Tampa Bay Aquarium Society

25 Years

St. Pete/Tampa Florida

THE FILTER

TBAS . . . Since 1992

July 2017
Volume 26 Issue 12

Hyphessobrycon amandae
Ember Tetra

Photo Mike Jacobs . . . 2017

July Meeting

Andres Ryan:
Super Local
Fish Farmer

July Bowl Show

1) Arts & Crafts (hand made)
2) Fish "T" Shirt (must be worn)
3) Aquatic Photos

TAMPA BAY AQUARIUM SOCIETY

"THE FILTER"

Tampa/St. Pete, Florida

TBAS

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TBAS

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Hello All – as you may remember from the June letter from the President, Dharmesh noted he would miss the June monthly meeting as he was taking his family on a vacation to Jamaica. As some of you may already know, tragedy struck while he and his family were away. Lightning struck his home, a fire ensued and eventually the fire reached his car in the garage. There was an explosion and the home was totally destroyed. If there is any silver lining to the event it is the family was not there and they are all safe. Our thoughts and prayers are with Dhmaresh, his wife and two children as they attempt to put their lives back together. We have told him that the club is there for him and his family – anything we can do will be done! Obviously, Dharmesh will be stepping back from his club responsibilities for the time being but we look forward to his return at a time he sees fit to do so.

The speaker for the July meeting will be Andres Ryan. He will be talking about his fish farm and some of the specialty species he breeds. We look forward to his presentation.

The past weekend the International Betta Congress (IBC) held their annual convention and show in Orlando. I know some of you took the opportunity to visit the show and you have to admit there were some spectacular fish being displayed. We had about 400 entries this year from all over the country. We also had entries from Asia (Thailand) and a number of entries from Europe. On Sunday some of us had the opportunity to purchase bettas from the auction. Next year's convention and show will be held in Mexico.

That's it for this month – look forward to seeing all of you at the July meeting.

Bill

Bill Little, VP TBAS

Xiphophorus hellerii
Firecracker Sword

R/O: All You Need to Know Part 2

by Joe Gargas

Reverse osmosis is a process whereby water is forced under pressure through .a semipermeable membrane, thereby filtering out the dissolved salts and most of the organic substances. Low molecular weight organic compounds and dissolved gases freely pass through the membrane. Dissolved gases will not remain present long enough to create a problem, and organic compounds will not normally be present in tap water from a city water utility. In any case, a carbon filter will ways be placed ahead of the membrane to protect it from chlorine. This carbon filter will absorb most of the organic compounds, which are not highly water-soluble. The membrane will also filter out such pathogenic organisms as viruses and bacteria. As material which cannot pass through the membrane must not be allowed to accumulate on its surface, it is necessary to continually flush the upstream side of the membrane with a flow of fresh feed water which will vary from two to five times the volume of desalinated water produced. This ratio is set at the factory and will never need to be adjusted by the user. The water flushed off the high-pressure side of the membrane is designated as brine reject, since it will be high in dissolved salts.

Common Misconceptions

Contrary to popular belief, reverse osmosis is not to be used as an aquarium filter! Such a filtering process would require that aquarium water be fed to the unit, filtered through the membrane and then returned back to the tank in .a recycle loop. Part of the water would go as brine reject, thus continually reducing the volume of .water in the aquarium as well as its ionic strength. The point would soon be reached where fish died of osmoregulatory stresses, or the tank would run out of water altogether. Also; the membrane would quickly foul without prefiltering.

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The second common misconception is that reverse osmosis is a water softening process similar to the common household water softener; Reverse osmosis is a rejection process, which removes dissolved salts and molecular compounds, producing softer water as a product. Water softening is accomplished by common household water softeners by exchariging sodium for the other cations.

The third misconception is that fish can live in totally desalinated water produced by a reverse OSmosis unit or a deionizer. The fact is that without some dissolved salts in the water, fish would not be able to retain salts in their blood and would soon die from osmotic stress as too much salt-free water entered the fish through the gills and skin.

