OCA

Ohio Cichlid Association

Cichlids - Catfish

Buckeye Bulletin

Central American Cichlid Special Edition June 2018

• Next Social Meeting: Friday, June 1, 2018 at 8:00 pm •

Ohio Cichlid Association

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The Ohio Cichlid Association's Buckeye Bulletin is produced monthly by the Ohio Cichlid Association.

If you have an article, photograph, or ad to submit for publication, please send it to buckeyebulletin@gmail.com. When submitting articles for publication in this bulletin, please remember to include any photographs or art for the article. The Ohio Cichlid Association is not responsible for any fact checking or spelling correction in submitted material. Articles will be edited for space and content.

For membership info please contact Hilary Lacerda: hilarylacerda@gmail.com or visit the OCA forum.

On the Cover

This month's cover photo is a *Herichthys meeki.* The photo was provided by this month's speaker, Lee Newman, who also provided an excellent article!

Do you want your picture on the cover of the *Buckeye Bulletin*? Please email photos to buckeyebulletin@gmail.com.

In This Issue of the Buckeye Bulletin

With Featured Articles From:

LEE NEWMAN
RUSTY WESSEL
RON OLDFIELD
WILLEM HEIJNS
AND JONATHAN STRAZINSKY

About the Ohio Cichlid Association

The OCA is an organization dedicated to the advancement and dissemination of information relating to all aspects of the biology of cichlids and related aquatic life. Our purpose is to promote the interest, keeping, study, breeding, and the educational exhibition of Cichlids. Additionally, the exchange of ideas, meeting new people, and distribution of information concerning Cichlids is of primary interest.

The 2018 OCA Board

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Get The Most Out of the OCA

The OCA's monthly meetings are free and open to the public. Feel free to invite a guest! There are many ways to get the most of your membership:

• submit an article, classified ad or photograph for the bulletin • put a fish in the bowl show • attend the OCA Extravaganza • turn fry in for the BAP program • attend the social meetings • buy and sell fish during the winter auction • join the board • start a forum discussion • visit ohiocichlid.com •

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PRESIDENT'S MESSAGE FROM DON DANKO

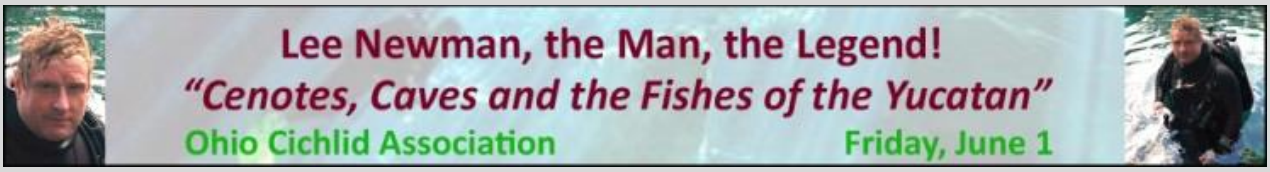
This month, we have a special treat for you, that is a Central American Cichlid Special Edition Bulletin! Contributors include Dr. Lee Newman, our June speaker, Rusty Wessel, Dr. Ron Oldfield, Willem Heijns and Jonathan Strazinsky. Both Lee and Rusty write about the Cenotes of Mexico, while Ron presents observations on harem breeding with *minckleyi* from Cuatro Cienegas. Willem provides an interesting look at new developments in molecular systematics and Jonathan writes on a collection of odd and ends – Cichlids and non-Cichlids – that he has packed into a 180 gallon while his swimming pool is being upgraded. Can't wait to read that one after seeing that tank at the recent Board Meeting Jonathan hosted!

Raffle Chair, Carl Olszewski has started a raffle ticket exchange for new products that you may have previously won in the raffle and that you don't need. This gives you the potential opportunity to win other items in the current raffle. Please get involved by bringing in something you won, but really don't need.

Extravaganza Registration is now open on our Ohiocichlid.com website, so be sure to register. The prices are good until the end of October, at which time the two packages that include a tee shirt will no longer be available – and, tee shirts won't be available after that date either! Additionally, the base registration price will go up a little. The reasons for these actions are to allow us to effectively plan the tee shirts ordering and to allow us to plan other activities more effectively.

Please join us at the June 1 meeting at the Middleburg Hts. Recreation Center at 8 pm. Lee Newman is a great speaker and we have a fantastic venue at the Rec Center. See you there!

Don



OCA Program Preview
June, 2018

Lee Newman

Lee Newman, of Vancouver, Canada, has been keeping freshwater fish for over 40 years, and for many of those years has been working with Neotropical cichlids. Specifically, he spent many years studying the husbandry of cichlids of the genus Satanoperca. He has collected cichlids in both Mexico and South America. Since earning his full cave diver certification in 2010, he has taken interest in the fishes and ecology of the cenotes and cave systems of the Yucatan Peninsula in Mexico. (Cenotes are small bodies of water that are the result of ancient sink-holes.)

Currently the Curator of Fishes with the Vancouver Aquarium, Lee is also an award-winning photographer and writer. He has contributed to the ACA's Buntbarsche Bulletin, Cichlid News, the journal of the South American Cichlid Study Group, and many other publications.

Lee is a long-time friend of the OCA, and it will be great to have him back in town! He has recently returned from diving in the Yucatan, and will be presenting "Cenotes, Caves and Fishes of the Yucatan".

There is no meeting in July, and in August we will again be visited by Mark Henry Sabaj, who will talk about the historic Cope Collection, a very special collection of preserved South American fish specimens, which our 2016 Jim Smith Award helped to get organized to modern standards. He will also talk about a recent expedition to Colombia.

SOCIAL MEETING INFORMATION

The Next OCA Social Meeting is Friday, June 1, 2018 at 8:00 pm

Middleburg Heights Community Center, Room C
16000 Bagley Rd
Cleveland, OH 44130

Meetings usually begin with a talk about cichlids or a related subject. The OCA is proud to bring world class speakers to Ohio, not only for our yearly convention, the OCA Extravaganza, but also for our monthly meetings. With Northeast Ohio being the hotbed for cichlid breeders that it is, we have discovered that there seems to be no shortage of world-class speakers locally, a number of which have used the opportunity to talk at OCA meetings to later tour the country with their fantastic presentations. After the talk we usually take a break for refreshments and some socializing among "cichlidiots". This also gives people a chance to look at bowl show entries, and after the break the bowl show winners are announced. Next, Breeder Award Program (BAP) awards are handed out. We have a Breeder Award Program for cichlids and one for catfish, turning our program into probably the largest one of its kind in the country. The entries are subsequently auctioned off, making some of the newest and rarest cichlids in the hobby available to our members at low auction prices! The OCA has had a number of first spawns in the United States and members have donated some very nice stuff to be auctioned off for the benefit of our Jim Smith Fund. Meetings end with a raffle, where we give away prizes that are set up on a huge table, which typically bends to the point of breaking under their load!

SOCIAL MEETING SCHEDULE

(All times approximate)

7:30	Doors Open
8:00	Social Time
8:15	Call to Order Announcements New Member Welcome & Speaker Introduction
8:30	Speaker
9:30	Break
9:45	BAP Awards Bowl Show Results
9:55	Mini-Auction
10:25	Raffle

UPCOMING
OCA SOCIAL MEETING PROGRAMS

2018

June 1
Lee Newman
"Cenotes, Caves and Fishes of the Yucatan"

July
No Meeting

August 3
Birger Kamprath
"Synodontis and Close Relatives"

September 7
Mark Sabaj Perez
The Cope Collection
Collecting in Colombia

October 5
Mike Wise
South American Dwarf Cichlids

November 2
Jeremy Basch
Geophagus

December 7
Christmas Party
Details TBA

NEW JIM SMITH FUND RAFFLE!

BY LEW CARBONE

As you are probably aware, the OCA's **Jim Smith Fund** exists to support research, education and conservation efforts that focus on cichlids and catfish. The higher the amount in the fund's treasury, the more we can give in grants, which are awarded yearly at the Extravaganza.

As part of our continuing efforts to increase the amount we can give, the OCA will be holding another raffle, this time with a truly exciting prize: The Extravaganza experience! Here's what the winner will receive:

>Extravaganza 2018 registration

>Extravaganza 2018 T-Shirt

>A full year of OCA membership

(And, are you ready for this?)
>**Up to 4 nights stay at the Holiday Inn Strongsville during Extravaganza 18 Weekend!!**

Raffle tickets, priced at $5, will be available at the June, August and September OCA meetings. The drawing will be at the September meeting, with the winner not needing to be present.

By then, you should have made your hotel reservations, but if you win, we can change them to free room-nights, and can add to the number of nights you're staying. If you're registered for the event already, we can refund you for anything that is included in the prize.

We'd like to congratulate Mark Kazanoff for winning our previous JSF Raffle, a complete Aqueon 55LED tank set-up, and to thank all of you that participated in that raffle. Your support is absolutely necessary if we are going to make a difference for the cichlids and catfish that we love!

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CENOTE FISHES OF THE YUCATAN PENINSULA

BY LEE NEWMAN

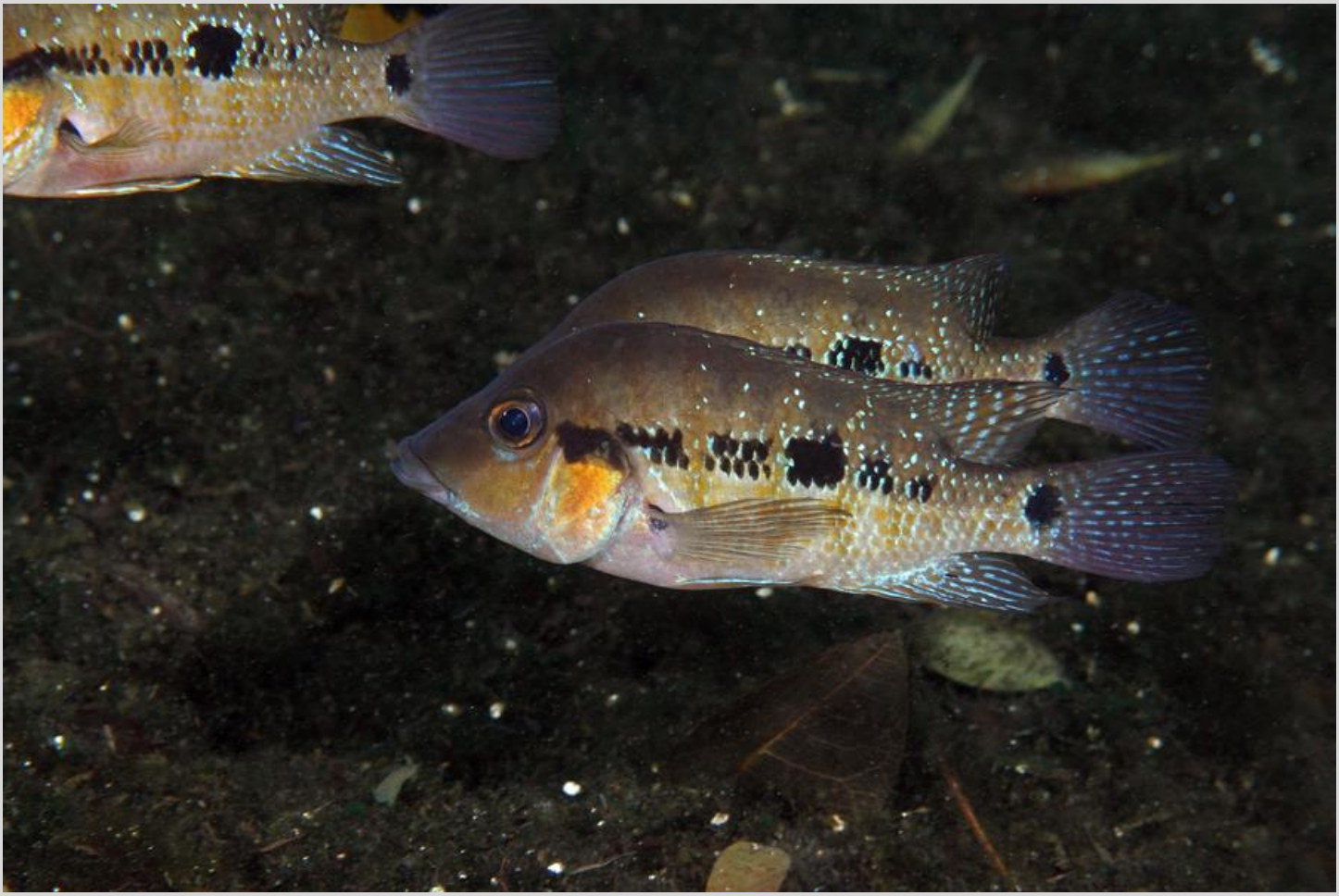
Well-known for its white sand beaches, crystal-clear blue water and colourful night-life, the Yucatan Peninsula hides a dark side - miles and miles of flooded cave passages dissolved from the limestone over thousands of years exposed only to sunlight through small windows in the landscape. In a bizarre twist of geological fate, these windows - referred to as cenotes by the Maya, are the only significant surface waters on the peninsula. Punctuating the landscape, connected, yet separated by flooded cave passages, the cenotes play host to a diversity of fishes.

