

DELTA TALE

March 1990



Official Publication of the
Potomac Valley Aquarium Society

POTOMAC VALLEY AQUARIUM SOCIETY



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One of my New Year's resolutions that I'm trying hardest to keep is to publish the Delta Tale on a regular bi-monthly schedule during 1990. This issue (March) means so far I'm successful, but at the cost of compiling an issue without ANY original PVAS material in it, other than Val Springer's very impressive cover art, and the diatribe you are presently reading. As of this writing, I have no original material for the May issue either. PVAS has a lot of knowledge and experience to share with other hobbyists - PLEASE SHARE SOME OF YOURS THROUGH A DELTA TALE ARTICLE!

The date for the spring auction is set for May 20th in the Wood Center. The Board is still in the planning stages for our fall weekend workshop, tentatively set for October 27-28th, and would welcome your suggestions for speakers and program topics. The Board also needs the membership's views on whether to have a fall banquet during the same weekend. I will conduct a poll at the March meeting - please come and make your views known.

The program for the March meeting is construction of an inexpensive, very effective trickle filter by Rick McKay. Rick is building one for his 135 gallon discus tank. THIS PROGRAM SHOULD BE A MUST FOR ALL HOBBYISTS - FRESHWATER AND MARINE!!

Larry Wilkie has volunteered to breathe life back into our monthly bowl show. He has formed a group to establish new monthly competition classes. The classes for the next two months are:

March - Corydoras	April - Livebearers
Peat Spawners	New World Cichlids
Open	Open

The Delta Tale issue dates for the remainder of this year are: May, July, September, and November. Please have any notices, Trading Post ads, and original articles in my hands by the first of the month preceding the issue month. You can mail them to the club address in Shirlington, or send them directly to me at: 5709 Lane Drive, Franconia, VA 22310.

THE MIRROR

Reviews and Reprints of Delta Tale Articles

The December 1989 issue of The Daphnian, the journal of the Boston Aquarium Society, praised Gene Aldridge's article "The Bristle-Nosed Plecostomus" and John Mangan's "Preparing for a Fish Show".

The January 1990 issue of The Reflector, published by the Central New York Aquarium Society, summarized Tony Fitz' article "Spawning Aphyosemion Australe Gold - the Gold Lyretail Killie", and also praised Tony's killie spawning article.

The January 1990 issue of The Nekton, the magazine of the Saskatoon Aquarium Society, praised Pete Thrift's article "My Experiences With the Brown Discus - Symphysodon aequifasciatus".

PROGRAM NOTES: FISH DISEASE - OR HOW TO KEEP YOUR FISH HEALTHY

Program by Ken Reeves, DVM, CAS; Reported by Kathleen Rader, CAS

Stress, Ken Reeves told his CAS audience, is the cause or at least contributing factor, to 90 percent of all fish disease. Reeves, a veterinarian and member of CAS, explained that there are many different kinds of stress, arising from handling, transportation, crowding, temperature fluctuations, toxicants (such as ammonia, nitrites and metals), low oxygen level, forced exertion and changes in pH.

TYPES OF STRESS & ITS CAUSES

Before a fish reaches your home tank, it has normally been put through a great deal of physiological stress and trauma: transported from where the fish is raised, to a wholesaler, to a retailer, and then to your home. Often, the fish are transported in bags of 500 fish with small amounts of water. Temperature fluctuates erratically, oxygen levels drop, feces and urine released by improperly prepared fish result in bad quality water, and the fish scrape and bite each other. Usually, the dealer can get them in condition to sell in a few days.

Stress from crowding takes place in the bag, in the retailer's tank and even in the home aquarium. It can result from the number of fish, their disposition, or the amount and arrangement of plants and decorations. Physiological stress comes from too many fish in the tank, which causes problems with oxygen level, ammonia and nitrite build-up. Removing all uneaten food and waste material can help, but if it is a chronic problem, it will eventually kill fish. Crowding can also occur when fish establish territories, especially when mating. Sometimes this can be relieved by changing the aquascaping to better suit individual fish preferences.

