V43#5

The DARTER

November/December 2017

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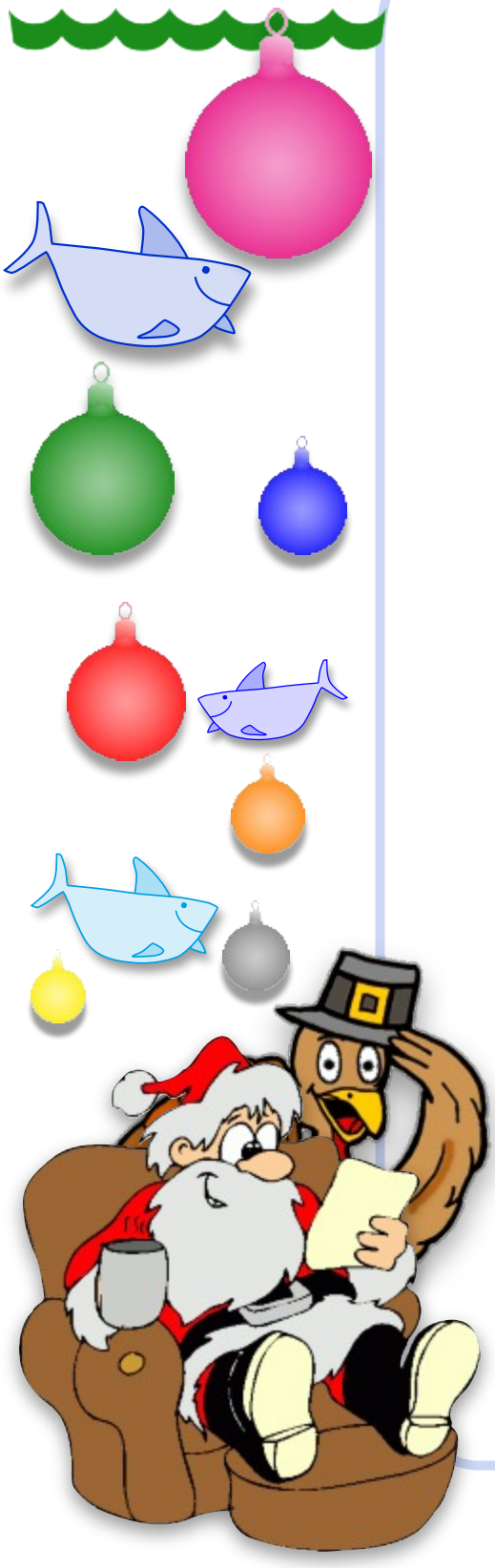
Volume 43, Number 6

FEATURES

The DARTER - November/December 2017

INSIDE THIS ISSUE



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FROM THE PRESIDENT'S TANK

Pat Tosie

What an interesting year we have had!

MASI had a very activity packed 2017! Host of the ALA in addition to our own Spring Workshop, Fish Show and Awards Banquet, 4 Auctions, 2 Bowling Partys, Social with near by clubs, night at the Drive in, Swap Meet, Summer Picnic and many informative speakers just to name a few. **We still have our Christmas Party coming up in December!**

Just like across the hobby, technology has changed for MASI in 2017. The Darter has been sent electronically all year to good effect. Give the Editor some feedback on how it has worked for you. We have also changed our auctions from a largely manual process to using barcodes and automating much of them.

We had several social events in 2017 but some were poorly attended. Think about how you would be more active in your club and let your Council members know how you feel or what types of events you would participate in.

We raised very good money for the MASI Challenge, probably the most we have in a while, to be given to the Stuart Grant Fund in 2017. PLEASE continue to bring donations to the meeting for Auction.

Yes, we lost several members but we have gained some new ones in their memory. Let's see just how much of the things we learned from those we lost we can transfer to the ones we gained!

This year will be one of our best!

Keep looking below water....

FROM THE EDITOR

Chuck Bremer

A great wrap up issue for 2017, Enjoy it!

Exactly half the pages have fishy articles on them. There are discussions of spawning 17 different species, many considered to be difficult to spawn and a BAP treasure trove.

In addition to some regular contributors we have a brand new Darter author with a very good article on native fish. He tells how to keep temperate climate fish indoors all year and trigger them to spawn using temperature and day length. Another recent new author continues to explore his tanks and their production.

MASI alone just hasn't been prolific enough to sustain a full publication so we dipped into surrounding clubs' newsletters. Was able to find an article by a recent MASI speaker as well as an article that may appeal to the Betta Fancier's in the club, among others.

One of those writers that wrote for us in 2017 will receive $100 for their efforts at the Spring Awards Banquet. If you wrote it could be you, if not compete for 2018 and help make the Darter even better. *...oh, and we could use some good cover photos too.*

Thanks to everyone who contributed in 2017!!

Hopefully we are able to keep The DARTER interesting and informative

Deadline for the January Darter is Election Day, Nov. 9th!

Send us an Article or Cover Photo!!

Send Feedback and Letters to the Editor to: editor@missouriaquariumsociety.com

MASI General Meeting - Thursday, Nov 16th!!

Cool Water Fishrooms

Michael Gaines is President and cofounder/instigator of the Northwest Arkansas Aquarium Society (NWAAS) and former president of the Heart of America Aquarium Society (HAAS) and served on the BOD for the American Livebearer Association (ALA).

Though a wide variety of fishes pass through his fishroom, there are always live bearers hanging around somewhere! He has bred around 70 species and is currently infatuated with barbs and rasboras.

Michael says "There are a lot more fish that work well in a Cool Water Fishroom than most fishkeepers realize! This has been one of my best received presentations."

7:30 PM Dorsett Village Church - 2240 Bennington Place, Maryland Heights, MO

November will be the last Mini-Auction of 2017

2017 MASI Dates to Remember:

11/19/2017	Auction	Crown Plaza Hotel	9:00 AM
12/2/2017	Council Meeting	Harrison Home	7:30 PM
12/21/2017	Christmas Party	Dorsett Village Church	7:30 PM

Christmas party… December 21!

Whacha Bringin'?

Santa Will be There!

Sign Up a Dish at the November meeting to help plan this Party!!

Monthly Bowl Show

Chris Mohrle

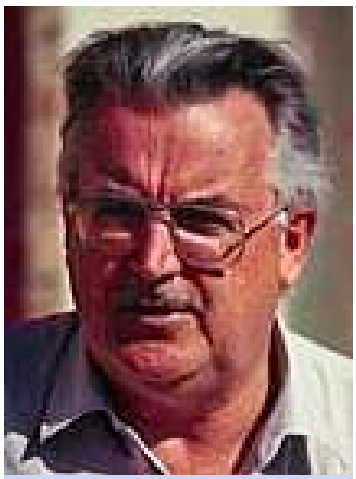
***NONE!* Why wasn't your fish entered?**

Al, Laura and Speaker Jim won the September Raffle!

Contribute to Help incentivise Ad Konings as a speaker next Spring!

MASI Challenge

2017 Net Busters



Stuart M Grant Fund

GOAL: $2000+

WWW

SUCCESS!!

Sunday, Oct 1st

Everything needed to set up & maintain aquariums for Beginner to Advanced Hobbyists

Specialty Vendors of Aquarium Equipment (lighting, tanks, filteration, etc.); Many Cichlids, Live Bearers, Tetras, Catfish, and other Fish; Plants; Decor and Foods

2017 MASI SWAP MEET

MISSOURI AQUARIUM SOCIETY

CROWNE PLAZA

11228 Lone Eagle Dr, Bridgeton, MO
Off I-70 by Lambert Airport











MASI SUPERBOWL 2017

October 19th

Champions!!

Class 1 - Old World Cichlid 2 Entries

Julidochromis Transcriptus	Jack Heller	1st
Yellow Lab	Al Grudzinski	2nd

Class 2 - New World Cichlid 5 Entries

Apistogramma Cacatuoides Orange Flash	Jack Heller	1st
Apistogramma Macmasteri	Ed Millinger	2nd
Pterophyllum Scalare	Laura Morrison	3rd

Class 3 – Rainbows 2 Entries

Boesemani "Aytinjo"	Gary Lange	1st
Psuedomugli Gertrude Aru	Laura Morrison	2nd

Class 4 – Killifish 7 Entries

Fundulopanchax Gardneri Inidere	Charles Harrison	1st
Fundulopanchax Gardneri Makurdi	Al Grudzinski	2nd
Epiplatys Lomottei	Jack Heller	3rd

Class 5 - Live Bearers (Fancy Fin) 4 Entries

Poecilia Reticulate Mosaic Dragontail Male	Rick Renfro	1st
Poecilia Reticulate Mosaic Dragontail Female	Rick Renfro	2nd
Guppy	Pat Tosie	3rd

Best in Show:

Jack Heller - *Julidochromis Transcriptus*

Peoples Choice:

Gary Lange - *Boesemani* Aytinjo

Class 6 - Live Bearers (Normal or Wild Type) 2 Entries

Poecilia sp.	Pat Tosie	1st
Poecilia sp.	Pat Tosie	2nd

Class 7 - Egglayers (Cyps. Barbs, Danios, etc...) 4 Entries

Long Fin White Cloud	Chris Mohrle	1st
Rosie Barb	Pat Tosie	2nd
Long Fin White Cloud	Chris Mohrle	3rd

Class 8 - Egglayers (All other species) 5 Entries

Betta Splendens Red	Al Grudzinski	1st
Betta Splendens Champaign	Al Grudzinski	2nd
Betta Rubra	Gary Lange	3rd

Class 9 - Catfish (Cory, Aspidoras, Brochis, etc) No Entries

Class 10 Catfish (All other types) 7 Entries

Green Phantom Pleco	Pat Tosie	1st
L-204 Pleco	Evan Keim	2nd
Synodontis Petricola	Chris Mohrle	3rd

The annual Fall Auction is this weekend!!

MASI AUCTION MESSAGE

Mike Hellweg

The Annual Fall Auction is November 19, 2017. I will have bags at the general meeting this week.

We will need volunteers to help out starting at 9:00 am and running all day. We are short a couple of our regular workers as they will be at the annual OCA Extravaganza. Unfortunately, the conflict in dates couldn't be avoided.

We will be going back to a tank raffle at this auction and trying a different size tank. I would appreciate feedback on whether or not you would like to continue with a 75 gallon tank in the future, or if you would like to rotate tank sizes, or if you would like something else entirely, like filters, heaters, etc. The folks at Tropical World Pets on Watson Road will be supplying the tank. Be sure to thank them for their support. The raffle is a major source of funding for the club, and helps to cover the cost of the room.

As always, the folks at the Crowne Plaza will be selling sandwiches, chips, nachos, and drinks right outside the door, so there is no need to head out somewhere else for lunch.

Mike

auction@missouriaquariumsociety.com

MASI Fall Auction
November 19, 2017!!

Verbal & silent auctions running throughout the day!

CROWNE PLAZA

11228 Lone Eagle Dr, Bridgeton, MO
Off I-70 by Lambert Airport

500-800 Lots of Aquarium FISH, Plants, Equipment, TANKS, Fish Food, Décor and all things Aquarium!!

