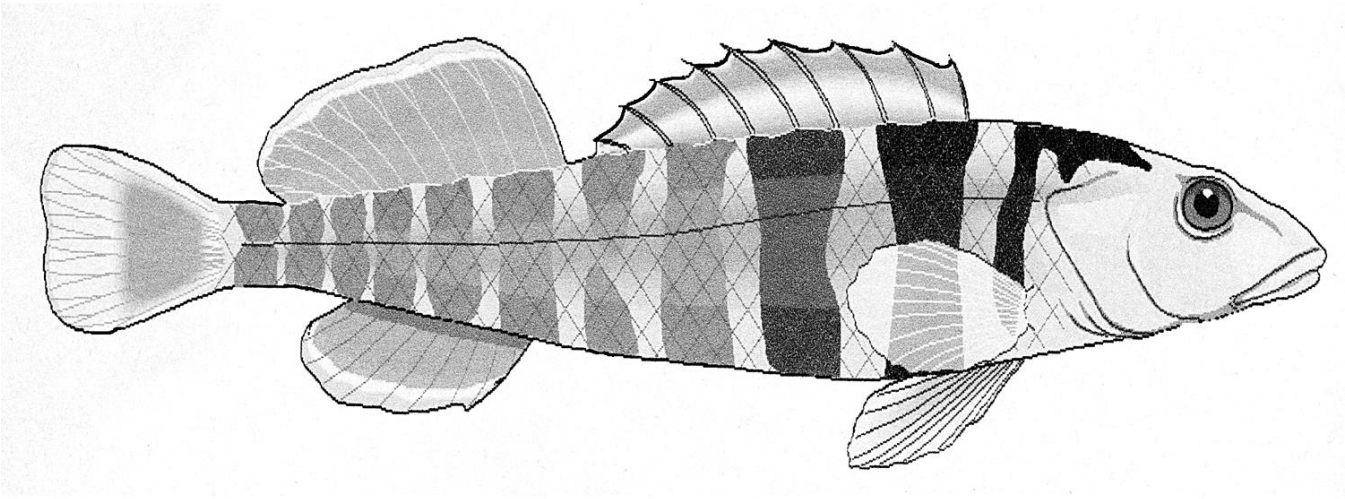
The Darter

July - August 2007



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St. Louis, Missouri

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MASI's official web page: **www.missouriaquariumsociety.org**

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The Missouri Aquarium Society will exchange their publication, THE DARTER, with other aquarium societies. Failure to receive three consecutive issues of a society's publication will be considered as a termination of our exchange with that society, unless advised to the contrary.

Please send exchange publications to:

MASI Exchange
P.O. Box 1682
Maryland Heights, MO 63043-1682

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THE DARTER (ISSN 0192-78333) is published bi-monthly by the Missouri Aquarium Society, Inc., 1813 Locks Mill Drive, Fenton, MO 63026-2662. Perdiodicals Postage Rates paid at Fenton, MO. This publication is free to members of the Missouri Aquarium Society, Inc. and other qualified requesters as determined by the publisher. Subscription requests can be sent to: Missouri Aquarium Society, Inc., 1813 Locks Mill Drive, Fenton, MO 63026-2662.

POSTMASTER: Please send all address changes to Missouri Aquarium Society, Inc., P.O. Box 1682 Maryland Heights, MO 63043-1682. Please allow 6-8 weeks for change of address. Include your old address as well as new - enclosing, if possible, an address label from a recent issue.

Places to Be
Things to See

THURSDAY August 16, 2007
General Meeting, 7:30 PM @ Dorsett Village Baptist Church

SUNDAY August 19, 2007
Auction, 12:00 @ the Stratford Inn
Contact: John Van Asch – 618-277-6165, johnsfishy@att.net

SATURDAY August 25, 2007
Executive Council, 7:30 PM - Hosted by Tammy Clemente

THURSDAY September 20, 2007
General Meeting, 7:30 PM @ Dorsett Village Baptist Church

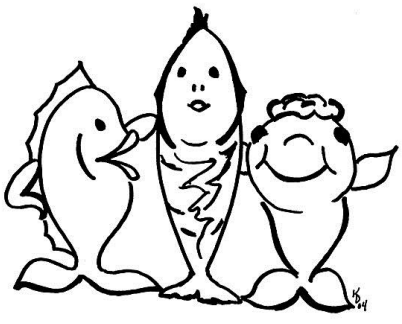
SATURDAY September 29, 2007
Executive Council, 7:30 PM - Hosted by Steve Edie

SUNDAY October 7, 2007
Fall Swap Meet, Noon to 3:00 @ the Stratford Inn

THURSDAY October 18, 2007
General Meeting, 7:30 PM @ Dorsett Village Baptist Church

THURSDAY November 15, 2007
General Meeting, 7:30 PM @ Dorsett Village Baptist Church

SUNDAY November 18, 2007
Auction, 12:00 @ the Stratford Inn
Contact: John Van Asch – 618-277-6165, johnsfishy@att.net



Membership

Yearly membership in the Missouri Aquarium Society, Inc. is $20 per calendar year ($15 for the remainder of the year). Membership includes the Darter subscription for the year, which is currently 6 issues. New memberships and renewals can be submitted at club functions such as meetings and auctions, or by contacting our membership chair, Kathy Deutsch at 314-741-0474, katfish@i1.net, or 9 Old Jamestown Ct. Florissant MO 63034

Presidential Preamble

By Mike Hellweg

Greetings all! I hope this finds you comfortable and enjoying the warm (but hopefully not too warm) summer season. Just don't forget your fish! Even with us spending a lot more time outdoors, our fish still appreciate feeding, water changes, filter cleaning, etc.

Many hobbyists move their fish outdoors for the summer. The fish just love the time outdoors! They will show their enthusiasm with brighter colors, growth, and, on many occasions, spawning. They will get an extra boost to their diet via all the bugs and other critters that are attracted to the water. Even though it is often thought that having small tubs or water gardens increases the number of mosquitoes in the area, with fish in them the opposite is actually true. The fish will enthusiastically eat both the larvae, and many adults that light on the surface of the water to lay eggs.

Many of your plants will also appreciate a move outdoors for the summer. The bright light and lengthened photoperiod will usually induce blooming, and often even seeds will be produced outdoors.

Let's move on to club business. Another fiscal year is over – our 48th. Counter to many other clubs around the country, our club is healthy and strong. Our Treasury is stable, which will allow us to go another year without raising dues, in spite of postage increases. Our membership is also strong and stable at just under 100 members. The nice thing is that many of our members are active members. In spite of your busy lives, more than half of you make it to our regular monthly meetings, and more than 30 regularly work to help out with club events. We have several new members who have become active in the club. Very few other clubs are so lucky! Just ask our members who have recently moved to other cities. They have clubs, but nothing like what we have here. They miss MASI.

Speaking of new members, we have 4 new faces (well, technically 3 new faces and one returning face after a few years off) on the MASI Executive Council, our Board of Directors, for the coming year. This is more change on the EC than we've had in many years. What a great chance for some new ideas!

In fiscal year 2008 we will have an Annual Show. This is great news! Gary McIlvaine has volunteered to run the show, and is looking for help. He will be holding regular show committee meetings at his house. Contact Gary (his email and phone number are on the MastHead page) if you would be interested in helping out.

We are still looking for a Bowl Show chair, though Phillip Newell has been doing a great job as temporary chairman – maybe he'll decide to take it on full time. Hint, hint.