The most common toxins in a tank are ammonia and nitrite. Ammonia is highly poisonous and nitrite is almost as bad. Ammonia/nitrite toxicity usually occurs as "new tank syndrome". Nitrogenous wastes degrade to ammonia and reach a peak in the tank in 7 to 10 days. Nitrosomas bacteria then break the ammonia down to nitrites, which peak at 12 to 14 days. The nitrobacter bacteria break the nitrites into nitrates -- which are relatively non-toxic, and can be removed from the tank by partial water changes. The fish keeper should also be aware of toxins and heavy metal poisoning, which can come from copper pipes in your home, metals in your water supply, or the use of household cleaners, tobacco or other smoke, near your aquarium.

Temperature fluctuations affect the oxygen level in the water and thus cause physiological stress. Warmer water cannot hold as much oxygen as can cooler water. Denver aquarists need to be aware that at our altitude, the oxygen level in water is 25 percent less than what it is at sea level. What is taken for standard conditions in magazine articles, written by sea level authors, may not work at higher elevations such as ours.

Active fish need more oxygen than slow moving fish. Filtration and pumps affect the oxygen level in your tanks, so check pumps periodically to make sure they are working to optimum capacity. Plants consume oxygen through respiring at all times, but this is partially offset by oxygen production through photosynthesis during the day. If your fish are huddled at the surface every morning when you turn the lights on, you may have a problem with the plants consuming too much oxygen during the night. Uneaten food and debris are broken down by bacteria which deplete the oxygen from the water.

Stress resulting from forced exertion usually occurs when a fish is being picked on. It is more apt to occur in commercial tanks and is not much of a problem in home aquaria.

Most fish are fairly tolerant of minor fluctuations in pH, but radical changes cause stress. Burning of the skin and irritation of gills can be the result. These in turn may lead to bacterial infections or cause immediate death. You can avoid this by adapting new fish to your tank slowly. In acid pH (less than 7), ammonia is in the form of ammonium ion, and is not very toxic. (Ammonium ion is 100% less toxic than ammonia.) If a major water change is made and the pH is raised to the alkaline end (above 7), the ammonium ion immediately changes to ammonia, which can kill your fish. By doing frequent small water changes and monitoring your pH, you will avoid this kind of stress to your fish.

Each of these stresses is compounded by the other. One more fish, or one skipped water change, can put your tank over the limit. If you lose one or two fish, add new, and lose another one or two fish -- you have probably reached the maximum capacity of that tank.

Rapid death can be the result of vascular shock brought on by temperature fluctuations or by the toxic effects of low oxygen, nitrites or ammonia. Delayed death can be the result of accumulated stress which gave bacteria the chance to invade the body. These stresses are usually the result of low oxygen, parasites, temperature, transportation and/or crowding. Multiple low level stress can produce cumulative effects and disease.

Ammonia poisoning attacks the gill filament lamellae, where beds of blood vessels exchange waste gasses from the fish, for oxygen from the water. This poisoning gives bacterial infections a chance to start and results in the production of lots of mucus. The fish are suffocating and if the poisoning is severe enough, the fish will not survive. Once the gills are burned off by the ammonia, there is nothing that can be done. At lower levels of ammonia, bubbles are present at the ends of the lamellae, but the lamellae can regenerate if the ammonia is reduced. Loss of aeration may produce acute ammonia toxicity.

With nitrite poisoning, nitrite binds to the hemoglobin giving the blood a chocolate color and may make the fish a bluish color. This condition makes the blood unable to carry oxygen, because nitrite is there instead. The fish suffocates, no matter how much oxygen is present. Methylene blue will break down the nitrite, and can help this situation. It can be reversed entirely by removing the nitrite from the tank. Fish can survive this condition, but will grow slowly.

Commercial fish farmers reduce stress by pre-immunizing all fish that come in, and by using antibiotics on a routine basis. The home aquarist can best reduce stress by maintaining high water quality, keeping the filter clean, making sure there is good circulation, removing debris and uneaten food, and doing regular, partial water changes.

FISH DISEASES

Fish diseases can be divided into those caused by bacteria, protozoans, trematodes (flukes), copepods (crustaceans), nematodes (worms), viruses, algae and fungus. Bacterial infections can be further subdivided into external and internal infections. Both can be caused by numerous organisms.

