



AQUATICA

THE ON-LINE JOURNAL OF THE BROOKLYN AQUARIUM SOCIETY
VOL XXVIX JANUARY ~ FEBRUARY 2014 No. 3

Amphilophus citrinellus



Photo: John Todaro



102 YEARS OF EDUCATING AQUARISTS
AQUATICA

VOL XXVIX JANUARY - FEBRUARY 2014 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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BROOKLYN AQUARIUM SOCIETY

CALENDAR OF EVENTS ~ 2014

HAPPY NEW YEAR



JAN 10 Pat Donston ~ Stronger Fish, Healthy Aquariums ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

FEB 14 Kathy Cardineau ~ Setting up a Pond ~ 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 O'Leary ~ Freshwater Nano Diversity: The Ins, Outs and Inbetweens ~ 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 new 55 gallon tank & stand.

JUN 13 Chuck Davis ~ Gizmos, Gadgets and Other Good Ideas ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction. BAS elections.

July/August - No Meetings

SEPT 12 Greg Sullivan ~ Saltwater for the Squeamish ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

OCT 10 Giant Fall Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.

NOV 14 James Fatherree ~ Reef Basics ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

DEC 12 Holiday Party ~ Members, Their Families and Friends, All You Can Eat Sit-down Dinner

• Fish Bingo & Prizes • BAS Awards presentations.



BAS PHOTO CONTEST PICTURES

WINNING PHOTOS IN THE FRESHWATER CATEGORY

THE JUDGES FOR THE PHOTO CONTEST WERE:

Chris Clevers - Hikari
Daniel Griffin - Seachem
April Harris - Seachem
Andy Hudson - Central
Aquatics
Kay Martin - BAS

Robert Moneyhan - Central
Aquatics
Pam Morisse - Central
Aquatics
Amanda Neese - Seachem
Dr. Robert Price - BAS



Nano Aquarium - TOM LIS



Best Aquascape and Best
Mid-size Aquarium
TOM LIS



Best Large-size aquarium - NICK CAPUTO



Spectacular Cichlid - RACHEL O'LEARY



Most Fabulous Plant - STEVE MATASSA



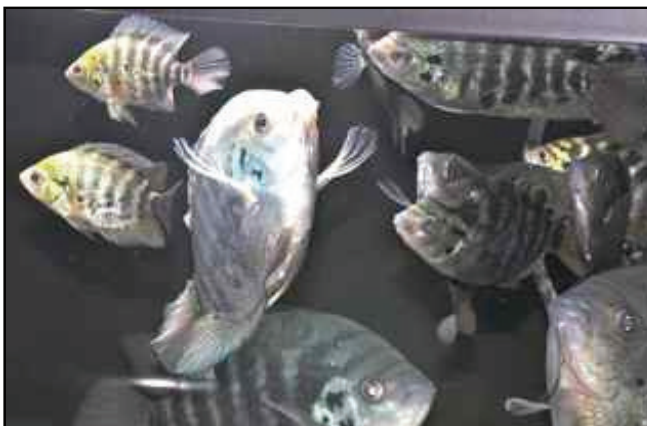
WINNING PHOTOS IN THE FRESHWATER CATEGORY



(Triple Tie) Best Freshwater Photo
STEVE MATASSA,



(Triple Tie) Best Freshwater Photo
JOE GRAFFAGNINO



(Triple Tie) Best Freshwater Photo
NICK CAPUTO



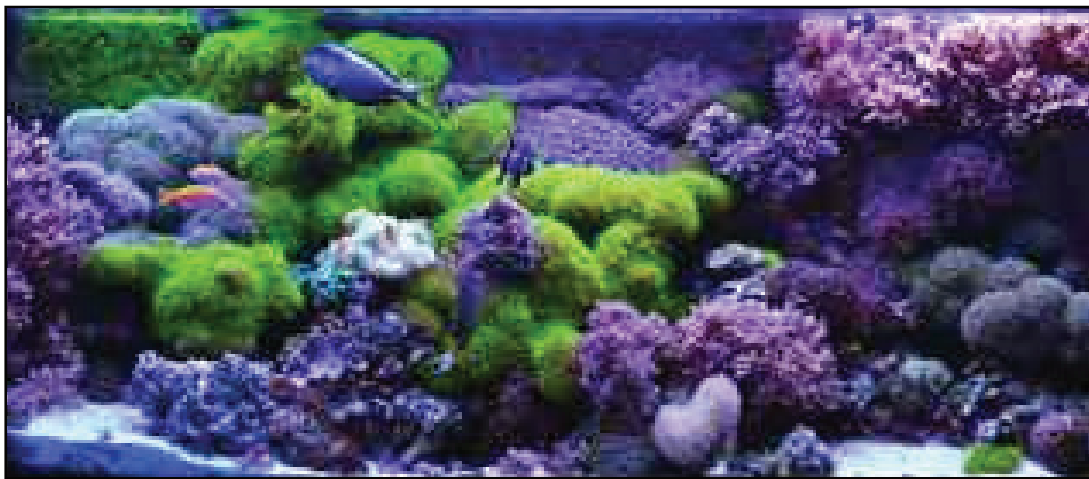
Most Amazing Freshwater Invert.
RACHEL O'LEARY



Spectacular Freshwater Fish - **NICK CAPUTO**



WINNING PHOTOS IN THE SALTWATER CATEGORY



Best Aquascape - and Best Large Aquarium - **BERNARD DEREN**



Best Nano Aquarium - **BERNARD DEREN**



Best Mid-size Aquarium - **STEVE MATASSA**



Spectacular Saltwater Fish- **BERNARD DEREN**



Most breathtaking Coral Reefs
BERNARD DEREN



WINNING PHOTOS IN THE SALTWATER CATEGORY



(Tie) Most Amazing Saltwater Invert
BERNARD DEREN



(Tie) Most Amazing Saltwater Invert
STEVE MATASSA



Bernard Deren and Steve Matassa tie winners of the category "*Most Amazing Inverts.*" Each recived a Coralife aquarium lighting fixture.



Best Saltwater Photo - BERNARD DEREN

**THE BAS CONGRATULATES ALL OUR WINNERS
AND THANKS TO THE JUDGES FOR THEIR TIME
AND EFFORT AND THE BAS PHOTO CONTEST
SPONSORS FOR THEIR SUPPORT AND
PARTICIPATION.**



HOBBY HAPPENINGS

Raleigh AS secretary and editor of our newsletter **Michael Maieli** asked me if I could use this space to give some tips on filtration, heaters, etc. The answer: “No, I really can’t.” I



don’t have a heater or power filter in my fishroom and the technology has come so far that I can’t advise people on heaters and filters, but below you can see how an acceptable fish-keeping environment was created in my New Jersey fishroom.



Jarry Jinks in his New Jersey fishroom.



In my basement fishroom in N J, I quickly realized that a heater in every tank (only five tanks at the time) was going to be too expensive down the road. Before starting to build racks and expand, a loop of the baseboard hot water heating system was added to the room with its own thermostat. The room was about 10 feet by 25 feet with only 6'9" clearance to the joists. The thermostat was kept at 78° degrees in the winter. The bottom row remained at about 74° degrees and the top row about 80° degrees. This worked well with cichlids as they could be moved to the top shelf tanks to increase temperature to induce spawning.



A view of Larry's New Jersey fishroom . Note his use of labels on the tanks and the plastic "Critter Keepers" and the one gallon plastic shoe boxes, in the left for ground, which he uses to hold fry, eggs or pairs of killies.

In the summer, the thermostat was turned down, but I had to run a dehumidifier.

With the advice and assistance of my NJAS mentor, **Jack Borgese**, an investment was made in a regenerative blower and an air system was set up with 2" PVC pipe and a lot of brass valves. The blower was kept in a workroom next to the fishroom and had to have a valve to bleed off excess air pressure so as not to damage the blower. Our bedroom was right over the workroom

and we got "white noise" from the blower. You didn't notice the "white noise" until the power went out and the noise stopped! Talk about a rude awakening! Box filters or sponge filters were used in all my tanks. I used the **Ginny Eckstein** method of filter maintenance: change the filters when they clogged up. Also, change only one filter at a time in multiple filter tanks. Hey, I didn't want to kill all my bacteria!

With this setup, expansion progressed from twelve to twenty to forty to about seventy tanks at the end. First, a main rack with three rows of tanks was built. Because of space limitations, the tanks were on end so you looked into the narrow sides of the tanks. The top row had 13 ten gallon tanks, the middle 9 twenty gallon long tanks and the bottom row had 9 thirty gallon tanks. The rack was built in step fashion so each shelf came out further than the one above it.