Viewing 10:00 AM Auction Begins at 11:00 AM

Contact Info: *auction@missouriaquariumsociety.com*

MASI 2018 Calendar

Jan 18	Council Meeting	6:45 PM
Jan 18	**General Meeting**	**7:30 PM**
Jan 27	Council Meeting @ Heller's	7:30 PM
Feb 11	**Auction**	**9:00 AM**
Feb 15	**General Meeting**	**7:30 PM**
Feb 24	Council Meeting @ Bremer's	7:30 PM
Mar 15	**General Meeting**	**7:30 PM**
Mar 18	Council Meeting @ Theby's	7:30 PM
Apr 19	**General Meeting**	**7:30 PM**
Apr 21	**SWAP**	**9:00 AM**
Apr 21	**Awards Banquet**	**PM TBD**
Apr 22	**Auction**	**9:00 AM**
Apr 28	Council Meeting @ Lange's	7:30 PM
May 17	**General Meeting**	**7:30 PM**
May 19	Council Meeting @ Hughey's	7:30 PM
Jun 21	**General Meeting/ Elections**	**7:30 PM**
Jun 30	Council Meeting @ Tinker's	7:30 PM
Jul 19	**General Meeting**	**7:30 PM**
Aug 12	**Auction**	**9:00 AM**
Aug 16	**General Meeting**	**7:30 PM**
Sep 20	**General Meeting**	**7:30 PM**
Oct 7	**SWAP**	**10:00 AM**
Oct 18	**General Meeting/ SuperBowl**	**7:30 PM**
Nov 11	**Auction**	**9:00 AM**
Nov 15	**General Meeting**	**7:30 PM**
Dec 20	**Christmas Party**	**7:30 PM**

All General Meetings Are held at 7:30 PM Dorsett Village Church - 2240 Bennington Place, Maryland Heights, MO

We've a Busy Year Planned!!

MASI Spoken BAP Reports

Spawning Difficult Fish

October 19th, 2017

Various Authors

Deb Sultan - *Synodontis multipunctatus* - Cuckoo Catfish

- **From Lake Tanganyika**, pH 7.5-8.5, 15-35 dH
- Live in the Benthic to littoral zones over a sand bottom
- **Named for the Cuckoo Bird** that acts as a parasite of other bird species for reproduction
- During the breeding ritual of the cichlid host the Multi swoops in and eats the eggs of the host between the fertilization and pickup and leaves its own eggs for pickup instead.
- In the parasitic breeding cycle the fry hatch in 2-3 days then proceed to eat the unhatched fry of the cichlid mouthbrooding host
- **Used *Aulonocara jacobfreiberrgi* as the host.** Found they could be used once but learned and were difficult to use as repeat hosts. Perhaps also best to use a non-Tanganyikan cichlid, ie: one from Victoria or Malawi, as they have less innate avoidance of the *Synodontis* parasitic process.
- Placed in a 4', 75 gallon tank over a sand bottom with pH 8.3 and 12 dH and fed worms (red worms or black worms) twice per week to condition.
- **This species is not an obligate parasite** but have also been recorded reproducing by means of egg scattering in the absence of parasite hosts.

Guy Tinker - *Enantiopus melanogenys* - Tanganyikan Sand Sifter

- **Also from Lake Tanganyika**
- There are two similar species one with a black chin and one with a yellow chin. *Melanogenes* has the black chin.
- **Eat small crustacea and ostracods** from the sandy bottoms. Create a nest/bower as shallow depression in the sandy bottom as a spawning site. It is a shallower nest than many other bower building species.
- With 2 pair in the tank the adults became confrontational and aggressive. Solved this issue by placing 3 rocks in the middle of the tank to block the view and mark artificial territories.
- Used a tank at 77 degrees F. They are probably spawn able at lower temperatures as they are found down to 40 meters in the lake.
- As a mouthbrooder the adults have a long holding period compated to many mouthbrooding cichlids.
- Fry are rapid growing and stay in a school after release.
- **The fry eat a lot.** Guy moved them to a breeder box after the first few days.
- Guy found them easy to trigger to breed but fry survival was the key to raising them.

Mike Hellweg - Kuhli loach - 3 Pangio species- *P. malayana, P myersi & P. Kuhli*

- **1st success was with a 10 gallon tank** with pea gravel substrate over an underground filter that had been set in a corner and not cleaned. He did see them spawn and the eggs are green when laid and first float but then sink to the bottom. The adults intertwine in the breeding embrace.
- Now breeds them in conjunction with a course Hamburger Matten Filter (HMF). It has a protected plenum behind the filter where detritus and the fry/juveniles accumulate. To collect the fry/juveniles he siphons them out every few months.
- **When buying wild caught Kuhlis**, they usually come in as mixed lots of similar species that

may have up to 5 species intermixed. Separate best based on the band shapes - some differences in species are subtle and easily overlooked.

- Sex by looking for a heavy bodied female with the green eggs showing through the abdomen. St Louis water is just fine for spawning, no changes necessary.

- **Feed Grindal worms and black worms** with some micro pellets a couple of times per week to condition. Fry get microworms and Baby Brine Shrimp. Best with frequent large water changes in a dirty tank (no siphoning of detritus/mulm from the bottom).

Mike Hellweg - *Akysis vespa* - Wasp Cat Fish

- **One of the smaller Bagrid catfishes** from South East Asia

- They like to hide in the sand with only the eyes showing. They have a black and yellow pattern giving them their common name.

- They also, like many catfish, have stinging spines.

- Mike feeds this species Grindal worms daily.

- **His initial spawn went undetected for some time.** The catfish were kept in a tank with a sand bottom and well fed but no fry were seen so he considered them a failure, caught the adults out and repurposed the tank for other species.

- The tank first housed one of the Apistogramma species who spawned several times but could not overcome disappearing wrigglers. The tank was sequentially repurposed with other increasingly larger cichlids, such as Honduran Red Points, always with the same result. The wrigglers disappeared over time, increasingly speedily.

- While feeding the current resident species he noticed the sand moving and discovered that Akysis juveniles were in residence. They would emerge for black worms placed on the sand.

- **Sex this species by looking for a slender male** and a more robust female. St Louis Water is also fine with no modifications.

- (Notes on Mike's usual spawning set up: He places new species in a bare bottomed tank with driftwood, live plants- such as java moss and java fern, and a flower pot saucer filled with sized different rocks and objects to provide a spawning choice. In another corner of the tank he places a similar pot saucer containing sand as an alternative media. In the tank he also places a sponge filter and/or HMF as many fry survive by grazing on the rotifers and other small creatures that colonize it easily.)

Pat Tosie - the small Goodeid Livebearers: *Girardinichthys multiradiatus* "San Miguel" & *Skiffia multipunctata* "Lago de Camacauro"

- **Used St Louis water with no problems.**

- **These species "DON'T LIKE HEAT!!"** The overall key to breeding them is to keep them cool. At higher temperatures they waste away and die. He had always been told that but thought he could keep them in his normally heated fishroom anyway- with no success.

- To overcome the heat Pat kept these species in an unheated portion of the basement that was in the mid 60's to very low 70's F.

- After one can overcome the temperature barrier, spawning is relatively straight forward. He kept them in a 2 ½ gallon tank full

of plants and fed Cobalt flake food, microworms and Brine shrimp for variety. Fry were fed microworms and Baby Brine Shrimp (BBS).

- **Lots of patience is required** as these species have gestation periods of nearly 3 months.
- The tanks were lit 24/7 and larger tanks had power filters, ie: Emperor 400's, most tanks with a substrate.
- Pat recommends using a one species only tank for the goodeids.

Jack Heller - Peruvian Madre de Dios Region Annual Killifish - *Moema quiii, M. rubrocaudatus & M. Kenwoodi*
(See an additional in-depth article on techniques for spawning these fish with notes on other smaller species elsewhere in this issue.)

- **These are annual killifish** that appear in the rainy season in temporary pools. The native term for these fish is "Cloud Fish" as they seem to appear from the clouds during the rainy season. These species live only 9-10 months so spawning should occur immediately after they reach maturity.
- **Jack uses "Eco Earth" coir** from the reptile section of the box pet stores as a substrate. He uses 33% RO + 66% tap water in the spawning tank.
- He uses a $1.25 clear glass from World Market or plastic cups with a top to provide a spawning site. They are checked after 2 weeks for eggs. When eggs are present he uses a canning bag to dry the eggs and coir. He uses a chamois to find and remove or dry the eggs which show up as golden jewels. The media with eggs is placed into a ziplock bag in the dark and labeled. 7 months at 75 degrees is the base incubation period.
- **Then they are checked and rewet if eyes can be observed.** They hatch within 6-24 hours. If not he places in a container and submerges to the bottom of a 55 gallon tank to let the increased pressure trigger the reticent eggs to hatch.

- Fry are started with micro

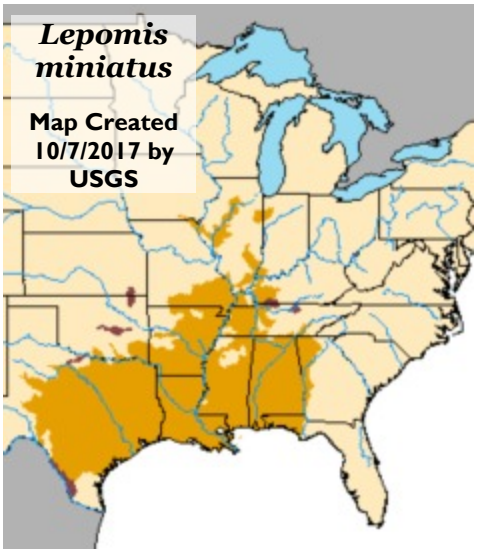
Breeding the Missouri Native Redspotted Sunfish *Lepomis miniatus*

-

By James E. Wetzel

MISSOURI WATERS SUPPORT 18 species of sunfish of the family Centrarchidae. Of these, panfishes of the genus *Lepomis* are particularly well suited for the aquarium, where in addition to a range of colors, they also exhibit interesting behaviors.

A personal favorite of mine is the Redspotted Sunfish, Lepomis miniatus, also known as the Stump Knocker for the drumming sound produced by courting males. The Redspotted Sunfish (RSSF) is most frequently encountered in low gradient streams that support at least some submerged vegetation, particularly like those of the Missouri Bootheel.



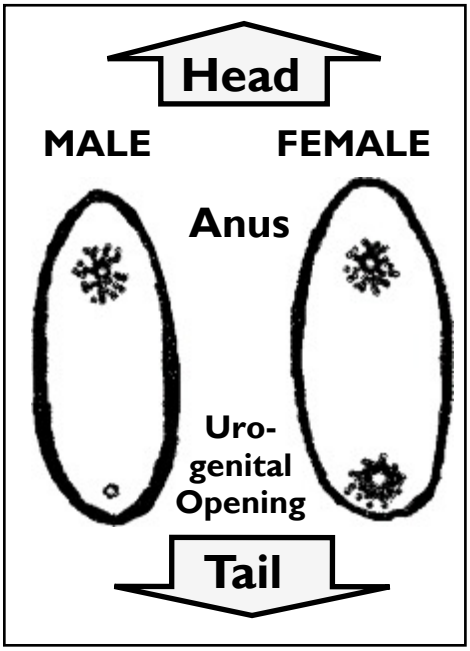
The RSSF is relatively chunky when compared to more familiar Northern Bluegill, *Lepomis macrochirus*, and is small to intermediate with respect to size compared to others in the genus *Lepomis*. The RSSF seldom exceeds 6 inches in total length and is capable of maturing sexually at 2 inches even though breeding does not typically begin until females are at least 3 inches and males when about 4 inches.

RSSF have a base coloration of brown with darker brown freckling on opercula and an iridescent blue patch below the pupil on eye. The blue may be an indicator of sexual maturity. Fish greater than 3 inches develop spots on flanks for which the species is named. Spots of males are orange-red to red while females are barely evident as pale yellow to orange. Time of year

Iridescent blue patch below the pupil on the eye.

and diet can influence intensity of spot coloration in both sexes.

Basic husbandry is like that of neotropical cichlids that are middle of the road in terms of disposition and quickly loose fear once they associate you with food. The RSSF in nature consumes a range of animal prey that readily fit into the fish's mouth and they will sometimes purposely consume rather large pieces of vegetation (personnel observation). In the aquarium, they readily train to consume dried feeds. Diets formulated for carnivorous cichlids are suitable as a base diet that can be supplemented with less processed alternatives such as freeze-dried, frozen and live forages. The RSSF will typically eat many small meals in a day, but can consume enough in one meal to support growth and a modest level of reproduction when diet quality is high.



