Fe Ave.). [www.rmccichlid.org](http://www.rmccichlid.org)

## **CONNECTICUT**

### **Connecticut Area Reef Society**

Meets monthly at various spots throughout the state, typically the third or fourth Sunday of the month. [www.ctars.org](http://www.ctars.org)

### **Greater Hartford Aquarium Society**

Meets 7:30 p.m. on the fourth Tuesday of every month at the Lutz Children's Museum, 247 South Main Street, Manchester, CT. [www.ghasct.org](http://www.ghasct.org)

### **The Norwalk Aquarium Society**

Meets the third Thursday of every month (except July and December), Earthplace, 10 Woodside Lane, Westport, CT. [www.NorwalkAS.org](http://www.NorwalkAS.org)

## **DELAWARE**

### **Delaware Reef Club**

Meets the third Monday of every month, 7:00 p.m., at the William Penn High School's main cafeteria in New Castle, DE. [www.delreefclub.org](http://www.delreefclub.org)

### **Diamond State Aquarium Society**

Meets on the second Monday of each month of the school year, September thru May, at 7:30 p.m. at William Penn High School, 713 E. Basin Road, New Castle, DE 19720. <http://dsas.topcities.com>

## **FLORIDA**

### **Coastal Aquarium Society**

Meets at the Pritzker Marine Biology Research Center at the New College of Florida the first Wednesday of each month at 7:30 p.m. For more information, visit <http://coastalaquariumsociety.com>.

### **Gold Coast Aquarium Society of South Florida**

Monthly meetings with presentations, raffles, and auctions. Details and forum at website. [www.goldcoastaquarium.org](http://www.goldcoastaquarium.org)

### **Southwest Florida Marine Aquarium Society**

Meets on the third Saturday of each month at 3:30 p.m. at The Imaginarium, 2000 Cranford Avenue, Fort Myers, FL (unless otherwise noted on the club website). [www.swfmas.com](http://www.swfmas.com)

### **Space Coast Reef Club**

Meets the first Wednesday of each month at 7 p.m. at the Space Coast of Florida. [www.spacecoastreelfclub.com](http://www.spacecoastreelfclub.com)

### **Tampa Bay Aquarium Society**

Meets the 2nd Monday of every month at the Florida Aquarium, 701 Channelside Drive, Tampa, FL. Doors open at 7:00 p.m., and the meeting starts at 7:30 p.m. [www.tbas1.com](http://www.tbas1.com)

## **GEORGIA**

### **Atlanta Area Aquarium Association**

Meets the first Sunday of every month at 1:30 p.m. in Room 101 of White Hall on the campus of Emory University. [www.atlantaaquarium.com](http://www.atlantaaquarium.com)

### **Southeast Georgia Reef Club**

Meets on third Tuesday of the month at Shoney's Restaurant in Waycross, Georgia at 7 p.m. [www.segreelfclub.com](http://www.segreelfclub.com)

## **HAWAII**

### **The Big Island Aquarium Society**

Meets the first Friday of every month, the Komohana Agricultural Complex, Hilo, HI, 7 p.m. Contact: Ricky K. Ogata, P.O. Box 6807, Hilo, HI 96720, [kazuor@interpac.net](mailto:kazuor@interpac.net)

### **The Honolulu Aquarium Society**

Meets the first Friday (except holidays) of each month, 7p.m., the Kuhio Elementary School Cafetorium, 2759 South King Street, Honolulu, HI. [www.honoluluaquariumsociety.org](http://www.honoluluaquariumsociety.org)

## **ILLINOIS**

### **Champaign Area Fish Exchange**

Meets on the first Saturday of every month in the Plant Sciences Laboratory, Room 1125, on the University of Illinois campus. Doors at 6:45 p.m., meeting at 7 p.m. [www.champaignfish.com](http://www.champaignfish.com)

### **Chicago Killifish Association**

Meets the third Saturday bimonthly at the Holiday Inn Select, 1801 N. Naper Blvd., Naperville, at 2 p.m. [www.aka.org/chika](http://www.aka.org/chika)

### **The Chicagoland Marine Aquarium Society**

Meets the second Saturday of each month, 1 p.m., DeVry University, 1221 N. Swift Rd., Addison, IL (unless otherwise noted). [www.cmas.net](http://www.cmas.net)

### **Greater Chicago Cichlid Association**

Meets 7 p.m., the second Sunday of each month, the Holiday Inn Rolling Meadows, close to I-90 & I-290/53. [www.gcca.net](http://www.gcca.net)