Another rack was built with six 55 gallon tanks on end on the bottom shelf and six 30 gallon tanks and one 20 gallon tank on the top shelf. Later, a rack with four 20 gallon high tanks was added over two of the 55 gallon barrels used to age water. Another rack had two 75 gallon tanks and there were some free standing racks stuck here and there with a variety of tanks. Plastic "Critter Keepers" and gallon plastic shoe boxes holding fry, eggs or pairs of killies were anywhere they could fit on or between other tanks and there were even two 10 gallon tanks on the dryer! My wife wasn't thrilled that the laundry room had become the fishroom, but I usually did the laundry to offset this problem.

Five plastic 55 gallon barrels were used to age and treat the water. We had chlorine rather than chloramine and the water was usually aged for a few days. Only cold water was used to avoid any problems due to sediment or ions from the hot water heater. Even in the winter, the cold



Larry and his NJAS mentor, Jack Borgese in Larry's New Jersey fish room, discussing important fishy matters.

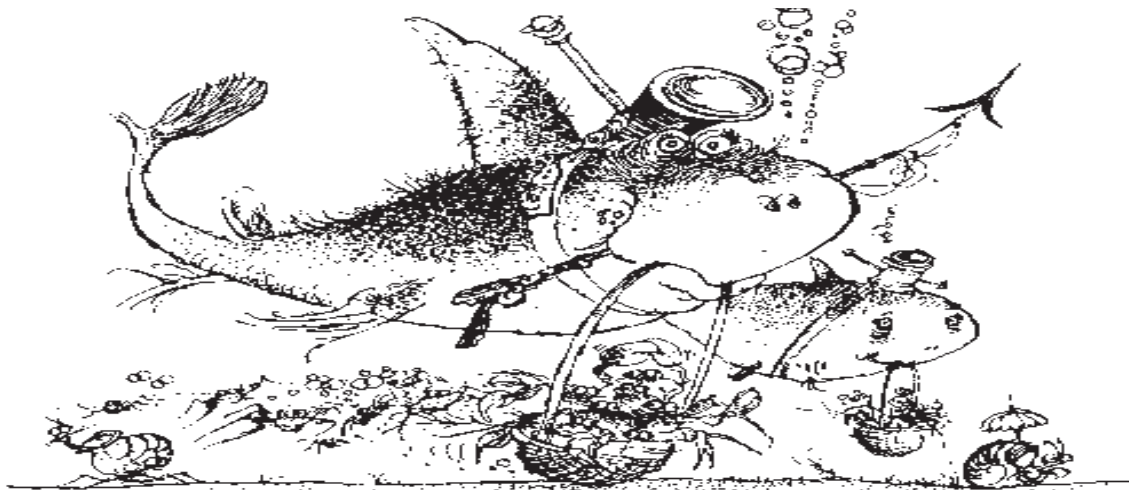
water would come up to room temperature in 48 hours. In the summer, more frequent water changes could be done as the cold water came up to room temperature faster.

It usually took about three 2 hour sessions to change all the water in the room. The upper tanks were siphoned right into the sink and a sump pump with a remote control outlet was used to fill the tanks with clean water from the barrels. I still had to use a siphon and buckets to change the bottom rows, which usually led to water spills!

My wife is happy that the fish are behind the garage and out of the house proper! 🐟

Larry

Next month I'll discuss the improvements made in the whole fish-keeping process in the fishroom we built after moving to North Carolina.





DR. Robert M. Price, BAS
Photos: John Todaro, BAS

Tool Use, Play Behavior and Spousal Cooperation in Hybrid Cichlids.

After some 7 years of close study, it has become apparent that *Amphilophine* cichlid hybrids exhibit several behaviors usually ascribed as too sophisticated for fish. These include rudimentary tool use, overt play behavior and cooperative communication, including acoustic communication. The subjects of this research have all been kept in a row of tanks in my bedroom, as they do not exhibit these behaviors regularly enough for a casual observer to notice, as some are interactive with their owners/captors.



The *Amphilophines* are a large and generally predatory and intelligent tribe of cichlids that make up 25% of all the Central American ichthyofauna. They were forced to become large and opportunistic feeders as the Central American biotopes do not offer the kind of food pantry to be found in the Orinoco and Amazon river basins. As of 2003, 139 species were recognized and there are more still being discovered. They are all considered to be descendants of a single *Heroina* cichlid ancestor that made its way up from South America. They have a fairly recent marine origin, and are only secondarily fresh water fish. Their intelligence and complex behaviors have been the subject of much recent study since **George Barlow** wrote *The Cichlid Fishes* in 2000.



The genera *Amphilophus*, *Archocentrus*, *Hypsophrys*, *Neetroplus*, *Parachromis* and *Petenia* comprise the tribe and their hybrids, who are of prime consideration here, are Flowerhorns, parrot Cichlids, Red Texas Cichlids and Rose Queens. The fish studied herein reside in tanks on the far side bedroom wall, so they can be observed often and at different hours.

Tool Use

During the past three years, on two occasions, I have observed a white Rose Queen male and a Red Texas Cichlid male use a tool for a duration of several weeks. The Rose Queen (who unfortunately perished during Hurricane Sandy) found the black intake tube from a small Aqueon filter in the course of extensive gravel digging. It proceeded to carry the object in its mouth and use it as a battering ram. The culmination of its expertise occurred when it successfully used the tube to hit the air stone over the top of the tank. It kept picking up and jousting with the tube occasionally for three weeks. The same fish was also wont to put its head in the filter box and throw the carbon bag into the tank. The Red Texas Cichlid who now dwells in the same tank also hates airstones. It has figured out how to pull the plastic tubing up and over the side of the tank to get the air stone to the top. This past summer, the same fish, who is a compulsive digger, began to spray mouthfuls of gravel at the air stone. It finally pulled the bottom piece of the filter intake

(Editors note:

*George Webber Barlow
Professor of Integrative
Biology, Emeritus, UC
Berkeley spoke at the BAS.
He died July 14, 2007.*



George Barlow



off and swam around the cave it had built in the tank in circles, with the pointy end in its mouth. It struck the air stone with the tube repeatedly.

My Female Gold Fader Flowerhorn has for the last year lived in a tank with stream pebble substrate and learned to engage in rock knocking. She found a pebble that was pointy on one end which she could easily manipulate and began using it to knock on the glass whenever she was hungry. The same fish was breeding in the Spring of 2013 and she and the male constructed a large rock-lined cave with 2 entrances. One day she pulled the Eheim heater off the tank wall and put it right next to her nest, where she sleeps. My attempts to reattach it were in vain; she pulled it off and put it back on the substrate over and over. I finally solved the problem by raising the tank temperature from 83° to 87° degrees. Now she leaves the heater alone.

Spousal Communication


As of the year 2000, George Barlow had documented 16 cases of vocalizations made by cichlids. Acoustic communications in combination with body posturing and display give *Amphilophine* cichlids a potentially very rich vocabulary. There have been 23 soft, low frequency vocalizations thus far documented, ranging from grunts to purrs to knocks and



drumming. The above mentioned female Flowerhorn was working in concert with her mate on the nest in March 2013. The nest they were building had rocks in two roughly parallel rows covered with driftwood and a back and front entrance. There were a lot of pebbles in the back which she was pushing through the front. After a while, she and the male took a break and got together face to face. After that, the female continued her work, but the larger male now picked up the pebbles and she pushed through and threw them away from the front opening, leaving it quite larger in about an hour.

There was a medium sized conch shell in their tank blocking egress from the front nest entrance. The male braced himself behind it and tried to push it out of the way to no avail. The female tried unsuccessfully as well and a few moments later, both retreated to the other side of the tank and stayed face to face for several minutes. Then they returned to the area behind the shell, almost perfectly lined up in

parallel, both with their mouth against the shell. They then both pushed forward simultaneously, and moved the shell several inches out of their way. It is not stretching the imagination to conclude they had conversations, likely including acoustic communication, to make a joint effort for both to do what one could not.

I ascribe no particular importance to the *Amphilophine* hybrids, other than the fact that *Amphilophines* are intelligent. The fact that they were hybrids more than likely reflects my interest in them in general. Species in the Midas Cichlid Complex have been reputed to engage in other complex behaviors. 

Literature cited:

George W. Barlow, *The Cichlid Fishes - Nature's Grand Experiment in Evolution*, Perseus Publishing: Cambridge, Massachusetts. XVI +335p.