When immature and / or when temperature is below typical room temperature, RSSF show minimal inclination for aggression towards other sunfish. Still, groups of six or more prevent pecking order leading to damage of subordinates when tank used is small. Any sunfish of the same genus can be used to distract aggressors.

When it comes to actual breeding, the RSSF do not form custodial pair bonds, rather parental investment post-conception is exclusively by a single parent, the parental male. Not all male parents are parental in sunfishes- but that is for another day.

Animals close to ripe can be distinguished by relative size of urogenital opening relative to the anus, see Figure. Urogenital opening of the male is smaller than anus but the female's the urogenital opening is larger relative than the anus.

Typical of the sunfish family, male RSSF prepare the bowl-shaped nest site by tail-sweeping and occasional moving of some items using their mouth. They are the only species I have seen doing this. Normally nests are located in water ranging in depth from 18 inches to 4 inches. They will readily create a nest in the substrate of an aquarium and will in a pinch even spawn on a bare bottom. Males also like to defend a volume centered on nest that naturally exceeds a 5-foot radius around the nest. This can be a problem when females unable to get away from advances can be damaged or killed and male kept exhausted so he cannot complete breeding cycle. Breeding can occur spontaneously in a tank setting although risk to breeding fish, especially females, and fry are very high without intervention.


Back plastic oil pan nest about 1/3 full of pea gravel.

Here is described an approach readily adaptable to aquariums that greatly increases control, thus limiting risk to all fish and greatly increases the number of fry that can be successfully reared to the point they can consume dried feeds. The key is employing a partition and, when needed, isolating early free-swimming stages from all but possibly the parental male.

Conditioning is often easier when temperature is 68 to 72 °F -just below that optimal for breeding. While the conditioning is focused on gaining weight the photoperiod can be 12 hours light: 12 hours dark. Intensity or spectrum does not appear important. My preference is to feed at least twice daily to apparent satiation at roughly 12-hour intervals using pellets with occasional substitution with live forages (i.e. meal worms, crickets). The objective for conditioning is to get females with distended abdomens even when not in a satiated state. Do not use for breeding attempts females lacking the distended abdomen at the end of the conditioning phase.

Sexes can be commingled during conditioning. Once fish are conditioned, select a good looking male that is ideally a little larger than the

females. Females can be kept together although they are isolated from direct contact with males of all sunfish species. Then move the photoperiod and temperature for the aquarium(s) involved in subsequent steps into the range optimal for breeding. My default breeding photoperiod is 16 hours light: 8 hours dark.

That dark is not totally dark is key; otherwise male may not come into breeding condition or may not stay with the breeding effort through completion. A night light shining on the tank indirectly enough to see the fish is usually enough to keep male in the game. Otherwise keep the tank light on 24 / 7. The temperature range targeted for breeding is in the mid to upper 70's °F.

The breeding setup starts with a cycled tank, with or without a particulate substrate. The smallest tank size I like to use is a minimum of 20-gallons (30" L x 13" D x 13" W) with the length divided roughly in half using a removable partition allowing diffusion of water between the halves.

The male's compartment is relatively open and receives the male and a fabricated nest filled ½ to 2/3's full with pea gravel, typically placed in a corner opposite the partition. The other compartment for female(s) has lots of cover in the form of plants, driftwood, or rocks.

The male is usually installed a couple days ahead of female(s) so he can settle in. Sometimes he will spontaneously begin nest construction. He needs to be calm when you approach the tank. When female(s) are added to their compartment you can expect a change in the male's behavior involving his coloration and activity levels. Male can respond to female presence by simply being in the same water without line of sight.

After a couple more days I remove the partition and watch the action for 15 minutes. If all goes well the male will at least begin courting female by swimming almost violently around the tank in an exaggerated manner with a tail wagging "dance" as he returns to the nest. If the female is ready she will swim directly to the nest and spawning will get under way within 15 minutes. Sometimes she will require a little time and may almost appear to be driven to the nest.

What you want to see is the female present her belly to the male every time he approaches her. Presenting her back or a female hiding means it is time to replace the partition with the male on the nest side and the female(s) on the other. When the spawning bout gets underway I stay with the fish until the females leaves the nest for at least 5 minutes. A fleeing female can be damaged if she cannot hide at this time.

During the spawning the fish swim in concentric circles with the female on the inside. As the fish swim the female periodically leans with her ventral region coming into contact with the males flank and she shudders releasing eggs. The eggs / embryos fall into nest where they adhere immediately to the first surface they contact. Upon completion of the spawning bout the nest can contain anywhere from 500 to a couple thousand eggs. Removal of female(s) to another tank can be immediately after a spawning bout until about 5 days later but must be prior to exodus of newly free swimming larvae up into the water column. All females will be a threat to offspring.

Development of young is rapid and is better with a current like provided by a fanning parental male. Embryos typically are hatching by 36 hours post-conception into prolarvae and take roughly 5 additional days to exodus the substrate as larvae. Larval exodus typically occurs in mass shortly after dusk which is also when paternal care typically ends. Filtration intakes need to be covered at this time to prevent impinging of larvae. Starting the day of substrate exodus, freshly hatched brine shrimp (BBS) are supplied at least twice daily for the next 14 to 21 days. I like to feed once in the AM before work, again at end of the work day, and a final time just before going to bed.

Ideally the BBS are less than 6 hour post-harvest before being fed-although one harvest per day gives satisfactory results. Starting at least a couple days before cessation of BBS start co-feeding with a dried feed formulation suitable for fry. I like to feed the dry feed a few minutes before the BS while co-feeding. Fry should approach your hand by this point each time they are fed.

I co-feed for a week before ceasing BS feedings. Then increase feed size as needed using formulations typical for cichlids of the same size. The parental male can be left with free-swimming offspring even though they normally disperse. Under exceptional rearing conditions the offspring can approach breeding size within 120 days.

Adult photographs Courtesy of Ben Cantrell

The Three Moemas: A Successful Breeding Program

By Jack Heller

Companion article to the *"Photo log of Annual Killifish collected during a rainy season trip to Peru"* published in the September, 2017 issue of the Darter

A RAINY SEASON COLLECTING trip to the Amazon rain forest in southeastern Peru in February of 2016 resulted in the capture of three major species of annual killifish that I had long pursued. These species were *Moema quiii*, *Moema rubrocaudatus* and *Moema kenwoodi* (Fig. 1-3).

My host in Peru had these fish shipped to me shortly after I left for home. Needless to say, I was very excited about the impending arrivals and I immediately started preparing my tanks to receive them. These three Moema species, unfortunately, rarely survive, under the best of conditions, for more than a year. so I chose to set them up for breeding as quickly as possible.

For housing I filled five of my standard ten-gallon tanks and three of my eighteen-gallon breeder tanks with 50% R.O. water, added oak leaves and alder cones to further soften and acidify the water, and finished filling the tanks with treated tap water. The temperature in these tanks was seventy-three to seventy-five degrees F. DH and KH ran between three and five degrees (fifty-four to ninety ppm GH/KH). These tanks had already been set up and running for a week and a half when I received the fish, so they acclimated quickly and easily.

These annual killifishes are known to be substrate spawners and were expected to respond to the peat spawning method using a container of peat submerged in the breeding tank similar to other annual killifish. However, knowing that these species were among the larger annual killifish, I used breeding containers made from five and a half inch tall, thirty-two ounce deli containers with a hole cut in the lid large enough for the fish to easily swim through without scattering the medium all over the tank (Fig. 4 deli cup and glass container, both half filled with coir). For smaller species I often


Moema kenwoodi

use a small spherical glass container that I get at the craft store for a few dollars. These little containers have a capacity of sixteen fluid ounces, and I place one cup of coir in them. They do a relatively good job of containing the medium so that not too much of it ends up on the bottom of the tank (Fig. 4).

The medium I like to use is not peat moss but rather boiled coir or coconut fiber usually found in the herp section of the large pet stores and goes by the brand name "Eco-Earth".

Coir has two advantages over peat. It is denser than peat and the spawning container does not need to be weighted down with marbles or rocks in order to prevent it from floating. The container, when half filled with coir, will stand in the aquarium on its own. The second advantage of coir occurs when the coir is rubbed in a chamois or pigskin to further dry it one can see eggs that are present. Since coir is courser than peat moss, it does not cling to the eggs as readily as peat and it is far easier to find the eggs (Fig. 7 rubbing coir in chamois and revealing eggs).

Coir has worked so well for me that it is currently the only medium that I use for spawning annual killifish.


Moema rubrocaudatus


Moema quiii

Fig. 4 Egg collection container placed in tank

To prepare the coir I boil the "Eco-Earth" in a ceramic coated kettle for about ten minutes, let it cool, and then swirl it in a bucket of water before spooning it into a net, running the net under water to wash out the smaller particles, squeezing out the excess water and storing the coir in a plastic jar.

Swirling the medium in a bucket before spooning it into the breeding containers causes the sand mixed with the coir to separate and sink to the bottom of the bucket Making the medium in the storage jar much cleaner and easier to use. I use large plastic storage jars of the type that come with cookies or large pretzels bought in bulk from the big box stores. These jars hold twenty-two to twenty-five cups of coir each and have a screw-on lid. (Fig. 5 include bag of coir, stoneware kettle and storage jar).

Once this medium is prepared and stored, each deli container is filled half full with medium and topped off with water from the tank. Snap on the lid on and hold a small lid from a margarine tub over the lid hole so medium won't escape the hole into the tank when I submerse the container. Removing the small margin tub lid very slowly and carefully from over the hole in the lid of the deli container prevents most medium from exiting the container into the tank. Give the medium a minute to settle, partially lift the lid off the deli container gently and let the last of the air bubbles float out of the container before snapping the lid back into place (Fig. 4 container being placed in tank and container sitting in tank).

After the spawning container has been in the tank for a day or so, one can tell if the fish have found their way into it, even if never seeing the fish in the container, because the coir's surface has obviously been disturbed.

With either the large containers or the small ones, I harvest the coir every two weeks. I squeeze as much of the water out the coir as possible by pouring it into a canning bag and squeezing it over a larger container.

I have used a canning bag for many years to squeeze water out of the spawning medium because canning bags are constructed for durability and hold up far better than fish nets during this procedure. After squeezing the moisture from the coir, it is laid on a chamois or pigskin and rubbed thoroughly to further dry at which time one may also see if there are eggs.

Two cups of the coir medium, or one of these deli containers half filled with coir, is a substantial amount of medium to rub in a chamois, so I split the volume in half and only rub half of the coir at a time. I don't do any further drying of the eggs of this group of species, but place them directly into the Ziploc bags for incubation. This practice has worked well with rainforest fish, but with annual killifish from other more arid regions of South America, I do lay

Fig. 5 Bag of coir, stoneware kettle and storage jar)

the medium on newspaper for a further drying period.

If eggs are found, I then place the coir into a one-quart Ziploc freezer bag and label it with the name of the fish and the date of harvest. I prefer freezer bags for storage because they appear to do a better job of retaining moisture

Fig. 6 Model 1602N Thermal Air Hova-Bator

during the storage period.

The label on the bag includes the complete name and location of the species and the date that the peat was harvested. I also note a rough approximation of the number of eggs observed. After placing this information on the label, I then record it in my notebook with a sequenced control number and check the notebook to see how long I have incubated the species previously- if that information is available, and the number and quality of fish hatched.

If historical information indicates substantial and healthy hatches, I use the historical incubation period to suggest a hatch date for the recent bag of eggs and also record this information. I then enter the control number and suggested hatch date on the label and mark the calendar in my fish room with the control number and the suggested hatch date. For safety I also mark the calendar four weeks prior to the suggested hatch date so I can remember to check the eggs prior to that hatch date.

The bags of coir are laid sequentially in my incubator. The incubator is a model 1602N Thermal Air Hova-Bator, a small styro incubator with a 25 watt heating unite which is commonly used to incubate herp eggs or bird eggs. It holds several dozen bags of coir when stored vertically, and does a good job of holding a temperature setting (Fig. 6).

