

modern AQUARIUM



November 2023
volume XXX
number 9

Greater City Aquarium Society - New York

長江水族館

專營各國熱帶觀賞魚和全套優質水族器材



131-08 40th Road, Flushing

Skyview Mall 天景豪苑旁

347.732.0373

monsteraquarium@hotmail.com



歡迎參觀 七天營業

Open 7 Days • 10am-8pm



LIKE AND FOLLOW US ON FACEBOOK

WWW.FACEBOOK.COM/MONSTERAQUARIUMINC

modern AQUARIUM

Series III Vol. XXX, No. 11 November, 2023

ON THE COVER

Cover photo: *Maratecoara lacortei*. Photo by Rosario LaCorte. See our advertisement for Rosario's book on page 25.

GREATER CITY AQUARIUM SOCIETY

BOARD MEMBERS

President.....Horst Gerber
Vice-President.....Edward Vukich
Treasurer.....Leonard Ramroop
Assistant Treasurer.....Open
Secretary.....Open
President Emeritus.....Joseph Ferdenzi

MEMBERS AT LARGE

Pete D'Orio.....Al Grusell
Jason Kerner.....Dan Radebaugh
Marsha Radebaugh

COMMITTEE CHAIRS

Bowl Show.....Joseph F. Gurrado
Breeder Award.....Harry Faustmann
Early Arrivals.....Al Grusell
Membership.....Marsha Radebaugh
N.E.C. Delegate.....Joseph Ferdenzi
Programs.....Open
Social Media.....Dan Radebaugh
Technical Coordinator.....Jason Kerner

MODERN AQUARIUM

Editor in Chief.....Dan Radebaugh

Copy Editors:

Susan Priest

Donna Sosna Sica.....Thomas Warns

Advertising Manager.....Robert Kolsky

See us on the Web: GreaterCity@earthlink.net,
or use QR code:



In This Issue

From The Editor.....	2
G.C.A.S. 2023 Program Schedule.....	3
President's Message.....	4
Our Generous Sponsors and Advertisers.....	5
Fishy Friends' Photos.....	6
Tonight's Speaker: Tom Keegan.....	7
Speaking on Fish Biology 101, Part 2.....	7
October's Cartoon Caption Winner.....	7
Cartoon Caption Contest.....	8
by Denver Lettman.....	8
Pictures From Our Last Meeting.....	9
Photos by Marsha Radebaugh.....	9
The <i>Ancistrus</i> Effect.....	11
by Joseph Ferdenzi.....	11
G.C.A.S. Breeders Award Application Form.....	12
A Life In Fish.....	13
My Cousin Robert.....	13
by Jason Gold.....	13
Methuselah, The Amazing Lungfish.....	17
by Jules Birnbaum.....	17
Fish Can Recognize Themselves in Photos!.....	18
by Betsy Mason.....	18
Bowl Show Rules.....	20
My Microworm Recipe.....	21
MA Classics.....	21
by Alexander A. Priest.....	21
G.C.A.S. Member Discounts.....	24
Modern Aquarium Covers 2018.....	26
MA Classics.....	26
The Undergravel Reporter.....	27
Vertebrates: The Final Frontier?.....	27
GCAS Holiday Awards Banquet.....	28

From the Editor

by Dan Radebaugh

Well, here we are, closing in on the end of 2023. Covid still hasn't gone away, but the current strains of the virus don't appear to be as deadly as those that typified the early pandemic. To be sure, it's still causing worldwide problems, but certainly not on the same scale as did the earlier versions of the virus. While those who have cloistered themselves at home certainly were not wrong to do so, we seem now to be in a much safer environment with regard to the pandemic. I do know a couple of folks who recently did come down with Covid, and it wasn't fun for them, so don't get too cocky. While my personal choice these days is to not wear masks in my ordinary daily activities (such as they've been), I certainly have kept current with the vaccinations. Why be dumb? Chat with your doctor.

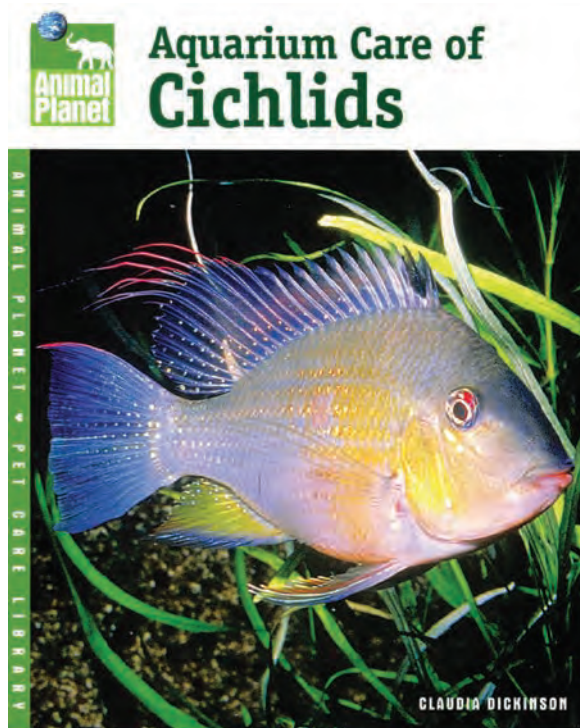
As I read this month's issue, it strikes me that this is a particularly fun issue. We have some terrific photos, and stories by some of



our most familiar authors, with some science thrown in along the way. If we just had some winning lottery numbers it would be perfect!

But what would make me even happier? That's easy! I would love to look at a **Modern Aquarium** table of contents and see a member's name that hasn't been there before! After all, the purpose of a club magazine like **Modern Aquarium** is to share knowledge with one another. None of us knows everything! Nor can we effectively spread knowledge to one another without a means to do so.

A club publication like **Modern Aquarium** provides that means. We are not all walking encyclopedias, but if we share what we do know, that helps *everyone* here to know more and screw up less! Member A might know a lot about South American species, but not so much about native species. Perhaps if someone else in the club (member B, for example), writes an article about a native species they're keeping, member A might be inspired to "try his or her hand" at keeping that species. The magazine facilitates the exchange of knowledge from everyone in the club to everyone else in the club. This of course works better the more folks you have providing the knowledge to others in the club via the magazine! We all do better when we all share information! The club magazine facilitates that sharing!



by Greater City member Claudia Dickinson
(Animal Planet® Pet Care Library)

Hardcover – Also available on Amazon Kindle
<https://www.amazon.com/Aquarium-Cichlids-Animal-Planet-Library/dp/0793837774>





GCAS Programs

2023

March 1	Tom Keegan <i>Fish Biology 101, Part 1</i>
April 6	David Banks <i>Lake Tanganyika Cichlids and Appropriate Tankmates</i>
May 3	Emiliano Spada <i>Antique Aquariums and Equipment</i>
June 7	Karen Randall <i>Sunken Gardens</i>
July 5	Dr. Paul Loiselle <i>The World of Jewel Cichlids</i>
August 2	Night At the Auction
September 6	Sebastian Alvarado <i>Color Changes In Fish</i>
October 4	William Guo <i>Freshwater Shrimp</i>
November 1	Tom Keegan <i>Fish Biology 101, Part 2</i>
December 6	Holiday Party!

Articles submitted for consideration in *Modern Aquarium* (ISSN 2150-0940) must be received no later than the 10th day of the month prior to the month of publication. Please email submissions to gcas@earthlink.net, or fax to (347) 379-4984. Copyright 2023 by the Greater City Aquarium Society Inc., a not-for-profit New York State corporation. All rights reserved. Not-for-profit aquarium societies are hereby granted permission to reproduce articles and illustrations from this publication, **unless the article indicates that the copyrights have been retained by the author**, and provided reprints indicate source, and that two copies of the publication are sent to the Exchange Editor of this magazine (one copy if sent electronically). For online-only publications, copies may be sent via email to gcas@earthlink.net. Any other reproduction or commercial use of the material in this publication is prohibited without prior express written permission.

