



AQUATICA

THE ON-LINE JOURNAL OF THE BROOKLYN AQUARIUM SOCIETY
VOL. 32 JANUARY ~ FEBRUARY 2019 No. 3

Corydoras sp. CW062

**HAPPY
NEW YEAR!**



Photo: Ian Fuller



108 YEARS OF EDUCATING AQUARISTS
AQUATICA

VOL.32 JANUARY • FEBRUARY 2019 NO.3

CONTENTS



PAGE 2 THE AQUATICA STAFF

PAGE 3 CALENDAR OF EVENTS.
 BAS Events for 2019.

PAGE 4 MARINE ANGELFISH #2. THE BLUE RING ANGEL. If you're thinking of getting a marine angelfish for your tank, you must read this article.
ANTHONY P. KROEGER - BAS

PAGE 6 SEA STARS STARTED DISSOLVING. WHAT HELPED SOME OF THEM SURVIVE? Researchers say they've detected genetic differences that might help explain why some of these creatures on California's coast survived a deadly plague.
VERONIQUE GREENWOOD - New York Times

PAGE 8 THE BUMBLEBEE MOUTHBROODER. The breeding of *Pseudotropheus crabro*, the Bumblebee mouthbrooder, a native fish of Lake Malawi.
JOE GRAFFAGNINO - BAS

PAGE 10 GUPPY PLAGUE/AIDS. A COMMERCIAL PERSPECTIVE #2
 Questions and answers about this guppy problem.
ANTHONY P. KROEGER - BAS

PAGE 14 PASTE FOOD INGREDIENTS. A list of what some common paste food additives contain.
JOHN TODARO - BAS

PAGE 15 WHIPTAIL CATFISH. An article worth reading again from our files.
JOE GRAFFAGNINO - BAS

PAGE 16 SPECIES PROFILE OF THE WHIPTAIL CATFISH. An overview of this unusual catfish.
JOHN TODARO - BAS

PAGE 17 A BLAST FROM THE PAST. An article from the archives of the Brooklyn Aquarium Society from *The Bulletin*, 1916.
CHRISTIAN J. HEEDE - BAS

PAGE 19 TIGER SHRIMP. Statistics on this freshwater dwarf shrimp in the home aquarium.
RYAN CURTIS - BAS

PAGE 21 I DIG YOU! A GEOPHAGUS AQUARIUM. How to care and breed this family of fishes from South America.
ANTHONY P. KROEGER - BAS

PAGE 23 FISH DISEASE TIPS - A BRIEF OVERVIEW OF FISH DISEASES.
 Fish diseases can basically fall into four categories. This article lists them.
ANTHONY P. KROEGER - BAS

PAGE 25 THIS SNAIL GOES THROUGH METAMORPHOSIS. THEN IT NEVER HAS TO EAT AGAIN. The transformation of a deep sea mollusk is comparable to an average person growing as much as 60 feet tall with a giant sac of bacteria filling its guts.
JOANNA KLIN - New York Times

PAGE 28 AQUARIUM HEATERS- OVERVIEW. Information on aquarium heaters and how to choose one for your aquarium.
MARINEANDREEF.COM - News Letter

PAGE 30 FISH COLLECTING IN SOUTH EASTERN PERU. Ian Fuller's collecting adventures in South Eastern Peru.
IAN FULLER - Corydorasworld.com

PAGE 36 GET TO KNOW OUR SPONSORS.

PAGE 38 SPONSORS ADS.

PAGE 41 BENEFITS OF MEMBERSHIP.

PAGE 42 BAS MEMBERSHIP APPLICATION.



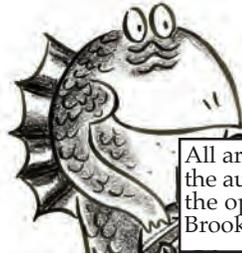
AQUATICA STAFF



Editor: **John Todaro**
 Associate Designer: **Ginny Cahill**
 Copy Editor: **Kay Martin**
 Freshwater Shrimp Editor: **Ryan Curtis**
 Marine Editor: **Open**
 Plant Editor: **Izzy Zwerin**
 Catfish Editor: **Ian Fuller**
 Illustrations: **John Todaro**
Norman Doughty
Chris Giam
Julia Noonan
Shelly Sacks
Bill Amely

Contributing Writers:
Ryan Curtis
Ian Fuller
Joe Graffagnino
Veronique Greenwood
Christian J. Heede

JoeAnna Klin
Anthony P. Kroeger
MarineandReef.com
Dr. Frederick Schneider
John Todaro



All articles in *Aquatica* are the opinion and experiences of the author or authors, and do not necessarily represent the opinions of the editors or staff of *Aquatica* or the Brooklyn Aquarium Society Inc.

Exchange Editor:

Note: The Editor takes full responsibility for misspellings and punctuation errors.

AQUATICA is published on line bi-monthly (except July / August) by BAS. **Original articles** may be reprinted by other non-profit organizations, provided proper credit is given to the author and *AQUATICA*, and two copies are sent to the Exchange Editor. Transcriptions of lectures may not be reprinted without written permission of both Editor and the Speaker. A notice of where original *AQUATICA* articles have been published should be sent to the **BAS Exchange Editor, P.O. Box 290610, Bklyn, NY 11229-0111**

AQUATICA will exchange publications with all interested societies. If we do not receive your publications for three consecutive months, we will assume you no longer wish to exchange and your club may be removed from our mailing list.

ALL CORRESPONDENCE CONCERNING THIS PUBLICATION SHOULD BE SENT TO:

• Editor: **John Todaro, 247 Middletown Road, South Londonderry VT, 05155 - Phone: 802 824-3743**
 Fax: Same. You can submit articles to the Editor by mail, fax, or E-mail to: **JTODDYBAS@AOL.COM**.

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:

Brooklyn Aquarium Society, C/O Membership Chairperson, P.O. Box 290610, Brooklyn, NY 11229-0011.

BROOKLYN AQUARIUM SOCIETY BOARD OF DIRECTORS

OFFICERS

President:
Steve Matassa
 1st Vice President:
Gennady (Gene) Kogan
 2nd Vice President:
Marie Licciardello
 Treasurer:
Open
 Corresponding Secretary:
Dan Smith

Exchange Editor:
Bill Amely
 Membership Chairperson:
David Manuel
 Sergeant-at-Arms:
Lita Goldberg
 Recording Secretary:
Kay Martin
 Web Master:
Bernard Deren
 Editor:
John Todaro

BOARD MEMBERS

Robert Kolsky
Denver Lettmen
Nick Martinez
Leon Perry
Paul Santiago
Alissa Sinkler
Wayne Sinckler
Bob Strazzulla
Larry Whitfield
Ronald Wiesenfield

BROOKLYN AQUARIUM SOCIETY

CALENDAR OF EVENTS ~ 2019



A HEALTHY &
HAPPY NEW
YEAR TO ALL!



2019

JAN11 Dr. Timothy Hovanec, Tim's Aquatics - Modern Day Approach to Aquarium Chemistry ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

FEB 8 Joseph Graffagnino -A Pond Grew in Brooklyn ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

MAR 8 Richard Ross - Coral Spawning and Secure ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

APR 12 Ralph Chi of Pacific Aquarium & Pets, Inc. Topic TBA ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

MAY 10 Giant Spring Auction ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

JUN 14 Speaker from House of Fins - Topic TBA ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

NO MEETINGS JULY & AUGUST

SEPT 13 TullioDell Aquila - The Facts of Light ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods.

OCT11 Giant Fall Auction ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods..

NOV 8 Lou Ekus (Tropic Marin) Reef Chemistry Mad Easy ~ Followed by an auction of marine fish, aqua-cultured corals, freshwater fish, plants & dry goods..

DEC 13 Holiday Party ~ Members, their families & friends • BAS awards presentations.

MARINE ANGELFISH - PART 2

BIG! BOLD! BEAUTIFUL!



THE “Blue Ring” Angel

Pomacanthus annularis

Blue Ring Angels have a subtle beauty with an “in your face” attitude. This fish flaunts itself big time! Never one to hide, this angel is always front and center in any aquarium it occupies.

Blue rings are most commonly exported from India and Sri Lanka, but their range extends over to Indonesia.

They are sometimes exported from there too.



Adult size for a blue ring angel is about 15" inches. The colors on a blue ring are crisp and contrasting. The base body color of an adult is a deep orange brown on the flanks, head and belly. A bright orange area encircled by a neon blue ring (hence the fishes' name) is located back of and above the eye. A brilliant blue stripe extends through the eye and down towards the pectoral fin. A second blue stripe extends the same just below the eye.

The flanks are covered with usually 6 to 8 broad neon blue upwards curving stripes. The stripes (lowest) run through the anal fin. All stripes curve up and end in the dorsal fin, which ends in a long filamentous extension. The rear 10% of the body, as well as the dorsal and anal fin posterior portions, are a deep chocolate brown. Ventrals and pectorals are orange, with the pectorals hosting a bright blue stripe at the base. The caudal fin is snow white; the dorsal fin is usually tipped with a fine red edge, and so is the anal fin.

Given this angel's showmanship attitude to display all its finery, this is one beautiful angelfish indeed.

In my opinion, blue rings are one of the hardest and easiest to keep of all the large angelfish. Usually most dealers have access to this fish. Prices are generally moderate.

Like most large angels, juveniles look very



different from the adults. Juveniles are very dark in color with a multitude of variably colored blue vertical bars covering the entire body.

Blue rings, like all larger angelfish, need room, ideally a 55-gallon for juveniles and a 180-gallon for adults. A large capacity power or canister filter is mandatory and don't forget to cover the tank!

Water quality must be good: 1.020 to 1.024

salinity. Keep temperatures between 74° and 82°F. Zero ammonia/nitrite and low nitrates. I do a partial water change of about 25% weekly. But this angelfish is not nearly as sensitive to poor water as the other big angels are.

Blue ring angelfish are much easier to feed too! Try to feed them as wide a variety of fresh greens as possible and flake foods too, as well as a wide variety of high quality frozen, pellets and flake foods. Although they do nibble at marine sponges I have not found them to eat it with gusto like other larger angels do.

Blue rings are peaceful with all other fish except themselves. This angelfish is very territorial. I have not even been able to keep an adult and a juvenile together. As much as I hate to say it, for most people and most situations I recommend you keep this angelfish alone.

I have found blue rings to be hit and miss in reef tanks. Introduced as a juvenile and fed a wide variety of foods, you have a good chance of keeping their coral nibbling to a minimum.

Wild adults are more problematic. If you want to try this angel in a reef aquarium, start with a juvenile and grow it up feeding a wide smorgasbord of foods to tempt it, so it will be less likely to take an interest in your corals.

Blue rings seem to be much less susceptible to common marine diseases (ex. Ick)) than other large angels. Properly cared for, this is probably the hardest larger angelfish in my book.

If you keep cleaner shrimp in your aquarium, this angel will readily present itself to them! This is an extremely interesting behavior to watch. A blue ring will literally tilt over on its side to allow the shrimp to clean its flanks. It will also spread its fins, full width, to obtain a cleaning. It's amazing to see a cleaner shrimp walk all over their body as it cleans them. It's certainly a sight no one will ever forget.

If you want to try a "top shelf" angelfish for the first time, look no further; the blue ring angelfish is your best choice hands down! 



Veronique Greenwood - New York Times
Reprinted from the *New York Times* June 10, 2018

Sea Stars Started Dissolving. What Helped Some of Them Survive?



Researchers say they've detected genetic differences that might help explain why some of these creatures on California's coast survived a deadly plague.



First they developed ominous white patches. Then, in a touch straight from a horror movie, their rotting arms began to detach from their bodies and crawl away. They didn't make it far.

"They just kind of dissolve within days," said **Lauren Schiebelhut**, a biologist at the University of California, Merced, who studies the creatures.

More than 80 percent of the ocher sea stars on the northern coast died as a result of that outbreak of sea star wasting syndrome, as the disease is called. In the wake of the devastation, Dr. Schiebelhut and her colleagues looked at the survivors and wondered: Did they have something that the dead did not?

In a new paper in the *Proceedings of the National Academy of Sciences*, they report a detectable difference between the genes of sea stars before the epidemic and the survivors. Genetic tests also show that new generations of sea stars have more in common with the survivors than with past generations — the events of 2013 seem to have left an indelible mark on the sea star's gene pool.

The ocher sea star makes its home in rocky

tide pools all along the California coast. Before the outbreak, the researchers had taken tissue samples at 16 different locations scattered between the San Francisco Bay and the Oregon border. Afterward, they took samples from the survivors in the same locations. Using several kinds of genetic testing, they found that some sequences were more common in sea stars now than they had been before, while others were less common.