We are already planning out fish for the Fish Raising Contest for 2008, even though the 2007 Contest isn't quite over yet. There is still a chance for anyone to win, even if you missed a showing. The last showing will be at the September General meeting.

Our fall Swap Meet is coming up quick – October 7, 2007. There are still plenty of tables available. The cost is just $25 per table. Contact Swap Meet chairman Bob Buckles (also on the MastHead page) for registration.

We are looking at offering some other social events in the new fiscal year. A fish room tour, a home Aquarium Beautiful contest, a fall barbeque, a collecting trip, a shop hopping run up to Sailfin in Champaign, IL, maybe even a couple day group trip down to see both the Tennessee Aquarium and the Atlanta Aquarium, and other things have all been discussed. All that any of these ideas need to become a reality is someone willing to lead the charge. None are too difficult. If you are interested in organizing one or more of them, just let me know.

Our June ice cream social was a huge hit – so much so that we never got around to the Q & A program for the June meeting! Thanks to Ed Millinger and Edy's Ice Cream for that one.

…and for now, 'nuff said…

Editor's Notes

Steve Deutsch

We have three new articles from MASI members; two from Mike Hellweg and one from Ed Millinger.

When we run short of reports and articles to fill a Darter, we reprint articles from other clubs that should be of interest to some of our members. We have three exchange articles in this issue, two from the Greater City Aquarium Society and one from the Calgary Aquarium Society. For the time I have been editor, Steve Edie, our exchange editor, has provided these articles. However, Steve has been wearing too many hats both for this club and for national organizations, and decided he needed to pass on one of them. Since I would much rather be exchange editor than treasurer, I agreed to take over. I received a new CD of articles from Steve Edie to finish up his time as exchange editor, so this gives me a chance to get up to speed. His help has been greatly appreciated. I have wanted to do the exchange job for a while, so I will see how it fits with being editor.

Mike Hellweg's article on *Neoheterandria elegans* was reprinted in the July - August 2007 issue of the Southwestern Michigan Aquarium Society's SWAM. Congratulations to Mike!

Article deadlines for the remainder of the year are August 15 and October 15.

Gammarus Shrimp: My Favorite Live Food

By Charley Sabatino

Reprinted from Feb 2005 *Modern Aquarium* of the Greater City Aquarium Society

Almost every breeding article I have read talks about the need for a good feeding regimen, which includes copious amounts of live food. While there are several types available to the hobbyist, all live food can be placed into 2 groups: purchased or cultured (many can actually be placed in both).

Purchasing live foods is fine, but for the hobbyist with many tanks, this can be somewhat of a problem due to the need to either store and "keep alive" large quantities of organisms like tubifex and blackworms or make frequent trips to the LFS (local fish store) for brine shrimp. Furthermore, foods such as tubifex and blackworms have the additional issue of possibly carrying pathogens into your tanks.

Culturing live foods eliminates the issues related to purchasing them, but it is generally considered to be difficult, dirty and time consuming. However, there are other organisms available to the hobbyist that are quite easy to culture, easy to maintain, provide good nutrition and do not harbor pathogens. My favorites among these are Microworms, Daphnia (which can be cultured indoors or outdoors), Grindal worms, *Gammarus* shrimp and Red Wrigglers. My favorite among these is the *Gammarus* shrimp and I will outline their culture and harvest procedure.

Background

Gammarus shrimp (AKA Freshwater shrimp, Calendonian shrimp or "scuds") are a member of the order of amphipods and of the suborder Gammaroidea. They are native to the US and are collected in the wild in many areas. They can grow up to 1/4 inch in length, and are considered to be scavengers. They mate while the female carries the male on her back as they swim. The female then holds up to 50 orange colored eggs in her egg pouch. The young hatch out fully formed, but are much too small to see. They will molt several times and eventually grow to adulthood, when the cycle will start again.

Culturing

Gammarus shrimp can be cultured in as small a container as a gallon jar, but most articles suggest a 10 gallon tank. In order to grow and reproduce, they need aged aquarium water from an established tank that has some calcium hardness for shell development. If your water (like mine) is very soft, crushed coral or African cichlid buffer can be added. All that is left is to add an airstone and some shrimp.

Gammarus starter cultures can be obtained from several retail sources on the Internet, as well as club members. It is best to acclimate them to the tank or container like new fish.

Feeding is no problem. While many websites hawk special "Scuds Food," I have found that they eat anything fish eat. Sinking algae wafers are the best in my case, but I have also fed them flake food, leftover baby brine shrimp, bits of plants, and crushed snails. Make sure you choose wisely when you feed them. By feeding the *Gammarus* (or any other live food) good quality foods, they in turn become good quality food for your fish. This allows you to "supercharge" your live food.

Gammarus, while relatively easy to culture, are most vulnerable in the beginning. Make sure they are actively multiplying before beginning to harvest. This can take up to a few months depending on the size of your starter culture. Once established, regular water changes with water from an established aquarium is appreciated.

Harvesting them is very easy. Scoop up some with a fine mesh net, add them to a tank and watch the fish go CRAZY. Even though *Gammarus* shrimp are relatively small, even mid-sized cichlids enjoy hunting for them. I have read that discus love them and will root around for hours until every shrimp is gone.

Overall, *Gammarus* shrimp are a great live food—nutritious, clean and easy to culture and harvest. A container or tank of these will assure that a good quality supply of live food is always available.

June Bowl Show Results

Open 1 Entry, 1 Entrant
1st place - Hifin Lyretail Swordtail - Mark Langer

Catfish 11 Entries, 8 Entrants
1st place - Pepper Cory - Corydoras paleatus - Marlon Felman
2nd place - Spotted Hoplo - Hoplosternum pectorale - Phillip Newell
3rd place - Giraffe-Nosed Catfish - Auchenoglanis occidentalis - Lawrence Kent

Judges: Phillip Newell, Kathy Deutsch, Charles Harrison

Member Classifieds

Charles Harrison (314) 894-9761, csharrison@inkmaker.net -
OTO Chlorine test kit, 4 ounces $12.50 last for about 2 years, detects traces of Chlorine in tap/tank water, and other "Chemicals for the Fish hobby"

MASI Members can place a classified ad in the Darter for free. Ads may be up to 30 words in length. Send your ads to the editor. The ad will run for one issue unless you specify how long to run in, in which case it will run as requested.

Characodon lateralis The Rainbow Goodeid

By Mike Hellweg

One of the most colorful of all the Goodeids is the diminutive Rainbow Goodeid. They have long been a popular fish among livebearer enthusiasts, and, along with a few other popular Goodeids, they have even become available commercially in limited quantities. I've now seen them in a few shops around the country, and along with *Ameca splendens*, even in a couple of "Big Box" pet stores locally! Pretty amazing for a Goodeid!

They are the perfect aquarium fish. They are not aggressive, have a thick body, a gregarious personality that has them always out in the open, and they are colorful. Males top out at just less than 2" and females can maybe go just over 2", though that is pretty rare. Male Rainbow Goodeids can vary in color, even within a single brood. The basic body coloration is yellow and blue, with red and black fins. Some males have orange/red in the body, and some have a greenish tint to the metallic blue sheen.

