



April, 2011
Volume 19 Issue 8

THE

TBAS . . . Since 1992

FILTER



Celebese Rainbowfish, *Telmatherina ladigesii* . . . photo MFJacobs 2011

APRIL PROGRAM

Town Hall Meeting

APRIL BOWL SHOW

1) Sucker Catfish 2) All Other Cats

Tampa Bay Aquarium Society



“The Filter”

Tampa/St. Pete Florida

CONTENTS

April 2011
Volume 19 Issue 8

President

Mike Jacobs

V-President

Dre Alvarado

Secretary

Joe Hiduke

Treasurer

Patty Moncrief

BOD

Hank Darin
Gene Linkowski
John Papp
Jim Norris
Ludo Van Den Bogaert

Welcoming

Mike LoBello

**WebSite &
Newsletter Editor**

Mike Jacobs

- 3) President’s Time
Mike Jacobs
- 4) To SALT or Not to SALT
Mike Jacobs
- 8) Pygmy Cories
Joe Berberich
- 9) For the Love of Catfish
Tanja Diederich
- 14) Monthly Bowl Show Results
- 14) BOD Meetings
- 14) Internet Ideas
- 15) Monthly Bowl Show Categories



Sterbai Catfish, *Corydoras sterbai*. . .
Photo by Nan Smith 2011



a wholesale/retail end of our hobby. The losses people experience are being blamed on the customer and not the wholesaler/retailer and as a result future members of the aquarium hobby are lost before they get started.

In the last two issues of a famous aquarium hobby magazine there were folks writing in with questions about trying to keep neons and cardinals alive from the fish store they were getting them. The magazine’s response talked about the “Neon Disease” and all sorts of ideas that put the blame nowhere I believe it belonged. Not knowing the EX-ACT place the fish were bought I could still make an intelligent guess . . . I would ask the new customer to ask the store worker for a conductivity meter and measure the conductivity of the water the neons and cardinals are in . . . if the number is in the area of 2500-5000 uS then just move along.

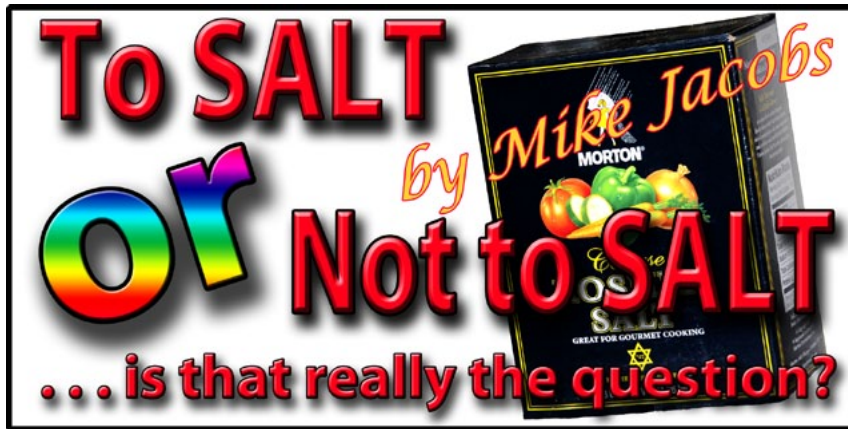
Thanks for your patience TBAS members . . . next month your bulletin will be back to normal -- whatever that means . . . !!

There were some of you expressing a very real desire to help on the Auction Committees! That’s a wonderful thing to hear. We are already getting these committees together, because we have moved the auction to October 2011! If you really want to help, then say something to a BOD person, or better yet, come to a BOD meeting . . . you are more than welcome at the BOD meetings, and you get some good food and to see people’s fish tanks! Just let the person hosting the meeting, or me, know you’re coming.

See You Guys at the APRIL Meeting!!!