An adult male Jack Dempsey, *Rocio octofasciata*, from the cenote Ponderosa/Eden, Quintana Roo, Mexico.

In the fall of 2010, I made my first trip to Mexico - specifically the Yucatan, and specifically to take a cave-diving program. The course was eight very long, physically and mentally-demanding days of academics in the classroom and dive skills training in the cenotes and caves. However, during some of the dives in the course, Bil Phillips, my instructor, would take a moment or two to point out fishes - in many cases, cichlids, in order to ask a question once we were topside. Bil was as interested in the fishes of the cenotes as he was in exploring and conserving the caves. This was my first time seeing

a Jack Dempsey (*Rocio octofasciata*) in the wild! I had kept the species briefly as a kid, unable to really appreciate them in the confines of a 15-gallon aquarium, but in the cenote, they were beautiful and expressive in their behaviour.

Since 2010, I've been making regular trips back to Mexico to go cave-diving, and what has emerged as a consequence, is an interest in how the fishes got into the cenotes and why there are certain species in one, and not another. What was immediately obvious after diving only a few cave passages at the conclusion of my training on the first trip, was that the flooded cave passages appeared to be an effective barrier to fishes moving from one cenote to another. Not because of predators, but because of the total absence of light (with very few exceptions) and the 'Swiss cheese' morphology of the cave passages. A fish making a trip through the caves would literally have to rely on blind luck to end up at another cenote! So, how did the fishes get there and why don't all the cenotes have the same species? It turns out that to be able to talk about the fishes, we have to understand some of the geology - as they are inextricably linked.



The False Firemouth Cichlid, *Cribroheros robertsoni*, at cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

Sedimentation, Glaciation and Speleogensis (146 million years of it in a few sentences)

The Yucatan Peninsula is the exposed part of the Yucatan Plate - a limestone formation formed during the Cretaceous Period (146 to 60 million years ago). Over the last few million years, there have been a few 'marine transgressions' - periods during which seawater flooded the landscape to

form shallow seas that enabled additional deposits to be laid down. More recently, glaciation has caused fluctuations in sea level. During periods of low sea level, rainfall, acidified by atmospheric carbon dioxide (CO_2), penetrated the highly soluble layers eventually dissolving passages through the limestone leading to the sea. The passages, while above sea level were then decorated with speleothems (stalactites from the ceiling, and stalagmites from the floor, as well as other formations) by the acidic freshwater water dripping in from above.

A cave passage past the "Room of Tears" in cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

Over time, the passages got larger and more decorated as the limestone was dissolved and the minerals re-deposited. Eventually, as the ceiling thinned, the weakest parts no longer supported by the water table when sea levels were higher, collapsed, forming an opening into the passage. When the sea level rose at the end of the last glaciation period, about 18,000 years ago, the caves were flooded, in part by the influx of sea water, but also by the freshwater percolating in from the surface. The openings, or cenotes, became jungle pools - the only surface waters on the peninsula. There are few, if any, rivers or lakes because of the porosity of the limestone - all of the water that falls as rain quickly percolates into the ground to become groundwater.

So where did the fishes come from, and when?

To begin with, and because of the time-scale involved, we have to consider freshwater fishes being able to disperse and colonize not only in freshwater, but saltwater as well (that will make more sense

in a few sentences). Freshwater fishes are generally characterized as belonging to one of two groups - primary division fishes or secondary division fishes. Primary division freshwater fishes are those that have had an evolutionary history in freshwater and lack the ability to tolerate elevated salinity. Secondary division freshwater fishes have an evolutionary history that at some time included a marine ancestor and therefore have the ability to tolerate increased salinity. Despite the distinction, there are exceptions to both sides of the rule!

A male Mangrove Molly, *Poecilia orri*, from cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

Certainly the simplest explanation for freshwater fishes in Central America, including the Yucatan, is a dispersal northward from South America once the Isthmus of Panama closed, about 3.3 million years ago (Mya). However, using mitochondrial DNA (mtDNA does not change very much from generation to generation and can therefore be used to delineate historical phylogenetic relationships) it appears that *Astyanax*, a primary division genus, have been in Central America for about 8 million years. That could mean, the land-bridge from South America was forming far earlier than the date offered for the final closure (3.3 Mya) allowing primary division fishes to disperse north, including *Pimelodella* and *Rhamdia*. Secondary division fishes, such as the Poeciliidae and Cichlidae would not have had to wait until the Isthmus of Panama formed, as they were already distributed on the Caribbean islands and could have dispersed across a shallow sea between South America and Central America during the Miocene (23 to 5 Mya).

A male Firemouth Cichlid, *Thorichthys meeki*, Tercer Cielo Cenote, Tulum, Quintana Roo, Mexico.

Why in one Cenote, and not in another?

While spending time in the cenotes before and after cave dives, I noticed that each cenote had its own compliment of species - sure there was overlap, but in some cases, dramatic distinctions in the species present were observed. Teodiceldo Camargo-Guerra, Luis H. Escalera-Vázquez and Luis Zambrano, 2013, looked at species composition (community structure) in the cenotes of the Biosphere Reserve of Sian Ka'an, south of Tulum (one of the main areas for cave-diving) and just north of the border with Belize. The cenotes were categorized based on a set of physical, hydrological and biotic characteristics. The physical characteristics included area, length and width of the cenote, maximum depth, volume and shoreline development, hydrological characteristics included temperature, conductivity, dissolved oxygen, pH, ammonium, nitrate, phosphate, silica and transparency, and biotic characteristics included chlorophyll *a*, zooplankton, periphyton (algae, bacteria and detritus attached to submerged surfaces) productivity, aquatic plants, and aquatic insects. Generally, the characteristic that appeared to be primarily responsible for diversity in community structure was habitat - the amount of shoreline and associated plant life (aquatic and emergent). Cenotes with shoreline areas had a higher species diversity than those with no shoreline areas (steep-sided). The water parameters, over the four-year study period, proved to be relatively stable year-to-year and did not significantly fluctuate with the seasons.

A male Yucatan Gambusia, *Gambusia yucatana*, in cenote Ponderosa/Eden, Quintana Roo, Mexico.

My own observations made over the last eight years visiting some of the same cenotes each trip would agree with the study mentioned above. Cenotes with limited habitat appeared to be based on the availability allochthonous sources of energy, or food. Allochthonous food items are those that are produced, or originate from outside the cenote – such as the surrounding forest . These cenotes are usually very small and have mostly shaded surface areas by overhanging rock, and therefore appear to have very simple communities - usually made up of mostly *Astyanax*, *Rhamdia*, and snails. Whereas cenotes with abundant shoreline habitat produce a diversity of autochthonous food items - items that are produced or originate within the cenote. These cenotes have significantly larger surface areas, shoreline areas, exposure to sunlight and are ringed by forest and the community structure is much more complex – algae and aquatic plant production is high, allowing for invertebrate grazers such as snails, vertebrate grazers and surface-pickers such as *Poecilia* and *Gambusia*, detritivores such as *Cribroheros robertsoni*, generalists like *Rocio octofasciata* and predators such as *Parachromis friedrichsthalii*. Larger cenotes also support turtles (Mexican Slider, *Trachemys* sp.), Morelet's crocodiles (*Crocodylus moreletii*) and an abundance of beautifully-coloured birds!

Conservation

Not to say there aren't others, but easily the two most obvious threats to the flora and fauna of the Yucatan cenotes are ground water pollution and introduced exotics. In terms of the pollution of ground water, the main issue is the very porous nature of the limestone of the peninsula, and is

exacerbated by the fact that there is precious-little soil on top of the rock to hold the water and allow plants to lock-up pollutants. As a result, anything liquid that hits the ground very quickly ends up in the ground water – thanks, in-part, to the regular heavy rains the region experiences. Direct surface run-off into the cenotes is very common during the wet season.

A Mexican Slider, *Trachemys* sp., at cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

Unfortunately, the observable effects of the contaminated water are algal growth events, usually consisting of free-floating algal blooms and smothering mats, and water quality related health issues such as neuromast pitting, fin ray erosion and fin membrane disintegration of some of the longer-lived fish species. The worst-affected appears to be the Jack Dempsey (*Rocio octofasciata*) and the Mayan Cichlid (*Mayaheros urophthalmus*). For some reason, and luckily so, some cenotes and their fishes appear to be less affected by contaminated ground water. Perhaps the catchment is less impacted by human activities or there are elements associated with an increased capacity to make toxins biologically unavailable and/or export nutrients.

The most prevalent exotic species seen in the cenotes around Tulum is *Tilapia* (*Oreochromis niloticus*). During our cave-diving trips we've seen landowners with small outdoor ponds culturing *Tilapia* and of course, there is the possibility of intentional introductions. One of the most common cenotes for cave-diving and training as well as cenote and cavern tours, is "Carwash" – aptly-named because of the taxi drivers that would wash their cars there in the past – before it became a popular site for swimmers and divers. The Maya name is Aktun Ha, meaning "cave water".

A view of the spring-side bottom of cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

The first time I saw Carwash, it was a lush and beautiful cenote – full of healthy-looking aquatic plants and abundant fishes. Between the spring-side and siphon-side cave entrances, there is a 18' deep basin – with a rich growth of emergent and submerged water plants and algae with sunken fallen trees providing habitat and cover. However, there was one fish species that looked a little out of place. We soon identified it as a *Tilapia* – they were barely 2" TL, but there were a lot of them. Over the following couple of years they grew, and grew, and turned Carwash cenote into a very barren, brown, seemingly *Tilapia* mono-culture.

Cave-diving explorer, instructor, mentor and friend, Bil Phillips, was as interested in the ecology of the cenotes as he was the caves and so we talked about a plan for trying to remove the *Tilapia*. Given their ability and willingness to eat pretty much anything, trapping with bait seemed like a make-work project, so we employed 'managed fishery techniques' – the only sure-fire way to collapse the numbers of a species! Over the course of a few trips we removed almost all of the *Tilapia*. With permission and support from the cenote owner, after the other divers and guests had left for the day, we got in under the cover of darkness with a small Morelet's crocodile as the only witness and removed the *Tilapia*. Hawaiian slings can be frightfully efficient in the hands of a couple of capable cave divers with a working knowledge of cichlid behaviour and physiology! Within a year of removing all but five of the *Tilapia* (clearly, the smartest of the bunch!) Carwash cenote was well on its way to its former glory.

Cave explorer and instructor, Bil Phillips and the author with their catch of *Tilapia* from cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

Another aspect of conservation worth mentioning is the cenote-dwelling *Astyanax* (not the blind cave variety) and the invertebrates species in the caves. When cave divers enter a cave, the *Astyanax* follow the divers and use the light to hunt small cave-adapted shrimp and isopods. Normally, without the cave diver's light, the *Astyanax* would not enter the cave, but are now a predation pressure on some of the cave-dwelling species. Additionally, when cave divers do a traverse (travelling through the cave system from one cenote to another) it can inadvertently serve to distribute the *Astyanax* to cenotes they would not normally be found. Unfortunately, *Astyanxa* are generalists and can survive on just about any type of food. In order to reduce the impact of the opportunistic tetras, cave divers are often taught to cover their light for the first few minutes of a cave dive to discourage the *Astyanax* from following them in.

There are also some grass-roots efforts being made to protect the ecology of the cenotes. Some owners are now posting signs prohibiting the use of sunscreen if you're going into the water, and some have even sectioned off the sensitive parts of the cenote and made them out-of-bounds to swimmers and divers - in one, they sectioned off the main area where the water lilies grow and in another, a area used by Mexican Sliders (a local species of turtle). Admittedly, these are small steps, but evidence for a growing concern for keeping the ecology of the cenotes intact.

A Mexican Tetra, *Astyanax* sp., at cenote Aktun Ha (Carwash), Quintana Roo, Mexico.