I kept my colony in a 30 long with a large potted sword plant, an algae covered large piece of driftwood, and a pea gravel bottom. The tank was filtered with a hang-on-back waterfall type filter and a sponge filter. The tank was on a lower rack in the fishroom, so it stayed relatively cool in the low 70's Fahrenheit. They shared the tank with a group of *Corydoras davidsandsi*. I fed them spirulina based flakes daily, and they nibbled at the frozen bloodworms that I squirted in the tank for the Corys, though they didn't go crazy for them and the Corys usually got most of them. They also seemed to love slices of zucchini, squashed peas, and French cut green beans. Some people have commented that Goodeids should not be kept with Corys, as they will constantly harass the Corys. At least with the Rainbow Goodeids, I didn't notice any problems between the two. And I didn't hear about the rumored problems until long after I had set up the tank and someone visiting my fishroom was surprised to see the two together in the same tank.

Water parameters were pretty stable, with a pH of about 7.4 and a total hardness around 125 ppm. They received a 50% water change once weekly, and the filter was cleaned once a month.

My small group of 2 males and 4 females quickly grew into a thriving colony, and I was always passing out young fish or pairs. Broods were small, usually no more than a dozen or so fry at a time. The fry were about 3/8" or so at birth. The adults usually ignored the fry, though I would occasionally see one of them chasing some of the newborns that still had the *trophotaeniae* attached. Fry grew quickly, and were adult size within about 5 to 6 months.

Like many other Mexican fishes, the Rainbow Goodeid is threatened in the wild by habitat destruction. This is a problem that doesn't seem to have any easy solution, so it would be a good idea if anyone working with these fish set aside a tank or two just to keep a colony going. These fish are beautiful and always in demand, so it shouldn't be hard to justify "just one more tank" to maintain a colony.

For more information about these and other livebearers, consider joining the American Livebearer Association. You can get more information, and even join online, at www.livebearers.org or by writing to:

American Livebearer Association Timothy J. Brady Membership Chairman 5 Zerbe Street Cressona, PA 17929-1513 (570) 385-0573 (H) (570) 385-2781 (FAX)

Club Hopping

Steve Edie

Aug 19 -- St Louis, MO: Missouri Aquarium Society – Auction

Sept 1 – Indianapolis, IN: Circle City Aquarium Society - Auction

Sept 21-23 – Des Moines, IA: Midwest Cichlid Association – Annual Show

Oct 7 -- St Louis, MO: Missouri Aquarium Society – Swap Meet

Oct 13 -- Cincinnati, OH: Greater Cincinnati Aquarium Society – Auction

Oct 13-14 -- Kalamazoo, MI: Southwest Michigan Aquarium Society - Workshop and Auction

Oct 21 -- Milwaukee, WI: Milwaukee Aquarium Society – Auction

Nov 16-18 -- Cleveland, OH: Ohio Cichlid Association – Cichlid Extravaganza

Nov 18 -- St Louis, MO: Missouri Aquarium Society – Auction

April 11-13, 2008 -- Hartford, CT: Northeast Aquarium Council – Annual Convention

Jul xx, 2008 – Atlanta, GA: American Cichlid Association – Annual Convention

Oct xx, 2008 – Laurel, MD: All-Aquarium Catfish Convention – Convention

Jul xx, 2009 – Cincinnati, OH: American Cichlid Association – Annual Convention

Filters for Dummies

By Grant Gussie

Reprinted from Nov 1998 Calquarium Of the Calgary Aquarium Society

Your tanks have too many fish in them. My tanks have too many fish in them.

Everyone who keeps fish has tanks with too many fish in them. "But," you say, "I only have one inch of fish per gallon, just like you told me to have". Very good. You therefore have a low enough fish density that it is possible to maintain a healthy tank, but you are still going to have to maintain it. It will not take of itself... there are just too many fish in it for that. How many lakes do you suppose have one inch of fish per gallon in them? Answer: none.

The same goes for the rivers and the oceans. Let's face it, fish densities in our aquaria are much, much higher than in nature. Our aquaria therefore require regular maintenance in the form of feeding, water changing, and cleaning. You can not eliminate these chores; you can just reduce their urgency by keeping your tanks' fish densities as low as is practical. So, you are stuck with doing (at least some) tank maintenance. Ho hum.

But all is not lost, since there is a very simple way to reduce the workload, a method that is so universally employed that it is often thought of as involving a mandatory piece of equipment. The filter.

All filters have one thing in common: they move water through a porous material. This material is called "filter media" in the aquarists' parlance. All filters also require some form of pumping mechanism, and these come in two basic types: air lift and power. The air lift filter makes use of air bubbles rising up a vertical tube to move water. These are relatively low capacity devices that require an external air pump. Power filters have a small, electrically powered water pump incorporated within them and do not rely on an external air pump. These can move water at a much greater flow rate than can an air-lift filter of comparable cost, power consumption, or physical size.

Filters will do a number of things for you. Most obviously, they will strain suspended junk out of the water (mostly fish poo and uneaten food). This makes the water clearer. Filters may also have a biological action, where living organisms remove dissolved fish wastes. This makes the water purer. Another way to make water purer is through chemical filtration, in which dissolved chemicals are taken out of the water by a chemical filter medium.

Various kinds of filters are used to produce one or more of these three types of filtration - mechanical, biological, and chemical. So I will discuss each of these three in turn.

Mechanical Filtration

Most easily supplied, but alas, also the least important, is mechanical filtration. The reason it is the least important is simple, fish really don't care (within limits) if their water is clear or not. Not many lakes and rivers are as clear as the typical aquarium (or certainly, at least, not as clear all the time) so fish can handle a modest amount of suspended solids without trouble.

But everyone uses mechanical filters anyway. It looks nicer. All mechanical filters pass water though a filter media that serves as a mechanical strainer. Because the filter media traps the solid material, it will eventually clog up, thus rendering the filter ineffective. Mechanical filters therefore require regular maintenance. The more you clean a mechanical filter the better, because the gunk they trap will decompose and add pollution to the water.

In the distant past the filter media of choice was "glass wool" - horrible stuff that cut fingers and looked like it would give you asbestosis. Then polyester filter material came on the market in the late

60's - a vast improvement. This is the same stuff sold to stuff pillows, but it is repackaged and sold in pet stores for a comparatively exorbitant price.

Nowadays, however, the most popular filter medium is open-celled foam rubber, for the simple reason that it can be rinsed and reused. They can also be cut to fit any filter box. A useful trick if you want to cut foam (and own a table saw) is to freeze the foam in an ice block, then cut the ice on the table saw.

Not only do you need a filter medium, you also need a filter box to put it in. The first of the mechanical filters to be widely used in aquaria were submersible box filters.
These are operated via an airlift. Box filters are cheap, but they have low capacities and are consequently only recommended for tanks smaller than 40 liters.

Hanging power filters were introduced in the 60's and were a great step forward in performance. There are two basic types of hanging power filter. The earlier filters all used the siphon design, where filtered water is pumped out of the filter box and is replaced by tank water that flows into the filter box through a siphon. This design relied on the siphon being maintained or they would run dry. It is (and always will be) a real pain to get all the air out of these filters' siphons. But with a hacksaw you can modify those filters with the "motor on top" so that they at least do not rely on a finicky siphon. Cut a notch in the top off the filter on the side opposite the hanging lip, and then hang the filter inside the aquarium. The tank water then simply overflows into the filter box through the notch, and no siphon tubes are required.

Some hanging filters perform much better after this modification is done. The hideously over-powered Superking model comes to mind, since water just cannot flow through the siphon tubes fast enough to keep this monster's motor satisfied.

