AQUATICA

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VOL XXVII JANUARY ~ FEBRUARY 2013 No. 3

January's speaker Joe Yaiullo; Reef & Marine Fish

102 Years of Educating Aquarists

AQUATICA

VOL. XXVII JANUARY - FEBRUARY 2013 NO.3

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The **Brooklyn Aquarium Society Inc.** is a non-profit organization 501(c) (3) for people interested in the aquarium hobby and the study of aquatic life. The Society meets the 2nd Friday of each month except July and August at the Education Hall of the New York Aquarium at Coney Island, Surf Avenue at West 8th St., at 7:30 PM. Meetings are open to visitors. Refreshments are served. Membership is $25 per year family / $20 individual / $15 for students under 14. Send inquiries or membership checks payable to:
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Note: The Editor takes full responsibility for misspellings and punctuation errors.

BROOKLYN AQUARIUM SOCIETY
CALENDAR OF EVENTS ~ 2013

HAPPY NEW YEAR
2013

JAN 11 Joe Yaiullo - Marine/Reef Presentation ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
FEB 8 Kathy Cardineau - Ponds - The Easy Way ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
MAR 8 Kevin Kohen - Superstar Fishes for Reef Aquaria ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
APR 12 Mark Denaro - Where Rare Species are Common ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
MAY 10 Giant Spring Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.
JUN 14 Laura Birenbaum - Coral & Marine Inverts' Tolerances for Dry Shipping ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

July/August - No Meetings

SEPT 13 Joe Graffagnino ~ Knowledge of Useless S - - t I Acquired Over the Years ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
OCT 11 Giant Fall Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.
NOV 8 John Coppolino ~ Modern Fish Keeping in Reef Aquaria ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
DEC 13 Holiday Party ~ Members, their families and friends, all you can eat sit-down dinner • Fish Bingo & Prizes • BAS Awards presentations.

2014

JAN 10 Pat Donston ~ Marine/reef TBA Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
FEB 14 Chuck Davis ~ TBA Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
MAR 13 Gene Ritter - Reef Diving in NYC ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
APR 11 Rachel Oleary ~ Freshwater topic ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.
MAY 9 Giant Spring Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gal. tank & stand.

Joseph Yaiullo
Curator/Co-Founder of the L.I. Aquarium & Exhibition Center

Joseph Yaiullo is one of the world's most highly regarded Aquarium authorities. He has consulted with many public Aquariums worldwide, and has also presented reef-keeping lectures throughout the United States, Canada, and Europe.

Prior to co-founding the L.I. Aquarium, Yaiullo worked with the Riverhead Foundation for Marine Research and Preservation, and served as Exhibits Director at the Okeanos Ocean Research Foundation. While working as a Senior Aquarist with the New York Aquarium, he played an integral role in the design and construction of the 22,000-square foot Discovery Cove building, winner of the 1990 American Zoo and Aquarium Association Certificate of Achievement award.

Yaiullo is a graduate of Southampton College, Long Island University (Southampton, NY).

This article by **Joe Yaiullo** first appeared in **Advancedaquarist.com Vol. VI February 2007** and is reprinted with the permission of **Terry Siegel,** Editor and former member of BAS.

Featured Aquarium
Atlantis Marine World
(now L.I. Aquarium & Exhibition Center)

It's hard to believe at the time of writing this article, but the reef tank here at Atlantis Marine World (AMW) is now over 6 years old and this is the first article I have written about it. I have given many lectures about it, but this is the first attempt to put it on paper.

I find it difficult to talk about the history of this tank without going into some detail about my reef keeping history. I started reef keeping back in the day when reproducing aiptasia and some *valonia* growth were cool things, and *goniopora* were viewed as "easier to keep" as it lived longer than other corals, but what we didn't realize at the time was they just took longer to die than some of the other corals we were trying to keep.

Joe Yaiullo proudly posing with his baby the 20,000 gallon reef and fish exhibition at the L.I. Aquarium.

I I grew up on the water, always fishing and having fish tanks as a kid. I graduated from Southampton College with a degree in Marine Biology back in 1987 and was hired on as an aquarist at the New York Aquarium in Coney Island, Brooklyn, New York. At the time, there was one 90 gallon display tank that was maintained as a reef tank and while some corals did well, others over time faded away. What intrigued me most of all with the tank was watching soft corals like star polyps actually spreading over the substrate and generating new polyps… simply amazing. I was forever hooked and at that point I was a confirmed Coralaholic. My thanks to aquarists **Werner Schreiner** and **Steve Abrams** for opening my eyes to the cnidarian world.

So now that I was a Coralaholic and I needed more and more, I then secured a 180 gallon tank behind the scenes and set it up as an experimental reef tank.

It was within this tank I put the first acropora frag into a flower stem holder, and I take great pleasure in seeing them used around the world now.

Another major leap forward for me was a series of articles by **Alf Nilsen** in 1990 in some US magazines. To see his amazing reef tank pictures of wonderful corals, and to see that the pictures and corals were not staged, was very inspiring. Reading at the time alien words like "potassium iodide" and "strontium chloride" had me scrambling up to the old labs and dusting off the brown lab bottles to find such chemicals. For me, it was a great benefit to be both a hobbyist and a professional aquarist, and more thanks go out to reef tank hobbyists who led the way and showed the professionals how to do it right. It should also be noted at this point that **Dr. Bruce Carlson** was instrumental in marrying the professional and hobbyist realms to the benefit of all. Fast forward to 1993 and I was setting up a 1400 gallon display reef tank at the NY Aquarium, which at the time was a major undertaking.

But the Coralaholic need is a strong one, and to meet that craving, I founded my own public aquarium, AMW, that somehow happens to have a 20,000 gallon reef tank, which opened to the public in 2000. The project took almost 8 years from my first rough sketch to ground breaking.

Even though it's a public aquarium, I still view it and the reef tank as my own DIY project, much like any hobbyist feels about their tank. We designed, fabricated, and built everything in-house so there is a great sense of ownership. The reef tank is 30'long x 14' wide x 6.5 deep (water depth) and contains over 20,000 gallons. The tank is a poured concrete tank with walls 12" thick reinforced with lots of epoxy coated rebar.

The two acrylic windows measure 6' x 10' x 3.5" thick. The interior is sealed with a polyurea lining, much like the spray on bed liners for pick up trucks.

The base rock consists of 30,000 pounds of quarried limestone from Wisconsin which dates back 300 million years.

This very dense limestone, at 150 pounds/cubic foot, is very strong and some of the slabs required 7-8 people to place them.

All this rock was placed with natural lock and keys and no cement was used.

10,000 pounds of live rock was then placed on top of this base rock. The live rock was specially ordered as I needed large pieces, especially the branch rock, with individual pieces weighing as much as 55

pounds. The live rock was held off-site for several months to cure, so no major curing took place within the tank. Once the base rock was done to my liking, we then loaded up a pick up truck with some rock and brought it to the aquarium. The live rock was placed around the tank to about one foot high off the bottom, then one foot of water was added.

More loads of rock were brought to the aquarium, then another foot of water was added, and this was repeated till it was too deep to walk around, and the remaining rock was placed using SCUBA. The initial corals and inverts were placed in the tank and nothing was rushed.

Most of the initial fish were tangs, etc. that helped with algae control and no algae blooms occurred, mostly due to curing the live rock prior to it going into the tank. The rockwork does not extend to the back wall, and lighting is designed so that it does not emphasize the back wall, which makes the tank appear much wider than it actually is, as the back wall fades away from view. Originally, the side walls were exposed as well, but over time I grew tired of that look and have since installed vertical walls of live rock using a hammer drill and 3/4 inch fiberglass rod.