A common external bacterial infection is *Flexibacter columnaris*, or columnaris disease. This is caused by microscopic bacteria which look like inch worms crawling all over the fish. It can be a whole body infection which may cause the fins to rot, and the fish may produce abundant slime over its entire body. It may also be seen as white, cottony growth at the mouth. Columnaris can be treated with antibiotics that have a gram-negative effect, such as oxytetracycline, nitrofurazone or chloramphenicol, or a potassium permanganate bath.

Internal infections are systemic infections resulting from bacteria which are always present in the tank, but are only a problem when the fish are stressed. Since the bacteria are inside the fish, putting treatment into the water will not help. Symptoms include dropsy, bettas with big bellies, angel fish with popeye, and blood hemorrhage on the fin. Internal infections can be reduced by lowering the stress level of the fish, usually by maintaining better water quality.

Protozoans are the largest group of diseases. They are subdivided into three classes: external, internal in the digestive tract, and systemic in the tissue.

The number one external protozoan disease is ich - *Ichthyophthirius multifiliis*. It is commonly recognized by the white spots on the fish's body, but it can also be found on gills and eyes. The cysts are filled with rapidly multiplying parasites. The cysts rupture and the organisms seek shelter on the bottom, develop into bullet shaped trophozoans which swim rapidly, and indiscriminately until they hit fish, where they attach and begin multiplying and repeat the cycle. The free swimming stage is the only one susceptible to medication. The life cycle is 3-5 days at a temperature of 70-80 degrees. Treatment can consist of a combined formalin-malachite green product such as Super Ich #9, or moving the fish every day for three days, or by using a diatom filter to remove the trophozoans. Young fish and some tetras are sensitive to malachite green, so beware.

There are numerous other external parasites, most of which can be treated in the same manner as ich. *Trichodina* is a circular organism which moves erratically over the body and gills, producing flashes. The fish cover themselves with a heavy mucus and are itchy. *Ambiphyra* and *tichodophyra* are both ciliated parasites which occur on gills, and probably cause more of a mechanical problem than a medical one. *Epistylus* is a stalked organism found in colonies, which occur on the ventral body as blood-tinged mucus patches.

Epistylus is most often seen in wild-caught South American Cichlids. Chilomnella and costia are both very small, and produce a condition called the slime disease, which is very irritating and serious. Tetrahymen or the "guppy killer", is a parasite which is very pathogenic. The fish get lesions with white circles of necroses around the organism.

Hexamida, also called Otomitus and Saronucuuus, is the most common internal parasite. It is a flagellate protozoan that is commonly found living in the digestive tract of fish. It causes severe problems in stressed fish, is most serious if the fish is young, and is commonly found in tanks of young fish in Florida. Its symptoms include loss of appetite, weight loss, and mucus stools. It initially attacks the digestive tract, but if systemic, can effect the heart, liver and kidneys. Angels and discus are most susceptible. It causes them to spin around and lie on their side. Tetras and marines also get it. It can be avoided and the condition may be improved by raising the temperature, making frequent water changes, and keeping the oxygen supply high. Treatment of metronidazole or flagel (250 mg in 1 oz. food) may help.

Systemic protozoans can be found attacking the muscles of the fish. Neon tetra disease (Plistophera) consists of spore-filled pansporpblasts, which occur as white diffuse areas visible in the muscles. Henneguya is a systemic protozoan that forms cysts in tissue and fins. Both of these conditions are difficult if not impossible, to treat.

Trematode infections are the result of an egg-laying fluke. Dactylogyrus is common in livebearers, discus and other cichlids, where it attacks the gill lamellae, feeding on the blood of the host, covering the lamellae so that the fish can not breath very well. When gill flukes are present, you may see mucus dripping from the gills. The eggs drop to the bottom of the tank and mature, and may result in the build-up of a heavy infection. In livebearers, the larva may be seen on the body of the parent, most commonly occurring on the body or fins. A combination of malachite green and formalin can be used to kill the adult, and should be repeated to kill the young as they hatch.