Trial and error has shown that the optimal temperature for these eggs appears to be seventy-eight degrees F. At this temperature, the three Moema's are usually ready to re-wet in six and a half to seven months. I check the eggs around the estimated hatch date, and if the eggs are eyed up and the embryos appear ready, I re-wet them. Where I have no history with a species- as was the case with the Moemas, I consult Dr. Roger Brousseau's book, “A Hobbyists Guide to South American Annual Killifish” or Frans Vermeulen's book, “The Killies of the Lost World” and Frans's web site, "itrainsfishes.net", plus other literature available on the web. These books have hatching guidelines for several species and at least one of these sources will generally provide me with approximate incubation periods to show when to start checking the eggs.

When developed eyes in the eggs are visible and the coir is ready to wet, I use a plastic shoe box, pour the coir in the box, stick the plastic bag that held the peat under the show box, so I remember which bag is being re-wet, and add tap water that has been prepared by mixing in a gallon milk jug with a teaspoon of non-iodized salt and a pinch of Flubendazole.

Fig. 7 rubbing coir in chamois reveals the eggs

Then I wait. After following the above steps, I can usually expect the first hatchlings to show up in a few hours. In the case of the three Moemas, these good size fry and can be quickly spotted in the corners of the box and on the surface of the coir once it settles at the bottom. Separate the fry from the medium with a fine tipped bester and place them in a container with a capacity of roughly 24 fluid ounces, such as a CoolWhip container. If the hatch is exceptionally large, as is usually the case with a *Moema rubrocaudatus* hatch, I divide the hatch between two such containers. I then label the container with the information from the bag, including the sequence number and enter the information on the hatch date, quantity and quality of the hatch in my notebook.

After setting the fry up in containers with hornwort or java moss

from an active tank and some small rams horn snails, I feed them with a mix of microworms and paramecium, and later in the day, with baby brine shrimp. I follow this feeding pattern for around two weeks and then dispense with the paramecium, retaining the other two foods. I also add some daphnia to the container after the first week to filter the water and provide a constant source of food. I do a partial water change every two days for the first two to three weeks.

When the fry are large enough, generally in about three weeks, they are moved to ten-gallon tanks that have had the water level drawn down to half. I add a few teaspoons of non-iodized salt and a pinch of Flubendozol and plenty of hornwort, java moss and rams horn snails, and introduce grindel worms along with baby brine shrimp.

These Moemas grow rapidly and start to sex out in four to six weeks. The sexes grow at different rates, and the males can be extremely aggressive so separate them by size and sex as soon as possible. This is particularly important for *Moema quiii*, which is the largest, and definitely the most aggressive of the three. I emphasize that, to continue the species, these fish should be set up to breed as soon as they appear large enough. It is important to match males and females by size as closely as possible, and to pick the healthiest, fullest bodied fish for breeding.

The eggs of these Moemas require a great deal of patience during the long incubation period and the fish require a high degree of commitment during the raising and breeding process, but these efforts are very rewarding when these beautiful and vibrant species attain maturity and again start spawning the next generation.

Breeding the US Native

Dwarf Banded Pygmy Sunfish

ELASSOMA cf. Zonatum

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By Mike Huber

DWARF PYGMY SUNFISH are found through out the south eastern United States.

The pygmy sunfish comprise a genus of several species complexes of small fishes, but despite the common name, they are not actually sunfish. True representatives of the sunfish family are the bass and bluegill. Once it was thought the pygmy sunfish were cichlids but it was also thought they where closely related to killifish. Currently they are in their own family ELASSOMATIDAE.

Pygmy sunfish inhabit slow flowing, weed-choked areas of water and can be found in drainage ditches, swampy areas, or streams. They are fairly small fish,with all species reaching only about an inch or so in size.

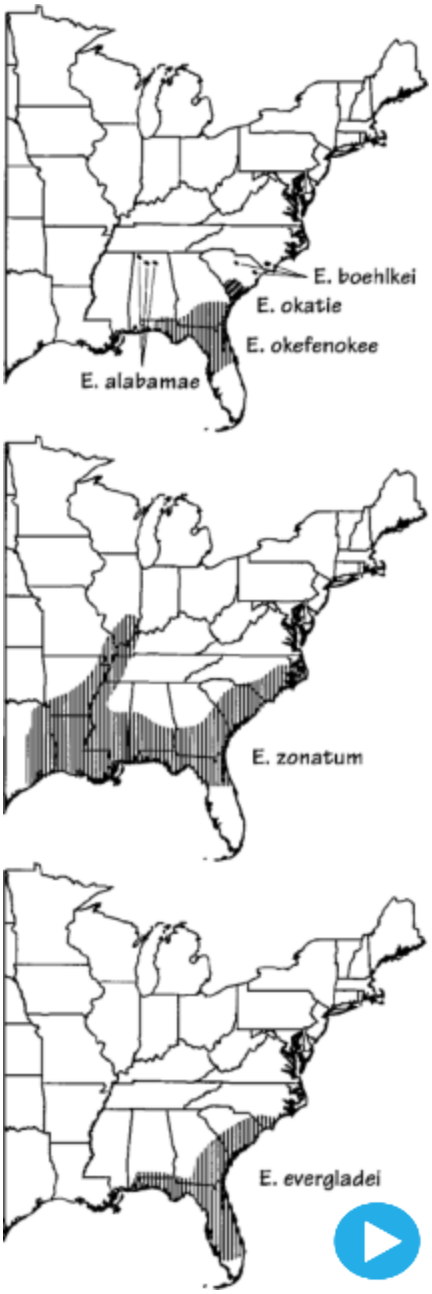
They can be difficult to feed in the aquarium, demanding live food only.

I feed them brine shrimp,micro worms, banana worms, daphnia, cut black worms, and when available mosquito larva.

When fed bigger, whole black worms they became used to eating in one place in the tank when fed often. I tried frozen food and over time they started to eat that as well. When I put some baby Plecos in the tank with them and feed the plecos pellets of spiralina and omnivore pellets I noticed the sunfish eating the omnivore pellets after they had softened. The pellets where fed in the same place I put all the worms and frozen food.

The pygmy sunfish were put into a 5 gallon tank when I first got them and after they grew moved to a 10 gallon tank with a lot of plants by a window where there was no heat from the fish room. The placement also allowed the temperature to fluctuate.

In one corner of the tank was a Java fern where they liked hanging out when not eating. I only used a sponge filter in the tank. I did not see the spawn nor did I see the eggs but just noticed some thing very small moving in the plants which was baby fish.



- Map from Quattro, J.M., W.J. Jones, J.M. Grady, and F.C. Rohde. 2001. Gene-gene concordance and the phylogenetic relationships among rare and widespread pygmy sunfishes (genus Elassoma). Molecular Phylogenetics and Evolution. 18:217-226.
- Drawing from Fishes of Texas, Credit: Joseph R. Tomelleri

Snails in the Aquarium

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By Rick Renfro

EVERYONE SEEMS TO have an opinion about snails in ponds and aquariums:

"**They take over your tank**, once they are in your tank you will never get them out!"

"They add too much biomass and are unhealthy."

Etc...

I have two of the "hated" three types of snails, the Malaysian trumpet snail, the ram's horn snail, and the pond or bladder snail. I raise and sell red ram's horn snails, but never knew much about them.

The main reason people don't want snails in their tank seems to be because it is nearly impossible to completely control them, and most likely everyone who has had one of these species their tanks has had the experience of turning on the lights, sitting down to look at your fish and seeing hundreds of snails all over the aquarium. In my tanks I probably have around a thousand ram's horn snails, and maybe the same number of Malaysian Trumpet snails- though they hide in the substrate so it is hard to tell.

I do feed what some may feel is too much, which supports a large population of snails. I colony breed guppies, keep nine species of corydoras, and have two types of Ancistrus. The guppies are always dropping fry, so I am feeding a lot of different sized livebearers along with the catfish. ...and a large population of snails.

Snails can and do eat a lot if food is available.

What are these creatures and what is their role, good or bad, in nature as well as the aquarium? What are the benefits of having these animals in your aquarium or pond? Is there any way to control them? Are they useful as part of a clean-up crew?

Ramshorn snails are in the family of Planorbidae (ramshorn snails) in the class Gastropoda (snails & slugs) and grouped with the "*pulmonate*" snails, because they breathe air by means of an organ that is like a lung, so they do not breathe water with gills.

> **"Never doubt the courage of the French. They were the ones who discovered that snails are edible."**
>
> -Doug Larson

There are various species of ramshorn, but the snails that are most popular in the aquarium hobby are the American ramshorn snail, also called the red ram's horn snail, that is said to originate in Florida. A ramshorn found in local streams is black and could come into aquariums as little bitty eggs on new aquarium plants.

These species of snails are mostly herbivorous eating decaying plant matter- though they are opportunistic feeders should they come upon a dead creature. I have never seen one eat a live healthy plant, though they do eat live algae. Mostly they are either sifting through the substrate, or scraping the glass for algae.

As a critical part of the clean-up crew, snails are a major aide to the cleanliness and stability of my tanks. My large tank is heavily planted, though I rarely find a decaying leaf or stem in this tank. I never see a dead fish, though this is a heavily loaded guppy tank and sometimes fish go missing. The snails are efficient and make short work of decaying organic matter in the tank. In the wild these animals serve the same role by consuming the waste that settles to the bottom of the stream or lake, and also serve as a nutritious food source for larger invertebrates and fish.

Snails absorb calcium carbonate in the water while living, and release it when their shells decay. Water hardness is an expansive subject, but it is basically the amount of calcium and magnesium dissolved in the aquarium water. As more of these chemicals are dissolved in the water the higher the alkalinity of the water, making it hard. Conversely, the lack of dissolved minerals causes water to become more acidic, more soft. When attempting to raise or lower the pH of the water in a tank, some people use chemicals that temporarily change the levels. This method is quick and causes wide variation in the pH of the water, which is not healthy for fish or invertebrates. The use of additives like crushed coral,

crushed oyster shell, cuttle bone, and Argonite tend to maintain a more consistent alkaline pH, and this consistent buffering benefits snails that are growing their shells. Softening water is much more difficult and the methods to do this are volatile and require intense monitoring, but that is another article.

There are actually three oxygen transport systems typical in snails. The first two oxygen transport systems are a red hemoglobin bound to blood cells and a clear myoglobin also in the hemolymph, a liquid in the invertebrate that contacts all the cells of the animal. Most snails rely primarily on the third transport system, hemocyanins, as a transporter for oxygen. Hemocyanin is not bound to blood cells but suspended in the hemolymph, These hemocyanins bind one molecule of oxygen between two copper molecules to facilitate its movement. The blue/black color in most ramshorn is from these oxygenated hemocyanins, that otherwise are colorless when lacking oxygen when they have reverted to a state of only two copper molecules.

The red ramshorn is red because their blood contains primarily the hemoglobin similar to human hemoglobin that is rich in iron instead of copper. They also have the hemocyanins but it is less predominant in the red types.

Here are a couple tested methods to control the snail population in an aquarium. One effective control in a planted tank is the use of fertilizers that contain copper which is poison to the invertebrates that rely on hemocyanin to transport oxygen. The reason copper is so toxic to invertebrates is that their systems are designed to easily uptake copper. Copper is scarce in the wild and their systems have developed to be extremely efficient at taking in copper but have no system to guard against taking in too much. They also lack the ability to expel an overabundance of the metal. The presence of high levels of copper in any animal is toxic and to these snails high levels quickly damage cells and cause widespread malfunction of the animals systems.

I added Osmocote capsules containing a small amount of copper to fertilize my plants in my large planted tank and almost wiped out the Malaysian trumpet snails, most of the common ram's horn (black) snails, and all of my mystery snails. The red ram's horns essentially unaffected. Aside from completely cleaning out your tank, using all new substrate, new filters, and only tissue cultured plants, you probably won't completely rid your tank of all snails for good- though I don't know why you would want to.