The Greater City Aquarium Society meets every month except January and February. Members receive notice of meetings in the mail or by email. For more information, contact: Dan Radebaugh at (718) 458-8437, email to gcas@earthlink.net, or fax to (347) 379-4984. For more information about our club or to see previous issues of *Modern Aquarium*, you can also go to our Internet Home Page at <http://www.greatercity.net>, <http://www.greatercity.org>, or <http://www.greatercity.com>.

President's Message

by Horst Gerber

Our October meeting was a great success! We had a full house, and I am not talking blackjack! We had to ask the wonderful QBG staff for two more tables and additional chairs, and we came close to standing room for a few last-minute stragglers!

We also distributed flyers for our Christmas party. Please see the last page of this month's **Modern Aquarium** for details. \$30 per person is really a bargain by today's standards! The club helps to keep your costs very reasonable.

Our auction was practically endless! There were well over 100 items, with bargains galore! Our raffle also had quite a large number of items, thanks in no small part to our friends at Monster Aquarium. Please remember them when you need fish or supplies. They are very generous with us month after month!

Our speaker William Guo did an outstanding job of getting us interested in the world of shrimp (*not* for the dinner table) and their beautiful color variations, where they come from, and how to keep and breed them. I look forward to an article on this subject in an upcoming issue of **Modern Aquarium**!

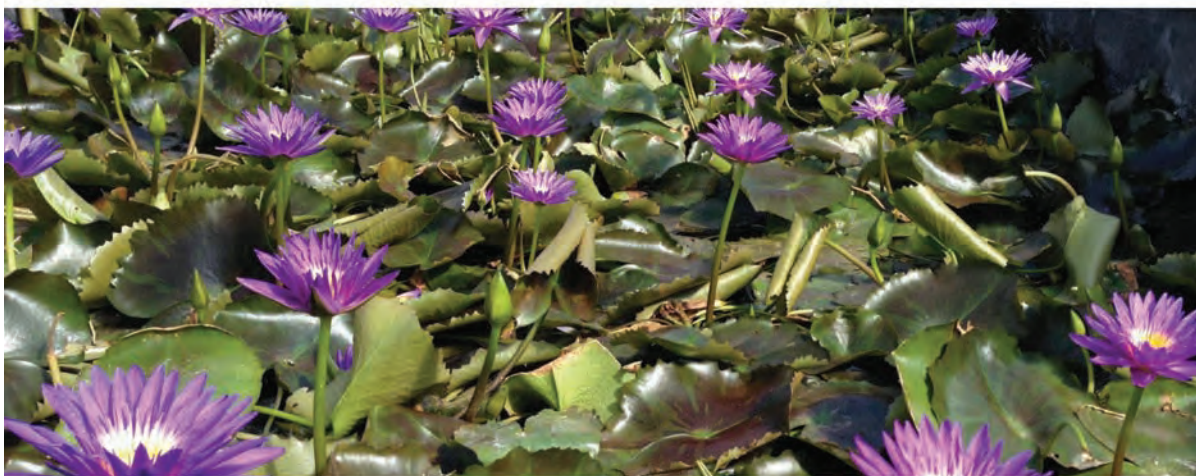
With a couple more meetings, I'll surpass Dan R's length of tenure as President, so if any of you boys and girls are interested in stepping up to take over this prestigious position in this prestigious aquarium society, please talk to me (or Joe or Dan) about it. Yes, it takes a little time and attention, but it's well worth your efforts and talents to help keep this great club great!



Horst



Florida
AQUATIC NURSERIES





GCAS Thanks You!

Our Generous Sponsors and Advertisers

The Greater City Aquarium Society extends our heartfelt thanks to the following manufacturers for their generous donations. Thanks also to our advertisers, whose contributions to our success as a Society are deeply appreciated. Please patronize our supporters.

Advanced Marine Aquatics

Al's Aquatic Services, Inc.

Amazonas Magazine

Aquarium Pharmaceuticals

Aquarium Technology Inc.

Aqueon

Brine Shrimp Direct

Carib Sea

Cobalt Aquatics

Coralife

Ecological Laboratories

Fishworld

Florida Aquatic Nurseries

Franklin Pet Center Inc

Fritz Aquatics

HBH Pet Products

High Quality Exotic Goldfish

Hydor USA

Jehmco

Jungle Bob Enterprises

Jungle Labs

Kent Marine

KHC Aquarium

Kissena Aquarium

Marineland

Monster Aquarium, Inc.

Nature's Reef & Reptile

NorthFin Premium Fish Food

Ocean Nutrition America

Oceanic

Omega Sea

Pacific Aquarium, Inc.

Penn Plax

Pets Warehouse

Pet Resources

Pisces Pro

Red Sea

Rena

Rolf C. Hagen

San Francisco Bay Brand

Seachem

Sera

Spectrum Brands

Your Fish Stuff.com

Zilla

Zoo Med Laboratories Inc.

Fishy Friends' Photos

by Greater City Aquarium Society Fishy Friends

***B**elow are photo submissions to our “Fishy Friends” Facebook group. I’ve left the subjects unnamed, but not the photographer. If you see a shot you like, and want more info, ask the photographer about it! I’m sure he or she will be delighted to tell you!*

Victor Huang



Andrew Jouan



Kemoine de Lavallade



Geri Domingo



Tony Siano

Marsha Radébaugh



Joseph F. Gurrado



Tonight's Speaker: November 1, 2023

Tom Keegan, Speaking on Fish Biology 101, Part II

Tom Keegan has been keeping fish since he was five years old, and has never left the hobby. He started with a Metaframe ten-gallon tank and a box filter in the early sixties, and began working at the local aquarium shop when he was twelve. Using equipment from the store, he built a small fishroom in his basement, and started breeding angelfish and others for extra money. Tom earned his Pre-Med BS in Biology from Stony Brook University in 1978. Working at, and later managing the store, he helped, taught, and was involved with many professors at Stony Brook with their experiments with fish, and became the go-to person for guidance.



At the end of his junior year in college the store was up for sale, and he took the leap and purchased it. He operated the store for some thirty years, building it up to over 300 tanks plus a pond section with about twenty vats. Seven days a week he lived the dream of observing and keeping fish from all over the world. In 2003 when the store closed (long story), he moved on to a new career, but never stopped keeping fish in his home and yard. He now runs a small koi farm on his property, and has a fishroom in his house where he breeds various species for fun. An active member of LIKA, GCAS, and NCAS, Tom has a lot of fish and equipment experience, as well as knowledge learned from many of the old-timers in the hobby.

From his experience with fish over the years he knew there was something more going on in a fish's head than most folks give them credit for. Through reading and research he found that there was a lot of material about this, so he put together a two-part lecture. The first part talks about the physical aspect of fish senses—how they see, hear, smell, taste and yes, feel. The second part explores how they use these senses, and how cognitive fish really are. They think and learn much better than most people imagine!