David Isham TFCB

Reprinted from *In Depth* the publication of the Tropical Fish Club of Burlington
October, 2013

Discus Tank Journal

10-10-13: They did not spawn yet. I'm going to have to try harder with these and a couple of other species.

9-7-13: New batch of food. They ate flake food while they were waiting for it! Squash in the new batch was fresh patty-pan from my garden.

9-6-13: Changed 90% of water. I was very bad, I went two weeks!

5-11-13: New batch of food. I found my fish-oil capsules & added 3 this time.

5-7-13: 90% water change.

4-2-13: I made a new batch of food. It came out more red this time. Too

much paprika? They did not like the freeze-dried blackworms I tried to pass off as "food."

2-2013: Plants have not died from the lighting change. I need to clean the glass on the hood!

1-3-13: Water changes are still 90% every weekend. The ballast on my one-tube fluorescent failed. I broke down and spent \$99 for a 36" LED by Marineland. 17,000 hrs @ 11hrs/day works out to about four years. Longer, I hope. It looks like a little more light, but maybe not as much as two daylight tubes four feet long. We will see how the plants like it!

Discus Tank Journal

12-8-12: A big batch of new food. I have been changing 90% of water every week.

10-28-12: 90% Water change as I write this. Coleslaw for lunch.

10-20-12: I have a new Black & Decker food processor! I got the last one at the Mardens in Portland, ME. \$25. I tested it on some coleslaw a week later. This is devoted to the fish, so I can run beetles through it. I love Mardens! They are all acting pretty frisky, I'll need to figure out how to harvest some rainwater soon. Chasing, fin-quivering, threatening to lip-wrestle though I have not seen that yet. I'm imagining pairing-up, but I can't really say that it's happened.

10-19-12: Water change before the trip to ME. 90%

9-13-12: I missed the weekly water-change last weekend! Bad; this is the second time that it will be two weeks between 90% changes. Fish are doing well, though. Overfiltering & under populated is saving me, I think. I'll be looking for a "garage-sale" food processor this weekend to expedite fish-food production.

6-17-12: 90% water change. My water is from Lake Champlain, no chemicals added. Mechanical filtration and UV sterilizer for all water coming into my house. I use two heaters with less than the recommended wattage for one. If one heater dies, I'll still have heat, and if one sticks on full, the other will back off, and I hope the fish won't cook. I also use two

power-filters, each with two bio-wheels.

6-10-12: 90% water changes once per week; I'm trying to do them more often. The 72 Gallon tank is under-populated and over-filtered, though. Hans wrote again:
Stendker Discus from Discus Hans

Order Number: 615

Detailed Invoice:

Date Ordered: Friday 18 May, 2012

The comments for your order are

Hi David,

How are the new Discus doing after a few weeks???

If you've questions, please let me know if you've some time, please leave a review/feedback on the online store; it helps me a lot.

Best regards,

Hans

www.discusfishstore.com

5-29-12: They come running for the food now! Greedy. I feed them 2x per day, sometimes 3. I can't tell them apart yet.

5-24-12: Still a little nervous; they "run away" when I come to feed them.

5-23-12: Eating better. My food is based on what they were getting from Hans, but I use fish & shrimp instead of beef.

5-22-12: 1pm they arrived, all 6 "red pigeon-blood" are in good shape! One laid on its side until I poked it, then came to. They ate my home-made food nervously. My note to Discus Hans; he phoned me that day.

HI,

More feedback, I won't bother you after this! Eating at 4pm! I call that pretty good. It is my own food, frozen, Your recipe with fish&shrimp substituted for the beef. I add some chicken liver too. One is apart from the other 5, it may not have eaten yet.

Thanks for the check-up call. I will probably be getting some of those blackworms. {free sample of some freeze-dried blackworms came with my fish. I asked Hans about them & if they were safe. He said yes, and a friend of his sells them}

5-21-12:

The comments for your order are:
Hi David, your Discus will be shipped out today, you will receive them Tuesday.
FedEx tracking # will be: 898923346202
Best regards,
Hans
www.discusfishstore.com

5-18-2012:

Date Ordered: Friday 18 May, 2012

Old news

3-18-07: Picked up 5 from Discus Hans for \$100. 2.5" size. 2 Marlboro reds and 3 Blue diamond. One MRed is larger O₂ was added to the bag, 4.5 hour ride in a cooler in my

WRX, I kept it as warm in the car as I could stand. Dumped into the tank at home as soon as I got it up to 76°F. 3 heaters going, one 250 watt, 2 150 watt.

Tank is a 72 Gal. bowfront with a lot of driftwood and *Cryptocoryne spatula* v. *balansae*, *C Wentii*, Java fern, java moss, and a big orange snail. Ramshorn?

They are hiding for several hours, then swimming in a school for a couple of days fairly quickly but not stressed. Exploring the tank? They were raised up to this point in a crowded bare tank utilizing constant water change.

3-19-07: Still not eating.

4-8-07: Eating my prepared food for a while now. LN says they are spoiled. Probably right. I think I need some dither fish to get them out more. The large snail has laid eggs in the tank, maybe twice, if I think the first were eaten: the clutch moved to the other side of the tank, and looked different, so I think a first clutch was eaten, but I can't really tell. I pulled the blob out and put it into a different tank. Let's hope I get a bunch of little snails!

All have red eyes. All have nice shape: round, and round at the forehead. One of the "Blue Diamonds" has nicer blue than the others, and I think "he" is the largest blue. One red is definitely the largest of the lot.

4-10-07: Lots of hanging out in the back nipping at each other. No one seems damaged, though. Temp stays at 84-85° Fahrenheit. Water changes have been 40% twice per week, once I went a whole week.

4-17-07: Coming to the front at feeding time, just like goldfish or angelfish!

5-6-07: Eating freeze-dried tubifex, probably almost anything else! They are about 1/3

larger! 3" SL for the biggest MRed & biggest Blue Diamond.

6-3-07: New batch of food, with paprika this time, but no flake food. They may like it better, but it's hard to tell. They're bigger, and they gobble it. I turned down the heater! It was up to 87°F. in there, now back to 84°F. Why don't Aquarium heater thermostats work?

6-13-07: The crypts are coming back. I vacuumed the gravel vigorously when I took out the previous fish (and left it fishless for 2 weeks). The crypts did not like that! The root-system is putting out new shoots/plants now, though. soon it will look like a real planted tank again. The crypts I have are supposed to do OK at the higher discus temps. *C. spatula*, *C. wendtii*. I also have some Java fern and some Java moss. The J. moss died back, but will probably resurge.



8-7-07: Snail eggs hatched from the big snail. It is some kind of ramshorn? I will find out. An Ancistrus was also added, the one-two punch means no more algae! Everyone in the tank likes algae wafers, even the Discus. The biggest Marlboro Red has developed white markings on his sides, and still has the black fins. He (?) really looks good!

The two biggest are over 5" in diameter

now! One Blue Diamond continues to be smaller, maybe half the size. It could be the only female, though.

9-1-07: Water change, and I left the heater unplugged for 24 hours! Bad Dave! They were acting spooked... I also got lazy about making new food, and they ate some high-quality flakes and algae wafers for a week. Today they got the new batch of homemade food,

though. I stopped adding flake food, four vitamin pills, increased the paprika and garlic, wild caught salmon and the usual 2 shrimp. I can send anyone the full recipe if they want.

9-8-07: Water change. Plants are looking good, the java moss die-off is mostly gone, and it's coming back. I don't think it likes a 10° degree temperature change. I need to get a pic after lights in the room are out (reflections) and I keep forgetting.

10-11-07: Java moss still getting better. It shows like the "Christmas-tree" variety. Many strands look like a wide fir-tree branch.

11-6-07: Water changes are 40%, but I am only getting to it twice a month. The fish keep growing. They like just about any food they can get! I use some Ken's fish food flakes and some small floating pellets when I run out of my frozen prepared stuff.

12-15-07: Vacuumed the bottom & changed water. The 3 biggest discus are getting some nice extensions to the dorsal and anal fins. These guys look good! Some friskyness has been noted for the last two months, I think there is at least one pair. No mouth-wrestling has been noted.

One ancistrus is keeping the algae in check. There are also many ramshorn snails. I am not sure if the snails are local or off-spring of the large foreigner in the tank.

1-2-08: Added one *Anubias barteri*.

1-4-08: New batch of frozen food; completely filled a big zip-lock 1/8" thick. This batch had shrimp-tails left over by humans in addition to the usual amount of shrimp I use. They were mostly chiton.

1-20-08: 40% water change. I answered the phone while filling the tank via hose. NEVER do that.

2-3-08: 40% Water change. Temperature is 81F. The Java moss is looking good again, some is showing as the "Christmas Tree" variety.