The lighting has evolved to include (12) 1000w Daylight metal halides (Venture Cool Deluxe), (8) 1000w Blue metal halide (Venture Color Series BDX), (6) 400w 10K metal halides, and (1) 400w 20k moonlight. There are a few small translucent skylights, but they don't contribute to the corals' needs, but do make for a nice subtle wake up period for the fish.

The protein skimmer is one that I built and fusion welded from standard polyethylene containers from Chemtainer. The contact chamber measures 4' diameter and 6' tall, with the entire skimmer measuring 10' 4" tall. It uses a 5hp pump to run a 2" Mazzei venturi and total flow is about 200gpm. 1 gram/hr ozone from a Del ozone unit is injected into the protein skimmer as well..

I also added a second protein skimmer, the ETSS 5000, which has 75gpm going through it. I had to modify the air intakes to handle that much flow.

Water flow in the tank is a great and never ending challenge. There is a 5hp closed loop that flows ~200gpm., and part of that water goes to a 300 gallon CSD which takes 5 minutes to fill, and empties in 1 minute. This will be upgraded to a 500 CSD in the near future as well. The closed loop also feeds (3) 1.5" Eductors. The Clown tangs love surfing in the outflows of these eductors. Random water flow is achieved by using (5) 1" SeaSwirls and recently I am trying out the newly released WavySea. Other random flow is achieved using a rotating device from the pool industry, and also a 2" unit by OceanMotions. Propellers are a very efficient way to move water, and I use a prototype unit we built that utilizes a ½ hp DC motor and a 5" prop, and at full power it can move ~510gpm. I'm also testing a prototype unit that is a converted MagDrive 18 that moves an incredible amount of water. I also use a floating Scotts Aerator ½ hp prop unit to "storm" or stir up the tank several times/week. This unit is so strong it can only be

used for short periods of time. Additional water flow will be added over time, and it is extremely important to remember that what worked the first few years, probably won't work in the subsequent years.

Mechanical filtration is handled by (2) high rate sand filters, with a combined flow rate of 220gpm. As the fish and corals are getting larger, I will be adding additional sand filters to handle the ever increasing bio load and increasing the water flow through them to a total of 420gpm. Detritus accumulation has been a never-ending problem in the tank and some more mechanical filtration should minimize that problem.

Water Quality: I use natural sea water from a local New York body of water called Shinnecock Inlet which opens up to the Atlantic Ocean. The water is trucked into Atlantis Marine World and held in a 21,000 gallon holding tank and used in all of our marine tanks. Calcium demands are handled by custom built Ca reactors, and all the water that goes through the reactors then goes through a reverse flow reactor filled with Rowaphos to grab the PO4's released by any type of reactor media used. Upwards of 50gpd of a milky white suspended CaO solution is also dosed. I dose on average 600mls of a 20% SrCl2 solution as well as 600mls of a 1% KI weekly as well, both of which are from ESV. I do have some troughs on the tank that have some macro algae, so I dose 20ml's 1-2x/ week of iron using the Randy Holmes Farley mixture on Reef Central. Water changes are generally 5-10% per week using the natural sea water. The natural sea water is less than optimum for reef keeping as it's low in pH, alkalinity, calcium, etc., but the normal daily dosing on the reef tank soon brings the water to acceptable levels. Water temperature is generally between 74-78F, and is maintained by a plate and frame heat exchanger which is connected to our central Geotherm cooling loop.

I also use Phosban and Rowaphos on the tank in custom made Deltec reactors. PO4's are a major concern on a big tank that is a closed system and while both products do work well, the scale of the tank makes it impossible to use just them for PO4 control. I do believe that the GFO's grab other nasties that accumulate in reef tanks. Several years ago, many of the corals, anemones and other inverts looked a bit stressed over an extended period of time and I could not figure out why, as all the standard

water qualities were fine. Phosban had just hit the market and I put some in the tank. Within 3 days, the corals (both soft and stony), mushrooms, etc. that were not extending were relaxed and showing normal polyp extension. The PO4 levels hadn't changed, so my assumption is the Phosban removed some major irritant that the existing filtration (carbon, protein skimming with ozone) didn't recognize. For that reason, I believe the use of GFO products are a benefit when reef keeping.

So how does one control PO4's in a large reef tank with lots of fish that are well fed? Water changes are one way, but when you have a tank this large, even a small 20% water change is 4,000 gallons. Over the past year, I have been using lanthanum chloride by Vanson/ SeaKlear. My dosing regiment is 300ml's diluted in 5 gallons of RO water, and this is then slow dripped over several hours into the sump which goes directly to the protein skimmer. This will on average drop the PO4 level 0.10 ppm overnight. I try to keep my PO4 levels below 0.2ppm; if it gets higher, I see a slow-down in coral growth and fading colors. When using LaCl based products, it must be dosed with great care, and I have found the above regimen works well.

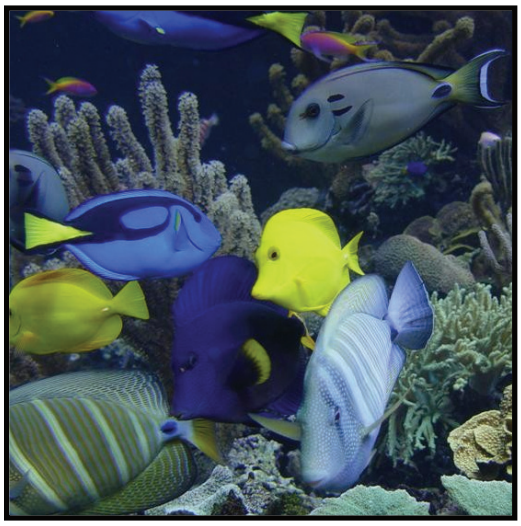
PO4's are a concern and require effort to control, but luckily NO3's have been below 1ppm with no work on my end. There must be enough denitrification within the rock and substrate to handle the large bio load and for that I'm grateful.

Most of the maintenance can be done from the top of the tank walkways with a 16' extension cleaning pole and 10 foot long grabbers, but about every 10 days or so, I need to dive the tank to closely inspect the corals, pruning, planting, etc., as well as removing the more stubborn algae on the windows. The dive is done by leaving the SCUBA tank on the tank walkway and using a long regulator hose and extra weights and then carefully walking around the tank.

As time progressed, I began to realize the tank, while mostly focusing on the corals, could also be about the fish as well. Watching some natural behaviors, and given the size of the tank, adult sizes of the fish were being recognized and with that came courtship and regular spawning events. Courtship and spawning events have been observed with the hippo and yellow tangs, a variety of wrasses, including the cleaner wrasses, genicanthus angels, cardinal fishes, damsels and clownfish, and the *anthias*. To date, we have not collected any of the eggs. Engineer gobies have spawned and the young have been removed from the tank and reared. I spoke to colleague **Kevin Curlee** and that lead to an exciting visit from **Dr. Eugenie Clark** who has been researching the "gobies" in the wild. At the time of writing (8-06), eggs from the damsel *Amblyglyphidodon aureus* (species?) have been removed and are currently being reared, which is the first documented case that we can find.

