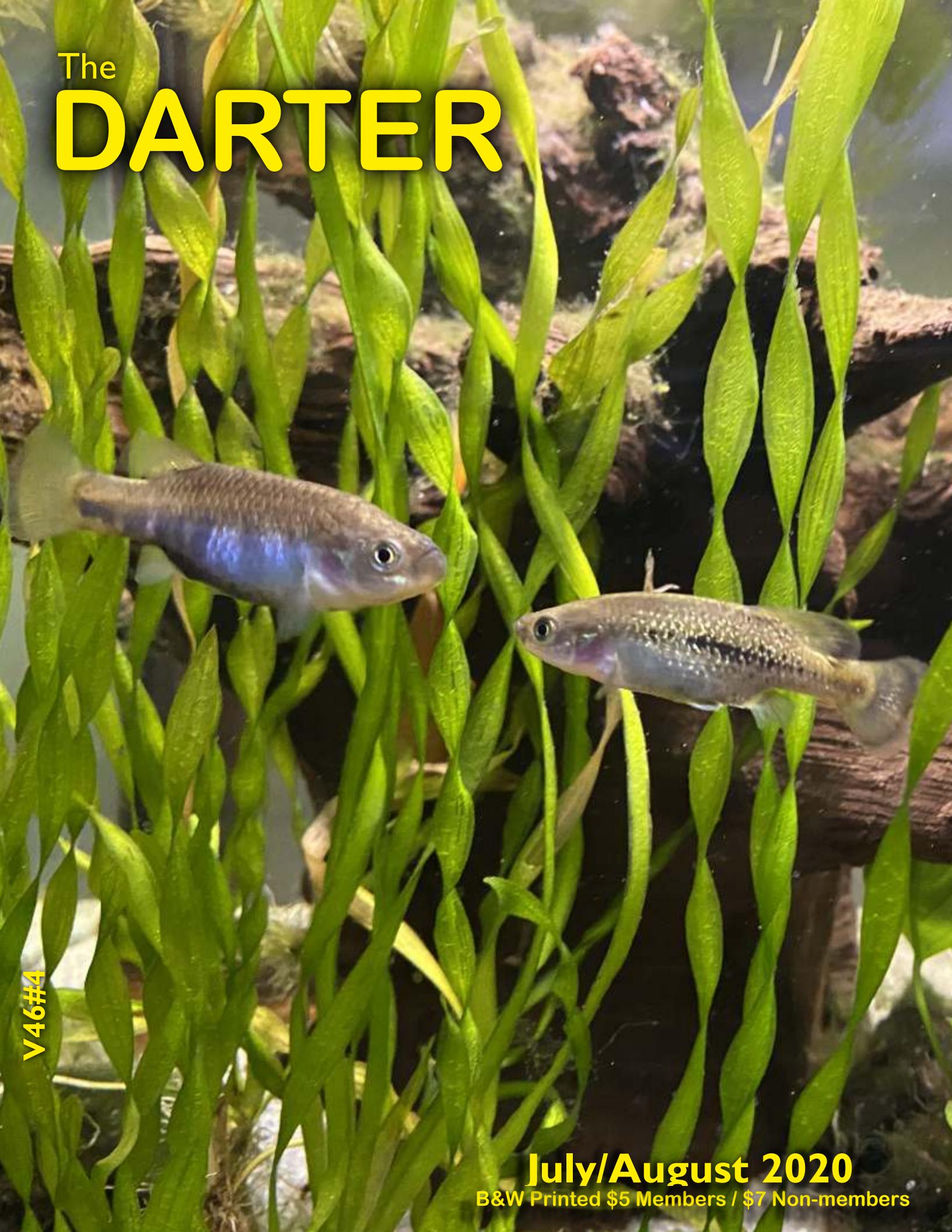
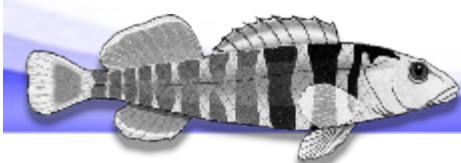


# The **DARTER**



V46#4

**July/August 2020**  
B&W Printed \$5 Members / \$7 Non-members



# The DARTER

## PRESIDENT

Pat Tosie  
1813 Locks Mill Dr.  
Fenton, MO 63026  
314-616-4316  
[pattosie@yahoo.com](mailto:pattosie@yahoo.com)

## VICE PRESIDENT

Gary Lange  
2590 Cheshire  
Florissant, MO 63033  
314-412-7636  
[gwlange@sbcglobal.net](mailto:gwlange@sbcglobal.net)

## TREASURER

Jack Heller  
14212 Trail Top Dr.  
Chesterfield, MO 63017  
314-576-5111  
[hellerjackl@aol.com](mailto:hellerjackl@aol.com)

## SECRETARY

Angela Hellweg  
511 Sunward Dr  
O'Fallon, MO 63368  
636-240-2443  
[pugdog64@yahoo.com](mailto:pugdog64@yahoo.com)

## EXECUTIVE COUNCIL

Ian Eggert	<a href="mailto:ijEggert@gmail.com">ijEggert@gmail.com</a>	262-391-2555
Charles Harrison	<a href="mailto:Charles@inkmkr.com">Charles@inkmkr.com</a>	314-894-9761
Jake Harris	<a href="mailto:jvh792@gmail.com">jvh792@gmail.com</a>	314-223-7950
Mike Huber	<a href="mailto:Michael.I.huber@jci.com">Michael.I.huber@jci.com</a>	314-737-6759
Holly Paoni	<a href="mailto:HPaoni@gmail.com">HPaoni@gmail.com</a>	217-320-5705
Caleb Pitman	<a href="mailto:Festus2014@yahoo.com">Festus2014@yahoo.com</a>	636-232-4461

Program Lead	Member	Contact Email	Phone
Advert & Promo	Ian Eggert	<a href="mailto:ijeggert@gmail.com">ijeggert@gmail.com</a>	(262) 391-2555
Advert & Promo	Jake Harris	<a href="mailto:jvh792@gmail.com">jvh792@gmail.com</a>	(314) 223-7950
Auction Chairman	Mike Hellweg	<a href="mailto:mhellweg511@charter.net">mhellweg511@charter.net</a>	(636) 240-2443
BAP Chair	Steve Edie	<a href="mailto:sredie@charter.net">sredie@charter.net</a>	(636) 922-4232
Convention Chair	Chris Mohrle	<a href="mailto:propagationaquatics@gmail.com">propagationaquatics@gmail.com</a>	(314) 541-3897
Corresp Secy	Pat Tosie	<a href="mailto:pattosie@yahoo.com">pattosie@yahoo.com</a>	(314) 616-4316
Exchange Editor	Kathy Deutsch	<a href="mailto:kathy@skdeu.com">kathy@skdeu.com</a>	(314) 741-0474
Fish Rescue	John Van Asch	<a href="mailto:johnsfishy0731@att.net">johnsfishy0731@att.net</a>	(618) 604-7228
Flower Lady	Angela Hellweg	<a href="mailto:pugdog64@yahoo.com">pugdog64@yahoo.com</a>	(636) 240-2443
HAP Chair	Mike Hellweg	<a href="mailto:mhellweg511@charter.net">mhellweg511@charter.net</a>	(636) 240-2443
Historian	Cory Koch	<a href="mailto:sithlid@gmail.com">sithlid@gmail.com</a>	(636) 278-0736
Hotel Liaison	Mike Hellweg	<a href="mailto:mhellweg511@charter.net">mhellweg511@charter.net</a>	(636) 240-2443
Librarian	Dave Rush	<a href="mailto:fishydave2@yahoo.com">fishydave2@yahoo.com</a>	(314) 291-8932
Membership	Ed Millinger	<a href="mailto:amazoneddyl@yahoo.com">amazoneddyl@yahoo.com</a>	(573) 883-9943
Monthly Bowl Show	Chris Mohrle	<a href="mailto:propagationaquatics@gmail.com">propagationaquatics@gmail.com</a>	(314) 541-3897
O-FISH-L Editor	Pat Tosie	<a href="mailto:pattosie@yahoo.com">pattosie@yahoo.com</a>	(314) 616-4316
Points Tabulator	Melanie Holmes	<a href="mailto:melanieholmes7158@yahoo.com">melanieholmes7158@yahoo.com</a>	(636) 293-4161
Program Chair	Gary Lange	<a href="mailto:gwlange@sbcglobal.net">gwlange@sbcglobal.net</a>	(314) 412-7636
Refreshments	Watson's	<a href="mailto:robertwrmrsh@yahoo.com">robertwrmrsh@yahoo.com</a>	(217) 532-3238
Social Events Coord	John Van Asch	<a href="mailto:johnsfishy0731@att.net">johnsfishy0731@att.net</a>	(618) 604-7228
Social Media	Holly Paoni	<a href="mailto:hpaoni@gmail.com">hpaoni@gmail.com</a>	(217) 320-5705
Swap Chairman	Holly Paoni	<a href="mailto:hpaoni@gmail.com">hpaoni@gmail.com</a>	(217) 320-5705
Webmaster	Charles Harrison	<a href="mailto:Charles@inkmkr.com">Charles@inkmkr.com</a>	(314) 894-9761
Welcoming	Ron Huck	<a href="mailto:emperortetraron@yahoo.com">emperortetraron@yahoo.com</a>	(314) 481-2915

## MEMBERSHIP



Annual membership in the Missouri Aquarium Society, Inc. is \$15 and includes an electronic subscription to The Darter. B&W printed Darter's are available at the meetings for Members: \$5; Non-members: \$7. Published six times per year.

Join or renew membership at any meeting, most club events, by PayPal from the MASi Website's Membership Page or by contacting the membership chair.

**EDITOR** Chuck Bremer [editor@missouriaquariumsociety.com](mailto:editor@missouriaquariumsociety.com) [www.missouriaquariumsociety.com](http://www.missouriaquariumsociety.com)

## THE DARTER

(ISSN 0192-7833) is a newsletter published six times a year by the Missouri Aquarium Society, P.O. Box 1321, Maryland Heights, MO 63043. The Missouri Aquarium Society (MASi) is a non-profit organization. This publication is free electronically to members of the Missouri Aquarium Society and other qualified requesters as determined by the publisher. Subscription requests can be sent to the above address or to [editor@missouriaquariumsociety.com](mailto:editor@missouriaquariumsociety.com). Use these addresses to notify of all address changes and please allow 6-8 weeks for change of address. Include the old address as well as new.

Opinions expressed by the contributors are their own and do not necessarily reflect the opinions of the Missouri Aquarium Society.

The editor reserves the right to edit any article for length, clarity, or content.. Photos provided are by each Author unless otherwise indicated.

## REPRINT POLICY

Reprints of individual articles are allowed as stated:  
PERMISSION TO REPRINT ANY ARTICLE IS LIMITED TO NONPROFIT AND NOT-FOR PROFIT AQUARIUM SOCIETIES. Permission is not given to redistribute or post the Darter in bulk.

Proper credit must be given to the author and one electronic copy or two printed copies of any publication in which a reprinted article appears must be sent to the exchange address: [Exchange@missouriaquariumsociety.com](mailto:Exchange@missouriaquariumsociety.com).

## EXCHANGE POLICY

MASi will exchange THE DARTER with other aquarium societies.

Failure to receive three consecutive issues of a society's publication may be considered as a termination of our exchange, unless advised to the contrary. Send electronic versions to [Editor@missouriaquariumsociety.com](mailto:Editor@missouriaquariumsociety.com) & [Exchange@missouriaquariumsociety.com](mailto:Exchange@missouriaquariumsociety.com)



**Cover - Allotoca maculata**

- Pat Tosie



# INSIDE THIS ISSUE



<a href="#"><u>From the President's Tank</u></a>	<a href="#"><u>Pat Tosie</u></a>	<a href="#"><u>4</u></a>
<a href="#"><u>New Members</u></a>	<a href="#"><u>Ed Millinger</u></a>	<a href="#"><u>5</u></a>
<a href="#"><u>MASI YouTube</u></a>	<a href="#"><u>Jake Harris</u></a>	<a href="#"><u>5</u></a>
<a href="#"><u>Parking Lot Swap</u></a>	<a href="#"><u>Various</u></a>	<a href="#"><u>6</u></a>
<a href="#"><u>Council Minutes</u></a>	<a href="#"><u>Council</u></a>	<a href="#"><u>7</u></a>
<a href="#"><u>Exchange Editor's Corner</u></a>	<a href="#"><u>Kathy Deutsch</u></a>	<a href="#"><u>9</u></a>
<a href="#"><u>Conservation Fisheries Challenge</u></a>		<a href="#"><u>10</u></a>
<a href="#"><u>MASI Auction Message</u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>11</u></a>
<a href="#"><u>Virtual Bowl Show Winners</u></a>	<a href="#"><u>Mohrle &amp; Paoni</u></a>	<a href="#"><u>12</u></a>
<a href="#"><u>Local Fish Shop Sponsors</u></a>		<a href="#"><u>14</u></a>
<a href="#"><u>MASI Fishy Folk - Phil Nixon</u></a>	<a href="#"><u>"La Truite"</u></a>	<a href="#"><u>17</u></a>
<a href="#"><u>Shop Hopping</u></a>		<a href="#"><u>18</u></a>
<a href="#"><u>MASI Fishy Folk - The Watsons</u></a>	<a href="#"><u>Mary Herschelman</u></a>	<a href="#"><u>19</u></a>
<a href="#"><u>Changes in the MDC handling of Crayfish</u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>20</u></a>
<a href="#"><u>Search for the right Cattail</u></a>	<a href="#"><u>Chuck Bremer</u></a>	<a href="#"><u>22</u></a>
<a href="#"><u>Why Can't I Get Rid of that @#\$% Duckweed?</u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>25</u></a>
<a href="#"><u>Water Snowflake lily, <i>Nymphaoides indica</i></u></a>	<a href="#"><u>Chase Klinesteker, SWMAS</u></a>	<a href="#"><u>28</u></a>
<a href="#"><u>The Bulldog Tetra - <i>Rachoviscus graciliceps</i></u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>29</u></a>
<a href="#"><u>Spawning <i>Polycentrus schmbergkii</i>, Dwarf SA Leaf Fish</u></a>	<a href="#"><u>Pat Tosie</u></a>	<a href="#"><u>31</u></a>
<a href="#"><u>Orange Lyretail Killifish, <i>Aphyosemion australe</i></u></a>	<a href="#"><u>Chase Klinesteker, SWMAS</u></a>	<a href="#"><u>32</u></a>
<a href="#"><u>Finding and Spawning <i>Chortiheros (Theraps) wesseli</i></u></a>	<a href="#"><u>Pat Tosie</u></a>	<a href="#"><u>33</u></a>
<a href="#"><u>Feeding Fish Bloodworms, Possible Health Risks</u></a>	<a href="#"><u>Thomas M. Keevin</u></a>	<a href="#"><u>34</u></a>
<a href="#"><u><i>Danio feegradei</i> and <i>D. meghalayensis</i></u></a>	<a href="#"><u>Dr. Paul Loiselle, JSAS</u></a>	<a href="#"><u>37</u></a>
<a href="#"><u>Fishes as Dishes - Crispy Bacon Wrapped Stuffed Tilapia</u></a>	<a href="#"><u>Pat Tosie</u></a>	<a href="#"><u>39</u></a>
<a href="#"><u>HAP Bloom Report</u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>40</u></a>
<a href="#"><u>Club Hopping</u></a>	<a href="#"><u>Steve Edie</u></a>	<a href="#"><u>41</u></a>
<a href="#"><u>Member Classifieds</u></a>		<a href="#"><u>42</u></a>
<a href="#"><u>HAP Temporary Rule Change Recap</u></a>	<a href="#"><u>Mike Hellweg</u></a>	<a href="#"><u>43</u></a>
<a href="#"><u>Virtual Bowl Show Rule Recap</u></a>	<a href="#"><u>Mohrle &amp; Paoni</u></a>	<a href="#"><u>44</u></a>
<a href="#"><u>Advertisers &amp; Supporters</u></a>		<a href="#"><u>46</u></a>
<a href="#"><u>MASI Supporters and Friends</u></a>		<a href="#"><u>48</u></a>

Article Photos are provided by the Author unless otherwise noted.

Click/Tap this to bounce back here. Then tap/click the article you want to read next!





## FROM THE PRESIDENT'S TANK

**Pat Tosie**

and winning! We will also be posting as many entries as possible in The DARTER. See page 12 of this issue.

**The 2020 MASi Challenge** (Conservation Fisheries, Preserving the Southeast's Aquatic Biodiversity) started strong, then everything came to a halt so we have extended the 2020 MASi Challenge till the end of 2021! Please keep this in mind when we start having face to face meetings and events. PLEASE bring some fish, plants and supplies to the monthly meetings and auctions and donate to this worthy cause so we can make or even surpass our goal. PLEASE support the MASi Challenge.

**We would like to sincerely Thank Melanie Holmes for her service on the Council the past year.** She has done a Fantastic job as Points Tabulator and Council member. As the Council Meeting Minutes indicate, because of COVID interruptions, the Council decided to suspend elections for 2020 and extend officers also through 2021. At that time she asked to step away for time management reasons.

**Jake Harris was appointed** to fill out her term until the next election is held. Thanks to Jake for helping out.

## FISH BUCKS! FISH BUCKS! FISH BUCKS! FISH BUCKS! FISH BUCKS!

**You still have the opportunity to EARN FISH BUCKS** and purchase special items at our upcoming annual banquet now scheduled for November 14, 2020. This will be a fun time, and remember, if you don't use your FISH BUCKS, you lose them, so come on out to our banquet and have some fun!