Then they turned their attention to the juvenile sea stars that appeared after the outbreak.

Each year, flurries of tiny sea star larvae spend the first stage of their life floating in the open ocean. Months later, they return home to settle down.

At the time of the wasting disease outbreak — the cause of which is still unknown, but may be linked to warmer temperatures — many larvae spawned by dying sea stars were still at sea. The researchers thought that when the next batch of young sea stars appeared, they would resemble previous generations. "We expected their gene pool to look very similar to the original adults," said Dr. Schiebelhu 



Scientists aren't sure what caused the outbreak, but they have suggested it might have been due to warming ocean temperatures.

Credit: Lauren Schiebelhut.



The Bumblebee Mouthbrooder

Pseudotropheus crabro



Iso known as the Bumblebee Mbuna comes from Lake Malawi in Africa. The description of this species is that young fish are more brightly colored than older ones. Females keep the gold with black bars coloring, but males starting at approximately four months, start getting darker. The males develop black in their dorsal and pectoral fins first and then their entire body turns a dark blue, almost black color. When stressed, the young males will revert to the gold coloration until they reach adult size. Their maximum length is nine inches.

In Lake Malawi, they live around large boulders and in caves. They are a specialized eater that feeds on the parasites of a large African catfish; the *Bagrus meridionalis*, which has a mutually beneficial relationship. The *P. crabro* eats the parasites and in return, the catfish won't eat the *P. crabro*. In the aquarium, they eat anything, but you should feed them vegetable matter in their diet as well as pellets, flakes and frozen foods.

This species is aggressive and should be housed with other Mbuna species such as *Pseudotropheus*, *Melanochromis*, *Cynotilapia*, and *Maylandia*. Also, I would recommend one male



with three females to try and spread out the aggression. They are mouth brooders and if the female can hold the eggs for 15 days she will hold them full term (28 days) before releasing them. However, if she feels that the fry will be in danger she will hold them longer. At times, the fry has starved to death before the mother would release them due to her being housed in the same environment with other aggressive cichlids. It is best to let her hold them for 15 days and then remove her to a hospital tank until she releases the fry. She will care for them for 10 days and then remove her and put her back in the aquarium with her group. Another option would be to remove the holding female at day 15 and strip the fry from her. The fry should be kept separate and housed by themselves and the mother should be placed in a hospital tank for 10 days for her to recuperate and regain her strength. However, the fry will be better parents if they are kept with the mother for those 10 days as the parent will impart parenting skills to her young during that time.

I was able to obtain my trio of *P. crabro* at a North Jersey Aquarium Society event. I brought them home and housed them in a 40-gallon breeder aquarium. They were the only



fish in the tank. I could see that they were aggressive feeders and the male constantly chased the two females all over the tank. 11 weeks later, I noticed that one of the females did not come up to attack the food floating on the surface. I found her hiding in a

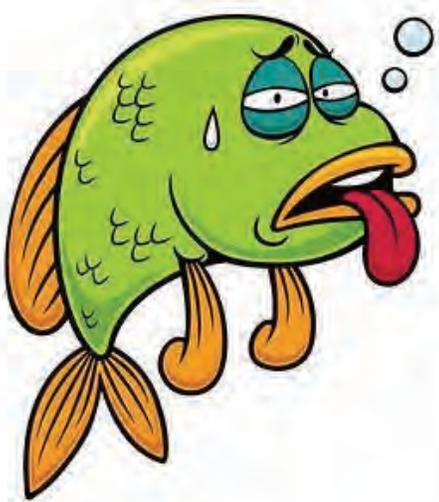
corner between a corner filter and a medium-sized flower pot. She was either wounded or holding eggs. I didn't want to disturb her so I waited her out. On the 15th day, I pulled her out and placed her in a 5-gallon tank. I stripped her of the fry and found 45 babies, a few still had egg sacks on their bellies. I moved the fry to a 15-gallon tank where they grew quickly. I left mom in the 5-gallon tank to rest and eat after her ordeal. 12 days later I put her back in the original tank and two days later I found her dead. The male had killed her. Two weeks after that, the second female was holding eggs but ate them three days later. I guess the aggressive male harassed her too much.

I would recommend keeping these attractive fish, but follow my recommendations

above for success. If you like a fish that has spunk, tenacity and a bit of violence, then this is the fish for you. 



GUPPY PLAGUE/AIDS



A Commercial Perspective: Part 2

Guppy “aids,” rather than plague, is a very appropriate name for this problem. I firmly believe it results in a “temporary” total, or almost total, collapse of the infected fish’s immune system, resulting in mass mortalities. My attempts to cure guppy “aids” are based upon the premise above.

I asked myself the following questions and I came up with the following answers:

QUESTIONS

#1

Assuming total immune system collapse what could I do to install an alternative immune system or boost the collapsing one?

#2

Assuming the secondary bacterial infection is the real killer, what can I do to prevent it from overwhelming the guppies’ compromised immune systems.

#3

Aids as a virus in mammals is treated with a “cocktail” of drugs. Would a “cocktail” work in guppies too? Or is one drug sufficient?

#4

Once cured, is there any carrier (Typhoid Mary) reinfecting potential?

#5

Commercially speaking, I make money selling fish, not medicating them or disposing of dead fish. Sick and dying fish are worthless. At what point does it become commercially expedient to dispose of sick fish rather than medicate them?

**From my experiments,
I came to the following
conclusions:**

ANSWERS

#1

No one individual drug is sufficient to “cure” this problem.

#2

Iodized salt is essential to remediating this problem. Test fish treated without salt, no matter what medication, always had 75% mortality prior to 96 hours.

#3

Post-cure, I found no “Typhoid Mary” recontamination.

#4

Commercially speaking, any guppy still sick after 7 days should be destroyed, unless it is a valuable breeder. The cost of recovering such fish exceeds its value.

Now to my questions and experiments:

EXPERIMENTS

#1

How to boost or install an immune system?

A fish’s body slime is its first defense against the bacteria I suspect killing guppies. The “aids” virus just enables the bacteria to overwhelm the guppies.

Salt has been known for years as a “boost” for fish, a tonic if you will. Iodine is an essential micro-nutrient. Its properties are still not completely understood.

When I added 1 tsp of un-iodized salt per gallon, the “black line” bacterial infection slowed. When I added iodized salt, the black line faded in intensity and its progress slowed further.

To further boost body slime, I added “Stress Coat™” and “garlic salt” from the grocery. This did not stop the bacteria, but did slow it enough to give the “cocktail” time to work on the bacteria.

If caught early (prior to fin degeneration/ray exposure), you can feed the fish medicated food. The only medicated food I

found success with was Tetramin’s medicated bacterial flake food a product the FDA no longer allows to be imported into the USA. I do not know the medication composition of this food, but it works. Fed early with the slime boosting regimen, 90%+ of infected fish recovered after 7 to 10 days.

I have tried other medicated food, but none helped, so this medicated food is unlikely to be available to American hobbyists. Still any medicated food available is worth trying.

#2

How to keep the bacteria from overwhelming the fish?

Like any animal life, bacteria have a survivability zone in which they are most comfortable living in. Anything outside this “comfort zone stresses the bacteria and impedes its progress, which in this particular instance is essential as the guppies’ immune systems seem to begin recovery 96 hours post



“clumping,” if the fish survive that long.

Iodized salt definitely weakens and slows the bacteria, but what other parameters can we adjust? I tried temperature and light.

Guppies tolerate wide temperature variations, but at 90°F they are badly stressed. I raise all tanks being treated to 87°F. This probably is not comfortable for the guppies, so I assume it may be the same for the secondary bacteria infection.

I know some bacteria have a photosynthetic symbiosis so I cover all infected tanks with a blanket 16 hours a day, the other 8 hours offering dim light. These two actions definitely slowed but did not stop the “black line” bacteria.

I change 80% of water on all treated tanks daily, restoring all the medication used to 100% efficacy at that time.

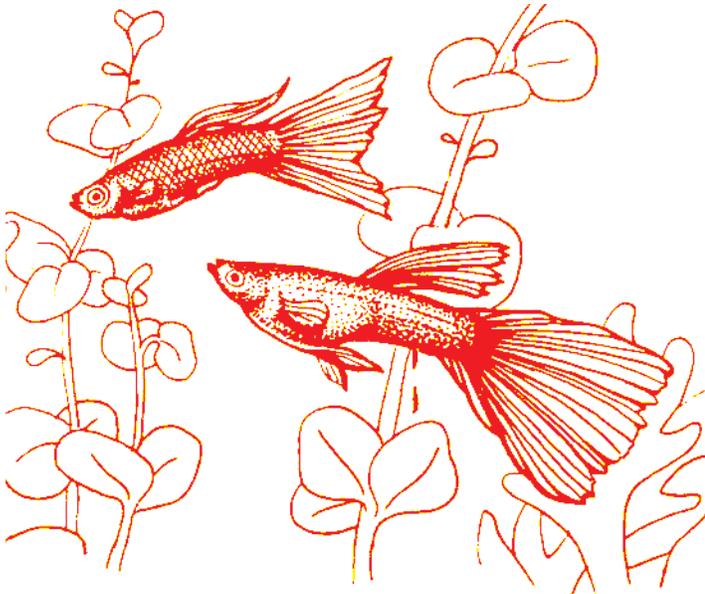
#3

Would a “cocktail” of drugs work?

It is my opinion that the only way to treat this problem is to use a “cocktail.” But which drugs?

I have thrown everything but the kitchen sink at this problem.

This “cocktail” is always added in addition to the iodized salt and Stress Coat™.



Of all the “cocktail” combinations I have tried, the following 2 seem to be the most successful. Caught early, I can usually keep losses under 5% with either of these “cocktails.” But “cocktails” must be utilized for a period of 7 to 10 days, at which time all signs of clamped fins, “anchovy shimmying” and clumping behavior are gone. The “cocktail” formulas are:

COCKTAIL NUMBER 1

**Formalin,
Malachite green,
Kanacyn,
Cuppramine by Seachem.**

COCKTAIL NUMBER 2

**Formalin,
Acriflavine,
Kanacyn,
Velvex by Jungle**

In both formulations Formalin and Kanacyn form the base, working in conjunction with the other medications.

If you do not have access to Cuppramine, you can use pre-1972 pennies at the rate of 10 pennies per gallon. The pennies must be pre 1972; newer pennies do not have a high enough copper content to be effective. Do not bother wasting your time and money on any other chelated copper products. I have found only Cuppramine to be effective.

Use full strength for all medications for the first 5 days, past what I view as causative agents' critical 96 hour weakening point. Reduce medications by 50% on day 6 and 7. You should see drastic improvement by this time.



#5

Under no circumstance reduce the salt or Stress Coat concentrations at any point during treatment.

I have found blue, green, purple and red guppy strains respond better to the treatment, which includes malachite green.

Strains of some guppies, for example, yellow, white, 3/4 black, 1/2 black (except 1/2 blue, 1/2 black green), respond better to the Acriflavine cocktail.

#4

I have not had carrier or reinfection problems once treatment is completed. However, careful monitoring of all recovered, as well as susceptible, fish is always advisable following such outbreaks.

Commercially speaking, I find treating breeders worth the effort. This event affects guppies of all sizes, ages and maturity. I find treating non-breeding stock effective only to the 7 day point. Any fish still displaying symptoms at that time, I destroy. The cost and time of treatment, as well as the possibility of cross-infection of uninfected tanks, is simply too high to risk a new outbreak beyond the initial one, especially the cost of monitoring all newly shipped fish extremely closely and quarantining all newly shipped guppies at least 10 days, as these are the fish most likely to become affected.

Hopefully you never encounter guppy "aids," but if you do, I hope these observations will help you. 

Happy fishkeeping.

Tom



John Todaro - BAS

From the Brooklyn Aquarium Society's publication

SCRUMPTIOUS MEALS & LIVE FOOD TREATS Compiled, Edited & Written by John Todaro

Paste Food Ingredients



The following list covers what some common paste food additives contain and might help you in your ingredient choices. These are just some ingredients you might want to use. Check a nutritional value list in a cookbook to find other ingredients you could also add.

By checking nutritional values and what different foods provide, you can determine whether or not you want to include them to your paste food recipes.

This is one way that you can help improve the strain of fish you are working with and the quality of their lives.

Give paste foods a chance, your fish will love you for it! 