October's Caption Winner: Tom Warns

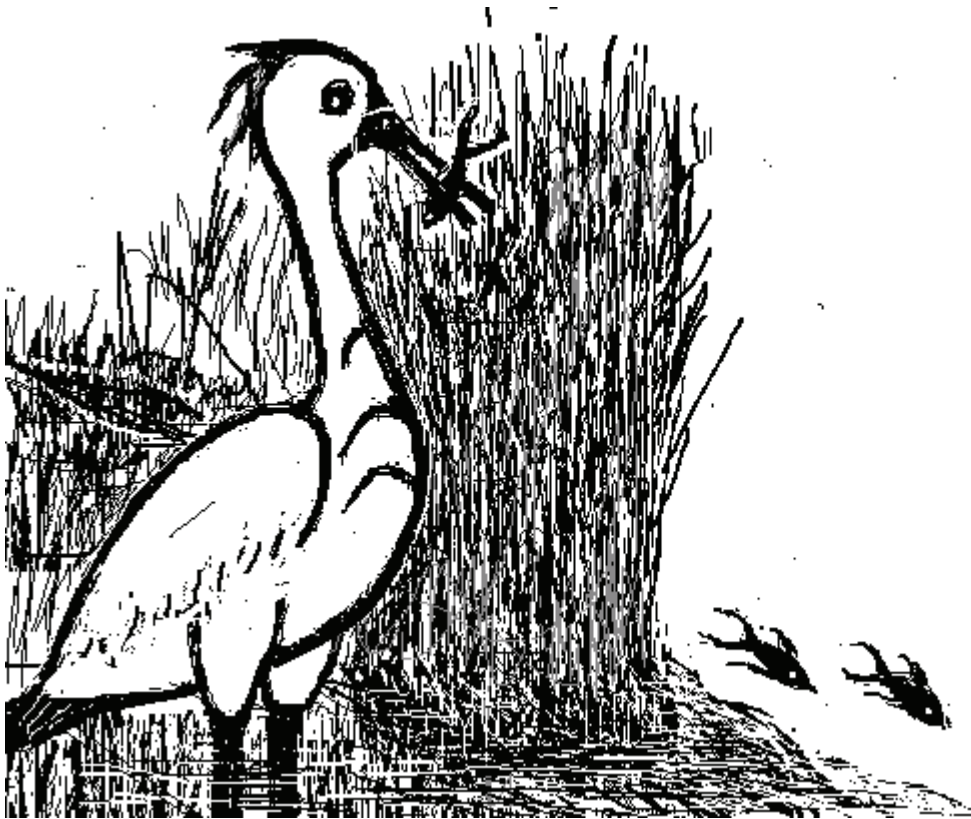


Whose idea was it to remake **Little Shop of Horrors** for the aquarium crowd?

The Modern Aquarium Cartoon Caption Contest

by Denver Lettman

*In this contest, you, the members of Greater City, get to choose the caption! Just think of a good caption, then mail, email, or phone the Editor with your caption (phone: 347-866-1107, fax: 877-299-0522, email: gcas@earthlink.net. **Your caption needs to reach the Editor by the third Wednesday of this month.** We'll also hand out copies of this page at the meeting, which you may turn in to Marsha or Dan before leaving. Winning captions will earn ten points in our Author Awards program, qualifying you for participation in our special "Authors Only" raffle at our Holiday Party and Banquet. Put on your thinking caps!*



Your Caption:

Your Name:



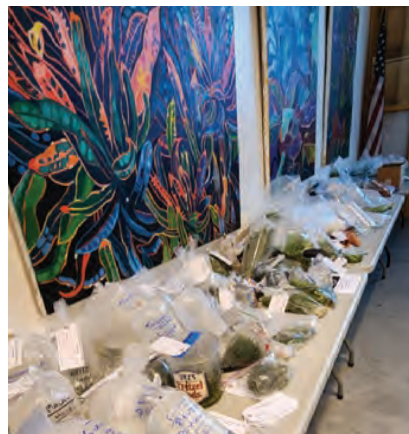
<https://www.amazonasmagazine.com/>

Pictures From Our Last Meeting

Photos by Marsha Radebaugh



Looking over the goodies!



A better view of the goodies



Our Speaker this evening,
William Guo



All Right! We're ready to have a meeting!



John Buzzetti and Tom
Keegan in uniform again!



Welcome new GCAS member
Katherine Hernandez!



Mike Gallo receiving his Door
Prize!



And Lonnie Goldman
receiving his!

Bowl Show Winners!



President Horst presents Ed Vukich with 'bowl show blue'!



Richie Waizman receiving his 2 Bowl Show Awards from President Horst!

From the Keystone Clash



John Buzzetti with Bri Farrel, winner of the People's Choice Award at the 2023 Keystone Clash. The award was sponsored by our own Joe Ferdenzi (who happens to be John's cousin). Bri's winning entry was a *Corydoras sterbai*.



The *Ancistrus* Effect

by Joseph Ferdenzi

The elimination of algae in aquariums has been a much discussed topic for over a century. Over those years many methods have been proposed, and many fish and products have been touted to do the job.

My experience with aquariums has led me to conclude that the complete elimination of algae in an aquarium is not only extremely difficult, it is really unnecessary. Algae is a natural part of the aquatic world. Some algae is to be tolerated. What you don't want is for algae to be so out of control that it dominates your tank.



The purpose of this article is not to discuss all the methods you can use for algae control—that would indeed be a very lengthy article—but to share with you one partial solution to too much algae: a fish widely known as the Bristlenose Pleco, a species of *Ancistrus* catfish that is very commonly available.

Ancistrus catfish are relatively small even as adults—large males top out at around five inches. They are easily kept in a community aquarium as long as you make sure to feed them with sinking pellets, tablets or wafers. They prefer food that is high in animal protein as opposed to plant based foods.

Ancistrus have sucker-shaped mouths and are constantly looking for food. This activity means that surfaces in the aquarium are being constantly cleaned by their raspy teeth. What does this mean for the

control of algae in the aquarium? A recent unintentional experiment of mine provides a very illustrative answer.

I had spawnings of two kinds of catfish very close in time. One was a black form of *Corydoras schultzi* and the other was an albino version of the *Ancistrus*. Being somewhat short of space, I decided to divide a 40 gallon tank with a large sponge panel into equal halves.

Each half had an identical box filter and each had an *Anubias barteri* held down by a stone. No gravel was on either side, and



no heaters were used. The lighting for both halves came from one LED fixture.

The only real difference in the two halves was that the right side contained a colony of *Corydoras* and the left side had a colony of *Ancistrus* (see photo below). Each colony was fed with largely the same types of sinking food, and each was doing well. →



But as time went on, one very noticeable difference began to emerge. While each *Anubias* plant was growing, the leaves of the *Anubias* with the *Corydoras* had a noticeable film of algae growing on the leaves. The leaves of the *Anubias* plant on the side with the *Ancistrus* by contrast, were almost spotless. Because, as the saying goes, one picture is worth a thousand words, this article has two photos for you to compare the leaves of the respective *Anubias* plants.

I can only conclude that this striking difference is due to the *Ancistrus* effect. This further leads me to conclude that one or two *Ancistrus* in an aquarium will certainly help in controlling the growth of algae on some surfaces. They will not eliminate all algae, but they will certainly help.



Greater City Aquarium Society Breeder's Award Application Form

Name of breeder: _____

Fish name (Latin): _____

Common name (if any): _____

Is this fish in the CARES program? _____

Date spawned: _____

Witness signature: _____

Date presented at meeting: _____

Witness signature: _____
(must be at least 60 days after spawning)

PROGRAM USE ONLY

_____	+	_____	+	_____	=	_____
Points for species		First breed		CARES		Total points

Certificate # : _____

A Life In Fish – My Cousin Robert

by Jason Gold

I have a first cousin named Robert. Our fathers were brothers, so we even have the same last name. He's about five years older than I am, which means that in my early memories of him, he was double my age. A big kid. When my family still lived in New York, we'd go to each grandmother's house—my father's mother's on West End Avenue on the Upper West Side and my mother's mother's on Saunders Street in Forest Hills—on alternating Sundays. Those visits were always filled with pint-sized old people (come to think of it, about the same age as I am now) who spoke with Brooklyn-Yiddish accents, smelled of bath oil and talcum powder and cigars, and asked about school. There was always a big buffet spread on the dining room table and seltzer siphons in the kitchen. The cousins were usually there too.

But when I was six we moved from The Bronx to Atlanta, and after that I saw Robert and my other relatives only once a year on our annual Winter Break trips to NYC. Without those weekly gatherings, without being invited to one another's birthday parties and sharing the kids' table at holiday dinners, they were still family of course, but no longer truly familiar. We did fly into New York for Robert's bar mitzvah when I was eight, and every kid got to take home a little bowl with two neon tetras—and that was the start of my life in fish. So there was always a fish-y connection between Robert and me, at least in my mind.