A Complicated Place

In the last few paragraphs I've tried to describe, as simply as possible, some of the ecology of the fishes of the cenotes. As mentioned above, it is difficult to understand the fishes without also learning something about the geology and hydrology of the area - which, in my case, was made significantly easier by cave-diving. The decorated caves are now slowly being dissolved by the increasingly acidic freshwater percolating in from above and the ecology of the cenotes is under threat from anthropological activities that add toxins and pollutants to the water. Unfortunately, as the development of the peninsula continues, the harmful effects, particularly those affecting the freshwater, will increase. While biologically diverse and certainly beautiful, the Yucatan Peninsula is a complicated place in which geology and hydrology have worked nothing short of magic. However, the real trick would be in conserving it.

References

Teodiceldo Camargo-Guerra, Luis H. Escalera-Vázquez and Luis Zambrano, 2013. Fish community structure dynamics in cenotes of the Biosphere Reserve ofSian Ka'an, Yucatán Peninsula, Mexico. Revista Mexicana de Biodiversidad 84: 901-911, 2013.

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https://caves.org/project/qrss/qrss.htm

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Duplication of natural polygynous mating behavior of male Cuatro Ciénegas Cichlid, *Herichthys minckleyi*, in an aquarium

Ronald G. Oldfield

May 24, 2018

As many aquarium hobbyists know, Central American cichlids of the taxonomic tribe Heroini (as well as many other cichlids) are famous in both the aquarium hobby and the scientific community for forming monogamous breeding pairs to mate and care for their offspring. However, scientists studying the feeding ecology of one particular heroine species, Cuatro Ciénegas Cichlids, *Herichthys minckleyi*, reported in passing that they observed some females guarding offspring alone, with no male present, and some males guarding two nests simultaneously (Kornfield et al. 1982). Cuatro Ciénegas Cichlids are found only in the isolated desert valley of Cuatro Ciénegas in the Chihuahuan Desert of northern Mexico (Figure 1). To me this seemed very exciting! It suggested that Cuatro Ciénegas Cichlids had undergone evolution in their mating behavior so that males were no longer mating monogamously but instead were mating polygynously – with more than one female at the same time. Was polygyny typical in Cuatro Ciénegas Cichlids? What is so special about the environment of Cuatro Ciénegas that could have caused them to undergo evolution in mating behavior?

To answer these questions, I convinced several people to help me, including Dean Hendrickson, Curator of Fishes at The University of Texas at Austin's Biodiversity Center. In August of 2008, Kapil Mandrekar and I traveled with Dean to Cuatro Ciénegas to observe the fishes there. We were also able to observe Cuatro Ciénegas Cichlids that Dean maintained alive at UT Austin. Dean's population began with nine live first-generation offspring of individuals captured from Poza La Becerra, Cuatro Ciénegas by Gary Kratochvil and Ad Konings in February 1993 (Konings 1994) and he kept them from 1995 - 2017. The stock was maintained first in aquariums but starting in June 2000

some were moved into huge (25 m × 25 m × 2 m deep) concrete-lined, outdoor, well-fed ponds, where the population grew to an estimated >1000 individuals. On three occasions beginning in 2008, Dean gave me living specimens to take back home to Cleveland. Kapil and I compared the behavior we observed in those wild and captive Cuatro Ciénegas Cichlids to the behavior we observed in the closely related and monogamous species, the Texas Cichlid (called the Rio Grande Cichlid in the academic community), *Herichthys cyanoguttatus*, in the wild and in aquaria.

Figure 1. The author and Kapil Madrekar at a typical poza (pool) in Cuatro Ciénegas.

We found that in Texas Cichlids, males pair-bonded with a single female and together the two fish guarded a small territory about 1 meter in diameter. In Cuatro Ciénegas Cichlids, on the other hand, a small number of very large males formed huge territories that often contained several females, and they defended those territories against other males while each female raised a batch of offspring (Oldfield et al. 2015). Even after being removed from the wild for 17 years (and presumably several generations) the males in Dean's outdoor ponds behaved just as those in the wild did. Their

polygynous behavior seems to be hard-wired and not simply some plastic response to some environmental factor unique to Cuatro Ciénegas. This is not the first time that heroine cichlids have been reported to stray from monogamy. Males of many species have been observed to desert their mate for a new one or to mate with two females simultaneously. However, these seem to be exceptions in species that are otherwise typically monogamous. Besides Cuatro Ciénegas Cichlids, only *Parachromis dovii* males seem to typically maintain ongoing pair bonds with more than one female at the same time under natural conditions (van den Berghe and McKaye 2001).

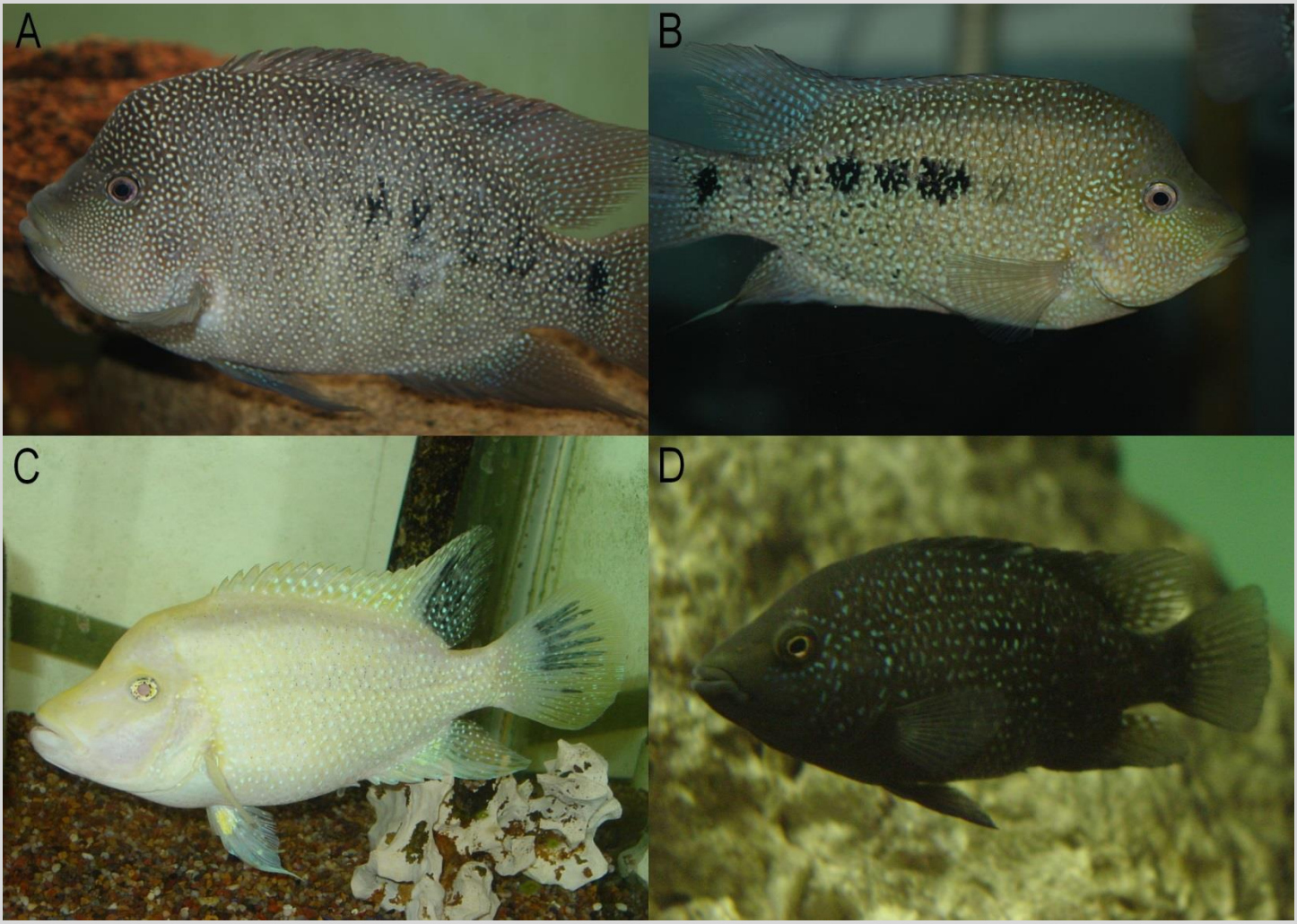

Figure 2. Non-breeding color patterns observed in aquaria. (A) *H. cyanoguttatus*, (B) *H. minckleyi* gray, (C) *H. minckleyi* oligomelanic, (D) *H. minckleyi* all-black (juvenile)

Cuatro Ciénegas Cichlids have also evolved color patterns that differ from their close relatives. The non-breeding color in Cuatro Ciénegas Cichlids is similar to that of Texas cichlids, typically consisting of greenish gray background overlaid with small, blue iridescent spots (Figure 2). However, some Cuatro Ciénegas Cichlids display yellow and tan colors not present in Texas cichlids. Dean's

population even produced an oligomelanic specimen (as reported previously in the wild by Konings 1994 and Oldfield et al. 2015). We also observed all-black coloration in juveniles in aquaria and in adult males in the wild. During breeding, Texas cichlids of both sexes display the rear half of the body black and the front half white. Breeding Cuatro Ciénegas Cichlids sometimes exhibited this color pattern as well, but in the wild males often turned (nearly) completely black and females (nearly) completely white. We also observed some breeding males both in the wild and in aquaria exhibiting an all-white color pattern identical to that of females (Figure 3). Our observations indicate that the all-black pattern can be turned on and off in an instant and serves as a signal between rival males. Kapil observed three large males displaying black color racing to eat a large insect at the water surface. When one acquired the food, it swam away quickly and turned greenish gray. I observed a large black male interacting with other adult males and females for several minutes. Then to my surprise, it returned to a brooding female and switched to the black and white color pattern. In aquaria, the black pattern was rarely observed in adult males, possibly because individuals more easily establish dominance and eliminate rivalry when there are fewer competitors and less space over which to compete (Oldfield 2011). However, it was sometimes observed in large groups of juveniles, displayed by only a few of the larger individuals in a tank.

A stable environment and low levels of competition and/or offspring predation in Cuatro Ciénegas (compared to other sites in Central America) may be what allowed *H. minckleyi* to evolve a polygynous mating system and new body color patterns. The springs there provide clear water that could allow males to watch over larger territories, and constant water levels and temperatures that may have selected dominant males that maintain territories long-term. Also, *H. minckleyi* is the only native cichlid in Cuatro Ciénegas, so males do not need to defend their territories against other cichlid species.