### **The Green Water Aquarist Society of Chicagoland**

Meets the first Friday of each month (except July and December), 7:30 p.m., the Alsip Village Hall, 4500 W. 123rd Street, Alsip, IL. [www.gwasoc.org](http://www.gwasoc.org)

## **INDIANA**

### **Circle City Aquarium Club**

Meets the first Thursday of each month, 7:30 p.m., Garfield Park Conservatory, 2450 S. Shelby, Indianapolis, IN. Virtual meetings at [clubs.yahoo.com/clubs/circlecityaquariumclub](http://clubs.yahoo.com/clubs/circlecityaquariumclub) every Monday and Wednesday, 7 p.m. [www.circlecityaqclub.org](http://www.circlecityaqclub.org)

### **Indy Cichlid Club**

The ICC holds monthly meetings where members can meet and discuss the latest information in the hobby. Contact [indycichlidclub@gmail.com](mailto:indycichlidclub@gmail.com). [www.indycichlidclub.com](http://www.indycichlidclub.com)

### **Michiana Aquarium Society**

Meetings the third Sunday of each month, Jan.-Nov. (second Sunday in June), 6 p.m., the Roseland Town Hall, 200 Independence Dr., Roseland, IN. [www.michianaaquariumsociety.org](http://www.michianaaquariumsociety.org)

## **IOWA**

### **Greater Iowa Reef Society**

Reefkeepers' club sharing years of knowledge for success! Monthly meetings include conferences, tank tours, DIY workshops, coral trading, group discounts, guest speakers, and raffles. Save money and find success! [www.greateriowareefsociety.org](http://www.greateriowareefsociety.org)

### **Iowa Aquaria Association**

Meets quarterly, the first Saturday of February, May, August, and November. [www.iowa-aquaria.com](http://www.iowa-aquaria.com)

## **KANSAS**

### **The Heart of America Aquarium Society**

See the Heart of America Aquarium Society listing under Missouri.

### **Wichita Aquarium Club**

Please visit the website for meeting information. [www.wichitaaquariumclub.com](http://www.wichitaaquariumclub.com)

## **KENTUCKY**

### **Louisville Marine Aquarium Society**

Meetings usually the third Sunday evening of the month. [www.LMAS.org](http://www.LMAS.org)

## **LOUISIANA**

### **Southeast Louisiana Aquarium Society**

Check our website for meeting times and locations. [www.selas.us](http://www.selas.us)

## **MARYLAND**

### **The Capital Cichlid Association**

Meetings the second Saturday of every month, 2 to 4 p.m. [www.capitalcichlids.org](http://www.capitalcichlids.org)

## **MASSACHUSETTS**

### **The Boston Aquarium Society**

Meets the third Monday of each month, 7:30 p.m., New England Aquarium, The Exploration Center, Central Wharf, Boston, MA. [www.bostonaquariumsociety.org](http://www.bostonaquariumsociety.org)

### **New England Fancy Guppy Association**

Typically meets the third Sunday of the month at 1 p.m. Email [laurasminskins@comcast.net](mailto:laurasminskins@comcast.net) or check the website for more information. [www.newenglandguppies.org](http://www.newenglandguppies.org)

### **The Pioneer Valley Aquarium Society**

Meets the first Tuesday of each month from September through June, the Captain Charles Leonard House, 663 Main Street, Agawam, MA, 7 p.m. [www.pvas.net](http://www.pvas.net)

## **MICHIGAN**

### **Grand Valley Aquarium Club**

Located in Grand Rapids, MI. Meets the second Saturday of each month, 7 p.m., after a half-hour social period, the Holiday

Inn Express, 6569 Clay Ave SW, just off Highway 131, at the 68th street exit. [www.grandvalleyaquariumclub.org](http://www.grandvalleyaquariumclub.org)

### **The Greater Detroit Aquarium Society**

Meets the fourth Wednesday of every month (unless otherwise noted), the Good Shepherd Lutheran Church, 814 North Campbell Road, halfway between 11 and 12 Mile Road, Royal Oak, MI, 8 p.m. <http://greaterdetroitaquariumsociety.org>

### **Michigan Aquatic Plant Group**

Check forum for meeting times and locations. [www.miapg.com](http://www.miapg.com)

### **Motor City Aquarium Society**

Meets the second Thursday of every month, St. Gertrude's Religious Education Building, 28839 Jefferson St., Clair Shores, MI, north of Martin Rd. (11 1/2 Mile Rd.) near the Blue Goose Restaurant. Enter from the back of the building. Doors open 7:30 p.m. [www.motorcityaquariumsociety.com](http://www.motorcityaquariumsociety.com)