It's the time of year when NORMALLY the fish hobby gets very active with shows, swap meets and auctions. This year is different for obvious reasons, but we are starting to see some activities being re-scheduled.

**There was a MEMBERS ONLY swap on July 12** where MEMBERS brought their BAP and HAP (possibly a few other fish, pairs or groups), got a ticket for each bag and exchanged them in a drawing of pulled tickets. When your ticket was pulled, you got to pick a bag. You must have brought a bag to get a ticket. No money was exchanged.

**August 9 and November 8, 2020, are MASi's next auctions, and the MASi Swap meet is being planned for September 27.** The Ohio Cichlid Association is still planning their 26th Extravaganza November 20-22, 2020. If these happen, all are sure to be well attended.

*Keep looking below water....*

**Chuck Bremer**

## FROM THE EDITOR

**Lots of Information in this issue.**

**Now Go Find It!!**

**Content deadline for the 5th Darter of 2020 is September 8th.**

Send Feedback and Letters to the Editor to: [editor@missouriaquariumsociety.com](mailto:editor@missouriaquariumsociety.com)

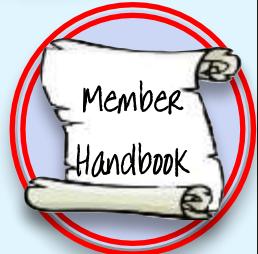


# MASI New Memberships for 2020!

Jim Abney	Saint Louis, MO
Amanda Diemer	Ferguson, MO
John Hittler	Hillsboro, MO
Eric Seider	Saint Peters, MO
Tony Steele	Fenton, MO
Matt Seggerman	St Charles, MO
Collin Tesreau	O'Fallon, MO
Ranjit Chauhan	Maplewood, MO
Pankil Doshi	Saint Louis, MO
Kevin Carnell	Jackson, MO
Andy Patrick	Saint Louis, MO
Mike Nekula	Saint Louis, MO

New Members  
since the May  
Darter!

Say  
“Hello” to  
new members  
and make  
them feel at  
home. Ask  
them their  
experiences  
and opinions.



Make them feel welcome!  
New Members bring interesting  
ideas that may help improve the  
club and make it more relevant for  
all.

Help these Folks get involved  
and you continue to improve the  
club!

Also **NEW**: Check out MASI's  Presence





## Parking Lot Swap Report

### MASI Members Only Parking Lot BAP/HAP Swap July 12, 2020 @ Jost Chemical Parking Lot

#### The Parking Lot Swap was a Success!

A small group of 30+ participated and everyone was diligent about wearing masks, even in the heat. Plenty of sanitizer was available and a breeze was blowing.

Setup began promptly at 9:00. The calling of numbers for replacement bags began promptly at 10:00 and ended just before 11:00 and before the thermometer passed 86F. There were well over 100 bags and it took about the same amount of time as an equivalent auction.

**It will go down as a BIG day for BAP and HAP** with nearly 50 BAP and 20 HAP turned in, in addition to several good fish brought by those who do not participate in BAP or HAP just to trade for new ones. Some nice and unique things, several never seen in any local fish store, crossed that table.

Although most present were longer term members, we did have several new members who came to a meeting for the first time and several members who came longer distances just to trade fish.

**"I'm new and have never been to one of these, how does this work?"** Was the most often asked question. To which the easy answer was "Neither has anyone else, help us learn together for the future;" Everyone was on an even footing, new or longer term members alike at this event.

**A brief visit to Jerry's Cory Castle was in line for most** and those present also had the opportunity to take advantage of a 50 Cents per gallon sale on some nice tanks that had been donated by a long term member. See the Want Ads for the remainder of those.



**Any feedback about how such a function could be improved for the future is welcome!!**





# COUNCIL MINUTES

Executive Council

**The voting portion of the Executive Council consists of 4 elected officers, 6 elected council members and the 3 appointed positions: Auction Chair, Editor and Show Chair.**

On page 2 are contacts for the current Executive Council and other Committee Chairs and Service positions within our Club. Please provide input to anyone or to attend the Council meetings yourself.

**Members are invited to attend the Council meetings to bring up issues, contribute to the discussion or just to see how they are run.** Meetings are currently being held by invitation on the ZOOM platform. Contact the Webmaster ([Charles@inkmkr.com](mailto:Charles@inkmkr.com)) if you desire an invitation.

**Give the Council your Feedback or Support!**  
**Next Executive Council Meeting July 23, 7:00 PM on ZOOM**



Pat Tosie called the meeting to order at Thai Rama Restaurant, hosted by Caleb Pittman. Present were Gary Lange, Angela Hellweg, Ian Eggert, Charles Harrison, Melanie Holmes, Mike Huber, Holly Paoni, Caleb Pittman, Mike Hellweg, Chris Mohrle and several guests.

## ANNOUNCEMENTS

The next Council meeting is Mar 28 at the home of Gary Lange.

MASI Fishy bowl is May 9 at Epiphany lanes.

**SECRETARY:** Angela read the Minutes from the Jan meeting. A motion to approve the amended Minutes was made by Mike

Hellweg and was seconded by Chris Mohrle. The motion passed.

**TREASURER:** Pat read the Treasurers report. A motion to approve was made by Angela Hellweg and was seconded by Charles Harrison. The motion passed.

**EDITOR:** The deadline for Darter submissions for the Mar-Apr issue is Mar 10. The Darter will be sent out on Mar 16 and will include the Spring Weekend information.

**CONVENTION:** Chris needs ideas for Fishy Bucks auction items

**LISTMASTER:** Chuck has 1000 names on the email list.

**POINTS TABULATOR:** Melanie has caught up with tabulating points.

**MEMBERSHIP & WELCOMING:** Ian needs an updated list of upcoming speakers for shop posters.

**SWAP:** 25 tables have been reserved so far.

**WEBMASTER:** The forum will be deleted from the MASI website due to non-use.

## OLD BUSINESS

Member of the Year nomination are Ian Eggert, nominated by Ed Millinger, Mike Hellweg, nominated by Charles Harrison, and Chuck Bremer, nominated by Tom Keevin. A motion to approve the nominations was made by Charles Harrison and was seconded by Caleb Pittman. The motion passed.

The 2019 MASI Challenge for the George Maier Funds ended with \$2500.00 raised. The check will be presented to the AKA at their June convention.

MASI shirts have been ordered and will be available at the next General meeting.

## NEW BUSINESS

The new owner of Art of Aquaria would like to work in cooperation with MASI and would like to do an interview for a Darter article.

A motion to adjourn at 8:25 was made by Charles Harrison and was seconded by Mike Hellweg. The motion passed.





Holly

After COVID

## COUNCIL MEETING

5/28/20

Pat Tosie called the meeting to order on ZOOM at 7:00. Present were Gary Lange, Jack Heller, Angela Hellweg, Ian Eggert, Charles Harrison, Melanie Holmes, Mike Huber, Holly Paoni, Mike Hellweg, Chuck Bremer, and Chris Mohrle.

## ANNOUNCEMENTS

The next Council meeting is June 18 at 7:00 on ZOOM.

## REPORTS

**SECRETARY:** A motion to approve the Feb Minutes was made by Mike Hellweg and was seconded by Chris Mohrle. The motion passed.

**TREASURER:** Jack Heller read the Treasurer's report. A motion to approved the amended report was made by Charles Harrison and was seconded by Chris Mohrle. The motion passed.

**EDITOR:** The deadline for the July/Aug Darter is July 7, and the Darter will be sent out on July 13.

**CONVENTION:** The Convention has been cancelled, but the Annual Banquet will be rescheduled for Nov 14.

**BAP:** Steve Edie is working on temporary rule changes for submissions.

**HAP:** Mike Hellweg announced temporary rules change during COVID-19. Members will be able to electronically submit HAP forms and photos and must write a 200 word article.

**LISTMASTER:** Chuck reported 83 MASI non renewals.

**BOWL SHOW:** Holly and Chris are working on a plan to have online bowl shows.

**SPEAKERS:** Gary is still working on choosing an online platform for speakers. Ed Millinger has volunteered to record member Fishrooms for online tours.

**WEBMASTER:** Charles will put a link to webinars on the MASI website.

## OLD BUSINESS

As of Jan, the MASI Challenge for Native Fishes Conservation has raised \$448.00. A motion to extend the challenge through 2021 was made by Mike Hellweg and was seconded by Charles Harrison. The motion passed.

## NEW BUSINESS

A motion to extend MASI Officer and Council member terms through June 2021 due to the

inability to hold elections because of COVID-19 was made by Mike Huber and was seconded by Ian Eggert. The motion passed.

A motion to extend MASI memberships through 2021 at no additional cost was made by Mike Hellweg and was seconded by Gary Lange. The motion passed.

A motion to resubmit a bid to host the 2021 AKA convention was made by Charles Harrison and was seconded by Ian Eggert. The motion passed. The date is to be determined.

A motion to submit a bid to host the 2021 ACA convention July 22-25 was made by Jack Heller and was seconded by Melanie Holmes. The motion passed.

Gary will look into the possibility of have an outdoor auction at a park.

A motion to adjourn at 8:12 was made by Mike Hellweg and was seconded by Chris Mohrle. The motion passed.





# EXCHANGE EDITOR's CORNER

Kathy Deutsch- FishWhisperer

**It is always eye opening to see the continuing quality of the exchanges with other clubs.** MASi gets its share of reprints, no doubt. But every exchange I see is at least entertaining and colorful.

**Contact me if there is an article you would like to read.**

## NEC March 2020 articles

"Raising Royal Farlowella Fry" and "Tips and Tricks" by Joan Snider was really a reprint from March 2016 TFCB

## NEC May 2020

*Candidia* Goby Breeding by Larry Feltz (Interesting and entertaining walk-through of a breeding process)

## BCAS Buckette June 2020 all reprints

But something on *marinum* in the lungs. It appears to be a British article about a gentleman who contracted an illness from his fish tanks. Don't start your siphons using your mouth- Yeah, I do it too.

## BAC June 2020

"Covid-19 and the Ornamental Fish Industry" by Anthony Kroeger. How the pandemic has hurt the industry, some different insights.

"*Teleogramma brichardi*" by Joe Graffagnino. A good breeding article.

"Sexing Neocaridina Dwarf Shrimp" by (presumptive) Ryan Curtis. Short, with illustrations of the shrimp.

Setting up African Biotopes in the Home series Part 4 "Agua Fria River Guinea" by Anthony Kroeger. A whole lotta info in a bite sized article.

"Transporting Corys-Avoiding Self-Poisoning" by Ian Fuller. I was riveted by this.

"You Say Cattapa, I Say Catalpa (Leaves That Is)" by Denis Vardaro. Short article extolling the virtues of Catalpa in a tank

"Zip! Zip! Zoom! Zebra Danios in Your Tank" by Anthony Kroeger. Lively article about keeping this fish.

"Species Profile Zebra Danio" by John Todaro. summary of information on the breed, referenced from seriouslyfish.com

"*Xenotoca lyonsi*" by Joe Graffagnino. Breeding and observations.

"John Todaro Experiences with Aphysemon bitaeniatum" by Anthony Kroeger. Short, first person article about a friendship and fish.

## KWAS June 2020

"Fish Room Lounge 2020" by Zenin Skomorowski. A detailed and fun article about building a fish room.

"Have Fish. Will Travel" by Karen Murray, thorough article about moving fish.

## GCAS July 2020

"*Andinoacara altifrons*" by Joseph Graffagnino, about keeping these cichlids, also searching, with several references, to the real name of these fish.

"Anubias, the Plant Anyone Can Grow" by Joe Ferkdenzi, helpful, complete guide to growing, as well as species that can be with them.

"Key Largo, Just Another Dive" by Stephen Sica, fantastic photos and a fun narrative about a dive.

## GPASI February 2020

BAP article on raising *Corydoras* C134 by Regina Spotti, step by step information

## GPASI May 2020

"90 Gallon Dirt Planted Discus Tank Project" by Jim Felix. One word: dang. Even if you never have any desire to try a dirt bottom tank, it is something to read.

"Spawning *Corydoras* CW109" by Eric Bodrock, nice background info and of course, spawning info.

## BCAS July 2020

**SHOUT OUT: Mike Hellweg was reprinted** with his Minifins article on Live Foods from the January-February 2018 Darter

## NJAS June 2020

"Pethia gelius Species Group" by Dr. Loiselle. Golden barbs. Really easy to digest article on these cool guys.

"DIY Time Release Fry Food" by Andrew Fa. With photos, a different twist on vacation feeding.

## YATFS June 2020

"*Aspidoras poecilus*" by Dave Ayre, fun and interesting article on the fish

## GSAS June 2020

"A Box Full of Wet Moss" by Alyssa Bentley, about breeding the Gulf Coast Pygmy Sunfish, long and really intriguing.

"Raising Bettas During Covid Lockdown" by Amit Bapat, in depth article on bettas



# MASI 2020 Challenge Extended through 2020 & 2021!!



## CONSERVATIONFISHERIES PRESERVING THE SOUTHEAST'S AQUATIC BIODIVERSITY

KNOXVILLE, TN



CFI is a non-profit, 501(c)3 organization in Knoxville, Tennessee. Founded in 1986 and incorporated in 1992, CFI is dedicated to the **preservation of aquatic biodiversity** in our streams and rivers. Over nearly 30 years they have developed techniques to propagate more than 65 nongame fish, including some of the **most imperiled species** in the southeastern United States. They were the first facility in the Southeast to propagate rare, non-game fishes for recovery work.

CFI's primary goal is to **restore fish populations** that have been eliminated because of pollution or habitat destruction. However, CFI also produces many rare or difficult-to-collect species for other purposes related to aquatic conservation.

Conservation Fisheries is most proud of the region's freshwater fish diversity, which includes more than 400 species, many of them threatened or imperiled.



**GOAL:  
\$2000+**

**Watch here for CFI featured species profiles each Darter issue of 2020: © CFI**

### **Percina aurora | Pearl Darter**

**The Pearl Darter is known only from** the Pearl and Pascagoula River systems in Mississippi and Louisiana (not known from Alabama).

Conservation Fisheries has kept individuals collected from the Pascagoula River (2002–2008) and even had some early spawning from Pearl Darters in 2002, 2004 and 2008 however, we have never had sufficient numbers of fish of the appropriate sex to achieve significant production.



**We have, however, successfully propagated the closely related Channel Darter, *P. copelandi*, and believed if provided with enough fish, we could successfully do the same with the Pearl Darters. The primary objectives are to develop efficient propagation protocols with an eye toward possible population augmentation in the future.**





## MASI AUCTION MESSAGE

Mike Hellweg

**Second rule change**, due to a change in the way the MO Dept of Conservation (MDC) is now interpreting certain sections of the Missouri Wildlife Code, we will no longer accept ANY Crayfish for sale. You can still keep them, just cannot sell or distribute them in the state of Missouri.

**Third rule change**, due to COVID 19, until further notice, as a courtesy to fellow members, ALL auction attendees and workers will be REQUIRED to wear a mask whenever inside the building. The auctioneers can remove them while auctioneering, but that's it. Away from the podium, auctioneers will have to wear one, too.

### As everyone now knows, the Annual Spring Auction was completely cancelled

after we made a couple of attempts to reschedule. We'll see if the Annual Summer Auction on August 9, 2019 can go off without too much of a hitch—though there will be some definite changes, so please read on.

**First rule change** as I mentioned last issue, no more Styros can be sold or will be accepted as donations at all—Period. The club will have a few for sale, but we do not want nor need any more, and the hotel will be charging us for each one left at the end of the auction. No one has room to store them. So please just properly dispose of them with your local waste disposal company.

**If you don't want to wear a mask, that's fine, but please don't bother coming to the auction.** No argument, no discussion, no excuses. We will simply ask you to leave, and will not accept your items for sale. The mask is not to protect you, it is to protect everyone around you. Obviously, if you don't feel well, please don't come.

**Fourth, again due to COVID 19 restrictions**, the room will be laid out differently with more space between rows, and no tables in the room. By law, capacity will be limited to 150 people - half of normal occupancy.

Members may begin registering as sellers on July 19th at 12:01 am, and seller registration will be open to all on July 26th at 12:01 am.

**Of course, all of this is pending no further worsening of COVID 19 in our area.** So in the meantime stay in your fishroom, change lots of water, and if you go out, wear a mask!

**Watch the Facebook page, Band page, website and your email for updates as we get closer to August 9th.**

As always, the hotel will have lunches available.

**Hopefully we'll all be able to get together soon!**



And for now, 'nuff said,

Mike

[auction@missouriaquariumsociety.com](mailto:auction@missouriaquariumsociety.com)



**Holiday Inn**

**AIRPORT WEST, EARTH CITY  
3400 RIDER TRAIL SOUTH  
ST. LOUIS/EARTH CITY, MO  
63045**



**Get Ready for an Auction  
August 9, 2020!!  
Aquarium FISH,  
Plants, Equipment,  
TANKS, Fish Food,  
Décor and all things  
Aquarium!!**





# The Missouri Aquarium Society's NEW Virtual Bowl Show June, 2020 Winners!



[propagationaquatics@gmail.com](mailto:propagationaquatics@gmail.com)

[hpaoni@gmail.com](mailto:hpaoni@gmail.com)

**We have taken our Bowl Show, ONLINE**, and it can be found under our pinned notices in our Facebook discussions group- <https://www.facebook.com/groups/MissouriAquariumSociety/>. There are 2 classes each month, each in their own pinned post.