Digenetic trmatodes are produced in a cycle where cysts containing flukes occur in abdomen, liver and muscle of fish, which are the intermedata host. The fish are subsequently eaten by larger fish or birds, who then get the reproductive stage. The cyst stage usually does not kill the fish. There is no treatment.

Copepods, small crustacean parasites that suck blood, can be a problem with koi and goldfish. Argulus, or fish louse, attaches itself to the skin and can easily be seen. Ergasilus is visible on the gills. Lernea or anchorworm, attaches itself under the scales of the fish. All can be mechanically removed by the hobbyist, or the fish can be treated with a salt water or formalin bath.

Several types of nematodes, or roundworms, affect tropical fish. Capillaria nematodes have a direct life cycle where the worm lives in the intestine, eggs are passed and fall to the bottom, are then ingested by fish to start the cycle again. This worm can be very destructive. It commonly occurs in cichlids, especially wild-caught ones, and catfishes.

Indirect capillaria have a cycle where the infected fish is eaten by a bird, the eggs are passed in feces and affect copepods such as daphnia, which are eaten by fish, who are the end-stage host. It is usually not destructive. Cammalus is a roundworm parasite of livebearers. You can see the worm hanging out of the anus of the fish, but it retracts when disturbed. Treatment for these worms is difficult. Trichlorophon at 1.5 - 2.5 ppm can be placed in the water, but this is toxic to some fish -- or Telminic can be added to the food for 3 consecutive days.

Cestodes or tapeworms, can be seen as segmented worms trailing the fish in its waste. The infection occurs by eating certain live foods such as tubifex and daphnia. A treatment of Yomesan at 50mg in 100mg of food, for one dose, should help the problem.

The most common viral disease in fish is lymphocystus or cauliflower lips on angel fish. This is a contagious disease that spreads slowly and will probably clear up by itself.

Fish AIDS - the discus plague - or whatever you want to call it, seems to be an immune suppressive virus that attacks angels, discus, oscars, uaru and chocolate cichlids. The fish will begin by hiding in corners, away from light, turn dark in color, huddle in tight groups, become extremely spooky, lose their appetite, their finnage may rot off, and blisters may appear on the skin, especially in discus. The fish appear to be in great pain. The disease runs its course in 2 to 3 weeks, with 20 - 90 percent fatality. It is prevalent in the Asian and Florida fish farms and is now appearing in South American breeding farms, which means it may soon get into the wild population. Treatment should include antibiotics for associated bacterial infections, raising the temperature as high as 90 degrees, doing minimal water changes, and trying to entice the fish to eat by offering live food. Many of the adults are sterile after the disease, and young fish may have deformed finnage. If the fish can reproduce, it's offspring will have normal finnage.

Oodinium, or velvet, is a disease caused by a chlorophyll-containing, pathologic algae, and is recognized by a slimy white coating on the body of the fish. It is especially common in killifish, livebearers, and anabantoids. Treatment can be given with malachite green, salt, ^{light}antibiotics or copper.

Saprolegnia is the most common fungal infection. It is usually a secondary invader of wounds. It looks like white cotton and usually will clear itself up, but can be treated with malachite green.

This program by Dr. Ken Reeves was very informative and thorough on fish diseases. It is important for hobbyists to know not only what their fish has, but also how to correct it and keep the fish from getting it in the future.

THE SAGA OF MARIO AND GLORIA

Or

Trials and Tribulations of a Fish Hobbyist Behind the Iron Curtain

by Erny de la Fuente, Jr., SFAS

I will begin this article by specifically emphasizing that I do not intend it or want it to have political connotations of any kind. Politics I will leave alone and let those "great" minds that get paid for politics talk politics. I will merely relate what has been narrated to me by a fellow hobbyist who is a Cuban refugee, who has chosen to remain anonymous and to whom I shall refer as Mario.