### **Southwestern Michigan Aquarium Society**

Meets at 8 p.m. on the first Friday of each month at Kalamazoo Valley Community College's Advanced Technology Center, at 6767 West "O" Avenue in room 5830, in Kalamazoo, MI. [www.swmas.org](http://www.swmas.org)

## **MINNESOTA**

### **Minnesota Aquarium Society**

Meets the first Thursday of every month (except July) at King of Kings Lutheran Church at 2330 N. Dale St., Roseville, MN 55113. Meetings begin promptly at 7:30 p.m. [www.aquarium.mn](http://www.aquarium.mn)

## **MISSOURI**

### **The Heart of America Aquarium Society**

Monthly meetings on the third Saturday of each month from 2:00 p.m. to 5:00 p.m. at the Truman Memorial Building in Independence. For more information, contact Mike at 913-568-4014 or visit [www.kcfishclub.org](http://www.kcfishclub.org).

### **The Missouri Aquarium Society**

Meets the third Thursday of each month, 7:30 p.m., the Dorsett Village Baptist Church, 2240 Bennington Place, Maryland Heights, MO 63043. [www.missouriaquariumsociety.org](http://www.missouriaquariumsociety.org)

### **Saint Louis Area Saltwater Hobbyists**

See website for meeting dates and time. [www.slashclub.org](http://www.slashclub.org)

## **NEW HAMPSHIRE**

### **The New Hampshire Aquarium Society**

Meets the second Wednesday of every month, September through June, 7 p.m., Somersworth, NH High School/Vocational School. [www.nhaquariumsociety.com](http://www.nhaquariumsociety.com)

## **NEW JERSEY**

### **Jersey Shore Aquarium Society**

Meetings the second Monday of the month, Knights of Columbus Hall, 70 E. Main St. (Rt. 537), Freehold, NJ, around 8 p.m. [www.jerseyshoreas.org](http://www.jerseyshoreas.org)

### **The Metropolitan Area Killifish Association**

Meets the fourth Wednesday of the month (third Wednesday in November and December), the Meadowlands Environment Center, Lyndhurst, NJ. [www.aka.org/maka](http://www.aka.org/maka)

### **New Jersey Tri-State Tropical Fish Association**

Meets monthly, 7 p.m., the Barrington Municipal Building, 229 Trenton Avenue, Barrington, NJ. Contact: Bill Farrell, President, at 856-428-1431 or [fish4thought0321@aol.com](mailto:fish4thought0321@aol.com)

### **North Jersey Aquarium Society**

Meets every third Thursday of the month (except



August and December) at the Lyndhurst Elks Club, 251 Park Avenue, Lyndhurst, NJ 07071. Doors open at 7:00 p.m.; meeting starts promptly at 7:45 p.m. [www.njas.net](http://www.njas.net)

#### **The South Jersey Guppy Group**

Meets the third Sunday of each month, 1 p.m., the Griggstown Firehouse in Princeton, NJ. Contact: Dave Polunas at 732-329-9597 or email [daveguppy@aol.com](mailto:daveguppy@aol.com)

### **NEW YORK**

#### **Brooklyn Aquarium Society**

Meets the second Friday of the month, 7:30 p.m., the New York Aquarium's Education Hall, Coney Island, Surf Ave. and West 8th St., Brooklyn, NY. [www.brooklynaquariumsociety.org](http://www.brooklynaquariumsociety.org)

#### **Capital District Marine Aquarist Society**

Meetings are informal and held once per month at a volunteering member's home. [www.cdmas.org](http://www.cdmas.org)

#### **Central New York Aquarium Society**

Meets 7 p.m., the third Wednesday of every month (except July and August), at the Dewitt Community Center, 148 Sanders Creek Pkwy, East Syracuse, NY. [www.anyas.org](http://www.anyas.org)

#### **Danbury Aquarium Society**

Meets the fourth Friday of each month (except July and December), 8 p.m., the Carmel Ambulance Corps, Vink Road, Carmel, NY. [www.northeastcouncil.org/daas](http://www.northeastcouncil.org/daas)

#### **The Greater City Aquarium Society**

Meets the first Wednesday of each month (except January and February), the Queens Botanical Garden, Queens, NY 7:30 p.m. [www.greatercity.org](http://www.greatercity.org)