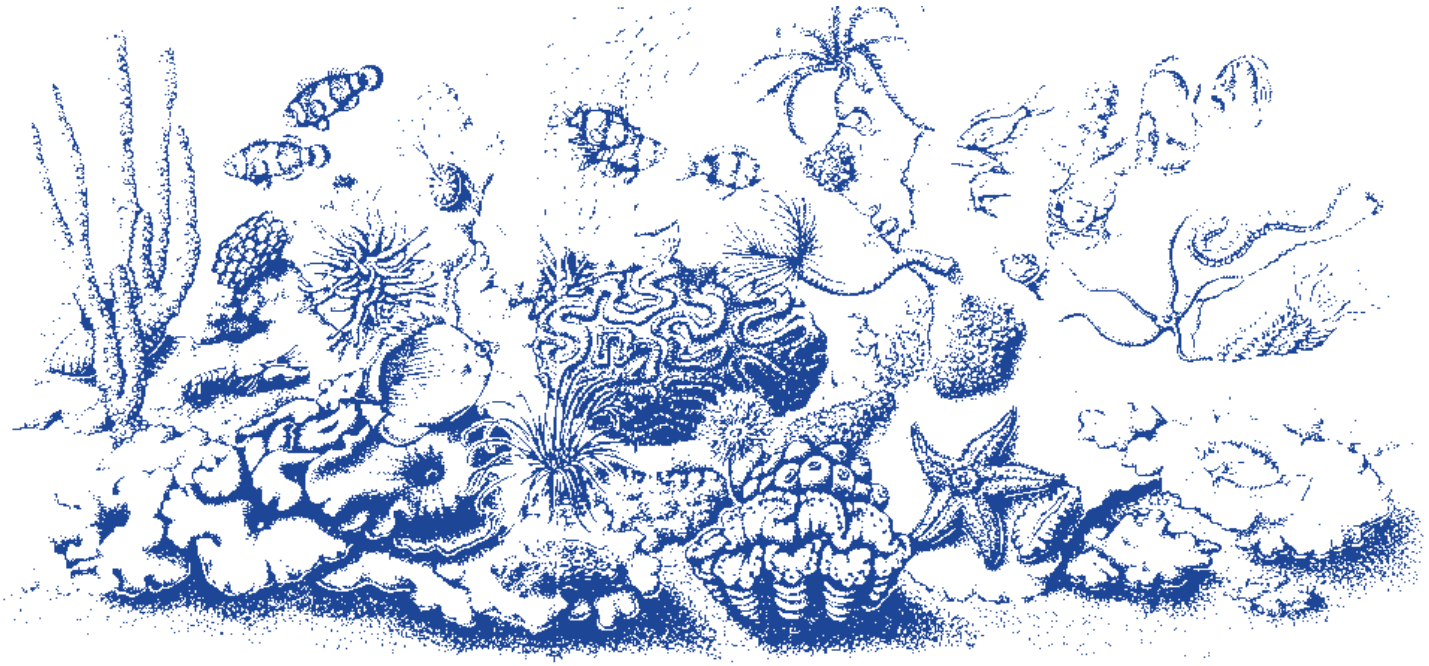
The coral growth, especially the sps, has been explosive the past two years, which has led to other thoughts on what fish could be considered "reef safe." I have always been fascinated with the orange spot filefish and have since introduced them to the reef tank. It appears that two mated pairs have formed, with two others staying "single" and at times there are several of them interacting in a non-violent manner. They do cruise the tank and graze constantly

on the corals, but, from what I can see, they don't do any damage, and may actually help stimulate coral growth with their constant "pruning." They do take prepared foods as well, but even when fed, they constantly graze.



While talking about foods, the tank is fed a diet primarily of mysis shrimp, Cyclops, spirulina flake food, New Life Spectrum pellet foods, sand eels, and on occasion frozen rotifers and ESV spray dried phytoplankton. Because I have many large fish, and some of these include questionable reef fish like Emperator, Annularis, Majestic, Regal and Blueface Angels, the tank receives several feeds per day, especially first thing in the morning. Keeping these fish well fed will help minimize them damaging the reef inverts, as a hungry fish is much more likely to pick on your favorite corals. If I were to do the tank over again, I would have actually made it 4 feet deeper so the fish would have more of a water column for their courtship and spawning, and probably make it longer, but probably wouldn't make it any wider.

As I've said, I am a Coralaholic and have no desire to be cured. My reef tank is my baby and mistress in one. Reef keeping is certainly a science, coupled with art and I view the reef tank as something that needs to be constantly designed for both form and function. The corals and fish form a living palette of color to play with, and that palette is truly dynamic by nature. What worked the first few years will probably not work in the subsequent years, and one must always be open to change and adaptation. Not that I play chess, but reef keeping is much like a really intense chess match. You need to stay at least 20 moves ahead of your opponent just to stay in the game… not to win… but to just hopefully stay in the game. So enjoy your reef tank, but don't get too comfortable as your "opponent" is just waiting for you to make a wrong move. Stay ahead of your opponent and you both can stay in the game for many years to come.



The Practical Plant
Chapter 6

If you have been following this column, you have your tank and lighting all picked out by now. Maybe you even purchased the stuff you need and it's sitting on a stand just screaming to be set up. But before you put a drop of water in that tank, let's talk a little about the first thing you place in it -- a substrate.

Aquarium plants are going to vary in their substrate needs, if they even need a substrate at all. True aquatic plants, unlike their terrestrial cousins, are very good at taking in nutrients directly from the water through their stems and leaves. Some are so good at it, they forgo substrates completely. Floating plants come to mind immediately. There are some anchored plants that do best if not planted in the substrate at all. Plants like Java fern, *Microsorium pteropus*, *Bolbits heudelotii*, and *Anubias* Sp. should be grown on a rock or a piece of driftwood. Secure the plant's rhizome in place using cotton thread. Use a color thread that blends in well with whatever you are attaching it to, so it won't look out of place. These plants grow slowly; thus, eventually, the thread will rot away, but by then the plant will have attached itself to the rock or the driftwood. If you are patient with these plants, they will reward you with uniquely encrusted decorations to use in your tanks. So, if you decorate a tank with just floating plants and ferns, you don't need a substrate at all. I have a twenty gallon long tank decorated with a variety of ferns. This is one of my favorite aquariums. I used black sand as the substrate. It's void of nutrients, but, in this case, who cares. It's sort of a "low tech" setup with simple lighting and filtration. What I really like about this setup is that when I get bored with the arrangement, since all the plants are attached to rocks and wood, redecorating is easy.

Stem plants are also really good at absorbing nutrients from the water column. Most of these plants, unlike the ferns, do require a substrate. Their root structure is not just to anchor them in place, but also to absorb nutrients in the substrate, supplementing the plant's diet. As a group, I would not call the stem plants heavy root feeders.

The real heavyweights among root feeders come from the category known as rosette plants. Major culprits include the Sword plants, *Echinodorus* Sp., the Lotus plants *Nymphaea* Sp., *Aponogeton*

Over the past few years, a variety of commercially prepared substrates have appeared on the market. I've tried almost all of them and they all seem to work really well. I'll give you a brief rundown on the ones I've tried

Sp., and others. These plants will require either a richer substrate and/or supplemental root feeding.

Some people like to use soil. It is a rich source of minerals and organic material. If you are going this route, you will need to use ordinary potting or garden soil. Make sure it contains no additives, pesticides, or fertilizers. I was inspired to give this a try myself after reading the *"Ecology of the Planted Aquarium,"* by **Diana Walstad**. My corys, however, had other plans. They surprised me with six spawnings this summer; now tank space is in very short supply. As soon as these guys get bigger, and I find homes for them, I'll give it a try and let you know how it works out.