As I got older I'd hear about what my various relatives were up to. My parents had these pigeonholes for each of the cousins, and they weren't especially kind. This one was "creative," that one was "a mama's boy," another was "a princess," all said with a knowing sidelong glance. Those were euphemisms for wild and shy and spoiled. Robert's pigeonhole was "oddball." They'd wonder aloud what would ever become of him. That was different from my reputation in the family—I was merely "quirky," a miniature adult

and a smarty pants. To be sure, those weren't exactly meant as compliments. I had peculiar hobbies, hung out with the grown-ups, and was a data dump of arcane information. Instead of **Sports Illustrated** I read **TFH** and **Horticulture**. My friends and I would get together to go to old movies or play board games or bridge. I loved doing my math homework and hated most sports. Yes, I was a nerd, off at the edge of the bell curve in a family that valued middle-of-the-bell-curveness. Robert was always dissecting things

and had pet snakes and ferrets, and as much as they all thought it was a bit weird that I was so into plants and fish, they thought it was a *lot* weird that he was so into snakes and ferrets.

Robert grew up in Westchester, and the answer to what would become of him was that he became a doctor—a urologist.

He went to both college and medical school at Tulane, in New Orleans. By the time he was in med school, I was in college. He'd stop over and spend a night with us in Atlanta every August, when I was also getting ready to head back to school, as he drove from New York to New Orleans, snakes and ferret in tow. The ferret traveled in a cage and ate canned cat food, but the snakes each traveled in their own sweat sock, knotted at the open end, and fasted for the three days they were all on the road. The rest of my family was basically grossed out by his traveling menagerie, but my college years were the only time since I was 8 that I didn't have at least one aquarium, and I was pet hungry. I let the snakes climb all over me and held the ferret, as instructed, between my thumb and pointer finger, just below its head. I thought they were way cool, even if everyone else thought they were weird and scary. Robert was a bit like a ferret himself, kind of shaggy and wary, and kind of cool too.

Then Robert and I both disappeared into our adult lives. I'd see him and the other relatives every few years at family events—weddings and



The Gold Cousins: Jason, Ira & Robert.

bar mitzvahs and maybe a seder—but we had careers and families, mine in NYC and his in Boca Raton. We didn't really know one another as young adults.

Decades later, Robert's mom, my Aunt Charlotte, was turning 90, and there was going to be a weekend of celebrations in Boca. I decided to go. The day I was leaving, an epic ice storm bore down on the East Coast, and I waited at LaGuardia for hours while my Delta flight was delayed...and delayed...and then cancelled. When I got home at 2 AM, I started looking for other flights online, found one on JetBlue, and at 4 AM and 4°F, headed back out, this time to JFK. That flight ended up being delayed too, but it did finally take off, and I made it to South Florida. The only other Northeasterners who'd managed to get there despite the nor'easter were another cousin and an aunt who'd arrived early to spend



a full week in the Sunshine State. The parties were great, and it was really fun to see everyone, but with a quarter of the country still iced over, JetBlue couldn't get their planes and crews where they needed to be, and their whole system melted down. Now it was my flight home that was cancelled, and I spent most of two days online and on hold trying to find a plane or a train or even a rental car back to New York. No go. The inescapable conclusion was that I was going to be stuck in Florida for the week. And hey, there are way worse places to be stranded by an airline meltdown.

Robert and his wife Nancy were incredibly great about it and offered to put me up until I could get back home. It wasn't as cold there as it was in New York, of course, but still sweater weather, so Nancy asked, "Since we can't go to the beach, is there anything else you'd like to do while you're here?" I knew the answer—the first



places I always want to go when I'm someplace new. But I hesitated. Guess I didn't want to seem too, you know, quirky. But what was the worst that could happen? "Um...are there any good farmers markets or garden centers or aquarium stores you know about?" Nancy rolled her eyes. "Oh my God, it must be genetic!" But Robert was all smiles. "I know exactly where we should go. We'll start tomorrow morning!"

And we did indeed! The two aquarium stores he took me to were all about salt water, not my slice of the hobby, but whether it's from some blackwater backwater or a kelp forest or a stretch of tropical coral, I've never met a fish I didn't like. The reef tanks at these places were gorgeous, crammed with fabulous and fascinating creatures. But the coolest place we went wasn't an aquarium store at all, it was Underground Reptiles. It was like the private zoos I'd fantasized about as a child. Perfect for a pair of quirky/oddball cousins. In addition to the amazing snakes and lizards and tortoises basking under their heat lamps or hiding in their lairs and even some display-only herps like pit vipers and a baby alligator, they had non-mainstream mammals like hedgehogs and ridiculously cute sugar gliders and Robert's old fave, ferrets! We were there for





hours—two middle-aged men like kids in a candy store. But you know, cold-blooded candy with scales. We went to nurseries too, full of gorgeous tropicals, and I got a little crepe ginger to bring home for my window sill as a hedge, so to speak, against the arctic blast. We also went to the beautiful Pondhawk Nature Preserve where we watched from elevated boardwalks as cranes and flamingoes stalked among the basking alligators and iguanas in a restored wetland. But Robert saved the best for last.

On our last day, we drove west on a road as absolutely straight as it was flat. The immaculately landscaped suburbs and golf courses fell away to open, scrubby, oak and palmetto forest with an occasional roadside bungalow, and after about a half-hour's drive a levee loomed before us. We pulled over, climbed the embankment, and there, stretching from the razor's edge of the levee to the western horizon, were the Everglades, the River of Grass. The place was magical, as quiet and isolated and exotic and bursting with life as an Orinoco tributary or an Irrawaddy oxbow. It was just so *alive*, reminding me of all those photos I'd pored over as a kid of languid blackwater streams where you could practically feel the swelter and hum of the jungle. The sky was full of birds, the grass caught the breeze, the waters teemed with fish that rose to snap at the hovering insects. There

was a Mesozoic timelessness about the place—a calm despite the palpable buzz and throb of all that life. Robert is a weekend fisherman, and we moved along the levee, casting into the pools and channels. We didn't catch anything and we didn't say much either, but that didn't matter. Though it was a long time coming, Robert and I were now more than just relatives and contemporaries, we were friends, bound by our only-the-rest-of-the-world-thinks-they're-strange hobbies.

A couple of years later, Robert's middle child got married. It was a big to-do, and all the cousins were invited, so it was back to Boca. At that point I had just returned from my first adventure to those places I'd fantasized about visiting since I was a child reading **TFH** cover to cover. I'd traveled for a month in Borneo and Sulawesi and was tan and relaxed and had lots of tales to tell. Robert was busy being the father of the bride, but that connection from *Underground Reptiles* and the Everglades was still there. He was way into stuff—fishing, biking, nature, food—and being into stuff makes someone interesting to me. It doesn't really matter what they're so interested in; I enjoy the energy of people who are way into just about anything. During the snatches of conversation we were able to manage, he asked me a lot about my trip. He offered that if I ever was planning another adventure like that to let him know—he'd love to join me. In fact, I'd asked several people to come





on that trip with me, and they all made excuses. Of course I understood that that kind of travel isn't for everyone, but in my life it seemed that it wasn't for *anyone*—anyone except me. (Before the trip I'd sent my full itinerary to my mom and sisters and kids. My older sister's response was: "Are we even related?") And so I'd gone solo. But just the idea that here was someone in my life who was open to that sort of travel felt great! We had different interests, yes, but something essential in common driving those interests.