- 10 pt ALFALFA - Contains minerals and vitamins.
- BEEFHEART - Provides high protein, high calorie, calcium, iron, Vitamin A, ascorbic acid.
- BEEF LIVER - In moderation, (Alone, it would be an overload of Vitamin A) It is however, high in protein, Vitamins A, B, and C.
- BREWERS YEAST POWDER - (1 lb. 4 oz. container) 60 calories, 1% fat, 3% sodium, 6 grams sugar carbohydrate, 6 grams protein, 35% riboflavin, 30% niacin, 30% vitamin B - 6, 15% foliate, 6% biotin, 15% pantothenic acid, 20% phosphorus and 14% Thiamin.
- BROCCOLI - High in protein, low in fat, supplies calcium, iron, Vitamin A, Riboflavin, Thiamin, and Niacin.
- CARROTS - Vitamins A, B, C, and E, good fiber, helps in coloration.
- CLAMS - Protein, Thiamin, Riboflavin, Niacin and Iron.
- DUCKWEED - Vitamin A.
- EGGS - Low in calorie, high in vitamins and minerals. Egg protein is the standard measure for judging the protein in other foods.
- GELATIN - Protein (use less with livebearers and pupfish).
- KRILL - Freeze-dried are 60% protein, 19% fiber, 6% moisture. Krill is used as a binding agent. If you use krill, you don't need gelatin.
- GREENBEANS - (4 oz jar Beechnut) 3 grams sugar, 2 grams fiber, 7 grams total carbohydrates, 10 mg. sodium. 180 grams potassium, 1 gram (6%) protein, 35% vitamin A, 6% calcium, 6% iron.
- LETTUCE - Vitamin A.
- OATMEAL - Gerber™ baby cereal. 60% calories, 1 gram fat, 50 mg. potassium, 10 grams carbohydrates, 1 gram fiber, 2 grams (10%) protein, 2% vitamin A, 25% vitamin C, 15% calcium, 60% Iron, 15% vitamin E, 45% thiamin, 45% riboflavin, 25% niacin, 15% phosphorus, 8% zinc.
- PAPRIKA - is a color enhancer (red), it has 2% vitamin A.
- PEAS - High Calorie, protein, Calcium, Iron, Vitamin A, Riboflavin and Niacin.
- SHRIMP - Excellent protein, high calcium, Iron, Vitamin A, Riboflavin, Thiamin, and Niacin.
- SPINACH - High protein, good iron levels & Vitamins A & D, but it does contain Oxalate Acid, which can deplete the calcium.
- SPIRULINA POWDER - Protein, Vitamin A, Vitamin K, Vitamin B12, Calcium, Iron, Sodium, potassium.
- SWEET POTATO - High calorie, high quality protein, calcium, high in Vitamin A, Thiamin, Niacin and Ascorbic Acid.
- SALMON - Contains Vitamins A, B, C and E, and aids in improving the red coloration of fish.
- TETRA BITS - (2.65 oz. can) is a color enhancer. 46% protein, 5% fat, 2% fiber & 6% moisture.
- WHEAT GERM - Highest levels of vitamins, protein, and minerals of all cereals.



Joe Graffagnino - BAS
Reprinted from *Aquatica* Sept/Oct 2011

**ARTICLES FROM THE FILES
WORTH READING AGAIN**

WHIPTAIL CATFISH

Rineloricara Sp.



There are several species of Whiptail catfish which are very difficult to distinguish apart. This catfish species comes from cool, fast moving streams in South America. The species Latin name is *Rineloricara*. This type of catfish gets its common name from its slim, armored, flat, and stiff body that has color variations from gray to brown. They are a slow moving, peaceful fish that has a tail fin that extends to a delicate “whip-like” extension. Whiptail cats get about 6 inches in length.

The only way I can sex them is that the female’s belly is larger than the male’s, as is with most types of catfish. When the female is pregnant, her stomach is huge; she will sit outside the PVC tube and wait for the male to allow her entrance. As she lays her eggs, he is directly behind her fertilizing them. When completed, the male then chases the female from the tube and he cares for the eggs.

I received my group of a dozen small fish from one of Brooklyn Aquarium Society’s expert fish breeders - **Lisa Quilty**. Lisa bred the parents in a small PVC tube and brought the fry in for “Breeder Award Points” and she is one of our clubs leading spawners of difficult fish. I brought them home and set the group up in a 10-gallon tank with riverbed gravel, a corner box filter that contained charcoal and ammonia chips and I placed a couple of wood pieces in the tank to make them comfortable. After a few months, I added some small and narrow clay and PVC tubes. The small fish grew quickly with weekly water changes and high protein flake food. To improve their diet, I gave them frozen food, such as blood worms, cyclopes and daphnia a couple

of times a week. I would, on occasion, provide them with a piece of frozen zucchini that they would ignore until it started getting a fungus on it and then the next day the zucchini would be gone. I guess they will only eat it if it’s soft.

Early one evening, my friend and fellow fish breeder **Vinny Babino** came over and, as I was showing him the various fish I had in the aquariums, he looked into the whiptail catfish tank which I kept at the end of a long row of tanks that I rarely paid any attention to, and remarked that there appeared to be a lump inside the PVC tube. I looked and then with a flashlight discovered the male was sitting on a batch of green eggs. With this species the female lays the eggs and the male cares for the eggs, actually gently scraping the eggs to help the fry escape after about 7 days.

An interesting note: Vinny had obtained the parents of the fry and had them in his home aquarium. When he went home that evening his fish had also laid eggs in a PVC tube. Several times afterward both of our groups laid eggs the same day. I must have had my fish for approximately 2 years before they spawned. 

Species Profile:

WHIPTAIL CATFISH

Rineloricaria fallax

- **Family Name:** *Loricariidae*.
- **Species Type:** *Plecostomus*.
- **Scientific Name:** *Rineloricaria fallax*.
- **Common Name(s):** Whiptail Pleco, Whip Tail Pleco, Whiptail Catfish, Whiptail Plecostomus
- **Geo. Origin:** South American Rivers.
- **Habitat:** Bottom.
- **Diet:** Herbivorous - fresh green vegetables such as zucchini slices, cucumber slices and romaine lettuce. This species also will take sinking algae wafers.
- **Gender Differences:** Males tend to have a more pronounced brush around their mouth.
- **Breeding:** Difficult. Perfect water conditions are required, along with plenty of food. Make sure the food is eaten though, as any left to waste will degrade the water quality. A long, shallow (15-25cm deep) breeding tank should be set up, with very fine gravel. Some hollow

logs/tubing are essential as the eggs are laid in these and then guarded by the male. The fry are hard to raise, and in their first few weeks should be fed young brine shrimp.

- **Temperament:** Peaceful and shy.
- **Life Span:** 14 years.
- **Maximum Size:** 6"
- **Temperature:** 64° - 78°F
- **pH:** 5.8 - 7.8
- **Water Hardness:** 10° - 20°
- **Description:** The whiptail comes from shallow, fast flowing streams, so some water movement is required. Broad leaved plants are recommended and are rarely damaged. Some driftwood is also recommended, but not essential. As with most catfish, the Whiptail is nocturnal. This fish has very strict water requirements so it is not recommended for beginners. 



Christian Julius Heede - BAS

From the archives of the Brooklyn Aquarium Society - the *Bulletin*, Vol.2 No.11 June, 1916

A BLAST FROM THE PAST

THE BULLETIN OF

The Brooklyn Aquarium Society, Inc.

Sixth Avenue, corner Ninth Street
(Brooklyn Public Library)
BROOKLYN - NEW YORK

ISSUED MONTHLY IN THE INTEREST OF THE STUDY OF
AQUARIA AND ALLIED SUBJECTS

Vol. 2, No. 11.

JUNE 1916.

Price, 5 Cents.

Girardinus Reticulatus.

By C. J. HEEDE

FISH fanciers who have kept *Gambusia affinis*, var. *Holbrooki*, were delighted to find that another live-bearing species was obtainable in which both the males and the females are marked alike, and not like the *Gambusia* of which only the male is spotted and the female of a plain color. This fish was first called *Poecilia*, but later rightly changed to *Girardinus*, to which class they actually belong. They were first imported from Brazil, the West Indies and Venezuela. The color of the body is metallic-yellowish, covered with irregularly arranged black spots which extend also onto the fins and tail. It is a fine looking fish for the aquarium, breeds easily and rapidly, the time between each brood being about four to six weeks, and a bit longer in the winter-time.

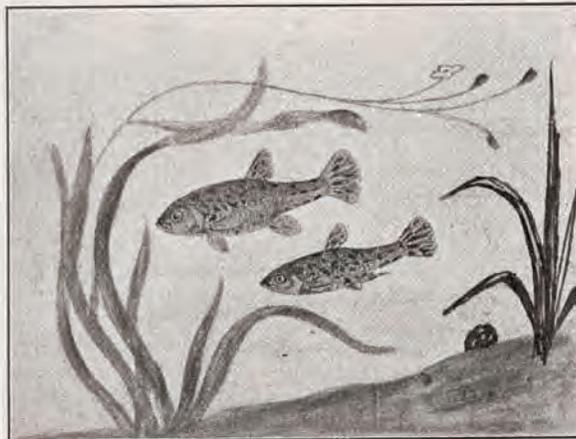
The temperature of the tank should be from 56° to 88° Fah. being the minimum and maximum limits. The number of young in each brood varies from ten to fifty. When born the young have a black spot on each side, as is characteristic of all *Girardinus*. They grow rapidly and soon attain the color of the parent fishes and if born early in the Spring will start to breed in the latter part of the ensuing Summer.

Both the parent fish and the young are easy to feed; they take artificial food as well as scraped raw meat, daphnia and cyclops and are also fond of vegetable food, especially fine algae, but they will not destroy the common living plant growth in the tank. The newly-born must of course be fed with the finest food.

In Nature they live in streams where the water is fresh and cool. Thus it is occasionally advisable to partly renew the water in the tank where they are kept, so the fish will keep strong and healthy. The added

water must of course be of the same temperature as the balance of the aquarium or the fish may acquire fungi.

They can readily be kept in tanks with other live-bearing specimens such as the *Poecilia*, *Mollienisia* and *Xiphophorus*, but not so well with any



of the carnivorous species, as the different *Gambusia*, etc.

The parent fish are seldom cannibalistic towards their young but to be on the safe side, when trying to raise the young, the upper part of the tank must be well filled with floating plants; some fine kind of *Utricularia* will serve as a good protection against the possible attacks of the parent fish.

The *Utricularia* is a carnivorous plant, and while it is perfectly safe to have it in the tank for the protection of newly-born fish of

Dr. Frederick Schneider - BAS
(president 1913-15)

The Brooklyn Aquarium Society, Inc.

the live-bearing species, it cannot be safely kept in an aquarium with spawning fish.

Daphnia and Other Water Insects.

By DR. F. SCHNEIDER.

(Continued)

CYCLOPS are small pear-shaped water creatures, having two long antennæ and several pairs of swimming legs. They have a single eye in the front of their heads, from which fact they derive the name "Cyclops." There are ten or twelve varieties closely allied to each other to be found in many stagnant ponds. Their swimming movements are steady and regular, unlike those of the daphnia. The female may be easily recognized by two large egg-sacs, which the novice sometimes mistakes for the tail. These egg-sacs develop each two days, when sixteen to thirty-two eggs are hatched; in two days more these become detached and fall to the bottom, where the young cyclops, having four legs, but no tail, undergo a moulting in about fifteen days and the other feet and tail then form. In another two weeks they mature and reproduce.

CYPRIS is a small water creature resembling somewhat the soft-shelled clam in shape. The body is contained within a shell while the antennæ and five pair of legs which are used for swimming, extend beyond this shell.

Cypris is also used as a fish food but it is not as desirable as the two other foods mentioned.

FAIRY SHRIMP, another of our little water acquaintances, closely resembles the salt water shrimp with which most of us are familiar. It swims on its back and is found in our stagnant ponds and muddy streams, among half decayed brushwood and other litter; usually hidden under stones or aquatic plants and generally feeding at dusk or at night. Its food is decaying vegetation, small animals and spawn. It makes a good fish food, but should not be introduced in tanks with young fish because of its size.

CRAYFISH inhabit streams and resemble somewhat a small lobster. Their habits are very interesting to study. If caught when young and fed on any dead worms, snails, or other animal matter they will grow rapidly. There is no expansion to the shell, so in the gradual growth of the crayfish, the shell cracks open and it emerges from the suit which has grown too small for it. This may happen three or four times during the first

year. He usually hides himself while the shell is soft. These little creatures may be kept in aquaria well supplied with aeration or running water, but are best kept by themselves. They may be used as a constituent in the preparation of a fish food.

TUBIFEX is another of the live fish-foods to be had in the nearby ponds. This little worm makes an excellent food.