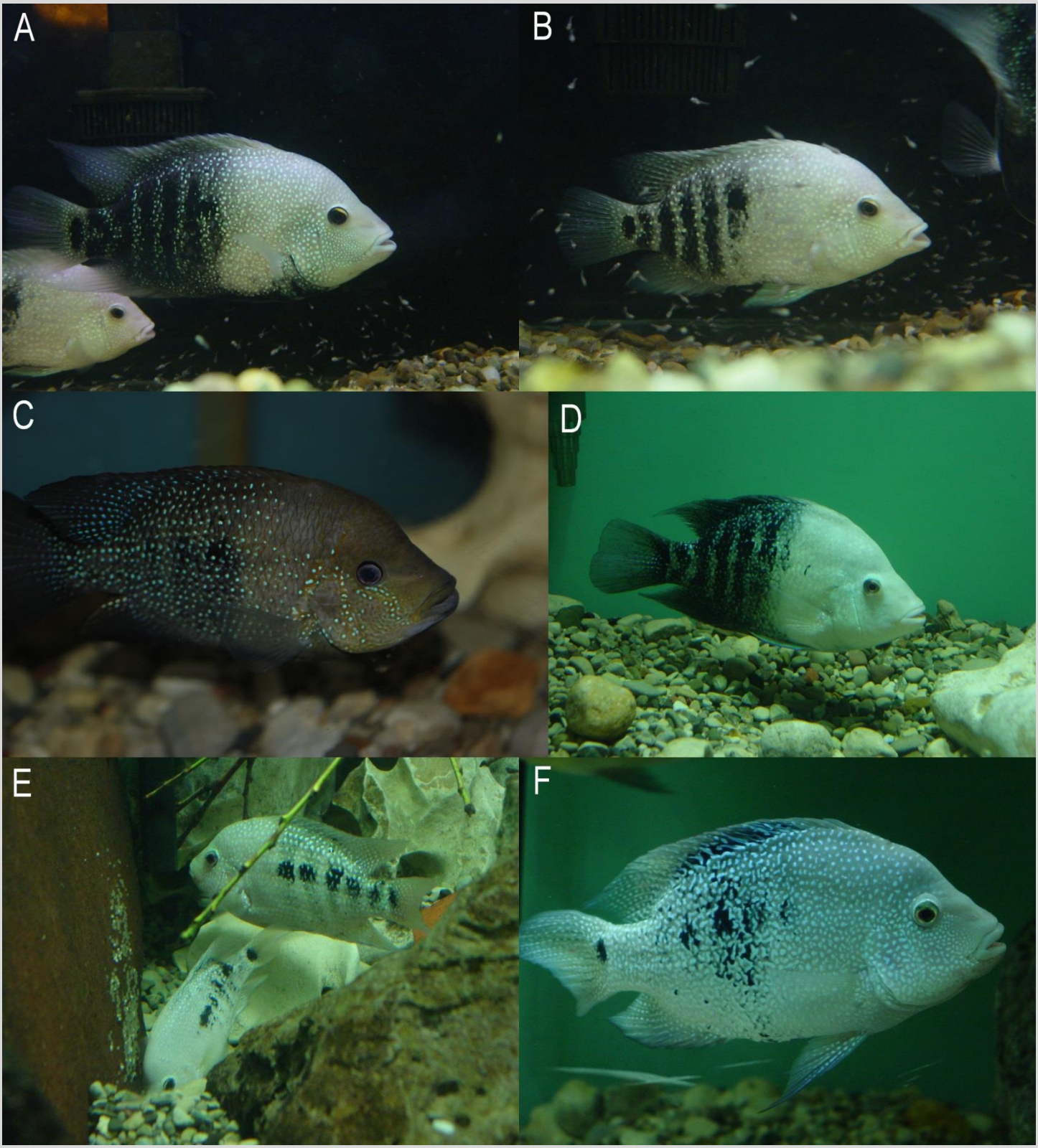

Figure 3. Breeding color patterns observed in aquaria. (A) *H. cyanoguttatus* male, (B) *H. cyanoguttatus* female, (C) *H. minckleyi* male, (D) *H. minckleyi* female, (E) *H. minckleyi* male all-white, (F) *H. minckleyi* female all-white. (The all-black pattern seen in breeding males in the wild was not observed in breeding males in aquaria.)

Overall, I found Cuatro Ciénegas Cichlids easy to care for and breed, being similar in most respects to other heroine cichlids. I will not repeat here basic guidelines that have been published in aquarium literature many times for similar species. I will however, highlight some fundamental details about how I kept the fish that might differ from the techniques of other people. My understanding is that both Cuatro Ciénegas and Texas have very hard water. I never measured pH or hardness, but I always used natural gravel substrate and added seashells to make the water harder. I assumed that it worked because the shells slowly dissolved over time, meaning that calcium carbonate was dissolving in the water. I kept the fish at various temperatures over the years, ranging from high 60's to low 80's, and they seemed to do equally well at all temperatures. I also typically offer a huge variety of foods, including many kinds of commercial pellets, green leafy lettuces, earth worms, crickets, frozen fish foods, frozen grocery shrimp, etc. The lettuce seems to contribute not only to diversity in the diet, but it seems to provide behavioral enrichment as well because browsing gives the fish something to do in between meals besides attack each other.

Another way I try to prevent excessive aggression is to use tanks larger than most people do. Most hobbyists that I have talked to typically breed heroine cichlids in tanks 6 feet long or less. They get a group of sibling fry from one spawn and then raise them in that tank. As the fish mature, a male and a female form a pair-bond and attack the other fish in the tank. After the other fish have been killed or removed, the pair spawns. To me this seems like very poor welfare for the non-breeding fish, and in my opinion it is not ethically justifiable to accept such aggression as part of the breeding process. My previous research on Midas cichlids (Oldfield 2011) found that aggression decreased tremendously when they were given enough space, so when breeding Cuatro Ciénegas Cichlids I used tanks as large as possible. My primary tank was a standard 96" × 24" × 30" high 300-gallon aquarium, which was sufficient to prevent them from injuring each other.

People had often asked me if I had ever seen any "sneaking" males. Sneaking behavior is rare but sometimes occurs in fishes during spawning when, immediately after a female lays eggs, a small male that is not the female's mate rushes in and releases sperm in an attempt to fertilize some of the

eggs. Sneaking is especially rare in those species that typically mate monogamously. In those species, there is no shortage of females so there's little reason to sneak. However, in species in which large dominant males monopolize multiple females and the available breeding sites, there are a lot of smaller males with no territory and no mate, so sneaking is their only option to get their DNA into the next generation. My answer to this question was always no, I had never observed males sneaking fertilizations. Then on the morning of September 23, 2012, around 10:00 A.M., I was working on my computer in my basement and I turned to look at my 300-gallon aquarium and saw something that caught my attention. My large, dominant male – the largest fish in the tank − was mating with the largest female in the tank. They were an established pair and had been spawning together for years on a large rock in the tank. (I never saw that particular male mate with more than one female at the same time.) Another, smaller male was hovering obliquely in the water, hiding next a large piece of wood near the water surface, and was pointed straight at the mating pair. As the female finished a pass of egg-laying, in a sudden burst of speed the small male dove to the rock, tilted his underside toward the eggs, and then leisurely swam away and went back to his hiding place (Figure 4). I reported this observation in a scientific journal article (Oldfield et al. 2015), archived video recordings of the sneaking behavior on the internet, and through my university I issued a press release that showed some of the videos (http://thedaily.case.edu/case-western-reserve-university-researcher-discovers-fish-uses-sneaking-behavior-stealth-mating-strategy/). At the time, I thought my observation of sneaking behavior seemed like a big deal. Since then, both Ad Konings and Ron Coleman have recorded videos of other heroine cichlids performing sneaking in the wild: *Thorichthys helleri* (see Konings 2015) and *Amatitlania septemfasciata* (unpublished), respectively. This seemed surprising because both species are thought to be monogamous in the wild. Perhaps sneaking behavior isn't as rare as it seemed to be. Time may tell exactly how monogamous heroine cichlids truly are. Even though I made this exciting observation of sneaking behavior in an aquarium, I had never observed my large dominant male, or any other male for that matter, exhibit polygynous behavior in an aquarium by breeding with two females at the same time.

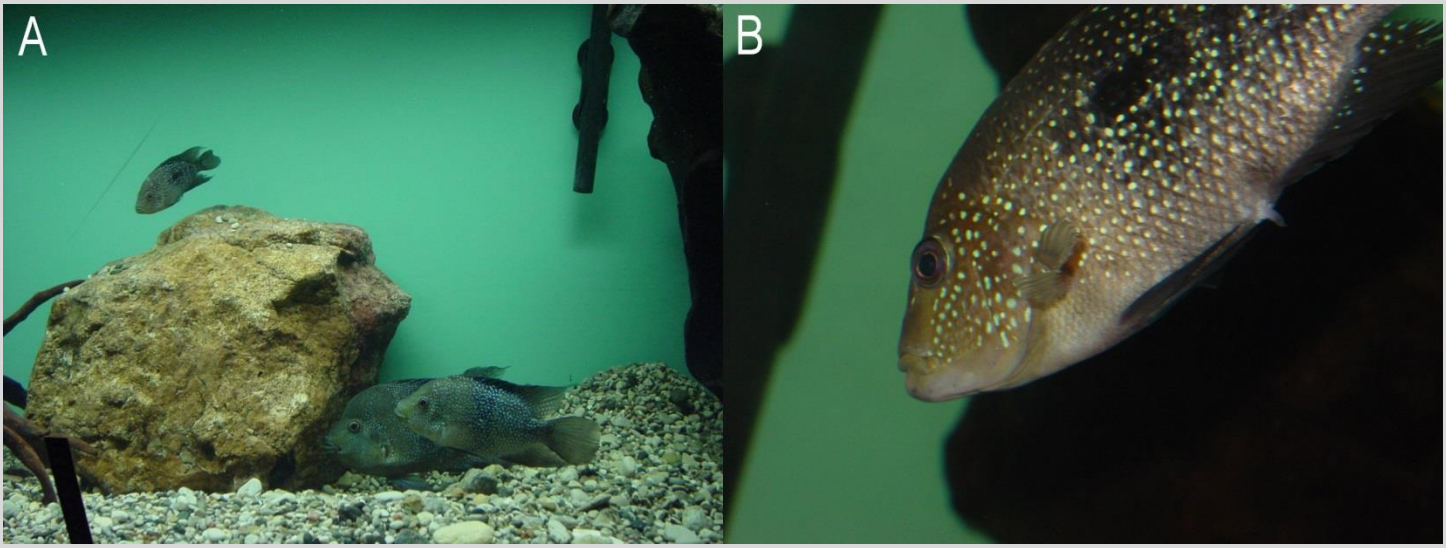

Figure 4. Sneaking behavior in *H. minckleyi*. (A) The sneaking male near the breeding pair. (B) Enlarged genital papilla of the sneaking male.

Finally, in Fall 2017, I observed a male defend two females simultaneously. Dean had recently been scaling back his collection of live fishes, and in July 2017 I acquired his few remaining Cuatro Ciénegas Cichlids and drove them back to Cleveland. To prevent inbreeding, I put Dean's old, large male in my 300-gallon tank with a few of my own fishes. The new male somewhat paired up with one of my females, but they weren't spawning. Then I did a water change and added about 40 gallons from another tank that contained cichlids of another *Herichthys* species that were spawning repeatedly. I don't know if that helped, but soon after that I got a large spawn.

The first spawn occurred in a cave on one side of the aquarium. The pair were caring for their offspring well. (Unlike Texas cichlids, Cuatro Ciénegas Cichlid males defend their offspring but never tend them directly.) However, within a couple weeks a second female formed a small territory outside the cave and began courting the male. The two females did not get along – on a couple occasions I observed them fighting briefly but violently. Eventually, the first female moved her fry outside of the cave toward the center of the aquarium. The second female then moved in to the cave and spawned with the male there. For several weeks, the two females brooded their offspring within the territory of the single male (Figure 5) (until I eventually removed the first female and her offspring).

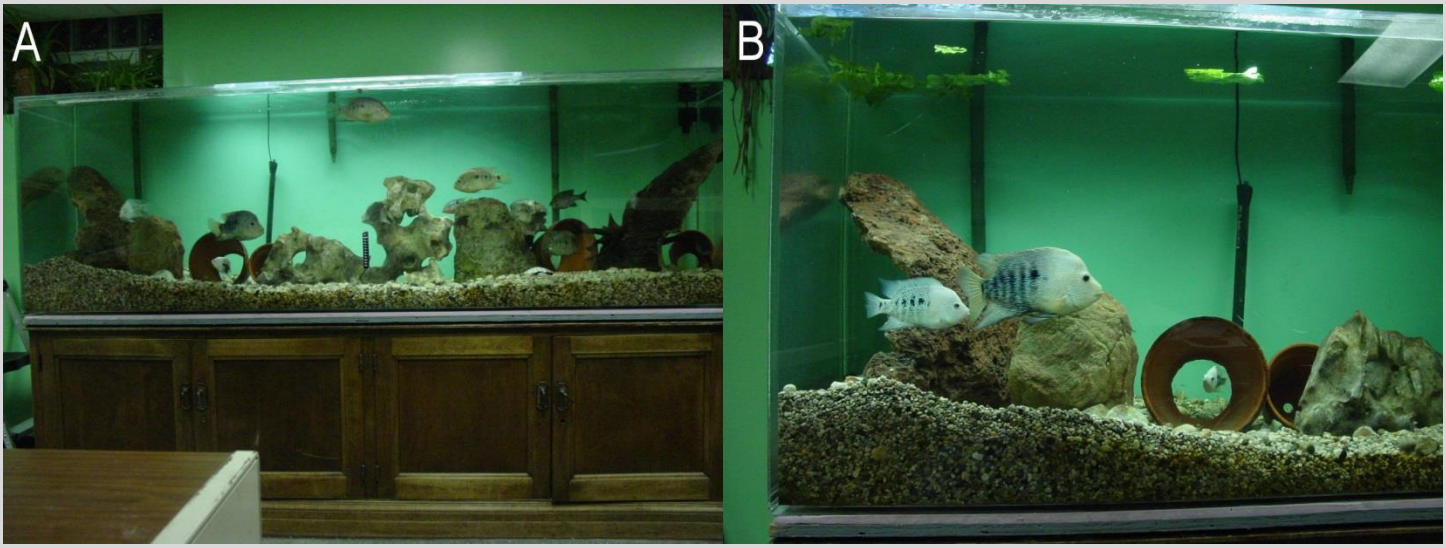

Figure 5. Polygynous behavior in *H. minckleyi* in an aquarium. (A) The breeding male is keeping all other fish (except his two female mates) out of the right half of the aquarium. (B) Two females are each defending a small territory and brooding offspring within the male's territory.