Finding that shared something meant a lot to me. It wasn't just the off-the-grid travel inspired by my hobbies that I'd undertaken solo because I couldn't find anyone else to go with me, it was also the hobbies themselves. I'd hung out in aquarium stores and aquarium meetings myself, I'd meandered the aisles of nurseries and planted my garden myself, and I'd wandered in the woods and waded into creeks and explored tidal pools myself. I'm actually a pretty gregarious person, but I'd accepted that that was the way things were, that no one else in my world really shared my interests with the same passion I held for them. What's stranger still is that my parents did have passionate interests of their own. But because my interests were different from theirs,

they somehow couldn't see that they still came from that same driven place; my hobbies didn't make me different from them, in fact they made me very much their child. But Robert totally got it. It was actually the first time I felt that anyone really understood that strange, internal Rube Goldberg perpetual motion engine that drives me as a hobbyist—perhaps that drives any hobbyist.

Now I hear from Robert anytime he reels in something quirky or odd from the swamps and canals of South Florida. I get a picture by text or email, snapped before he slips his catch back into the water: "Hey, Jason, look what I caught! Do you know what this is?" It's always some colossal specimen of something that really shouldn't be there. "Geez, that is one huge oscar!" or "A giant arowana!" or "Is that a clown knife? I had no idea they could even get that big! What a monster!" His response is always the same: "Yup, I knew you'd know." He already knew the answer anyway, but we're both fish guys in our own ways, and a picture of a fish is how we say Hi. We've always shared a last name, but now we share so much more. We share fish!



METHUSELAH, THE AMAZING LUNGFISH

by Jules Birnbaum



This lungfish is kept at the Golden Gate Park, at the Steinhart Aquarium of the California Academy of Sciences. The fish came to the aquarium from Australia in 1938 and is probably 92 years old. That was the year after the Golden Gate Bridge had been opened, and FDR was in his second term as president. WWII had not begun.

Lungfish are freshwater vertebrates belonging to the class Dipnoi. They have no major predators. They have remarkable adaptations that have helped them to survive: a primitive lung and the ability to enter a state of estivation, which is similar to hibernation.

Did having lungs allow them to leave the water 400-420 million years ago? Lungfish can survive on land and in water. They can burrow into mud if the water dries up. They can walk along a shallow river bed. They can live over 100 years. They are living fossils! They survived global warming. They can teach us a lot about molecular biology.

The lungfish can be found in Australia, South America and Africa. They can weigh 22 pounds and can grow to 4 feet in length. They eat frogs, fish, worms, tree roots, plants, seeds and mollusks. These amazing fish can go three years without food!

They do not make good pets because of their large adult size and their aggressive nature. They are easy to keep, but they do bite. This fish does not move much, and a 75 gallon tank might work. They can be aggressive with anything that gets close to them, so they should be kept alone. If you wish to purchase one the price can be \$40 for a young fish to as much as \$1,800 per adult fish. Wet Spot lists a 5" wild lungfish for \$99 when available.

I should mention that I have never kept a lungfish, nor would I recommend this fish to you unless you have a *large* tank available.



Credit TOM MCHUGH / SCIENCE PHOTO LIBRARY

Fish Can Recognize Themselves In Photos!

further evidence they may be self-aware

by Betsy Mason – February 6, 2023



Bluestreak cleaner wrasse, *Labroides dimidiatus*, can recognize photos of themselves, suggesting that they have self-awareness.

Some fish can recognize their own faces in photos and mirrors, an ability usually attributed to humans and other animals considered particularly brainy, such as chimpanzees, scientists report. Finding the ability in fish suggests that self-awareness may be far more widespread among animals than scientists once thought.

Animals that recognize their reflection in the mirror most likely first learn to identify themselves by seeing that the movement of the animal in the mirror matches their own movement, researchers think. Because the cleaner fish were also able to recognize their own faces in still images, they, and possibly other animals that have passed the mirror test, may be able to identify themselves by developing a mental image of their own face that they can compare to what they see in the mirror or photos, the authors say.

“I think it’s a great next step,” says comparative cognitive psychologist Jennifer Vonk of Oakland University in Rochester, Mich., who wasn’t involved in the study. But

she would like to see more research before drawing conclusions about what’s being represented in the mind of a nonverbal being like a fish. “As with most other studies, it still leaves some room for further follow-up.”

Kohda’s lab has more experiments planned to continue to probe what’s going on in the brain of the cleaner fish, and to try the new photo-recognition method on another popular research fish, the three-spined stickleback (*Gasterosteus aculeatus*).

Animal behaviorist Jonathan Balcombe, author of the book **What a Fish Knows**, is already convinced, describing the new study as “robust and quite brilliant.” People shouldn’t be surprised that fish could be self-aware given that they have already been shown to have complex behavior including tool use, planning and collaboration, Balcombe says. “It’s time we stopped thinking of fishes as somehow lesser members of the vertebrate pantheon.”

Photo from MARRIO31/ISTOCK/GETTY IMAGES PLUS

CITATIONS

M. Kohda et al. [Cleaner fish recognize self in a mirror via self-face recognition like humans](#). *Proceedings of the National Academy of Sciences*. Published online February 6, 2023. doi: 10.1073/pnas.2208420120.

M. Kohda et al. [Further evidence for the capacity of mirror self-recognition in cleaner fish and the significance of ecologically relevant marks](#). *PLOS Biology*. Published online February 17, 2022. doi: 10.1371/journal.pbio.3001529.

M. Kohda et al. [If a fish can pass the mark test, what are the implications for consciousness and self-awareness testing in animals?](#) *PLOS Biology*. Published online February 7, 2019. doi: 10.1371/journal.pbio.3000021.

About Betsy Mason

Betsy Mason is a freelance science journalist based in the San Francisco Bay Area and a 2022 Alicia Patterson Foundation fellow reporting on how science impacts how we think about other animals. She is coauthor of **All Over the Map**.



The advertisement for 'The Museum of Aquarium & Pet History' features a central blue banner with the title in a decorative, serif font. Below the title, there are illustrations of a woman feeding fish in a bowl, two dogs sitting, and a girl holding a bag of 'MELON MARVELS' pet food. The banner is flanked by two vertical panels: the left panel shows a parrot, a boy with a birdcage, and a fishbowl; the right panel shows a large goldfish, two puppies, and two children with a fishbowl. Below the banner, text describes the museum's collection of over 3,000 items related to aquariums and pet keeping, and provides the website URL <https://moaph.org/>.

The
**MUSEUM OF
AQUARIUM & PET
HISTORY**

If you like history, and you like pets, then this is the place for you. Dedicated to the history of aquarium & pet keeping, The Museum of Aquarium & Pet History includes a huge depository of over 3,000 items all focused on the pet industry. From antique fish bowls, aquariums and cages, to foods, medications, books and advertising signs, we've got it all! To learn more about this amazing collection of historical pet artifacts, please visit our website:

moaph.org

<https://moaph.org/>



BOWL SHOW RULES

There is a Bowl Show at every GCAS meeting, except our Night at the Auction/ fleamarket meeting and our Holiday Party and Awards Banquet meeting. Bowl shows are open to all members of GCAS. Rules are as follows:

- Only current GCAS members may enter fish in the Bowl Show.
- There is a limit of 2 entries per member per meeting.
- Unlike some other clubs, every month is an “open” Bowl Show at the GCAS (i.e., there is no “theme,” such as that one month cichlids are judged, the next livebearers, the next anabantoids, etc.).
- Any fish that wins any prize (1st, 2nd, or 3rd) may not be entered again in the same meeting year.
- B.Y.O.B. (Bring Your Own Bowl!) Entrants are responsible for providing suitable containers and suitable water for their fish. These containers must be clear on at least three sides.
- Only one fish per container (i.e., no “pairs”).
- No plants, ornaments, or equipment (filters, airstones, etc.) are allowed in the judging tank (an external mirror, or opaque cards between containers is acceptable, as is a cover that does not obstruct side viewing).
- Points are awarded: 5 points for 1st Place, 3 for 2nd Place, and 1 for 3rd Place.
- Ribbons are awarded: blue for 1st Place, red for 2nd Place, and green for 3rd Place.
- The person with the most points at the end of the meeting season receives the Walter Hubel Bowl Show Champion trophy at the Awards Banquet.
- The decision of the judge(s) is final.
- A running UNOFFICIAL total of the points awarded is printed in **Modern Aquarium**. Only the tally of points maintained by the Bowl Show Coordinator is official.
- **In case of ties:**
 - 1st Tiebreaker – most 1st Places
 - 2nd Tiebreaker – most 2nd Places
 - 3rd Tiebreaker – most entries

My Microworm Recipe

by ALEXANDER PRIEST

Let's say you've been a member of an aquarium society for over 15 years, and have even convinced some members that you know how to take care of fish. Now the President of the society knows better — he's been to your house many times. But he's the kind of guy who never has anything bad to say about anyone or anything. So even though he hates castles and bricks in aquariums, he invariably compliments my 90 gallon community tank, which has both. (Since the castle is nearly 20 years old and is no longer made or sold, it has essentially become an historical aquarium artifact. I guess this makes it somewhat respectable to our President, who is also an aquarium history buff!)