To give the reader some background information, I will mention that in most underdeveloped (non-communist) countries, items manufactured outside their country (particularly those manufactured or being imported from the United States) can only be imported after being levied tremendous tariffs, sometimes exceeding 300%! No, I don't have an extra "0" - 300% (i.e., a item which would normally cost \$10 would bear a tariff of \$30, thus costing \$40). These tariffs are levied on all imports, which obviously would include aquarium fish and supplies. This is a major problem, but it can be overcome by passing the extra cost down to the hobbyist (imagine how your hobby would be affected if you suddenly had to pay 3 or 4 times as much for all your fish and supplies. I would have to moonlight selling beer at the Orange Bowl to pay for mine!). Obviously, these tariffs work towards the detriment of the hobby but, nevertheless, people in those countries still manage to keep fish - THAT'S HOW POPULAR OUR HOBBY IS!

Our hobby is also popular behind the Iron Curtain in countries such as Cuba. However, the hobbyist's problems there are of a different nature. There, the availability of aquarium fish and supplies and the existence of pet shops are not there. Aquarium fish and supplies, which are usually imported by other countries from the United States, are simply not imported by Cuba as there are no trade relations between the U.S. and Cuba. Aquarium supplies for the most part are hand made; there are no Diatom filters, no Whisper 1000s nor PlenPlax valves, nor any of the other items which we use (and take for granted) daily in our wonderful hobby of keeping tropical fish. It's hard to imagine, but it's true. What do they do, then? How do they manage without the necessary "tools of the trade"? Well, anything and everything that can conceivably be used in the hobby is adapted and used in the hobby - from old pots to discarded refrigerators (more on these later) and from old surgical equipment to scrap pieces of glass, metal, and plastic.

Mario and his wife (who I shall call Gloria) were very much into plants, animals, and nature in general. They have quite a cactus collection and were so much into nature that they went as far as bringing up tiger cubs (borrowed from the Havana Zoo) along with their family dog in their own home. Needless to say, of course, they were heavily into fish. They kept and bred fish of several different species, including barbs, tetras, several species of livebearers, and their speciality, angelfish - Pterophylum scalare, or commonly referred to in Cuba as "Escalares". I shall later talk about their fish keeping "maneuvers".

Speaking of other things which we often take for granted in the good old U.S.A., we find that if we want a new sink or bathtub in our homes, all we have to do is order one or pick up one at the nearest major hardware store. In Cuba, being all imported items astronomically expensive and it the fact that sinks and bathtubs are low priority items (food, clothing, and shelter being at the top of the list), a discarded sink or bathtub would come close to making even the fattest of aquarists jump up and down with joy. Mario and Gloria were also fortunate enough to have an old automobile - something else we would take for granted at home. They would be driving down the street, spot an old sink, an old bathtub, an old refrigerator, or any other discarded container which could conceivably hold water, slam on their brakes, stop, back up, stop and, no matter where they were going or how they were dressed, load it onto their car and haul it home.

Metaframe, PennPlax, or O'Dell aquariums were, of course, as scarce (if not non-existent) as pink flying elephants on the dark side of the moon. Mario doesn't remember how a whole case of large aquarium silicone tubes got into his possession, but acquiring these was a great event in his life - he was going to master the art of aquarium building! He designed and made large wrought iron stands and designed tanks of various sizes to place on them. He purchased enough glass to build the aquariums and, silicon gun in hand, went for it. He says the first couple of tanks were kind of difficult to do but once he got the hang of it, it was a piece of glass - oh, I mean cake.

As to filtration, they did not have Aquology Power 600s nor did they use Magnum 300s (not even Magnum 69s, assuming they existed). Air pumps used were old air compressors converted to aquarium use and patched up with makeshift spare parts such as paper clips, wires, hair pins, and scrap pieces of metal (another cardinal rule they followed: Do not throw away any screws, bolts, nails, or metal pieces no matter how useless they may appear. At one time or another they will become useful!). Sponge filters used, obviously, were also home made out of foam rubber.

Still on the subject of filtration, Mario's fish has an advantage over most of ours. Water purification methods in Cuba were not those which we know today, using chlorine, fluorides, ammonia, etc, etc, etc. Consequently, Mario and Gloria set up a "slow drip" water system for their aquariums where their fish would have a constant supply of fresh tap water (chemical free) slowly dripping into their tanks. This as you all well know, is an ideal situation which we can fantasize about all day and all night. However, it is a fantasy which can only become reality if you have a natural well; and even so, what do the folks up north do about water temperature during the winter?