#### **Hudson Valley Reefkeepers**

Group meets monthly at a member's home. Visit the events section of the website for more information. [www.hvreef.org](http://www.hvreef.org)

#### **Long Island Aquarium Society**

Meetings are the third Friday of every month (except July and August) at 8 p.m. at Stony Brook University. [www.liasonline.org](http://www.liasonline.org)

#### **Long Island Reef Association**

Meets the first Friday of the month. See website for location and speaker. [www.longislandreef.org](http://www.longislandreef.org)

#### **Nassau County Aquarium Society**

Meets the second Tuesday of the month (except July & August). [www.ncasweb.org](http://www.ncasweb.org)

### **NORTH CAROLINA**

#### **Raleigh Aquarium Society**

Meets the first Thursday of each month, the North Carolina State University School of Veterinary Medicine; downstairs, across from the library; 7:30 p.m. [www.raleighaquariumsociety.org](http://www.raleighaquariumsociety.org)

#### **Reef Aquarium Society of Charlotte**

Meets every third Saturday of the month, 2 to 4 p.m. [www.rasoc.org](http://www.rasoc.org)

#### **Western North Carolina Aquarium Society**

Meets from 7 to 9 p.m. on the third Thursday of every month in the Aquarium & Planetarium Building at the Catawba Science Center, located at 243 3rd Ave. NE in Hickory, NC 28603. Freshwater and saltwater aquarium enthusiasts welcome. Contact: Scott Arney at [cichlidz1@aol.com](mailto:cichlidz1@aol.com)

### **OHIO**

#### **The Cleveland Aquarium Society**

Meets the first Tuesday of the month, the Cleveland Zoo educational building, just inside the main gate, 8 p.m. [www.clevelandaquariumsociety.org](http://www.clevelandaquariumsociety.org)

#### **Columbus Area Fish Enthusiasts (CAFE)**

Meets bimonthly in Columbus, OH. [www.columbusfishclub.org](http://www.columbusfishclub.org)

#### **The Greater Akron Aquarium Society**

Meets the first Thursday of each month, the Tallmadge Community Center, 80 Community Drive, Tallmadge, OH. [www.gaas-fish.net](http://www.gaas-fish.net)

#### **The Greater Cincinnati Aquarium Society**

Meetings the last Sunday of the month (may vary with speaker and event schedules), 7:30 p.m., the Winton Woods Visitor's Center, 10245 Winton Road, Cincinnati, OH 45231. [www.gcas.org](http://www.gcas.org)

#### **Medina County Aquarium Society**

An all-species club located in Medina, OH. See website for meeting dates and times. [www.mcas-fish.net](http://www.mcas-fish.net)

#### **The Ohio Cichlid Association**

Meets the first Friday of every month (except July, because of the ACA convention), the Old Oak Bible Church, 7575 Old Oak Blvd., Middleburg Hts., OH (north of Fowles Road). Doors open 7:30 p.m., meeting promptly at 8 p.m. [www.ohiocichlid.com](http://www.ohiocichlid.com)

#### **Stark County Aqua Life Enthusiasts Society**

Meets the second Sunday of every month, the Perry Grange, 6300 Richville Dr., Massilow, OH, 5:30 to 8:30 p.m. [www.scalesclub.com](http://www.scalesclub.com)

#### **Youngstown Area Tropical Fish Society**

Meetings the third Friday of each month, the Presbyterian Church, Mineral Ridge, OH, 7:30 pm. [www.yatfs.com](http://www.yatfs.com)

### **OKLAHOMA**

#### **Oklahoma Aquarium Association**

Statewide organization with chapters in Tulsa, Stillwater, and Oklahoma City. Meets monthly. For more details, call 405-263-4769 or visit the website. [www.theokaa.org](http://www.theokaa.org)

### **OREGON**

#### **The Greater Portland Aquarium Society**

Meets the fourth Tuesday of each month, 7 p.m., the Fellowship Masonic Center, the corner of 57th and Sandy, Portland, OR. [www.gpas.org](http://www.gpas.org)

### **PENNSYLVANIA**

#### **The Aquarium Club of Lancaster County**

Meets the third Saturday of each month except July and August. For more information, visit [www.aclcpa.org](http://www.aclcpa.org).