WATERBOATMEN are mottled gray and black in color and are about three-eighths of an inch in length. Their eyes are small and inconspicuous and the body is covered with fine hairs which, in the water, cause an almost complete envelopment in air, like a glittering armor and enables the bug to remain below the surface for some time. In Mexico the eggs of this specie are collected in large quantities to be eaten by the Indians and are exported in a dried state as food for birds, poultry and fishes. Care should be used in the handling of these little creatures as they are very apt to sting when held in the hand.

WATER MITES are small and round and move about by the rapid action of their fringed legs. They are parasitic on both fish and mussels and are frequent external fresh-water parasites, easily detected by their size.

WATER SPIDERS make an interesting study. One specie is about three-eighths of an inch long, spins a bag-like web of silk, half the size of an acorn among the water-plants with the opening below the surface and lives in it, under the water, taking a bubble of air into it every time it comes to the surface, which is effected by erecting the ends of the abdomen out of the water, jerking it under and quickly crossing the hind legs over, then descending to the nest and releasing the air.

Other forms of life might be mentioned, such as the larvæ of various insects which inhabit the water, part or all of the time. Some of these serve the aquarist as live fish food, while others are dangerous and entirely unsuitable for any such purposes. Glass-like larvæ, caught in the nearby ponds are called "phantom larvæ," on account of their transparency. It is the larvæ of a small gnat-like fly, swims in a horizontal position near the surface of the water and feeds upon small daphnia. This fact may account for the absence of daphnia where these glass worms are caught. They make an excellent fish food.



Ryan Curtis - BAS

TheShrimpFarm.com is the place to go for freshwater shrimp. The owner is **Ryan Curtis**, their mailing address: The Shrimp Farm USA, 2401 East Washington St, STE 200 A2, Bloomington, IL 61704 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 Freshwater Aquarium Shrimp.



Tiger Shrimp

Scientific Name: *Caridina cantonensis*.
Common Name: Tiger Shrimp.
Origin: Taiwan.
Breeding: Easy.
Life Span: 1 - 2 Years.
Gestation Period: 30 days.
Temperment: Peaceful.
Diet: Omnivore.
Found in the wild: Yes.

General Water Parameters

pH Range: 6.0 - 7.25
Temperature Range: 65° - 75°F.
GH Range: 4 - 10
KH Range: 2 - 6

The Shrimp Farm's Water Parameters

pH Range: 6.5 - 6.8.
Temperature Range: 70° - 74°F.
Hardness Range: 3 - 15 dkh.
GH Range: 6
KH Range: 6
TDS Range: 175 - 250
Full Grown Size: .75" - 1.50"
Approximate Purchase Size: .75" - .95"



Tiger Shrimp History

The Tiger shrimp comes from South East Asia, and was one of the first *Caridina* species to become popular in The United States after the Amano shrimp was introduced. There are 3 color variations of this aquarium shrimp available in the hobby: the Wild Type, Blue Tiger shrimp and the Black Tiger shrimp.

Tiger Shrimp Care

Tiger shrimp are one of the easiest *Caridina* species to care for. They do prefer softer and slightly acidic water. Adult shrimp can adapt to harder more alkaline water but their lifespan may be affected and breeding will be greatly reduced and sometimes even prevented. As long as the aquarium water is slightly acidic and soft, the Tiger shrimp requires no special attention. As with all Dwarf shrimp, it is important to keep all water parameters constant.

Tiger Shrimp Diet

Being superb for aquarium algae control, Tiger shrimp are natural algae eaters, and will be seen grazing on algae often. When the Tiger shrimp is kept in larger groups, it is often necessary to add extra food for the shrimp. As with most other Dwarf shrimp, the Tiger shrimp will happily accept food intended for bottom feeding fish and any aquatic invertebrates. They are also very fond of blanched vegetables.

Tiger Shrimp Breeding

If all water parameters are kept constantly within the Tiger shrimps' requirements and a male and female are present, the Tiger shrimp will breed easily. The males and females can be difficult to sexually differentiate, but the female has a bit larger and wider tail section in order to carry the eggs. Also, when the female is sexually mature, you may be able to see a saddle on the female if her coloration allows.

Tiger Shrimp Behavior

Generally a non-aggressive Dwarf shrimp, the Tiger shrimp can be quite a fascinating shrimp to observe. They do not harm any other aquarium inhabitants, and get along with most other Dwarf shrimp (make sure to check the Dwarf shrimp Compatibility Chart to find what shrimp should not be kept together). When there are no predators present in an aquarium, the Tiger shrimp will be quite active, foraging and cleaning the aquarium of algae.

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. 

Ryan

I DIG YOU!

A *GEOPHAGUS* AQUARIUM



G. tapajos

***Geophagus* are cichlids native to South America. There are many beautiful species in the hobby and more new species coming in all the time.**

The question is how do you house and keep these magnificent cichlids?

Here's a guide for how to set up a tank for *Geophagus* and keep them happy.

All species will do well in a similar setup in your home tank.

In nature, *Geophagus* come from areas with sandy or a muddy bottom which they love to dig in. The name *Geophagus* is from the Greek language - Geos = earth, Phagein = eat, so *Geophagus* are "earth eaters."

Anyone who watches this fish will attest to that. Give *Geophagus* a sand substrate and they are happy.

Geophagus come from all kinds of water in nature: black, white, and clear. In moving water usually about 77 - 82°F. They tolerate soft to medium hard water easily. Try and keep the pH neutral or a bit less.

Geophagus can grow fairly large, about 8" on average. They have a very healthy appetite and will produce larger

amounts of waste, so both a high capacity power and/or canister filter and larger volume (about 30% water changes a week). Water changes are mandatory for this fish.

Geophagus do not tolerate poor water quality and rapidly fall ill to bacterial diseases if exposed to it. *Geophagus* can adapt to most water qualities, but their water must be clean!

Being cichlids and fairly large ones, *Geophagus* need room. A 55-gallon tank is fine for a group of 6 juveniles. Use a sand bottom and tough potted plants such as amazon swords or jungle Val. Also give them roots



and flowerpots (ceramic) laid on their sides as hiding places. Use string or fishing line to tie Java fern or anubias to the pots to keep the geophagus from digging them up.

Cover the tank! *Geophagus* can and will jump. As stated before, change 30% of their water weekly.

Geophagus are not especially nasty, but a dominant male will harass co-species: *Geophagus*, remember, are still cichlids.



G. winemiller



G. jungleKet

Feed *Geophagus* spirulina, peas, spinach, kale, shrimp, flakes, pellets and frozen foods. They are greedy, heavy feeders, always digging in the sandy bottom looking for tasty morsels. However, do not overfeed *geophagus*; it can induce bloat. I starve my *geophagus* one day a week.

All *Geophagus* have beautiful colors and very interesting habits. Their breeding will be the subject of an future article. Set up a tank in your home. I know you'll enjoy watching them. 🐟

Happy Fish keeping.



G. abalios



G. brasiliensis

Tony



G. sveni araguaia



Anthony P. Kroeger - BAS

IS MY FISH SICK: Part 1 can be read in *Aquatica*, Sept/Oct 2017
Part 2 can be read in *Aquatica*, May/ Jun 2018

IS MY FISH SICK PART 3

FISH DISEASE TIPS

A Brief Overview of Fish Diseases

Fish diseases can basically fall into four categories. These are: Parasities, Bacterial, Fungal & Viral diseases.



EACH CATEGORY HAS DOZEN OF DISEASES WITH MANY DIFFERENT TREATMENT OPTIONS/REGIMENS. HOWEVER, EACH CATEGORY ALSO HAS ITS BASIC SUSCEPTIBILITY TO TREATMENT GENERALLY. IT IS THESE BASIC SUSCEPTIBILITIES TO TREATMENT THAT WE WILL EXPLORE, SO AS TO GIVE YOU, THE HOME HOBBYIST, A STARTING POINT TO TREAT FROM.

First, we come to parasites. This is the most broad based and common diseases: parasites may be external or internal. Usually, however, they are external and visible to the naked eye.

Size may be very small, such as oodinium, medium like ick or large like fish lice (*Argulus*), either way, the effect is the same. Parasites feed on a fish's blood or body fluids weakening it. Heavy infestations of parasites result in the fish's death.

Parasites usually have a rather complex life cycle where juvenile parasites must leave the current fish host to find and infect a new one. It is during this search that many parasites are most easily killed by medications.

Some parasites must be ingested by a bird and passed thru their digestive tract to complete their life cycle. Because parasites are in open water, they can easily be exposed to treatments that are lethal to them. Copper, Formalin, Methylene blue, Malachite green, Nitrofurazone and even salt, can all cause parasites to die in the appropriate doses.

The second category of fish diseases is bacterial. This too is a very common group of fish illnesses. Bacteria destroys tissues, so an infected area will be cloudy, white or look like it is rotting away. This area can be anywhere on the fins, body or mouth. Bacteria can result in open bleeding ulcers also. A white edge on fins or mouth followed by decayed finnage or flesh indicates a

bacterial disease, as does any cloudy area anywhere on the fish.

Bacterial diseases are treated with the "Myacin" family antibiotics: Terramycin, Erythromycin, Kanamycin, etc. This is usually used in conjunction with either a "dye" drug Ex: Malachite green or Acriflavine, or instead of a "dye" drug a sulpha (sulphur) based treatment.

The third group of diseases we come to are fungal. Fungus generally invades only dead or damaged tissue. This damage can occur from improper handling of a fish or from another disease causing organism, the fungus following as a secondary invader.

Fungus can cover a small or large area. Sometimes engulfing large areas of the fish in what appears to be a cotton ball. Such large infections are usually fatal.

Malachite green and Formalin seem to be the best treatments for most fungal infections. Salt will not cure it, but it does seem to prevent it

from spreading from its initial effected area. Salt should be a treatment component of a fungal treatment regimen for any fish that can tolerate it.

The last group of diseases are poorly known and treatment for most viral diseases are rudimentary. Viral diseases can be very virulent and rapidly kill fish such as vibrio or suc or they can be long term such as Lymphocystosis.

In addition fish can carry viruses ala "Typhoid Mary." There really are no vaccines for fish viruses currently.

As a hobbyist, your best bet is to quarantine all new fish for 21 days to insure a virus does not get into your aquarium. If a fish does develop a viral infection, your best bet is to destroy it. Perhaps someday viruses will be treatable, but not yet. Better safe than sorry. Destroy viral infected fish and keep viruses out of your tank. 

Happy fishkeeping.

Tony

**Is My Fish Sick Part 4
will be in *Aquatica* Mar/Apr 2019**





JoAnna Klin - *New York Times*,
Trilobites July 11, 2018

This Snail Goes Through Metamorphosis. Then It Never Has to Eat Again.

The transformation of a deep sea mollusk is comparable to an average person growing as much as 60 feet tall with a giant sac of bacteria filling its guts.



Four views of an adult *Gigantopelta chessoia*, which live deep below the ocean's surface near hydrothermal vents.

Credit: Chong Chen

In the ocean off the coast of Antarctica, a snail lives around scorching hydrothermal vents. Its name is *Gigantopelta chessoia*. From the outside, it looks like any other shelled slug. But on the inside, something strange is happening, scientists report in *Proceedings of the Royal Society*, like no metamorphosis ever observed in any other animal on

the planet.

"We're calling it crypto-metamorphosis," said **Chong Chen**, a deep sea biologist at Japan Agency for Marine-Earth Science and Technology, who uncovered this hidden transition that is unlike the external body changes most other animals undergo during metamorphosis.

Once the snail reaches a certain body length, its digestive system stops growing. Its teeth, stomach and intestine make way for an expanding esophageal gland. The organ gets so big, it takes up most of the snail's body, and basically becomes a new organ. Bacteria colonize it, and the snail, which grazed for food when it was smaller, no longer needs to eat. Instead it just sits there getting bigger, surviving on energy the bacteria produces inside the snail's cells.

To make a human comparison, imagine growing from an average size adult to one 30 to 60

feet tall, with a giant sac of bacteria living inside you.

Not all animals eat. Some shallow water corals, for example, have algae living inside their tissues that take in sunlight and convert it to energy that provides the corals with nutrients. In the deep sea, there is no sun, but vents provide chemicals that bacteria break down. This is the basis of the deep sea food chain. *Gigantopelta chessoia*, instead of algae, have bacteria living in some of their cells that convert hydrogen sulfide and oxygen the snails absorb from the vents into energy.



Hydrothermal vents in waters off the coast of Antarctica, which emit chemicals that the bacteria in the snails transform into energy.

Credit: NERC ChEsSo Consortium

Because their guts and their radula, or snail teeth, were kind of small, and they seemed to be fine relying on bacteria, Dr. Chen and his colleagues originally thought these snails didn't feed.

"But when we looked at the small guys, they had a very different anatomy," said Dr. Chen. "Their internal organs were much more like a normal snail."