Mike

You will, of course, notice that there are only two articles this month. I decided that it’s time to bring the SALT issue we have talked about to the attention of all of the clubs and people that read the TBAS bulletin. I believe strongly that salt is causing a problem on



I have been in the tropical fish hobby for a long, long time . . . maybe almost 60 years . . . and I think I have heard most of the old wives' tales and out and out falsehoods that have been told in the hobby. The "pH shock" tale was maybe the best tale of them all . . . the "pH makes a difference in keeping fish" was another . . . being "fed too many worms make for fat fish" . . . now I'm fat, but I've never seen a fat fish: maybe there is one somewhere, but the rumor of "fat fish" from feeding them too many worms holds no validity . . . none . . . "black worms are as dangerous as red tubifex worms" was another . . . NOOOOO . . . not even REMOTELY CLOSE! You want another rumor that is out of hand . . . "the rift lakes of Africa are hard water lakes"!!! The Rift lakes of Victoria & Malawi are soft/medium-soft water environments. The exception is Lake Tanganyika, which is very hard and high in pH and alkalinity. However, the hardness is mainly from Magnesium, not Calcium like the water in Florida. Manufactures, however, jumped on the band wagon and have marketed and sold "Cichlid Salts" which were really never needed!^(#10) Most of the aquarium rumors I just try to ignore. However, some of them, quite frankly, even I get caught up in, because I didn't THINK . . . I just took someone's word for it all. Now, with the Internet available to all of us, we can all do a great deal of investigative work concerning rumors to illuminate all of the incorrect hobby rumors.

I want to investigate one of those "old time rumors" in this article.

SALT . . . there, I said it . . . the four letter word of aquariums . . . SALT . . . I don't ever want to hear it again. Whatever you say about salt, it's not true, certainly terribly exaggerated and I'm gonna try to talk some logical sense to you . . . I hope. I don't have a lot of Scientific Factual malarkey BS published paper stuff . . . just some thinking, some digging and some real information . . . BUT NEITHER DO YOU HAVE REAL PROOF . . . NO YOU DON'T . . . NOPE . . . because it doesn't exist . . . not at the level you guys are using salt!!!! You may have some old tales and innuendos that have been passed down from person to person, but no factual "paper stuff" . . . nope . . . it's not out there . . .

I've looked! So let's agree to sit and talk and the best "man" wins in the end . . . or better said the aquarium hobby wins, because this is getting really, really silly . . . but do your homework and don't just say "Well, I don't know, old Jeb told me about 30 years ago!" . . . that's not gonna buy it in this argument. When the public goes into some of the larger national tropical fish stores to buy fish and there are little salt containers in EVERY tank to maintain the salt level at about 4000+ uS (conductivity), you now know why the aquarium hobby is no longer the number two hobby in this country (from a study made in the early 1970's till the early 1990's) . . . behind photography (everyone has/had a camera). Here's the present hobby list of 2011 from WikiAnswers.com . . . Top US Hobbies:

1. Golf
2. Playing a musical instrument
3. Skiing
4. Gardening
5. Swimming
6. Snow Boarding
7. Mountain Climbing

We didn't even make the list and I think it's in large part due to salt! MOUNTAIN CLIMBING??? MOUNTAIN CLIMBING . . . the tallest thing I climb is my bed????????????

OK . . . ME, WE, US . . . SALT or NON-SALT!

Let's begin this way. The gentleman who introduced me to real fish keeping was named Stanley Karafin. We were in Gary, Indiana in the early 1960's, and boy, do I miss old Stanley – what a wonderful old character of a guy. Looking back, this was the beginning of the heyday of the undergravel filter and all of the "lifetime" tanks . . . "never change the water" was the mantra then . . . but not Stanley, he would always tell me . . . "Mike, get the poop out of your tanks and don't put poop in it either (use your sense of humor with poop)!!! . . . Change your water and change your filter medium as OFTEN as you think about it, but never let it go for more than a month." Honestly, he said that to me 100,000 times until it just became routine and automatic for me. I will forever be grateful to Stan for that lesson and what he taught me about aquarium fish and the aquarium hobby. I had to drive 20-30 miles to get to his store, passing several fish stores, but it was well worth all of the positive things he taught me in an age when rumors and wives' tales were absolutely rampant. "CHANGE YOUR WATER MIKE . . . get the poop out of their house!" Wheew!! I tell you this story only to let you know that I was never allowed to let the tank go forever without water changes . . . never . . . and I was taught to never put "poop" . . . anything (even medicines) . . . into a tank! Stan would holler, "You can only put so much 'poop' in an aquarium until you can no longer hide it. It's still in there and will bite you sooner or later." . . . Now we know he's not exactly right, but he was very, very, very close! Bad aquarium keeping was what was going on,