Let's also say that you're sitting at home, and the President of the society calls you to ask if he could drop over that evening after work to get some microworms for a recent spawning at his house. You always keep a culture of microworms going, but even if you gave him your entire container, it would not be enough. What to do? Simple! Tell him to come right over, and before he arrives make him up a "supercharged" batch that will produce loads of fry food.

I am not claiming that I have the one best recipe for microworms. I am saying that I have a method that works for me. I have maintained the same microworm culture for over ten years, reviving it back from crashes and even from maggot infestations. I'm going to share my method with you, and debunk a number of commonly held misconceptions.

Microworms (*Panagrellus redivivus*) are endemic to the leaf litter of the forest floor. They belong to the phylum *Aschelminthes* and the class *Nematoda* (roundworms). While "roundworms" may evoke thoughts of the pork tapeworm, hookworms, pinworms and similar parasites, microworms only feed on microscopic organisms, such as yeast, and pose no threat to fish or humans.

Microworms are an excellent first food for fry. They are also popular with many small adult fish, including tetras, guppies, and corys (which especially seem to appreciate the fact that they stay on the bottom of the tank, waiting to be gobbled up). I routinely feed them to my tank of Endler's livebearers.

The size of a microworm at its earliest stage after being hatched is 0.25 - 0.35 mm (that's 0.00984 - 0.01378 inches — even smaller than a newly hatched brine shrimp!).

Before I give you my recipe, I'm going to correct two commonly held misconceptions about microworms and their culturing. First, you do not

need to use mature tank water, deionized, or reverse osmosis water, or dechlorinated tap water when preparing the media. I use warm tapwater only. Second, adding vitamins or supplements will not produce healthier or more nutritious microworms. Microworms feed on yeast; the cereal, mashed potato, or other medium is what the yeast feeds on.

I've read some articles saying that it is not necessary to use yeast in every mixture. The authors of those articles contend that if you take some of the worm/food/yeast mixture from an active container, there will be enough yeast to start a second culture. This is true, as long as you don't really need an active and vigorous new culture any time soon.

While preparing for an article in this magazine nearly seven years ago, I performed several experiments. In one experiment, I mixed two identical batches of cereal and water (measuring the amount of each) and put them into two identically sized and shaped containers. I added the same amount of culture media, from the same source, to each. The only difference was that I added yeast to one batch, but not to the other. After four days, the batch with yeast added was producing enough worms to harvest. After a week, the other batch barely showed any activity. To that second batch, I added some dissolved yeast, covering half of the media with it. Within less than a day, the side of the container next to the half covered with the dissolved yeast was filled with microworms, while the other half barely showed any activity. The conclusion I draw from this is that the yeast is an absolutely essential ingredient in every batch, if you want fast microworm growth.

The more yeast you use, the more vigorous will be the growth of microworms. On the other hand, the more yeast you use, the sooner the culture will go bad. Basically, adding yeast accelerates everything.

To grow microworms at home using my method, you will need:

- A "starter" culture of microworms
- At least two plastic containers, with lids
- A "starchy" culture (food) media
- Yeast
- Water

You can get a starter culture from another aquarist (one of the benefits of belonging to an aquarium society), or from commercial sources. Microworm starter cultures can even be found on Internet auction sites, such as AquaBid.com or eBay.com.

This article first appeared in the August, 2008 issue of *Modern Aquarium*



Any brand of unflavored baby oatmeal should work.

The plastic containers can be anything from a washed out margarine container, to a shoebox. The container only has to be waterproof and have a tight-fitting lid (both to prevent the worms from crawling out over the sides, and to keep the culture medium from drying up). I prefer clear or dark containers to (usually) white margarine containers only because it's easier to see the white microworms as they crawl up the sides.

To prepare the containers, punch several small holes in the lid. The yeast will produce carbon dioxide (CO₂), which needs to be "vented" (and fresh air needs to be able to enter). On the other hand, fruit flies seem to be especially attracted to microworm cultures, so you need many *very small* holes to both vent the mixture and keep fruit flies out. (While fruit flies are also an excellent live

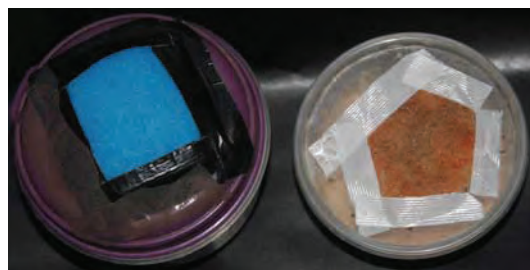


A clear container allows you to see the microworms as they crawl to the sides.

food, those sold as fish food are usually the "wingless" variety, while what you're likely to get in a microworm culture are the kind that fly out and into your house every time you open the container.) If you cut a quarter-dollar size hole in the lid of the container, and tape gauze or a piece of aquarium filter pad over it, this also works quite well.

When culturing microworms, it's best not to put "all your worms in one basket," so to speak. I recommend preparing at least two (preferably three) containers. Once your initial culture is established, start a second culture (then a third) according to the instructions to follow.

The medium I use is unflavored baby oatmeal. I've successfully used both Gerbers and Beech-



Taping filter media over a hole allows air exchange but discourages fruit flies.

Nut brands, and I have no doubt that a comparable store-brand oatmeal for babies would work just as well. Among the experiments I performed seven years ago was to try instant mashed potato mix, as this was one of the most recommended culture media I came across in my research. In my experiment, mashed potato mix resulted in an *extremely* slow growing culture that was, in my opinion, basically unuseable.

Once you have your materials and ingredients, here's how to use them:

- Mix enough baby oatmeal with ordinary, untreated, warm tap water to form a moist paste, about three-quarters of an inch deep in your container.
- Sprinkle enough active dry yeast to lightly cover the surface, moisten and mix gently. The end mix should be moist (you may need to add a bit more water, as oatmeal tends to soak up moisture), but not "soupy." If you added too much water, just add a little more cereal.
- Using a moistened finger or paper towel, clean the sides of the container of any media. (This will save you a lot of work later, because you will be able to harvest worms from the side of the container and use them immediately, without having to first put them into water and syphon them

out to avoid contaminating your tank with yeast and cereal.)

- Add your live culture, spreading it over the prepared cereal/yeast mix.
- Cover and keep the mixture at room temperature. (If you are going away for a while, you can refrigerate a batch – they won't grow much, but if kept moist, they should last much longer.)

You should see the surface of the media “shimmer” with the activity of the worms within a day. Be ready to harvest your first worms as soon as they start climbing up the sides of the container. For the first day or so, it may be necessary to add more water to keep the mixture moist. (It seems that the oatmeal keeps absorbing water for a while.) The easiest way to do this is with a plant mister (get one from your local dollar store).

If you really need microworms FAST (as I did in the story I related at the start of this article), mix yeast with the baby oatmeal. But, also mix some more yeast with water in a separate small container. After stirring and getting out the lumps, pour this on the top of the media. Our President e-mailed me that he was able to feed microworms to his fish from the culture I gave him the next day, and within a few days that culture was “producing worms by the gazillion.”