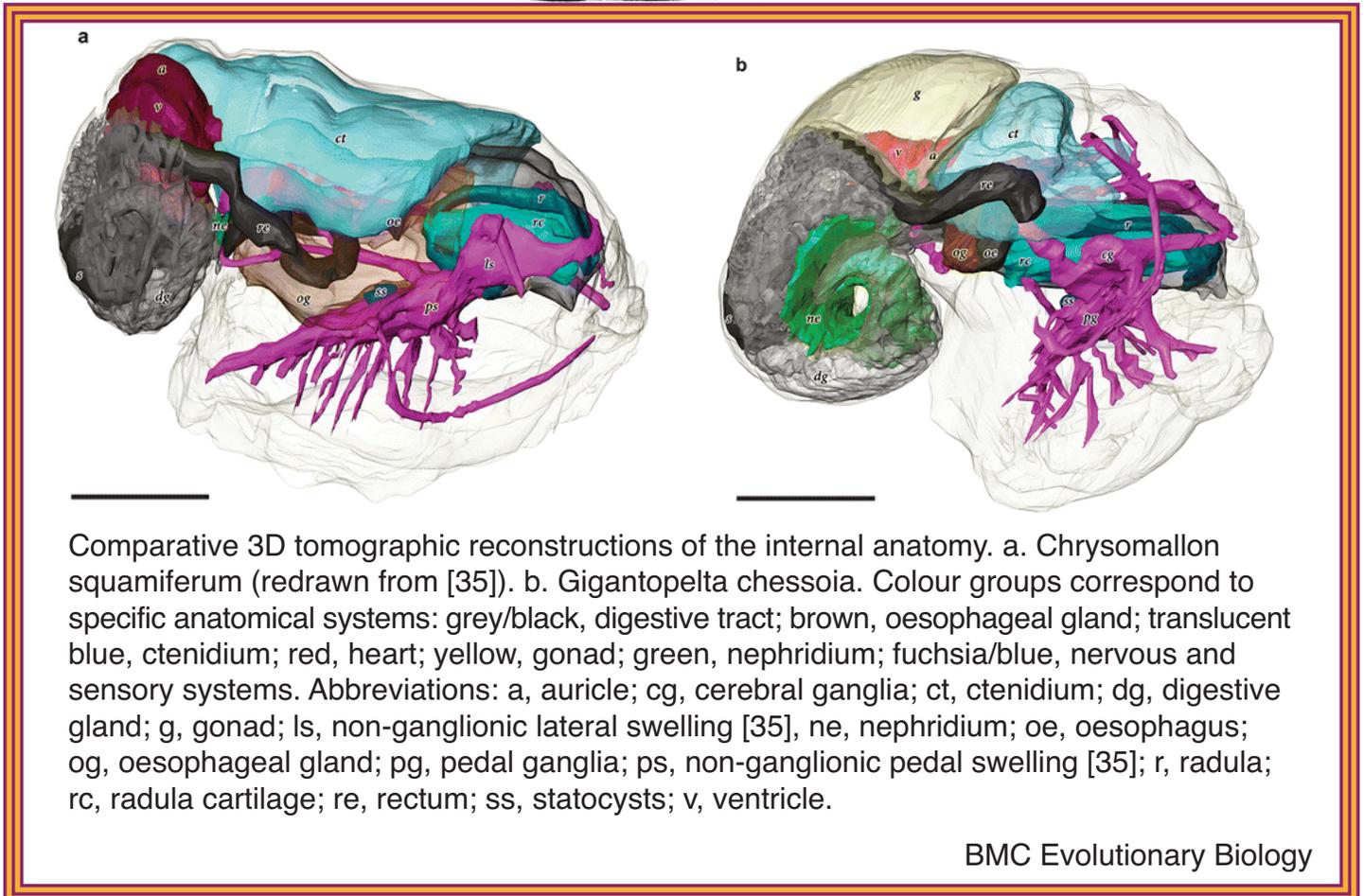
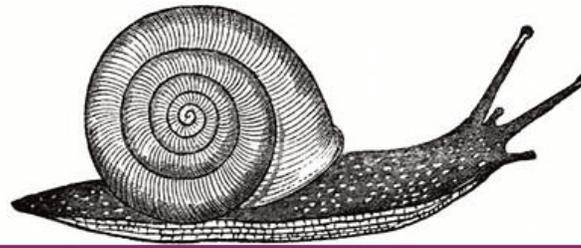
And there was no bacteria inside them.

This was weird

The only other snail in its family that relied

on chemical-converting bacteria was an armadillo-esque mollusk called the scaly-foot gastropod. And in that species, the small ones looked just like the big ones. The two had evolved with the same ultimate adaptation, but through very different routes

The team wanted to see if this transition from grazing to relying on bacteria was gradual — like how humans shift from breast milk to solid food as they grow — or sudden — like how a caterpillar may switch from eating plant matter



to sipping nectar when it becomes a butterfly.

To find out, they gathered snails from their homes, 9,000 feet below the surface, and preserved their bodies so they could scan them and reconstruct the internal organs on a computer. By evaluating the relative size of these organs, they determined that the change was sudden.

Just as the snail's body length reached 5 to 8 millimeters, the esophageal gland expanded dramatically and was teeming with bacteria. Indeed, this was a new type of metamorphosis, only visible from the inside.

However this change occurs, the snails gain an advantage by producing their own energy. They can grow bigger and make babies instead of searching for food.

Knowing about this change will also help researchers make more accurate calculations about the flow of energy in deep sea ecosystems. And in the future, looking at anatomy could prove useful in other ecosystems too.

"We think this crypto-metamorphosis could be common in other animals," Dr. Chen said. "If we look closely enough, maybe it's even present in systems like forests or coral reefs." 



Aquarium Heater



Overview

Aquarium Heater General Info

Most aquariums require a heater to maintain a consistent water temperature. Aquatic life such as fish, coral, and other invertebrates need to be kept at certain stable temperatures. What temperature should you keep your aquarium at?

Different aquarium fish and invertebrates will need different temperature requirements. Fish, corals, and other invertebrates come from many different environments all over the world. A successful aquarium must replicate the environment they are from as closely as possible.

The temperature for tropical fish should be kept close to 78°F/26°C. Marine aquariums should also be kept at 78°F/26°C.

Some fish that are referred to as tropical are really subtropical. Some of the more common fish that fall in the subtropical category are: Cardinal Tetras, White Cloud Danio, Rosey Barbs, Variatus Platy, Dragon Gobies, and some marine Blennies. These subtropical aquariums should be kept at 72°F/22°C.

Discus aquariums should be kept at 82°F. Goldfish, Sunfish, Bass, and Koi are coldwater fish. Coldwater aquariums are usually kept anywhere from 55°F to 68°F. An aquarium heater is typically not necessary for these fish, but aquarium chillers are used instead.

If your aquarium inhabitants are not kept at the proper temperature, they could suffer, get sick, or even die. Your aquarium can give you signs that it needs a heater. The most common sign is sick fish or lethargic fish. The most common disease is Ich (*Ichthyophthirius multifiliis*), which can easily break out and become visible because the aquarium temperature has become too low. If you are not sure the heater you have is keeping the correct temperature, use an aquarium

thermometer to see if the heater is working correctly.

Which aquarium heater do you need? The basic rule of 3-5 watts per gallon is recommended for keeping your aquarium at optimal temperatures. With cold rooms you will need more watts per gallon. For example, if your house is 75°F and you need to heat a 55-gallon marine aquarium, then a 200 watt heater would usually suffice. However, if the room is 68°F you may need a 300 watt heater.

Using more than one heater is advisable because heaters can fail and having a backup heater will keep your tank temperature from fluctuating wildly if one heater stops working.

If you do not need a heater all year long then remove, clean and store the heater when it is not needed to prolong its life.

When changing the temperature of your tank, proceed slowly. Do not turn a new heater on for at least 15 minutes so the heater may reach the same temperature as the water. This is a good idea for all heaters and especially important with glass heaters since they can crack if there is a massive temperature difference.

Sudden temperature changes will also stress fish and corals. Change the aquarium temperature over a period of days or even weeks for best results.

The dial on an aquarium heater does not change how powerfully the heater heats, it only tells it when to turn on and off. If your heater is on and your tank isn't warming to 78°F when your heater is set at 78°F, you don't need to turn up the heater. You need a bigger heater.

There are different heaters to be used in different applications. The most common is the submersible dial-in heater. These are usually made of strong glass or sometimes titanium metal. These heaters can be placed completely in the aquarium near an area with high flow.

If you have a sump, or refugium, the heater will do well if it is placed horizontally in the lower areas.

Inline heaters, such as the Hydor In-Line, are plumbed into the water line of the aquarium filtration. They work well plumbed into the return line of common canister filters. You can also use a Lifeguard Aquatics Heater Module to put your heater in line with your filtration.

For tanks less than 5-gallons, try an easy to use a preset miniheater such as the Hydor Slim Heater.

For larger tanks over 100-gallons, or when delicate temperature control is required, consider using a heater with a separate controller. JBJ True Temp Titanium Heating Systems are a good choice.

Separate controllers, such as the American Marine Pinpoint Temperature Controller, can be added to any heater to make it more precise and accurate. They also provide redundancy. When using a stand alone heater and a controller, both the controller thermostat and the heater thermostat have to fail for the heater to overheat your tank.

If you have aggressive or delicate fish you might consider a JBJ True Temp Heater Holder to protect both the heater and the fish. Some fish, like eels, knifefish, stingrays, and anemones, like to rest against the heater--and a caged heater will protect these fish.

What Makes a Good Heater?

The build quality of a heater can make a significant difference in a heater's cost. You usually get what you pay for. Cheap glass heaters have been known to crack and electrocute fish or leach toxic metals into the aquarium water. High quality heaters are made of Pyrex quality glass or titanium to prevent cracking.

Some heaters are more precise than others. The most precise heaters use digital temperature controller (e.g. JBJ True Temps, ViaAqua Titanium & AquaTop Titanium Aquarium Heaters with Digital Controllers). Precise heaters are good at turning on at the exact same time every time. If you set your heater at 78°F and it always turns on when the temperature reads 77.7°F, you have a precise heater. If your heater turns on somewhere between 78°F and 76°F then the heater is not very precise.

Accuracy is different than precision. If when you set your heater to 78°F and the tank warms to 84°F your heater is not very accurate. The most accurate heaters, Eheim Heaters and JBJ True Temp Heaters, can be calibrated. It is common for cheap heaters to be 2-3 degrees off. With heaters that can be calibrated, just measure the temperature after adding the heater and adjust accordingly.

Different Types of Heaters

For 2 to 5 gallon tanks we carry the Hydor 7.5 Watt Slim Heaters. These micro heaters are a great choice for 2 to 5-gallon bettas, bowls and micro tanks. For other small tanks we have the Lifeguard Aquatics 25 Watt, AquaTop 25 Watt Pre-Set Nano aquarium heaters.

The Eheim Aquarium Heaters are very precise and come in 50 watt, 75 watt, 100 watt, 150 watt, 200 watt and 250 watt sizes. These heaters are made of Pyrex glass and can be calibrated for better accuracy.

The Hydor 200 Watt and Hydor 300 Watt In-Line Aquarium Heaters are placed inline with a water line outside the tank. This serves the purpose of removing a potentially unsightly heater from the tank.

The Hydor Theo Aquarium Heaters are made of shatter-proof glass and can be completely submerged. They come in 50 watt, 100 watt, 200 watt, 300 watt and 400 watt versions.

The Marineland Precision Submersible Heaters feature a thermal safety switch to prevent heater failure during operation.

The ViaAqua Titanium Heaters and AquaTop Titanium Heaters are more resilient than glass heaters. The ViaAqua Titanium Heater has an easy to read external temperature indicator.

The JBJ True Temp Titanium Heaters are top of the line heaters that are much more expensive than the other heaters at MarineAndReef.com, but they include a controller and remote sensor for highly accurate temperature control. 

Please contact us with any questions

Sales@marineandreef.com

Toll-Free 1 877-9349

Monday-Friday 8 am-11:30 am & 12:30 pm-4 pm MT

Note: we do not have daylight savings time in Arizona





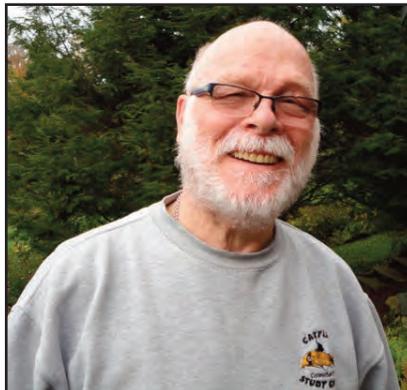
Fish collecting in South Eastern Peru



In mid November 2015, I embarked on my third trip to the Madre de Dios region of south eastern Peru. The sole intention this trip was to catch, log and photograph as many fish as possible, especially catfishes. The region is well known for its bio diversity, but there is very little actually known about the species to be found there.