Over the past few years, a variety of commercially prepared substrates have appeared on the market. I've tried almost all of them and they all seem to work really well. I'll give you a brief rundown on the ones I've tried (at least the ones I remember using).

Flourite:

This is the first one I ever tried. It was one of the first, if not the first, on the market. It's made by Seachem™ and comes in two colors. There is a red variety which is colored similar to terra cotta with scattered lighter and darker bits mixed in it. There is a brown variety which is very similar, but somewhat darker. The overall appearance is nice and fairly natural looking. There are two things that I'm not so happy with when using this product. The biggest problem is excessive dust -- the worst dust offender of them all. Being a bit more critical, I find the grain size a little too large for my liking.

Oxyx:

This is another Seachem™ product. The overall look is a grey color. Dust production is less than that of Flourite -- a big improvement, really. This product comes in two grades (grain sizes). The larger one is called gravel and the smaller grade is called sand. It's more like fine gravel than sand. The most unique feature of this product is that it has a slight buffering effect, and will help maintain KH and pH levels. I feel this feature makes this substrate especially well suited to tanks utilizing pressurized CO_2 injection.

Volcanit:

This is a German product made by Aqualine Buschke. It is an attractive mix of red and grey. What I like about this one is that it is composed of materials of volcanic origin, which ensures a porous structure that will host a population of beneficial bacteria. I would describe the gravel size as medium, and it is also low on dust.

Eco-Complete:

This one is made by Carib Sea. I just recently tried this one for the first time, so I can't comment on the long term results. I do have to say that right out of the bag it really impressed me. The unique feature of this substrate is that it comes packed in a liquid, and is supposed to be pre-seeded with beneficial bacteria. It is also completely dust-free. It is a brownish, greyish color which goes really well with dark brown colored driftwood. The gravel size is about the same as Volcanit.

Most of these preparations are clay-based, hence the dust problem. Clay is a common additive because it is a rich source of iron. Since these commercial preparations are already rich in iron, they eliminate the need for a layer of laterite.

Laterite:

Laterite is a clay-based material usually used under a layer of sand or gravel to provide iron and other plant nutrients. If you have fine

gravel or sand you really like and wish to use, there is nothing wrong with the laterite approach; it has a long history of success. However, if not handled correctly, these clay-based products will cause the most densely clouded water you have ever seen. Rinsing it will do you no good. To minimize this problem, place the closed bag of substrate in the empty tank, cut the bag open along three sides and slide the bag off. Gently slope the substrate. It should be about 2" deep in the front and 4" in the back. Place your rocks and driftwood in at this point. If the driftwood you have has a slate bottom, then, of course, it should go in before the gravel. You do not want to trap substrata under the slate as this can create an anaerobic situation with disastrous results. For this reason (and others), I prefer the denser woods which require no slate bottom. This is also a good time to install the filter and heater, but don't turn them on yet. As for airstones and CO_2 diffusers, I would wait until after the water clears to install them, to avoid clogging them.

Place a small plate on the substrate, and then add the water slowly onto the plate to avoid disturbing the gravel beneath it. You will probably still get some clouding, but it shouldn't be that bad. Fill the tank about 1/2 to 3/4 of the way up. After the water clears, you can plant the tank, finish filling it, and turn on the filter, heater, and lighting. Until the substrate matures and develops a biofilm, it will be prone to clouding, so it is best handled gently during planting.

What I'm really trying to get at, is that you need to look at the plants you intend to keep and choose an appropriate substrate. It's not a one-size-fits-all situation, but the commercially prepared substrates seem to come closest. If you choose a substrate which is too rich in nutrients for your plants, it may contribute to an algae problem.

Substrate Heating:

There is also a technique known as "Substrate Heating" that you should be made aware of. I mention this because if it's something that interests you, it needs to go into your tank prior to the substrate.

It consists of using a long heating cable snaked back and forth across the bottom of the tank under the substrate. If you are using these cables, I would definitely stay away from the slate bottomed driftwood because it will interfere with the cables. These cables are used to supplement, not replace, your normal aquarium heating. Substrate heating is probably the most controversial topic in our little corner of the hobby. Some swear by this method and others are detractors. Substrate heating is far more popular in Europe than here in the U.S. Another consideration: the cables are fairly expensive.

I have not yet experimented with these, nor met anyone who has. I can only tell you what the benefits are supposed to be. They claim to gently warm the roots, to encourage growth. Also the difference in heat between the loops of the cable and the spaces created between the loops is intended to create convention currents in the substrate. These currents will bring fresh nutrients to the roots. Along with the nutrients, you are bringing oxygen to the roots, creating the right environment "aerobically" for the desired types of bacteria to prosper and the nutrients to be in their most available state. If any of you have first hand experience with this technique, I would like to talk with you. I'm not quite this high tech myself -- not yet anyway. I allow Malaysian Trumpet snails to live in my tanks in the hopes of providing some of the same benefits of heating cables. They consume virtually anything edible and further break down those nutrients into more useable forms. During the daylight hours, they spend their time burrowing through the substrate, aerating it and leaving their feces as fertilizer.

In the next issue, we'll talk about some related topics, such as plant shopping and the process of planting and decorating your new aquatic garden.

Talk to you then.

Izzy

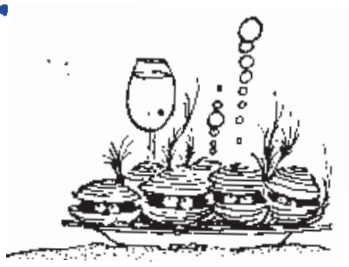
John Todaro BAS
From the Brooklyn Aquarium Society's publication
SCRUMPTIOUS MEALS & LIVE FOOD TREATS
Compiled, Edited & Written by John Todaro, BAS

Drunken Oatmeal Culture or Beer Barrel Oatmeal

(VITAMIN ENRICHED FORMULA)

Warren Burke, a former member of the BAS, developed this simple culture medium with the addition of vitamin B12 and beer to help the yeast get started. He just couldn't settle on a name.

So, bartender, no matter what you call it - how about another round of microworms for everybody!



RECIPE

INGREDIENTS:

1 box of Gerbers® oatmeal baby cereal
2 envelopes of Knox® unflavored gelatin
3 800 mg. vitamin B12
Water from a healthy aged aquarium
1/2 cup of stale beer at room temperature
1 pkg. Fleischmann's® Active dry yeast

Preparation:

1. Empty the box of cereal into a large mixing bowl.
2. Add the 2 envelopes of gelatin.
3. Add the vitamin B12. Crush the tablets.
4. Mix dry ingredients with a plastic or wooden spoon.
5. Now add enough water along with the active dry yeast and enough beer to make a firm paste, the dryer the texture of the paste the faster the culture will begin.
6. Add the starter culture of microworms and stir them into the mixture. Don't worry about killing the worms -- you won't.
7. Now add the paste to three plastic shoe boxes to 1/4 inch thick. Place the lids on the shoe boxes and set aside where the temperature is about 60 to 65F. If you have extra culture left over, you can save it in a plastic container and keep it in the fridge to start a new culture within the next week. This way your cultures will be staggered and you will always have a vigorous culture ready to feed to your fry.

In about 48 hours after setting up a culture, you'll see millions of microworms starting to form and climbing up the sides of the shoe boxes.

FEEDING:

Scrape off the worms that have climbed up the sides of the container with either a popsicle stick, plastic playing card, etc., and serve immediately.