2-13-08: Food gone; lasted 5 weeks. I only fed non-discus 3 times.

2-17-08: One of the Marlboro Reds was vibrating fins mid-morning. I have not seen any cleaning of a spawning-spot yet.

2-18-08: They eat 1/8" floating pellets and flakes fine.

2-22-08: New batch of frozen food.

3-3-08: Heater failed! Tank temp when I got back from ME was 67°F! Discus are in the corner and NOT happy.

2nd heater failed!! This one has been in the tank not plugged in. I plugged it in, the light came on, it went off after running, tank not warm enough yet, turned it up, light never came back on, no heat!

These are both Guardian brand heaters, bought at the same time, less than one year old. A 250 watt and a 150 watt. Will I buy that brand again?

I dug out an old glass Ebo-Jager 150, it still works fine, and saved the day!

2-9-08: Tank temp is 88°F. It took 8hrs to bring it up; too fast would not have been good. Fish are eating frozen food, though you'd think that that would scare them after the "big freeze!"

2-10-08: Turned the heater down slightly.



9-7-08: H₂O change 40%. These have not been happening often enough! about once per month. Hans is a great source of Discus!

9-16-08: Frozen food used up. Feeding some "Omega" flakes. They were getting frisky with each other; showing off for company and dislodging the favorite spawning log. Java fern has attached to much of the wood pretty well now. Java moss continues to look good and then bad; I think 80F+ may disagree with it.

11-27-08: New fish food. I forgot the paprika this time! I did add turkey liver and along

with the multi-vitamins (3 pills) I added two caps of fish-oil. extra shrimp-tails this time but no shrimp. The fish was salmon.

12-3-08: Topped off the water with 15 gallons when I should have done a real water-change.

12-26-08: 40% water change. Overdue!

12-30-08: Back from ME; Eric fish-sat, even though it was his anniversary! He was better at feeding them 2x per day than I, I think.

1-2-08: The two red ones are spawning again! Eric's steady feeding probably deserves a lot

of the credit. The male is eating her eggs so soon after they come out that I have not actually seen even one egg! They are the same two I saw spawning before, though, and I did get a good look at the female's egg-tube. I was able to get some pictures and some video, so you can judge for yourself at the February meeting.

1-6-08: I added 15 gallons of water. A real water-change is due.

2-7-09: 60% water change. They did not show stress. The big cichlids don't seem to mind more than 40% at once. They're big! yay! A new batch of the real food is overdue, but they eat the Wardley stuff OK. I have been checking the temp almost daily, it is 82°F-86°F. Daily room temp varies from 62°F to 70°F.

2-12-09: I won a door prize at our meeting! A discus breeding-cone. I think they still like the wood better, but when it gets warmer, I will try putting the red pair into a separate tank with the cone & some rainwater. Discus at the TFCB monthly auction would be the next step!

2-21-09: A new batch of food, and a 50% water change. The tank has one ancistrus, and it's looking pretty big now. No algae on the glass, but there are also quite a few snails

3-1-09: 60% water change. The *Cryptocoryne crispatula* is taking a while to replace itself after I harvested some. I'm leaving it alone and trying to keep the top cover clean. This tank only has one four foot fluorescent tube. It gets some reflected sun from the west window.

3-28-09: 60% water change.

4-5-09: A new batch of food. I used a pre-packaged salmon fillet, 2 shrimp, a handful of shrimp tails, 3 multi-vitamin pills, 2 fish-oil pills, 2Tbs garlic, 2Tbs paprika, butternut squash, chicken liver, and 3Tbs spirulina flakes. Chopped it up fine, put it in a 1Qt zip-lock, shmushed it to 1/8 inch thick, and froze it. They get about 1.5" dia piece 2 times per day. I just toss it in frozen, and they don't wait for it to thaw. Most ingredients are chopped up frozen, and sort of half-thaw before I get them in the freezer zip-lock.

5-1-09: Out of the "real" food, I toss in an algae-wafer for the Ancistrus once a day. No algae can be seen.

5-3-09: I added water, should have done a change. I think I did a change between now and the last time I noted it. Temp.- 84°F.

5-31-09: 60% water change.

7-18-09: 40% water change in there somewhere.

8-22-09: New batch of food, date is on the bag. This time, a frozen salmon fillet & two big scallops. Squash was patty-pan, and I added 4TBS spirulina flakes. I gave some to **Dave Banks**, thanks for loaning me some algae wafers, Dave!

9-3-09: Top up with water. My water system is under repair for a week now, LOTS of air in the water. I need to be very careful not to kill fish with it. Needs to stand for 15 minutes or so.

9-10-09: Water system still needs a new line out into the lake, we are waiting for an excavator.

9-20-09: New water line is in! I have not seen any of the fish-killing tiny bubbles since the work was done.

9-27-09: Water change, 60%.

11-5-2009: New fish food batch, I had no chicken liver this time. catfish fillet, shrimp tails, butternut squash, multi vit pills, fish oil pills, garlic, paprika, spirulina flake.

11-21-09: 60% H₂O change. I attached some of the excess java-moss to driftwood, and did the same for an *Anubias barteri* that was only attached to a very small bit of wood. The cover needs cleaning, to allow more light in. The single *ancistrus* was seen; it's still alive, no algae on the glass (except on the top cover). I have been tossing in squash and algae wafers once a week or so.

12-20-09: 2 water changes.

1-10 10: Water changes.

2-10-10: Water changes. Rubber bands attaching java ferns did not hold up. I think someone ate them. The single *ancistrus* is nearly full-grown, and almost certainly female. I have been tossing in squash for a month or so now.

3-7-10: 50% H₂O change. Cleaned one side of one filter. Temp 84°F. Filter update: 2 Penguin power filters, double biowheels. No floss. I have four baskets of pea-sized gravel on the backs; water goes right past, not through them. I have 4 plastic screens that all water goes through. Floss was ripped off these. The 4 Bio wheels rarely stop turning.

3-20-10: 60% H₂O change. Vacuumed 1/2

bottom, rinsed 1/2 of power filters out.

4-4-10: 60% H₂O change. This tank has its own dedicated hose for changes since January.

4-5-10: Out of homemade frozen food. A batch lasts about 2 months.

4 & 5-10: I fed small earthworms to them twice, and they were popular.

5-23-10: 60% water change. Two others have been done since 4-4-10. I tossed in half of a cooked shrimp; they ate some.

5-24-10: I should have chopped up the shrimp! I'll be fishing it out tonight. I wanted to see if they could rip it up.

6-14-10: Video of discus eating freeze-dried tubifex worms, taken by my brother **William Isham**, a real marine biologist.

8-20-10: The red female got pop-eyes, and was dead in two days! The others still look fine on 9-9-10, 3 weeks later. Needless to say, I stepped up the water changes! The day I saw the problem, I did one of 90%. Two days later, I did that again. Since then, it's been 75% per week. I will get a new hose for exclusive discus-use, as I had to toss the one I had for the other tanks. Discus will get the newer hose; others will get their old one. Note that you need to be careful with a new hose, even if it is drinking-water safe. Just taste the water coming out. I always run water through the hose before using it at all times anyway.

9-25-10: I made a new batch of Discus-food.

9-30-10: Still keeping up with 75% water

changes. The giant Hygro is OK, but not growing as fast as the ones in the other tank that get more light. It looks like it's OK at 80° Fahrenheit plus. The *Anubias* does not look very happy, though.

I do NOT see any more pop-eye. No fin-rot or any other sign of bad water, either.

11-9-10: I am continuing twice per week water changes, except for the week of 11-14-10.

11-21-10: 75% water change. Fin-rot is going away, color on the Blue Diamonds is a little better. The Marlborough red looks very good. I am out of home-made frozen food. The water I put in was a little cold, and the Blue with bad fins clamped them for a little while. The giant hygro is doing good in this tank with only one tube over it. The tank with two new tubes has them doing better, though.

2-6-11: All discus died but one! I think it was a hunger-strike when I didn't have time to make food over the holidays. They had seemed to be eating various store-bought food, but now I think not much, or they changed their minds. One had fin rot, so there may have been poor water quality, but then I started doing 75% changes two times per week, and the last two to go really looked good. No fin rot or popeye or ich that I could see.

They were four years old, I think they should have lasted longer! I will try to get some more soon. I made some more food...

2-8-11: 75% water changes.

11-8-11: The last Blue Diamond is still doing well. His fins are not perfect, but slowly getting better. I am getting more fish soon; Discus Hans sells to individuals now. His site is set up for it. <http://discusfishstore.com/catalog/index.php?cPath=39> I'm leaning towards some blue pigeon bloods and some Tefes.