To harvest my red ramshorns I bait them with algae wafers. They mob the wafers and I easily pick them up with a net or with my hand. The snails are neutrally buoyant and easily float out of your hand so I mostly use a small net. Sometimes I put a cut water bottle containing a wafer and a rock in the tank and let that sit overnight.

Before I finished this article, I found on MASI's Buy/Sell facebook site a discussion about ridding a tank of snails. A "No-Planaria" product was recommended that is a nut palm extract and is supposedly safe for fish and snails but will kill snails and planaria in 72 hours. Such chemicals are another option, there are many products that advertise that they will kill snails but are safe for fish.

Some people throw excess snails into the trash, some feed them to snail eating fish, I sell mine on AquaBid and the MASI auctions. So far I have shipped snails to Missouri, Wisconsin, Washington, Michigan, West Virginia, Maryland, Minnesota, and Tennessee, and along with the MASI auctions, snails have paid for my premium fish food from Brine Shrimp Direct, one of our club sponsors and suppliers of amazing food that gets results.

Remember, almost everything that your tanks produce has value to someone in this hobby.

Are we there yet?

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The state of Volume Aquarium Lighting

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By Chuck Bremer

RECENTLY I WAS sitting at my Mom's dining table and looked up at the wagon wheel chandelier she had suspended overhead. The chandelier had 5 bulbs which had morphed over time to 2 tungsten, 1 CFL and 2 LED. It was a good illustration of changes that are also affecting the aquarium hobby.

My first 10 gallon Metaframe aquarium in about 1960 came with one of those metal light fixtures that would give quite a prick if you were barefoot when you turned it off. That fixture contained an incandescent bulb of about 60 watts.

It is easy to stick with the things we know and have experienced and often less easy to judge when is the time to make a change. Since 1960 aquarium lighting has morphed through several stages, each in turn becoming mainstream and each with advantages over the other. Here we will examine some of those changes and show what has happened and you can make the decision if you "are there yet"- at the point it makes sense to swap out old lighting for newer lighting.

Using the aquarium as an example lighting has gone through first incandescent, then fluorescent T-12, T-8 and T-5 or CFL (T-2) and more recently several flavors of LED lighting have appeared on the scene.

How we measure the lighting has also changed. Till recently the measure was Watts because the energy use was a major factor and the conception of light output was directly correlated to the watts causing the tungsten filament to glow. As the type of lighting has changed it has also been necessary to change the measurement of lighting to indicate an output of light, no longer the input of energy, and now lumens are mandated to be used with new products- even if most of us still remember the light output equivalent to the original watts.

Like Output Screw Base Light Bulbs Compared

800 Lumen Screw Base	Watts	Lumens/ Watt	Energy/ Year
Incandescent	60	13.33	$34.16
CFL (T2)	15	53.33	$8.54
LED	9	88.89	$5.12

13 cents/KWH, Lit 12 hours per day, 365 days per year.

Small Desktop Display Aquaria

We now have a way to compare efficiency across light sources. For example a 60 watt incandescent bulb creates about 800 lumens of light so bulbs that create 800 lumens of light, all else being equal, are equivalent for lighting to the original 60 watt incandescent.

For screw in bulbs the first Table contains the approximate equivalent watts needed to create the same 800 lumens of light: Incandescent- 60 watts, CFL- 15 watts, LED- 9 Watts

The Table shows that LED is the most efficient and produces about 90 lumens per watt, the CFL produces 50 lumens per watt, the incandescent being the least efficient producing only about 13 lumens per watt. Doing the math indicates that for the same amount of light the LED will use about 1/7th the electricity to run it and the CFL only about ¼ as much as the incandescent.

For one or two small tanks this extra energy expenditure may not be a big deal. For this article we will use an electricity cost of 13 cents per KWH with aquariums lit 12 hours per

day 365 days per year to calculate the yearly electric cost.

Another decision and cost factor is the life of the bulb. However, all three types are now running less than $1 per bulb so are comparably priced. The incandescent will have to be replaced about once during that year, the CFL also a bit longer but probably replaced early the next year but the LED not replaced for about 5 years.

Fish Room Lighting

Let's consider a fish room where much more light may be needed. In the fish room the base comparison usually becomes fluorescent lighting instead of screw type bulbs because most already have determined that Incandescent or halogen lighting is the most expensive and also generates excess heat.

The amount of light needed in your fish room probably depends on how you keep your fish. If you are keeping tanks that do not have a lot of plants lighting is important only to see the fish and the amount and quality of light needed is much less than if you are keeping your tanks also as well planted tanks. However, the same principles apply.

The tanks I keep are planted tanks so my consideration is getting enough light of a quality to grow plants as well as to view the fish. My fish room is also (too?) large with 100 ft of tank length or the equivalent of 25 - 4 foot fluorescent lights end to end. My wife reminds me every month just how expensive that is when the electric bill is paid.

For combined plant growth and fish display I like a light quality of at least 4000K that mimics sunlight fairly well. Proper Kelvin is a topic of another article but suffice it to say that light of 4000K or higher has more white light to show the fish to best advantage and also enough red and blue light to grow plants. Lower Kelvin may have more red light and grow plants slightly better but less blue which will muddy the fish colors.

Over the past 4 years since I have set up my current fish room I have experimented, either accidentally or on purpose, with several light types, including: T12 fluorescent, T8 fluorescent, T5 VHO compact fluorescent and various types of LED bulb replacements and fixtures. Commercial and aquarium lighting has gone through several rapid changes over this same period, the result of which is that LED has gone from an aquarium specialty product to mainstream lighting for the home environment. Quality, availability and prices of all types of lighting have changed accordingly.

All lighting is labeled as total initial lumens output for the light, no matter what direction the light is directed. Since fluorescents are the main comparison here are some other factors that may be different from LED lighting.

Fluorescents are round and radiate in 360 direction around the tube. LEDs can be manufactured to radiate all in one direction, concentrating the light. This means that lumens are not directly comparable but for best efficiency fluorescent light output must be reflected into the direction needed. Generally this is redirection downward in an aquarium setting. Unfortunately most light fixtures cannot achieve more than 70% efficiency at this light redirection. Reducing the lumen output by this factor means that a flourescent bulb producing 2000 lumens is only getting 1400 into the aquarium. The bulb diameter also becomes part of the inefficiency as larger diameter bulbs, such as T-12's, act to cast their own shadow further reducing the effective light into the aquarium. This directional inefficiency can also be present when round LED replacement bulbs are used for fluorescent fixtures .

Fluorescents are brightest within hours of being lit for the first time. However, over time they become less bright as the lighting elements and phosphors age. Under typical use typical fluorescent output is only about 80-90% the rated output after a few

Common 4 Foot Shop Light Type Fixtures

2 Bulb 4 ft Fixture	Watts	Lumens	Lumens/ Watt	Energy/ Year	/4000 L
T12	84	3200	38.1	$47.83	$59.79
T5 VHO	108	5000	46.3	$61.50	$49.20
T8	64	3600	56.25	$36.44	$40.49
LED	42	4500	107.14	$23.91	$21.26

13 cents/KWH, Lit 12 hours per day, 365 days per year.

Two overgrown 40 gallon breeders under 4500 lumen/ 4 ft LED shop lights. Left with dwarf vallisneria variety plus anubias, Amazon Sword, Crinum, etc. Right with primarily Italian Vallisneria variety.

months. VHO compact fluorescents degrade most markedly to as low as 50% output within a few months. Typical LEDs light output over time still has to be established well but in most cases the rated life of 3-5 years assumes that they are still 80% as bright at the end of that time.

I find that with tubular style light fixtures directly over the aquarium it takes about 1000+ lumens per foot of aquarium to grow many plants well. Below that and they linger but may not grow. This was determined by placing similarly planted tanks under lighting of varying output, including T-12, T-8, T5-VHO, and various LED outputs. You can see the average lumen outputs in the Table of Shop Lights. They were taken from the light or fixture labels and adjusted according to the factors above. Most of my aquariums are 12-14 inches tall with the lighting mounted about 7 inches above that to allow working room.

In that configuration T-12 or T-8 would grow plants for a few months then things would slow down. T5-VHOs would last about a year then output would also be too low. Although I could have replaced the bulbs to re-attain outputs near original, (costs $3-$10 per bulb), replacing any of the fluorescent types with a LED above 4000 lumens per shop light jump started the plants and they continued to grow noticeably over the remaining year of the testing. Lower lumen output shop lights were not as effective in promoting rapid plant growth.

Effective amounts of light is of course dependent on the type of plants being grown- Java moss will grow at about 300-500 lumens per foot or even less and Hornwort at about 750 lumens per foot (it is also usually closer to the light source), but at 1000 lumens per foot even some of the more difficult plants can be maintained such as colored Ludwigia and indoor Lily's- most Vallisnerias will go wild!

One can see from the 2nd Table that a 4' LED is nearly twice as efficient at $24 per year as the 4' fluorescents ($36-$48 per year) and nearly 3X as efficient as the T5 VHO, $62 per year. One can now get different bulb and wattage lighting to match the output and when lumen output is matched the LED fixtures are even more efficient, $21 per year, when light output is compared equally.

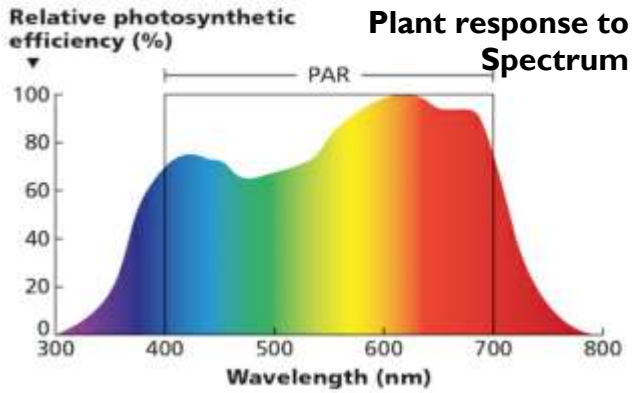
So… are we there yet…is it time to replace those older fixtures with LEDs?

For me with a relatively large fish room and needing enough light to grow plants the answer has easily been "Yes!" My calculations show that replacement of a T8 fluorescent fixture in my fish room with a higher output LED fixture will cover the fixture replacement costs in the first year alone and the energy savings and lack of maintenance costs will continue to accumulate after that.

For others who have smaller light needs the answer might be maybe, depending on the individual situation. Already at the 2016 Aquatic Experience the fluorescent lighting in the room had been completely replaced by LEDs, I saw no other lighting than LEDs. It has also been noticeable that the fluorescent lighting is now often being donated by shops to clubs or sold at swap meets. This also indicates a change in the industry.

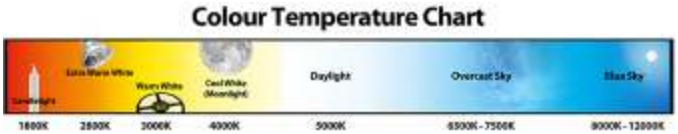
Fixture replacement costs of LEDs have come down and are now about ¼ what they were about 2 years ago. I saw complete 4' shop lights for below $25 yesterday. Reliability has also improved. No longer is it necessary to utilize a transformer in line that also eats up energy - everything is wired for 110 volts and just needs to be plugged into an outlet. Most LED fixtures now come on an aluminum heat sink built into the structure making them much more reliable and longer lasting.

LED output has been tweaked from about 90 lumens per watt 2 years ago to 110 per watt now and as costs have gone down there are now enough individual LED bulbs being placed per square inch to produce much more intense lighting than 2 years ago. The newer LED fixtures now have even higher light output than that obtainable by all the fluorescent fixtures, matching closely the T5-VHO bulbs, and the energy costs are lower than any of them.



Plant response to Spectrum

Curve as typically used for Plant light spectra. Sources vary, and so do plants!



Are we at the end of the line? Of course not!