On my first two visits to the region, my attention was more or less focused on *Corydoradinae* catfishes, these being the group of Catfishes that I have specialised in for more than forty years. During those first trips, my colleagues and I collected eighteen species, five of which proved to be new discoveries.

On this latest trip, I had planned to visit as many previously un-sampled areas as possible, and for this particular trip I employed the services of three guides, **Felix Mamani** a partner in our **Go Wild Peru** venture, which was started in the summer of 2015, along with **Michael Barber** from Virginia, USA. **Lance Peck**, is very familiar with fishes of the region and who, along with his wife **Belinda**, was responsible for the re-discovery on *Corydoras weitzmani* in 2002. Lance is very knowledgeable of the flora and fauna as well as the fishes of the region. His friend **Fernando Rosenberg**, a partner in the Tarycia research and conservation facility on right bank of the Rio Madre de Dios, a little down river from Puerto Maldonado where we are based. Fernando has great geographic knowledge of the region and also is a very good fisherman, as are Felix and Lance. In fact, each has their own



unique skills, which I was soon to benefit from.

Initially for the first couple of days we explored local sites, mainly in search of the very beautiful *Moema quii*, but it turned out to be a little too early in the rainy season, and what we did find were far too small to be worth pursuing. So on the third day we hired a car, loaded up and headed northwest towards the mountains and the town of Qunicemil. Here we planned to be based for three days, branching out to sample many of the streams that feed the Rio Araza and its smaller tributaries. The Rio Araza itself is a tributary of the Rio Inambari. Access to these small tributaries is often far from easy, roads are pretty much non existent, tracks are rare and the occasional native trail is the only way and travelling any distance on foot over mountainous, rocky, jungle terrain is not something I would want to be doing at my age. So for this, my first real foray to this region, we decided to stay on the main highway and sample the adjacent streams. Another difficulty with recording location data is there are no names for any of the streams or even smaller rivers. The only references we had to go on were the names the road builders or state au-



thorities gave to each of the bridges, all of which have no real relationship to any map references or even local names. With meeting very few locals, it was impossible to ascertain any of these. However, with modern technology (My smart phone) I was able to take GPS readings for each and every place we sampled and also record water parameters, temperature and TDS.

The first stream we sampled was at an altitude of 915m (3,000ft), and here we are in cloud forest as against the rain forest of lower altitude. The rocky fast running stream was quite shallow with periodic deeper pools. The water temperature was 69.8°F with a TDS of 39 $\mu\text{S}/\text{cm}$. In this stream we collected several specimens of a *Astroblepus* species and a single specimen of a species of *Chaetostoma*. (Figs. 1-2) The one thing I soon realised was how



fig. 1



fig. 2

difficult and hard work fishing is in fast moving water in rocky streams; for the best results, it is a two or three man team. The attack consisted of two holding nets in a slight 'V' formation in front of rocks where the water is being channeled through, and then the third person moves the rocks. The plan was as the fish are being dislodged when the rocks are moved, and the fast water flow sweeps them into the awaiting nets. This system proved quite successful although moving rocks is quite strenuous, especially with the sun blazing down on your back and with the air temperature in the mid to upper 86°'s F, rotating the tasks is a good idea.

Most of these high altitude streams look pretty much the same, only varying in size and incline. Those with a steeper fall often had spectacular waterfalls making for very dramatic scenery. The



fig. 3

second stop was one such stream, the faster heavier flow was noticeably cooler than the previous stream, at 875m (2,870ft) with a temperature of just 64.4°F and TDS of 32 $\mu\text{S}/\text{cm}$. Here we caught what we thought were two new *Ancistrine* species, a bushy nose that I believe to belong to the *Andancistrus* genus (fig. 3) and another, a green bodied specimen that to me looked completely new, but I am a Cory guy and have a lot to learn about "Pleco's". Whatever it turns out to be it is a very beautiful little fish. In another stream a little lower down, we found another specimen of the same genus with a black body with small white blotches (figs. 4-5). As we progressed down the mountain



fig. 4



fig. 5

the temperatures of the streams were progressively getting warmer, although not by very much. The last stream of the day before we returned to



Quincemil, recorded parameters of 73°F, TDS 42 $\mu\text{S}/\text{cm}$. By the end of this first day, we had sampled 8 streams and collected more than a dozen species of catfishes. One of these was a very interesting *A rubrolinatus* species (fig. 6). Back at the hotel, all



the fish were refreshed with new clean water and settled for the night. Then it was our turn to clean up and head out for a good meal and a well-earned beer.

The next morning we were up at dawn (5:00 am) and on our way for another day of the same, working the streams, gradually working our way back to Quincemil, where Lance guided us to the area where he first discovered *C. weitzmani*. There, as with all the other streams we had collected in, the water level was lower than expected and we were able to fish in places normally inaccessible, to everyone's surprise, we spotted a group of 15 – 20



C. weitzmani (fig. 7), Due to all the devastation that had been caused in the area by gold mining activity, we thought they would no longer be there. After a second night in Quincemil, we set out and sampled some of the local streams near the town with not much success. Many of these streams were still suffering from the effects of gold mining activity and would take more time to recover.

We were, by this time, well loaded up with fully laden fish boxes and so a little restricted as to what else we would be able to collect. I had, however,



decided that on the road back to Puerto Maldonado there was one particular spot that was a must stop off point. This place is known to some as Santa Rita, which is in actual fact a village a few kilometers away. Anyway, this is a little hot spot and the type locality of the *Corydoras* species *C. knaacki* Tencatt & Evers, 2016 CW096 (fig. 9) and the wider distributed CW097. Also to be found there is a undescribed species of *Apistogramma*. In November we should be well into the rainy season, but up until that point we had had very little rain at all. I had been expecting daily rain falls', the result being that the days were very warm, nights seemed only a little cooler and everywhere the water levels were lower than normal. So when we arrived at Santa Rita, we never really noticed the build up of cloud, and got our gear ready, and after spotting a large school of *C. knaacki* from the top of the bridge we were keen to get in the water and start collecting. Within a very short space of time we had collected 60+ specimens and then all hell let loose with the biggest, heaviest sudden downpour I have ever experienced. Within the first second I was completely soaked, undaunted, I decided to search the margins for *Apistogramma* and had collected 8 or 9 when an almighty clap of thunder cracked right overhead, and then there was a lightning flash which touched down on a tree that was far too close for comfort, and with Lance shouting for us to get the %\$!?! out of the water





we beat a hasty retreat back to the car and hastily packed our catch. We drove back to Puerto Maldonado very happy with our three days' work. Although on arriving back at base there was still a couple of hours work to do. Setting up all our collected fishes into our quarantine system.

For me, quarantining is very important and puts the fish we catch in the best possible condition for the long journey back home to our tanks. We actually start at the collection site where we only put the number of fish in each bag that will go into one of our quarantine tubs, which are actually round washing up bowls. Each bag of fish is released directly into bowls, one bag per bowl. When all the fish have been released, each bowl in turn is almost completely drained and immediately refilled to a depth of 6 or 7 cm with clean aerated water, and a tablespoon of cooking salt added. The bowls are each covered with a thin sheet of ply board and stacked in 4's in a darkened shelved area in the corner of the aquarium.

The following evening, each bowl is again drained and refilled, only this time only half a table spoon of salt is added. On the third day the process is repeated without the addition of salt. On the following day, the fish are transferred into one of our 36 stock tanks where they will be fed daily until three days before they are due to be bagged for shipping, when they go through the same procedure again to make sure they are 100% ready for transporting. This system seems a little long-winded, but works very well and very few if any losses are incurred.

The following two days after our trip up to the cloud forest were spent taking pictures and logging details of the fishes caught, and catching up on the planed chores around the facility, especially water changing and checking the quarantined fish.

Our next collecting foray took us away from Puerto Maldonado in a northerly direction towards Brazil, to a location known affectionately as Cheese Creek. This is a well-known collecting spot and because of the relatively new highway, this and many more good catching locations are far more accessible. Today it takes just a couple of hours, where as just a few years earlier it would have taken several days to reach this spot traveling along a dirt road. Cheese Creek is always a very productive area, and, like many of the streams

that cross the highway is also ideal for using a seine net, which is what we tend to use at the beginning of a fishing session. The first pull of the seine up and onto the bridges right hand bank foundations presented us with a large number of a very nice looking *Otocinclus* (fig. 1), which may possibly be a new un-described species. After collecting a nice



group of these, using seine we made several sweeps, working our way along the near bank. We collected a small group of *Corydoras* sp. C120 (fig. 2) and three quite large *Corydoras* sp. C115/C116. We also caught several species small tetras, but



many proved to be very delicate, and needed special handling to avoid casualties. As it was Catfishes that were our a main interest, we returned all but a few of the interestingly colored tetras. We also caught couple of small pike cichlids, and several specimens of a very nice, bold spotted, red and brown *Ancistrus* species (fig. 3) and numerous small *Rineloricaria lanceolata*.





From Cheese Creek, we drove further north heading for an region called as Alegria. This meant leaving the main highway and traveling several kilometers along a toll road; well, in actuality it is a rough dusty jungle road to an area know as Shirigayoz. The road crosses several small black and clear water streams that we intend sampling at a later date, but on this particular trip we were heading for a particular location to see if we could find the so far elusive *Corydoras* sp. CW040 (fig. 8). This is a densely forested swampy area with a fairly large (3 to 5 meters wide), reasonably fast moving, clear water stream running through. The first thing that struck us was, as with many of the other locations on this trip, the water level was low, about half a meter lower than when I visited there earlier in the year, and the stream now had exposed sand bars, and being shallower made maneuvering in the water and using a hand net a little easier. Most of the swamp area itself was now exposed mud with numerous small puddles. In the many of the puddles we collected four specimens of a small *Buenocephalus* species (fig. 4) and several *Corydoras*



sp. CW110 (fig. 5), several species and several small *Apistogramma rubrolineatus* (fig. 6). We also found some large clumps of a species of *Echinodorus* sp. (Amazon sword plant).

After spending a couple of hours working swamp area puddles, we moved to the main stream and here we collected *Corydoras* sp.



CW062 and *Corydoras arcensis*, a species we did not expect to find here, being described from an area a lot further north in the border area with Brazil. At one point when working a little sand bar area, we encountered what at first we thought was a very dangerous coral snake and for a few moments we were very aware of the consequences of being bitten by such a creature, being bitten by mosquitoes, sand flies, ants and the occasional wasp sting was one thing, but snakes definitely need to be kept at a distance. Later we checked the pattern and, much to our relief the snake proved to be a harmless mimic, but we are always mindful that venomous snakes are there.

After working the main stream for a further couple of hours and not finding anything else new, we decided to call it a day and headed back towards the log bridge where the vehicle was parked. It was here that we decided to have a last dip or two, and as the saying goes, we immediately hit "pay dirt", well, we thought we had. Lance had waded in up to his waist and started working a little bay on the near bank and after a few pulls of his net he caught a small cichlid, a *Mikrogeophagus* sp. similar to *M. altispinosus* (fig. 7) a species



found a lot further north east in Bolivia. This he said was the same species as one he had previously



caught a single specimen of some ten years earlier.

We worked the area a little longer, but again could find no more. We got all our gear together and headed back to the car, but before getting everything bagged up and loaded, because of the success catching the *Mikrogeophagus* sp. Lance decided to have another try just on the other side of the bridge. There was just enough room to stand on some fallen wood where he proceeded to make a pull of his net across what looked like a patch of leaf litter, but in reality was a patch of half submerge mud and other debris being held up in the water by a large air pocket and which later proved to have been at least two and a half if not three meters deep and not a place to go wading. However, that very first pull of his net saw the first and only *Corydoras* sp. CW040 (fig. 8) caught



fig. 8

on this trip. Lance tried several more pulls of his net but no more specimens were forthcoming. These two species are now on the top of my wanted list for my next trip.

Another very inviting place that I visited which is known as Loboyoc was the last place I collected was within thirty minutes drive from Puerto Maldonado. At weekends the privately owned area, which is set up very much like a public park here in the UK, and is a magnet for families where they enjoy the café facilities and swim in the small clear stream. Being a Thursday the area was more or less deserted. The fast moving stream is part of the Río Manuripe system, and is around 7 meters wide where it passes under the road bridge. It is fairly shallow at no more than a meter deep. For the first 50 meters or so, it runs over a coarse gravel bed and then narrows and deepens before dividing and rejoining form-

ing an island about the size of a football pitch.