**June 2020 was our first month**, and there have been a few kinks to get worked out, but mostly its doing well, if a bit slow. As a NEW program, that's to be expected.

The judges were having a hard time this month as no one that entered provided a size reference in their photos. This can be any standard sized object. Taping a quarter or dollar bill to the glass, laying down a tape measure, or yard stick, or even putting a soda can or water bottle in the photo would be very helpful. The judges just did the BEST they could considering.

**We want this to be a fun and easy way to participate in the club**, while we aren't able to meet. You also earn bragging rights, fishy bucks, and may see your photo fish on the cover of a social media group and in the Darter.

**We hope to see everyone enter the contest soon!**

## June Bowl Show results...

**Bare Essentials (fish of 1 solid color, nose to tail, and fins)**

**1st place - Jake Harris- Albino Bristlenose.**

**2nd place - Emily Rose Vandygriff- *Amphilophus sagittae***

**3rd Place - Jake Harris- Electric Blue Acara .**



See the  
Rules on Page  
44 and Enter  
YOUR Fish  
Too!!



## Characins - (Tetras, Pencilfish, etc)

1st - Megan Moncure- Red / Blue Columbian Tetras.

2nd- Jake Harris, Beckford's Pencilfish.

3rd place- Megan Moncure- Emperor Tetra.



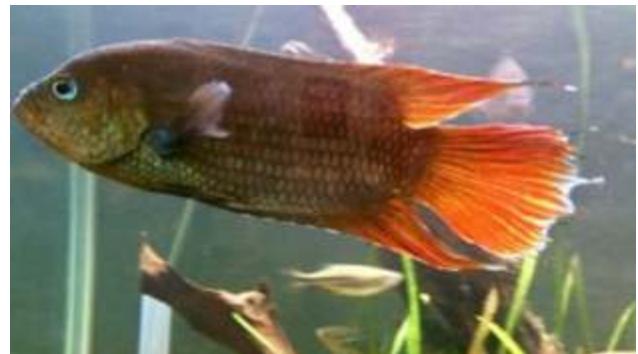
## Peoples Choice-

Emily Rose Vandygriff- *Amphilophus sagittae*



## Honorable Mentions-

Melanie Holmes -*Belontia signata*



Each entry earns 1 Fishy Buck.

3rd Place gets 3 bucks,

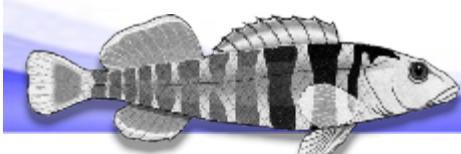
2nd place gets 4,

First Place and peoples choice get 5 fishy bucks.

Anyone can have 5 entries per month... So start collecting those fishy bucks, for our awards banquet fishy buck auction.

Get those July entries in. ;-)





## The DARTER

This time has also been especially difficult for most of the Local Fish Shops (LFS). Please be cognizant of their plight and patronize them when you can.

Many of them are keeping store hours or offering on-line or by phone ordering with curbside pick up.

All ads have the LFS' phone numbers listed. Call them or visit their web sites when you need something and find out how to make the transaction happen.



**Malawi Aquatics**  
Custom Aquariums &  
Maintenance



IMPORTERS OF QUALITY  
AFRICAN FISHES

AQUARIUM CONSULTANTS

Over 50 species of Cichlids of both Africa and South America as well as many other aquarium species and oddities.

Huge selection of aquariums, rock and décor to help all display their best



11619 W. FLORISSANT BLVD.  
ST. LOUIS, MO 63033  
(314) 830-6460



Your Hometown  
Pet Specialist

314-849-4020  
[www.twpstl.com](http://www.twpstl.com)

8444 Watson Rd.

St. Louis, MO 63119  
Mon.-Sat. 9:30-9:00

Sunday 11:00-6:00



\* Excludes Sale items.

Freshwater, Salt Water, Reptiles, Dry Goods





We offer the largest selection of Saltwater fish, Plants, Corals and Inverts.

Check Our Weekly Special On  
our face book page [f](#)

**Store Address:**  
1972 S Old Highway 94,  
Saint Charles, MO 63303  
PH: 636-757-3684

**Hours of operation:**  
**TUESDAY-FRIDAY 1:00PM-8:00PM**  
**SATURDAY 11:00PM-8:00PM**  
**SUNDAY 11:00PM-6:00PM**  
**CLOSED MONDAY**

**YOUR local supplier of animals and equipment for marine systems!**

Marine fish and invertebrates, live rock, R/O water, premixed saltwater, water additives, fish foods, meds, pumps, filters, heaters, skimmers, and more.

Water tests and saltwater system problem solutions.

M-F 11A-7P 3802 S Lindbergh, Ste. 103  
Sat 10A-8P Sunset Hills, MO, 63127  
Sun 11A-4P Ph: 314.843.3636

**Aquaria & Gifts**  
**SEASCAPE** Studio



Over 100 tanks and  
**HUNDREDS** of  
Freshwater species!!

**“The difference is  
Black and White”**

720 S Neil Phone: 217-352-1121  
Champaign, IL 61820 Fax: 217-352-9502  
[www.Sailfin.com](http://www.Sailfin.com) Email: [sales@sailfin.com](mailto:sales@sailfin.com)

**HOURS**  
Monday - Friday 9:00 am - 7:00 pm  
Saturday 9:00 am - 6:00 pm  
Sunday 11:00 am - 5:00 pm

**Only 2 1/2 hours from the Arch!**



**AQUA-WORLD**

Family Owned and  
Operated For Over  
Thirty Years



3910 Gravois Ave. 16063 Manchester Rd  
St. Louis Ellisville  
314-772-0100 636-391-0100  
M-F 10:30-8:00 M-F 10:00-8:00  
Sat 10:30-6:00 Sat 10:00-6:00  
Sun Closed Sun Closed

**Aqua-World facebook**



# PET CONNECTION



## Between The Hill and Botanical Garden

2212-2214 S. Vandeventer Ave.  
- St. Louis, MO. 63110

Pet Connection is the place to come, whether you're looking for a new pet or just need to take care of one you already own.

[www.petconnectionstlouis.com](http://www.petconnectionstlouis.com)  
petconnection89@sbcglobal.net  
314-773-7387 / 773-PETS  
Mon - Fri: 10 AM till 6 PM  
Sat: 10 AM till 4 PM



For fish products shop the yellow and blue aisles.



10251 Lincoln Trail, Suite #11  
Fairview Heights, IL 62208  
(618) 514-9571



Hours: Tue-Fri 2-7; Sat 10:30-7; Sun 12-6



**Fresh & Salt Water  
Tank Maintenance  
& Other Services!**



Dog

**Pet Adoptions**

Cat

Online Adoption Search

Fish

Affordable Vaccinations

Small Animal

Phone On Lindburgh  
in Florissant, MO:  
(314) 839-5136

Reptile

**Pet Services**

Dog Training

Grooming Salon

Affordable Vaccinations

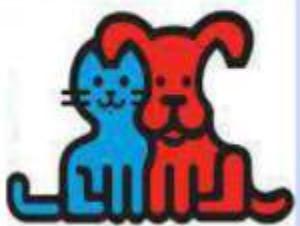
Bird

[www.petco.com](http://www.petco.com)

Pooch Hotel

Pet Sitting by  
Rover.com

**petco**



17 St. Louis locations



At Midwest Tropical Fish you can find the largest selection of Cichlids in the Midwest. Our main focus is customer satisfaction. We deal only in high end products for your happiness.

**Shop in store or at [www.midwesttropicalfish.com](http://www.midwesttropicalfish.com)**

*Pick up in Store or we can ship it to you.*

**Subscribe to our Mailing List**

618-946-7408

[midwestfish2@gmail.com](mailto:midwestfish2@gmail.com)  
214 South State Street  
Jerseyville, IL 62052

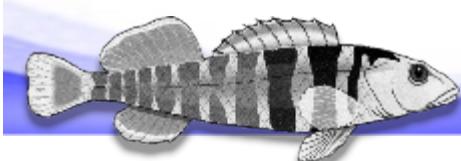
Mon: 10:30 am - 6:30 pm

Tue - Thu: 11:00 am - 7:00 pm

Fri - Sat: 10:00 am - 8:00 pm

Sun: 12:00 pm - 6:00 pm





## Meet MASI Fishy Folk: Phil Nixon

### CAFE Member Interview with Phil Nixon

by "La Truite"

Reprinted from the Champaign Area Fish Enthusiast's (CAFE) In Seine Menu, June 2020

### Phil is also a MASI Member

**P**HIL NIXON, OUR CAFÉ treasurer, is by profession an extension entomologist, now retired. His interest in insects and fish began when he was about 11, playing in a central Illinois creek near his home south of Springfield.

**His older brother had a three gallon fish bowl in which he had kept Goldfish.** Phil thought he could bring some Creek Chubs home and put them in it. He learned about water changes and that the Chubs were better behaved than the Goldfish who regularly attempted Harikari by leaping out of the bowl onto the floor.

At an early age Phil was interested in biology and one day collected a Mason jar full of pond debris, water, and its inhabitants. His brother had a small microscope that Phil used to classify the animals in his sample which he was able to do pretty successfully and record. No comment about whether the Chubs got live food



Phil Nixon with his tanks. This particular tank is home to some red-faced Top Minnows.

supplements from these early collecting trips.

**When Phil was about 13 he upgraded to a 6 gallon rectangular tank** with an air pump-powered box filter and later replaced it with a hang-on-the-back airpowered filter. These were the kinds of filtration available in small tropical fish shops in the mid-60s. In high school Phil got another 5-gallon tank and attended Springfield fish club auctions and populated the tank with Swordtails and Corys.

**After high school,** Phil attended a community college while living at home and took biology courses in preparation for transfer to Southern Illinois University. He considered high school teaching until a course in educational psychology dampened his interest in education. While at Lincoln Land Community College he did a 4-H entomology project and took an entomology course spawning his interest in that area. His 4-H insect collections advanced from the county level to the State Fair where they were judged by University of Illinois entomologists. They remembered him

eight years later when interviewing him to be a U of I entomologist.

**He moved his tanks and fish to SIU and added a 15-gallon tank** to his collections, which he recalls had grass pickerel, silversides and a large-mouth bass. He completed bachelors and masters degrees in zoology, specializing in entomology, with botany minors at SIU.

**Phil did his Ph. D. in entomology** at Kansas State University. He moved his aquarium systems to his aunt's house and among other species, raised Oscars, at first not so successfully. Young fish died for no apparent reason, until he discovered that young Oscars need dither fish to chase. This gave him experience in keeping angelfish as they were inexpensive and easy to rehome once the Oscars grew up. A lab on campus was doing research on roaches which supplied his Oscars with live food.

**After receiving his Ph. D.**, he and Carie married and moved to the Chicago area where he was hired as a University of Illinois Extension Entomologist. There for seven years he



organized lectures and consultations, largely with commercial firms that in some way dealt with insects. Phil and Carie bred native Killifish and were members of the Chicago Killifish Association.

**In the early 1990s the Nixons' moved to Champaign**, first living in Dobbins Downs, later buying a house in rural Tolono. They joined CAFE around 1991 with Phil becoming Librarian and a board member about a year later. He ceased to be Librarian when the library was sold about a year ago. Phil has served two stints as President of CAFÉ, the most recent for more than ten years until becoming Treasurer in 2016. He is an auctioneer at CAFÉ auctions, as well as those of MASI and Tri-County. They are members of the Illinois Audubon Society and Carie is a board member of the Champaign County Audubon Society. They are also members of the Bonsai Society of Central Illinois of which Phil is President.

**Currently the Nixons' have 30-40 tanks, including three 75's and a**

**125.** Most of the tanks contain sponge filters, supplied with air from a large in-line piston pump. Most of the tanks are located in the basement, and the air runs through 2-inch diameter PVC pipe along the ceiling.

The Sailfin Shiner tank has an underground filter, and the 125 Bristol Shubunkin Goldfish tank has a canister filter. Several tanks have power filters, with the Goldfish tanks also having sponge filters. Some tanks are lit by LED's, but most have fluorescent lights. Almost all tanks have plants grown in trays of topsoil covered with gravel. These include several species of Cryptocoryne, Vallisneria, and Aponogeton. Many tanks also have Najas or Java Moss.

**Fish include Shiners, Killifish, Carie's Goldfish, and Dwarf Bristlenose Plecostomus.** They regularly supply plecos to Sailfin Pet Shop. Phil's fish are primarily natives whose parents or grandparents were collected by him, many on trips to North American Native Fishes Association annual conventions, where he is their auctioneer.



## SHOP HOPPING - St Louis Area, 2020

**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!**

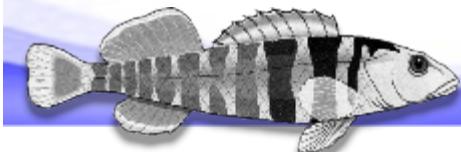
**Happy Fish Shopping!**

*The Missouri Aquarium Society*



Local Fish Shop	Location	Phone
<b>AquaWorld, Gravois</b>	St Louis, MO	(314) 772-0100
<b>AquaWorld, Manchester</b>	Ellisville, MO	(636) 391-0100
<b>Corals-n-More</b>	St Charles, MO	(636) 757-3684
<b>Give Shops a Call or Order On-Line where available</b>		
<b>Malawi Aquatics</b>	Florissant, MO	(314) 830-6460
<b>Midwest Tropical Fish</b>	Jerseyville, IL	(618) 946-7408
<b>Pet Connection</b>	St Louis, MO	(314) 773-7387
<b>Petco, N Lindburgh</b>	Florissant, MO	(314) 839-5136
<b>Sailfin Pet Shop</b>	Champaign, IL	(217) 352-1121
<b>Saltwater Paradise</b>	Fairview Heights, IL	(618) 514-9571
<b>Seascape Studios</b>	St Louis, MO	(314) 843-3636
<b>Tropical World Pets</b>	Webster Groves, MO	(314) 849-4020





## Meet MASI Fishy Folk: Bob & Lora Watson

### Watson Couple Enjoy Collecting Rare Fish

© Mary (Galer)  
Herschelman

Reprinted with permission from

June 29<sup>th</sup>, 2020, Montgomery  
County, IL



**H**OBBIES COME IN all shapes and sizes. Some like to hike in the great outdoors. Others like to try their hands at photography or golf.

**But Bob and Lora Watson of Hillsboro found a hobby that keeps their fins busy, caring for thousands of rare and unique fish in their home.**

“My husband has always had fish,” said Lora Watson. “Then about eight years ago, we really got into it.”

Watson said her husband saw an ad online for a fish show from the Missouri Aquarium Society near the airport in St. Louis, and the couple decided to check it out. While they were there, Bob signed up to become a member of the club.

**They now belong to five different organizations dedicated to collecting and preserving rare fish,**



**Abigayle Sturgeon, granddaughter of Bob and Lora Watson of Hillsboro, checks out one of the fish tanks in her grandparents' home. The Watsons collect colorful and unique fish in their 60 aquariums. They also enjoy teaching their grandchildren about taking care of fish and helping to preserve rare breeds and fish that are often extinct in the wild.**

and have 60 aquariums in their basement where they care for them.

As their hobby took to the water, the Watsons began to learn more about caring for fish. Her husband was interested more in “live bearers,” which are fish that give birth to babies, instead of fish that lay eggs. Although, they do have fish that lay eggs as well.

“We learned about what temperature the water needs to be for different fish and how to treat it,” Lora said. “It’s always a learning process.”

**She said they have about 50 different species of fish** in their home, and caring for them includes weekly cleaning of all the tanks. Watson said it can be an all-day process on her own, but that she and her husband can do it together in about four hours.

To clean the tanks, they carefully wipe down all the exposed sides and vacuum out the “gunk,” replacing 25 percent of the water with fresh water.

“They enjoy it when I clean their rooms,” Watson said with a laugh.

The fish eat typical fish flakes like many pet fish, but also live worms and the baby fish eat brine shrimp.

“For my husband, he just really enjoys the fish and finding those rare ones that don’t exist in the wild,” Lora said. “For me, it’s just a lot of fun.”

**One of her favorite parts is watching the bearers give birth.** Just this week, a white swordtail had 40 to 50 babies. She said the most they have ever counted was 80 babies from one birth, and all of them lived.

Lora said one of their most unique fish is the Rio Otapa, which are originally from a river in Mexico, but are quite rare. Because of poachers in that area of the river where they live, part of the river is a “no collection” area until the population rebounds.

“However, because of people like us, we no longer need to disturb the wild ones as long as we can keep them in the hobby by raising them and sharing them with other hobbyists,” Lora said.



**The Watsons have raised the swordtail fish for several years, even winning second place in an annual show from the American Live Bearers Association one year.**

“That one is really special to us because it was a nationwide show and we competed with people from all over the Americas,” she said.

That plaque is displayed in their basement near the aquariums with other awards they have won. Another plaque is dedicated to an article they wrote from one trip when they took their grandson, Skyler, with them on a collecting trip, and he discovered a fish not native to that particular area.

**Although breeding the fish is a hobby and not a business** for the couple, they do sell some of the fish and ship them nationwide. Lora said the fish have to fast for two to three days before shipping, and are then put in a bag (similar to if someone purchased one from a pet store or won one at a carnival). The fish have to fast so they do not create waste in the bag during shipping. She then packs styrofoam around the bags and ships them. So far, all their fish have arrived safely at their destination, even though one order took two weeks to arrive in New Jersey.