Harvesting microworms is easy. They crawl out of the food media and onto the sides of the container. If you put sticks in the middle of the media, they will crawl onto the sticks also. If you followed my recommendation to clean the media from the sides of the container, then use your finger to scoop the worms and then just swirl your finger around in the tank to release them. Even if you are “squeamish” about worms, you probably can handle this. These worms are so small that the only thing your naked eye can see is something resembling white foam.

While a worm culture that has gone bad has a very bad odor, a healthy culture gives off a faint aroma of yeast or beer. This is where the second (and I use a third, myself) container comes in. Within a week of your first “harvest,” prepare a second container in the same manner as the first. Take some of the worm culture from your first container, and “seed” your second mixture with it. You should get two to three weeks of harvesting from a given batch. Once a week, slightly stir the mixture and if it gets too watery, add a little more cereal. If the growth slows, dissolve some yeast and pour it on the surface of the mix. If the batch starts smelling really bad, throw it out.

Even if the culture smells bad and turns dark and “soupy” it can be revived or used to start a new culture if you can see any “wiggling” at all on the surface. “Supercharge” fresh media with extra yeast and a liquid yeast topcoat, as I described

previously, then add some of the smelly mix on top. You should have a fresh (and sweet-smelling!) culture in a day or two.

If you remember, I mentioned that microworm cultures attract fruit flies. I'm assuming you don't want to release flies into your fishroom every time you feed your fish. Because fruit fly larvae are more sensitive to the cold than are microworms, here's something I've tried with about 85+% success: put the contaminated microworm culture into your refrigerator for a day or two, then carefully take some of the culture that is maggot-free (maggots will show up as large bumps on the surface) to use to start a new culture.

Up to now, I've told you how to culture microworms and how to revive a culture under certain conditions. But, you might ask, “why should I bother, when there are a number of commercial fry foods available?” A good question, and the answers are as follows:

- They are the ideal size for even very small fry.
- They are 76% water and 24% dry matter; 40% of the dry matter is protein and 20% is fat.
- The wiggling of the worms attracts fry.
- Microworms do not swim away.
- Microworms live longer in freshwater than baby brine shrimp.
- Microworms do not cloud water.
- Microworms do not need special equipment to hatch (i.e., airstones, filters, heaters, and/or lights are not required).
- Microworms are inexpensive, as compared to hatching baby brine shrimp.
- Microworms can be cultured continuously. You must keep buying (costly) brine shrimp eggs.
- Except for a culture that has gone bad, microworms do not smell as strongly as many other live foods (grindal worms, for example).

Cheap, easy, long-lasting, clean, and well accepted – what more could you ask for in a fish food? It's too bad that the longest they get is only a millimeter in length, or they'd be great for larger adult fish, as well.



GCAS Member Discounts at Local Fish Shops



10% Discount on everything.



20% Discount on fish. 15% on all else.



10% Discount on everything.



10% Discount on everything.



10% Discount on everything.



10% Discount on fish.



10% Discount on everything.



10% Discount on everything except 'on sale' items.

High Quality Exotic Goldfish
 Show Imports from Thailand & China
 Ranchus, Ryukins, Orandas & Telescopes

Rennie Ramnanan
Hobbyist & Breeder

Call/Text: (917) 445-2010
 Email: renapond@yahoo.com

Professional Shipping to anywhere
 in United States!



10% Discount on everything.

JUNGLE BOB ENTERPRISES, INC.




4130 Sunrise Hwy
 Oakdale, NY 11769
 ph: 631-319-6592
www.JungleBobAquatics.com

Manufacturer of Quality Reptile & Aquarium Supplies

15% Discount on everything in store, or online at:
<http://www.junglebobaquatics.com> Use coupon code gcas15.

AL'S AQUATIC SERVICES INC
ALSAQUATICSERVICES@OUTLOOK.COM
AL TURRISI
 516.633.8806
 CONTRACTOR
 POND DESIGN & INSTALLATION
 SALT & FRESH WATER AQUARIUM SYSTEMS
 REEF TANK SYSTEMS




917-300-2293

124-11 Jamaica Ave
 Richmond Hill, NY 11418

naturesreefandreptile.com

Mon-Sun
 10 am - 8 pm

[naturecandreprs](#)
[nature_reef_reptile](#)

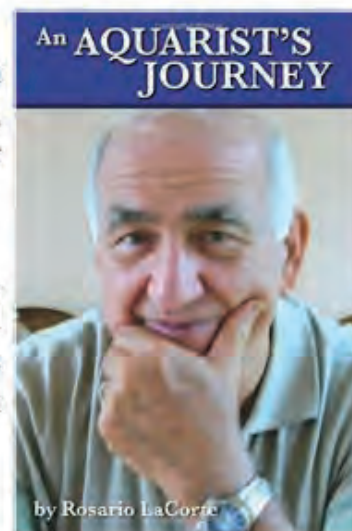
10% Discount on everything.

An Aquarist's Journey

Rosario La Corte is one of the world's leading authorities on breeding fish and he has written numerous articles and books, contributing greatly to our understanding of fish and their habits.

Now, for the first time, here is a compilation of his travels, adventures, successes (and, very occasional failures) all relating to collecting, keeping, and breeding fish, and in his own words (and edited by **Modern Aquarium's** Editor, Dan Radebaugh).

Available in softcover at Amazon.com



Modern Aquarium Covers

2018

modern
AQUARIUM



March 2018
volume XXV
number 1

modern
AQUARIUM



April 2018
volume XXV
number 2

modern
AQUARIUM



May 2018
volume XXV
number 3

modern
AQUARIUM



June 2018
volume XXV
number 4

modern
AQUARIUM



July 2018
volume XXV
number 5

modern
AQUARIUM



August 2018
volume XXV
number 6

modern
AQUARIUM



September 2018
volume XXV
number 7

modern
AQUARIUM



October 2018
volume XXV
number 8

modern
AQUARIUM



November 2018
volume XXV
number 9

modern
AQUARIUM



December 2018
volume XXV
number 10

March 2018

Oxycirrhites typus

April 2018

My First Reef Tank

May 2018

Brain Coral & Grunts

June 2018

Microgeophagus ramirezi

July 2018

Red Alpha lyretail swordtails

August 2018

Heros efasciatus

September 2018

Aquascaping

October 2018

Kryptopterus bicirrhus

November 2018

Hypsophrys nicaraguensis

December 2018

Scorpaena plumieri

by Joe Gurrado

by Joseph Ferdenzi

by Stephen Sica

by Joseph Ferdenzi

by Jeff Bollbach

by Dan Radebaugh

by Joseph Ferdenzi

by Stephen Sica

by Dan Radebaugh

by Stephen Sica



Vertebrates

(The Final Frontier?)

A series by the Undergravel Reporter

In spite of popular demand to the contrary, this humor and information column continues. As usual, it does NOT necessarily represent the opinions of the Editor, or of the Greater City Aquarium Society.

Scientists have been puzzled by how long it apparently took vertebrates to adapt to survival in deep-sea environments. The first vertebrates appeared in shallow marine habitats approximately 500 million years ago. It was approximately 370 million years ago that vertebrates are believed to have first transitioned to life on land, and approximately 200 million years ago they evolved to fly. Many have wondered why it was only in the last 50 million years that vertebrates evolved to live in the deep-sea environments. While adapting for deep sea life can be challenging for a variety of reasons—the high pressures, total absence of light, and frigid temperatures, to name a few—it is not immediately obvious why developing lungs and taking flight should have evolved hundreds of millions of years before adapting to deeper waters would.

A study led by Andrea Baucon of the University of Genoa, however, is challenging that perception. Dr. Baucon and his international team of scientists published a study in the September issue of the Proceedings of the National Academy of Sciences that argues that fossil evidence actually dates the first deep-sea vertebrates to approximately 130 million years ago, or 80 million years earlier than originally thought.