Spiral Wound Membrane Design

All of the commercial and residential sized units on the market employ this design. It is also the only design that the aquarist will ever use. In this design, the membrane is spirally wound around a perforated hollow Center tube in the same way that paper towels are wound around a hollow axial cardboard tube. The difference is that there is 1) a coarsely woven mat for the feed water to flow through and 2) a watertight envelope of a semipermeable membrane enclosing a permeate transport layer through which the desalinated water flows. Both of these are spirally wound together, something like a jellyroll. One layer is the semi-permeable membrane, which are actually two sheets of membrane arranged face to face and glued together at their perimeter. This forms a watertight envelope which completely encloses the permeate transport layer; feed water diffuses inward leaving the salts behind on the outside surface of the envelope, while the desalinated water then flows through the enclosed permeate transport layer spirally inwards to the center pipe. Outside of the membrane envelope is the feed transport layer; this is a coarsely woven mat serving as a spacer through which feed water can freely flow between the spiral coils and across the outside of the membrane envelope. As the feed water is pressured radially inwards through the membrane, the salts are filtered out and the desalinated water flows into the permeate transport layer. Once inside the .permeate transport layer, the water flows spirally inwards towards the hollow center tube. This filtered water will be discharged from the center pipe as desalinated water. To prevent accumulation of dissolved salts on

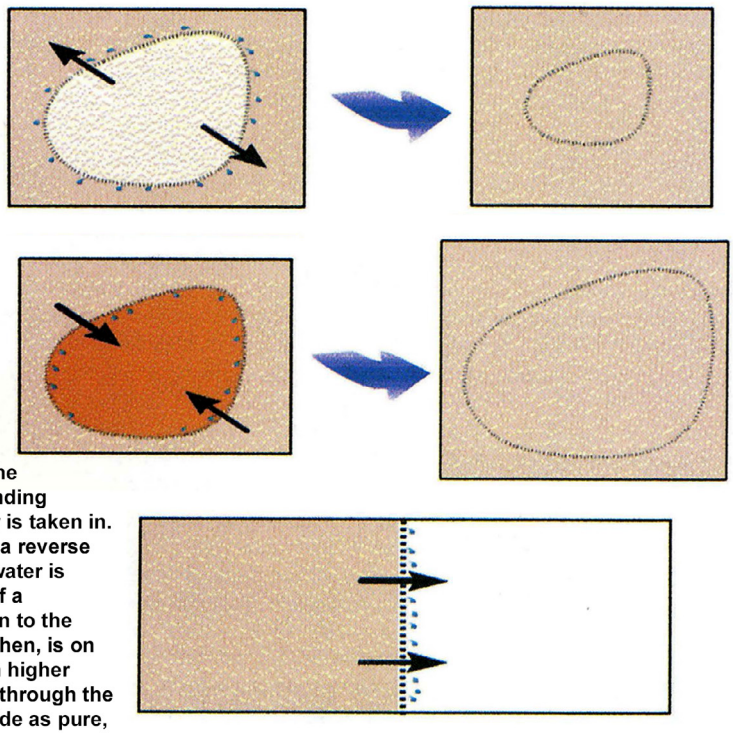
the surface of the membrane, some of the feed water flows axially downward through the woven mat of the feed transport layer; that is, it flows parallel to the center pipe to flush the accumulating salts off the membrane surface. This axial flow containing the accumulated salts is designated as brine reject. On units larger than 25 gallons per day, a feed water pump is required to raise the pressure on the upstream side of the membrane so that the volume of brine reject can be reduced. On larger units without the feed water pump, the brine reject/desalinated water ratio can be as high as 12 to 1, which means that it would take 13 gallons of feed water to produce one gallon of desalinated water with 12 gallons going to brine reject. Using a feed water pump with a dissolved solids total (TDS) of 2000 ppm; the brine reject/desalinated water ratio is approximately 1 to 1 with a 98% removal of TDS in the desalinated water.

In living systems, water moves by osmosis from a region of lower concentration to a region of higher concentration, as in the two situations depicted at the top.

In the first, a cell is located in water with a higher concentration of ions than exists within the cell (intensity of the coloration indicates level of concentration). Water moves out of the cell until the concentration within the cell membrane is the same as that outside, and the cell shrinks as water is lost.

In the second case, a cell is placed in a solution with a lower concentration than exists within the cell. Now water moves into the cell until the ionic concentration within the membrane equals that of the surrounding solution, and the cell swells as water is taken in.

The bottom illustration diagrams a reverse osmosis situation, where ion-laden water is placed under pressure on one side of a membrane, and the other side is open to the collection apparatus. The pressure, then, is on the "brine" side, that is, the side with higher concentration. Thus, water is forced through the membrane, collecting on the other side as pure, deionized water.