At this time, the Watsons only ship fish to the continental United States because they worry about the safety of the fish in sending them afar to other countries. They are also careful to ship mostly in the spring and fall due to extreme temperatures in the summer and winter months. She said that due to the pandemic and lack of shows, their aquariums are pretty full at this time, and she hopes the shows will be able to start up again soon.

**During the summer months, they host what Lora affectionately calls “fishy summer camp,”** keeping a large variety of fish in barrels in their yard. Lora said they thrive in the outdoors, growing and becoming more vibrant in color. They also help to keep the mosquito population down, eating the eggs the pesky bugs lay in the water.

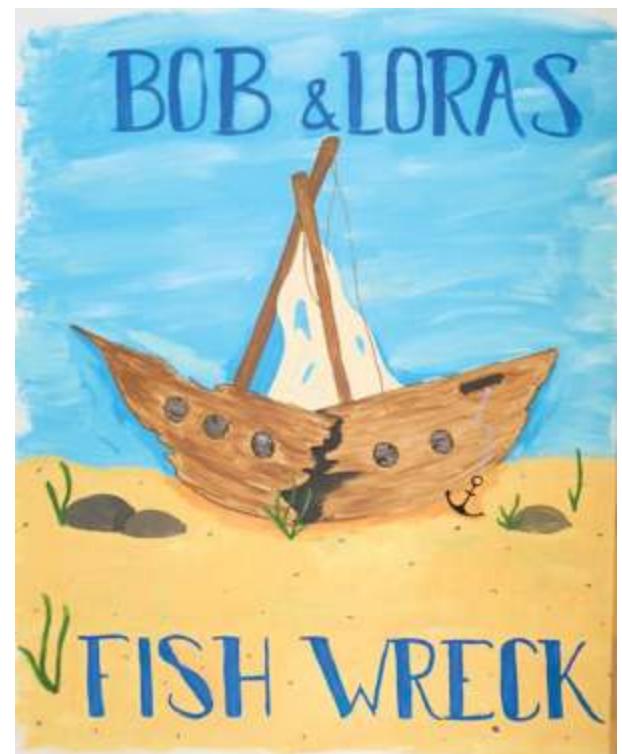
“It’s just become something we both really enjoy,” Lora said. “And we enjoy doing it together.”



**Lora Watson and her granddaughter, Abigale Sturgeon, check out her “fishy summer camp” where they allow the fish to enjoy the outdoor life during the summer.**

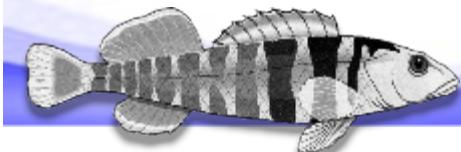
**The couple have also met lots of new friends who collect fish in Illinois and Missouri.**

When she’s not caring for fish, she’s the apartment manager for Village Apartments in Hillsboro and her husband is the owner of Watson and Sons Electric. They also manage several rental properties and enjoy spending time with their children and seven grandchildren, with a new one due in November.



**This mural leading to the Watsons’ basement was painted by their daughter, Kelly Watson, in tribute to their growing hobby.**





## Changes in the MO Dept of Conservation handling of Crayfish

—

By Mike Hellweg

**A**S SOME OF you may have heard, recently a couple of local shops have been cited by the MO Dept of Conservation (MDC) for selling what, up till now, have been popular Crayfish- the Mexican crayfish and the blue "lobster".

**The controversy has popped up on our social media pages**, too. Only the genus *Cherax*, the rusty crayfish and the self cloning Marmorkrebs are outright banned, meaning you cannot possess them. The other crays have been legal but now things have changed for them.

Since the regulation is written rather confusingly, I checked with the MDC and got their official statement. People can still keep crays that they already have, but live crays can no



longer be bought or sold except for food or for scientific research. Crays can also be caught and used for bait, and one species can still be raised and sold for bait - the virile or Northern Crayfish, but this does not include the aquatic hobby.

**Basically, it means no more crays in the auction.** I have amended the auction rules, and Holly is amending the swap rules to the same effect. NO crayfish of any species may be sold. Those rules will be posted on the MASi website and circulated, before the our next public Auction.

**Marmorkrebs: Elizabeth Pennisi, Science, 2018** "An aquarium accident may have given this crayfish the DNA to take over the world"

<https://www.sciencemag.org/news/2018/02/aquarium-accident-may-have-given-crayfish-dna-take-over-world>

<https://alchetron.com/Marmorkrebs>

**MO Dept Conservation, Regulations & Feedback:**

<https://mdc.mo.gov/about-regulations/wildlife-code-missouri/comment-existing-regulations>

<https://mdc.mo.gov/newsroom/crayfish-regulation-discussions-continue-o>



**CPO or Orange Mexican Dwarf Crayfish**



**Cherax - Common Yabby**

<https://nas.er.usgs.gov/queries/greatlakes/FactSheet.aspx?SpeciesID=58&Potential=Y&Type=2&HUCNumber=>

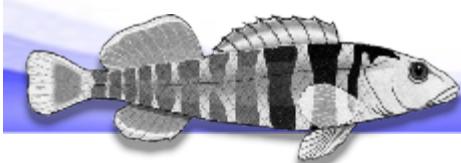


**Procambarus alleni - Electric Blue Crayfish**



**Cherax destructor - Common Yabby, a large crayfish that comes in several colors**





## The Search for the right Cattail!

By Chuck Bremer

**C**ATTAILS! Been around them all my life and didn't realize there were so many!

I grew up on a farm and soon after we constructed our first farm pond, when I was very young and impressionable, the cattails showed up as the first inhabitant. I always thought there was only one kind of cattail and that no outside body of water was complete without them.

Fast forward about 50 years and well into my fish keeping days... where my focus, not unlike that farm pond, has been on creating mini aquatic communities. I like to create a balanced community in a small space, therefore small fish and usually small plants. When graduating to outdoor tubs I took this desire for miniatures back outside to create outdoor tubs as miniatures of the outdoor habitats I knew.

I decided that any outdoor habitat has to have cattails- to match my mind's eye of that early farm pond. That's when things got a bit more complicated!

I remembered cattails as an up to 3/4" wide broadleaved, grassy plant growing in the edge of the water that bloomed and produced a seed stalk and hotdog shaped inflorescence up to 6



inches long and about an inch in diameter.

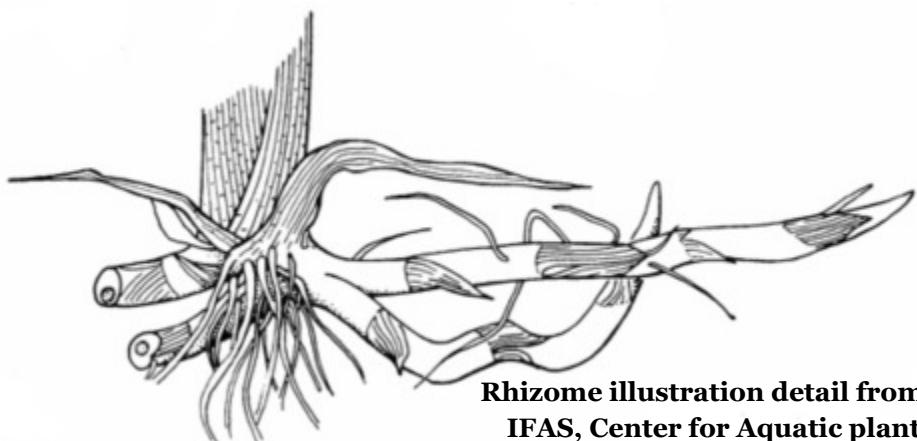
Below ground the cattail has a corm like root system that grows about six inches below the surface of the mud and, depending on the species, may grow in water up to 3 feet deep. The leaves consist of vertical veins with large air filled cells and are arranged alternately on the central stem or spike. New spikes form at nodes of the corms/rhizomes and the plant can spread rapidly.

Cattails have a long history with humans around the world and are eaten, used for building and tools and also for medicinal purposes. Euell Gibbons in his book "Stalking the Wild Asparagus" titles the chapter on cattails as "Supermarket of the Swamp" which

others have now paraphrased as the "Super WalMart of the Swamp".

**One of its values is Edibility**- the young shoots and the corms/rhizomes, said to taste like cucumber, are dug and eaten raw, steamed or boiled. The pollen can also be used as flour for many purposes. Per surface area, cattails can produce more starch than the equivalent area of potatoes! The North American Indians introduced the first European settlers to the cattail as a staple and helped many survive the Northeastern winters. Even in hard times cattails are easily dug even from below a sheet of ice as they begin to develop and emerge in the spring.

**Other uses include** the tough leaves as thatch for roofs, cordage for binding, weaving materials for various



Rhizome illustration detail from;  
IFAS, Center for Aquatic plants  
University of Florida, Gainsville, 1990



purposes and tinder for fire making. The tough and straight central stem can be used as a hand drill or arrow shafts and stem extract can be used as a styptic or wound dressing.

Even though the common cattail is a bit large for my smallish tubs, while looking over possibilities for outdoor gardening I was astounded to find that there wasn't just one species of cattail but several and the one most likely to fit best in my small tubs was the one commonly called the dwarf cattail or *Typha minima*. Thus began a hunt.

**It turns out that there are several species of cattails**, up to 30 around the world, and the one I grew up with in Southern Illinois is not morphologically like most of the other commonly available species in that it has wider leaves than many.

Most of the species are similar in that they have narrower leaves, less than 3/4" wide and of varying heights from 2-8', depending on the species.

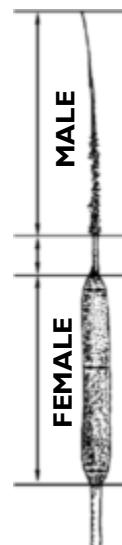
**Nearly all species commonly found in the aquatic hobby look identical** in a pot waiting at the water-garden center for sale because cattails usually bloom only on the second or third year's growth and the flower contains the most easily distinguished characteristics.

The smaller species are also not commonly found in the wild in the US and are shipped to the garden centers in the spring before blooms develop. Since growth is new every year, all have short stalks at that time- no matter what the species. My experience was that no matter what the species was marked on the pot the chance of getting it correctly identified was not 100% - even with two pots sitting side-by-side. Nor did I know enough about the different species to know that not all would be miniatures when fully grown.

### The major characteristics of the cattails are

not just the leaves but as with many groups of plants, the flowers. Each cattail plant is monoecious and has both male and female blooms on the same plant. In most species, both sexes can be found on the same stalk with the male flower above the female separated by a space. The male flower (stamina) is much more fragile and exists only to pollinate the female (pistil) which will then develop the familiar fruiting structure or "cattail". After pollination the male portion often falls from the stalk leaving a sharp elongated tip above the remaining "cattail".

From my bumbling search to find the best species for my outdoor miniature tubs I developed the following guide to the most commonly found cattails in the US, including garden centers.



*T. angustifolia*

### Broadleaf Cattail - *Typha latifolia*

*latifolia*, native to North America, is the most often found broad leaved species with leaves of a blue color up to one inch in width. It is not quite so tall as *T. domingensis* so fares better and is already likely native in most areas so not considered as invasive. Several varieties of *T. latifolia* have been developed with striped leaves for use in waterscaping: var = *variegata*; and these are often offered for purchase in garden centers.

**Hybrid Cattail - *Typha x glauca***, is a hybrid between *T. latifolia* and *T. angustifolia* or *T. domingensis* that

### Common Cattails available in the United States

**Narrowleaf Cattail - *Typha angustifolia***, likely originated in Europe but became introduced so early into North America, possibly even by migrating birds, that it is a common cattail in the wild even across the northern half of the United States and all of Canada. In many places it is the predominate species and is often sold and used for water gardening.



*T. latifolia*

## Cattails Commonly Found in the United States

Species	Common Name	Origin	Leaf Width In.	Height to Ft	Flower Parts - In.		
					Gap	Len	Dia
<i>Typha angustifolia</i>	Narrowleaf Cattail	Europe	0.5	5	1	5	0.5
<i>Typha domingensis</i>	Southern Cattail	N America	0.5	6	0.5	6	0.75
<i>Typha latifolia</i>	Broadleaf Cattail	N America	1	5	0	5	1
<i>Typha laxmannii</i>	Graceful Cattail	Europe/Asia	0.5	4	2	4	0.75
<i>Typha minima</i>	Dwarf Cattail	Europe/Asia	0.25	2	0.25	2	1



may occur either artificially or naturally in the wild. It is often called Blue or White cattail and the initial crosses are considered to be sterile but backcrosses do occur. However, the cross occurs so easily and the seedlings are so vigorous and rapid growing, up to 4 meters (12 ft.) per year, that it needs no sexually reproductive phase to spread rapidly and is already considered one of the more invasive cattail varieties.



*T. domingensis*



*T. laxmannii*

dwarf types and can then become confused with *T. minima* - even being cross-labeled on occasion.

**Dwarf Cattail - *Typha mimima*,** sometimes also called the Miniature Cattail is native to Asia and the Alpine lakes of Europe and is the smallest of the cattails normally used for waterscaping. As the smallest it is also more easily outcompeted by the other species if they should be planted together. Early in the spring in the pots at purchase it looks identical to the other narrow leaved species. Even though *T. minima*'s adult leaves rarely exceed 1/4 inch they may be so narrow as to appear nearly round and at the small size when just emerging from the substrate the other narrow leaf species look similar.

**Dwarf Cattail (other) - *Typha gracilis*** - is not currently considered to be a valid species but it is still sold by some under that name especially in



*T. minima*

**Southern Cattail - *Typha domingensis***, from the southern parts of North America, is very common across the southern US but has not invaded the northern portions where it is considered an undesirable pest. Most states have prohibitions against this species, although it is found on occasion to have been imported and established in small areas. For most water garden uses it is too tall, rising to 8', to make an attractive plant in proportion to others in the waterscape. This species is rarely offered for purchase.

#### Graceful Cattail - *Typha*

*laxmannii*, sometimes also called the/a Dwarf Cattail, is a native to Europe and Asia and is often sold for waterscaping because it is somewhat shorter than either *T. augustifolia* or *T. latifolia*, the other narrow leaved cattails. *T. laxmannii* is considered invasive and as such is prohibited in some Midwestern states. Because of its slightly shorter height and alternate common name it may on occasion be sold as one of the

Europe. To further confuse the name of "Dwarf Cattail", most scholars consider the real *T. gracilis*, named by Rafinesque in his 1836 book on N. American Flora, to be a subspecies of *T. angustifolia*, and it was synonomized in 1909, but a few consider it a synonym of *T. minima* which serves to point out the continuing confusion between the dwarf and narrow leaved cattail types.

#### Cattails are easy to grow.

**Plant them directly into the substrate** in a larger pond for maximum spread or into a pot when spread needs to be controlled, such as a water garden or tub. They do best in loamy and even clay soil but because of their height and ability to catch the wind some rocks or other weights can be used to reduce tipping when potted. Cattails need water and, although they may grow some if not covered in water, most species need to be covered with water three or more inches deep to thrive. Depending on species, some will grow in water several feet deep. Most species are considered winter hardy and will even withstand freezing. They do best in full sunlight but will grow more slowly also in partial shade.

**Most species of cattail are also considered invasive**, especially non-native ones. Check in your area for the species you intend to acquire before doing so. Although a naturally invasive group, cattails can themselves be overcome by many reeds and rushes such as *Phragmites*, common reed grass, over time. It is interesting to watch a fresh body of water to see the progression of species in the natural ecology.

**You will find the cattail group an interesting and beautiful addition to any water garden, large or small.**

#### References & Additional information:

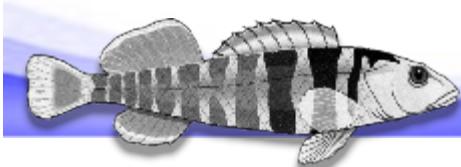
<https://www.backwoodshome.com/the-incredible-cattail/>

Rafinesque, C. S., 1936, New Flora and Botany of North America, Vol 1., Philadelphia, PA.

Speichert, Greg & Speichert, 2004, Encyclopedia of Water Garden Plants, Timber Press.

Numerous online State Conservation Dept flyers on invasive and local species





## Why Can't I Get Rid of that @#\$% Duckweed?

—  
By Mike Hellweg

**D**UCKWEED IS AN oft cursed plant in the aquarium hobby. Some of our fellow hobbyists absolutely hate it and will curse not only the plant, but also anyone who keeps it, while others have learned to love it and actually attempt to grow it!

It can be very useful, but it is much maligned as it very quickly gets out of hand and becomes an infestation that, once established, becomes very difficult to eradicate – as I can well attest.

**But why does this happen?** Why does duckweed do so well at taking over? And most of all, how can we get rid of it once and for all? To get answers to these questions, first we need to understand our adversary.

**Duckweed has been around a long time**, and the fossil record shows that some of the earliest duckweed was annoying the dinosaurs during the Cretaceous Period. It is now found pretty much worldwide and is likely dispersed the same way it moves from tank to tank for us, by sticking to things that move from one body of water to another. Since it is both eaten by and dispersed by waterfowl, someone at some point gave it the clever common name of duckweed. Anyone who has seen a nature video of



wildlife in swamps has seen duckweed sticking to the various animals who make their home in the swamp.