Most modern hanging filters are nowadays of the "overflow" design. In this design the pump is connected to the tank water directly through an inlet pipe, and the pump pushes water into the bottom of the filter box. The water then flows up through the filter material and overflows into the aquarium as a small waterfall.

The advantages of this design are that they are quieter (never blowing air) and self-priming (you don't have to get the air out of a siphon tube). Their disadvantage is that you can not direct the return water, it just falls straight down. They therefore tend to refilter the same water over and over again. You can solve this problem by attaching a length of hose to the inlet pipe, so water is drawn in from the other side of the tank, rather than from below the waterfall.

Another design of power filter is the canister filter. This design uses a sealed filter sitting on the floor and connected to the aquarium by lengths of siphon hose. Thankfully, the siphons on canisters are a lot easier to get going than the ones on hanging filters because canisters are placed much lower than the aquarium.

Canisters tend to be somewhat more expensive and also pump much less water (per dollar) than hanging filters. They may leak as well, so should sit in a bucket on the floor. And they are also much more difficult to clean than hanging filters, as they must be partially disassembled before cleaning. They do however hold much more filter media than hanging filters and so serve as reasonably efficient bacterial filters (see below). They also have the potentially tremendous advantage that they do not require that the tank be completely full of water to operate.

Biological Filtration

Although I have a low opinion on the usefulness of mechanical filtration, there is one application in which a mechanical filter is very useful: as a pre-filter for a biological filter. Biological filtration removes dissolved pollution, and so it is the most important kind of filtration, and the only kind of filtration that a fresh water aquarium actually needs. But if you use a mechanical filter to strain the solid gunk out of the water before it reaches the biological filter, the biological filter can be left alone to do its job for longer periods of time.

The most important role that biological filtration has is the elimination of ammonia, which is quite toxic to fish. You can get rid of ammonia in two ways: let plants eat it or let bacteria eat it.

In practice, of course, both types of filtration will occur in any planted aquarium, regardless of what you do. Filter bacteria will grow on the plant roots and stems, and the plants will take up ammonia as they grow. By including an additional biological filter you are only promoting a natural process so that it can occur quickly enough to rid the tank of the ammonia produced by the number of fish in that tank.

Diatomaceous Earth Filtration

Also used as a mechanical filter medium is something called "diatomaceous earth". This is made of the hard silica exoskeletons of single-celled marine organisms called diatoms. These skeletons are not only very small, they are festooned with a baffling assortment of spikes, holes, hooks, and assorted appendages that trap suspended particles very well. Anything larger than a bacterium gets trapped by these filters, so they make the water very clear. That's why they are often used in swimming pools.

Diatomaceous earth requires its own specially designed filter unit. These filters are tricky to set up because you have to suck up free-floating diatoms so that they coat the inside of a nylon filter bag before filtering your tank. You then run tank water through the bag until it clogs up. The bag is then rinsed out, discarding the diatoms along with the trapped gunk. The process is then repeated with a fresh coating of diatoms. Fresh diatoms must be purchased separately.

Because DE is so effective at filtering out anything and everything, these filters clog up in no time. And because of their short running time between cleaning, diatomaceous earth filters are only good for intermittent use. The idea is that you would only filter a tank for 1/2 an hour or so once a week, rather than running the filter continuously.

These filters were once very popular - aquarium magazines from the 60's and 70's were full of their ads - but nowadays, few people bother to use them because quite frankly they are more trouble than they are worth. Water clarity is more easily achieved through conventional filters and proper tank maintenance.

Bacterial Filtration

Aquarists often think that bacterial filters are the only kind of biological filters there are. This is not so, but it is true that most biological filters in use are bacterial filters. In these filters bacteria eat the ammonia, thus creating nitrate as the final waste product.

The ammonia is consumed in a two-stage process. First *Nitrosococcus* bacteria convert ammonia to nitrite, and then *Nitrospira* bacteria convert nitrite to nitrate (by the way, these two bacterial genera are almost always misidentified as *Nitrosomonas* and *Nitrobacter*, respectively). Both of these conversions consume oxygen, and so they are called "aerobic". And both of these conversions require some time to get going, because the bacteria involved are slow growers.

The ammonia-to-nitrite conversion is usually well underway within two weeks of setting up a new filter, but the nitrite-to-nitrate conversion generally takes longer, usually four to six weeks. A bacterial filter is not "mature" until it successfully converts ammonia all the way to nitrate.

The process of maturing a bacterial filter is called "cycling". Filters that are not fully cycled can lead to "New Tank Syndrome", which is the loss of fish from ammonia and/or nitrite poisoning. This is the reason that it is recommended that new aquaria be left with only a couple of fish for six weeks before the remainder of the fish population is added.

Various commercial products are sold to help you cycle a tank faster by providing packaged bacteria. A lot of discussion has been around about their relative merits, and manufacturers have made lots of claims backed by "scientific" research (that for some reason never gets properly published) on how good their product is, but all this stuff is just so much crap. Don't buy any of it. They will just add organic pollution to your tank - they are basically just sewage anyway. If you want to speed up the

process then seed a new filter with some filter media from an established one. If you don't have an established filter handy, just be patient. Your filter will cycle by itself.

The first bacterial filter to gain wide use is the undergravel filter, which became popular in the 70's. These are inexpensive and effective bacterial filters, and so are still in wide use. In undergravel filters, water is pulled down though the gravel by an airlift or water pump that draws water from below a slotted false bottom beneath the gravel. The flow of oxygenated water allows the bacteria to grow on the gravel grains, and so ammonia is consumed while passing through the gravel.

The problems with undergravel filters become quickly apparent. First of all, they don't do plants any favors. People can and do grow plants with undergravel filters, but growing plants is a lot easier without them.

More importantly however, because UG filters draw water and fish poo down into the gravel, these filters are very hard to keep clean and they soon clog up. All the solid matter gets broken down by other bacteria which creates free phosphate and even more ammonia, and hence even more nitrate. Nitrate and phosphate levels increase rapidly, and so algae grow with abandon. Keeping the gravel clean enough to prevent this only results in the removal of most of your desirable bacteria along with the gunk. Undergravel filters cause far too many long-term maintenance problems (especially in moderately to heavily stocked tanks) to be recommended.

An improvement over undergravel filters is the reverse-flow undergravel filter. In these devices, water is pumped down through the "uplift" tubes and then rises up through the gravel. The water is mechanically pre-filtered before it is pumped so that the poo is not trapped in the gravel. By keeping the mechanical pre-filter clean you prevent the solid waste from breaking down and adding to the nutrient load of the aquarium. This allows the bacteria in the gravel to grow undisturbed for much longer periods of time. So with proper maintenance, reverse flow UG filters result in a cleaner and less algae-ridden tank.

A regularly cleaned mechanical prefilter is now regarded as a very important part of any high-capacity biological filter. Biological filters that lack a mechanical prefilter should only be used in very lightly stocked tanks.

Reverse-flow undergravel filters do however have their disadvantages as well.
Plants suffer from reverse-flow undergravel filters just as they do from downward-flow UG filters. Tanks with these filters also require supplemental aeration, since oxygen is removed from the water as it passes up through the gravel, and the filter does not create any surface agitation or bubbles to replenish it.