12-1-11: I'm waiting for my beautiful wife to OK the expenditure!

4-2-12: New discus after the next trip! 





Manuel González-Rivero
is a research fellow at the University of Queensland.
NYT October 2013

DIVING IN BERMUDA TO FIND THE CORAL REEF SURVIVORS

It has been a hauntingly eerie experience. For two weeks we have been diving in the waters around Bermuda, out in the North Atlantic. On every reef there are the ghostly white signs of coral death in place of the multicoloured complexity we would expect to see. Such "bleaching" has knock-on effects for biodiversity across the reef. Our job at the Catlin Seaview Survey is to identify which species are vulnerable and which are apparently robust, and why.

Bleaching occurs when the symbiotic relationship between coral and diverse groups of algae breaks down. An increasingly common feature of reefs worldwide, it is brought on by thermal stress resulting from seawater temperature anomalies associated with climate change. Studying coral bleaching can thus help us predict the threats reefs will face in the future.

This makes our survey in Bermuda particularly important. Our arrival coincided with a bleaching episode, one that has given our team – normally based at the Global Change Institute at the University of Queensland in Brisbane, Australia – its first opportunity to witness a large-scale event of this kind. Our observations are adding to a detailed picture of the world's coral reefs, being pieced together online at a repository called

the Catlin Global Reef Record.

Documenting coral bleaching is time-consuming, and our working day can stretch to 18 hours. The team is up early to check the kit: gas bottles are refilled, lenses cleaned or replaced, data recorders reconfigured. A successful day rests on this house-keeping. By 8.30 am, it is time to dive.

We may be drifting in the Atlantic, but we are not working in isolation. A tip-off from the US National Oceanic and Atmospheric Administration, based in Silver Spring, Maryland, alerted us to the possibility of catching a bleaching event in progress and made us intensify our work.

NOAA routinely monitors ocean temperatures, and our colleagues there noticed unusually large and sustained warming early in the season around Bermuda.

Without doubt, our most important tool for logging these changes is the SVII, a specially developed three-camera system





which captures 360-degree panoramas. With the SVII mounted on an underwater scooter, we can survey a 2-kilometre-long transect in just an hour, capturing thousands of images in the process.

Our colleagues at the Scripps Institution of Oceanography in San Diego, California, will later help us analyse these images and rapidly identify marine species. A modified version of the facial recognition software used by security experts to identify suspects in a crowd makes this work easier.

Today, part of our team is working on the reef's shallows. About 70 per cent of the fire corals here have already been bleached, although there is less damage to brain corals and other reef-builders. While our divers work on the shallow reef, our "deep team" remains on the ship to survey the reefs further down using a remote-controlled robot vehicle. It lets us scrutinise areas of the reef beyond the reach of scuba diving, work that is vital to fully understanding the reef's functioning. Encouragingly, we have found no signs of bleaching at depths greater than 15 metres.

The results of such studies are beginning

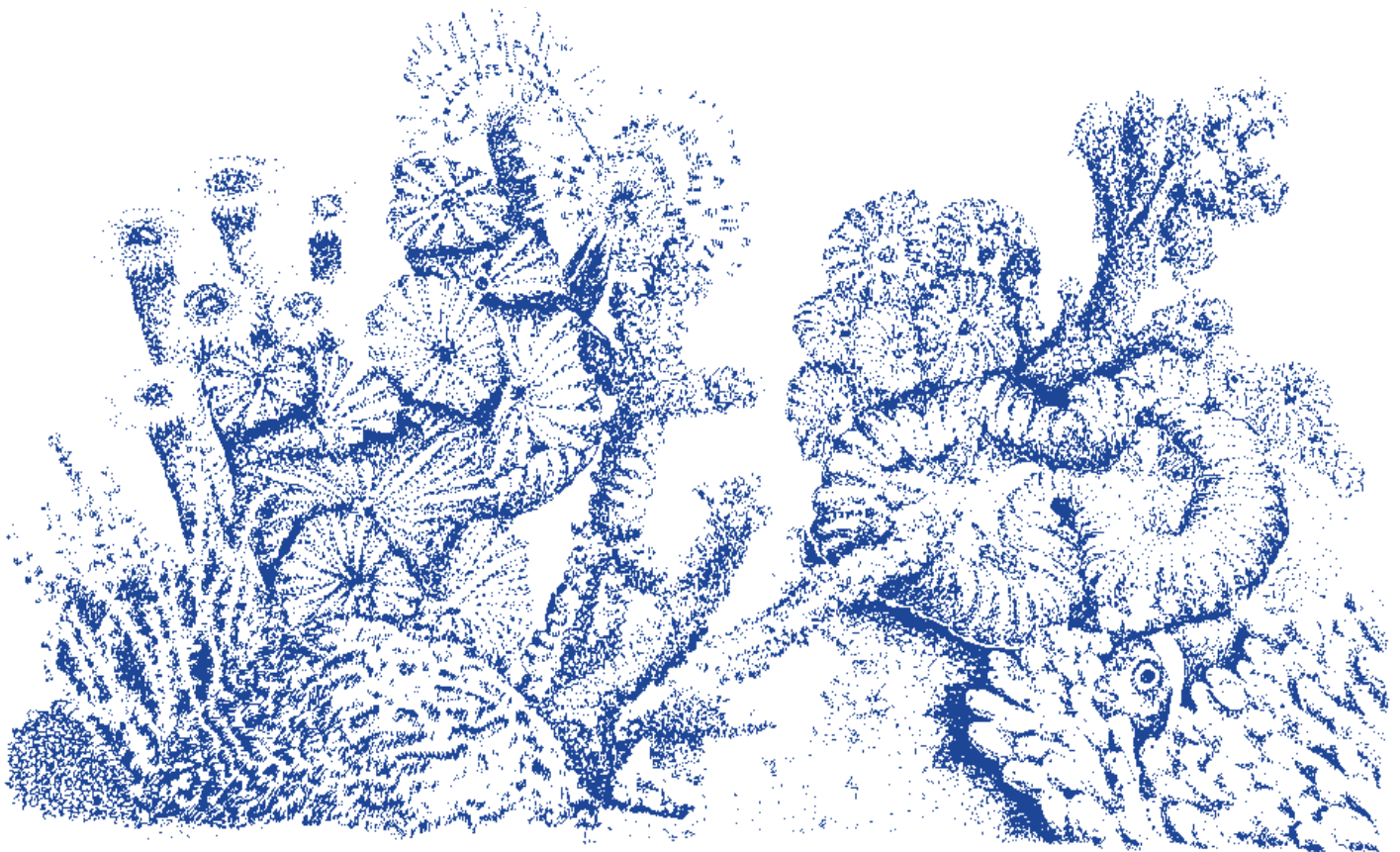
to feed through into coral management schemes. We may not be able to prevent bleaching, but we can help conservationists choose marine protected areas more wisely, so that they include coral reefs that might be particularly bleach-resistant.

The bleaching we are seeing is similar to that seen in other parts of the world. It is extensive yet selective, and a rapid recovery can follow. For Bermuda's reefs, though, recovery is not guaranteed. They lie on the edge of the largely tropical band in which coral communities are viable, and reef diversity here is relatively low, leaving the ecosystem vulnerable.

But as our time here draws to a close, there is cause for some optimism. Our readings suggest the area is beginning to experience a seasonal drop in seawater temperature, which may counteract the warm water anomaly and help buy some species time.

With luck, it is a sign that the peak of this particular bleaching episode has passed, offering these astonishing reefs a window of recovery.

This article appeared in print under the headline "*The white spectres of death underwater.*" 





JAMES GORMAN
Published: NYT October 7, 2013

Energy-Saving Secret of JELLYFISH

The moon jelly, or common jellyfish, is often viewed as a problem, an ecological invader, a nuisance to swimmers, or worse. A moon jelly population explosion last month clogged the water intakes of a Swedish nuclear power plant, forcing it to shut down. The jellyfish, which can be 2 to 15 inches in diameter, is such a concern that engineers in South Korea designed seagoing, prowling robotic blenders to liquefy the offenders.

But a group of American researchers were interested in another aspect of these highly successful blobs: They may be the most efficient swimmers on the planet.

Brad J. Gemmell at the Marine Biological Laboratory at Woods Hole in Massachusetts, and several other scientists, analyzed the movement of the jellies as part of a project funded by the Navy to look at what Dr. Gemmell called “nontraditional propulsion.”