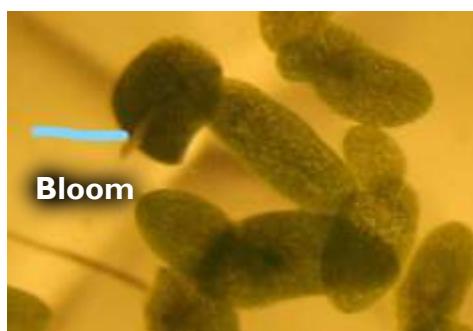
**The most widespread species is likely *Lemna minor***, which originally occurred in Europe, but which has been spread to Asia and North America by migratory water fowl. While many of the smaller species in the genus *Lemna* look fairly similar, there are actually some fairly easy to differentiate species like *Lemna trisulca*, which is a popular and useful plant for breeders as its intertwined chains form tangled hiding places for young fish near the surface.

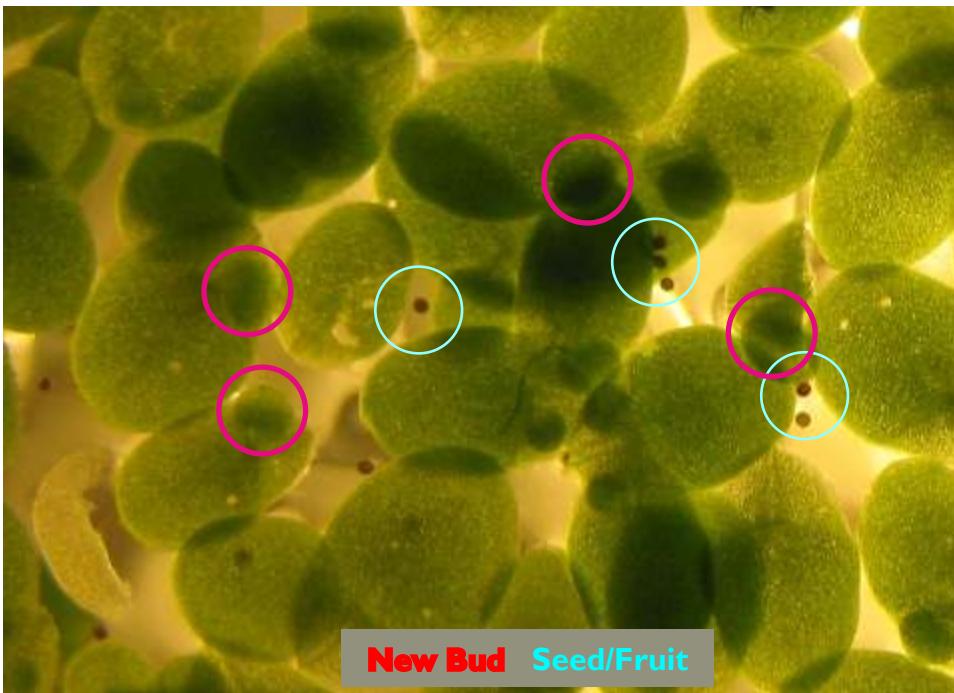
### A Bit of Science

**While we look at duckweed and talk about its leaves, technically it doesn't have leaves!** Nor does it have stems. Instead it has a thick, flat, fleshy structure with a single hairless root in *Lemna*, two to several hairless roots in *Spirodella* and *Landoltia*, and no roots at all in *Wolffia* and *Wolffieldia*. This fleshy structure has spongy air bearing tissue called aerenchyma that helps the duckweed float. Most species float on the surface, but some float just under the surface. Some species have a single vein, while others can have two or three veins. Yet others have none at all. If you care to look for the veins, they can be seen most easily with a magnifying glass and backlighting.

**One reason duckweed are so resilient** is that it often produces tiny, rootless, starchy daughter plants instead of normal daughter plants. These are called turions, and instead of floating they drop to the bottom. Fortunately for us, fish will gobble them up, but if they aren't eaten, they rest for several months and then pop up to the surface. That's why even if we think we've eliminated duckweed from a tank, sometimes it comes back after a long absence.

**Duckweed often flower even in our aquaria**, but the tiny blooms are almost never seen. Male (stamen) and female (stigma) parts of flowers are separate and are hidden in a small slit in the plant's surface. Fortunately for us hobbyists, it requires plants from two separate clone lines to produce fertile seeds, and most often in our aquaria the plants come from a single clone line.





Insects pollinate them in the wild as they walk over the surface of the plants, and individual plants can also pollinate one another as their stigma and anthers (the pollen bearing part of the stamen) are rubbed together when plants are moved by wind, current, and wildlife.

Fruits produced by pollination are tiny, often smaller than a grain of salt. Each fruit has from one to several seeds, so the seeds are even tinier. That's why sometimes we get duckweed in with other plants, even though we have cleaned them thoroughly; a seed or two get past us, germinates, and soon a single duckweed becomes a whole tank.

**Surprisingly, duckweed is now considered to be** in the Araceae or Aroid family, the same family as more universally beloved aquarium plants like *Anubias*, *Bucephalandra*, *Cryptocoryne*, and pond plants like *Colocasia* (Elephant Ears or Taro), and the much more popular floating plant *Pistia* (water lettuce).

**There are around 40 species** of duckweed divided into 5 genera - *Lemna*, *Spirodella*, *Wolffia*, *Wolfiella*, and *Landoltia*. Nearly half of all known species are found in North America. They are among the smallest of all known flowering plants, with blooms that are so small that it is difficult to see them without a powerful magnifying glass or a microscope.

As you can imagine with such tiny plants, their fruits and seeds are even tinier, often less than 1 mm in diameter. But their more usual (and more annoying) way of reproducing is by producing vegetative clones. The *Lemna* produce daughter plants or clones in a tiny budding pouch at their basal end (where the root grows). Each plant can produce up to a dozen daughter plants over the course of a 2 month lifespan.

**Under ideal conditions, they can actually double in number every 16 hours**, and if left unchecked, a single plant could produce enough daughter plants to cover the entire surface of the planet in just over two months.

Fortunately, many animals love to eat them, and they cannot stand desiccation for more than a few hours, so those of us on dry land are fairly safe from them.

**In fact, we land lubbers can actually eat them.** Duckweed are more protein by weight than soybeans! They also contain B vitamins, carotenoids, and other nutrients, and can be cooked and eaten like spinach (but don't do this with duckweed from your tanks as it can contain residue of chemical or drug treatments you've given your fish!).

Research is ongoing now to figure out ways to convert aquatic wastes to human nutrition, and duckweed is one of those plants being studied. In addition to being eaten directly, it can

be dried, processed and used provide up to 60% of the diet of cattle, ducks, chickens, rabbits and fish (think Tilapia here).

**Duckweed do so well in our aquaria because we provide them with light, water and nutrients.** They float at the surface, so they have access to all of the carbon dioxide that they need. Duckweed soak up phosphorus and nitrogenous wastes produced by fish. That's where they can become useful to us - we can remove excess phosphorus and nitrogenous wastes from the tank by simply removing excess duckweed on a weekly basis. This can be composted and later used as food for plants in our gardens. Many fish such as swordtails and many Killies like to have some cover on the surface of the tank, and duckweed fills this roll admirably.

**As long as the duckweed is thinned out every week**, it will not become too much of a problem. But let it go another week, and suddenly it's a problem. If you let it go too long, it becomes a thick cover on the surface of the tank and can cut down oxygen exchange, causing problems for the fish, cutting down light for plants, not to mention annoying the hobbyist.

**The other major problem** with duckweed is how easy it is spread from one tank to another. All it takes is one tiny plant stuck to a net, the siphon hose, your hand, etc. So, if you don't want it to spread, be very fastidious in cleaning between working in a tank with duckweed and one without it.

## **So, how do we control duckweed?**

**The easiest way to control duckweed is to** prevent it from entering our system to start out with. If you buy a bag of fish that has duckweed in it, be sure to remove the duckweed before even floating the bag.

When I float bags, I rinse them first under running water to remove any potential hitchhikers from the outside of the bag. But usually I simply put my new fish into buckets first and clean any plant matter from the water with a fine mesh net, adding water from the quarantine tank until the fish is mostly in my water, then netting the fish and putting them in their new





home. This stops most duckweed from entering my system.

**Any new plants are carefully washed** under running water and inspected for duckweed and other pests before adding them to the quarantine tank. Obviously, any driftwood, rocks or other items are also thoroughly cleaned before adding to a tank.

Sponge filters are great for moving from tank to tank and allowing you to set up a new tank immediately. But they are also great for moving duckweed, its turions, and fruits and seeds to another tank. So be sure to rinse them thoroughly before adding them to a new tank, and watch for telltale signs of duckweed floating on the surface.

**Once you notice that duckweed has entered a tank**, physically remove as much of it as possible by SLOWLY swirling a fine mesh net just under the surface of the water. Be sure to keep the fish away from the net.

I'm not sure if they're still available, but for many years Python made a small surface skimmer that worked perfectly for removing duckweed quickly from a tank without bothering the fish. After physically removing as much duckweed as possible, carefully wipe it down from the sides and under the rim with a paper towel and dispose of that towel.

This will get MOST of the duckweed, but some will still get by, and it won't get the turions at all. Most of the turions can be removed from the substrate with an aquarium vacuum, but not all. You'll have to be vigilant and continue to manually remove new

growth as you see it. Eventually you'll get it all.

**Another trick is to remove as much as possible** as described above. Then add a powerhead/water bottle duckweed extractor as illustrated with the opening just under the water surface so that it creates a whirlpool on the surface and swirls and removes any remaining duckweed over the course of a few hours.

This is a simple device made from a powerhead placed upside down in the tank. The intake filter is a water bottle with the bottom removed. Add a clump of filter floss to the water bottle, and you're ready to go. Be sure to carefully disassemble and clean this unit as you move it from tank to tank.



**If you don't want to try something like this**, buy a couple of young goldfish, gold barbs, sailfin mollies, young Uarus, or other surface feeding vegetarian fish. Goldfish seem to work best. Clean the tank as much as possible, then move the goldfish to the tank and don't feed them for a few days. They'll eat all of the remaining floating duckweed, and also hunt down most of the turions in the substrate. Move them from tank to tank as needed.

**If you have a large tub or pond with a duckweed infestation**, you may be tempted to use a chemical control agent. These do work very well, but they can also stunt other plants, especially other Aroids.

In addition, when the duckweed dies, it releases all of the nutrients that it had tied up back into the water, creating an algae problem or worse. It's best to manually remove it with a skimmer and simply learn to live with it, or add a couple of young barbs or goldfish to the pond or tub just to control the duckweed.

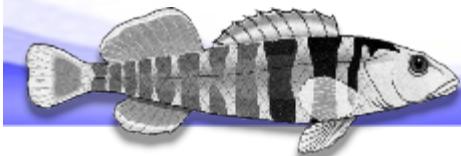
**Finally, you can learn to respect the duckweed and use it to your advantage.** As mentioned above, it is excellent for removing phosphorus and nitrogenous wastes and for shading the tank and making some fish feel more comfortable. It will compete with algae for nutrients and works very well at keeping annoying algae at bay.

**The key here is to keep the duckweed from getting out of control** by regularly thinning it out. A weekly removal should be enough. Don't allow it to cover more than a third of the surface of the tank.

If you've got fish that actually want a vegetarian diet, you can grow as much as you need to feed them in other tanks and, when doing regular maintenance, instead of throwing it away, move it to the vegetarian fishes' tanks and let them feast!

**Getting a duckweed infestation is not the end of the world. It can be controlled and even eliminated without having to completely dismantle the tank and throw everything away. Who knows, you may even come to appreciate it!**





## WATER SNOWFLAKE LILY, *Nymphoides indica*

by Chase Klinesteker

Sent to MASI by Chase from the SouthWest Michigan Aquarium Society (SWMAS)



**T**HE WATER SNOWFLAKE or Banana Lilly is a tropical ornamental pond plant. Its' flower is only about 3/4 inches in diameter with bright white feathered petals which are star-shaped and stunning.

**It is related to the Banana Plant** and reproduces mostly by rhizomes, although plantlets can form at the



The Water Snowflake Lily flower is delicately beautiful

leaves. The bright green floating heart-shaped leaves are 2-8 inches in diameter and are on stems up to 2 meters long. In nature it grows in shallow muddy water.

**It is widely sold for the water garden trade but has become a weed plant in Florida.** It is excellent for container gardens and small ponds. It likes full sun or partial shade. The small, beautiful flowers only last about one day, but several flower stems grow from underneath each leaf base. The young leaves, stems, flower buds, and fruits can be cooked, boiled, or curried and are edible.

I purchased a plant of the Water Snowflake last fall at a SWAMAS auction. Since I don't have an outdoor pond, it was decided to pot it in a 70 gallon planted tank. There is a 2-bulb shoplight over the tank which is on about 12 hours per day. About 1/4 inch of potting soil with aquarium gravel over it in a pint container was all that was used. After 5 or 6 months, it began to bloom.

***Nymphoides indica* is a delightful plant to cultivate and get to bloom, although it would be much easier in an outdoor pond!**



*Nymphoides ezannoii*

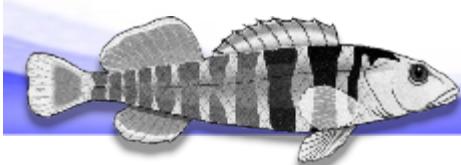


*Nymphoides peltata*



*Nymphoides krishnakesara*





Minifins

## The DARTER

### The Bulldog Tetra

#### *Rachoviscus graciliceps*

By Mike Hellweg, CFN  
(Certifiable Fish Nut)

**W**E'RE ALL FAMILIAR with many of the so-called "bread and butter" tetras that are usually found in fish stores and even big box stores around the world.

**Tetras like neons, serpaes, black neons, Colombian redfin blues, bloodfins, glowlights, bleeding hearts and a few others are almost always in stock.** Some of the less common, but still popular tetras like cardinals, rummynoses, ember, emperor, blue emperor and blind cave tetras are also pretty well known. They're such a big part of the hobby that they've had the moniker "bread and butter" associated with them, meaning that they are literally sure sellers and put bread and butter on the shop owner's table.

But there are so many more tetras out there, and many of them are rarely seen in the hobby, but definitely deserve our attention. The bulldog tetra is one that you shouldn't let pass by if you happen to see it.

They are one of the "chunky" bodied tetras, similar in size and shape to the more familiar Emperor tetra. They have a blunt, rounded snout with a toothy under bite that gives them their common name of bulldog tetra. While they look tough, they are



actually great community tank fish, though they look their absolute best in a group of 8 or so in a planted tank.

In full color, males are a dark bluish purple below the lateral line and a dark purple-black above it. The adipose fin is bright red. The anal fin is bright yellow outlined in red. The caudal and dorsal are lemon yellow. Females are a dull pinkish-purple overall. Males top out at about 2 inches, with females reaching about a quarter-inch less.

**One of the most unusual things** about them is that males "flash" for one another when displaying, and for

#### Normal Coloration



the girls when they are courting. They flash two oblong oval shaped gold spots along the lateral line that just appear as if out of nowhere and



disappear just as quickly. The first time I saw it, I was surprised and had to sit and watch them for a half hour or so just to be sure I really saw it.

**Bulldog tetras have only been known** in the hobby for about 20 years or so, and have only been known to science since 1981. They come from small coastal rivers in southern Brazil. They are exclusively found north of Rio de Janeiro in the southern part of the state of Bahia near the popular resort town of Cumuruxatiba.

They are found in clear water streams with slow flow, and water that is just slightly acidic with a total hardness of around 200 ppm. Due to their proximity to the coast (sometimes less than a couple football fields away from the Atlantic), they can tolerate, though they do not require, a bit of salt in their water. Temperatures fluctuate between 70 and 78 degrees Fahrenheit year round.

**Unfortunately, due to their limited distribution**, they are considered endangered in the wild as any major climatic event could irreparably harm the wild population.

Fortunately, care in our aquaria is fairly easy, and our St. Louis area tap water is ideal. They thrive at a pH around neutral, with water about 125 ppm total hardness, with low to moderate carbonate hardness - exactly what we get from the Missouri River over much of the year.

**A twenty gallon long type tank is perfect** for a group of 8 - 10 adults. Add a mature sponge filter or waterfall type power filter is perfect to maintain water quality and provide a bit of current. They don't even need a heater in their tank. As long as you are comfortable in the room, they will be, too. They seem to prefer fluctuations in temperature, and spawned readily for me in a tank that often saw temperatures in the low 70s Fahrenheit.



**In the wild they seem to be mostly insectivores**, so replicating this diet in our aquaria is optimal. They will eat commercial flakes and pellets; frozen meaty foods of all kinds, especially brine shrimp, Mysis shrimp, and bloodworms; live foods like daphnia, flour beetles, mini mealworms (*Tenebrio obscurus*), adult brine shrimp, *Gammarus*, young cherry shrimp, Grindal worms, white

Susswassertang, and clean water. Give them a lot of live and frozen meaty foods at least twice a day, and change at least 50 percent of the water every 5 to 7 days, but don't gravel vac the bottom.

**After about two to three weeks**, start looking under the pile of moss every day. From this point there are two options. The first is once you start seeing youngsters, remove the parents and start feeding the tank live baby brine, microworms, and similar small live foods twice or three times a day. Soon the youngsters will start coming out when food is added, and before long they will be swimming above the plants instead of in and under them.

The second is to remove the larger juveniles as you see them under the plants, and leave the smaller fry in the tank with the parents. The adults pretty much ignore the youngsters, but if you let a few of the older siblings remain, they will consume their younger brothers and sisters, and you won't see many fry until these older fish get large enough to join the adults.

***Rachoviscus graciliceps* is a CARES species**, as is its cousin *Rachoviscus crassiceps*, which has been very rare in the hobby. Care for both is very similar, so if you are lucky enough to find *Rachoviscus crassiceps*, grab them! Both are listed by the MMA (Brazilian government authority) as Endangered due to limited habitat and even with the loosening of Brazilian fish export laws, it is unlikely that we will see either of them coming any time soon.