Recently it occurred to me that if I stopped breeding Cuatro Ciénegas Cichlids they might disappear from the US altogether, and it would be difficult to import them from Mexico again now that Cuatro Ciénegas has been designated a protected area by the Mexican government. Cuatro Ciénegas Cichlids are listed as "Vulnerable" in the wild by the IUCN Red List (Contreras-Balderas & Almada-Villela 1996). The valley in which they live is subjected to water extraction for agriculture (Clippard and Airhart 2009) and introduction of non-native species, including the jewel cichlid, *Hemichromis guttatus* (Marks et al. 2011). Cuatro Ciénegas Cichlids might benefit from a managed captive breeding program that could provide a stock of individuals in case something happened to the wild population. The Association of Zoos and Aquariums has a Species Survival Plan designed to do just that. In December of 2017, I packed dozens of fry and as many non-sibling adults as possible into two shipments, one to the San Antonio Zoo, and another to Odysea, a new public aquarium in Scottsdale, Arizona, so that they might eventually be managed in such a program. However, shipping was an issue. Both zoos preferred that the fish be shipped via Southwest Airlines air cargo. To do this, I needed shipping boxes, oxygen, and most importantly, an account with Southwest. To ship with Southwest, one has to be registered with them as a "known shipper". This requires a lengthy application process and even a visit by an agent to inspect your home or place of business! I was saved by David Hale of Something Fishy fish store in Cleveland. Dave took half of a day out of his

busy schedule and provided boxes, helped pack the fish in bags with oxygen, and shipped the fish using his account with Southwest. He did a great job, and I would recommend anyone buy fish from Something Fishy. I hope that my efforts to distribute Cuatro Ciénegas Cichlids result in many more years of its persistence in aquaria in the US so that they might be used for the enjoyment and education of the public, for research by scientists, and to prevent their extinction should they ever be extirpated from their native environment.

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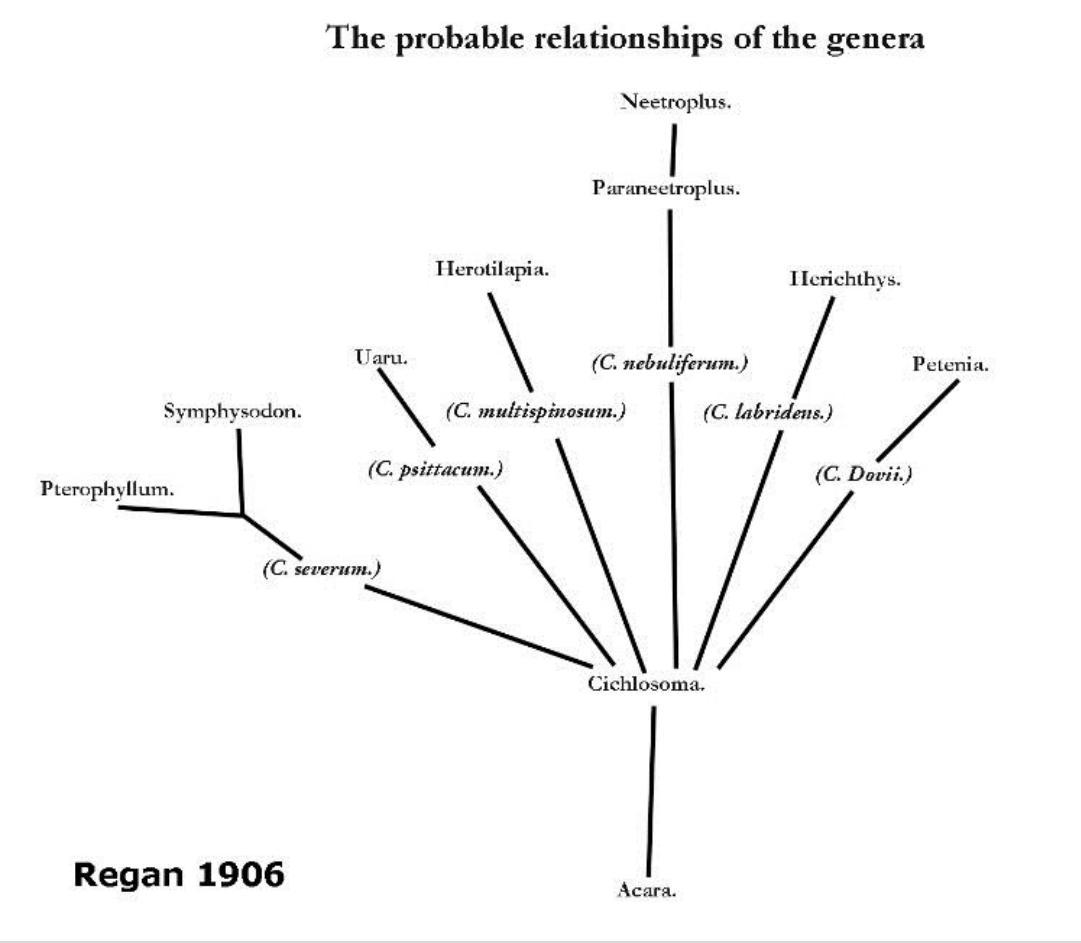
NEW DEVELOPMENTS IN MOLECULAR SYSTEMATICS FOR HEROINE CICHLIDS

BY WILLEM HEIJNS

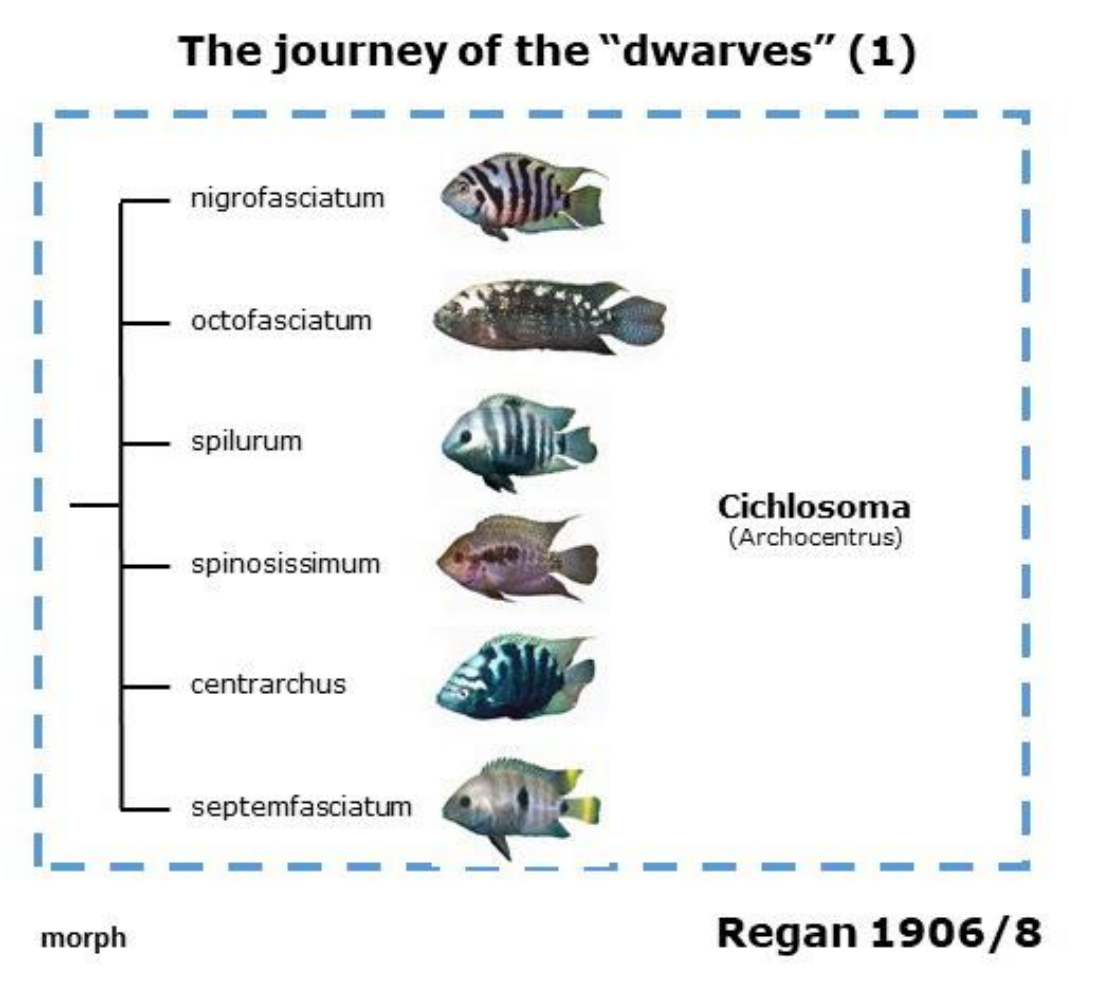
Modern cichlid systematics is based on interrelationships between taxa as recovered by phylogenetic studies. However, the first “phylogenetic tree” for Neotropical cichlids was published by Regan as early as 1906. His diagram of probable relationships (partly reproduced here) was based on what he called “diagnostic characters” of the included genera. Obviously, these characters were all morphological.



For 70 years, Regan’s diagram remained the only published phylogeny for this group of cichlids. In 1976, Frederick Cichocki wrote his (unpublished) dissertation on the cladistic (=phylogenetic) history of cichlid fishes, which was also based on morphological characters. Kullander (1998) was one of the last scientists to publish a comprehensive phylogeny on Neotropical cichlids using morphology.

Classification of Central American dwarf cichlids

The relatively small cichlid species of Central America were classified by Regan (1905) in his section *Archocentrus*. He defined *Archocentrus* using morphological characters such as dentition, bodyshape, squamation and fin meristics (high anal spine number). Five species were initially included, *Heros octofasciatus* was added one year later.



The rise of the molecules

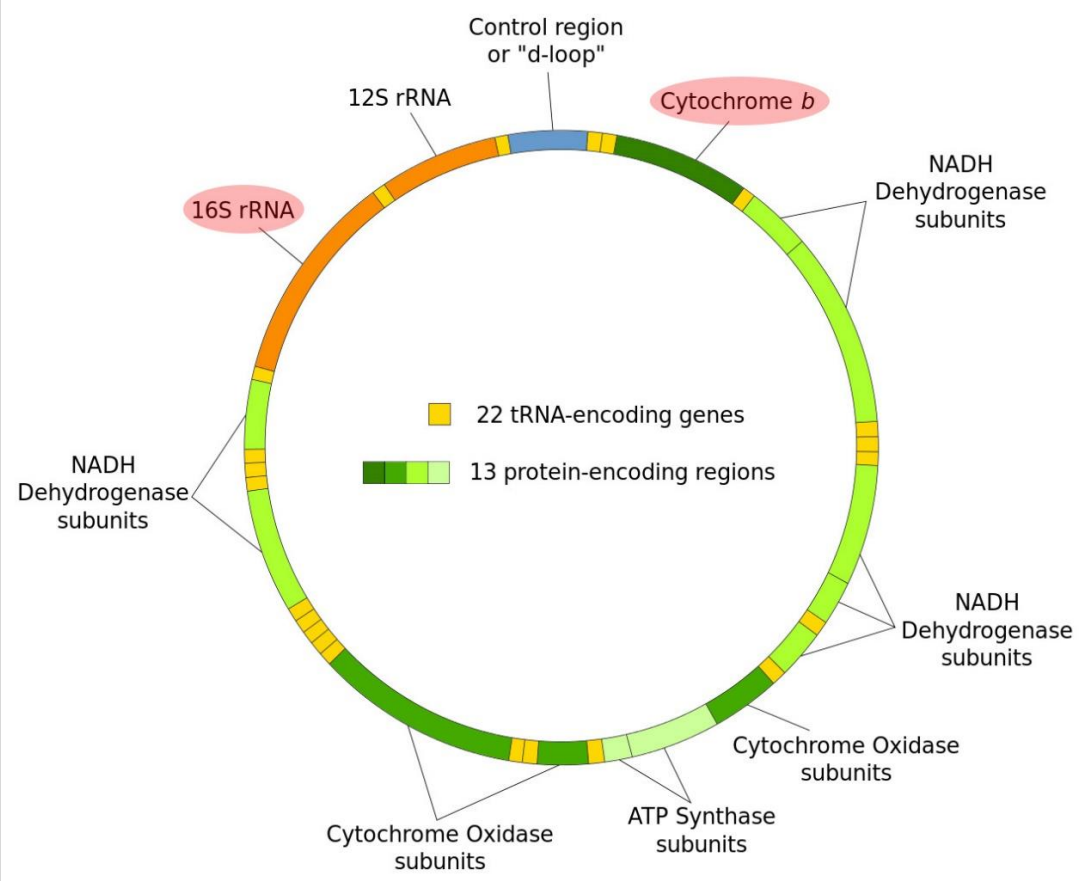
Since the discovery (in the 1950's) of the double helix structure of DNA (best described as a twisted ladder) with nucleotides as building blocks (the individual steps of the ladder), molecular research has made great progress. But investigating the nucleotide sequence of genes (the functional parts of the DNA ladder) was still a tedious and expensive undertaking. A very important step in the development of this investigation was made with the introduction (in 1983) of the Polymerase Chain Reaction (PCR), an automated procedure, based on the natural process through which the enzyme polymerase copies DNA. With PCR it is possible to efficiently make many copies of

selected parts of DNA, which makes determining the nucleotide sequence easier than ever before. The copying process with PCR is often called DNA amplification.