The scientists used a new way of calculating energy called “cost of transport” that took account of what was happening throughout the two-phase swimming motion of the jellyfish. In the first phase, the jelly contracts its open bell and pushes water behind it, propelling itself forward. Then, the bell returns to its original shape and fills with water again.

Earlier studies had shown that the jelly got a second thrust during the rest and refill phase, but




they had not calculated the jelly’s energy expenditure during that time. It turned out that the jelly was not actually doing any work in that phase. Instead the elastic tissue in the bell acted like a rubber band, re-forming the bell. That action produced water movement under the jelly, called a vortex, that pushed it forward.

The study found that the secondary push was responsible for about 30 percent of the distance traveled by the jellyfish. And it worked even with anesthetized jellies that were pushed

through the water. The recovery phase and its kick were purely mechanical. “That’s what makes them so energy-efficient,” Dr. Gemmell said.

The finding offers some ideas about propulsion that could be useful to the Navy. This kind of low-energy, high efficiency thrust would not power any kind of fast-moving, quick-turning ocean craft, but it might be useful for monitoring devices that need to maintain a position or move at a slower pace.

It also could be one reason, Dr. Gemmell said, why the jelly has so much energy to spend on reproduction, producing those problematic population explosions. 




John Todaro BAS

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



Spinach Delight

Vegetarian Fish Food

Here is an inexpensive supplement meal for fish like Goldfish, Koi, Mollies, Silver Dollars, Pacus, and marine fish that require additional vegetable matter in their diet. 

R E C I P E

INGREDIENTS:

- 2 pkg. chopped frozen spinach
- 1 pkg. Knox® unflavored gelatin
- 8 oz. hot water
- 1 tsp. cod liver oil
- Minimum amount of Gerbers® baby cereal to thicken.

OPTIONAL:

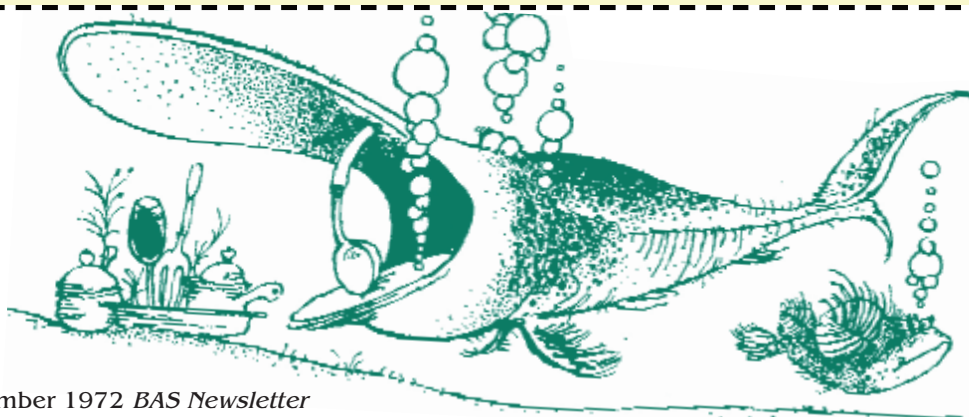
- 1/2 tsp Epsom Salt (See below).

PREPARATION:

1. Dissolve unflavored gelatin in the hot water. Mix until all gelatin is dissolved.
2. Blend thawed chopped spinach with gelatin water.
3. Add cod liver oil and enough baby cereal to soak up any extra liquid.
4. Cool mixture and place in Ziploc® bags and flatten to 1/4" inch and freeze.

FEEDING:

To feed, break off hunks, let thaw for a few minutes, then feed to your fish. Note that a strictly vegetable diet can cause constipation in fish. Feed Spinach Delight only several times a week. Feeding frozen brine shrimp several times a week takes care of this constipation problem. Otherwise, a small amount of Epsom Salt could be added to the mixture. Never feed more than your fish will eat in 5 to 10 minutes.





Hand-Me-Down Angelfish


Tropical fish have been part of my life for at least 50 years, and it's a family hand-me-down. As a young man, my uncle kept a 10-gallon tank with neon tetras, corydoras catfish, guppies and always a betta. Back in the 1940s and 50s, tropical fish were fairly difficult to obtain in Burlington, Vermont, and many were wild caught. He had a special fondness for South American fish, from the Amazon in particular. I recall a story he told about ordering a pair of Brazilian angelfish. He read about these beautiful, exotic fish in a magazine and was caught up in the romance of exploring the Amazon River. He had to order these coveted fish by mail and they came up from NYC on the train. They were very stressed by their travels, so he put them into his little community tank as soon as they arrived. To his horror, the angels behaved as cichlids usually do. By the next morning, all the other fish in the tank had been killed or eaten and only a single, precious, wild angelfish survived.

Lesson learned, he stuck to tetras, bettas and guppies from then on. For decades, the 10-gallon, stainless-steel framed tank sat on the floor at the top of the stairs to his attic bedroom - a perfect place for visitors to sit and watch the fish. Our mother recalls caring for her brother's aquarium when he was overseas in the Korean War and she was in high school. Years later, when my sister, Joan, and I were little kids, we would spend hours watching the tank whenever we visited our grandparents and uncle. We loved to tease the betta with the shiny lid from the box of brine shrimp pellets and watch him puff up and strut back and forth.

When I was deemed old enough, around the age of 8 or 9, my uncle gave me my own guppies in a bowl to care for. I soon graduated to a 10-gallon tank, and then a 20-gallon, purchased with S&H Green Stamps from the catalog store down on North Avenue. Aquarium inhabitants came from Woolworths on Church St. or a little cinder block



pet store on Williston Rd, near Al's French Fries. Following my uncle's lead, I developed a passion for South American fish and aquatic plants. Being the daughter of a science teacher, I found their native habitats, Latin names, interactions and breeding behavior fascinating. I still do.

Fifty years is a long time, and my hobby has waxed and waned, but I've never been without at least one inhabited tank of water. Like my uncle, my current obsession is angelfish—again. I bred a pair years ago and they made a great science project when my own children were young. (Picture a brine shrimp hatchery, tanks and tubing all over the kitchen counter.) Now, I have a fish room devoted to angels. Since my uncle's days of wild-caught silver angels, much has changed. He would be amazed at the range of modern angelfish genetics, their easy availability and relatively low price. I think he would be proud, too, of how much influence his humble 10-gallon tank had on his nieces. My sister and I have made quite a career of the hobby. 



TheShrimpFarm.com is the place to go for freshwater shrimp. The owner, **Brad Kemp**, has a new address: The Shrimp Farm USA, 11936 West 119th St., #197, Overland Park, KS 66213, U S A and has set up an Aquarium Shrimp Forum <http://theshrimpfarm.com/forum/index.php>. You can go to this forum and ask questions, talk to other shrimp nuts and discuss anything and everything related to Aquarium Shrimp.

American Ghost Shrimp



Scientific Name: *Palaemonetes paludosus*
Other Scientific Names: N / A
Common Name: American Glass Shrimp
Other Common Names: Ghost Shrimp, Glass Shrimp, American Freshwater Glass Shrimp
Origin: North America
Found in the wild: Yes
pH Range: 7.0 - 7.8
Temperature Range: 70 - 78 F
Hardness Range: 3 - 15 dkh
Life Span: 1 - 2 years
Gestation Period: 30 days Ideal pH: 7.2
Ideal Temperature: 75 F
Ideal Hardness: 8 dkh
Size: 1 - 2 inches
Diet: Omnivore

American Glass Shrimp History

The American Glass Shrimp has been in the

aquarium hobby in The United States for as long as the hobby has been around. The American Glass Shrimp is often found being sold as a feeder shrimp, to be fed to larger fish.

American Glass Shrimp Care

Most Ghost Shrimp that are found in America are sold as feeder shrimp and will not have a long life span in the home aquarium due to the conditions they are shipped to the store in and kept in the store. If the shrimp do survive, or if a captive raised stock is available, caring for the American Glass Shrimp is fairly easy. A well established aquarium will support a fairly large population of this aquarium shrimp.

American Glass Shrimp Diet

Glass Shrimp are very enthusiastic eaters, and will accept any food intended for aquarium fish or



invertebrates including flake foods and sinking pellets. The American Glass Shrimp has often been observed swimming upside down at the surface of the aquarium to feed on flake foods.