**They are long lived** (my original fish lived for nearly 10 years), and I occasionally see them at aquarium club auctions around the country, so they are occasionally available through hobbyist channels, if not occasionally through the trade.

**If you see either of them, be sure to grab a group of 8 - 10, put them in a planted tank, and enjoy! And don't forget to sit in front of the tank and spend time just watching your fish!**

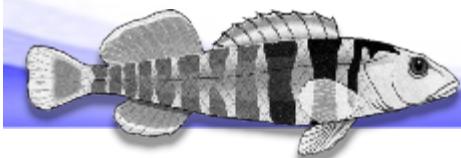
***Rachoviscus graciliceps* and cousin *Rachoviscus crassiceps*, are both CARES species. If lucky enough to find either, grab them! Both are Endangered and you're unlikely to see either again soon.**

and blackworms, and even chopped earthworms. Famed breeder Rosario La Corte also recommends feeding tetras finely chopped market shrimp (I use canned "mini shrimp" found with tuna in the grocery store) and rehydrated freeze dried krill, also chopped into bite sized pieces after it has been soaked for 20 minutes or so.

**A regular diet** of these meaty frozen and live foods will quickly bring them into spawning condition. Breeding takes a bit of work, but it's not too difficult. Clean water, good food and a place to lay eggs and for the fry to get a good start is all that is needed. They are most easily bred in the manner similar to other tetras like Emperor tetras.

**Set a couple of pairs up in a 10 gallon tank** with a mature sponge filter bubbling heartily so that it creates a slight current, add a large pile of Java moss or similar plant like





## Spawning *Polycentrus schomburgkii* The Dwarf South American Leaf Fish

By Patrick A. Tosie,  
Sr.

**P**OYCENTRUS SCHOMBURGKII IS a small leaf fish from Northern South America that reaches up to four-inches in total length. They are in the Polycentridae (Leaffishes) family and these guys can live in freshwater and brackish water. They are a mottled brown color that are high-bodied and oblong in shape.

**Mine were set up in soft freshwater** at 78F and the water was older with water changes of 10% once every month. They are not aggressive toward fish larger than themselves but if they can get smaller fish in their mouth they will eat them. However, they do not do well with aggressive fish larger than they are.

They prefer soft water, up to a pH of 7.0 with temperatures of 75F - 80F with a lot of cover and hiding places. I set several 1-year old *Polycentrus schomburgkii* up in an eighteen-gallon breeder that was completely full of floating hornwort, some java ferns, a few cryptocoryne plants and some duckweed.



They prefer to eat live foods but will take frozen brine shrimp. I kept a group of common guppies with them and in addition fed frozen brine shrimp. When the guppies started getting low they were replenished.

**I started with six juveniles** and kept them all in the eighteen-gallon breeder. After a couple of months and some growing, they started to die off. For about four weeks, they slowly died off at a pace of one a week.

When the tank was down to two, they were okay together and one could start seeing differences as one was getting heavier bodied. The fins were also a little longer on the thinner bodied one. The heavier one grew to three and a half inches and the thinner one to three and three-quarter inches.

**By May, it was obvious they were a pair** as they laid eggs on the java fern and the side of a flower pot. I would guess the eggs numbered well over one hundred, they were very small, maybe one-twentieth of an inch and oval in shape, opaque colored eggs.

**The male took care of the eggs** and on day two the male killed the female, ate all the guppies and stood watch over the eggs for another day and a half till they hatched. Nearly all the eggs

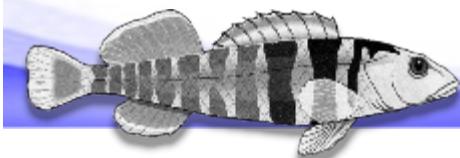
hatched and the newborn fry clung to the leaves and flower pot while the male kept a careful eye on them.

**For me the key to breeding was starting with a group** and letting them pick their own mates, then have a tank with a lot of plants and hiding spots. I would also suggest to keep a lot of small docile fish (common guppies) with them as they are growing and choosing a mate.

**The fry grew fast and they were very cannibalistic**, eating each other! I moved the male when the fry started swimming around, I caught him and moved him to a ten-gallon tank. The ones that grew the fastest were eating their little brothers and sisters. I was feeding them newly hatched brine shrimp every day and I was trying to separate the different sizes. I only saved about a third of the fry and raised them to three-quarters of an inch at sixty-days old.

***Polycentrus schomburgkii* was an enjoyable fish to watch and raise.** I particularly like watching their hunting style as they hid in the hornwort and ambushed the guppies. They would glide through the plants and pounce with lightning speed to capture their prey.





## ORANGE LYRETAIL KILLIEFISH *Aphyosemion australe*

by Chase Klinesteker

Reprinted from  
the SouthWest Michigan  
Aquarium Society  
(SWMAS) Newsletter:  
SWAM  
September 2017



**T**HE ORANGE LYRETAIL Killifish, *Aphyosemion australe*, is one of the most stunningly



colorful fish I have ever kept.

**DESCRIPTION:** It is a color variant of the more common Chocolate Austral. It is not often seen in fish shops likely because it is a jumper, shy in nature, and requires close attention to water quality.

**It is easily bred and lays eggs in nylon mops**, although hatching and rearing the fry can be a challenge. It was one of the first killifish to become popular in the aquarium hobby and comes from shallow slow-flowing streams in costal West Africa where there is heavy aquatic vegetation.

**They will eat a variety of foods** including frozen, live, and flake. Soft, acid water seems to work best, and I bred and began raising the fry in rainwater with good results. Once the fry reach a month or so in age, they can be transferred to tap water to grow larger.

They are susceptible to velvet disease, so frequent water changes are necessary, as well as the addition of a

teaspoon of salt per gallon to their water as a preventative. If you see clamped fins, they are not healthy, and a salt treatment of 2-3 teaspoon per gallon or a peat moss filter is recommended.

**Maximum size is about 2 ½ inches.** Sexing is easy---males are much more brilliantly colored and slightly larger than females. Their lifespan is longer than many killifish, about 3 years. Rainwater or a peat moss box filter should keep them healthy and happy.

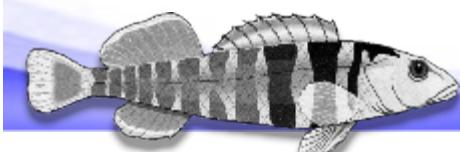
**BREEDING:** A pair can be bred in a small 2 or 3 gallon tank with light aeration or a sponge filter in a low light area. Males do not seem to be overly aggressive, so the female will be fine if there is some cover available.

A dark colored nylon mop is used for them to lay their eggs in, although their eggs are not very adhesive, and I have collected more eggs by siphoning out the debris on the bottom and checking it.

**Their eggs could be put in moist peat moss** for 3-6 weeks to hatch, but I prefer to pick the eggs from the mop and hatch them in water and a drop of methylene blue. Light aeration will keep them viable, and they hatch in around 2 weeks. Feed the fry infusoria for the first couple of days, then newly hatched baby brine shrimp.

**It is thought that the temperature** that these fish are kept and raised could be a factor in their health. Ideally, 70-75 degrees is recommended and they may be susceptible to higher temperatures, which could cause stunting, weakness, or poor color development.





# The DARTER

## Finding and Spawning *Chortiheros (Theraps) wesseli*

By Patrick A. Tosie, Sr.

**B**ACK IN THE mid 1990's I was fortunate to tag along with Rusty Wessel and Charlie Pyles to Honduras in search of a new and rare cichlid which was in the process of being described by Dr. Robert "Rush" Miller, the name was to be *Theraps wesseli* in honor of Rusty Wessel, the person who first found it.

**The collecting trips I went on with Rusty and Charlie were the best**, most fun and most rewarding trips I have ever been on and will remain as treasured memories for my lifetime.

In recent years, *Theraps wesseli* has had their Genus name changed to *Chortiheros* and it is the only species in the genus so from here on I'll refer to them as *C. wesseli*.

***C. wesseli* is from fast flowing rivers in in eastern Honduras**, the Rio Danto and Rio Jutiapa were a couple of rivers where we caught them. They may be from a few other rivers in the area but do seem to have a limited range.

**We did not catch any during the day** as they stayed in the fastest flowing areas of the river and hid in the rocks when we approached. At night as they came to the waters edge and were inactive we were able to catch some of them. We were able to get a permit from Honduras to take them out of



country and I was able to bring 6-10 fish home as juveniles and young adults. Using Kordon breather bags with one fish per bag they seemed to travel well.

**At home I set the *C. wesseli* up in a 135-gallon**, six-foot long tank with two Marineland Emperor power filters plus a couple sponge filters, two-inches of small Meramec gravel, and piles of larger rocks scattered about, with the water temperature of 78F-80F and lights usually left on 24 hours a day. Included in the tank were a group of 20 or so *Poecilia mexicana* used as dither fish so the *C. wesseli* might feel a little more comfortable.

My *C. wesseli* were active in the tank but shy whenever approached as they would hide in the rocks. If I would stay still for a while, they would come out in the open and stake out territory.

**I fed my fish flake foods, frozen brine and earthworms.** They did not grow very fast and it took 18-20 months before I saw any pairing off or pre-spawning behavior. Four of my fish paired off into 2 pairs and started protecting a territory, one at the left end of the tank and one right in the middle. The other *C. wesseli* were chased out of the areas whenever they got near either of the pairs territory.

**After pairing off and establishing their territories** for a month or two the tanked

seemed to settle down. The pair on the left side of the tank were the first to start acting like they were getting ready to breed as they kept closer to their pile of rocks and started changing colors. During breeding *Chortiheros wesseli* changes color—the lower half of their body to black and the color of the upper body to a whitish color during the spawning.

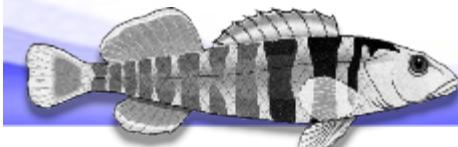
**The female guards the eggs and fry while the male keeps the other fish out of their territory.** Once the fry start swimming, they were fed microworms and baby brine shrimp. They had 100+ fry and were fairly good parents. I siphoned thirty fry from the tank and raised them in a 10-gallon tank.

**There is no better feeling than catching wild fish, raising them to breeding size and spawning them.**



***C. wesseli* habitat.**





## Feeding Fish Bloodworms (*Chironomidae/Chironomus*): Possible Health Risks to Hobbyists

By Thomas M. Keevin

**I**N A TIME, long, long ago in the pre-COVID-19 world when we actually had MASI meetings, a question was raised at one of those meeting by Pat Tosie. *"Had anyone had an allergic reaction as a result of feeding their fish bloodworms?"*

**I was surprised by the number of hands** that immediately shot up in response. So, the question and the overwhelming positive response prompted me do a quick literature review. I was curious if bloodworms could possibly be a health hazard to aquarium hobbyists.

**I first scanned some aquarium hobbyist blogs** to see what folks had to say. Here are some posts from MonsterFishKeepers.com that will help you gauge the potential severity of an allergic reaction to bloodworms. (Note that in the first description, the hobbyist was apparently even allergic to aquarium water in which the fish had been fed bloodworms. This has health implications for you even if you are not feeding your fish bloodworms.)

"I fed them for years and developed a very bad allergy. I started having severe allergic reactions, took me



three of them to realize it was the bloodworms. My eyes swell completely shut, I break out all over in red splotches and can't breathe. It feels like my chest is caving in. I now carry around an epipen and an inhaler. I tried just letting my husband feed them, but that didn't work out either. I can't clean our aquarium if they've been fed at all,

my hand and arm breaks all out in welts. Also, if my husband gets near me without having washed his hands after feeding, I start to react."

The reactions increased in severity. The first reaction was bad, but the third just plain terrified me. I've always had very bad allergies but I've never experienced anything as scary as my reactions to these things. On the third reaction it took 3 days for the swelling to go away in my eyes. They were swollen basically completely shut for 24 hours, even after steroid injections. If you do react and experience swelling in your eyes, whatever you do, DON'T touch your eyes! It will make it a lot worse."

**Another hobbyist** described a very similar response to blood worms in their post.

"I can't feed them at all, which sucks because fish love them and they offer great nutritional value. Even if I wear gloves and only use utensils to feed, my face swells, airway constricts, and I get a wonderful red itchy rash which lasts for a couple of days. I fed them for years without issues until one day I found myself in a rather unattractive mess requiring an Epipen and some heavy doses of Benadryl for a few days. I have tried it a few times

### Types of allergic reactions to Chironomids:

**Conjunctivitis**  
**Angioedema**  
**Rhinitis**  
**Hives**  
**Localized rash**  
**Asthma**  
**Anaphylaxis!**



since and even in their frozen state with gloves, I have a reaction."

To my surprise, a number of the bloggers commented that they had just discovered that they too had an allergy to bloodworms based on the descriptions of allergic reactions provided by their fellow hobbyists. The posts had solved the mysterious symptoms they were having. For example:

"Just figured out I am allergic to BW. What happens is my eyes start to get a burning itch and worsen if I scratch. Back of my hands get itchy. Just pinned it to it only happens right after I feed fish BW's!!! Sure enough, its all over the net."

**After reviewing what the bloggers had to say**, I then conducted a search of the scientific/medical literature and found that there was a considerable body of literature which both supports and parrots the descriptions of allergic reactions provided by the bloggers. There are so many scientific papers and clinical case reports that I could write a lengthy scientific review paper on the topic, and by the way - allergic reactions are not restricted to hobbyists. They have also been reported in fishermen that use chironomids for bait, in people that work in aquaculture, people that work in public aquariums, people that produce, package, or sell fish food, and people that live in areas with high concentrations of flies. For hobbyists, allergic reactions can be caused by exposure to live, frozen, freeze dried and processed (fish foods that contain bloodworms as well as other components) chironomids.

**The medical literature suggests** that allergic reactions to chironomids (bloodworms) can present themselves as conjunctivitis (inflammation or infection of the transparent membrane (conjunctiva) that lines your eyelid and covers the white part of your eyeball), angioedema (area of swelling of the lower layer of skin and tissue just under the skin or mucous membranes), rhinitis (inflammation of the inner lining of the nose), contact urticaria (hives), contact dermatitis (localized rash or irritation of the skin caused by contact with a foreign substance, asthma (condition in which your airways narrow and swell and may produce extra mucus), and anaphylaxis

## Tetra Warning Label:

### BloodWorms

FREEZE DRIED FOOD

**FOR ADULT USE ONLY- KEEP AWAY FROM CHILDREN**

**WARNING: ALLERGY ALERT - THIS PRODUCE CONTAINS INSECT LARVAE WHICH MAY CAUSE AN ALLERGIC REACTION IN SOME INDIVIDUALS. IF SYMPTOMS OF AN ALLERGIC REACTION OCCUR (SUCH AS HIVES, ASTHMA, WHEEZING, RED OR IRRITATED EYES OR SKIN, RUNNY NOSE OR SNEEZING), DISCONTINUE USE IMMEDIATELY AND CONSULT YOUR PHYSICIAN. AVOID ALL USE IF SYMPTOMS RE-OCCUR. DO NOT USE THIS PRODUCT IF YOU SUFFER FROM ASTHMA, HAY FEVER, OR ARE KNOWN TO BE ALLERGIC TO INSECT LARVAE. HOBBYIST AND HEAVY USERS SHOULD USE SPECIAL PRECAUTIONS NOT TO TOUCH OR BREATHE DUST OF PRODUCT. CALL 1-800-526-0650 FOR ADDITIONAL INFORMATION. HEAVY USERS CAN POTENTIALLY BECOME SENSITIZED TO THIS PRODUCT.**

**DISPOSAL: DO NOT RE-USE CONTAINER AND SECURELY DISPOSE OF CONTAINER.**

(Anaphylaxis causes your immune system to release a flood of chemicals that can cause you to go into shock - your blood pressure drops suddenly and your airways narrow, blocking breathing. Signs and symptoms include a rapid, weak pulse; a skin rash; and nausea and vomiting. Anaphylaxis requires an injection of epinephrine and a follow-up trip to an emergency room.).

**Approximately 20% of people exposed to blood worms have some level of allergic reactions.**

The allergen has been identified as chironomid hemoglobin (Chi t 1). As you probably know, hemoglobin is an iron containing protein that carries oxygen. It is responsible for the red color of human blood cells and of bloodworms.

Different organisms have different molecular hemoglobin structures; hence, bloodworm hemoglobin, which is different from human hemoglobin, can be an allergen to humans. Adults (flies) can also cause allergic reactions in humans (although aquarists are not exposed to adult flies), but the allergen is apparently tropomyosin.

The description of allergic reactions in the medical case study literature is very similar to what we saw in the fish hobbyist's blogs.

"A person who worked in an office setting in our hospital was referred to me after three admissions to our emergency department for marked angioedema and inflammation of the right side of the face, chemosis of the right eye, and blurred vision with onset in the morning at work. She had no atopic history and had eaten no food on the day of one of the reactions. Only after persistent questioning regarding what she may have transferred from her hand to her face (she was right-handed) did she divulge that she fed the fish in her aquarium in the office. She did not know the source of the fish food, and I requested that she place a tiny amount on her forearm the following day. This produced a swelling of the entire forearm. The fish food was freeze-dried bloodworms." (From Schellenberg 2005)

Schellenberg (2005) also describes an incident of accidental ingestion of bloodworms.