and it caused all sorts of problems for people when they went 8-9-10-11 months and only topped off their tanks every 3-4 weeks and CHANGED the tank once or twice every year and when they changed the water some of their fish died . . . oh!!! . . . must have been pH shock . . . Hmmmmm??? Now, when I hear people talk about salt and I ask them “WHY?” they tell me everything from nitrite poisoning to bacteria to Oodinium to “. . . cause Jeb said” but everything we are talking about today has to do with good . . . or maybe bad aquarium husbandry. From what I can gather from reading and listening there are 3 basic reasons people feel the need to put salt in their aquarium:

1) Treatment of nitrite, NO₂, poisoning

My goodness folks . . . First of all, if you are having a nitrite problem why are there fish in the tank in the first place? Put the fish in a different tank and FIX the nitrite problem . . . don't be a typical person and look for a pill or a quick fix . . . rest easy, Stan, am I doing good here already? FIX THE PROBLEM, don't mask it! Do you need the tank that badly? Probably not . . . put on an outside power filter from an established tank and run it for 2-3 days . . . FIX THE PROBLEM! If that is REALLY the only tank you have then put a “bit” (defined later) of salt in it but remember to make 4-5-6 75% water changes in the very near future to get the salt out of the tank but remember this . . . HOW MUCH SALT DO I PUT IN (you actually don't need SALT you need the Chloride ion Cl⁻)?! For the salt (Chloride ion . . . Cl⁻) to really help it has been shown and written scientifically, officially, that the chloride ion must be 6 times^{(#1)(#7)(#9)} the concentration of the nitrites to be helpful. It is the chloride ion that offsets Nitrite toxicity (not the Sodium) and most natural waters already have chloride in them. Lake Michigan water, for instance, has roughly 18 mg/l Chloride ion that is enough to offset 3 ppm Nitrite toxicity entirely on its own . . . no salt. **Just nice clean fresh water is all that is needed!!!! Know your water!!!**

What is the Nitrite problem all about anyway . . . it's called Brown Blood Disease. “Freshwater fish, particularly **channel catfish**, are susceptible to brown blood disease, which is caused by an accumulation of nitrite (NO₂) in the water. Although most studies conducted on brown blood disease have used **channel catfish** as a model, many other freshwater species are susceptible to the condition.^(#9) Continuing, “A minimum chloride concentration of 20 ppm is recommended to prevent nitrite toxicity among channel catfish in ponds.” **FOLKS: Most ponds are supplied with water containing at least 20 ppm Cl⁻**; however salt, should be added to ponds containing less than 20 ppm Cl⁻ to increase the chloride concentration to the desired level.^(#9) Did you read that . . . “**Most ponds are supplied with water containing at least 20 ppm Cl⁻.**” . . . That means just add clean water . . . not salt to the POND (tank) . . . **regular water changes** will do the trick in a tank with a nitrite problem. If you really think salt is necessary then add grains of salt not teaspoons or tablespoons . . . GRAINS! But folks . . . we are talking PONDS not tanks of aquarium fish filled with ordinary tap water that already has 20 ppm chloride.