Membranes

The cheapest membrane is cellulose acetate, but it can be attacked

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by the metabolic activity of bacteria growing upon its surface so that the feed water must be sterilized. This is usually done with chlorine. This membrane has an average .rejection rate of 80% and it can operate over a pH range of 5.5 to 8.5 with a maximum of 1000 ppm TDS in the feed water. The cellulose triacetate membrane costs more; it can tolerate a pH as low as 4 and as high as 8, and it is limited to a TDS of 1000ppm in the feed water. The cellulose triacetate membrane does not require chlorine for sterilization; however, it can tolerate its presence. There is even a polyamide membrane on the market, but its pH range is too limited to be of use to us. Although them are various types of membranes used for reverse osmosis, the thin film composite is the one best suited for our purposes. This membrane has a maximum rejection rate of 98% and can take up to 1500 ppm TDS in the feed water; however, with a feed water charge pump it can take up to 4000 ppm TDS. It can operate over a pH range of 4 to 12, but it cannot tolerate more than 0.5 ppm dissolved iron. The only significant limitation of this membrane is the fact that it cannot tolerate chlorine. This is easily corrected by placing a carbon filter ahead of the membrane. A particulate filter is placed downstream of the carbon filter to remove any particulate carbon before it can reach the membrane. The author uses a carbon filter ahead of the reverse osmosis unit. Longer membrane l.ife can be achieved by placing a sodium softener upstream of the charcoal filter. This is recommended in cases where the feed water is higher than 220 ppm CaCO3 total hardness. Where iron in the feed water is too high, an iron filter should he installed to prolong membrane life. These are available containing disposable filter media as well as ones that can be cleaned with potassium permanganate in cases where the iron content is very high. In cases where an iron filter is necessary it should be placed ahead of the carbon filter.

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MEMBERSHIP DUES!!!!

Membership Dues for TBAS are due on the anniversary of your sign-up date every year. Please make sure you check the "sign-in" list on the table at every meeting to check your "Dues-Date" . . . Thanks!!!

USE PAYPAL ON THE TBAS WEBSITE . . . TBAS1.COM . . . !!!!!

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During the fall of 2016, I had the privilege of joining a group of fish lovers who were collecting fishes in Tampa Bay. Near the south end of the Skyway Bridge we were able to gather several species of fish and I brought home some of these including about a dozen Gulf Killifish (*Fundulus grandis*). When collected this appeared to be an unimpressive and bland gold-colored fish. Once settled in this fish transformed into a very pleasing bright gold spangling background on a brown of the fins with all yellow. Additionally I have noticed that the juvenile fish in my tanks have vertical bars that do not seem to be present in my adult Gulf Killies.

Fundulus grandis . . . photo by Tony Terceira

Although this is a brackish water species, because the fish were collected in full-salt saltwater I set up their new 55-gallon home as saltwater tank. Additionally, I added a large piece of driftwood that was collected in the same area as the fish to the bare-bottom tank. I made a point of collecting additional water at the collecting site to help set up the new aquarium in

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order to skip the timely cycling phase. A 50/50 mix of new saltwater and water from the bay as well as the driftwood helped to create a seamless transition with no loss of fish.

I quickly realized that with the volume of fish in the tank, the biomass was overwhelming the initial filtration. Thankfully the TBAS annual fall auction came at just the right time and I was able to acquire a suitable filtration system for the tank. In addition to the improved filtration, I regularly performed 25% water changes and even more regularly cleaned (or replaced) the filtration material in RO water. When the fish joined my fish room they ranged from approximately 3" to 4" and in the last nine months have grown to a range of 4"-6" on a diet of primarily pellets, black worms, and an occasional mix of other fish foods. Within the first few weeks after setting up the tank I added two large spawning mops to the center of the tank. I constructed the mops just like I would for standard mops used in small killie tanks, however I made these two mops about 12" long (about twice as long as normal). Instead of tying the mop to a Styrofoam ball I looped a strand of each of the two mops around the center brace that spans the middle of the 55-gallon tank. At that point I wasn't sure if this approach would work because the information that I found online pointed toward the use of thick spawning pads that would collect the eggs.

The Gulf Killifish (also called a bull minnow, mud minnow, or Cocahoe minnow) is widely used as a saltwater baitfish so there is plenty of information on the Internet about how this fish is bred in a large-scale or commercial setting[1)], however there is very limited information on how to keep or breed this fish in an aquarium setting. I was quickly reminded of Bill Shields' sage insight that he has shared with me many times when he said, "Remember, fish don't read." Clearly these fish didn't know what was written about them on the Internet and they immediately dove into the spawning mops and began depositing eggs. This created a regular supply of eggs for my long series of failed attempts to raise the fry. I found that wet spawning worked better than damp spawning (an approach often used

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with African killifish) and the best success was coming from picking the eggs from the mops (always found in or around the top of the mops) and placing them in a small glass bowl. The low hatch rate was still some progress so I was encouraged to continue experimenting.