This is a very good fishing area, especially



fig. 9

for me being a Corydoras guy. The *Corydoradinae* species here are quite unique in their habit. I collected *Corydoras arcensis*, *Corydoras* sp. CW062 and a new species *Corydoras* sp. CW109 (fig. 9) and although all three species were in the same area, none were ever collected together. There were many other interesting fish species collected there, including 3 species of knife fish, 2 *Ancistrus*, 2 *Rineloricaria*, 1 *Farlowella* and several small tetras including the beautiful little *Tytocharax tambopetensis*. Many of the small tetras are very delicate and are very difficult to transport and require special techniques to ensure that they survive the rigors of transportation.

The Madre de Dios is one of the most bio divers regions in South America. So far I have collected 19 species of Cory and more than 25 species of *Loricariidae* catfishes and I am certain there are many many more new species to be found. While my health and fitness is still good I plan to make more trips to the region and not just for the fish, but to see and experience more of what is there. For those with other interests, there

are more than a thousand species of orchids known in the region, as is the case with a similar number of Butterflies. The number of birds and reptiles is equally as diverse, making the region a fantastic place to visit for any natural historian. 



lan



GET TO KNOW OUR SPONSORS

Our local aquarium shops are important friends of the fishkeeping hobby. They're here to serve your immediate needs - medications, live foods, or a replacement part for a filter, and best of all, you can inspect the fish you want to buy in person, plus most shops will special order fish for you.

MOST GIVE BAS MEMBERS DISCOUNTS.

"Get to know our sponsors and do your shopping with them!"



MARINE DEPOT wants to help you build a better aquarium. You can earn rewards for every purchase with over 3,875 items to choose from. You can TAKE ADVANTAGE of their special Financing Offers and ongoing sales and specials.

REFER YOUR FRIENDS - GIVE \$10 — GET \$10

It's Easy! Here's How It Works:

1. Just go to www.marinedepot.com and click on the REFER A FRIEND GET \$10 OFF button for information.
2. Your friends get a coupon for \$10 off their 1st order
3. You get \$10 (1000 points) when your friends place their 1st order.

www.marinedepot.com
1-714-385-0080

DISCUSGUY.COM, Discus Fish Store where we have high quality Discus fish for sale at wholesale prices delivered direct to your door. I have been raising and breeding discus for over 20 years providing customers and pet stores with excellent service and unbeatable prices on discus fish. If you have any questions about discus or if you are interested in a specific strain of discus that you don't see in my store, please contact me and I will get back to you as soon as possible.

WWW.DISCUSGUY.COM

TROPICAL FISH HOBBYIST magazine has helped aquarists succeed in fish keeping for 64 years. Every serious hobbyist should subscribe to TFH. Now a bi-monthly, they offer a special subscription deal: buy 6 issues and get 3 Free.

Use promo Code **VIP** to get the deal.
tfhmagazine.com/subscriptions
1-888-859-9034

AMAZONAS - The legendary freshwater aquarium magazine is now in English. This is a great publication. If you keep freshwater fish, you should subscribe.

Only \$29 for 6 issues and well worth it.

CORAL - The reef & marine aquarium magazine a fabulous magazine for reef and marine fish enthusiasts.

\$37 for 6 information packed issue.

For more information go to WWW.AMAZONASMAGAZINE.COM

ABSOLUTELY FISH's staff is knowledgeable and can help you solve your aquatic problems. They offer a 15% discount on select fish, marine life & supplies when you present your current BAS membership card. A really great aquatic shop and well worth the trip.

Make a day of it!

ABSOLUTELY FISH
1080 Route 46 West, Clifton, NJ 07013
Ph: 1 (973) 365-0200
Open 7 days a week:
Mon - Fri 12AM - 9PM Sat 12AM - 8PM Sun 12AM - 5PM

MANHATTAN AQUARIUMS has one of the largest selections of marine fish & corals on the east coast. You should check them out for your Marine Fish & Coral needs.

BAS members get a 10% discount with a current membership card.

MANHATTAN AQUARIUMS
522 West 37th Street, NYC, NY 10018
Ph: 212 594-2272 • Fax: 212 594-2271
www.ManhattanAquariums.Com
www.UniqueCorals.Com

MONSTER AQUARIUM INC. Specializing in exotic freshwater fish, plants & special orders plus a full range of dry goods & fish foods and filter repairs, plus they do set ups & tank maintenance. (freshwater only). They offer BAS members 10% discount on all in store items, does not apply to special orders. They're open 7 days a week from 10am to 8pm for all your aquarium needs.

MONSTER AQUARIUM INC.

131-08 40th Road
Flushing, NY 11354
Ph: 347.732.0373
MONSTERAQUARIUM@HOTMAIL.COM

CARIBSEA - From marine and reef community aquariums, African cichlid aquariums to planted aquarium substrate you can count on Caribsea. Trusted by hobbyists and professional alike since 1972. They have 280 products to help make you a better hobbyist.

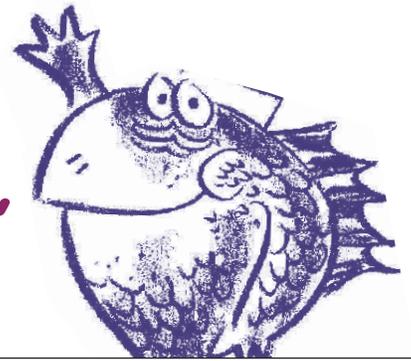
Go to their web site to download their latest catalog or product flyers, videos and directions or to contact them with questions at WWW.CARIBSEA.COM

GET TO KNOW OUR SPONSORS

Our local aquarium shops are important friends of the fishkeeping hobby. They're here to serve your immediate needs - medications, live foods, or a replacement part for a filter, and best of all, you can inspect the fish you want to buy in person, plus most shops will special order fish for you.

MOST GIVE BAS MEMBERS DISCOUNTS.

"Our sponsors want you to succeed in the hobby and we want them to succeed in their business."



AQUARIUM VILLAGE, has 4 to 5 livestock shipments of freshwater, saltwater fish and corals every week to offer you a great selection at a great price. With 6,000 Gals. of stocked tanks, 1,000 coral frags and 2 tons of live rock in stock at any one time. Saltwater is their specialty, but you'll also see a large selection of African cichlids, 1,000 Gals. of tropical fish, goldfish, koi and accessories and supplies to fit all your needs. They also do installation and maintenance.

A well-trained staff is on hand to answer questions and provide quality service. **Richard**, the owner also welcome group buys and offer specials to BAS members and unbeatable prices for new tank set-ups.

This is a must visit store!

AQUARIUM VILLAGE

461 Old Country Road, Westbury, NY 11590
Ph: (516) 333-0682

• www.nyAquariumVillage.com
Hrs: Mon-Sat 11-9 • Sun 11-6

PETLAND DISCOUNTS, the complete pet store carries a full line of pet supplies for fish, dogs, cats, birds, reptiles and small animals. They also carry a variety of fish, birds, small animals and reptiles.

OPEN 7 DAYS A WEEK

Locations in New York, New Jersey & Connecticut with 19 stores in Brooklyn. You can shop on line at:

WWW.PETLANDDISCOUNTS.COM

Check the white pages for a store near you.

CENTRAL AQUATICS has been generous in its donations from its **Aqueon** and **Coralife** brands to the BAS, and now they have joined the BAS family of sponsors.

Aqueon - *It's all about the fish* - Developed by true aquatic hobbyists and focused on products that will make your life easier when keeping an aquarium.

Coralife - *Beyond the basics!* All-inclusive aquariums and a complete range of lighting and equipment that meet the needs of advanced hobbyists.

You can learn more about their products at the following websites:

aqueonproducts.com &
coralifeproducts.com

1-888 - 255 - 4527

PACIFIC AQUARIUM & PET INC. in Manhattan's Chinatown carries ornamental goldfish, koi, freshwater fish, & aquatic plants.

BAS members get 10% discount with current membership card (Discounts not to be combined with other specials). They have a full line of aquarium supplies, and you can order custom size tanks.

PACIFIC AQUARIUM & PET INC.

46 Delancey St., NY, NY 10002

Ph: 1 (212) 995-5895

Open 7 days a week and all holidays 10AM to 7:30PM



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.

Ph: 718-332-1040 • Fax: 800-518-5251 or
www.TAXHELP1040.COM

ZOOMED AQUARIUM LED HO -

Energy efficient LED Aquarium lighting with a low profile design!

- Unique modular design allows for replacing or swapping out LED panels.
- 50% brighter than T5 HO fluorescent lamps.
- More LEDs than comparable hoods on the market = more light!
- Shimmer effect: Bright white light produces shimmer, just like in nature.

Find out more about it and other ZooMed aquatic products at

WWW.ZOOMED.COM

REEF NUTRITION Inc. Advanced Fish Feeds not only include natural, color-enhancing ingredients, they provide the highest quality nutrition and the least waste, resulting in a cleaner tank. Their high quality feeds are made using proprietary processes developed by their parent company, Reed Mariculture, a world leader in the development of algae - and zooplankton - based feeds.

Reef Nutrition - We Feed Your Reef. See your fave LFS for Reef Nutrition products with the purest & most natural feeds on the market.

For more info. go to

WWW.REEFNUTRITION.COM

Our Sponsors Support Us! We Must Support Them! Tell Them You Saw Their Ad In *Aquatica*

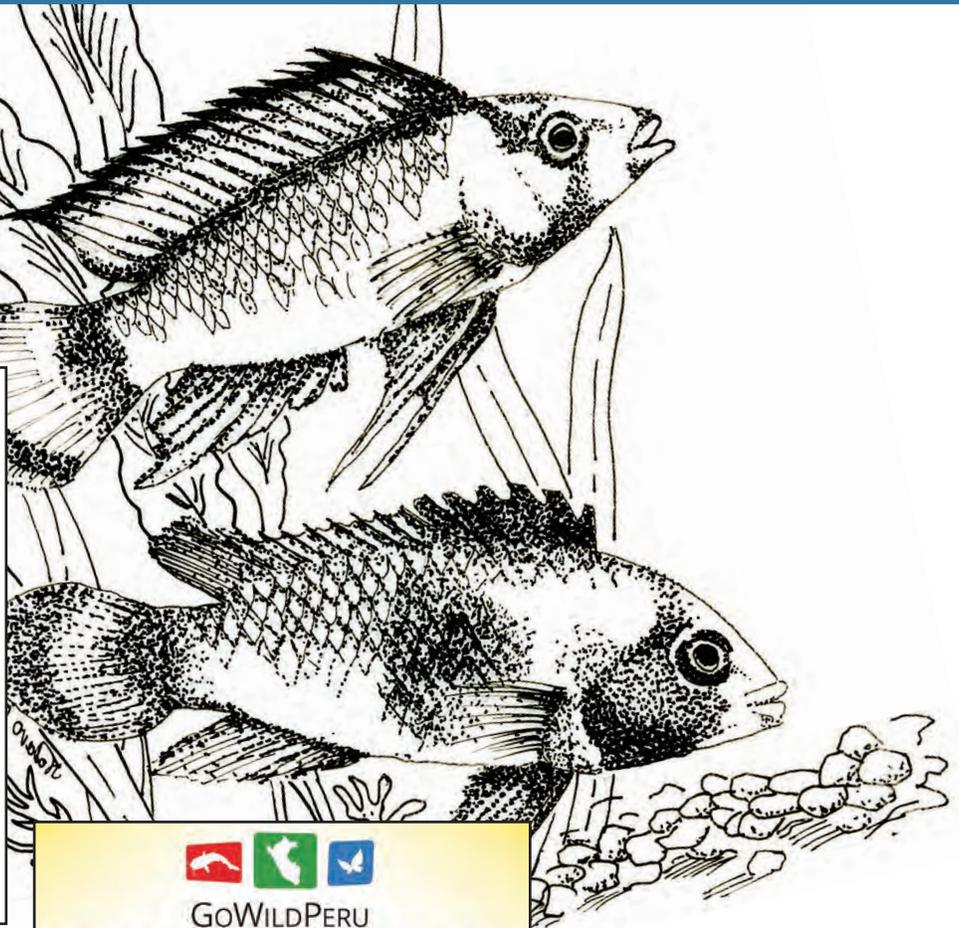


Build a Better Aquarium with Marine Depot

Earn Rewards for every purchase with over 3875 items to choose from
Take advantage
of our special Financing Offers and ongoing sales and specials.
Visit www.marinedepot.com for more information.