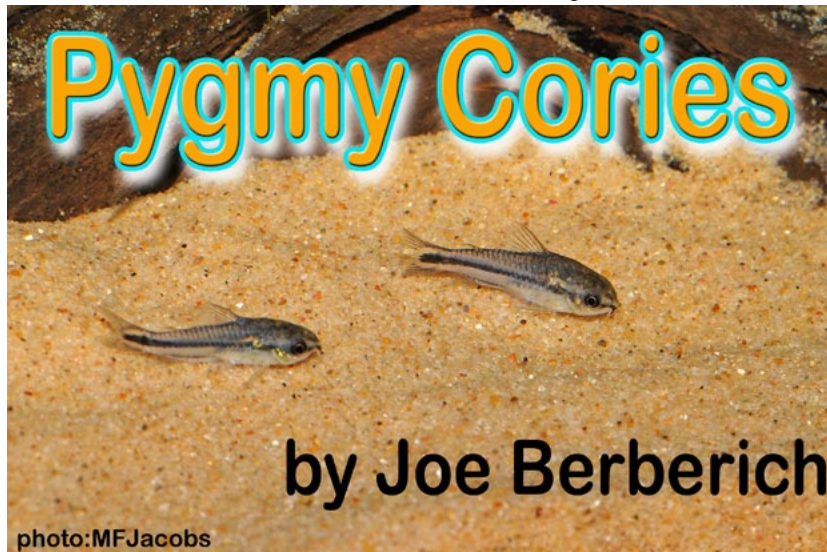
2) Treatment of osmoregulatory stress

This is what a lot of people hang their hat on. But listen to the facts: There does seem to be some validity to a bit of osmoregulatory stress of fish . . . but not very often. Generally it comes from a tremendous change in water of one osmotic pressure to water of a drastically different osmotic pressure when the fish is being moved, but once again and here is the point again: HOW MUCH SALT? Most scientific folks will recommend if the osmotic pressure is only a factor of +/- 300% simply don't worry about it . . . no harm no foul . . . but if you feel you must do something then add 1 - 3 mg/L of Chloride^(#4) . . . (using the highest value of 3 mgCl/gal) that starts out to be 3mg Cl/l x 1mg NaCl/.6066 mg Cl = 5 mg NaCl/l . . . now, going through all of the above calculations . . . that comes out to .003 tsp NaCl/gal . . . that's .003 tsp NaCl/gallon (.003 tsp NaCl/gal x 333/333 = 1 tsp NaCl/333 gal) . . . repeat those values to yourself . . . 1 tsp NaCl/300 gal. And again, you want to treat a 10 gallon tank . . . ok, put in 10 x .003 = .03 tsp/10 gallon? How much salt do you want to use? A grain or two of salt?

Along with all of this osmoregulatory stress, and here is the really big one . . . NOT THE NEED FOR SALT!! The real culprit in fish stress control is CORTISOL^{(#1)(#5)(#6)(#8)}. When stressed, fish produce Cortisol. Among other things, Cortisol INHIBITS the loss of Sodium and Chloride in fish^(#6). In fact it has been shown that when fish are stressed the fishes body will normally go through an uptake of Sodium and Chloride^(#6) through special cells on the gill filaments . . . combining this with the Cortisol STOPPING the loss of Sodium and Chloride, everything is fine until the stress is over . . . CORTISOL!!! Remember that name. By the way . . . again . . . in normal everyday water there is plenty of Chloride to be had by normal fish in normal tap water . . . no need to add salt! The amounts of Sodium and Chloride taken up during stress are miniscule . . . not teaspoons and tablespoons per gallon. Besides, it has been shown there is normally in the area of 20 mg/l of the chloride ion present^(#9) in most waters . . . so here again, there is no need to help this process along . . . there is plenty of chloride in water for the fishes' needs in 99.999% of the cases.

3) Disease on the body of fishes

The book “Fish Medicine” (W.B. Saunders Company), by Michael Stoskopf^(#4) says that salt at a concentration of 22 mg NaCl/L (22mg NaCl/L x 3.74L/gal x 1 tspNaCl/5500mg NaCl = .02 tsp NaCl/gal) (that's .02 tsp NaCl/gallon), used as a dip, for 30 minutes to control fungal infections and protozoal infestations is effective. Again . . . using the calculations as above this treatment comes to .02 teaspoon per 1 gallon . . . that's (.02 tsp NaCl/1gal x 50/50 = 1 tsp NaCl/50gal of water) . . . and he only recommend it for 30 minutes . . . 30 minutes . . . and you must monitor the fish's demeanor during the process . . . and some folks recommend 1 tsp NaCl/gal as a everyday occurrence! Of course you must understand why this dip works: the protozoa will burst under the osmotic pressure change from the freshwater to the saltier water because of osmotic pressure changes . . . imagine what that would do to a normal fish's gill cells when



While most of us have at one time or another had cories in our tanks, we might not be aware of smaller versions called pygmy cories. These smaller cories do the same job of cleaning the bottom and the substrate as their larger cousins, but they take up less space doing it.