After experimenting with new saltwater and aged tank water, I settled on adding regular (usually daily) water changes with aged tank water to the process, which notably increased the hatch rate. The next, and largest challenge, seem to be finding food for the newly hatched fry. Because my experience is with breeding freshwater fish, my usual tricks of greenwater, infusoria from live plants, and other similar approaches that relied on freshwater wouldn't work in saltwater I felt like I was back at ground zero. I didn't have a local source for saltwater plankton or rotifers and really didn't want to start a new hobby of raising these myself; I tried a range of other options. One of the failures was based on the thought that I could add a saltwater plant which might work like freshwater plants that provide a range of microscopic foods. With the best of intentions I purchased some Chaetomorpha (a macroalgae) to work as structure and a source of food for the little mouths of the fry. I gently rinsed the Chaeto to rid it of any large hitchhikers, while hopefully leaving some small organisms attached that could be food. After a day I noticed the expected little "critters" in the 2.5-gallon tank with the fry. A day later the critters were nearly the size of the fry and a day or two later I had a tank of happy critters who were, by then, big enough to wipe out the fry.

After several other attempts, that included partial successes (meaning growing out one or two fry from a batch), I settled on raising the fry in 2.5 and 5-gallon tanks with plastic plants and a small sponge-filter in each tank. My best success so far (realizing they are still at less than optimal growth) has been with various types of powdered food (as low as 5-50 micron) and newly hatched BBS. Although this approach has led to the breeding, hatching, and raising of multiple batches of fry, I would still strongly recommend following the feeding approaches for the fry that are listed in several available books on raising tropical saltwater fish. While I have raised many freshwater species of fish, this is my first successful

attempt at breeding a saltwater species and I am very interested in continue to learn about and breed more of Florida's native brackish and saltwater fishes.

1) See the link: http://www.lsuagcenter.com/topics/livestock/aquaculture/baitfish/minnows for a wide range of additional information on the Cocahoe minnow/Gulf killifish.

If you fancy youself a collector, or want to learn to collect, the following 3 photos are of the collecting trip the local Killifish Club - SKS - took with Bruce and others on the day he caught the *Fundulus grandis*. Bruce is in the red/orange t-shirt below. It was a great day for fishing the Skyway and an even better day because we were with really GREAT friends. Talk to either Bill Shields, Brian Skidmore, Ethan Skidmore or Mike Jacobs and they will give you the information about our club.

Trust me it's FUN!!!!!

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MONTHLY BOWL SHOW

January
1)
2) None - Plant Auction

February
1) Male Betta Splenden (single fish)
2) Open

March
1) Tetras, Barbs, Rasbora
2) Cichlids

April
1) Platies
2) Guppies

May
No Bowl Show
Swap Meet

June
1) Corydoras
2) Anabantoids no Bettas

July
1) Arts & Crafts (hand made)
2) Fish "T" Shirt (must be worn)
3) Aquatic Photos (personally taken)

August
1) Mollies
2) Rainbows

September
1) Swordtails
2) Pleco/Sucker type fish

October
1) Dwarf Cichilds
2) Angelfish

November
1) Goldfish & Koi
2) Invertebrates (Fresh or Salt)

December
No Bowl Show . . . Christmas Party and the 2016 Results of the Bowl Show!!!

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Bowl Show Results 2017

by AL

NAME	JAN-MAR	APRIL	TOTAL
Kent Sheets	42	14	56
Ethan Skidmore	39	15	54
Joshua McWilliams	6	13	19
Elaine Thyner	6	0	6
Missina Rurcaw	5	0	5
Danielle Lee	4	0	4
Grant Eder	1	0	1

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***Corydoras cortesi* . . . Cortesi Cory**

photo: Mike Jacobs 2017

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Supporters of TBAS

Tampa Bay Wholesalers: Tropical Fish

alphabetical order

1) 5D Tropical Fish
2) Segrest Farms

Tampa Bay Tropical Fish Farmers:

alphabetical order

1) Amazon Exotics
2) BioAquatix
3) Carter's Fish Hatchery
4) FishEye Aquatics
5) Golden Pond
6) Imperial Tropicals
7) Lile's Tropical Fish
8) V-W Tropicals

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Dharmesh Patel

V. PRESIDENT
Bill Little

SECRETARY
Kryssi Damico

TREASURER
Patty Moncrief

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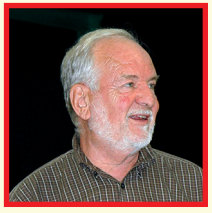

Hank Darin

Joe Gargas

Mike Jacobs

Bill Shields

Al Starkey

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TBAS

Tampa Bay Aquarium Society
St. Pete/Tampa, Florida

Website: www.tbas1.com

FORUM: www.tbas1.com/forum

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