How about foods? What did they feed their wet pets? TetraMin? Freeze-dried krill? Plankton flakes? Spectra III? Frozen brine shrimp? Ruby Color Pride? Aquarian growth food? Well, if by now you answered yes to any of the above, then write me a note and I will furnish you with a free straight jacket (it's the one I wear every time I start pondering how I got into this crazy hobby. The jacket is slightly worn at the sleeves but it will still give you a run for your money when you bounce yourself against the walls of your fish room). No, they did not feed any of the above foods. Most of their foods were collected, not purchased. Mario's adult fish had a stape diet which consisted of a food which, I believe, if clean, uncontaminated, and fed every day would make our fish grow and multiply at such a rate that we would either have to declare bankruptcy (because of all the extra tanks and equipment we

would need) or become rich (from all the money received from the selling of the fry). Mario fed tubifex worms.

How Mario collected the tubifex worms is a saga in itself. The city of Havana has one main river which flows through it: Rio Almendares. Into this river flow all waste and garbage which people dump in it. Needless to say, it is not clean by any stretch of the imagination. Its bottom is covered by about two feet of soft mud and muck, through which Mario and a friend walked looking for worms. Mario would waddle in the river in waist-deep water and would run his hands through the muck feeling for tubifex colonies. When he did this, his mouth would be even with the dirty water surface. Mario's friend, a bit more daredevil than him, would dive into the dirty water headfirst looking for tubifex worms on the bottom of the river.

When they struck paydirt, they struck it big. At any one outing on the river, they would fill several gallon jars with tubifex worms. Some of the tubifex balls would be so large and heavy that they would need two hands to pick them up. Some of the tubifex they would sell to fellow hobbyists and the rest they would keep for their fishy friends. He would bring them home and place them under running water so that they would cleanse themselves. He would then spend the next two hours under the shower scrubbing and scrubbing some more, trying to get all the dirt off his body. Afterwards, in the tanks which had no gravel, he would dump a large ball of tubifex for the fish to eat all day long. In the tanks which had gravel he would place a porcelain dish on which he would place a ball of tubifex. He did this so the worms would not crawl under the gravel, die, rot, and pollute the water. Picture this: a running water supply and live food 24 hours a day - not bad!

The tubifex diet was supplemented with mosquito larva (which he grew by the thousands in his back yard in whatever container would hold water), earthworms, daphnia (in the cooler winter months), and bloodworms. When none of the above were available, cereals were substituted for fish foods and when these weren't there, bread crumbs were fed!

Raising fry, particularly angelfish fry, was also something special. The first days of their lives, they were raised in a cloud of infusoria so they had a constant food supply. Their most common method of raising infusoria was to sprinkle chicken droppings in a container filled with water and let it sit for a few days. Now answer this: in how many books have you read about this method of raising infusoria? Believe me, they swear by it. They were then fed rotifers and cyclops as a dietary supplement. Then came baby brine shrimp. You might now say to me, "Stop right there! I thought you mentioned earlier that brine shrimp wasn't available?" Well, you are right. However, Mario knew several people who traveled frequently to Germany and these people would occasionally bring him brine shrimp eggs. They were very expensive and very scarce, so the period or stage for the fry to eat baby brine was dramatically chopped to a few days. What did the fry eat after that initial period? Well, after I tell you, it will amaze you: they ate tubifex worms. Yes, folks, tubifex worms. Mario and Gloria would sit at a table with a piece of glass on top of it to serve as a cutting board, and a sharp razor blade. And yes, believe it or not, they would cut each tubifex worm into tiny pieces small enough for tiny fry to eat. When he told me this, I almost fell off my chair. Now, can you just imagine yourselves doing something like that? That's what you call a dedicated hobbyist with lots and lots of patience. I wonder how many of us could or would go through that much trouble for our fish?

As to livestock, many of the species of barbs and tetras they kept and bred were brought in from Germany by Mario's friends. Quite a trip for these little critters! But, they survived and were spawned in Cuba under I am sure different conditions than they were kept in Germany or, for that matter, different from how we would keep them in the U.S.A. The original supply of angelfish in Cuba dates back to pre-Castro days, since for many decades angels were the most favorite fish in the island.