According to different sources there are from four to six species of pygmy cories, and none grow larger than one and a half inches to maybe one and three quarters of an inch in length. Most stay in the one-inch range. All these wonderful little creatures have different patterns of mostly the same colors.

All species are of South American origin, mostly Paraguay, Venezuela, Brazil and the Amazon Basin. Some species are now grown commercially by local farmers in the U.S.A.

The species I have found listed are *C. gracilis*, *C. griseus*, *C. habrosus*, *C. hastatus* and *C. pygmaeus*.

When I first inquired about getting some pygmy cories, I did not know there were so many species. So when I got them I assumed they were *C. pygmaeus*. Nobody set me straight on their real name, so when they finally spawned I informed Brian Skidmore (Breeders Award Chair) of the wrong name. I must beg forgiveness from Brian on this, my mistake. I have since found the real name of my little ones, and they are *C. habrosus*. The difference in color pattern sets all the species apart. *Corydoras habrosus* has a black lateral line up to the caudal fin, but instead of a nice straight line only bisected by the eye, the lateral black line is splotted with small gaps of white between them. They also have a featherhead or arrowhead pattern in the caudal fin. All other species of pygmy cory have different patterns.

All cory species are basically sexed the same way. Looked at from top down, the female is broader in body than the male. Also the pelvic fins on the female are rounder to hold eggs, so the male can fertilize them. Good luck in doing this!

I acquired eight fish the first time I got them and as soon as I got them home, four kicked the bucket. Then I got twelve more after making sure it wasn't something I did to kill the other four. These were all kept in a ten-gallon tank with bare bottom, a number #1 sponge filter, a nice clump of java moss and floating water sprite. Within two weeks there were little bitty things wiggling around that were even smaller versions of their parents. They grow at a fairly rapid pace. All in the tank are happy, and everybody eats the same thing only smaller bits. Flake food is all I feed them. They will spawn in the moss, on gravel or on the tank glass. They are not fussy. Just give them a place to do their thing.

I really hope at sometime you can get some species of pygmy cory to enjoy. Hey! They are also kinda cute.



Because the Bowl show in April features catfish, I would like to make a confession: I love catfish. My love affair started with the common pleco, and I haven't met a catfish I didn't like since. Like many people, my introduction to catfish was in terms of what the catfish could do for my tank. I didn't know anything about fish, but the fish stores assured me I would have an algae forest, if I didn't buy this two-inch pleco. So I got a tiny, adorable pleco, and I appreciated the time she spent cleaning the tank and the decorations. I also noticed she looked bony, so I started to read about them and discovered she needed food as well as the algae growing in my tank. I started feeding my Pleco and then next thing I knew, I had a 12" armored, behemoth lumbering through my tank. Of course at this point, I was in love with her, and she now stares me down across the room when she wants zucchini for dinner.

Next I learned that *Otocinclus* made a better algae eater for my 5-gallon tank, but they perished when I only bought one. After more research I discovered that these are tribal fish just like Neons, and now I keep them in little Oto cat herds of 10 or more. Happy, secure Otos are healthy Otos. Now that I know more about fish I recommend a few nice Zebra-striped *Nerites* for small tank algae-control.

My next catfish were Cories, because once again these fish are often sold with a "purpose" in mind. Fish stores try to sell me *Corydoras* catfish as tank-cleaning fish. These people actually believe you should buy a single Cory Cat to clean the bottom of the tank. While it is true that Cories tirelessly search the substrate for tidbits (please give them a soft substrate to protect their delicate barbels), they are not trash eaters and certainly not poop eaters. They are also miserable as single fish. They want to patrol for tidbits in Cory packs. I never keep less than 6 of a single species, and I keep multiple species together. I think of the same species as family and different species of Cories as friends. Mine are free to mingle.



photo by Nan Smith

My fish are lounge lizards. No one is expected to be on duty and many lounge. I offer them lots of caves and plants for retreats, and find that my free time and budget is devoted to keeping their water clean and bellies fed.