Scientists have faced challenges trying to date the first fossils of deep-sea vertebrates. The simple truth is that it is difficult to prove a fish lived at a deep-sea depth from fossilized remains alone, since the fish could have lived and died in shallow waters and then sunk to bottom of the ocean where it was fossilized.

The researchers in this study, however, studied evidence of fish behavior and actions in the fossil record. Dr. Baucon's team observed that the modern chimaera at 1,500 meters below sea level would produce distinctive marks in the sediment while searching for food. The researchers noticed numerous deep-sea fossils contained bowl-shaped marks that were consistent with the marks a fish might make while searching for food in the sediment, such as the modern chimaera. The researchers also found evidence in some trace fossils that were consistent with fish swimming near sediment that had just been stirred up, and other trace fossils were consistent with fish scratching the seabed with their teeth. These fossils, while not fossilized remains of deep-sea fish themselves, are consistent with the presence of deep-sea fish.

The next challenge was dating these fossils, even though there were no organic, fossilized remains from the fish themselves. The researchers were able to date the fossils using a technique called biostratigraphy. The researchers conducted tests on the trace microscopic organisms that were present in the same layer or stratum of rock as the trace fossils, and determined the approximate age of those organisms. Those trace microscopic organisms would have presumably been deposited in the sediment at approximately the same time as the disturbance in the sediment that was preserved in the same layer of the fossil, and thus be approximately the same age.

As for why fish may have finally colonized the deep-seas when they did, Dr. Baucon theorized that the explosion of plant life approximately 130 million years ago may have represented favorable conditions for the proliferation of bottom-dwelling worms. Once the seabed became a rich source of food, the fish would have evolved to seek the food.

Sources:

<https://doi.org/10.1073/pnas.2306164120>

<https://www.unipi.it/index.php/english-news/item/26585>

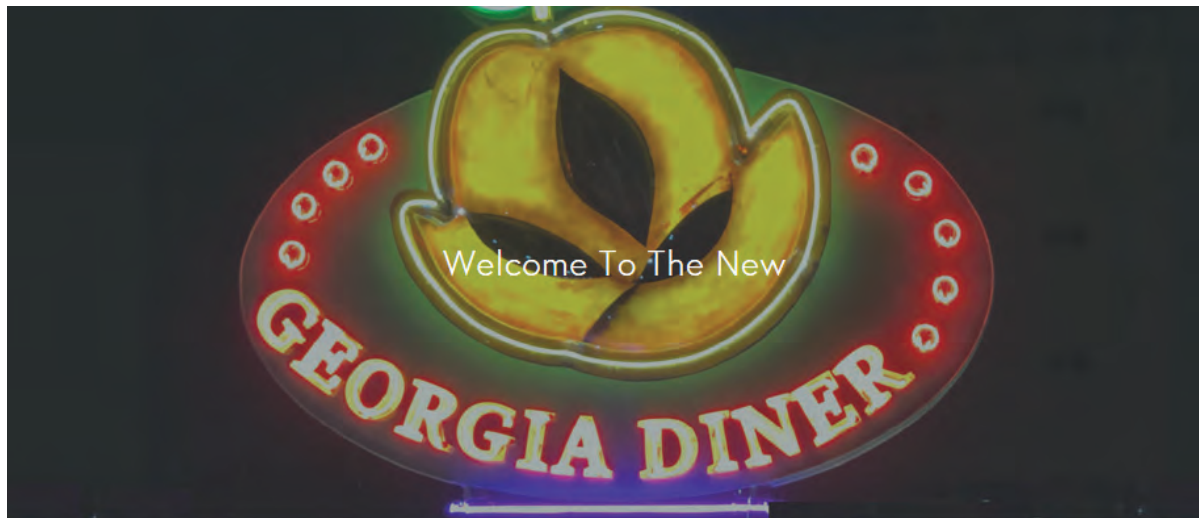
<https://www.nature.com/articles/d43978-023-00132-6>



GREATER CITY AQUARIUM SOCIETY

HOLIDAY AWARDS BANQUET 2023

*Join us for GCAS 2023 Awards presentations, party favors,
door prizes, AND choice of meal!*



80-26 Queens Blvd Elmhurst, NY 11373

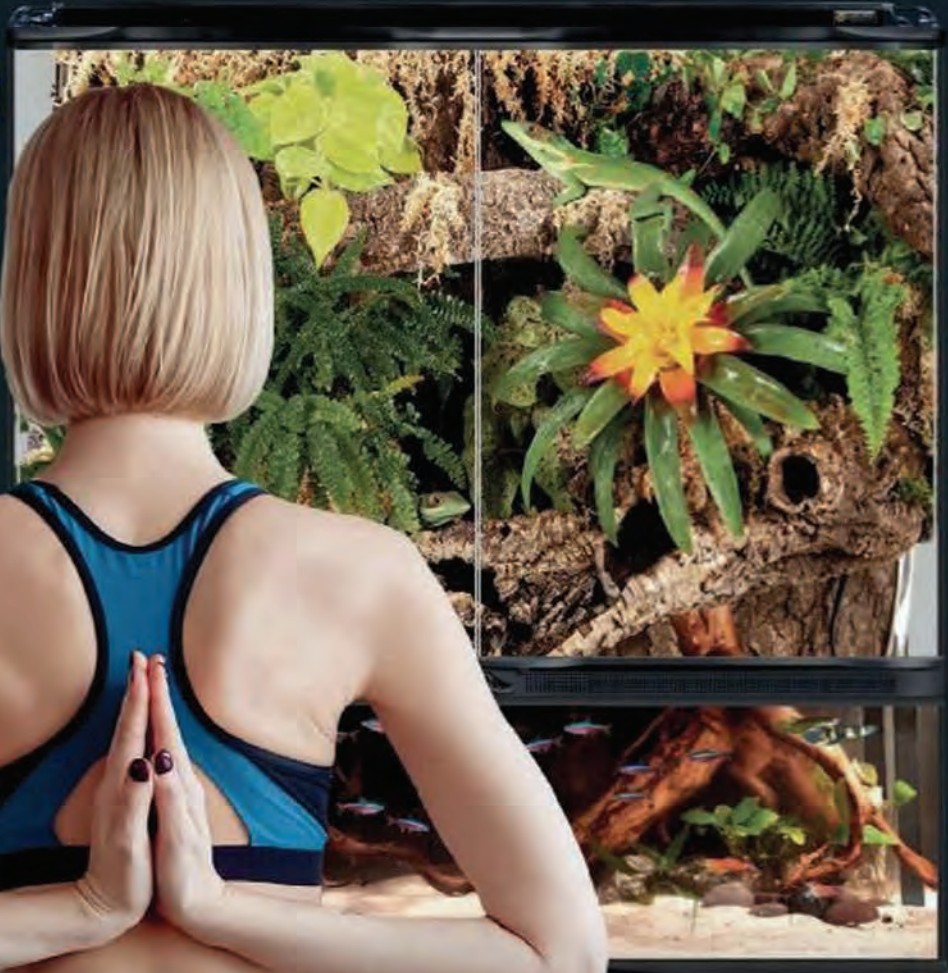
1-718-651-9000

DECEMBER 6, 2023, 7:00 PM

\$30.00 PER PERSON

Please make your reservations now!

FIND YOUR ZEN



PALUDARIUM *3 in 1 Habitat*

Zoo Med's innovative Paludarium has 3 sections: a Canopy, a Land Area & an Aquarium. Each can be home to a variety of different plants and animals limited only by your imagination.

Available in 3 convenient sizes:

12"L x 12"W x 24"H (4 gallons of water)

18"L x 18"W x 36"H (10 gallons of water)

36"L x 18"W x 36"H (20 gallons of water)

Build a Terrarium, build an Aquarium, build your own piece of nature and tranquility.

ZOOMED.COM