#### **The Bucks County Aquarium Society**

Meets the first Thursday of every month, the Churchville Nature Center, Churchville, PA, 7:30 p.m., doors open 7 p.m. [www.bcasonline.com](http://www.bcasonline.com)

#### **The Delaware County Aquarium Society**

Meets the first Friday of every month, except July and August, the Springfield Municipal Building, Springfield (Delaware County), PA. Doors open 7:30 p.m., meeting at 8 p.m. [www.dcas.us](http://www.dcas.us)

#### **Erie Aquarium Society of Erie Pennsylvania**

Contact: Erie Aquarium Society, P.O. Box 8025, Erie, PA 16505. Meets 7:30 p.m., the second Wednesday of each month, the West Ridge Fire Station, 3142 West 26th Street (Route 20) & Homer Avenue, Erie, PA 16506. <http://groups.yahoo.com/group/erieaquariumsociety>

#### **Greater Pittsburgh Aquarium Society**

Regular meetings usually the last Friday of the month, the Phipps Garden Center, corner of Fifth Ave. and Shady Ave. (Mellon Park). Doors open 7 p.m., meeting at 7:30 p.m. [www.gpasi.org/index.html](http://www.gpasi.org/index.html)

#### **Mason Dixon Reef Club**

Also serving Maryland; all meetings open to public. Check our website for times and locations. [www.mdreefclub.com](http://www.mdreefclub.com)

#### **Pennsylvania Fish Culturist Association**

Meets the second Thursday of every month (except July and August), 7:30 p.m., Lawncrest Recreation Center, 6000 Rising Sun Avenue, Philadelphia, PA 19111. Contact: Bill: 856-428-1431, or e-mail: [farfish403@aol.com](mailto:farfish403@aol.com)

#### **The Philadelphia Area Reef Club**

Meetings the first Wednesday of each month, the Katherine Drexel Library, 11099 Knights Rd., Philadelphia, PA 19154. Contact: [p.a.r.c@home.com](mailto:p.a.r.c@home.com)

#### **Pittsburgh Area Planted Aquarium Society**

Dedicated to planted aquaria. Meetings are typically held at 2:00 p.m. on the first Sunday of the month at A and B Oddball Pets and Aquariums, 262 Joseph St., Pittsburgh, PA. [www.homeofpapas.org](http://www.homeofpapas.org)

### **RHODE ISLAND**

#### **Tropical Fish Society of Rhode Island**

Meetings are the third Wednesday of the month at 7:30 p.m. (no meeting in December). Meetings are held at the Rhode Island Society for the Prevention of Cruelty to Animals (RISPCA) at 186 Amaral St., Riverside, RI 02915. [www.tfsri.net](http://www.tfsri.net)

### **TEXAS**

#### **Dallas Marine Aquarium Society**

Meetings are held on the second Saturday of each month. Visit the website for more information. [www.dallasmas.org](http://www.dallasmas.org)

#### **Dallas-Ft. Worth Marine Aquarium Society**

Meetings every third Wednesday of the month, around the DFW Metroplex. [www.DFWMAS.com](http://www.DFWMAS.com)

#### **Dallas Killifish Association**

Meets the first Saturday of the month at 6 p.m. Check website for date and location. [www.dallaskillifish.com](http://www.dallaskillifish.com)

#### **Greater Houston Aquarium Club**

Meets at a member's home on the third weekend of each month. Visit the website for time and location, or contact [stevecgg@myghac.org](mailto:stevecgg@myghac.org). [www.myghac.org](http://www.myghac.org)

#### **The Hill Country Cichlid Club**

Serving the I-35 corridor including Austin, San Antonio, and the rest of the Texas Hill Country. [www.hillcountrycichlidclub.com](http://www.hillcountrycichlidclub.com)

#### **Houston Aquarium Society**

Meets the fourth week of the month, varying locations. [www.houstonaquariumsociety.org](http://www.houstonaquariumsociety.org)

#### **Texas Cichlid Association**

Meetings the third Saturday evening of each month. [www.flash.net/~tcichlid](http://www.flash.net/~tcichlid)

### **UTAH**

#### **The Great Salt Lake Aquarium Society**

Meets the second Thursday of each month at the Garden Center, Sugarhouse Park, 1601 E. 2100 Street, Salt Lake City, UT. Doors open 7 p.m., programs, 7:30 p.m. [www.gslas.com](http://www.gslas.com)

#### **Utah Marine Aquarium Society**

Meetings held at the Living Planet Aquarium on the third Thursday of every month. [www.utmas.com](http://www.utmas.com)

#### **Wasatch Marine Aquarium Society**

Meetings the first Thursday of each month. [www.utahreefs.com](http://www.utahreefs.com)