When you love catfish, you may need to make some exceptions for them. If you want a catfish you will see, don't buy a South American Bumble Bee Catfish (hide in caves) or a Raphael catfish (you might sneak up on one

with a flashlight after lights out). If you give your ghost catfish a group of 6, you will see them more often, especially if you give them some plants for cover. Mine live in a group of three species, but they don't seem to mind and do synchronized tail-swishing. And even



Tanja's Ghost (Glass) Catfish . . . photo by Tanja Diederich 2011

though my Snowball is the prettiest fish on the planet, if I want to see him, I have to sneak up to the tank. If you want a catfish, who plays opossum, get a Banjo. They live under the sand – look after dark with a flashlight to pick out their predatory eyes. I dig them up once a week to make sure they are breathing, and it really doesn't matter. Even if you take them out of the water, they won't move. So they get the sniff test.

The Raphaels are rousted out of their caves once a month to make sure they are not stuck. I spent about 6 hours cutting one out of a decoration. Then she spent four months in rehab.



Tanja's Hoplo Cat . . . photo by MFJacobs 2011

If you want to keep other fish in the tank, keep an eye on your gorgeous Shovelnose or feathery Synodontis eruptus. They live up to their reputation as piscivores. And I wouldn't let my Banjos near any fry or decorative shrimp that I intend to have as residents. Keep in mind that the price of the piscivore is always inverted to the price of dinner (the prized fish in your tank, that the catfish just ate).

Many catfish grow to tank-busting proportions. I have learned to do my research, and I still fell for a 3" beauty to later discover I bought an Adonis catfish

that may reach 36+". My Plecos are 12" and grow in front of my eyes. Every time I see a Red Tail, I really want a Red Tail, but don't have the budget for a private lake.

My most outgoing, engaging and diurnal catfish is a Hoplo catfish. Not only is he a whirl of energy, he also likes to be front and center. He whisks the other tank inhabitants – much to their annoyance, but he is a gentle soul. I highly recommend this fish to anyone with a gentle tank, but don't temp him as a fry-sitter.

If you want an easy starter catfish that will eat algae, stay relatively small and maybe pop out a few fry – try a Bristlenose. But watch out, when they start breeding, they don't stop. I only have about 237 fry at this time.

Remember, just because a catfish has a sucker mouth doesn't mean he only eats algae. Ask my Red Lizards. They are not impressed with algae wafers. Although they are a variety of whiptail, they prefer black worms, but bloodworms will do in a pinch. Love your catfish, do a little research with every new addition.

I need more tanks: the confession of a fish keeper.

. . . continued from page 7

introduced to this amount of salt and then possibly back again if its owners are changed!

Those are the basic arguments I have heard for salt . . . and my rebuttals are there as well. Folks . . . salt is an irritant to freshwater fish. There is no doubt to this . . . no one denies this. Some freshwater fish will tolerate it better than others (brackish are ok . . . "tetras, catfish and fish that navigate by electrical fields are particularly bad" (#9)), but only a scant few were really designed by Mother Nature to deal with salt. Why do we subject them to something that they were never, ever meant to be subjected to?

Look at it this way! If you had some African Rift Lake Cichlids that were raised, of course, in HARD water, as some should be, and the cure for some disease was to put them into some soft water for 15-20 minutes. Would you then raise them continually in soft water from then on just to prevent the problem from coming back? I really don't think any African Cichlid keeper worth his salt would do that. He would bring the fish back to "normal conditions" and do a better job of preventing the problem from reoccurring. As Ruth Francis-Floyd, from the University of Florida said so profoundly, "Salt concentration should be based on intended use, duration of exposure, and tolerance of the species to be treated." (#9) This does not endorse the wholesale use of a bunch of salt on all fish.

I went to my fish room a bit ago to find out the conductivity change with salt in a tank. I emptied a 5-gallon tank completely and put 5 teaspoons of salt in the bottom of the tank (recommended doses of salt from some killifish breeders and other tropical fish folks is 1/2 to 1 teaspoon/per gallon) and filled it up with my tap water! The conductivity of my tap water is normally 415 +/- uS straight out of the tap and in the 5-gallon tank with 1 teaspoon/gallon (5 teaspoons total) of salt, the conductivity shot up to 4120 uS. You guys make the call. Salt or not? You want an osmotic shock change . . . well, you got it! It is totally beyond my comprehension why anyone would want that amount of salt in their tanks. Remember, Michael Stoskopf recommended in his book, Fish Medicine, the dose of 1 teaspoon/50 gallons of water and ONLY for about 30 minutes and then it was proper to monitor the fish and promptly take the fish out after 30 minutes because salt is such an IRRITANT.