The next advancement in bacterial filters was the wet/dry trickle filter, popular by the mid-80's. This filter is essentially a small aquarium underneath the main one. Water flows into the filter after exiting the main aquarium through an overflow pipe. The water is mechanically pre-filtered and then passed over the filter media, which is kept otherwise emersed ("dry") and thus fully exposed to air. Once the water passes over the filter media, it collects in a ("wet") sump, and from there a powerful water pump lifts the water back up to the main aquarium.

By passing water over an emersed surface these filters actually saturate the water with oxygen rather than deplete it. Also, because an overflow is used, this filter has the benefit of "surface skimming", which removes the film that builds up on the water's surface.

The filter media used in wet/dry filters is several liters of any one of a wide variety of little plastic thingies. Various manufacturers of the thingies tell of all sorts of unpublished "scientific" results proving that theirs' are the best. But the thingies of choice are still those plastic pot scrubbers sold at Safeway (or available in bulk at Costco). They cost less than half of what the imported German ones do, and they work just as well.

Unfortunately, wet/dry trickle filters are large devices, and they take up pretty much ail of the room under the aquarium. They also require a powerful pump that is expensive to both buy and to operate. A wet/dry filter is really a second aquarium under the "real" one, so there are obvious additional

costs involved with building and connecting two aquaria where one was used before. One wet/dry filter can however service many aquaria, and so these filters are the most popular choice in "central" filter systems.

Also available are "fluidized bed filters'. These filters are more compact than wet/dry filters. In these filters, water is pumped up through graded filter sand, which is suspended by the up-flow. Since sand grains are so small, a tremendous biological filter area is available in a small volume. Unfortunately, they are tricky to design since it is necessary to keep the sand suspended but not have it flow out of the top. The small sand grains also pack tightly and go anaerobic very quickly if there is a power outage.

Much less expensive and complicated are the new combination mechanical/biological hanging filters. These are highly recommended for medium-sized to larger tanks. These devices are essentially hanging power filters with some kind of biological filter module downstream of the mechanical filter. The biological filter can be a drip plate or a turning water wheel. The wheels are also sold separately so they can be retrofitted to an existing canister filter (a very nice idea). These devices are new on the market but they are now widely available.

The final kind of bacterial filter is the sponge filter. These are simple airlift devices that have a relatively low capacity. Essentially they are just foam rubber blocks with airlifts attached. The foam rubber sits on the tank bottom and water is drawn through it and up the airlift tubes. Because these filters lack a mechanical prefilter, they trap the solid material that really should be removed, just as undergravel filters do. Rinsing the filter clean removes most of the bacteria it was intended to grow, thus disrupting its biological activity. These filters do however have the tremendous advantage that they can not trap even very small fishes, and are therefore often used in fry tanks.

Another very good use for a sponge filter is to use it as a mechanical prefilter for a canister filter. As previously mentioned, canister filters require disassembly to clean, and cleaning the filter removes the bacteria they are intended to grow. But by sticking a sponge filter over the inlet of a canister, we prevent gunk from entering the canister, thus allowing it to act as a purely biological filter that would almost never need to be disassembled for cleaning,,

Denitrifiers

For a short time in the early to mid 90's, there were advertised a lot of different kinds of denitriying filters. But you don't see them much anymore because they don't work. That sort of put a damper on their sales.

Anyway, this is how they are supposed to work. Nitrate can be used by anaerobic bacteria as an oxidizer instead of oxygen. In effect, the bacteria breathe nitrate instead of oxygen. So if you create a region where there is no oxygen, but lots of nitrate, and a food source for the bacteria in the form of a carbohydrate, then the bacteria will consume the nitrate. The end result is nitrous oxide or nitrogen gas, which diffuses out of the water into air.

In denitrifying filters water is very slowly passed through a submerged filter medium. A small amount of a sugar (bacteria-food) is added. Aerobic bacteria consume all the oxygen in the outer layers of the filter medium, and so bacteria in the inner filter consume the nitrate in order to metabolize the remaining sugar. By the time the water passes through the filter, it has had all of the sugar and oxygen consumed, as well as at least some of the nitrate. The water is then aerated to replace the lost oxygen and get rid of the excess nitrogen gas. It is then returned to the tank.

So, why don't they work? Well, in practice, they are just too touchy. Too much organic matter in the water and you get poisonous hydrogen sulfide being produced. Pass the water through too quickly and ammonia is produced. Etc., etc. And even if you do get them set right, you must pass the water through them so slowly that they do not produce enough nitrate-free water to make any real difference to your tank, unless you get a very big denitrification filter. That means big bucks.

Plant Filtration

The second kind of biological filter is the photosynthetic plant filter. Plant filters are a major improvement in biological filtration over bacterial filters in several ways. Plants take up ammonia and incorporate it into their tissues directly, and so there is no build up of nitrate. They also take up metals and phosphates and so purify the water much better than do bacteria. They therefore help combat the problem of algae growing in the aquarium, rather than contribute to it. And of course, plants are net producers of oxygen, rather than consumers.

The plants are grown in trays through which the water flows. The temple plant (*Nomophila stricta*) is a very good choice as a filter for fresh water since it is incredibly fast growing and has a correspondingly high uptake of ammonia and other nutrients.

Temple plants can be grown fully submerged, but they grow faster, and therefore filter better, when they are allowed to grow up out of the water. They do not need to be grown in gravel. Instead, it is possible to grow temple plants "hydroponically". Simply stick cuttings through the holes of an egg crate held just above the water surface. Make sure that the bottom of the cutting is in the water. The cutting will start to take root almost immediately.

I have also had great success growing temple plants in an illuminated wet/dry trickle filter that uses Perlite® potting soil additive as a filter medium. The plant roots grew throughout the Perlite.

Salt water, on the other hand, is filtered best with a (fully submerged) higher alga like Caulerpa, or a salt-tolerant vascular plant like the mangrove. Caulerpa must attach itself to a solid surface (such as coral rock) to grow, while mangroves can be grown hydroponically.

The difficulties of plant filters are twofold. First of all, a plant generally requires more care than a bacterium; and secondly, plant filters are physically quite large and expensive.

The typical plant filter design is similar to the under-the-tank wet/dry trickle filter (discussed above) but with the additional cost and complexity that comes with the requisite bright illumination.

The only plant filters offered for sale are called "algal turf scrubbers" which are designed for growing submerged algae in salt water. If you want to grow emersed plants in a filter you will have to build the filter yourself.

Chemical Filtration

The third form of filtration is chemical filtration. Most often this is done with activated carbon. Activated carbon will adsorb dissolved organic molecules and metals, thus purifying the water. Adsorption (with a "d") differs from absorption (with a "b") in that adsorption is a process in which the pollutant sticks to a solid surface by an electro-chemical bond, while absorption is the purely mechanical process of "sopping it up".

Carbon filtration requires the regular purchase of fresh filter media because the old carbon must be discarded when it is exhausted (carbon can not be economically reactivated at home). There are a large number of brands of activated carbons available. These carbons come from a variety of different sources, including wood, coal, and coconut shells. Most commonly used are bituminous and lignite coal.

Tests reveal that the most expensive carbon is not necessarily the best at removing organic matter from aquarium water. Surprisingly, the inexpensive Aquarium Pharmaceuticals Super Activated Carbon brand scored best of those brands commonly sold in local stores (Marker, 1998).

Carbon filtration is quite important in salt-water aquaria because marine fishes are very sensitive to pollution, and because of the expensive sea salt they require. It is therefore very expensive to make the massive water changes required to keep pollution levels low enough for salt-water fish. So it is in everyone's best interest to purify the old water through carbon filtration.