Things continue to change. Longevity of LEDs is such that instead of replacing bulbs after 5 years, or whenever the fixture fails, the whole fixture will be replaced with something new and even more efficient. 120 lumens per watt is on the horizon. We are already getting many more form factors of LEDs to fit many needs and retrofit into spaces previously occupied by tungsten and fluorescent fixtures. Not needing to have bulbs changed for 5 years makes this possible. Manufacturing efficiency is increased and development costs have been recovered making competition more intense and price will reduce while versatility of selection increases as a result. There are many more changes on the horizon.

…just don't wait too long.

Below are some links to additional reading on the subjects, everyone has their opinion, and a lot of folks are now selling LED lighting.

http://clark.com/technology/lightbulbs-watt-to-lumen-conversion-chart/
http://www.lrc.rpi.edu/programs/nlpip/lightingAnswers/t8/abstract.asp
https://alliantenergy.bizenergyadvisor.com/BEA1/OMA/OMA_Lighting/OMA-12
http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22727.pdf
http://www.thetropicaltank.co.uk/plantlit.htm
http://www.lighting.philips.com/main/products/horticulture/hortiblog/light-and-growth/how-does-light-affect-plants-and-people-differently

Minifins

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Dario dario

The Scarlet Badis-

Mike Hellweg, CFN
(Certifiable Fish Nut)

Male of Dario dario. © Charley Grimes

At the 1999 American Cichlid Association convention in Detroit there was a vendor with a tank of really cool fish that were drawing comments from just about everyone.

The fish were tiny, about one half to three quarters of an inch long. They were glowing bright red with pale silvery blue stripes. Some specimens were glowing like bright red crayons on a sunny day; others were more washed out, but all with colors that until that time had not been seen on wild caught freshwater fish. Wow! Even with all of the fantastic show fish, folks were lined up just to see these new beauties. They were for sale, too! The price was astronomical - around $100 each if I remember correctly. They looked similar in shape and fin structure to the well known blue chameleon fish, Badis badis. The seller was calling them Scarlet Badis. That name seemed to fit them well.

When I got back to St. Louis, I asked Bill McCrum at Beldt's to keep an eye out for them. When he did find some, the price was still pretty high, so he didn't order them. It would be another year or so before the price came down enough that I was willing to spend the money on a group of them. I was a bit disappointed when I first got them.

I bought all they could bring in, just 8 tiny fish. All were less than a half inch long. Three were beautiful just like the ones I remembered from the ACA. Two had washed out red colors, were very thin, and died a few weeks later. Three were plain silver with clear fins. At the time I was told they were brackish fish from "Southeast Asia". Around the same time the Internet was starting to become a bit more widespread and word was getting around that these guys actually came from Northern India. I decided to set them up in a 20 long heavily planted with Cryptocoryne, Java ferns, Anubias on driftwood and Java moss.

Habitat at Laskarpara, Jalpaiguri district, West Bengal, India. © Peter Cottle

Female specimen. © Charles König

Photos don't do them justice. The colors of the male literally glow. Their head, shoulders, and back are rusty orange to ruby red. Their flanks are covered with 7 red bands which extend into the fins. These bands are interspersed with 8 silver blue stripes which also extend into the fins. The fins are outlined in pure white. The ventral fins are intense bluish-white and are often nearly as long as the fish is tall. The iris is golden to pale amber.

As gaudy as the males are, the females are that plain. Females are a dull silver gray, with clear fins. The clear ventral fins are more in proportion to body size. Some larger females exhibit a few thin, pale orange stripes on their flanks, but that's it for color. Probably due to this marked difference in coloration, females are rarely, if ever, imported. This is also

probably the biggest reason why hobbyists fail to get these fish to breed - they only have males!

Since these fish recently appeared in the hobby, it would probably be surprising to learn that they were actually described in 1822 - nearly two hundred years ago! They were described by the renowned naturalist Francis Hamilton Buchanan in his paper An account of the fishes found in the river Ganges as Labrus dario. For a paper published nearly two centuries ago, it is still taught today!

This is where they sat for 180 years until scientists took a closer look at them in 1995 when the Chinese ichthyologist Zhu looked at them and moved them to the Genus Badis. Kullander and Britz created the new genus Dario in 2002 and set them up as the type species, where they remain today. The hobby "discovered" them around 1999, and they became fairly common by 2006 or 2007.

While they are diminutive fish, the Scarlet Badis are by no means shrinking violets. The males are usually out and about where you can see them and enjoy their colors. In fact, while we might today call them nano fish, they have piscinalities that make them seem much larger. As with most nano fish, their behavior is fascinating.

The biggest problem with the scarlet Badis is trying to find females. For some reason most sellers only get males, with just a few females as contaminants to the shipment. If you see a plain silver fish, usually much smaller than the others, with no color in the fins, grab it. That's a girl! If you get really lucky you might find more than one!

You'll rarely see them if you keep them with a lot of other fish, but if you keep a group by themselves in a well planted 20 gallon long and you will be treated to a very active socially interactive fish. If you keep them in a smaller tank, be sure to give males especially places to get out of the line of sight of other males as they will scrap and fight amongst themselves, with a really large male becoming the dominant fish in the tank and others hiding most of the time. In a larger tank there will be little real damage, but in a smaller tank the dominant male might eventually kill the weaker males.

Scarlet Badis are undemanding for water parameters, as long as both very hard, alkaline water and very soft, acid water are avoided. Tap water in St. Louis seems to suit them fine. Keep the temperatures in mid 70s Fahrenheit, use a slowly circulating filter like a sponge or Mattenfilter and they will be very happy.

Plant the tank with lots of Crypts, Anubias, Java ferns on driftwood, and similar plants, and give them several clumps of Java moss and they will glow. To give it a more natural effect add a couple of handfuls of soaked oak leaves to the tank. These will slowly break down and provide home to microscopic critters for the young fish to eat, as well as give them places to hide.

The spawning embrace of this species is typical of badids and similar to that in anabantoids. © Charles König

They do not seem to enjoy flake foods. Some specimens will eat fine pellet foods like Hikari micro pellets, while others will turn up their nose and starve rather than eat anything artificial. Some folks get them to eat frozen brine shrimp, but I've found they absolutely thrive on live foods like Grindal worms, newly hatched brine shrimp, microworms, Daphnia, young Gammarus and similar fare. I've even seen them go after blackworms! Certainly you will not get them to reproduce successfully without live foods.

Small Neocaridina shrimp make great tank mates, as do most of the popular fancy snails, though some snails are not above eating caviar, so use caution when choosing which snails you would use. Small Rasboras such as members of the genus Boraras or killies like the dwarf clown Killie (Epiplatys annulatus) or Norman's lamp eye (Aplocheilichthys us normani) make great companions as they spend most of their time in the upper part of the tank while the Dario spend their time in the lower third of the tank.

If you can get a group of a half dozen or more including both sexes, set them up in a heavily planted tank, and feed them lots of live food, soon you will see the little males guarding their clump of Java moss. Not long after, you will see young fish, almost exact copies of their parents but not so bright in color nearly three-eighths of an inch long. Look around the tangled roots of Anubias and Java fern, in dark places near driftwood, under decaying oak leaves, or under Java moss to get your first glimpses of the youngsters.

They are egg scatterers and usually release the eggs in Java moss, though I have also seen them lay eggs in the roots of Water sprite (*Ceratopteris* species) in the past. There aren't a lot of young, so they will find plenty of micro food for their first few days amongst the plants. About the time you first see them they will be large enough to take newly hatched brine shrimp, microworms, young Grindal worms, etc. which they will continue to eat for the rest of their lives.

Spawning is a brief affair - this female has just deposited a batch of eggs on the underside of a leaf... © Charles König

As with most nano fish, growth is rapid and they will often be ready to spawn on their own when they are about 12 weeks old, though they won't reach full adult size for almost a year. This precocious spawning seems to be pretty common among nano fish from different families and is likely a response to being near the bottom of the food chain, where even juvenile fish of other species will consider them as a snack.

The scarlet Badis is a true living gem. Give them a decent sized, well planted tank of their own and you'll be treated to a long lived, interesting beauty.

Photographs from www.SeriouslyFish.com and © as noted.

How To Help Your Betta Feel "Betta"

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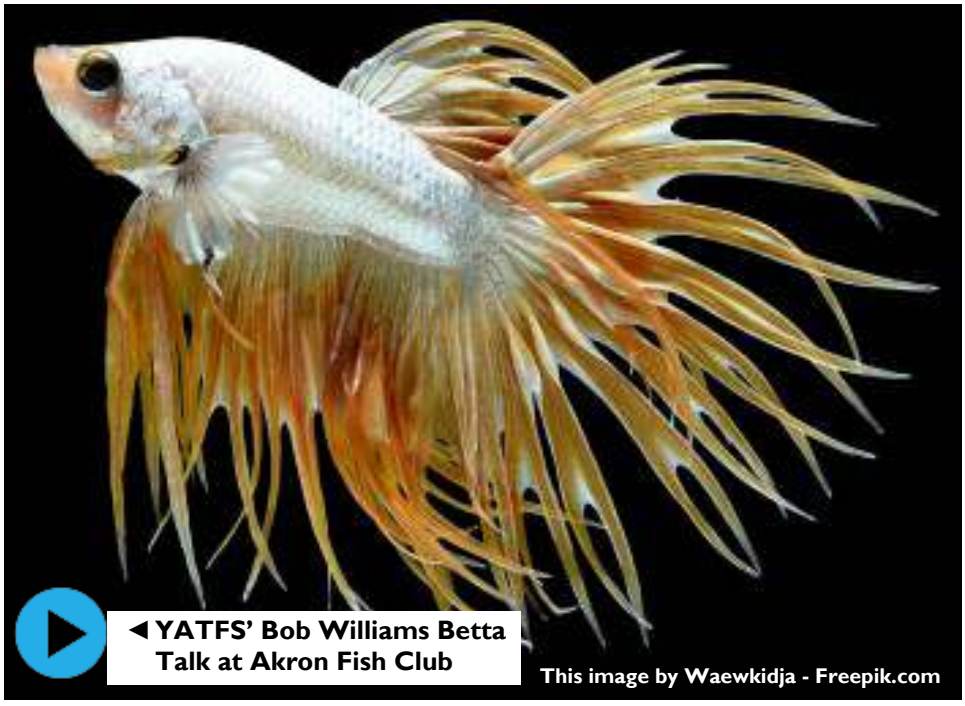
Betta Splendens 911-

By Lillia Miller

Reprinted from "Fancy Fins" , Vol 26, issue #3: October 2017. The publication of the Circle City Aquarium Club, Indianapolis, IN



◄YATFS' Bob Williams Betta Talk at Akron Fish Club

This image by Waewkidja - Freepik.com

WHEN MANY PEOPLE think of Bettas, they usually think of the little single fish you put in a bowl that doesn't live very long.

What many people don't know is that it's not difficult to spot signs of an unhealthy fish. Being able to identify some of these signs and symptoms could allow for a Betta with a much healthier and happier life.

Currently, I have 12 male Bettas and 5 females. They are one of my favorite fish. I love the varieties in color, tail and fin shapes and sizes and their fun personalities. I believe Bettas are an easy fish to care for if you follow the suggestions on water conditions, temperature and a nutritious diet. Although you may provide the very best environment for your Betta splendens, they are still prone to some common health issues. I've been able to save a few of my fish when they were very sick. This is my list of the 12 most common health issues, what to look for, and how to treat your fish.

Ammonia Burn

Ammonia burn is caused by the buildup of ammonia in the tank, most commonly seen with unfiltered fish bowls. Because of the lack of filtration in fish bowls, ammonia builds up faster than you can take out with water changes. The most common signs of this are lethargy and heavy breathing. To treat ammonia burn, get a water testing kit and test how high your ammonia levels are. Once you know the parameters of your fish's water, do a healthy water change and test the water again. The best way to prevent this is to give your fish a filtered tank that is at least 2.5 gallons. Any tank that is larger than 2.5 gallons can create a nitrogen cycle, which will help there be less ammonia spikes than if your fish was in a bowl.