"..... Dr. J. Roberts presented the case of a girl who had developed

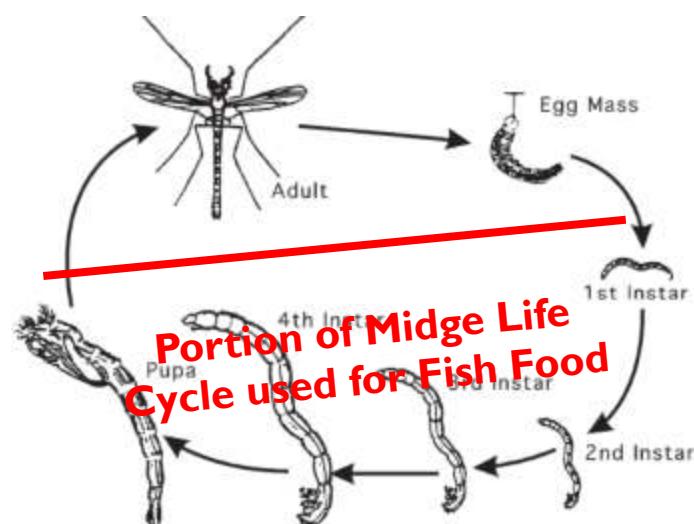


Figure 1. Chironomid life cycle (adapted from Walker 1987).



anaphylaxis after accidental ingestion of residual fish food that was on her hands when she was eating dinner. This individual had a striking reaction to a dilute preparation of the bloodworm fish food on skin testing and did not react to other fish food preparations."

**A simple skin-prick test** with a dilute solution of bloodworms can be used to determine if you have an allergy to chironomids. However, be careful! A medical publication (Nguyen et al. 2007), by a group of allergists, was prepared to inform the medical community that the skin prick-tests for bloodworm allergies could actually cause severe allergic reactions, including anaphylaxis. The paper described three severe allergic reactions and made the following recommendations.

"Performance of prick-prick test with Chironomus should be done with extreme caution. Undiluted red grubs should be avoided. Prick tests have to be started with a highly diluted solution and progressively increased to obtain the lowest effective concentration.

... In conclusion we report three cases of patients who developed adverse systemic reactions to skin prick testing with red grubs. Chironomus larvae have proven to be a potent allergen. As demonstrated, skin testing with red grubs can result in severe reactions and should therefore be performed only in controlled hospitalized settings."

I think this has answered Pat Tosie's question: *"Had anyone had an allergic reaction as a result of feeding their fish bloodworms?"*

**Approximately 20% of people that have contact with bloodworms** (mostly fish hobbyists) develop allergies to them, which can be severe in some people. This number corresponds well to the number of hands that were raised when Pat asked his question.

A runny nose, sneezing, coughing, hives, itching skin, and swollen eyes can all be a considerable inconvenience, but asthma or anaphylaxis can be fatal if not quickly treated. So, it was worth my time

## BloodWorms FREEZE DRIED FOOD

A premium quality, nutritious supplement to Tetra® primary diets such as TetraMin® Flakes. The combination of foods provides variety in your fish's diet.

- Perfect for Bettas
- Ideal for small to medium sized tropical and marine fish
- Specially processed and tested to minimize the presence of undesirable organisms found in live bloodworms
- Package features a child-safety lid

**FEEDING GUIDE:** FEED TWO TO THREE TIMES A WEEK IN CONJUNCTION WITH OTHER TETRA PRIMARY FOODS LIKE TETRAMIN. FEED ONLY AS MUCH AS YOUR FISH CAN CONSUME WITHIN SEVERAL MINUTES.

**DIRECTIONS FOR USE:** CAREFULLY OPEN CONTAINER BY REMOVING CAP, KEEPING CONTAINER AWAY FROM FACE, AND TAP A DESIRED AMOUNT OF PRODUCT DIRECTLY INTO AQUARIUM TANK. REPLACE CAP IMMEDIATELY AFTER USE. DO NOT TOUCH AND AVOID BREATHING DUST; IF ON HANDS WASH WITH SOAP AND WATER. DO NOT RUB EYES WITH FINGERS.



Helps you care  
for your fish!  
tetra-fish.com  
1-800-423-6458

**GUARANTEED ANALYSIS:** MIN. CRUDE PROTEIN 50.0%, MIN. CRUDE FAT 2.0%, MAX. CRUDE FIBER 15.0%, MAX. MOISTURE 9.0%, MIN. PHOSPHORUS 0.9%. **INGREDIENTS:** FREEZE DRIED BLOOD WORMS (INSECT LARVAE) ONLY.

**FOR ADULT USE ONLY-KEEP AWAY FROM CHILDREN**

**WARNING: ALLERGY ALERT-**THIS PRODUCT CONTAINS INSECT LARVAE WHICH MAY CAUSE AN ALLERGIC REACTION IN SOME INDIVIDUALS. IF SYMPTOMS OF AN ALLERGIC REACTION OCCUR (SUCH AS HIVES, ASTHMA, WHEEZING, RED OR IRRITATED EYES OR SKIN, RUNNY NOSE OR SNEEZING), DISCONTINUE USE IMMEDIATELY AND CONSULT YOUR PHYSICIAN. AVOID ALL USE IF SYMPTOMS RE-OCCUR. DO NOT USE THIS PRODUCT IF YOU SUFFER FROM ASTHMA, HAY FEVER, OR ARE KNOWN TO BE ALLERGIC TO INSECT LARVAE. HOBBYIST AND HEAVY USERS SHOULD USE SPECIAL PRECAUTIONS NOT TO TOUCH OR BREATHE DUST OF PRODUCT. CALL 1-800-526-0650 FOR ADDITIONAL INFORMATION. HEAVY USERS CAN POTENTIALLY BECOME SENSITIZED TO THIS PRODUCT.

**DISPOSAL:** DO NOT RE-USE CONTAINER AND SECURELY DISPOSE OF CONTAINER.

**Distributed By**  
United Pet Group, Inc.  
3001 Commerce Street  
Blacksburg, VA 24060

**Manufactured by** Tetra GmbH  
Herrenteich 78  
D-49324, Melle, Germany  
Made In Germany

sitting down and doing a short literature review if you now know why your hands itch after feeding your fish or if I have potentially saved somebody's life. The one thing I couldn't understand while reading the hobbyist's blogs was why they continued to feed their fish bloodworms when they actually had associated the fish food with their symptoms.

**A doctor's recommendation in one of the case studies was simple - Stop feeding your fish bloodworms and feed them something else! Remember, the more you expose yourself to bloodworms the greater the chance that you will eventually have a severe allergic reaction.**

## References

Baur, X., and V. Liebers. 1992. Insect hemoglobins (ChitI) of the Diptera family Chironomidae are relevant environmental, occupational, and hobby-related allergens. International Archives of occupational and environmental Health 64:185-188.

Ho, P., and C. Kalicinsky. 2014. Bloodworm induced anaphylaxis. Allergy, Asthma & Clinical Immunology 10, A29 (2014). <https://doi.org/10.1186/1710-1492-10-S1-A29>

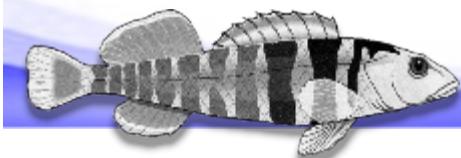
Jeong, K. Y., H. Y. Yum, I. Y. Lee, H. I. Ree, C. S. Hong, S. S. , Kim, T. S. and Yong. 2004. Molecular cloning and characterization of tropomyosin, a major allergen of Chironomus kiiensis, a dominant species of nonbiting midges in Korea. Clinical and Diagnostic Laboratory Immunology 11:320-324.

Nguyen, M., L. Paradis, A. Des Roches, M. N. Primeau, and J. Paradis. 2007. Adverse reaction resulting from skin testing in the diagnosis of red grubs ((Chironomidae) [Sic] allergy. Allergy (ALLERGY Net.) 62:1470-1471.

Schellenberg, R. 2005. Fishy food for thought. Allergy, Asthma & Clinical Immunology 1, 48. <https://doi.org/10.1186/1710-1492-1-2-48>

Wu, K. C., K. Räsänen, and T. J. Hudson. 2005. Fishing for allergens: Bloodworm-induced asthma. Allergy, Asthma & Clinical Immunology 1, 58. <https://doi.org/10.1186/1710-1492-1-2-58>





## Dr. Paul's Fish of the Month:

### **Danio feegradei Hora 1937 and Danio meghalayensis Sen and Dey 1985**

**By Dr. Paul Loiselle**

**Reprinted from the Jersey Shore Aquarium Society's June, 2017 issue of THE SHORELINE**

**AM EXTREMELY PARTIAL** to danios. Like many other hobbyists, I can cite the zebra fish, *Danio rerio*, as a resident in my first aquarium.

I later grew to esteem the smaller representatives of the genus as superb dither fish for dwarf cichlids and with the further passage of time have now come to appreciate these colorful, hardy, and active Asian minnows as desirable aquarium fish in their own right.

**The subjects of this month's essay** are two of the more robust representatives of the genus *Danio*. One hails from India, the other from just across the frontier in Burma. Both have a rather complicated taxonomic history, having been conflated with *Danio dangila* (Hamilton 1822), type species of the genus and both are relative newcomers to the aquarium scene.

**The first species of this pair, *Danio feegradei*** Hora 1937 was described from material collected at Sandoway in Burma's Rakhine State. Like *D. dangila*, this species ports an impressive set of oral barbels and has a color pattern made up of broken pattern of light and dark lateral blotches.



A male *Danio feegradei*. Yoma Danios are easily sexed - the ventral and anal fins of females are edged in iridescent white.

**Preserved specimens apparently resembled one another sufficiently** for *D. feegradei* to have been treated as a junior synonym of *D. dangila* in recent catalogs of Indian freshwater fishes (Talwar and Jhingran, 1992; Menon, 1999). One strongly suspects that Drs. Talwar, Jhingram and Menon had never seen living *D. feegradei*, for as can be seen from the accompanying illustrations, these two danios are very different fish!

As contemporary authors (Fang et al., 2009; Kottelat, 2013) recognize *D. feegradei* as a valid species, its taxonomic status is no longer a matter of dispute. This is a robust danio, growing to 2.75" (7.0 cm) SL. This colorful species, which has been marketed as Danio sp. Yoma, or the Yoma Danio, made its aquaristic debut in 2005.

**The second species is of the pair, *Danio meghalayensis*** Sen and Dey 1985 was described from the Khasi Hills in the Meghalaya region of India, which is situated between the northern border of Bangladesh and the Indian state of Assam.

Kottelat (2013) places this species in the synonymy of *D. dangila*. As is evident from the accompanying photo, while *D. meghalayensis* may sport impressive oral barbels, its color pattern is quite unlike that of *D. dangila*. Indeed, this extremely

colorful danio could justifiably be described as a tarted-up *D. rerio* on steroids! Rainbow Zebra Danio would be an appropriate common name for this striking species. It certainly falls more trippingly off the tongue than Meghalaya Danio, which has also been proposed as a vernacular name for this species.

Growing to 2.5" (6.4 cm) SL, this is the largest of the laterally striped danios. Although it made its aquaristic debut in 2005, *D. meghalayensis* remains only episodically available. Its rather high asking price suggests a continued dependence on wild-caught fish. As the type locality of this species lies 4000 feet above sea level, could it be that intolerance of elevated water temperatures has also hindered efforts to produce this species on a commercial scale in either Florida or Southeast Asia.

**Like the generality of danios, this twosome are easily maintained.** They will prosper over a pH range of 6.5 to 7.8 and tolerate carbonate and general hardness values up to 20. DH. They are much less forgiving of elevated levels of nitrogen cycle by-products. An efficient biological filter and a program of regular partial water changes are essential elements of a successful maintenance strategy.

**These danios find temperatures in excess of 79. F. [26. C.] very**



**stressful.** If exposure to higher temperatures is unavoidable, providing their tank with supplementary aeration is highly advisable. These large danios are extremely active fish that require plenty of swimming room to prosper. Housing them in tanks less than 36" [c. 1. m] in length is strongly contraindicated. When disturbed, these danios do a very credible imitation of a cruise missile. Keep them in a well-covered aquarium and always lower its water level by at least 50% before trying to net them.

**Danios are highly social fish.**

Housing them in groups of fewer than six individuals can result in bullying and lead to the death of the group's smaller members. Unlike their distant cousins of the genera *Barilius* and *Luciosoma*, *Danio* species are not actively piscivorous. That said, they will prey opportunistically on smaller fish. Therefore housing either of these species with *Boraras* or *Microdevario* species could be expected to end badly.

Mid-sized barbs, the larger rasboras and livebearers as well as Australasian rainbowfishes are appropriate tankmates. So are most mid-sized cichlids.

Both *D. feergradei* and *D. meghalayensis* are too large and boisterous to be satisfactory dither fish for dwarf cichlids. Their robust appetites makes them easy to feed - flake, frozen and live foods are devoured with equal gusto. However their enthusiasm at feeding time - which calls to mind a shark feeding frenzy - puts most dwarf cichlids at a serious disadvantage when the time comes to put on the feedbag.

**Danios are easily bred egg-scatterers.** If well-fed and housed in a mixed-sex group, these fish will spawn more or less continuously, females ripening small batches of eggs every few days. However, mid-sized and large danios such as *D. feergradei* and *D. meghalayensis* are avid egg-eaters. Breeding these fish successfully entails setting up the breeding tank in a manner that denies the adults access to their spawn.

The traditional approach of setting the breeders up in a shallow tank over a layer or marbles works quite well. So does the use of a spawning grate in the breeding tank.



A male *Danio dangila*. Apart from its long oral barbels, this native of the Ganges River has nothing else in common with either *D. feergradei* or *D. meghalayensis*.



A male *Danio meghalayensis*. This species is not characterized by marked sexual dimorphism. Female Rainbow Zebra Danios are fuller bodied than males and less intensely but otherwise similarly colored.

**Danio fry require infusoria for their first few days**, after which they can be offered microworms and Artemia nauplii. Under a regime of frequent partial water changes, the fry are easily raised. Growth is fairly rapid, the young showing traces of their adult color pattern between four and six weeks post-hatching.

*Danio feergradei* is being bred on a commercial scale in Florida, the Czech Republic and the Far East. It thus appears on wholesalers' price lists with a reasonable degree of regularity and specimens find their way episodically into retail establishments.

As previously indicated, while *D. meghalayensis* has been bred by hobbyists, it does not appear to have yet entered into commercial production. It is thus harder to find and specimens, once located, are likely to be rather expensive. Both species are frequently available from on-line suppliers.

**While their active life style would suggest that large danios would not ship well**, my personal experience suggests the contrary. So if the opportunity to purchase either of these colorful danios from an on-line source, go for it.

**You won't be sorry!**

**Literature Cited**

Kottelat, M. 2013. The fishes of the inland waters of Southeast Asia: a catalogue of the fishes known to occur in the freshwaters, mangroves and estuaries. Raffles Bulletin of Zoology Supplement (27): 1 - 663.

Menon, A. G. K. 1999. Freshwater Fishes of India. Rep. Zool. Survey. India Occ. Paper (175): I - xvii, 1 - 366.

Talwar, P. K. and G. Jhingran. 1992. Inland Fishes of India and Adjacent Countries. Vol. I. A. A. Balkema, Rotterdam, pp. I - liv, 1 - 366.



## FISHES AS DISHES

We all love our fish! This column is dedicated to using fish for something tasty to enjoy. Try it, you may like it. If you have leftovers, bring them to a monthly meeting for others to enjoy!

### CRISPY BACON WRAPPED STUFFED TILAPIA

#### Ingredients:

- 4 tilapia fillets
- 4 slices bacon
- 1 tablespoon olive oil
- 1/4 cup chopped red onion
- 1/4 cup chopped red pepper
- 3 tablespoons plain crushed breadcrumbs
- 1 tablespoon lemon juice
- 1 tablespoon light brown sugar
- 1 tablespoon minced garlic
- 1 teaspoon dried parsley flakes
- 1/4 teaspoon black pepper
- 1 pinch salt
- 1 pound fresh green beans
- 1/4 cup parmesan cheese

#### Directions:

**Preheat oven to 350 degrees.**

**In a small sauce pan heat the oil.** When heated add the onions and fry for 2-3 minutes or until translucent.

**Add the red peppers, lemon juice, brown sugar, garlic, parsley, black pepper and salt.** Bring the mixture to a boil, then reduce to a simmer and cook 5 minutes, or until the peppers are tender.

While the pepper mixture cooks prepare a baking dish. I use a disposable aluminum 8x8 inch square cake pan because I don't like bacon grease on my good pans. Cut about 6 strips of aluminum wrap the size of your baking dish. Crinkle the strips of foil and place them securely in the bottom of the dish to make racks.

**Remove the pepper mixture from the heat** and process in a food processor or blender until smooth.



Return the mixture to the pan and stir in the bread crumbs until combined.

**Spread the mixture evenly** among the 4 Tilapia filets and roll them up. Wrap in bacon using one strip of bacon per filet. If needed secure in place with toothpicks.

**Place the filet rolls over the racks** to let the grease drain. Cover with aluminum wrap foil and bake in the preheated oven for 20 minutes.

**In another baking dish** spread the green beans evenly and sprinkle the top with parmesan cheese.

**After the 20 minutes remove the filets and turn on the broiler.** Remove the foil cover from the filets. Put the green beans and filets under the broiler and broil until the top of the bacon is crispy. Turn the filets to crisp the bottom side. If the cheese begins to burn too badly, take out the beans. When both sides of the bacon are crispy, take it out as well.