A lot of debate goes on as to how much carbon is needed, but current thinking is that you should use only a little carbon but change it often. Harker recommends about 1 mL carbon per 4 liters of water (3 tablespoons per 50 gallons), and to use the carbon only intermittently, about 12 hours per week, using fresh carbon each week. Put the carbon in the filter so water flows through it, but only slowly.

Also recommended for marine aquaria is chemical filtration with a foam fractionator, also known as a protein skimmer. A large protein skimmer is now generally considered to be mandatory equipment for all salt-water tanks.

Skimmers work like this: fine air bubbles are injected into a downward flowing column of water. Hydrophobic molecules like lipids and most proteins adhere to the bubbles and rise with them to form a froth at the surface of the water column. This froth is pushed upward through an outlet by more froth that continues to collect below it. The froth then flows into a collecting cup for removal. By removing the organic molecules before they break down, the skimmer helps maintain a much higher water quality than can be easily maintained without one.

Skimmers inject air into the water by one of two ways. Air can be injected conventionally with an air pump and a fine air diffuser. This design tends to be used in lower capacity skimmers suitable for tanks smaller than 400 liters.

Larger aquaria and reef aquaria usually employ venturi skimmers. These have powerful water pumps that force water through a narrowed opening into which an air inlet leads. This opening is called a venturi. The water must speed up to go through the narrowed opening of the venturi, and the faster a fluid travels the lower its pressure is. So air is drawn through the inlet to the inside of the venturi.

But alas, only very large, powerful, and expensive skimmers work in fresh water.
This is because fresh water has a higher surface tension than salt water and so the air bubbles are larger - too large to cause the water to froth. Very energetic pumps are consequently required to froth fresh water, making a fresh water skimmer economically unviable. They consequently are not used in fresh water aquaria, but they are used in sewage treatment plants where pollution levels are much higher and frothing is more easily achieved.

So how do you chemically filter a fresh water aquarium? If a fresh water aquarium is full of very inexpensive tap water then the simple answer is ...you don't. Why bother? Tap water is cheap and so why not just change the water with fresh instead of trying to purify the old stuff? The nitrates, phosphates, and organic matter dissolved in your tank are great fertilizers, and since you have to water your lawn and house plants anyway, just water them with old tank water and give your fish new water. While you are at it, rinse your mechanical filter foam in the wastewater before giving it to the plants so they get some solid fertilizer too. Nothing beats organic!

Recommendations

So, that should be about all you need to know about the various kinds of filters used in both fresh and salt water tanks.

For your first fresh water aquarium, I would recommend a hanging biological power filter and a lot of plants in the tank. For a fish room, I would recommend a central filter system using a combination wet/dry trickle filter and plant filter. For marine fish tanks, the same recommendations apply except that you should also add a carbon filter and a large protein skimmer. Marine coral reef tanks (which receive very little feeding) are better off with only a large skimmer and carbon filtration (no wet-dry filter), along with a large quantity of porous "live" rock that serves as an in-tank biological filter.
But the filtration of coral reef tanks is a specialized topic beyond the scope of this article, so I would recommend you do some further reading before you attempt it.

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BAP Report

Steve Edie

Member	Species	Common	Pts	Total
May 2007				
Mike Hellweg	*Telmatochromis* sp. "Orange Scribble"		10	2752
Mike Hellweg	*Xiphophorus monticolus* *		15	2767
Gary Lange	*Badis ruber* *		20	1499
Gary McIlvaine	*Anomalochromis thomasi*		15	284
Gary McIlvaine	*Zoogoneticus tequila* *		20	304
Dwayne Peters	*Pterophyllum scalare*	Black Angelfish	10	10
June 2007				
Steve Edie	*Labidochromis caeruleus*	Yellow Lab	10	170
Steve Edie	*Puntius oligolepis*	Checkerboard Barb	10	180
Cory Koch	*Cyprichromis leptosoma "Utinta"*		15	541
Cory Koch	*Lamprologus signatus* *		15	556
Mark & Tammy Langer	*Heterandria formosa*		5	620
Mark & Tammy Langer	*Hypsophrys nicaraguensis*		15	635
Mark & Tammy Langer	*Lamprologus meleagris*		10	645
Mark & Tammy Langer	*Neolamprologus tetracanthus*		10	655
Mark & Tammy Langer	*Poecilia wingei*	Endless Livebearers	5	660
Mark & Tammy Langer	*Puntius conchonius*	Neon Rosy Barb	10	670
Mark & Tammy Langer	*Xenotoca eiseni*	Red Tailed Goodeid	15	685
Gary McIlvaine	*Carlhubbsia stuarti*		10	314
Gary McIlvaine	*Cyprichromis leptosoma*	Blue Flash	15	329
Gary McIlvaine	*Dermogenys pusilla*	Half Beaks	10	339
Gary McIlvaine	*Haplochromis obliquidens*		10	349
Gary McIlvaine	*Poecilia latipinna*	Wild Color Sailfin Molly	1	350
Gary McIlvaine	*Poecilia reticulata*	Green Cobra Guppy	1	351
Gary McIlvaine	*Xenoophorus captivus*	Butterfly Goodeid	15	366
Gary McIlvaine	*Xiphophorus evelynae*		5	371
Philip Newell	*Poecilia wingei*	Endler's Livebearer	5	40

* = First MASI species spawn (5 point bonus)

** = First MASI species and genus spawn (10 point bonus)

*** = First MASI species, genus and family spawn (15 point bonus)

The Black Barred Livebearer *Carlhubbsia stuarti*

By Mike Hellweg

The Black Barred Livebearer comes to us from Guatemala and possibly also Belize. It is not frequently available, but it can occasionally even be found on wholesale lists, where it is sometimes called the Zebra Livebearer. I've read quite a few anecdotes that people have found it to be delicate, but that just might be due to not keeping it under the right conditions. Most of the specimens I've kept have been hardy and prolific. Many people also recommend adding salt, but again I've found that to be totally unnecessary.

Both males and females are white to creamy colored, with a series of up to a dozen thin black bars down their flanks. Adult males often have yellow on their flanks behind the gill and down into the belly, and they have a black dorsal with a thin blue band on the fringe. The gonopodium is very long, reaching back to the base of the caudal fin. Females are a bit larger, with the literature stating they can reach two inches, though I've never seen a female over an inch and a half. Males usually stay smaller, at about an inch and a quarter or so. They have a high bodied, almost rounded profile, similar to that of a Moon, but they never become as thick bodied or stocky as an adult Moon.

I keep them in 10 gallon tanks with a lot of vegetation at one end, and an open area at the other end. The adults spend most of their time in the current in the open area of the tank. When I've kept them without a good current, they seem to become listless. I generally keep a sponge filter running at full capacity to keep the water moving and well oxygenated and this seems to keep them happy. I do 50% water changes every week.

I also generally try to keep it around 80 degrees as they seem to do better in warmer water. I've kept them in cooler water, but they stop reproducing and seem to become less active at temperatures in the low 70's.

They eat everything so I feed a varied diet based on veggie flakes, shrimp and earthworm flakes, newly hatched brine shrimp, and other small foods. They occasionally get frozen bloodworms, but they only pick at them and the Corys in their tank get most of them.