A LETTER FROM THE NY AQUARIUM

Dear Friends,

Last week, **Jim Breheny**, Executive Vice President of WCS Zoos and Aquarium and Director of the Bronx Zoo issued the following statement:

The Wildlife Conservation Society's New York Aquarium has conducted a 24/7- effort to stabilize conditions and restore utilities and operating systems after experiencing serious flood damage during Hurricane Sandy. Staff established temporary life support for the aquatic systems, pumped flood waters out of basements and mechanical areas, and restored filtration and other life support essentials for the exhibit and holding tanks. We had a short window of time to get these systems re-established. Thankfully, we were successful in our efforts. The aquarium, located along the ocean in Coney Island, was struck by a surge of flood waters as the seas broke over the boardwalk.

During the storm, 18 staff members remained at the aquarium to care for the animals and secure the facility. We thank all of New York City and the zoos and aquariums across the nation who have offered help and support. The aquarium will most likely re-open during late spring 2013.

It is heartbreaking to learn that our beloved Aquarium and the surrounding communities of Coney Island and Brighton Beach have been devastated by the wrath of Hurricane Sandy. Right now we are still in a period of assessment at the Aquarium but you can well imagine that there has been extensive damage.

We thank you for your thoughts and concerns. The recovery for all of us in Coney may be long but like the phoenix we will rise again - and better than ever.

Please do not hesitate to contact me if you have any questions.

Regards,

Kate Fitzgerald
Community Affairs
New York Aquarium
Wildlife Conservation Society
718-265-3427

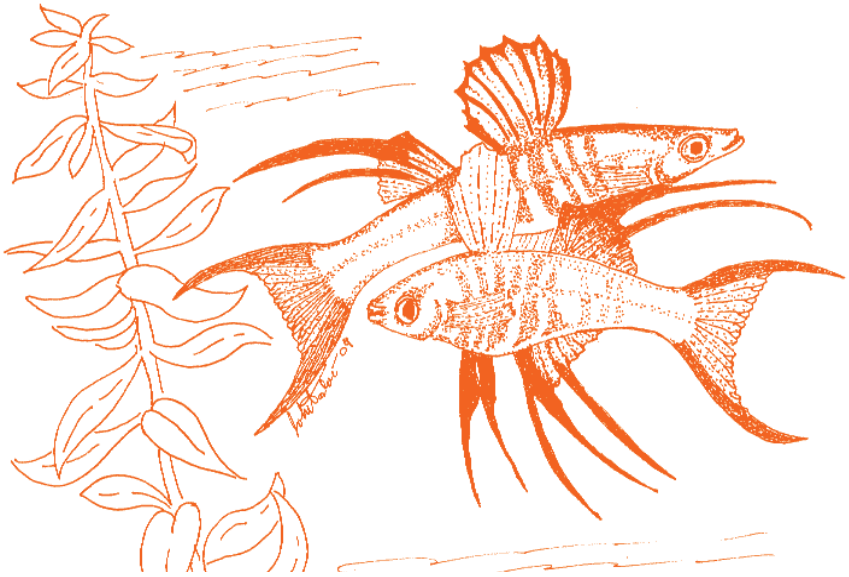
Patrick Donston
Owner of Absolutely Fish Inc.,
which is one of the largest retail fish stores in New Jersey. We house over 9,000 gallons of marine fish and invertebrates, as well as 5,000 gallons of freshwater fish from around the world. Absolutely Fish is exclusively an aquarium center, and carries no live animals except fish.

This article is from the Absolutely Fish.com web site and
is reprinted with the permission of Pat Donston.

Keeping Fish Healthy, Without the Use of Medication

Through many years of service and giving advice to fellow aquarists, I've been asked many times, "What can I put in my tank to prevent disease?" Medications such as formaldehyde, methylene blue, malachite green, and quinine hydrochloride are commonly used to cure some bacterial and parasitic infections. The problem is, if used on a frequent basis, parasites and pathogenic bacterial strains can develop an immunity to them. My theory on medicating fish is a preventative one:

"The best medication to heal a fish, is the fish itself."



What I'm really saying is the immune system is a powerful machine to fight and prevent disease. A strong immune system is extremely important to fishes' health and every aquarist must take the proper steps in providing these elements for success. The scope of this paper will briefly explain the most important elements needed to maintain a strong fish.

First and foremost are the water conditions. Aquariums must be kept with the utmost care in order to achieve a high standard of water quality. Toxicity problems such as ammonia (NH4+), nitrite (NO2-), or low pH can be devastating to fishes' health. These conditions will burn fishes eyes, scales, and slime coat. Remember the capacity of the host to resist disease depends on the maintenance of an intact physical barrier between the internal tissues and the environment. This is known as "natural resistance." If the slime coat or eyes are damaged through toxicity problems, parasites and bacteria find their way in the host much easier.

Low pH levels (acidic water) not only cause external damage, but also cause physiological stress. A sub-par pH will change the pH level of the blood inside the fish. Rapid operculum pumping tells us the O2 consumption is desperate and energy exhaustion may occur. The presence of natural resistors (or antibodies) in the blood, tissues, and mucus can diminish under physiological exhaustion. Fish, as with all animals, need natural resistors to fight off diseases. Under physiological stress, antibody production is decreased, leaving them susceptible to pathogens.

Ammonia, pH, and nitrite can be easily tested in the aquarium water. If any of these parameters are not in balance, one must trouble-shoot and find where the problem lies. I can describe from countless observations, fish will not be cured of any infection, no matter what medicine is administered, if ammonia or nitrite is present in water. That is why it is important to take the proper steps, ensuring wastes are eliminated. Below, I've listed several guidelines to follow:

1 Adequate biological filtration
2 Monthly partial water changes
3 Vacuum gravel bed (~ once a month)
4 Maintain filter media (~ once a month)

These general practices may vary in accordance to 1) tank size, 2) number of fish, and 3) type of specimens housed. One should consult a local aquarium shop or book for recommendations toward these guidelines in relation to the type of fish they may be keeping.

What if we have sick or dead fish and the above water parameters are in check? Can the water conditions still be a problem? As a matter of fact, there are many situations where it occurs. Ammonia and nitrite are not present, but dissolved organics are high, thus water conditions can still be a factor in fish's health. Although nitrogen-based wastes can be tested, organic waste bacteria and viruses cannot.

Lack of filtration or maintenance of the aquarium results in what I call "Dirty-water syndrome." Tank water becomes saturated with organic waste known as dissolved organic carbon or "DOC." Bacteria and viruses feed on this matter enabling them to propagate into large numbers. If the pathogen numbers are high in

the tank water, antibodies of the fish cannot fight as well, thus infections occur. Look at it this way: if we swim in crowded pools where filtration and chlorine levels are low, there are potential problems with sores on our skin. These occur from bacteria and viruses which are high in numbers of poorly maintained swimming pools. I don't think we would swim in a pool, knowing there is a high bacterial-viral count.