American Glass Shrimp Breeding

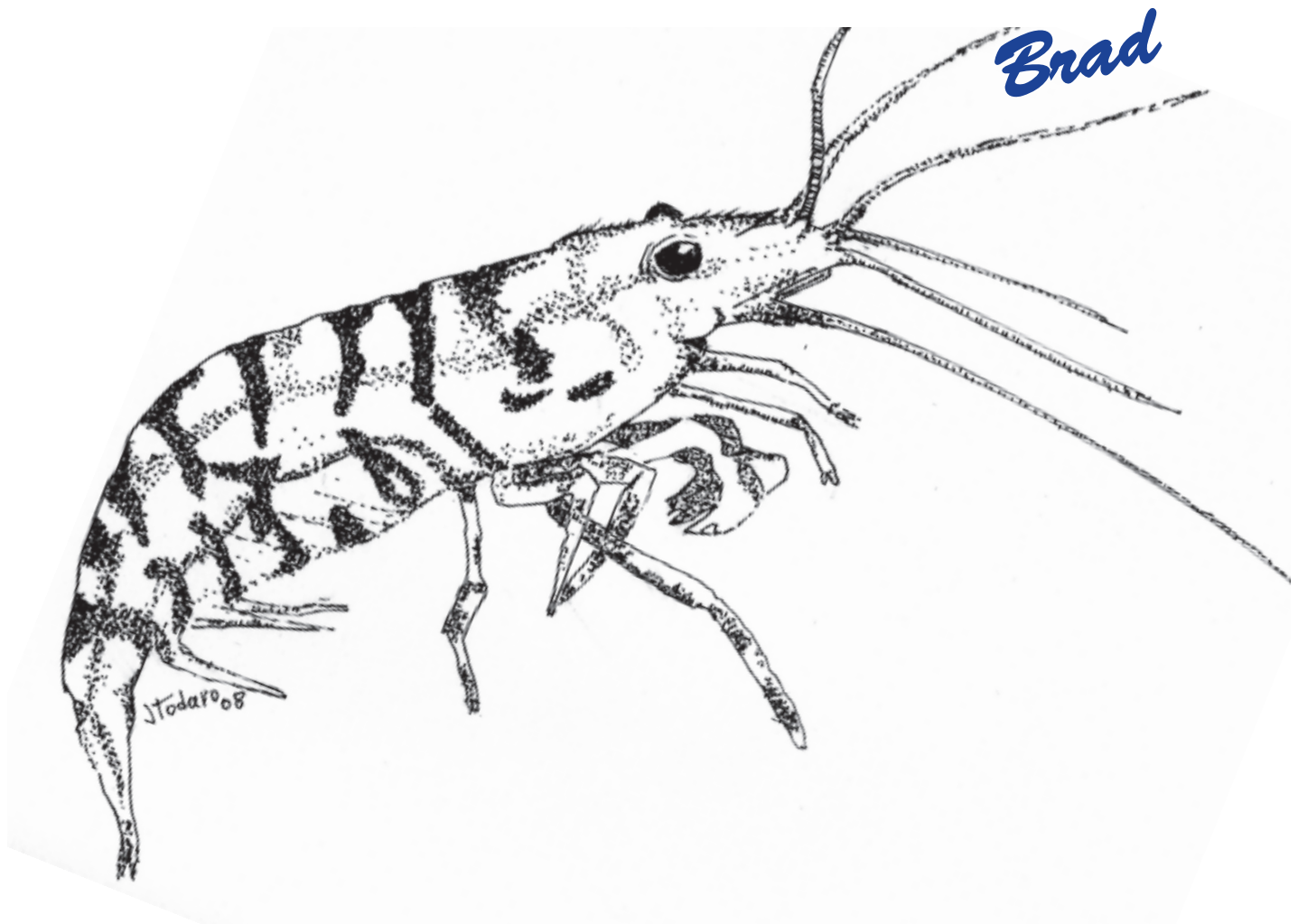
Breeding American Glass Shrimp can be a little bit difficult in the home aquarium. American Glass Shrimp are difficult to determine sex and they are a low order shrimp (their eggs hatch as free floating larva, not miniature versions of their parents) so they are a little more difficult to raise. Once hatched, the small larva will require powdered algae (Spirulina is a great algae for this) and should be in a separate aquarium to avoid predation. The larva will metamorphosis to miniature versions of the adults in about a week. Once the larva have reached metamorphosis, they will require no further special care.

American Glass Shrimp Behavior

The American Glass Shrimp is generally non-aggressive, but there have been reports of a few individuals that can get a bit aggressive. They can sometimes eat baby shrimp of any species or even fish fry. They are always an active shrimp when there are no predators in the aquarium.

Special Notes

As with all aquatic invertebrates, 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. Many shrimp are labeled Ghost Shrimp that are not American Glass Shrimp. These are often clear shrimp that look similar, but are not the same shrimp. 



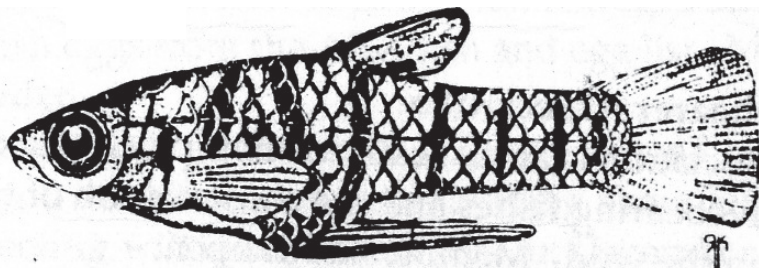


EDITOR'S NOTE: Dominique Isla was a member of BAS back in the 1990's; unfortunately for the hobby, he passed away in 2008. He was an avid livebearer aquarist and wrote for *Aquatica* in the past.

Reprinted from the May 1991 *Aquatica*.

Dom's Livebearer Corner

Quintana atrizona Barred topminnow



The Barred topminnow is a livebearer from Cuba and the Isle of Pines that is rarely seen in today's aquariums. I first learned about this fish from Innes' Tropical Fish. Then one day in February a fellow hobbyist mentioned it to me, and asked if I knew where to get a few.

Easier said than done. *Quintana atrizona* or Quinn Tuna, as my girlfriend calls it was first described by **Hubbs** in 1934. It is monotypic to its genus, meaning there is only one species in the genus *Quintana*. It was imported into the U.S. until the trade sanctions of the early 60's put an end to the flow of aquarium fish from Cuba. I have spoken to people who remember it, but to find a few live specimens, good luck!

Well, in May, a few pairs were collected by **Mike Smith**, through the American Museum of Natural History. He had been very fortunate in being welcomed in Cuba and allowed to collect there. This has helped to increase the number of species available from that part of the world in the U.S. today.

In September, I was able to get four juveniles F1. generation. I placed them in one of my standard livebearer set-ups, a 10 gallon bare bottom

tank with a box filter with charcoal, floss, and a sponge filter. Lots of green stuff (Java moss, Java fern, *Salvinia*, *Hydgro* and

Duckweed was included). I maintain the tank with a standard quarter tank weekly water change, temperature kept at 74°F..

The juveniles took to their new home with no problem. Their English name tells us what we need to know about them, Barred Top Minnow. First the males, when they sex out at about six months of age, have a black strip on their dorsal, hence the term, Barred. As for top minnow, let's just say that if you look for them in your tank, nine out of ten times, they will be hanging out at the top of the tank in the *Salvinia*. Still, if you enjoy livebearers and/or something a bit exotic, *Q. atrizona* is a neat fish to keep.

They are dainty feeders so don't overfeed, but otherwise they are not very demanding. My four juveniles have luckily sexed out into two pairs. The females presently appear gravid. I expect young at the end of the month.

I will be writing about one of my favorite livebearers from Mexico next issue, Cortes Swordtails, *Xiphophorus cortezi*. 



SPECIES PROFILE



Quintana atrizona
Barred topminnow

Scientific Name:

Quintana atrizona

Common Name: Barred topminnow.

Origin: Cuba, Isle of Pines.

Distribution: Found in small ponds.

pH Range: 6.8

Ideal pH: ?

Temperature Range: 73° - 80°F

Ideal Temperature: 75°F


Ideal Hardness: 8 dkh

Life Span: 1 - 2 years

Size: Males 1 inch - Females 1 3/4 inches.

Diet: Vegetation, but will accept flake food.

Maturity: Breeding size in 16 weeks. These fish are livebearers. They give birth to their young among plants. The female can be isolated a few days before she gives birth and should be removed from the isolation tank once she has given birth to the fry. On average they will have about 20 fry.

Remarks: Best kept in a well planted species tank of 10 or 15 gallons. They are peaceful fish. 