1-714-385-0080

www.marinedepot.com



GoWILDPERU

Guided Fish Collecting Expeditions & Wildlife Tours
www.gowildperu.com

Manhattan Aquariums

One of the Largest Selections
of Marine Fish & Corals on
the East Coast

522 West 37th Street
NYC, NY 10018

**10%
DISCOUNT
FOR MEMBERS**

Phone: 212 594-2272 Ext. 5
Fax: 212 594-2271
Cell: 347-782-2407

www.ManhattanAquariums.Com
www.UniqueCorals.Com

WWW.DISCUSGUY.COM

Wholesale Discus Fish Shipped to Your Door.

Discus Guy

LONG ISLAND'S AQUARIUM

AQUARIUM VILLAGE

461 Old Country Road
Westbury, NY 11590



A complete range of exotic fish; freshwater, saltwater, and corals.
4 to 5 shipments per week for the widest selection of great prices.
Also a wide range of aquarium equipment. A well-trained staff
provides the highest customer service for your aquarium needs.

- 6,000 Gal. of well stocked tanks. Saltwater a specialty.
- 1,000 frags of coral, plus 2 tons of live rock and a 44 cubic ft freezer of frozen foods
- A wide assortment of tropical fish, goldfish, koi and plants.
• Rare and unusual invertebrates.

SERVICES: Installation of entire systems.
• Aquarium maintenance. • Expert help on tank size, equipment, installation and logistics.

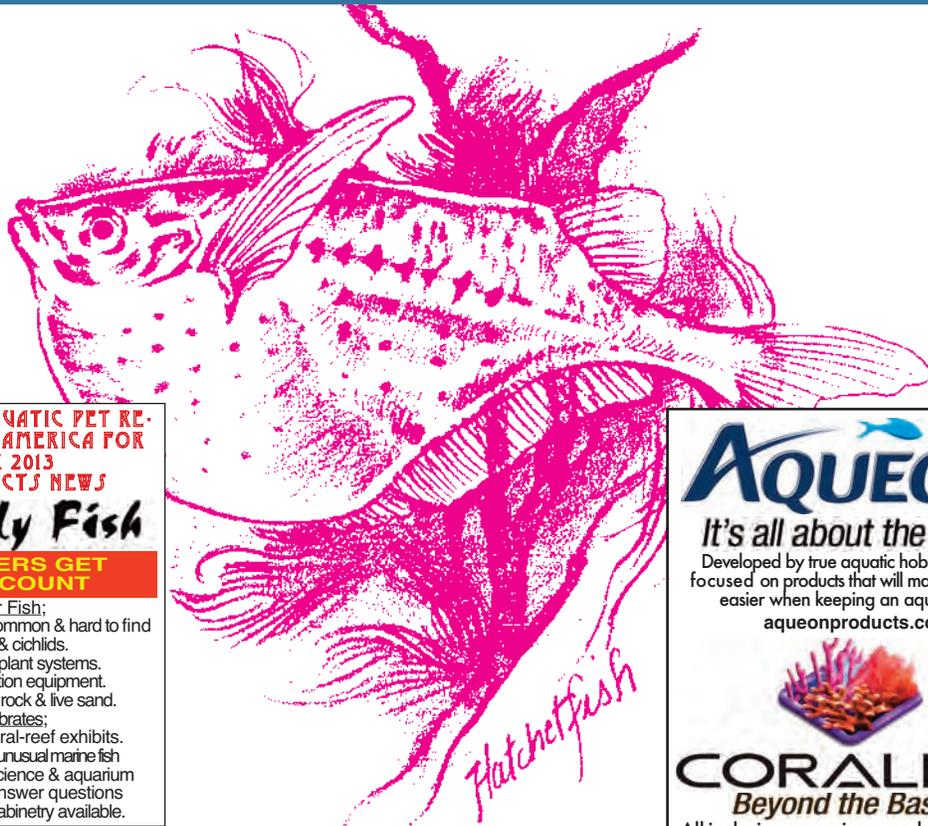
516 333-0682

info@nyaquariumvillage.com

Store hours: Mon - Sat 11-9 • Sun 11-6



Our Sponsors Support Us! We Must Support Them! Tell Them You Saw Their Ad In *Aquatica*



AWARDED BEST AQUATIC PET RETAILER IN NORTH AMERICA FOR THE YEAR 2013
BY PET PRODUCTS NEWS

Absolutely Fish

BAS MEMBERS GET A 15% DISCOUNT

Freshwater Fish:
 Over 120 tanks filled with common & hard to find tropical, catfish & cichlids.
 Specialized aquatic plant systems.
 High-tech reef & filtration equipment.
 Larger selection of live rock & live sand.

More invertebrates:
 Over 2,000 gals of coral-reef exhibits.
 Over 4,000 gals of rare & unusual marine fish

Expert Staff in marine science & aquarium husbandry ready to answer questions
 Custom aquariums & cabinetry available.

(973) 365-0200
 1080 Route 46 West Clifton, NJ 07013
 Open 7 Days a Week
 M-F 12AM - 9PM • Sat 12AM - 8PM • Sun 12AM - 5PM
 We Honor: Visa, Master Card, Discover, American Express, MAC

AQUEON
It's all about the fish®
 Developed by true aquatic hobbyists and focused on products that will make your life easier when keeping an aquarium.
aqueonproducts.com



CORALIFE®
Beyond the Basics!
 All-inclusive aquariums and a complete range of lighting and equipment that meet the needs of advanced hobbyists.
coralifeproducts.com
1-888-255-4527

CaribSea inc
 Trusted by hobbyist and professionals alike, since 1972

We have 280 products to help make you a better aquarist!

Questions about our products?
 Feel free to contact us via our web site.
www.caribsea.com
CaribSea, Inc.
 P.O. Box 13359, Fort Pierce, FL 34979
772-461-1113

AMAZONAS
 The legendary freshwater aquarium magazine is now in English
\$29 FOR ONE YEAR

CORAL
 THE REEF & MARINE AQUARIUM MAGAZINE
\$37 FOR ONE YEAR

SUBSCRIBE NOW!

WWW.AMAZONASMAGAZINE.COM

PACIFIC AQUARIUM & PET INC.
 46 DELANCEY ST., N Y, NY 10002
 Ph: **(212) 995.5895**
 Open 7 days a week & all holidays
 10am -7:00pm

Specializing in exotic marine fish, freshwater fish, goldfish & koi & freshwater aquatic plants.
 Complete line of aquarium supplies. Custom size tanks & maintenance available.

10% Discount to BAS members with current membership card

WWW.PACIFICNYC.COM
 Close to the F, B, D, & 6 Subway lines
 Visa, MC, Discover Card, AmEx



Our Sponsors Support Us! We Must Support Them! Tell Them You Saw Their Ad In *Aquatica*



Specializing in exotic freshwater fish, plants & special orders plus a full range of dry goods & fish foods. Filter repairs, set ups & tank maintenance. (freshwater only)

10% Discount for BAS members on all non-promo items. Does not apply to special orders

Open 7 days • 10 am-8 pm for all your aquarium needs.

Monster Aquarium
131-08 40th Road
Flushing, NY 11354
347.732.0373
monsteraquarium@hotmail.com

PETLAND DISCOUNTS

OVER 50 YEARS OF SERVICE

OPEN 7 DAYS

See our listing in the white business pages or online

www.petlanddiscounts.com

LOCATIONS:
New York. New Jersey & Connecticut

Reef Nutrition™
We Feed Your Reef™

Reef Nutrition's advanced fish feeds not only include natural, color-enhancing ingredients, they provide the highest quality nutrition and the least waste, resulting in a cleaner tank.

Our high quality feeds are made using proprietary processes developed by our parent company, Reed Mariculture, a world leader in the development of algae - and zooplankton-based feeds.

Reef Nutrition – We Feed Your Reef

See your fave LFS for Reef Nutrition products with the purest & most natural feeds on the market.

For more information, go to www.reefnutrition.com

JOSEPH S. REISMAN & ASSOC.
Accounting & Tax Experts
2751 Coney Island Avenue
(Corner of Avenue Y) Brooklyn, NY 11235



WE SPECIALIZE IN:

- Aquarium Societies
- Aquarium Hobbyists
- Aquarium Retail Suppliers
- Aquarium Wholesale Suppliers

Tel: 718-332-1040
Fax: 800-518-5251
www.TAXHELP1040.com

10% discount to Brooklyn Aquarium Society members with, valid membership card

AQUA EFFECTS

The Ultimate LED Light & Sound Experience




zoomed.com

TROPICAL FISH

THE BEST THING TO HAPPEN TO AQUARIUMS SINCE WATER

Fishkeeping is more fun when you succeed, and nobody has helped more aquarists succeed



Buy 6 issues, get 3 free Promo Code: VIP
SUBSCRIBE TODAY
ffhmagazine.com/subscriptions 1-888-859-9034





The Benefits Of Being A Member Of The BROOKLYN AQUARIUM SOCIETY

Your Membership Card is your Passport to Becoming an "Educated Aquarist." Don't lose it. Put it in your wallet or purse. You'll need it to attend Monthly Events and get discounts at participating pet stores.

YOUR MEMBERSHIP BENEFITS INCLUDE:

Free Admission to all general meetings, held on the 2nd Friday of the month (except July & August) at 7:30 pm at the New York Aquarium, Education Hall, at Coney Island, Surf Avenue at West 8th Street, Brooklyn, N.Y. The Society presents expert speakers on all aspects of the hobby, from freshwater fish to marine aquatic life. Breeder Awards Program (BAP) – Certificates and trophies awarded. General meetings are open to the public (a \$5 donation is requested for non-members). Free parking and free refreshments.

Special Interest Groups (SIGs) hold meetings, free at members' homes, for members only. Here's your chance to network with members with the same interests. Discuss, ask questions, learn, teach and develop your expertise in freshwater and/or marine aquarium keeping.

Aquatica The Journal of the Brooklyn Aquarium Society, our bi-monthly (5 issues except July & August) award winning publication is on our web site. Each issue is filled with articles on both marine and freshwater aquaria keeping. Articles can be downloaded.

The **BAS Bulletin**. All members receive our monthly (10 issues except July & August) Newsletter, the *BAS Bulletin* via email, keeping members up to date on the latest events at the Society, notices of interest and monthly regional society events. All non-commercial members are entitled to a free classified want ad in each issue, to sell, give away or request fish or dry goods.

The **BAS is on-line at BASNY.ORG**. You'll find up-to-date information about our monthly events, links to other aquarium societies

in the US and stores, manufacturers and related aquarium sites. We have an on-line library with downloadable articles. We have our own BAS forum, where you can interact with other freshwater, marine or reef members and post free hobby-related classifieds where members sell and trade fish, corals, plants and equipment.

BAS Hotline: For the latest information call the BAS 24 hour Hotline 718 837-4455 for event and inclement weather information. If you need advice on fish keeping, breeding or where you can find rare or hard to find fish, you can often get help calling the Hotline. Help from the Hotline is always free.

Volunteer: The Brooklyn Aquarium Society is an organization run by volunteers. Without them there would be no BAS. Volunteers help set up events, write articles, coordinate projects, assist and work on committees, help at auctions and meetings. Join in, help, learn and have fun doing it. Call **Steven Matassa**, President (718) 238-1792.

Discounts for Members at many BAS participating pet stores when you present your current BAS membership card.

Welcome and we hope you take advantage of the many benefits BAS has to offer.

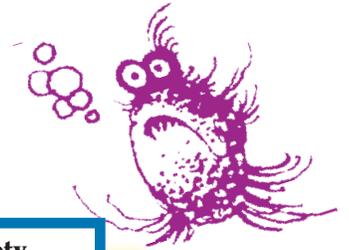
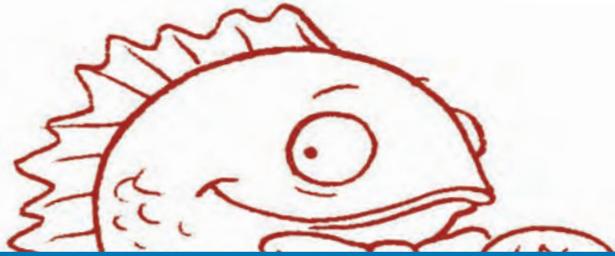
The Officers & Board of the Brooklyn Aquarium Society

Educating Aquarists Since 1911





BECOME AN EDUCATED AQUARIST



Membership & Renewal Application Brooklyn Aquarium Society

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



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, and fish auctions. Free parking and refreshments. 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				FAMILY				<input type="checkbox"/> \$15 STUDENT 1 YEAR
1yr. \$20	2yr. \$36	3yr. \$51	4yr. \$68	1yr. \$25	2yr. \$45	3yr. \$63	4yr. \$85	(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 _____