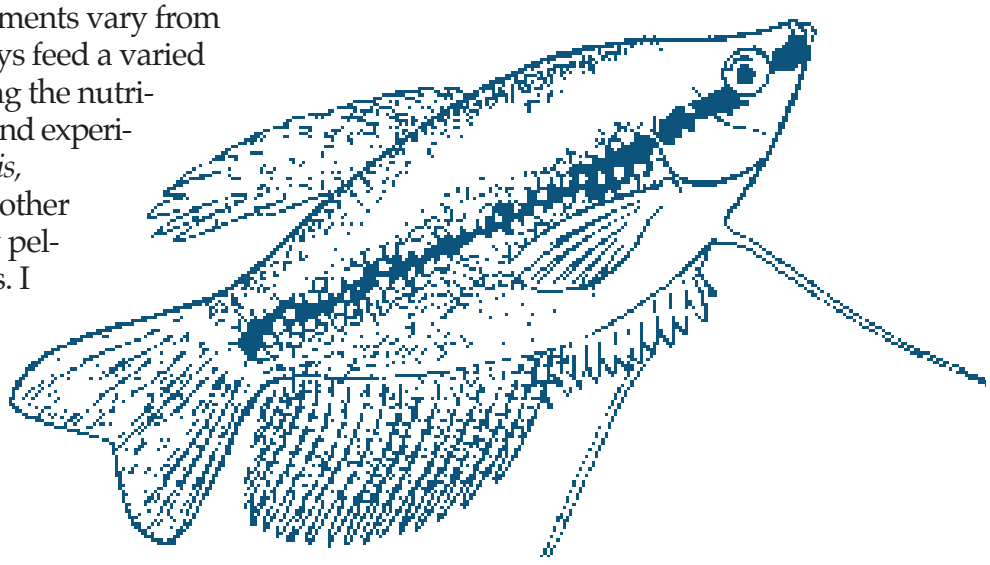
Dirty-water syndrome can be eliminated by following the guidelines I've stated in the previous section. Again I emphasize, if the DOC is high in the water, pathogens reproduce in great proportions, thus antibodies are out-numbered and can't fight disease no matter what treatment is used. We must have a clean tank to medicate fishes that are already infected with disease, otherwise the medication is useless. If the immune system is the key to a fish healing from disease, then it goes without saying, antibody production must always be a concern. Antibodies are enzymes (or proteins) produced by the immune system. These are the nutrients we feed our fish. Below I've listed the four basic nutrient groups. We must try to meet the fish's dietary needs of all four groups in order to achieve sustenance, growth, and reproduction.

1 Proteins (Niacin, Thiamine, or other amino acids)
2 Lipids (L-ascorbic acid, HUFAS)
3 Carbohydrates (cellulose, keratin, biotin)
4 Vitamins (B12, C, E, K3, A)

Of course, nutrient requirements vary from fish to fish. It is important to always feed a varied diet that ensures we are completing the nutritional needs. I can say from first-hand experience that I have healed *lymphocytosis,* lateral-line disorder, *Hexamita,* and other bacterial infections by feeding dry pellets saturated with liquid vitamins. I credit this to the strengthening of the immune system.

Live foods are not always the best solution for nutritional requirements. Studies have shown fish produce over 10 times the waste than if they were fed dry or frozen food. A soft dry pellet with low carbohydrate and ash content optimizes protein/energy ratio resulting in lower organic phosphorus and nitrogen excretion. The idea of a clean system by minimizing fish waste and a diet consisting of high-energy food is the pattern aquaculturists follow. Carbohydrates are found almost exclusively in plants, thus an herbivorous diet should always be fed (even to carnivorous fishes). Large Cichlids or marine fish fed exclusively on live foods never look as healthy as if they were fed a varied diet of dried plant and animal matter.

In conclusion, living organisms alter the composition of the water in which they live, and the resultant changes are sometimes harmful. The aquarist's task is to recognize these changes and attempt to control them. Most of our knowledge concerning fish dietary requirements comes from experimental nutrition studies. These studies have demonstrated the relative importance of dietary proteins, lipids, and carbohydrates for growth and energy to run the bodily machinery. If these requirements are met, the fish will do the rest.



David Snell

From *Delta Tale*, Vol. 32, #3. Potomac Valley Aquarium Society - Aquarticles

Breeding Head & Tail Light Tetras

Hemigrammus ocellifer - Steindachner 1863

I purchased a pair of Head-and-Tail Light tetras from the Centreville Aquarium shop in late October 2000. I put them into my tetra conditioning tanks. As with other Hemigrammus species, it's fairly easy to distinguish the males from the females. The males are more slender than the females, while the females appear to be more full and round in the midsection. Also, when viewing the females head-on, the females that are filling up with eggs appear visibly wide.

The conditioning tanks had a pH of 6 to 6.3 and a conductivity of 380ms. The tetras were fed mainly frozen bloodworms, live blackworms, newly hatched brine shrimp, and live fruit flies. In a few weeks' time, the female was very noticeably filling with eggs.

For my spawning tank, I had set up a 5.5 gallon tank that was filled with about 3 gallons of RO water, with a conductivity of 50ms, and a pH of 6.3. The water temp. was about 78-80°F. The water was treated with a double dosage of Kent Blackwater Extract. I attached a small piece of Java moss to a small lettuce clip that was attached with a suction cup to the back glass panel. On the bottom of the tank was my homemade spawning grate that would allow the eggs to fall to the bottom of the tank and be separated from the adults above. Since tetra eggs can be light sensitive, the tank was covered with a dark towel to reduce the amount of light.

The pair was placed into

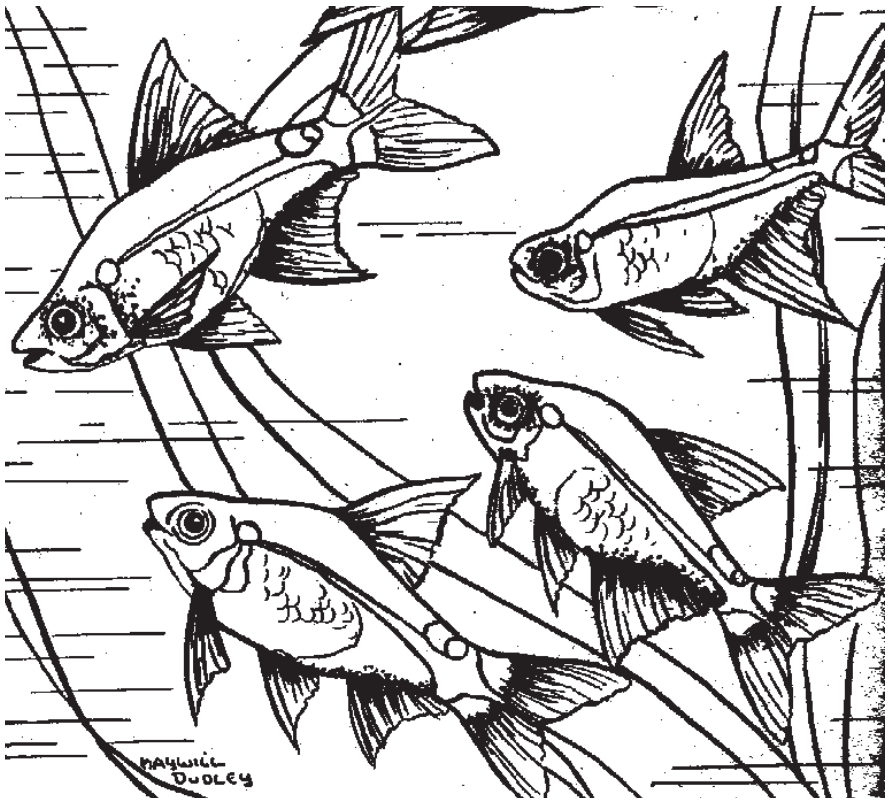
the spawning tank on November 19th. Two days later in the morning, the pair had spawned. I noticed there were about 300-400 eggs. It looked like about 10% of the eggs had already fungused. The adults were immediately returned to their conditioning tanks. I was concerned that more eggs would fungus during the course of the day so I left the towel covering the tank.