### **VERMONT**

#### **Otter Valley Aquarium Society**

Meets the second Tuesday of the month at 7:30 p.m. (except July & August) at the Maclure Library in Pittsford, Route 7 North. [jtoddybas@aol.com](mailto:jtoddybas@aol.com)

#### **Tropical Fish Club of Burlington, VT**

Meets monthly September through June, the second Thursday of the month, the VFW Hall, 176 South Winooski Ave, Burlington, VT. [www.tfcb.org](http://www.tfcb.org)

#### **Vermont Marine Aquarists**

Meets quarterly when there is interest. Contact [erik.engstrom@gmail.com](mailto:erik.engstrom@gmail.com) for more information. [www.saltwatervt.org](http://www.saltwatervt.org)

### **VIRGINIA**

#### **Potomac Valley Aquarium Society**

Meets the first Saturday of each month at the Green Acres School, 4401 Sideburn Road, Fairfax, VA. Doors open 12:30 p.m., meeting begins at 1:00 p.m. [www.pvas.com](http://www.pvas.com)

#### **Shenandoah Valley Aquarium Club**

Meetings typically held on the last Sunday of each month from 2 p.m. until 3:30 p.m. Currently meets at the Arbys in Waynesboro, VA. For more information, check **Facebook (Shenandoah Valley Aquarium Enthusiasts)**.

### **WASHINGTON**

#### **Greater Seattle Aquarium Society**

Meets the second Tuesday of every month, except July and August. Plant auction in February, big auction in April. [www.gsas.org](http://www.gsas.org)

#### **Inland Northwest Aquarium Society**

Meets the first Wednesday of every month, 7 p.m., Aquarium Solutions, 9516 E. Montgomery Ave, Ste. 18, Spokane Valley, WA. [www.inwas.org](http://www.inwas.org)

#### **Seattle Saltwater Fish Association**

Meets biweekly in west Seattle, Washington. Contact: Kristine at 206-935-3212 or email [kvillager@gmail.com](mailto:kvillager@gmail.com)

### **WASHINGTON D.C.**

#### **The Chesapeake Marine Aquaria Society**

Meets monthly in the Greater Washington/ Baltimore area. See website for more details. <http://www.cmas-md.org>

### **WISCONSIN**

#### **Central Wisconsin Aquarium Society**

Meets at least once monthly, and auctions (spring and fall), shows (before fall auction), and other outings are held. [www.cwas.org](http://www.cwas.org)

#### **Green Bay Aquarium Society**

Meets the second Wednesday of each month at the home of a club member. <http://www.gbasonline.org>

#### **Madison Area Aquatic Hobbyists**

Meets monthly on the third Saturday of the month. <http://madisonaquatic hobby.com>

#### **The Milwaukee Aquarium Society**

Meets the third Friday of every month (except July and December), Hoffer's Tropic Life Pets, 7323 N. 76th St., Milwaukee, WI. [www.milwaukeeaquariumsociety.com](http://www.milwaukeeaquariumsociety.com)

### **AUSTRALIA**

#### **Australia New Guinea Fishes Association**

Contact: [membership@angfa.org.au](mailto:membership@angfa.org.au), PO Box 673, Ringwood Vic 3134, Australia. [www.angfa.org.au](http://www.angfa.org.au)

### **CANADA**

#### **The Aquarium Society of Winnipeg**

Meets every third Sunday, September through June, theatre 100 at St. Paul's College, University of Manitoba, 70 Dysart Road. [www.asw.ca](http://www.asw.ca)



#### Association Regionale des Aquariophiles de Quebec

Meets 7:30 p.m. on the second Monday of every month at 2125 Louis-Jolliet, Quebec, QC. [www.araq.org](http://www.araq.org)

#### Brant Aquarium Society

Monthly meetings are held on the second Wednesday of each month, September to June, at TB Costain Community Centre at 12 Morrell St., Brantford, Ontario. [www.brantaquariumsociety.ca](http://www.brantaquariumsociety.ca)

#### Calgary Aquarium Society

Meets the second Tuesday of each month. Visit the website for time and location. [www.calgaryaquariumsociety.com](http://www.calgaryaquariumsociety.com)

#### Canadian Killifish Association

Meets monthly, the second Sunday, 1 p.m. Location changes month to month. [www.cka.org](http://www.cka.org)

**The Canadian Rift Lake Cichlid Association**  
Quarterly meetings, the University of Guelph, Arboretum Nature Centre in Guelph, Ontario. [www.crlca.com](http://www.crlca.com)