Americans are wonderful people. We are among the most productive people in the world, but we have been raised in a world, where if 1 pill will do the job in aquariums, use 8 and don't worry about it for the next 3 days . . . don't bother me. The quick fix is in and the levels of salt in aquarium tanks far exceed the limits that real aquarium scientists suggest. We all know where it comes from . . . old tales that get stretched . . . numbers get expanded upon . . . people exaggerate without looking things up or asking . . . and our precious hobby is suffering. We are putting fish from the Amazon (a conductivity of near 0 uS) in salt (a conductivity of 4500 uS) . . . we are putting fish that clearly never saw a grain of salt in the last 1,000,000,000 years in salt big time and begin

wondering why they don't live, much less spawn. We wonder why they act funny . . . salt is a known big time IRRITANT!

Let's go back to really taking care of our aquarium charges without shortcuts. We read books, look things up and ask questions of people in the know . . . we challenge people who disagree with us . . . not to cause an argument, but to discuss things and get them correct. Drop your ego! This is not an "ego thing" . . . it's a "let's get it right thing"!!! As is with most arguments the resolution lies somewhere between your story and my story . . . Ok, for the sake of an argument, I'll give you that much and buy that for the moment of this conversation, but I would issue you this challenge then. Let's say you have 10 tanks at home, all of them with salt in them to the tune of approximately 1 teaspoon/gallon. I challenge you to take one of those tanks and completely eliminate the salt from that tank for 9-11 months . . . slowly back the fish down (or you will lose them) from the salt, of course, but totally cleanse the tank of all salt . . . a complete breakdown. I bet you will be completely surprised. OOOPPPSSSSSS, nothing has happened, the fish didn't die and they are fine without the "salt cure-all". There is no . . . I SAY NO . . . NADA . . . salt in my tanks! There hasn't been salt in my tanks for 55- 60 years . . . my tanks are OK, and my fish are Ok. I wonder why that is? Why do I get away with no salt, my friends? Mike has some magic potion . . . No . . . no magic potion . . . just a friend . . . Stan Karafin, my MAGIC MAN. Whenever there is some sort of a problem I just ask myself, "What would Stan do?"

Thanks, Stan . . . thanks a million for the start you gave me to this hobby!

Postscript 1: It was suggested in our club conversation of salt that hobbyists' conductivity meters were "totally inaccurate at upper levels of its range". The following is an excerpt from the website of the make of my conductivity meter.

Model AP-2

EC Range: 0-9999 µS (editor: EC = Electrical Conductivity)

Temperature Range: 0-80 °C; 32-176 °F

Resolution: 1 µS; Temp. resolution is 0.1 °C/F

Accuracy: +/- 2%

If, as it was suggested in our club discussion, that the meter was inaccurate in its upper range we are talking about a range of 0-9999µS . . . the reading I was speaking of was ~ 4000µS. I would think is well within accurate limits of the meter I use.

I spoke with the meter's manufacturer's representative regarding accuracy of their conductivity meters. His reply was: "I can understand aquarists concerns because many of the meters that were on the market in the past were not accurate in the high ranges. However, today's meters use a much more advanced microprocessor and program that allows it to be accurate through its entire range. It's similar to any computer - as technology progresses, we can

POSTSCRIPT 2: There is an argument that a teaspoon of NaCl is from 3-5.5 gms (weight to volume) depending on the texture of the salt. The larger of the values is used in this article. I use the smaller grain salt to hatch baby brine so the larger unit is what I used.