Females will drop a dozen or so fry every month. The literature says the maximum number of fry is close to 30, but I've never seen that many fry. The fry are fairly small at about a quarter-inch, but the adults don't seem to chase them and pretty much ignore them. They spend most of their first few weeks among the plants, picking at the leaves of the plants, probably eating the microscopic animals and plants that live on the leaves.

Juveniles above a half inch or so are active, and spend as much time swimming in the open with the adults as they do among the plants with the fry. They grow quickly, and by about end of their third month they are nearly an inch long and have begun to reach sexual maturity.

The Black Barred Livebearer is an interesting livebearer that will even do well in peaceful community tanks, as long as it is kept warm and the water is clean and moving. In large tanks they spend most of their day where the current is strongest, and a big group of them would look great in a planted 55 or larger. If you get a chance to work with them, don't hesitate to give them a try.

For more information about these and other livebearers, consider joining the American Livebearer Association. You can get more information, and even join online, at www.livebearers.org or by writing to:

American Livebearer Association Timothy J. Brady Membership Chairman 5 Zerbe Street Cressona, PA 17929-1513 (570) 385-0573 (H) (570) 385-2781 (FAX)

Gymnogeophagus balzanii

By Ed Millinger

A more appropriate name for this South American fish (the male anyway) might be Gymnogeophagus baldzanii. Because the males head instead of sloping goes almost straight up and may remind you of someone who has a follicle shortage.

Thomas Weidner has a book published by Cichlid Press entitled "South American Eartheaters". If you have any interest at all in these fish it is a must have for your fish library. Weidner notes that this fish was named after its collector professor Luigi Balzan.

The shape of the males head is the definite attraction for me. For the most part geos have a head which slpoes upward gradually not almost straight up. The male has some bluish, red, and gold colored spangles in his fins while the female is mostly a yellow color with vertical brown stripes.

I originally purchased five balzanii for $40 with free shipping on Aquabid. After the fish started to grow it was very easy to sex them because of the aforementioned distinctive male trait.

I decided to keep the largest of the males and two females. I sold the other pair at a MASI auction. I initially kept these fish in 45 gallon aquarium. When I moved a year later I put them in a 75. By this time the male had reached seven inches and the female close to four inches which is about as big as they will grow.

Water parameters were as follows, temperature 80 degrees, P.H. 7.0. I had three inches of fine gravel that they enjoyed moving around. This meant plants were out with the exception of Java Fern. I had several clay pots and some slate stacked against them. These fish are shy and often times the male wouldn't come out even at feeding time. Speaking of food in addition to live blackworms, frozen bloodworms and brine shrimp it is important that you feed spirulina. They enjoy the pellets more than the flakes.

The 75 gallon is filtered by two corner filters and a sponge filter. Every week I change at least 20 per cent of the water and rinse the sponge. I change the corner filter material as needed. I don't use charcoal, instead I place a product called Keta-Peat nuggets under the filter floss. These nuggets are a water conditioner that helps simulate blackwater conditions found in South America.

In the spring I noticed about 100 eggs had been laid on some root wood I had in the tank. The next day however all the eggs fungused. I mentioned this to fellow MASI member Ron Huck and he suggested maybe it was because it was their first try. He was right, a month later they again laid eggs in the same spot. The female waited twenty four hours and then picked up the eggs in her mouth. As she started her brooding (which turned out to be ten days) I wanted to separate them so I found some eggcrate in my fishroom closet and divided the aquarium with 40% of the space for the female and 60% for the other two. This was a good idea except the holding female found her way under the egg crate and on the other side. I removed the egg crate and carefully shooed the female back to her side, placed the crate back in and placed a piece of slate deep into the gravel and solved that problem. During this separation and while she was holding I didn't want to feed her. However some of the frozen brine I was feeding the other two drifted through to her and she ate while holding the eggs. I still refused to feed her though.

Once she released the fry the fun began. Anytime I came close to the female she would take the fry back into her mouth in about three seconds. I had planned to take some fry away and hold them in a hanging net basket within the aquarium. I wanted to make sure I would be able to keep some in case she would become hungry. As the days progressed she felt more comfortable and at times would refuse to let the fry back in her mouth. It really was funny to watch. I would drop pellets in for the mother and then live baby brine for the fry. She of course was ready to eat and there would always be at least a few

fry wanting to reenter the safety of her mouth. Weidner states that the female may continue to take the fry back for as much as twenty days. After just one week the size of the fry was already increasing the bulge in her mouth and you can imagine that it will at some time become uncomfortable for her to accommodate them all.

A Most Extreme Leaf

By Alexander A. Priest

Reprinted from March 2006 Modern Aquarium of the Greater City Aquarium Society

Scientific Name: *Monocirrhus polyacanthus*
Common Name: Amazon Leaf Fish
Native Habitat: South America (Amazon River)
Feeding: Ambush predator - live food only (is a piscivore - that is, it eats other fish)
Sexual Dimorphism: Virtually none (but females are larger and somewhat wider)
Size: Up to 4 inches Total Length
Temperament: Extremely peaceful and slow moving (but will eat smaller fish!)
Reproduction: Egglayer (generally under broad leaves)
Tank: Low-light, heavily planted
Filtration: High quality water required, but with slow water movement
Water Parameters:
Temperature: 72°-79°F (22° - 26°C)
Hardness: Very soft (5° dH - 8° dH)
Acidity: acidic (pH between 6.0 and 6.5)
Degree of difficulty to keep: Fairly high
Difficulty to induce spawning: Low
Difficulty in raising fry: Very high

There are several freshwater, and at least one saltwater, fish that are commonly called (or have, as part of their common name) "Leaf Fish." Schomburgk's Leaf Fish (*Polycentrus schomburgkii*) is a freshwater fish found in Trinidad and Venezuela. The Banded Leaf Fish (*Pristolepis fasciata*) and the Malayan Leaf Fish (*Nandus nebulosus*), are freshwater fish native to Asia. The African Leaf Fish (*Polycentropsis abbreviata*) is a freshwater fish from Africa. The Sailfin Leaf Fish, or Leaf Scorpionfish (*Taenianotus triacanthus*) is a saltwater fish with a widespread distribution throughout the Indo-Pacific region, including Australia. One thing this diverse group shares is that they all resemble, to some degree, a leaf, or bunch of leaves, floating in the water. While there are probably others I could dig up, you get the idea. But, as the Animal Planet's show "The Most Extreme" might say, "There can be only one most extreme imitator of a leaf," and the Number One spot for this has got to go to the Amazon (or South American) Leaf Fish, *Monocirrhus polyacanthus*.

Monocirrhus polyacanthus means "one hair and many spines." The Amazon Leaf Fish has a pointed extension below its mouth that resembles a goatee (thus, a "single hair"). This fish almost always moves in a head-downward position, resulting in that "single hair" looking just like the broken stem of a leaf. This up to four inch long fish is somewhat oval-shaped, and laterally compressed. The

anal and dorsal fins are populated with spines (thus, "many spines"). Its body color changes in a chameleonesque manner, depending on its surroundings, anywhere from mottled brown to pale yellow. The markings on its sides, and its flat oval shape, give this fish the appearance of a dead leaf floating in the water. While the markings are more or less distinct, depending on the surroundings and individual fish, generally there is a line running from its eye back down to the underside, a line from its eye to the base of the caudal fin, and a line from the eye to the first rays of the dorsal fin. These lines closely mimic the veins of a leaf.