#### Durham Region Aquarium Society

Monthly meetings, the second Tuesday of each month, 7:30 p.m., the cafeteria of F. J. Dovevan Collegiate, 250 Harmony Rd. South, Oshawa, Ontario. [www.drass.ca](http://www.drass.ca)

#### East Coast Aquarium Society

Based in Halifax, Nova Scotia. Monthly meetings from September to June. [www.EastCoastAquariumSociety.ca](http://www.EastCoastAquariumSociety.ca)

#### Hamilton & District Aquarium Society

Meets on the second Thursday of every month at 7:30 p.m. (except July and August) at the Church of the Resurrection, located at 435 Mohawk Road West, Hamilton, Ontario. [www.hdas.ca](http://www.hdas.ca)

#### Kitchener Waterloo Aquarium Society

Meets the first Tuesday of every month (except July and August). [www.kwas.ca](http://www.kwas.ca)

#### The London Aquaria Society

Based in London, Ontario, Canada. Meetings the second Tuesday of every month, 7:30 p.m., except July and August. [www.londonaquariasociety.com](http://www.londonaquariasociety.com)

#### Ottawa Valley Aquarium Society

Meetings are the fourth Monday of every month (except July, August, and December) at 7 p.m. at the Mel Baker Hall of J.A. Dulude Arena at 941 Clyde Avenue, Ottawa, Ontario. [www.ovass.ca](http://www.ovass.ca)

#### Peel Regional Aquarium Club

Meetings the third Thursday of the month, September to June, 7 p.m., Turner Fenton Secondary School, 7935 Kennedy Road South. [www.peelaquariumclub.org](http://www.peelaquariumclub.org)

#### Saskatoon Aquarium Society

Meets at the Calvin-Goforth Presbyterian Church at 1602 Sommerfeld Ave. (corner of 3rd and Sommerfeld) on the last Sunday of each month at 1:30 p.m. [www.saskatoonaquarium.com](http://www.saskatoonaquarium.com)

#### The St. Catharines & Area Aquarium Society

Meets every third Thursday of the month (except August and December) at The Seafarers and Teamsters Union Hall, 70 St. David's Rd. E., Thorold, ON. Doors open at 7:00 p.m.; meeting starts promptly at 7:45 p.m. Visit us at our website or call 732-541-1392. [www.scaas.info](http://www.scaas.info)

#### Sarnia Aquarium Society

Meets 7:30 p.m., the second Tuesday of each month, the British Canadian Club, 375 Vidal Street South., Sarnia, Ontario, Canada. [www.sarniaaquariumsociety.com](http://www.sarniaaquariumsociety.com)

#### Société d' Aquariophilie de Montréal (S.A.M.)

Meetings are on every third Tuesday of the month, except July and August, held at 75 Sir Georges-Etienne Cartier in Montreal, Canada; events include conferences, breeder awards, and auctions. [www.aquasam.qc.ca](http://www.aquasam.qc.ca)

#### Toronto Willowdale Aquarium Society (TWAS)

Serving the megacity of Toronto. For more information, email us at [info@torontoaquarium.org](mailto:info@torontoaquarium.org) or visit [www.torontoaquarium.org](http://www.torontoaquarium.org)

#### Vancouver Aquatic Hobbyist Society

See website for meeting times and contact information. <http://vahs.ca>

#### Wet Coast Aquarium Society

Meets the second Monday of the month at 7:30 p.m. at The University of British Columbia. <http://wetcoastaquariumsociety.ca>

#### INDIA

##### Indian Aquarium Hobbyist Portal

Dedicated to aquarists of India, bringing them together, addressing lack of specific information in the hobby and providing useful resources. [www.iah.in](http://www.iah.in) or [www.indianaquariumhobbyist.com](http://www.indianaquariumhobbyist.com)

#### ITALY

##### Club Ittiologico Romano "Giancarlo Iocca"

Meets the last Thursday of each month. Visit the website for time and location. [www.cir.roma.it](http://www.cir.roma.it)

##### The Gruppo Acquariofilo Salentino

Please visit website for meeting times and other information. <http://www.gas-online.org>

#### MEXICO

##### Comunidad Acuariofila Regiomontana

An association dedicated to the study, conservation, and propagation of all fishes, plants, and other aquatic life. Located in Monterrey, Nuevo León, Mexico. Annual membership is \$15. Meets every second Saturday of each month at 3:00 p.m. Mail us at [info@carac.com.mx](mailto:info@carac.com.mx) for additional information or visit [www.carac.com.mx](http://www.carac.com.mx)