Fin Rot

Fin rot is another common Betta fish disease. The most common symptom for fin rot is shredded fins, and the edges of those fins are black or white. Fin rot is caused by a bacteria that exists in the water of every fish tank. This bacteria isn't normally harmful, unless the wa-ter is dirty, or if the fish is stressed or injured. If your betta fish is missing parts of their fins,

and the edges of the fins that remain are black or white, that is a sign of infection and should be treated with broad spectrum antibiotics. If the Betta is only missing the fins, it usually can be treated by clean and warm water. If the fins don't look infected and just look shredded, multiple water changes would be the best option.

Velvet

Velvet is a highly contagious parasitic disease. The most common symptom is a gold or rust colored dust on the fish. The treatment is an anti-parasitic medicine and aquarium salt.

Swim Bladder Disorder

The swim bladder is an organ in fish that makes your fish sink or float. There are many reasons the swim bladder could be making your fish sick, the most common ones are Swim Bladder Disorder (SBD) and genetics causing the fish's swim bladder to be deformed. It's easy to figure out that your fish may have swim bladder issues. If there is anything wrong with the swim bladder, your fish will ei-ther sink to the bottom of the tank, or float at the top of it. It can be dangerous if your Betta sinks to the bottom of the tank. They need to be able to go to the surface of the tank to breathe. If your Betta fish is sinking to the bottom of the tank, take enough water out of the tank to lower the water just enough so it takes a lot less energy to let your fish breathe.

Bettas are also usually bloated when they have SBD. To treat bloating, you can give your betta an epsom salt bath by mixing water and epsom salt in a container and putting your fish in it for five to eight minutes. Fasting can also work to help your fish be less bloated and constipat-ed. You can fast your Betta for two days to see if it has improved anything, but often times you will still need to do other treatment in addition to fasting to treat SBD.

Feeding your Betta peas also help treat bloat. To do this, take a frozen pea and let it thaw. After its thawed, shell and cut it into tiny bits small enough for your fish to eat, then put it on the end of a toothpick and try to feed it to your betta. Betta fish don't always eat it, but if they've fasted they might be more likely to want to eat it. It's not uncommon for fish to have chronic swim bladder issues if they were born with a deformed swim bladder, which could be caused by bad genetics from poorly bred fish.

Columnaris

Cottonmouth or Columnaris is a bacterial disease. The main symptom is cotton like growths on the mouth and scales of the fish. It is treated with antibiotics.

Popeye

Popeye is a viral infection that causes both eyes of the Betta fish to pop out. To treat it, use antibiotics for Popeye.

Furunculosis

Furunculosis causes open and red sores from an infection. To treat it, use antifungal medicine.

Ich

Ich is a common disease caused by stress in the aquarium, and it's contagious. The main symptom is the fish being covered in white spots. Treatment is IchGuard medicine and a quarantine tank if there are any other fish in with the Betta.

Anchor Worms

Anchor worms are another parasitic disease, and it's treated by anti-parasitic medicine.

Fungus

Fungal infections can cause your fish to become pale and have white cotton patches on the fish. It is treated with antifungal medication.

Internal Parasites

Your Betta might have internal parasites if they have long, stringy white waste. The treatment is clean water and anti-parasitic medicine.

Dropsy

Another common Betta Fish health issue is dropsy. Dropsy itself isn't a disease, it is actually a symptom of one. Dropsy is hard to treat because there are many uncertain things that could be the cause of the dropsy. Many times, people just treat the symptoms

of the dropsy than treat whatever is causing it.

There are many symptoms of dropsy but one of the biggest symptoms is called "pine coning". Pine coning is when your fish's scales raise up to the point where if you looked at your fish from above, your fish would look like a pinecone. It's also common for your fish to be bloated when he is pine coning.

Unfortunately, by the time your Betta has shown signs of dropsy like pine coning, it's often too late to treat as the cause for it has gotten serious. I recommend you still do you anything you can to help keep your fish as comfortable continue to try and help your fish. If your Betta is showing signs of dropsy and there are other fish in the tank, immediately put the fish showing symptoms into a quarantine tank away from any other fish.

Dropsy is contagious to other fish, so by separating your sick fish from your others, this will reduce the chance of it being spread. Epsom salt baths can be helpful to try to treat the severe bloating. Epsom salt works as a natural laxative which can help with the bloating that can come with pine coning, but it should be paired with other medications meant for dropsy for best treat-ment. If you know what is causing the dropsy, for example a bacterial infection, treat for the bacterial infection in addition to salt baths.

Act Quickly and Be Prepared

With the proper research, recognizing symptoms of your Betta being sick can be fairly easy to notice. Some of the best ways to prevent disease is to keep Betta fish in a tank that is at least two and a half gallons, with a filter and heat-er. Clean and warm water can help prevent many diseases caused by dirty water, like fin rot and ammonia burn.

It is a good idea to keep a first aid kit for betta fish in case they suddenly get sick and you cannot get to the pet store to get medicine right away. A quarantine tank with a heater and filter is recommended to help prevent your Betta spreading the illness to any other tank mates.

If you're prepared with a medicine cabinet for fishy first aid on hand, you'll be able to treat your fish as soon as possible.

Items to keep for fish first aid:

- **IchGuard**
- **Antifungal powder**
- **Broad spectrum aquarium antibiotics**
- **Epsom salts**
- **Aquarium salts**
- **Frozen peas**
- **Indian almond leaves**

See https://bettafish.org/diseases/ for additional information

Images from original article and originate:

Nippyfish.net
Fishlore.com
Bettafish.org
4.bp.blogspot.com
Thepetstep.com

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Breeding *Inpaichthys Kerri* and *Nematobrycon palmeri*-

The Emperor Tetras

By Lee Van Hyfte

Reprinted from "Fin Flap" , September 2017. The publication of Eastern Iowa Aquarium Association, Cedar Rapids, IA


Inpaichthys kerri - Blue/Purple Emperor Tetra


Nematobrycon palmeri - Emperor Tetra

I'VE BEEN BREEDING the Emperor Tetra on and off for a number of years but I chose to try yet again and put a little more effort and increase the numbers produced.

I always take the time to find choice stock so that I can try to control the quality of off-spring produced. I take great pride in a quality animal and it took a fair bit of time to find healthy young animals with which to breed. I have found over the years that in breeding tetras it is key to find young fish, and optimally barely sexable. Tetras as a whole are prone to infertility with age caused by being reared in hard water and calcification of the ovaries in females.

I managed to find some young wild caught brood stock that came from the Wet Spot in Portland Oregon. These fish met all of my mandatory criteria: healthy, young, and colorful even at a young age. I selected 2 pair out of 50 fish and brought them home.

I began to grow out the fish in a 10 gal tank with a few *Apistogramma* species in the aquarium. This would incidentally become a breeding tank much to my surprise. The growing Emperors would act as dither fish until mature. Unfortunately, I found Emperors to be a poor dithers due to their predatory nature so the Apistos were removed. This left the group of 4 tetras alone in the 10 gal tank.

- The water was kept at 78-80F, with water parameters as follows:
- pH was not assessed but assumed to be low due to use of RO water with almond leaf and alder cones added for tannins.

TDS reading was 75 ppm accomplished with RO water and the use of RO right, I added 1/4 tsp per 10 gallons as is typical for my Apisto breeding conditions.

I had utilized a sand bottom for the Apistos and kept conditions identical for both the Blue Emperor or King Tetra and the Common Emperor. I utilized Malaysian driftwood (my favorite for its high Tannin release). Plants in the aquarium were Java Moss and Java fern. Both of these plants are ideal and will thrive on ambient light from the room. Let me stress ambient light as many Tetra species eggs and fry are sensitive to light and too high light could prove fatal to the offspring.

The foundations of breeding were laid out. Quality water and quality conditions were previously established. I find that with both species if maintained in a soft water planted tank, offspring will appear with little intervention though the production numbers will be greatly

diminished without these parameters. Parents as well as other offspring will predate on freshly hatched fry. I change 50% off the water with aged RO and RO that has been treated with soaked almond and alder cone, I utilize a 50/50 mix.

From what I have read the Blue Emperor is keyed into higher temps to induce spawning and have noted greater production at 82 degree F. The common emperor seams stressed over 82F so this number was avoided.

Both species are essentially continuous breeders in my experience and would benefit from a continuous breeding set up that would isolate young fry from the adults. I utilized a more natural method for both species allowing small numbers of fry to develop on their own in with the parents. This is the point at which Java moss and spawning mops become a critical ingredient to assure production.

Fry develop utilizing microorganisms in the Java moss and older spawning mops. That indeed is their first food supply. It also serves as an excellent zone for fry to escape from predatory parents. Fry accept freshly hatched baby brine shrimp quite well and that provides an adequate first food as well.

I never observed spawning or egg development due to utilizing a natural method for production. I did notice episodes of aggression particularly in the common Emperor often showing signs of injury particularly to the females as well as substantial spawning ritual dances. In both species the males will often flare their fins and dance for dominance and it is quite a beautiful sight to behold.

I began to notice fry of the common Emperor near the bottom of the aquarium at 3/16" long. They would assume the standard head stander pose in the aquarium with an angle of about 30 degrees. At this young age the defining black line was quite evident. The Blue Emperors were often found displaced in varying zones of the aquarium but appeared to be more top oriented and in a perfect horizontal position which is observed in the Blue Emperor adults.

Feeding the adults was quite simple. Frequent feedings were provided of Baby Brine Shrimp, Frozen Blood Worms, and Frozen Brine Shrimp. I found particularly in the Blue Emperor that Baby Brine Shrimp (BBS) were a key element in production in the natural mode. If and when I would back off on BBS supply, production numbers would steeply decline. I do not feel that BBS is a particular trigger in as much that the parents were simply too full to bother eating the fry as well as supplying the young fish with a stronger food supply. I would like to comment that utilizing Grindal Worms in particular is very effective to induce ovarian development in all species of Tetras that I have attempted.

In summation, these are wonderful spirited fish that are all to often overlooked and forgotten in the aquarium hobby. I would really like to encourage people to give them a shot. Their behaviors and colors will not go unnoticed and you may be rewarded with a few more fish than you started out with.

Photos from the original article

FINESCALE SPLITFIN, *Allodontichthys polylepis*

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EXTINCT IN THE WILD

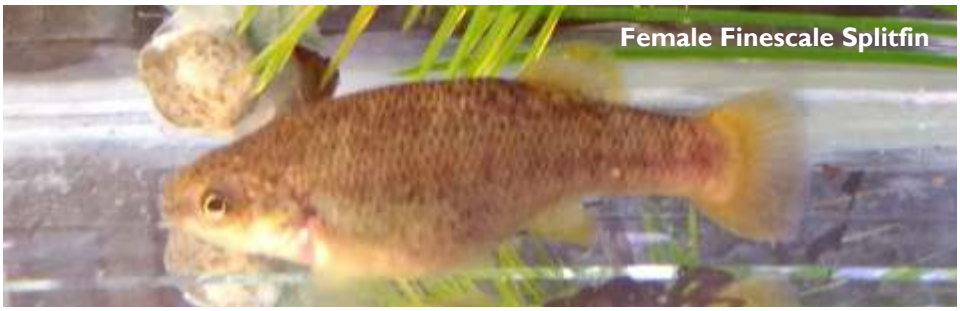
By Chase Klinesteker

Reprinted from "SWAM" , 2017 July/August

A publication of the Southwestern Michigan Aquarium Society

Kalamazoo, MI


Male Finescale Splitfin


Female Finescale Splitfin

AT THE 2016 ALA convention I purchased 5 fry of the Finescale Splitfin from the Rio de las Bolas in Mexico.

They were discovered in 1957, but a severe drought around 2000 destroyed the wild population. Recently, Patrick Miller informed me that Mexico has lost all of its' stock and there are probably less than 500 specimens in the entire world. This fish is in the ALA species maintenance program and very deserving of our efforts to save it.