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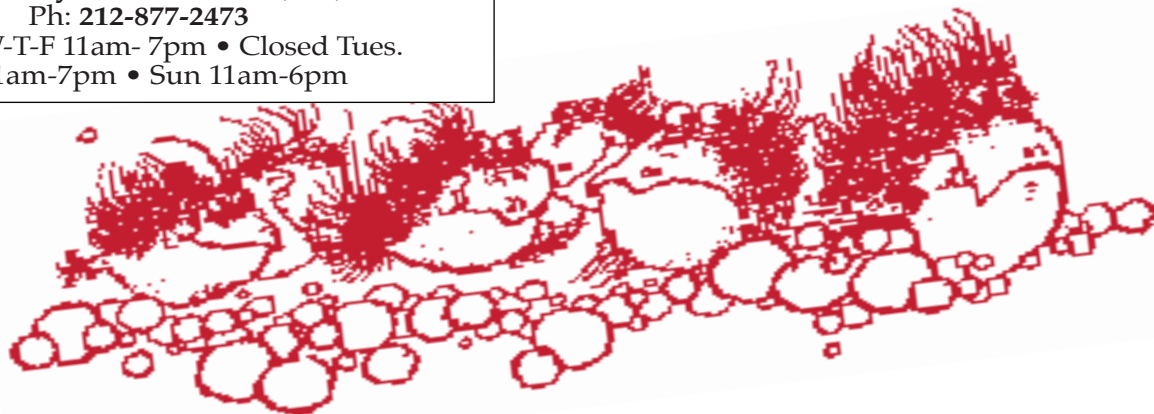
Pet Shanty. Family owned & operated; 3 rooms of freshwater fish & 1 of marine fish & corals. They stock a vast list of fish, posted on line at <http://pet-shanty.com>. They also carry other pets and pet supplies. Check them out; they probably have what you want. **Members get a 10% discount.**

Pet Shanty

2507 U.S. Hway 22, Scotch Plains, NJ 07076

Ph: 1 (908) 889-8262 • Fax: 1 (908) 889-0803

Mon-Fri: 10am-9pm • Sat: 10am-7pm • Sun 10am-5pm





SUPPORT OUR SPONSORS. THEY SUPPORT US. WE MUST SUPPORT THEM!

Petland Discounts, the complete pet store, carries a full line of pet supplies for fish, dogs, cats, birds, reptiles and small animals. Also a variety of fish, birds, small animals and reptiles. Open 7 days a week. Locations in New York, New Jersey & Connecticut. Over 15 stores in Brooklyn. Shop online at: See the white pages, for a store near you.
www.petlanddiscounts.com.

Reefs2Go.Com has joined the BAS family of quality sponsors. They're located in sunny Florida. Visit their web site to view the full line of saltwater fish, inverts, corals, live foods for marine fish and corals plus a complete line of saltwater dry goods and equipment. Get all the details on FREE SHIPPING and their 14 day Guaranteed Living or Credit policy. If saltwater is your passion and you're looking for deals, check their Daily Deals and Over Stocked Items page. For more great buys, check Buy 1 get 1 Free Offers. Check out the site. Read the testimonials and if you still have questions, call them Monday to Thursday from 10am to 5pm EST at 727-623-0914.

Pacific Aquarium & Pet Inc., in Manhattan's Chinatown, carries ornamental goldfish, koi, freshwater fish, & aquatic plants. **BAS members get 10% discount with current card** (Discounts not to be combined with other specials). They have a full line of aquarium supplies. You can order custom size tanks.

Pacific Aquarium & Pet Inc.

46 Delancy St., NY, NY 10002

Ph: 1 (212) 995-5895

Open 7 days a week and all holidays 10am to 7:30pm

Wardley Advanced Nutrition Perfect Protein formula is the first fish food designed to meet the amino acid requirements of fish to support their growth and good health. Amino acid content determines a foods quality, not the percentage of protein.

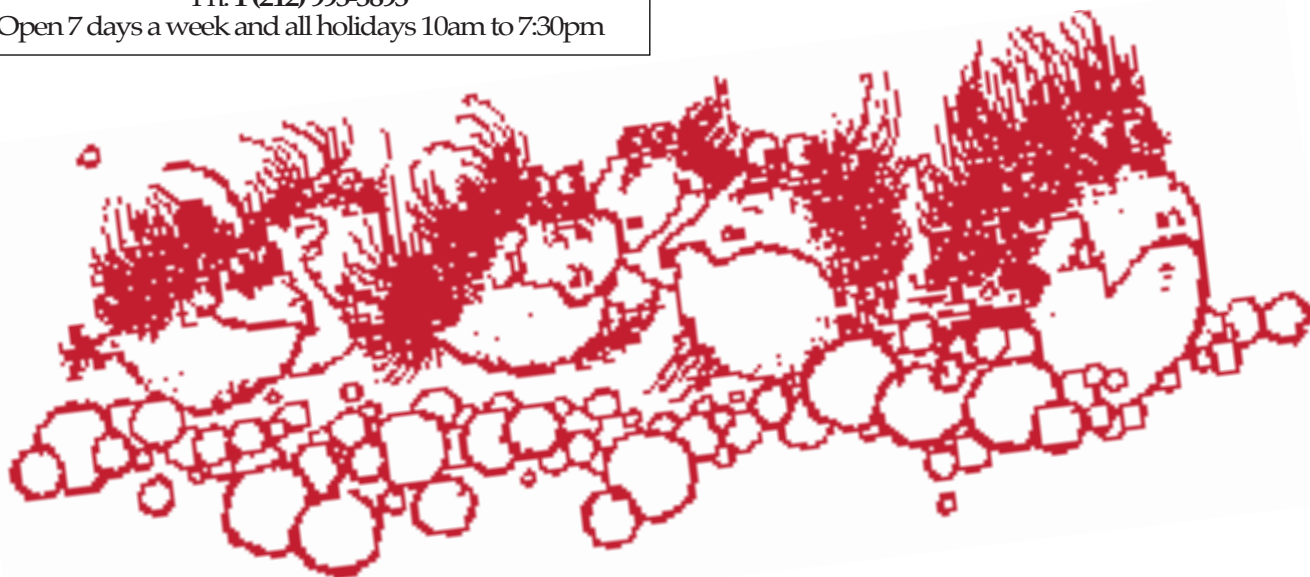
Better Nutrition and Cleaner Water
Now that's advanced.

Joseph S. Reisman & Assoc. Accounting & Tax Experts. They specialize in aquarium societies, aquarium hobbyists, aquarium retail suppliers and stores and aquarium wholesale suppliers. They offer a 10% discount to Brooklyn Aquarium members with a valid membership card.

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ZooMed Aquarium Log not only floats but also provides security, comfort and stress reduction for fish and other aquatic pets. It floats at the surface so that fish can swim inside and it comes in three sizes for any aquarium. Find out more about it and other ZooMed aquatic products at

www.zoomed.com



Membership & Renewal Application Brooklyn Aquarium Society

Mail This Form Or A Copy And Your Check Payable to Brooklyn Aquarium Society to
BROOKLYN AQUARIUM SOCIETY, ATT: MEMBERSHIP CHAIRPERSON
P.O. BOX 290610, BROOKLYN, NEW YORK 11229-0011



Please check your address label to see when your membership expires

Meetings are held at the NY Aquarium Education Hall on the 2nd Friday of the month at 7:30pm. Knowledgeable speakers on fish care and culture, door prizes, raffles, and fish auctions. All meetings are free to members. Visit us on line: WWW.BROOKLYNAQUARIUMSOCIETY.ORG

NAME _____ OCCUPATION _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

PHONE (DAY) _____ (EVE) _____ (FAX) _____

E-mail Address _____

TYPE & LENGTH of MEMBERSHIP: (CHECK ONE)

INDIVIDUAL

1yr. \$20	2yr. \$36	3yr. \$51	4yr. \$68
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FAMILY

1yr. \$25	2yr. \$45	3yr. \$63	4yr. \$85
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[] \$15 STUDENT 1 YEAR

(UNDER 18 YEARS)

*If family membership, please list all family members. Only first two listed will have voting rights.

1 _____ 2 _____ 3 _____

4 _____ 5 _____ 6 _____

Number of tanks [] marine [] freshwater [] Do you breed fish?
 [yes] [no]

If yes, what types do you breed: _____

Special interest (if any) _____

How did you hear about BAS [friend] [dealer] [flyer] [Aquatica] [mag ad] [online]
 other _____

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

On occasion, the Brooklyn Aquarium Society uses its mailing list to send notices of interest to our members.

If you **DO NOT** wish to receive these mailings please check here []

Official use

Member number: _____ Type of membership [F] [I] [S] Date
 paid: _____ Board approved date _____
 Amount paid: _____ Renewal/member since _____