#### PUERTO RICO

##### Aquarists Metro East of Puerto Rico

Meets in San Juan, every first Saturday, 1:30 p.m., Interamerican University Metro, 426. [www.amepr.org](http://www.amepr.org)

##### Asociación de Acuaristas de Aguadilla

Meets every second Sunday at 1:30 p.m. at Esc. Esther Feliciano de Mendoza, Ramey Base, Aguadilla, PR. Contact: [camatos99@yahoo.com](mailto:camatos99@yahoo.com) [www.aaapr.org](http://www.aaapr.org)

If your club would like to be included in "Meeting Place," please contact Tsing Mui at [tmui@tfh.com](mailto:tmui@tfh.com)

# aquarium society news

James Fatherree  
photographs courtesy of SEA-MAX

## Seattle Marine Aquarium Expo 2011

Over the weekend of July 23–24, I traveled from Tampa, Florida all the way across the United States to give a presentation at the Seattle Marine Aquarium Expo, better known as SEA-MAX. The expo was organized and put on by Kevin Adams, who is also responsible for the Marine Aquarium Expo in Orange County, California. The weekend was a very good one. There was plenty of interesting stuff and good people to see at the show, and I really enjoy going to such events.

While the expo in Orange County has been held for several years, this was the first time Kevin put together a show in Seattle, Washington. He apparently wanted to start pretty big, though, as there were dozens of vendors and five speakers who managed to draw a crowd of several hundred interested reef aquarium hobbyists. Many of the folks I talked to were locals, but there were lots of people from other cities and states as well.

Among the vendors were all sorts of good things to see, and even though I attend such events fairly regularly, I still come across new things every time I go to

one. That's one of the best things about these events. You can check out all of the latest stuff that's becoming available, and there's someone right there to answer all of your questions about it.

It's not just about all of the newest products, though, as there was also a vendor offering a huge assortment of aquarium books, many of which are

hard to find and/or out of print. There were also representatives from some of the biggest and best-known companies giving out information and selling their goods.

Of course, there were quite a few vendors selling livestock as well. I got to pore over hundreds of corals, fishes, and quite a few very nice giant clams. You might think that someone who's been in the hobby as long as I have would have seen it all by now, but that's definitely not the case. In fact, I came across one clam that was like nothing I'd ever seen.

And then there were the speakers. I talked about various ways to cut back on the electrical consumption of reef aquariums, and Bob Fenner talked about how to select healthy and compatible livestock, and how to best stock a small reef aquarium. Mark Callahan talked about creating a self-sufficient reef aquarium, and Dr. Tim Hovanec talked about nitrate- and phosphate-removing polymers. Patrick Foster finished up with a presentation about non-photosynthetic corals. There was lots of good information to hear on a variety of reefkeeping subjects—something for everyone, really.

On top of all that, attending the expo was a great opportunity to meet lots of fellow reefkeepers and talk about all sorts of reef-related stuff. It was definitely a weekend to remember!



SEA-MAX had plenty in store for reef hobbyists of all levels.



The author and fellow TFH columnist Bob Fenner pose for a shot with some mermaids.



# classifieds

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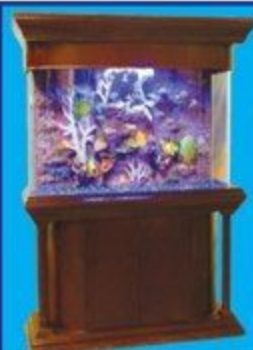
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## FISH

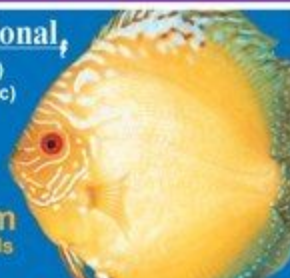
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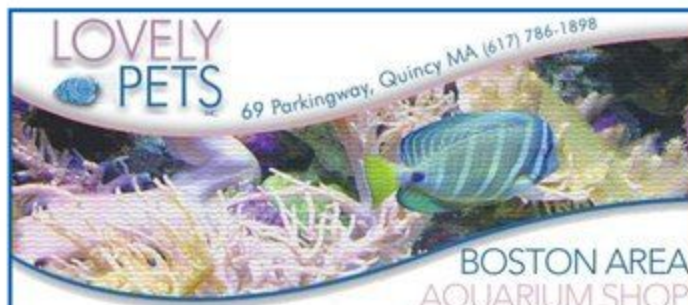
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