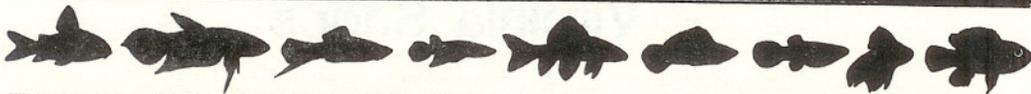
I hope by now I have accomplished my objectives for writing this article:

- 1) To offer the reader a view of certain problems (perhaps some unimaginable) fellow hobbyists face in their fervor of keeping fish
- 2) To offer the reader the solutions fellow hobbyists found to their seemingly insurmountable problems, and
- 3) By accomplishing objectives 1) and 2) above, perhaps to emphasize how extremely popular our hobby is, that even against terrible odds and the most adverse conditions, people will keep and breed tropical fish.

So, next time your brine shrimp eggs don't hatch, don't fuss; just take out your razor blades and some tubifex worms and chop away!

(reprinted from Tropical Journal, South Florida Aquarium Society)

POTOMAC VALLEY AQUARIUM SOCIETY



POST OFFICE BOX 6219 SHIRLINGTON STATION ARLINGTON, VIRGINIA 22206

APPLICATION FOR MEMBERSHIP

DATE: _____ 19__

NAME: _____

STREET: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: (HOME) _____ (OFFICE) _____

How long have you been in the hobby? _____

What parts of the hobby interest you? _____

What can PVAS do for you? _____

Have you ever belonged to another aquarium society? _____

If yes, which one(s)? _____

Individual annual dues for membership in the Potomac Valley Aquarium Society are \$12.00 per year, renewable each June.

Please hand this application to any PVAS member, or mail it to the address above. You will be contacted.

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ANIMAL EXCHANGE
765-A Rockville Pike
Rockville, MD 20852
424-PETS

AQUARIUM CENTER
Randlestown Plaza Center
Liberty Road at Offutt Road
Randlestown, MD
301-521-4529

CONGRESSIONAL AQUARIUM
Congressional Plaza
162 Congressional Lane
Rockville, MD 20852
881-6182

FISH FACTORY AQUARIUM
582 North Frederick Avenue
Gaithersburg, MD 20877
301-977-7500

GLENMONT TROPICALS
Glenmont Shopping Center
12345 Georgia Avenue
Wheaton, MD 20902
949-0344

MONTGOMERY TROPICALS
7845-G Airpark Road
Gaithersburg, MD 20879
301-670-0886

PETLAND
Briggs Chaney Plaza
13833 Outlet Drive
Silver Spring, MD 20904
890-0044

PETLAND
White Flint Plaza
5268 Nicholson Lane
Kensington, MD 20895
231-5216

PET MART - ROCKVILLE
2230 Veirs Mill Road
Rockville, MD 20851
762-3505

RICK'S FISH AND PET SUPPLY
36 South Market Street
Frederick, MD 21701
301-694-9664 301-831-6866

SHOWCASE AQUARIUM
11248-11250 Triangle Lane
Wheaton, MD 20902
942-6464

TROPICAL FISH WORLD, INC.
Walnut Hill Shopping Center
16529 South Frederick Avenue
Gaithersburg, MD 20877
301-921-0000

TROPICAL LAGOON
9439 Georgia Avenue
Silver Spring, MD 20910
585-6562

they deserve our support in return!

POTOMAC VALLEY AQUARIUM SOCIETY
P.O. Box 6219, Shirlington Station
Arlington, Virginia 22206-0219



ALWAYS
USE ZIP
CODE



THE POTOMAC VALLEY AQUARIUM SOCIETY WILL MEET ON THESE MONDAYS IN 1990:

8 JAN	9 APR	11 JUN	15 OCT
12 FEB	11 MAY	13 AUG	12 NOV
12 MAR	11 JUN	10 SEP	10 DEC

Meetings are held at the John J. Wood Facility, 3730 Old Lee Highway (Rt 237), Fairfax City, Virginia. Doors open at 7:30, and the meeting starts at 8PM.

ALL ARE WELCOME!