References Cited:

- 1) TBAS, "The Filter", May 2009, pg. 4 Joe Gargas . . . He's Back: Osmoregulation, Ionic Imbalance & pH, Joe Gargas <http://tbas1.com/TBASpdf/May2009.pdf>
- 2) Aquarium Resources and Maintenance Solutions: Salt in Freshwater Aquariums
http://www.algone.com/index.php?option=com_content&view=article&id=102:salt-in-freshwater-aquariums&catid=40:fish-health&Itemid=57
- 3) Aqua World Aquarium: When and When not to Add Salt
http://www.aquaworldaquarium.com/Articles/TonyGriffitts/Adding_Salt_to_a_Freshwater_Aquarium.htm
- 4) Aqua Science Research Group: The use of salt (sodium chloride, NaCl) in the freshwater aquarium or pond.
<http://aquascienceresearch.com/APIInfo/Salt.htm>
- 5) Pan-American Journal of Aquatic Sciences: Cortisol and Glucose: Reliable Indicators of Fish Stress? (2009)
[http://www.panamjas.org/pdf_artigos/PANAMJAS_4\(2\)_158-178.pdf](http://www.panamjas.org/pdf_artigos/PANAMJAS_4(2)_158-178.pdf)
- 6) Cortisol: <http://en.wikipedia.org/wiki/Cortisol>
- 7) Fish Diseases Diagnoses and Treatment J. Noga pg.68
<http://books.google.com/books?hl=en&lr=&id=SAAdDtT7YRRoC&oi=fnd&pg=PA1&dq=Fish+Diseases+Diagnosis+and+Treatment+J.+Noga&ots=5zVPT0cP0l&sig=4SzM2NIm-5gt60JZFAmjcX4ELqUs#v=onepage&q=Fish%20Diseases%20Diagnosis%20and%20Treatment%20J.%20Noga&f=false>
- 8) J. Gargas personal conversation 2009/2010 <http://www.aquaresearchcenter.com/>
- 9) University of Florida "Use of Salt in Aquaculture" Ruth Francis-Floyd pg. 2
<http://edis.ifas.ufl.edu/pdf/VM/VM00700.pdf>
- 10) Talling, J.F., and I.B. Talling. 1965. The chemical composition of African lake waters.
<http://malawicichlids.com/mw01011.htm>



Coastal
Aquarium
Society

Coastal meets on the 1st Wednesday of every month on the campus of New College in Sarasota Florida . . . come and spend an evening with us!
<http://coastalaquariumsociety.com>
You won't be sorry you came!
Directions are on the website.

MONTHLY BOWL SHOW RESULTS

<u>PERSON</u>	<u>Year Totals</u>	<u>March Results</u>	<u>TOTAL POINTS</u>
Angel Heald-Post	29	0	29
Barbara Kusich	20	7	27
Joe Berberich	16	8	24
Tanja Diederich	13	0	13
Jim Norris	6	6	12
Allen Alvarez	2	5	7
John Papp	0	7	7
Jim Lombardi	3	0	3
Dre Alvarado	1	2	3
Nan Smith	0	1	1

Board Of Directors' Meeting

2010 - 2011

February 2011	Patty Monerief (Fair)
March 2011	Mike Jacobs
April 2011	Gene Linkoski
May 2011	Mike Jacobs
June 2011	Joe Hiduke
July 2011	Mike Jacobs
August 2011	Ludo Van Den Bogaert

INTERNET IDEAS

- 1) <http://www.planetcatfish.com/>
- 2) <http://www.aquariumdomain.com/viewSpeciesFreshwater.php?id=38>
- 3) http://www.aquahobby.com/gallery/e_bristle.php

MONTHLY BOWL SHOW

January

- 1) Livebearers
- 2) Egglayers

February

- 1) Killifish
- 2) Invertebrates

March

- 1) Old World Cichlids
- 2) New World Cichlids

April

- 1) Sucker Catfish
- 2) All Other Cats

May

- 1) Livebearers Spawned & Raised
- 2) Egglayers Spawned & Raised

June

- 1) Open
- 2) Fish Shirt (must be worn)

July

- 1) Barbs & Rasboras
- 2) Danios, White Clouds & Rainbows

August

- 1) Bettas
- 2) Anabantids

September

- 1) Characins
- 2) Sharks, Loaches & Eels

October

- 1) Native Florida Fish
- 2) Any Plants

November

- 1) Goldfish & Koi
- 2) Participant Created Fish Art

December

No. . . Bowl Show
 . . . Awards!!!!

STAMP

PO Box 27044 Tampa, FL 33623

Tampa Bay Aquarium Society