The Amazon Leaf Fish is native to the Amazon River. I got mine courtesy of GCAS member Claudia Dickinson (whose adventures collecting in Peru were described in the December 2005 issue of **Modern Aquarium**). Generally speaking, a "laterally compressed," or "flat" shaped fish (such as a discus or an angelfish) are native to slow moving water with heavy plant growth, and *Monocirrhus polyacanthus* is no exception. It lives in quiet waters, drifting about in a generally head-down position.

It is nearly impossible to detect any fin movement at all as the fish propels itself forward using its nearly transparent caudal and pectoral fins. When feeding, it waits for a fish to swim by, or moves towards it very slowly. So perfect is its camouflage that I have never witnessed any evidence that an intended victim knew, or even suspected, that the "leaf floating towards it, or standing still in the water, was a predator. In most cases, the prey unwittingly approaches the leaf fish, rather than the leaf fish chasing its prey. Once its intended prey is close enough, the Amazon Leaf Fish rapidly opens its surprisingly large, extendable mouth. This action creates a vacuum, and "sucks" in the unsuspecting prey. The action has been well-described in **The Fascination of Breeding Aquarium Fish** as follows: "Suddenly their amazingly large mouth unfolds into a grand trumpet creating a partial vacuum which sucks in the unfortunate victim. They are capable of swallowing a fish one half their own size." This happens so suddenly that other nearby fish seem totally unaware that there is now one less among their number.

This is an extremely interesting fish to observe, but I would not recommend it for a beginner. For one thing, they require very soft acid water, and high water quality. To provide adequate filtration with minimal water movement, I have mine in a four foot long tank with three double sponge filters, and perform a twice weekly 15% water change. I also add the water conditioner "Instant Amazon™." (I happened to have it on hand when I got the fish because many of the Southeast Asian Anabantoids that I keep require nearly the same type of soft acid water as do the Amazon Leaf Fish.) Since my tap water is naturally soft and neutral, the Instant Amazon and the tannins from numerous pieces of driftwood serve to acidify it without requiring any other chemical treatment.

They are piscivorus (fish eaters). I tried a variety of dry and frozen foods, live adult brine shrimp, live blackworms, even live Pinhead Crickets, but my Amazon Leaf Fish would not touch any of them. After two weeks I still hadn't found anything that they would eat. How much longer could they survive? I was getting desperate! I was forced to use "feeder fish," something I did not want to do. I started out using Rosey Red minnows, but found that some of the minnows were so large that only the biggest of my
Leaf Fish could eat them. On the other hand, those minnows were large enough to snack on newly hatched Leaf Fish fry. So, I switched to feeder guppies, which the Leaf Fish readily accepted. The guppies quite often produce fry of their own within the tank.

I have discovered that the quality of the feeder fish in most pet stores leaves much to be desired. On more than one occasion, I bought "feeders" at a store in Manhattan, and about 90 minutes later, when I arrived at my home in the Bronx, every single fish in the bag was dead. Now I have located some stores that are 15 minutes or less from my house, and I get my feeders from them. Even so, I put the feeders in a bucket of aged water and feed them with flake food. About an hour or so later, I pull out the inevitable dead ones, pour the remainder into a net, and feed them to my tank (crossing my fingers each time that I have not just thereby introduced a fatal disease).

These fish are nearly impossible to sex. (After all, how do you determine the sex of a leaf?) Generally speaking, among fish of approximately the same age, females are larger and wider bodied. One website (http://aquaworld.netfirms.com/ Other/*Monocirrhus polyacanthus*.htm) states that "females display an ovipositor" (the pore through which the fish excretes eggs), but I have not been able to see any "egg spot" or tube among my specimens.

During courtship, the female and the male leaf fish seem to "bump" against each other. Egg-laying is a fascinating procedure, reminiscent of both freshwater angelfish and bubblenesting Anabantoids (which might be one reason why *Monocirrhus polyacanthus* is included in the Aqualog book All Labyrinths even though they do not possess, to my knowledge, a labyrinth organ and I have never witnessed any of them taking a gulp of atmospheric air from the water's surface). First, the female inverts herself and deposits up to 300 eggs on the underside of a leaf. Next, the male inverts himself and fertilizes the eggs (thus, the similarity to Angelfish, except that Angelfish perform these actions in an upright position on the top of a leaf). I have witnessed several spawnings, and very often two males and a female are involved, not just one pair. Finally, the male forms a mucous bubblenest over the eggs, and stands guard over them.

Frequently, and especially in the first day or so after the spawning, the male will lay on his side, unmoving and so close to the leaf that, from a distance, it is nearly impossible to see anything but what looks to be a thick leaf. Although I have read that the fry hatch in two to four days, my experience has been that they hatch in five to seven days. The fry also require live food. I have used brine shrimp nauplii, microworms, and daphnia with success. Larger fry should be separated out, as they may turn cannibalistic toward their smaller siblings.

A not-too-brightly-lit tank that is heavily planted, preferably with broadleaf plants (such as Anubias barteri, Echinodorus bleheri or Amazon Swordplants), and water between 72° to 79°F (22° to 26°C) that is very soft (5°dH - 8°dH) and fairly acidic (pH between 6.0 and 6.5) is required for their continued maintenance. The Amazon Leaf Fish is a predator, but not aggressive. They can be kept with other peaceful fish that are not too active, and that are large enough not to be considered food. But, they are really best kept by themselves. (The only other fish in my Amazon Leaf Fish tank are any as-yet uneaten guppies.)

When I first got this fish, I found a website that stated the Amazon Leaf Fish did not like changes to its tank setup (but gave no further explanation and did not describe the nature of the problems such changes would cause). Naturally, when I sat down to write this article, I couldn't find this website again. The **Baensch Aquarium Atlas** states, "Needs a heavily-planted tank with roots to hide behind. Once acclimated do not add new elements to a tank. The fish will become nervous." I mention this only because it is something someone else wrote that I have not experienced in my own tank. While I don't constantly fiddle with the aquascaping of their tank, I do move things around when doing routine water changes, and I have not noticed any adverse consequences as a result.

The Amazon Leaf Fish is a very distinctive looking fish whose behavior is fascinating to watch. As I wrote earlier, this fish is not one I would recommend to a beginner. On the other hand, if you have the tank space and are willing to commit to the extra work involved, they can be one of the most "extremely" interesting and enjoyable fish to maintain.

References:

Baensch, Hans A. and Riehl, Dr. Rudiger, **Aquarium Atlas - Volume I**, 1991, Baensch Publishing.

Axelrod, Dr. Herbert and Sweeney, Mary E.. **The Fascination of Breeding Aquarium Fish,** 1992, T.F.H. Publications, Inc.

Schafer, Frank, **Aqualog: All Labyrinths**, 1997, Verlag: A.C.S. GmbH.

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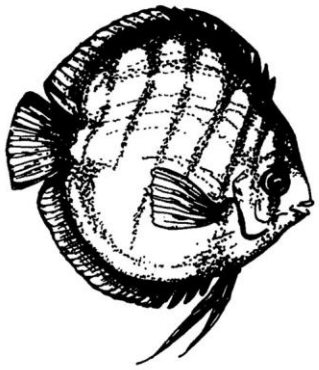

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Saturday, October 13, 2007

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Sunday, October 14, 2007

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-Ray "Kingfish" Lucas, Manufacturer Rep on *The Happenings In The Hobby*
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Auction Starts: 11:00 a.m. - ????

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Steve Deutsch

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