DESCRIPTION

Allodontichthys polylepis reaches a maximum size of about 3 inches. They are strongly canabalistic of their fry, and the fry are very large when born (5/8 inch). I only got 6 and 5 fry from the first 2 spawns, even though I took extra pains to save them.

They seem quite helpless when born and the parents are unrelenting in searching for them. Unfortunately, I was raising those 11 fry in a fairly warm tank (78 degrees) and they got sick and died. Males are slightly more colorful with a reflective blue and yellow in both body and fins along with a spotted and vertical body pattern, depending on the environment. Males also have a white crescent edging of the caudal fin.

These fish are from cool, clearwater creeks and streams with sand or gravel bottoms, and it is recommended to keep them below 24 degrees Centigrade. They may need a "winter resting period" and don't reproduce much below 20 degrees Centigrade.

Clean water is essential, so extra water changes are needed. They seem shy and slow to adjust to a new environment, yet can be quite aggressive once established, so wood, plants, and caves are helpful to give cover. Their diet in nature is mostly insects, so brine shrimp, other meats, daphnia, and some spirulina flake seem to work well.

BREEDING

My lower aquariums stay around 70-73 degrees, so I placed the 5 fry in a 20 gallon alone. 2 potted plants, a cluster of anubias, and a ceramic cave were used for cover. A pan-sponge filter was run vigorously and the bottom was free of gravel to make easier cleaning. A pair of bristlenose plecos was included to "tidy up".

They are slow growers and as they matured, one pair became dominate over the remaining trio, to the extent that the dominate female was the only one to have fry. The female got fairly round when ready to deliver, but if I waited for her to get "square" in the vent area, she would deliver in the tank and some fry would be lost.

The most successful spawn was when the female was full sized (3 inches) and I picked the right time for her to deliver. She was netted in a large 7X10 inch net that was left hanging in their tank with various plastic plants above and below for the fry to hide in with some daphnia to curb her appetite. The birthing process lasted 12-14 hours and I recovered 12 fry.

I fed the fry newly hatched brine shrimp at first and later added flake food. The fry grow slowly and seem hardier than the adults, but I emphasize the importance of cooler temperatures, as I believe that warmer temperatures were the reason the first 11 fry got sick and died. They did not respond at all to salt and methylene blue medication. **For those livebearer enthusiasts who like a real breeding challenge,** the Finescale Splitfin is a great choice, and helping to preserve a species that is extinct in the wild is an added bonus!

Photos from the original article

2017 BREEDER'S AWARD PROGRAM - Steve Edie

Remember there is no Mini-Auction at the Christmas Party in December. Plan to turn in your outstanding BAP or HAP for auction at the November meeting.

September

Member	Genus	Species	Common Name	Points	Bonus	CARES	Total
Chuck Bremer	*Chapalichthys*	*encaustus #@*	Barred Goodeid	0		15	1117
	Goodea	*gracilis #@*	Slender Goodeid	0		15	1132
	Limia	*sp. "Tiger" #*	Small Tiger Limia	0			1132
	Phallichthys	*quadripunctatus #@*	4 Spot Merry Widow	0		5	1137
	Trichopsis	*vittata*	Croaking Gourami	15			1152
	Xiphophorus	*clemenciae*	Yellow Swordtail	10			1162
Mike Huber	*Glossolepis*	*incisus @*	Red Rainbowfish	10		10	1408
	Macropodus	*opercularis*	Paeadise Fish	5			1413
Keim Family	*Corydoras*	*schultzei*		10			10
	Poecilia	*reticulata*	Guppy	5			15
	Xiphophorus	*sp. "Domestic Swordtail"*	Swordtail	5			20
Guy Tinker	*Neolamprologus*	*pulcher*	Daffodil	10			137
	Xiphophorus	*alvarezi*		10			147
Pat Tosie	*Poecilia*	*obscura "Rio el Sieva, Trinidad"*		5			5490
	Poecilia	*sp. "Rio Coatzacocoalcus" **		5	5		5550

2017 BREEDER'S AWARD PROGRAM - *continued*

October

Member	Genus	Species	Common Name	Points	Bonus	CARES	Total
Jack Heller	***Elassoma***	***evergladei* "Cooks Mill Pond, Bonifay, FL" ***		**20**	**5**		**610**
	Maratecoara	***lacortei* *****		**15**	**15**		**640**
	Moema	***kenwoodi* ***		**20**	**5**		**665**
	Moema	***quiii* ***		**20**	**5**		**690**
	Moema	***rubrocaudatus* ***		**20**	**5**		**715**
	Neofundulus	***splendidus* ****		**15**	**10**		**740**
Steven Hoffman	**Gambusia**	***holbrooki***		**5**			**175**
Mike Huber	***Aulonocara***	***stuartgranti* "Mbenji"**	**Regal Blue Peacock**	**10**			**1423**
	"Xystichromis"	**sp. "Red Kyoga"**		**10**			**1433**
	Labeotropheus	***fulleborni***		**10**			**1443**
	Labidochromis	**sp. "Hongi"**	**Red Top Hongi**	**10**			**1453**
	Puntius	***titteya***	**Cherry Barb**	**10**			**1463**
Guy Tinker	***Julidochromis***	***transcriptus* "Pemba"**		**10**			**157**
Bob & Lora Watson	***Xiphophorus***	***alvarezi***	**Chiapas Sword**	**10**			**125**

BAP Key:

* = First MASI species spawn (5 point bonus)

** = First MASI species and genus spawn (10 point bonus)

*** = First MASI species, genus and family spawn (15 point bonus)

@ = C.A.R.E.S Species at Risk (Double base points)

= Species previously submitted = 0 points, except for C.A.R.E.S. = base point bonus

^ = Species previously submitted, limited points for additional color varieties

Sources: Cal Academy - http://research.calacademy.org

CARES - http://www.carespreservation.com

HORTICULTURE AWARD PROGRAM - Mike Hellweg
September/October 2017

Remember there is no Mini-Auction at the Christmas Party in December. Plan to turn in your outstanding BAP or HAP for auction at the November meeting.

Member	Genus & Species	Common Name	Type	Points
Mekaela Tinker	**75 points**			
	Pistia stratiotes	**Water Lettuce**	**V**	**5**
	Pistia stratiotes	**Water Lettuce**	**OB**	**5**
Ed Millinger	**350 points**			
	Pontederia cordata	**Pickerel Weed**	**V**	**10**
	Pontederia cordata	**Pickerel Weed**	**OB**	**10**

HAP Key: **Reproduction Key: V = Vegetative, OB = Outdoor Bloom, IB = Indoor Bloom, S = Seedling; * MASI First!**

Anacharis

Pickerel Weed

Folks, we've been a bit low on HAP the past 2 months. How about going through your tanks to see if you have plants yet to be turned in?

CLUB HOPPING - Steve Edie

Nov 17-19 - Cleveland: Ohio Cichlid Association – Extravaganza

Nov 19 - St Louis: MASI – Fall Auction

Dec 3 - Chicago: Greater Chicago Cichlid Association – Swap Meet

2018 - *Save the Dates*

Jan 20 - Champaign,IL : CAFE - Winter Auction

Jan 21 - Alsip, iL - Greenwater Auction

Jan 28 - Hoffman Estates, IL - GCCA Swap

Feb 11 - St Louis: MASI – Winter Auction

Mar 4 - Rockford, IL - Rockford Fish Swap

Mar 10 - Cedar Rapids, IA - EIAA Auction

Mar 16-18 - Rocky Hill, CT - NEC Convention

Mar 18 - Alsip, IL - Greenwater Swap

Mar 24 - Peoria, IL - TCTFS Auction

Mar 24 - Des Moines, IA - CEACICH Swap/Auction

Mar 25 - Hoffman Estates, IL - GCCA Swap

Apr 15 - Indianapolis, IN - CCAC Auction

Apr 15 - Davenport, IA - Quad City Fish Swap

Apr 21 - St Louis: MASI – Spring SWAP

Apr 22 - St Louis: MASI – Spring Auction

May 20 - Hoffman Estates, IL - GCCA Swap

Jul 4-8 - Houston, TX - ACA Annual Convention

Jun 7-10 - Georgia - NANFA Convention

Jun 9 - Indianapolis, IN - CCAC Swap

Jul 11 - Champaign,IL : CAFE - Winter Auction

Aug 12 - St Louis: MASI – Summer Auction

Sep 16 - Indianapolis, IN - CCAC Auction

Oct 4-7 - Herndon, VA - CatCon 2018

Oct 7 - St Louis: MASI – SWAP

Oct 7 - Hoffman Estates, IL - GCCA Swap

Nov 11 - St Louis: MASI – Fall Auction

Nov 16-18 - Strongsville, OH - OCA Convention

Dec 2 - Hoffman Estates, IL - GCCA Swap

Nearby Clubs linked to their logo

Other links are on the MASI Linkpage.

Convention LogosHotlinked!

MEMBER CLASSIFIEDS

Buy/ Sell	Member	Item Description	Bid/Asked	Contact
Sell	Charles Harrison	Thiosulfate crystals (Chlorine Remover) - pound	$4.00	(314) 849-9761
		OTO double strength Chlorine/Chloramine test kits - 4 ounce	$12.50	charles@inkmkr.com
		Flubendazole, 10% powder 25 grams	$20.00	
		Lavamisole HCl Powder - 5 grams treats 100 gallons	$10.00	
		Methylene Blue 5% solution (4 ounces)	$12.75	
		Acriflavine Concentrate (4%) solution, 2 ounces	$12.70	
		Bromthymol Blue pH test solution, 4 ounces	$7.00	
Sell	Charles Hoppe	Several 10 and 15 gallon tanks, including wooden rack. Makes a nice small fishroom. Extras, contact me if interested.		(314) 846-4648 charliehoppe@me.com
Buy	Mike Hellweg	Small Styro shipping boxes - 12 x 12 x 12 or a little bit smaller. If your company uses them and throws them away, save them! Bring to the meeting or I'll come pick them up	Free	(636) 240-2443

Got $$$$ swimming in those Tanks?

MASI Members of good standing can place a fish related classified ad in the Darter for free. Free ads may be up to 30 words in length. Send your ads to the editor. The 30 word ad can run each issue unless specified how long to run, in which case it will run as requested. Deadline is 10 days prior to the January, March, May, July, September or November MASI Meeting. The Darter is Emailed about 3 days prior to each of these meetings.

SHOP HOPPING - September, 2017

These Local Fish Shops (LFS) help introduce hundreds of people to the Aquatic Hobby every day. They also help the Missouri Aquarium Society reach those hobbyists and keep them engaged by promoting our programs. **Support their programs too!**

Happy Fish Shopping!

The Missouri Aquarium Society

Special Events and Deals!

What	Where
New Facebook Posts	Saltwater Paradise
New Facebook Posts	Aquatic Treasures
Fish in Stock	Midwest Tropical Fish
Current Specials	petco
November Specials	PetsWay
Facebook	Pet Connection
Monthly Specials	Sailfin Pet Shop
Facebook/Specials	Aqua World
Monthly Specials	Tropical World Pets
Weekly Specials	Corals & More
Fish List	Malawi Aquatics

Please Patronize our Advertisers and Sponsors

MISSOURI MASC AQUARIUM SOCIETY

Monthly Bowl Show Entry Form

Entrant Name_____

Month/Year _____ **Monthly Class** _____

———- Fold here and place in front of bowl(s) with Entrant name hidden ———

Line	Species: Latin or Common Name	SEX	Monthly	Open
1		M F		
2		M F		
3		M F		
4		M F		
5		M F		
6		M F		
7		M F		
8		M F		
9		M F		
10		M F		

November

Aquatic Critters: Aquatic Invertebrates, totally aquatic amphibians (Pipid frogs/toads, Caecilians)

December

No Bowl Show & No Auction