Within 24 hours, the eggs started to hatch and I could see wigglers on the bottom of the tank. The fry only looked a few millimeters long and they looked like small slivers of glass. Within 36 hours, it appeared that all the viable eggs had hatched. There were 300 or so fry on the bottom of the tank. By the second day, I added ½ cup of water from my paramecium culture to make food available to the fry when they became free swimming. As with the *Hemigrammus erythrozonus* fry, I found the *H. ocellifer* "hanging" on the glass nearly motionless.

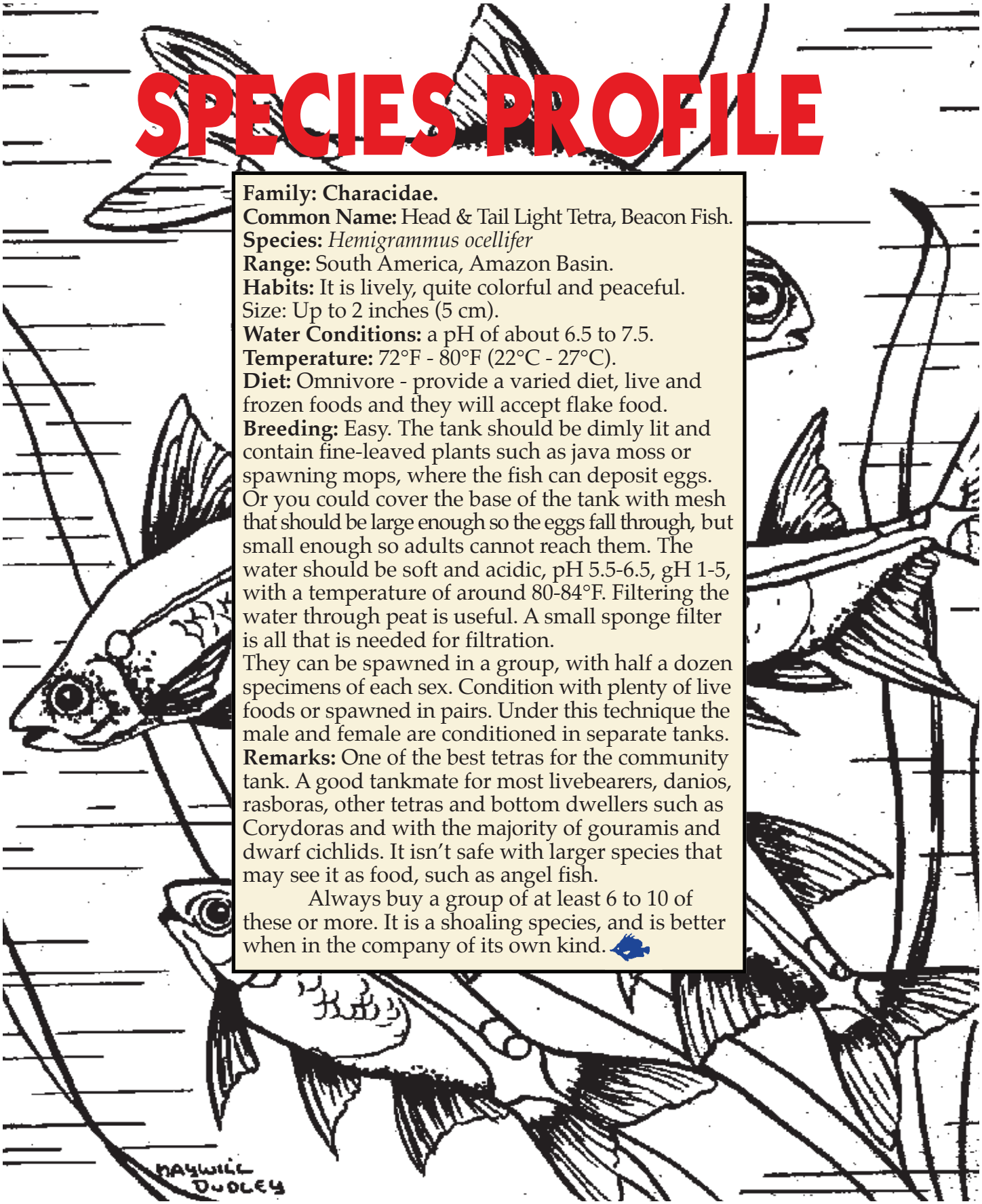
On the third day, I added another ½ cup of paramecium to the spawning tank. By the 5th day, all the fry were free swimming. The number of paramecium visible in the tank had declined. On the 6th day, I decided to try to start feeding the fry newly hatched brine shrimp. Although the fry appeared to be too small to consume newly hatched brine shrimp, the fry were able to eat it without much problem. At this point, I discontinued feeding paramecium and continued the newly hatched brine shrimp.

I started doing water changes about once a week with more RO water. The Head-and-Tail Light tetras seem to grow more slowly when compared to the growth of the Glowlight tetras. The 5.5 gallon tank was not likely the ideal size tank for raising them.

Over the course of the next two months, it was clear that the number of fry were declining, but the strong remained. At about 6-7 weeks, the color of the fry started to look like the adults with the noticeable "head and tail" light. At about 2.5 months, I had about 80-100 remaining tetras. I moved about half the tetras to my 75 gallon planted tank, and I auctioned off the other half in 4 bags at the PVAS 2001 Winter auction.



SPECIES PROFILE



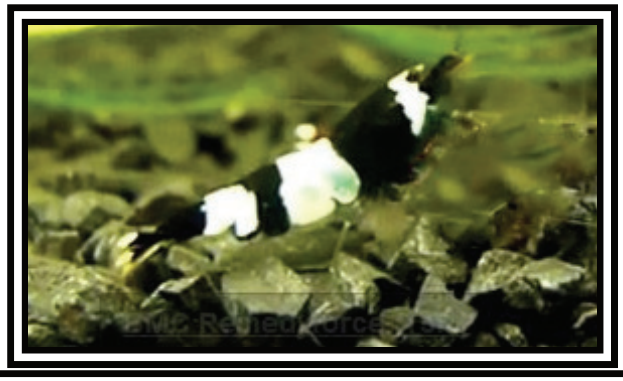
Family: Characidae.
Common Name: Head & Tail Light Tetra, Beacon Fish.
Species: *Hemigrammus ocellifer*
Range: South America, Amazon Basin.
Habits: It is lively, quite colorful and peaceful.
Size: Up to 2 inches (5 cm).
Water Conditions: a pH of about 6.5 to 7.5.
Temperature: 72°F - 80°F (22°C - 27°C).
Diet: Omnivore - provide a varied diet, live and frozen foods and they will accept flake food.
Breeding: Easy. The tank should be dimly lit and contain fine-leaved plants such as java moss or spawning mops, where the fish can deposit eggs. Or you could cover the base of the tank with mesh that should be large enough so the eggs fall through, but small enough so adults cannot reach them. The water should be soft and acidic, pH 5.5-6.5, gH 1-5, with a temperature of around 80-84°F. Filtering the water through peat is useful. A small sponge filter is all that is needed for filtration.
They can be spawned in a group, with half a dozen specimens of each sex. Condition with plenty of live foods or spawned in pairs. Under this technique the male and female are conditioned in separate tanks.
Remarks: One of the best tetras for the community tank. A good tankmate for most livebearers, danios, rasboras, other tetras and bottom dwellers such as Corydoras and with the majority of gouramis and dwarf cichlids. It isn't safe with larger species that may see it as food, such as angel fish.

Always buy a group of at least 6 to 10 of these or more. It is a shoaling species, and is better when in the company of its own kind.