PCR uses chemically synthesized short strings of nucleotides called primers, to select the segment of DNA (the gene) to be copied by the polymerase. The primer is designed to find the position in the DNA where the copying process has to start. Different primers have been designed by researchers to locate the specific genes they need to copy. But which genes to choose?

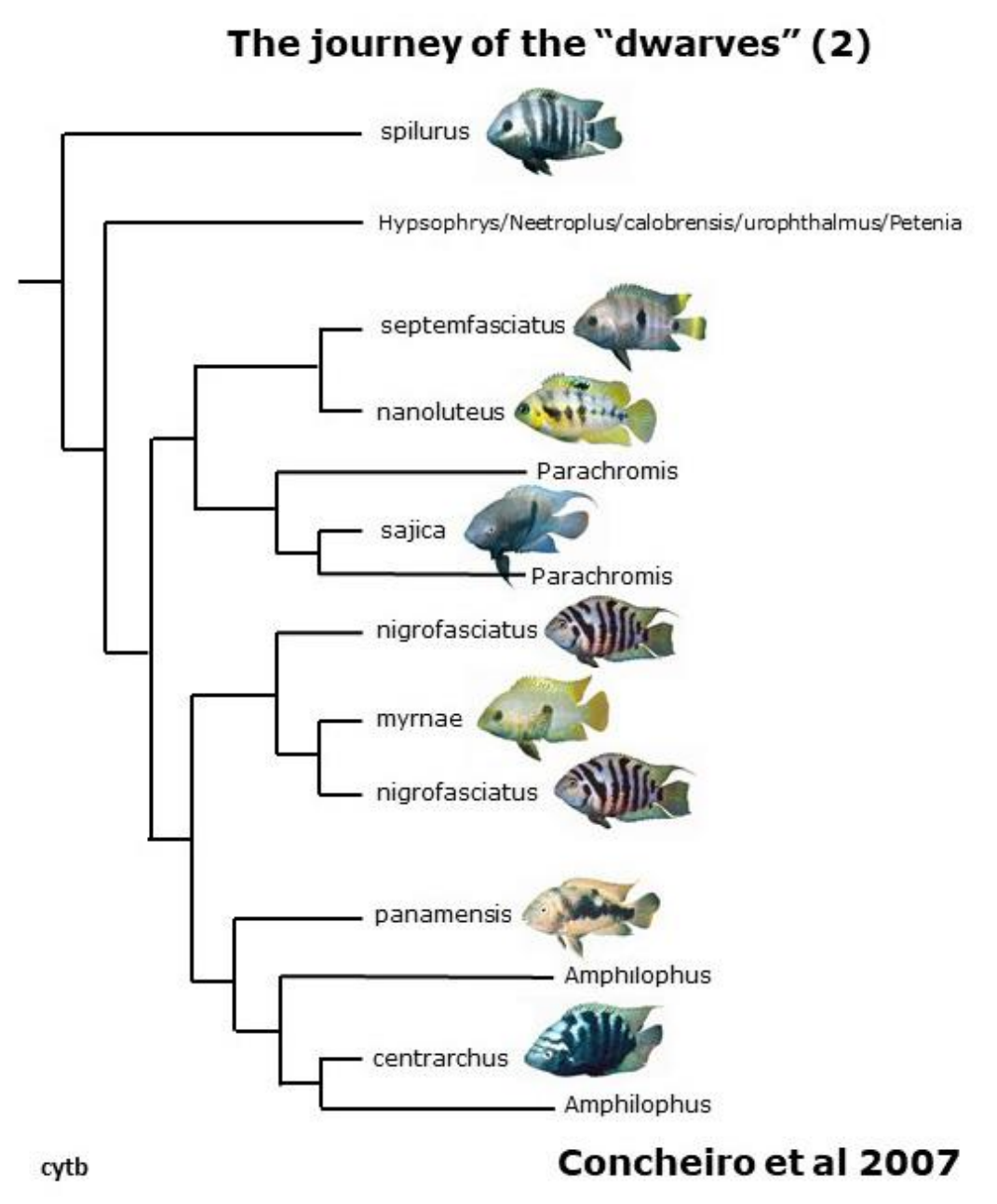
Mitochondrial DNA

The cytoplasm of a cell contains mitochondria, organelles that generate the energy needed for the cell to function. Mitochondria have their own DNA, called mitochondrial DNA (mtDNA). Surprisingly, this mtDNA has a relatively simple and highly conserved structure. It is built as a circular molecule with about 16,000 basepairs of nucleotides ordered in 37 genes.



In addition to its relatively small size, mtDNA is present in thousands of identical copies per cell (inherited from the mother). This made it easy to isolate and sequence and it was one of the reasons why mtDNA was first to be used in phylogenetic studies. The first mtDNA sequences of cichlids were done by Axel Meyer in Allan Wilson's lab in Berkeley (Kocher et al. 1989). While working with the human mitochondrial genome,

Kocher et al. (1989) discovered that the primers for the cyt-b and 16S gene could be used for many other vertebrate species, because the mtDNA locations these primers attach to, are identical across many species. The availability of these primers has contributed greatly to the popularity of using these two genes, especially the cyt-b gene. Early heroine cichlid phylogenetic trees were all based on the cyt-b gene, Roe et al. (1997) being the oldest one I could locate. A particularly important cyt-b tree was published by Concheiro Pérez et al. (2007) in which our dwarf cichlids are classified as follows:



All former *Archocentrus* species (and a few newly described ones) are now spread all over the tree. It's hard to see any logic in this tree. Note the position of *sajica* (embedded in *Parachromis*) and the position of *centrarchus* (in *Amphilophus*).

Nuclear DNA

The nucleus of a cell is where most of the genetic material is stored. The nuclear genome is much larger than the mitochondrial genome. In Neotropical cichlids it typically consists of over a billion (1,000,000,000) basepairs (nucleotides), organized in about 20,000 genes.

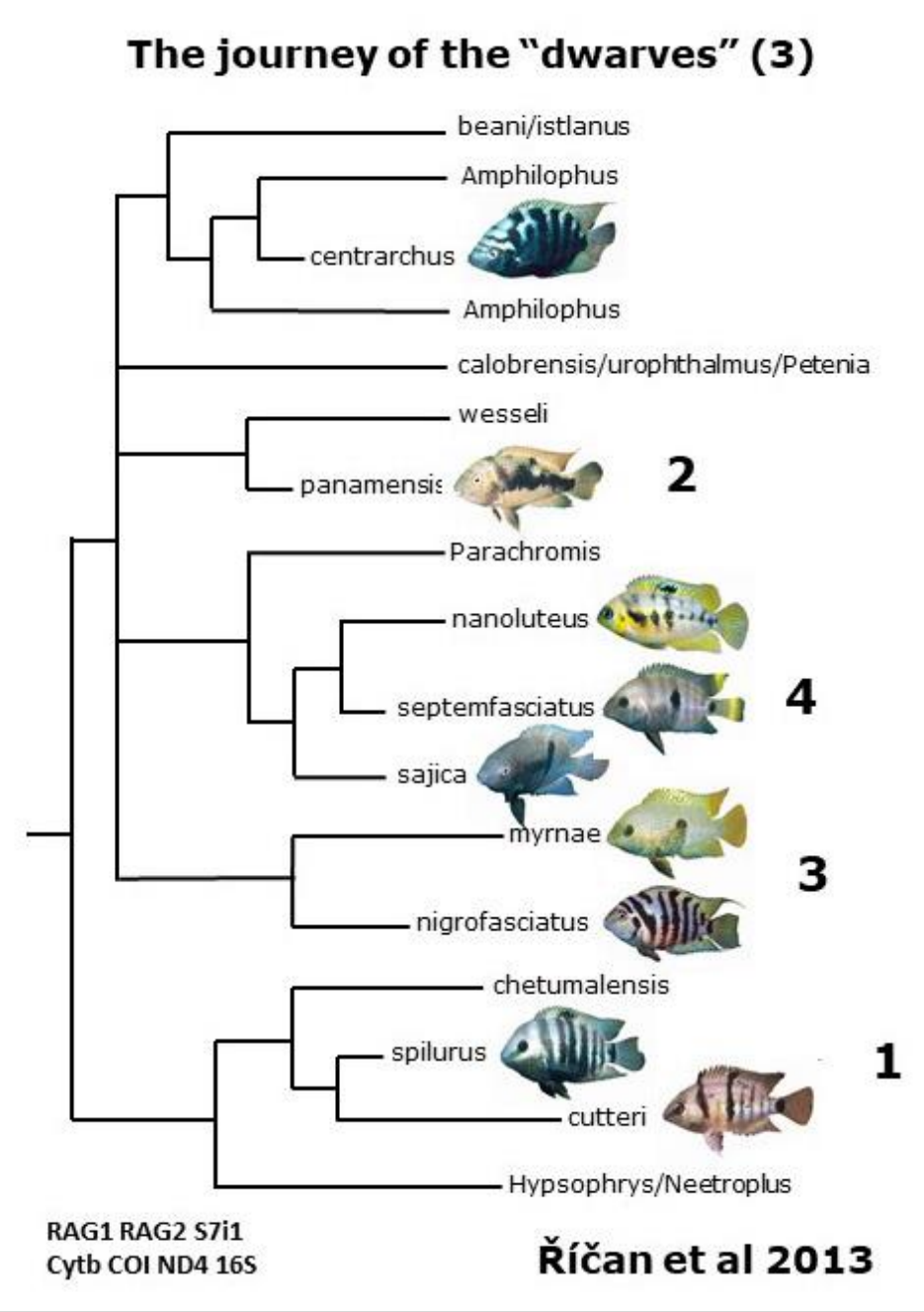
In addition, the nuclear genome is present in two copies (double chromosomes), which makes sequencing more complicated. In order to amplify nuclear DNA, locations had to be found for primers to attach to. Like with mtDNA, these locations serve as the starting points for the copying process of the selected DNA segments (i.e. genes). Over time, primers for several nuclear genes have been designed, the most popular ones being S7i1, RAG1 and RAG2.

Total evidence?

Currently there are two basic approaches to recover phylogenies: with DNA and with morphology. They can also be used in combination. Each method has its own (dis)advantages. Using **DNA** (both nuclear and mitochondrial) has the advantage that datasets can be shared across studies, since sequence data (i.e. ATTCGACGTT) are universal. **Morphological** characters (i.e. shape of the palatine bone) have to be defined and documented for specific groups of organisms, which requires knowledge about these groups. In heroine cichlids, morphology also has the disadvantage of being subject to convergent evolution; the same morphological characters emerging in distantly related lineages (i.e. pharyngeal teeth).

Nuclear DNA tends to evolve much slower than mitochondrial DNA. Therefore nDNA is better suited to study the relationships among “older” lineages, because it takes longer for significant diversification to occur in nDNA. In contrast, mtDNA can even be used on the intraspecific (population) level, where diversification occurs much faster. As the primers for mtDNA were designed first, the use of mtDNA gained early popularity. But there’s a problem with mtDNA. It inherits solely through the maternal line. Each cichlid’s mtDNA is an exact copy of its mother’s mtDNA. At first glance, this shouldn’t be a problem, but whenever a cichlid male hybridizes with a female of a different species, the mtDNA of that female will enter the population, “never to leave again”. If these wild crosses were rare, this would hardly matter. But as it turns out, they occur quite frequently. Some scientists have discarded the use of mtDNA altogether because of this and some other (technical) reasons.

Early molecular phylogenetic studies suffered from a small taxon sample and/or limited number of gene sequences. Larger taxon samples and more genes, both nuclear and mitochondrial, improved this.