**EAT MORE**

**Serve the tilapia with a big side of green beans and enjoy.**



**Total Time:**

**About 30 minutes – Yields 4 servings.**

# HORTICULTURE AWARD PROGRAM - Mike Hellweg

## May & June 2020

### Points Rewarded!



Member	Genus & Species	Common Name	Type	Points
Chuck Bremer	1290 points			
	<i>Iris virginica</i>	Southern Blue Flag Iris	OB	10
	<i>Acorus calamus</i>	Sweet Flag	OB	10
Mike Huber	550 points			
	<i>Iris louisiana Ann Chowning</i>	Ann Chowning Water Iris	OB	10*
	<i>Saururus chinensis</i>	Asian Lizard's Tail	OB	5*

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



Plants are unaffected by COVID 19!



Send your HAP reports to: [HAPReports@missouriaquariumsociety.com](mailto:HAPReports@missouriaquariumsociety.com)

**Editor's note:** Since HAP reports require an emailed photo and not a sale to confirm, the HAP program can continue even without Face-2-Face meetings. Click the scroll for the paperwork.



# 2020

## CLUB HOPPING Steve Edie

### Aug 9 - MASi Summer Auction, St Louis, MO

Sep 13 - QC Fish Swap, Davenport, IA

Sep 20 - Rockford Swap, Rockford, IL

### Sep 27 - MASi Fall Swap, St Louis, MO

Sep 27 - CCAC Fall Auction, Indianapolis, IN

Sep 27 - GCCA Swap, Hoffman Estates, IL

Oct 10 - HAAS Auction, Kansas City, MO

Oct 8-11 - CatCon - London, VA

Oct 18 - Greenwater Auction, Joliet, IL

Nov 1 - GCCA Swap, Hoffman Estates, IL



### Nov 8 - MASi Fall Auction, St Louis, MO

Nov 8 - QC Fish Swap, Davenport, IA

### Nov 14 - MASi 2019 Awards, St Louis, MO

Nov 22 - Greenwater Swap, Joliet, IL

Nov 20-22 - OCA Extravaganza, Strongsville, OH

Dec 6 - GCCA Swap, Hoffman Estates, IL

**PLEASE CONFIRM**

Nearby  
Clubs linked  
to their logo



# 2021

Jan 16 - CAFÉ Winter Auction, Champaign, IL

### Feb 28 - MASi Winter Auction, St Louis, MO

Mar 19-21 - NEC Convention, Wallingford, CT

Apr 16-18 - ALA Convention, Detroit, MI

### May 1 - MASi Spring Swap, St Louis, MO

### May 1 - MASi 2020 Awards, St Louis, MO

### May 2 - MASi Spring Auction, St Louis, MO

### June 10-13 - AKA National Conv, St Louis, MO

July 17 - CAFÉ Summer Auction, Champaign, IL

### July 22-25 - ACA Convention, St Louis, MO

### Aug 8 - MASi Summer Auction, St Louis, MO

### Sept 19 - MASi Fall Swap, St Louis, MO

### Nov 7 - MASi Fall Auction, St Louis, MO

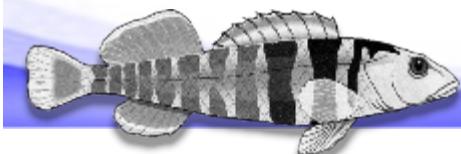


Other links are on  
the MASi  
[Linkpage](#).

Convention  
Logos Hotlinked!

Please be sure to check with event sponsors or On-Line  
before driving long distances for the foreseeable future.





## MEMBER CLASSIFIEDS

### Wanted:

**Sternco Mini Box Filter** distributed by **Metaframe and Sternco** as part of their basic 5 - 10 gallon starter kits in the late 1960s and early 1970s. It was 4" long and made by Sternco from 1963 - 1968. I'm looking for up to a dozen of them. I'm not looking for museum pieces, I still use them in small tanks.

**I'm also looking for one Scattergood Filtering** hang on tank filter, made in Missouri from the 1940s to the 1960s.

**Contact** Mike Hellweg - [Mike@Minifins.com](mailto:Mike@Minifins.com) Or see me at a meeting or call: (636) 240-2443



### Available to a Good Home:



**Several Rio water pumps and powerheads,** Like new. And other equipment not shown here:

- Rio Aqua Pumps & Powerheads: 2 - Rio 3100's, Rio 180
- Rio Pro Grade HyperFlows: Rio 32HF & Rio 20HF
- Iwaki Walchem - Aquarium Pump WMD 40RLXT
- Londa L86 Automatic Feeder

**Email Renee and make an offer. Trying to make room!!**

**Contact:** Renee - [ren411eal@gmail.com](mailto:ren411eal@gmail.com)

### See a Tank you might like? Many remained after

**the MASi Parking Lot Swap** and are available for \$0.50 per gallon, some stands also available. We have these and 60 more tanks from another donation to move!

**Contact Pat Tosie** for a listing and to make arrangements to purchase.

- Email: [PatTosie@yahoo.com](mailto:PatTosie@yahoo.com)
- Phone/Text: 314-616-4316



Member	For Sale	Bid/Asked	Contact
Charles Harrison	Thiosulfate crystals (Chlorine Remover) - pound OTO double strength Chlorine/Chloramine test kits - 4 ounce Flubendazole, 10% powder 25 grams Lavamisole HCl Powder - 5 grams treats 100 gallons Methylene Blue 5% solution (4 ounces) Acriflavine Concentrate (4%) solution, 2 ounces Bromthymol Blue pH test solution, 4 ounces	\$4.00 \$12.50 \$20.00 \$10.00 \$12.75 \$12.70 \$7.00	(314) 849-9761 <a href="mailto:charles@inkmkr.com">charles@inkmkr.com</a>
Mike Hellweg Minifins	General Aquarium Support: Dechlor, Coconut Caves, Flake Foods, Plants & Custom Fish Orders	Contact for Pricing	Email: <a href="mailto:Mike@Minifins.com">Mike@Minifins.com</a>
	Contact by email or buy at the back of the room at MASi General meetings		



# Got \$\$\$\$ swimming in those Tanks?

MASI Members of good standing can place a fish related classified ad in the Darter for free. Send your ads to the editor. 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 meeting.

Items also Change Constantly on [BAND.us/@MASIswap!](https://band.us/@masiswap)!

- **MASI BAND Swap page** - <https://band.us/@masiswap> - Because of nefarious activity

by non-identified attackers, this is now a CLOSED Group specifically for discussion and posting about upcoming MASI SWAPS and other sales efforts by members or others with approval on BAND. Post any sales, re-homes or other livestock exchanges here. Do NOT post these to FaceBook.

Those wishing to join will need to register with BAND, and then ask the moderator to join the group. It's not hard, it's just a name, email or phone #, a confirmation text or email. Then request to join, answer all 3 simple questions that are set up, then once the Moderator approves them, you are in.



## HAP Temporary Rule Change

For the duration of the COVID 19 outbreak, we will suspend the requirement that for vegetative reproduction credit one must donate plantlets, cuttings or plants for auction at a MASI General Meeting or at one of the quarterly MASI auctions.

Instead, a member can now submit by Email:

1. HAP form
2. Photo of the propagated plant -a cell phone photo is fine
3. Short, approximately 200 word, article about the plant and how the entrant propagated it.

These 3 items must be submitted for each species/variety for which HAP credit is being sought. All three items can be submitted in one email. These 200 word articles do not replace the required articles for level advancement in the program, which are more extensive.

Rules for submitting a photo of a bloom for bloom credit; and for submitting a photo of the bloom, fruit, seed and seedling for sexual reproduction credit remain unchanged as these can already be submitted electronically.

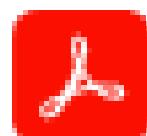
Forms, photos and articles should be submitted to me using the following email:

[HAPReports@missouriaquariumsociety.com](mailto:HAPReports@missouriaquariumsociety.com)

Thanks,

Mike Hellweg

HAP forms are available from the [HAP page of the MASI Website](#) or by clicking the HAP-form icon below my photo above. They can be filled out using the FREE Adobe Reader DC which can be found at <https://acrobat.adobe.com/us/en/acrobat/pdf-reader.html> or by clicking this Icon:





CHRIS

Bowl Show

# The Missouri Aquarium Society's NEW Virtual Bowl Show

## Combining our Monthly Bowl Show with Social Media

[propagationaquatics@gmail.com](mailto:propagationaquatics@gmail.com)



HOLLY

Social Media

[hpaoni@gmail.com](mailto:hpaoni@gmail.com)

### MASI ONLINE BOWL SHOW

**These rules for the Bowl show are intended to be similar to F2F rules** with the following changes to facilitate being online versus in person. Each month, in the stated category, 1st, 2nd & 3rd places will be chosen by the Judges from the photos submitted. In addition a People's Choice will be chosen by viewers of our FaceBook Group Social Media posts.

- Judges' and Show Chair's decisions are final.** Judges are chosen by the Show and Social Media Chairmen and may change from month to month. Judging will be according to the guidelines normally used for bowl shows as listed on the MASI website.  
<http://www.missouriaquariumsociety.com/monthlybowls.htm>
- By entering the contest, you give MASI permission** to use submitted photos in our social media groups, our newsletter: The Darter, or for other uses.
- Photo must have been taken by you**, of a fish/ plant/ other, that you have owned for at least 60 days before photographing. Photos must also have been taken in the same calendar year as the contest, and or at least the last 6 months. You must still own the fish at the time it is entered, and until the end of that month's contest.  
If ownership, authenticity, or time frame of the photo is questionable, Judges and Show chair can ask for more photos privately to prove that fish / plant / other is yours and still in your possession.
- Submitted with EACH entry will be the following....**
  - Owner's real name\***
  - Fish / Plant / Others- Scientific and common name.**
  - Age & Sex of the fish / plant / other .**
  - Current tank size and other species** the fish / plant / other is currently living with.

\*Used to tally Fishy Bucks and other club record keeping. If submitted with an alias, either Holly or Chris must be notified privately with the special circumstances as why

the real name can not be used or the entry will be disqualified.

5. **Participation is open to everyone**, but up to date dues paying MASI members\*\* will be awarded FISHY BUCKS (\$FB), as follows...
  - All Entries earn 1 Fishy Buck.**
  - Third Place earns 3 Fishy Bucks.** (Chosen by the Judges)
  - Second Place earns 4 Fishy Bucks.** (Chosen by the Judges)
  - First Place (Chosen by the Judges) & Peoples' Choice** (Chosen by the viewers on Social Media) **earn 5 Fishy Bucks each.** If they are the same fish this would be a total of 10 \$FB.

\*\*MASI Paid Membership is available online at - <http://www.missouriaquariumsociety.com/membership.htm>, and comes with multiple benefits including, access to F2F club programs and social events, ability to enter the HAP & BAP programs, discounts at some LFS's, 6X yearly Darter newsletter, early access as F2F auction seller, accumulation of Fish Bucks used only at special MASI Reward Auctions, members only annual uncommon fish sale, etc.

6. **Peoples Choice will be calculated by** tallying all positive reactions (likes, cares or hearts) below each photo. Other reactions buttons will not count. In the Event of a tie, a second vote held for 24 hrs - not to exceed 48 hrs, will be announced.

7. **All are monthly contests run during the calendar month,** starting on approximately the 1st, and ending at 11:59 on the 25th of each month.

Late entries will be deleted, and commenting closed on the thread to gives the Judges and the Show chair time to review and properly judge them.



JUNE BOWL SHOW- PHOTO THREAD- Post your entries HERE...

< ^ LINKED



8. **There will be 2 Monthly classes**, as listed in the show categories. One is a standard category, (Marked class A), one is an extra or fun category (marked class B), to keep things interesting, and allow for a wide range of opportunities. Each category will have its own pinned thread in the announcements, in the MASi Facebook Discussions group.  
<https://www.facebook.com/groups/MissouriAquariumSociety/> This group is public, and can be seen by anyone, however, only members of the group can post.
9. **Each person can enter 5 photos each month**, between the 2 classes- total. This number may change in the future, depending on participation, as per Judges and Show chairs authority.
10. **This membership participation activity of the "Bowl Show" will run as long** as Show Chair, Chris Mohrle, & Social Media - Holly Paoni deem it is needed during and after the Covid pandemic.

## SHOW CLASSES

### JUNE -

Class A - Characins: Tetras, Pencilfish, Piranhas, Pacu, Silver Dollars, etc.

Class B - Bare Essentials. Fish that are 1 solid color, including finnage.

### JULY -

Class A - Catfish, all types except cories (See April).

Class B - Outdoor aquarium aquascapes. (Includes tubs, containers, ponds)

### AUGUST -

Class A- Wild type and standard finnage Livebearers

Class B- Tubs, Containers & Pond plants and ' scapes.

### SEPTEMBER -

Class A- New World Cichlids

Class B - Fish raised outdoors for the summer season. (pond, tub, containers, tanks)

Please show in a flat sided clear containers, with the outdoor container visible in your entry photo.

### OCTOBER -

Class A - Rainbowfish & Blue eyes

Class B - Giant Fish, fish that are 12 inches or more.

### NOVEMBER -

Class A- Cyprinids: Barbs, Danios, Rasboras, Minnows, Goldfish

Class B - Your Favorite tool or hobby gadget

### DECEMBER -

Class A- Anabantoids: Bettas, Gouramis, Ctenopomas, etc. (Excludes fancy finned bettas)

Class B - Holiday inspired tanks

### JANUARY -

Class A - Aquatic Critters/ Oddballs Sharks, Loaches, Eels, Oddballs, and fully aquatic Amphibians

Class B - Shrimp & Snails

### FEBRUARY -

Class A - Old World Cichlids

Class B - Hobby Related Art. Must be made by person entering, and still own the artwork.

### MARCH -

Class A- Killies & Ricefish

Class B - Natural Aquascapes. (Use of driftwood, rocks, and live plants)

### APRIL -

Class A- Cories. Includes Aspidoras, Brochis, Corydoras and Scleromystax catfish .

Class B - Fancy Finned Bettas

### MAY -

Class A - Fancy Finned livebearers

Class B - Unnatural aquascapes. (Legos, toys, fake plants, etc.)



# Please Patronize our Advertisers & Sponsors

**SUNSET**  
CUSTOM HOMES, INC.

Patrick A. Tosie, Sr.  
President

P.O. Box 1327  
St. Louis, MO 63026

Cell 314/616-4316  
Voice Mail 314/401-0400  
PatTosie@yahoo.com



PAT TOSIE, REALTOR® Team Leader

**TOSIE TEAM**  
BUY, SELL & BUILD WITH EXPERIENCE.

PAT: 314-616-4316  
TosieTeam@gmail.com  
www.TosieTeam.com

BERKSHIRE HATHAWAY HomeServices | Select Properties



**InkForYourPrinter.com**  
**(636) 677-1900**

Locally Owned and Operated Since 1987  
4600 South Square Dr. High Ridge, MO 63049  
OEM & Compatible Inkjet and Refilled Inkjet Cartridges



**NATIONAL LASER & INK JET  
CARTRIDGE SERVICE**



Call, Click or Come in for your printing needs.

**ACCESS**  
CAPITAL FUNDING

FOR ALL YOUR  
MORTGAGE NEEDS

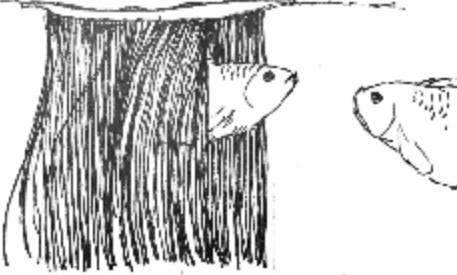
Rick Jokerst  
314-368-2652 Cell  
314-787-0292 Office  
www.accesscf.com  
NMLS# 232014 MLO# 10-1310

14366 S. Outer 40 Rd.  
Chesterfield, MO 63017  
MO Lic.# 10-204

 NMLS# 232028

**Leafmop**

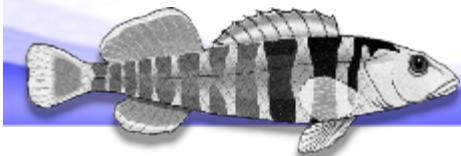
Spawning  
Cover  
Protection  
Mops



"The one with the Leaf"

Kathy Deutsch  
kathy@skden.com





## The DARTER

Hard-to-Find Tropical Fish  
True Aquatic Plants  
Live Foods

Michael Hellweg  
Owner



All major credit cards accepted via PayPal.com  
We'll ship to your door anywhere in the USA!

636.544.3276

636.980.1611 fax

mike@minifins.com

### MASI INSULATED FISH BAG

**Transport your fish in style!**

Insulated, rolls up for easy transport, expandable, fits in luggage, carry your fish anywhere, keep them safe from temperature changes and display pride in your club!

22" x 16" x 12" - holds several fish bags

100% recycled materials

Get yours before they're gone! Available at each monthly meeting or other events while they last!

**\$10**

Back by Popular Demand!  
Same Low Price!



**Also Available! \$15 MASI Polo- Shirts**

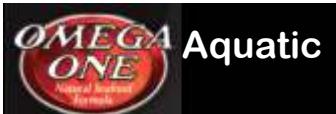




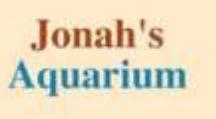
# MASI SUPPORTERS AND FRIENDS



Ad  
Konings



PlecoCaves.com



YOUR TRUSTED SOURCE FOR THE  
BEST IN PET PRODUCTS SINCE 1955