Brad Kemp

Editors Note: Our friend Dan Hagan has sold TheShrimp Farm.com! But The Shrimp Farm still lives on and is still the place to go for dwarf freshwater shrimp. The new owner, **Brad Kemp**, has a new address: The Shrimp Farm USA, 11936 West 119th St., #197, Overland Park, KS 66213, United States and has set up an Aquarium Shrimp Forum http://theshrimpfarm.com/forum/index.php. You can go to this forum and ask question, talk to other shrimp nuts and discuss anything and everything related to Aquarium Shrimp. Brad has consented to be *Aquatica's* Shrimp Editor.

BLACK KING KONG PANDA SHRIMP



Scientific Name:
Neocaridina heteropoda
Common Name:
King Kong Shrimp,
Black King Kong.
Origin: South East Asia
Found in the wild: No
pH Range: 5.8 - 6.8
Ideal pH 6.2

Temperature Range: 62° - 72° F
Ideal Temperature: 68°F
Hardness Range: -1- 2 dkh
Ideal Hardness: 2 dkh
Life Span: 1 - 2 years
Size: 1/2 inch
Gestation Period: 30 days
Diet: Omnivore

Black King Kong Shrimp History: The Black King Kong Shrimp is the selectively and very rare variant of the Bee Shrimp.
Special Notes: This algae eater is a good species for aquarium algae control. As with all aquarium shrimp, it is important to make sure copper does not get into the aquarium. Copper is toxic to all Dwarf Shrimp. Many medications contain elevated levels of copper, so it is recommended not to medicate an aquarium with Dwarf Shrimp in it.

We also utilize what I personally consider one of the most prime ways of shipping live shrimp. We are using a specially designed Styrofoam container that has a self-sealing lid. Once sealed, this box is superior at keeping temps stable inside the container.

Our DOA rate is next to "0."

Brad

We also now have a Facebook page:
- https://www.facebook.com/pages/The-Shrimp-Farm/196582057021072

A brand new Shrimp Forum:
- http://theshrimpfarm.com/forum/index.php

And a Pinterest Page:
- http://pinterest.com/theshrimpfarm/
- The Shrimp Farm.com
- Shrimp Farm Facebook
- Shrimp Farm Forum

Dominique Isla BAS

EDITOR'S NOTE: Dominique Isla was a member of BAS back in the 1990's; unfortunately for the hobby, he passed away in 2008. He was an avid livebearer aquarist and kept and bred dozens of different *Goodeids, Gambusia* and *Xiphosurous.*

As a member, he wrote a series of short articles on these fish. The following was published in the February 1990 issue of the Aquatica. He moved to Florida around 1997 to work at a fish farm in Homestead which was wiped out by a hurricane. He relocated to New Orleans for a couple years and then moved to Denver to establish a large fish breeding facility in the Denargo Park section of the city. Here is another of the articles he wrote for the BAS.

Dom's Livebearer Corner

The Red-tailed Goodeid
Xenotoca eiseni

Reprint from *Aquatica* 2/1991

At our last auction we saw many unusual and rare livebearers. One was a mature pair of Red-tailed *Goodeid, Xenotoca eiseni*. This striking livebearer is one of the most colorful of the *Goodeid* species. Let me explain briefly what *Goodeids* are, or to quote **Chuck Davis,** "good and deads."

The sub-family *Goodeids* (approximately 35 species are primarily from Central Mexico) are viviparous fish, and are true livebearers, unlike our more commonly known *Poeciliinae* species (example: guppies, swords, mollies). *Goodeid* females cannot store sperm, so their eggs develop only after copulation. The eggs are fertilized in the follicles, but are ejected into the ovarian cavity soon afterward, to complete their development. The embryos undergo a significant weight increase during gestation. They develop in a sac-like, elastic pouch where they attach themselves with a umbilical cord called a *trophotaenia,* and receive nourishment and expel waste. The average term of gestation in *Goodeids* is 45 -60 days.

The male *Goodeid's* mating organ is called an andropodium. It produces free-swimming sperm which are introduced into the female through a hidden tube in their stiffened anterior anal fin. This act is done quickly and a clue to its happening is heightened color in the pair. That's a brief idea of what *Goodeids* are.

Now back to the lovely Red-tailed *Goodeid.* Their genus *Xenotoca* is composed of three species, X. eiseni, X. melano soma and *X. variata.* We are concerned here with *X. eiseni*. They are truly striking: the male is yellow with a nice red tail. As he gets older, he develops a humped head. The female is like all female *Goodeids*, a bit drabber than the male. They can grow to a good three inches. Water requirements for them are slightly alkaline water, good filtration, aeration and a regular water changing schedule.

Temperature should be 70˚ - 84˚ F (20 - 29 C). They need a healthy varied diet, flaked, frozen and live food, and some nice health green plants to nibble on occasionally.

Breeding the Red-tailed *Goodeid* is not too complicated: isolate the female in a small container packed with Java moss. I use a small, clear plastic shoe box with a gently bubbling airstone.

Xenotoca eiseni gives birth after a gestation period of 32 - 35 days. The young are large and have an umbilical cord that falls off. They feed readily at birth.

Keep your pregnant female well-fed and she will deliver large broods. Ten to 25 young is the norm: the brood record in the ALA is 45. If you are interested after reading this article and would like to try your hand at keeping *Xenotoca eiseni*, a good source for them is the American Livebearers Association.

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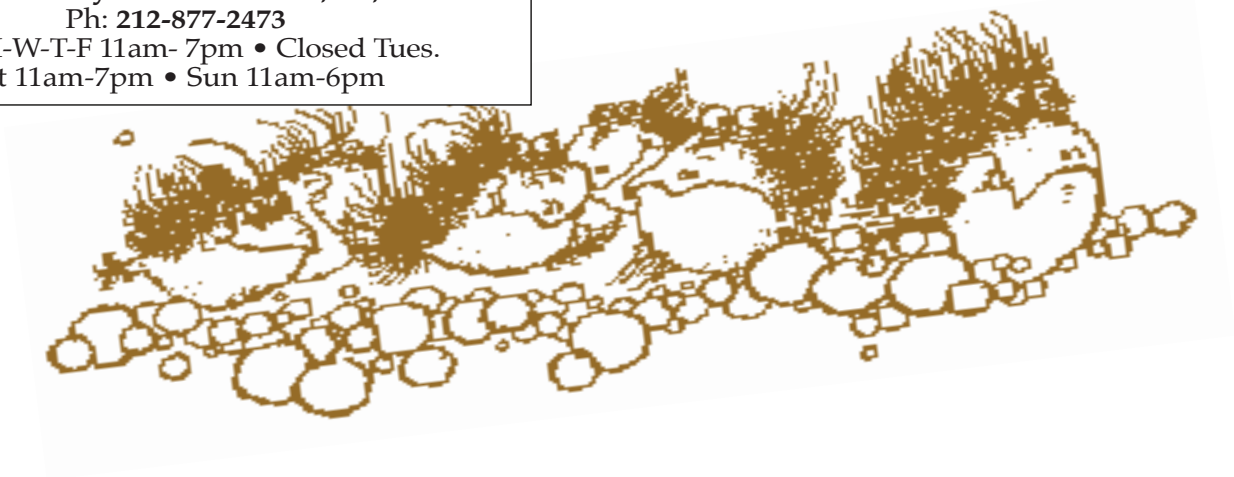

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Please check your address label to see when your membership expires

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If yes, what types do you breed:_____

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Special interest (if any)_____

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To volunteer check [yes] [no] A board member will contact you if you check yes.

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