The above pylogenetic tree was built with 7 molecular markers (3 nDNA and 4 mtDNA). The dwarf cichlids are somewhat better ordered, but still spread over the tree in a peculiar way. Generic assignments are difficult. The authors distinguish four different clades as belonging to the genus *Cryptoheros*.

But even the combined approach is not without problems. The phylogenetic signals from mtDNA are sometimes conflicting with those from nuclear DNA. Adding morphology may result in even more conflict, because of convergent evolution. Therefore, using any many characters as possible, the so-called “total evidence”

solution, does not necessarily improve the outcome. If we are looking for the “one and only” true history of the heroine cichlids, then trees derived from mtDNA, nuclear DNA and/or morphology cannot all be true if they differ. And combining these different trees into one “average” tree most likely blurs the solution, leading to vague trees with no practical usage. We need something completely new.

Looking for complete genomes

If morphology is tricky because of convergent evolution, and mtDNA because of its fast rate of evolution, nDNA seems the most promising for phylogenetic research. From this conclusion it is no big step towards attempting to use complete nuclear genomes, as large as they may be. Indeed, several cichlid genomes have been sequenced in their entirety (Brawand et al. 2014), but this has been very time consuming and expensive. There must be another way, and there is.

Instead of selecting a small number of genes (i.e. S7i1, RAG1, RAG2) from a nuclear genome, scientists have found a way to isolate many representative sample sequences from the genome without looking at specific genes. Restriction enzymes are the solution. These restriction enzymes had been used in the past for cutting DNA. Now this technique has been perfected to identify and isolate thousands of sequences from all over the nuclear genome. The differences found in these sequences (often in only one nucleotide, called Single Nucleotide Polymorphisms (SNP)) are used to build a phylogeny.

This new sequencing technique is called “double digest Restriction-site Associated DNA-sequencing” (ddRAD). The big advantage is that it can sequence very many strings of DNA from all across the genome in a cost effective way. Very many meaning (hundreds of) thousands of strings. This comes very close to sequencing complete genomes, which will probably be the next step. Instead of relatively few molecular characters (taken from single genes), thousands of DNA markers can now be used for analysis in phylogenetic studies, making the resulting trees much more robust and “closer to the truth”.

The importance of ddRAD for heroine cichlids

The first paper published on a phylogenetic study using ddRAD was by Říčan et al (2016). In my view this paper represents a milestone in Central American heroine cichlid systematics, because:

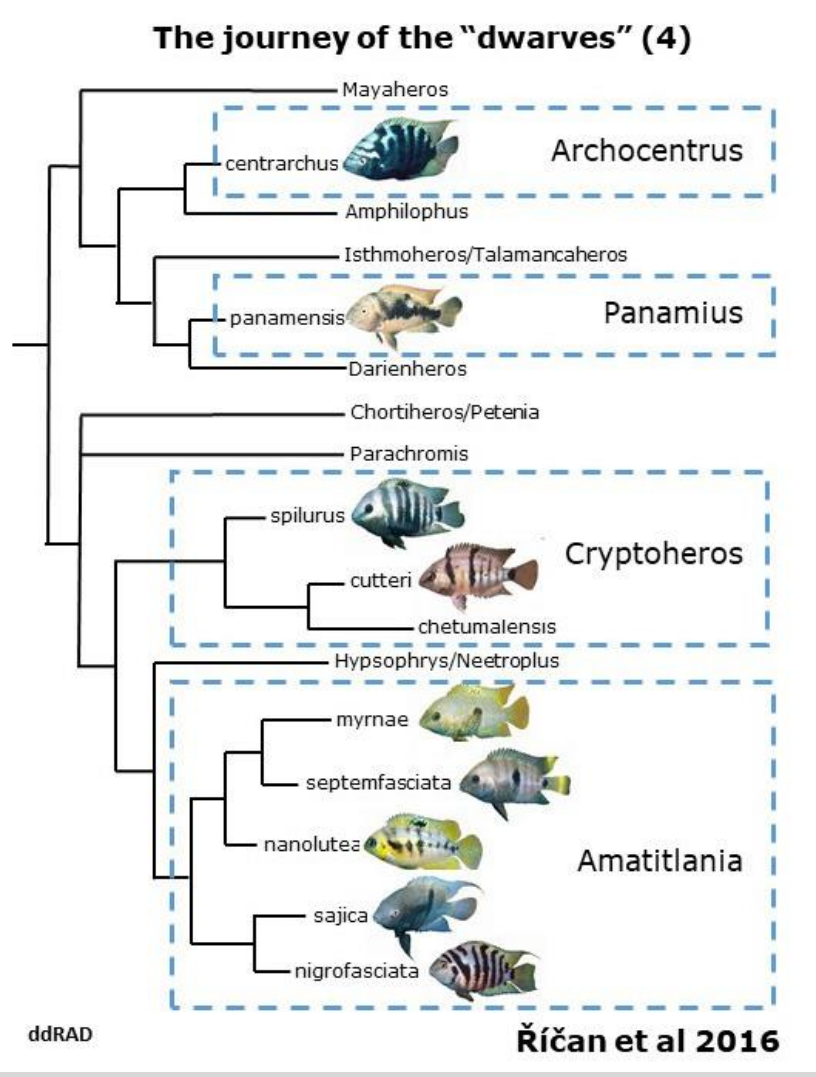
-it covers just about every taxon in the studied group (with all species represented by multiple specimens);

-the ddRAD sequencing method yielded 140,000 DNA SNP's to build the phylogenetic tree with; this huge number of characters and the complete taxon sample make the resulting phylogeny very robust;

-morphology is treated the way it should be treated: not leading in the building of phylogenetic trees but informative to diagnose taxa;

-all Central American (and several South American) heroine cichlid genera are named and diagnosed together and (in many cases) against each other; no more 'Heros' (or exCichlasoma).

The relevant part of the tree resulting from the analysis of Říčan et al (2016), containing our dwarf cichlids is presented below. Every diagnosed genus in this tree is a monophyletic group. Diagnoses were established with the use of morphology based on what the authors call "ecomorphs", a combination of head (cranial) and body (postcranial) characters. It is important to note that these morphological characters did not have any impact on the tree (as they used to have in the old days). But they can still be used to recognize taxa, by scientists as well as by hobbyists.



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MEXICAN VACATION!

BY RUSTY WESSEL

Parachromis friedrichsthalii Escondido

If you are planning a vacation down south and you really love tropical fish then you may consider a visit to the Yucatan Peninsula of Mexico. Cancun, Playa Del Carmen and Tulum not only are very popular tourist destinations but also have well over 7000 cenotes that are teaming with fish. Cenotes are basically underground rivers where the top layer of earth (limestone) caves in leaving a hole in the earth that reveals beautiful clear blue water rivers teaming with tropical fish. There are many cenotes varying in sizes from very small to expansive lagoons. Many of these cenotes and underground rivers are yet to be explored but the popular ones are often visited by tourists.

Most of the popular cenotes in Mexico will require swimmers to swim, snorkel or scuba dive without sun screens because the toxic lotions can harm the fish that inhabit the cenote. These crystal clear turquoise waters provide excellent habitats for cichlids and livebearers alike. Listed below will be some of the many fishes that you can find and a brief description of where to look for them. Literally there are so many cenotes to visit but some of the most popular ones include, Cenote Escondido, Cenote Eden, Cenote Zaci, Cenote Dos Ojos and the list goes on and on. Listed below is a partial list of what to expect to see in these beautiful habitats.

Petenia splendida

Rocio octofasciata

The beautiful blue Jack Dempsey can easily be found in many cenotes and sink holes and generally avoid any fast flowing waters. In some cases, they can be found in almost stagnant waters where oxygen is very low. This fact alone tells you it a a tough animal and is quite hardy in aquarium. Males grow to about 10 inches in the aquarium and a bit smaller in the wild. Females are generally slightly smaller than males. They are a tough and hardy fish that adapt well to aquarium. Their name alone dictates an aggressive species (named after the prize fighter Jack Dempsey) but in aquarium most find it is only moderately aggressive. Probably the bluest variety in nature is the one found at Cenote Escondido. This very blue jack is often used by breeders to cross breed with the hybrid (electric blue jack dempsey). The attempt is to keep the very blue coloration in the species and strengthen the weak genes associated with the electric blue jack dempsey.

Cribroheros robertsoni

The blue cichlid can be found foraging along the bottom using its long face to sand sift thru the detritus in search of food. It grows to about 7 inches and virtually there is little difference between males and females. They adapt very well to aquarium conditions and the coloration can vary from area to area. Most from the Yucatan are generally all blue. Red forms can be found further south in Belize and Honduras. Overall, cichlid wise they are non-aggressive.

Thorichthys meeki

The common name is the fire mouth and this is one of the most popular aquarium cichlids in the hobby. It reaches a length of 6 inches and males and female are basically very similar. They also stay close to the bottom and pick at the sediment in search of food. In spite of their small mouth, When threatened they expand the gills revealing the black ocellated blotch on the tip of the gill cover which appears to predators as another eye and hence a much larger fish which causes the aggressor to retreat. They are non-aggressive and do well in aquarium. The meeki from this area do not have the brilliant colors that one can find from some of the populations that exist further down south but none the less are excellent aquarium fish and have substantial personality.

Trichromis salvini

This beautiful species live very close to the shore and prefer the protection of tree roots and crevices in the rocks. It is a very secret species and tends to hide much of the time in order to ambush unsuspecting small fishes. Males reach a length of 6 inches plus and females slightly smaller. Females generally have a black ocellated blotch in the dorsal which makes them easy to sex. Coloration are mostly all yellow and with canine teeth that make them quite aggressive. Again, the very red species come from further south of the cenotes.

Vieja melanura

This large cichlid is found primarily in the open water and reaches a length of more than 12 inches in both males and females. In the hobby this fish was originally described as Vieja synsplilum. In aquarium it is mildly aggressive but does very well in large groups which tend to keep aggression down. The melanura from the cenotes primarily have more yellow orange coloration and they are very hardy in aquarium.

Mayaheros uropthalmus

This cichlid reaches a length of 12 inches and is one of the cichlids that can commonly be found in salt and fresh water. The cenotes along the coast line where brackish water exists provide excellent habitats for this animal. There is very little difference in males and female but the males generally grow larger. It is quite aggressive but its beautiful coloration (especially when breeding) make it a suitable aquarium fish. Overall, it is probably the hardiest fish in the region and the color patterns are different from cenote to cenote.

So, if you traveling South for vacation to enjoy the beaches of the Caribbean, there is no doubt one should check out some of these majestic cenotes of the Cancun area!

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THE JUNK DRAWER

BY JONATHAN STRAZINSKY

Everyone's got one, it's that drawer in the kitchen where wayward things find a home. Sometimes it's temporary but usually it's permanent. Pens, pencils, battery's, rubber bands, the occasional utensil even finds its way there. If you've got kids then more than likely you're gonna find legos and various action figure body parts floating around. It's usually that last ditch pitch place you look when you can't find that thing-a-ma-bob that works with the do hicky in order for the thing a ma-jigger to work. In the aquarium hobby everyone's got that one tank, "thee tank", the one that seems to gather the most eclectic collection of fish that shouldn't work but somehow through the miracles of science fiction it works! For me, it's a 180 gallon aquarium that greets you as you enter the fish room. It's fun to hear people when they walk through the door say things like "What the heck? Is that blah bitty blah in with a whatchama call it?" or "How is that even possible? Doesn't it kill everything?" Most all the other tanks are species specific. Some have fry in them growing up for BAP, some have "future projects" that you can't hardly wait to work with, but not this 180, it's special!

For those of you that aren't familiar, a 180 gallon aquarium is 72" X 24" X 24". Typically used as a nice display tank for a gaggle of frontosa or maybe a nice group of Vieja. Sure, it may start out "normal" but then something happens in the fish room and you're stuck with only half of a breeding pair. Maybe you just got home from an auction and you need tank space for that species you've been after for ten years. No matter the case you still find yourself with that small group or single fish that you're just not ready to get rid of yet. What if you find it a mate? What if someone was really interested in that one fish you have but now they're all of a sudden dragging their feet? What if someone calls you and offers you a fish you've always wanted that you really don't have room for? What ever shall you do? Throw it in the junk drawer! Some day you might use it!

My “catch all” tank started out as a grow out tank for a few species I knew would get along but would someday have to be separated. You might as well throw water parameters out the window with this one because I put a young male parachromis managuense in with a group of heros notata. Very shortly after, like ten minutes later, I added a group of paratheraps that needs some size too. Then a few days later I came across a young red tailed giant goramy. He was mellow so I threw him in there too. Shortly thereafter the three pearsei that were out growing their 29 gallon needed a place to go. So in the 180 they went. If you know me, you know there’s convicts all over my fish room. I line breed marbles and the culls find their way into the 180 too. Then I needed tank space so the belly crawler pikes moved into the 180 also. Yep, three adult crenicichla sp. belly crawler went in the tank along with a slew of pvc pipe for them to call their own. As you may have guessed the convict population in the tank declined somewhat rapidly!

As things grew it was possible to add larger things to the tank without fear of the big fish eat little fish situation. In went a parachromis loisellei a hoplarchus psittacum female that's pushing ten years old and a pair of bifasciatum (melanura)! I recently hosted an OCA board meeting and Steve Hienbaugh noticed a barely inch long neet in the catch all tank! Funny thing is I don't recall ever putting neets in there! Possible stow away in a piece of decor maybe?? The astonishing thing about this tank is it works! Consistent water changes are a must as there's some heavy waste producing eating machines in the tank. Filtration is essentially four giant powerhead driven sponge filters. The powerhead and sponges are at one end of the tank creating quite the current. Is the tank overcrowded? It sure is but aggression is at a minimum and feeding time is crazy! I'm going to need to do something soon before everything starts trying to breed in there! As of 5/19/18 here's the current stock list:

2-Cichlasoma urophthalmus (Extravaganza 2016)
5-Heros Notata (Extravaganza 2017)
2-Vieja Melanura (Can't remember)
3-Crenicichla sp. belly crawler (Pet supplies plus)
3-Cincelichthys pearsei (Scott Myers)
1-Boulengerochromis microlepis (Jeff Yadlovsky)
7-Amatitlania nigrofasciatum (born here)
1-Osphronemus goramy (Buffalo New York)
1-Pimlodus blochii (Rich Kastor)
9-Paratheraps bifasciatus "Río Bascom" (Ron Hanson)
1-Parachromis managuense (Chicago)
1-Parachromis loiselli (Gary @##$&*@# Mendez)

1-Vieja breidohri (Scott Myers)
2- Mystery pikes (Ohio Fish Rescue)
1-Hoplarchus psittacum (Mark Chalupka)
1-Neetroplus nematopus now Hypsophyrys neematopus (?????????)
1- Astronotus ocellatus, red (????)

What's in your junk drawer?

http://www.youtube.com/watch?v=DxEgt6M6w4s

-Jonathan Strazinsky

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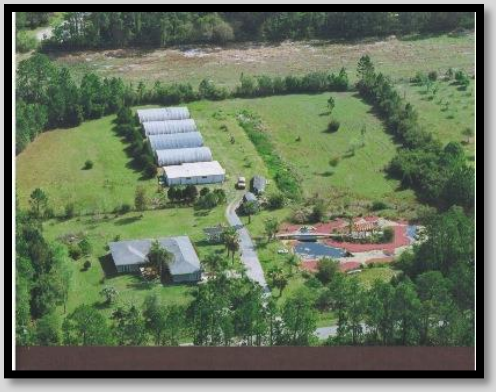

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MAY CICHLID BAP REPORT

Listed below are the Cichlid BAP submissions for last month. Members successfully bred these cichlids and raised fry to a minimum of 1". Varying point values determined by spawn difficulty were given to members' total Cichlid BAP points.

Congratulations on these spawns and thank you for your participation.

May 4, 2018

Lew Carbone	
Xystichromis nuchisquamulatus	10
Jonathan Dietrich	
Haplochromis lividus "Murchison Bay"	10
Pundamilia sp. "red flank"	10
Russell & Tom Pierce	
Sciaenochromis fryeri	15
Bill Schwartz	
Protomelas sp. "Steveni Taiwan" (Taiwanee Reef)	10
Roger Stark	
Aulonocara koningsi "Mbenji Island"	10
Protomelas spilonatus "Mara Rocks"	10
John Tesar	
Aulonocara jacobfriebergi "eureka red"	10
Aulonocara maulana "bi-color 500"	10
Justin Way	
Herichthys carpintas "Escondido"	10

CICHLID BAP TOTALS

Listed below are the Cichlid BAP grand totals. The information is maintained by Mark Chaloupka. See Mark at monthly meetings for more information about the Cichlid Breeders Award Program. Thank you for your participation.

CURRENT B.A.P. STANDINGS (5/4/18)

BREEDER	2018	TOTAL

MASTER BREEDER 1000 POINT LEVEL

Lew Carbone	30	3025
Don & Marilyn Danko	15	2420
Dan Woodland	-	2070
Josh Cunningham	-	1640
Bryan Davis	-	1455
Bill Loudermilk	-	1200
John Tesar	20	1130
Linda Wallrath	-	1130
Mark Chaloupka	-	1075
Rich & Maggie Schoeffel	-	1065

900 POINT LEVEL

Dennis Tomazin	-	965
Jeff Yadlovsky	10	965
Tom Swiderski	-	905

800 POINT LEVEL

Jonathan Strazinsky	45	895
Hilary & Antonio Lacerda	-	870
Gary Mendez	55	855
Dustin Brummitt	-	840
Ken & Sue Galaska	-	800

700 POINT LEVEL

Bill Schwartz	10	710
Jeff Natterer	-	705

600 POINT LEVEL

Bob Blazek	10	670
Charlie & Cathy Suk	-	615
Steve Zarzeczny	-	600

500 POINT LEVEL

Tim Craig	-	540
George Anagnostopoulos	-	515
Ron Georgeone	-	510

400 POINT LEVEL

Rick Hallis	-	495
Eric & Rhonda Sorensen	15	490
Phil Hypes	-	475
Kyle May	-	460
Bob Bina	-	435
Tyler Toncler	-	420

300 POINT LEVEL

Jonathan Dietrich	20	355
David Hale	-	335
Tony Poth	-	335
Greg Senn	-	325
Gary Zalewski	-	325
Ken & Karen Grimmett	-	310
Tom & Carolyn Evers	-	300
Andrew Schock	10	300

200 POINT LEVEL

Dennis Kuehn	-	285
James Shakour	-	275
David Hearn	15	270
Jason Mlynar	-	260
Dave Esner	-	250
Ken Walker	-	240
Justin Way	10	230
Mark Kazanoff	-	215
Paul Collander	-	205

100 POINT LEVEL

Bill & Janice Bilski	10	195
Marc & Dawn DeWerth	-	195
Ozeal Hunter	-	190
Chuck Carroll	-	185
Denis Rozmus	-	185
Andrew Subotnik	-	180
Bob Evers	-	175
Charles Nowakowski	-	165
Frank Mueller	-	160
Steve Heinbaugh	-	150
David Ayers	-	145
Greg Seith	-	145
Dan Ogrizek	-	140
John Griffith	-	135
Carl Oszewski	-	135
Joe Ring	-	120
Steve Olander	-	115
Peter Nario-Redmond	-	115
Aaron Stevens	-	115
David Toth	-	115
Raymond Langer	-	110

BREEDER LEVEL

Mark Huntington	-	95
Roger Stark	40	90
Dolores Bacisin	-	85
Pete Gembka	-	80
Rick Wood	-	75
Bob Tillman	-	70
Matt Urbin	-	70
Dave Dimond	-	65
Anthony Scarton	-	65
Nicholas Zarzeczny	-	65
Jim Jensen	-	60
Paul Palisin	-	60
Chris Jaskolka	-	55
John Kaminski	-	55
Keith Robinson	25	55
Dave Dimond	-	50
Margaret Heifner	-	50
John Kahl	-	50
Alex Gorges	-	45
Jason Gorges	10	40
Ethan Wiley	-	40
Matt Lacy	-	35
Christopher Sooy	-	35
Tom Tansey	-	35
Paul Hutnyak	-	30
Adam Stallman	-	30
Wayne Corman	-	25
Fred Roberts	-	25
Andy Lacerda	-	20
Scott Meyers	-	20
Bill Sensor	-	20
Jason Webb	-	20
Ken Carey	-	10
Jim & Amy Damm	-	10
Ron Drungil	-	10
Ben Jensen	-	10
Cory Knarr	-	10
Michael Meyer	-	10
Russell & Tom Pierce	25	25
Mike Trader	-	10

The points list for the Breeders Award Program has been updated to include only current members. If you are a current member and your name has been omitted, please see the B.A.P. Chairman at the social meeting so we can correct any errors.

Please remember: You may only turn in a species or strain of fish for B.A.P. points one time. If you need a list of what you have been credited with, see the BAP chairman at the social meeting.

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MAY CATFISH BAP REPORT

Listed below are the Catfish BAP submissions for last month. Members successfully bred these catfish and raised fry to a minimum of 1". Varying point values determined by spawn difficulty were given to members' total Catfish BAP points. Congratulations on these spawns and thank you for your participation.

Breeder	Species	Points
Dave Ayres	**Ancistrus sp. Long Fin Super Red**	**10**
	Corydoras schultzei "black"	**10**

CATFISH BAP TOTALS

Listed below are the Catfish BAP grand totals. The information is maintained by Steve Heinbaugh. See Steve at monthly meetings for more information about the Catfish Breeders Award Program. Thank you for your participation.

NAME	2018	TOTAL
Dan Ogrizek	10	430
Steve Heinbaugh		365
Dave Ayres	30	345
Don & Marilyn Danko		285
Phil Ayres		230
Ken Walker		120
Bob Blazek	30	110
Eric & Rhonda Sorensen		110
Dan Woodland		100
Matt Urbin		90
Tom & Carolyn Evers		80
Hilary Lacerda		80
Bill Schwartz	10	70
Bob Bina		70

John Kaminski		70
Justin Way		60
Bryan Davis		60
Phil Hypes		60
Jeff Natterer		50
Ken Galaska		45
Tyler Toncler		45
Matt Lacy		40
Josh Cunningham		40
Kyle May		40
George Aganostopoulos		40
John Tesar		30
Karen & Ken Grimmett		30
Lew Carbone		30
Andrew Schock		30
Bob Evers		30
Jason Mlynar		25
Russell & Tom Pierce	20	20
Tony Poth		20
Gary Mendez		20
David Toth		20
Paul Palisin		20
Jeff Yadlovsky		10
Dave Hearn		10
John Griffith		10
Carl Olszewski		10
Anthony Scranton		10
Jon Dietrich		10
Richard Shamray		10
William Zarzeczny		10
Wayne Corman		10
Mark Chaloupka		10
David Hale		10
Jonathan Strazinsky		10
Bob & Jennifer Tillman		10

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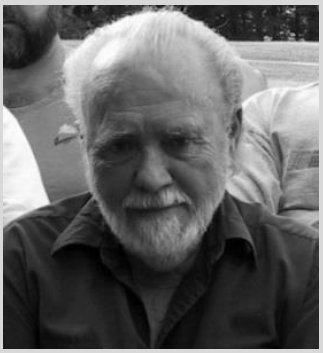

Throughout the year, we will be running a number of fund raising activities for the OCA Jim Smith Fund for Conservation and Education. These will include the following:

- Raffling off donated livestock or goods
- 50/50 Raffles during OCA events
- Donated bags of fish will be raffled at club auctions
- Sale of shirts and goody bags donated by Omega/Ad Konings
- Donations will be accepted through a button on the club website

Please consider donating cash, livestock or hardgoods at any OCA event or meeting to help raise money for the Jim Smith Fund. Because of the generous donations of our members and supporters, we have been able provide much needed grants for cichlid or catfish research and conservation! Thanks for your anticipated support!

The Jim Smith Fund is the OCA's endowment fund that annually awards Cichlid and Catfish researchers and others funds to promote Conservation and Education efforts. To date:

- 2008: $1,000 was given to support the construction of Anti-Netting Devices in Lake Malawi
- 2009: $1,000 was donated to the Stewart M. Grant Conservation Fund
- 2010: $1,000 was donated to the Max Hayes High School to support local education
- 2011: $2,500 awarded to Jay Stauffer at Penn State to catalog 3,200 collections of Cichlids
- 2012: $1500 awarded to Jay Stauffer of Penn State University to videograph cichlids in the wild
- 2013: the Jim Smith Fund was able to make two awards, one to Ed Burress for Pike Cichlid research and the other to Ron Coleman for Central American research
- 2014: an award of $1000 was made to Ad Konings for Tanganyikan breeding facilities
- 2015: Melanie Stiassny received a $1200 grant to fund attempts to collect live Teleogramma obamaorum. Sam Borstein received $2000 to study Malawi Cichlid feeding techniques.

The Jim Smith Fund has awarded over $13K to support Conservation and Education!!

OCA BOWL SHOW

Listed below is information about the monthly meeting Bowl Show. The Bowl Show is your opportunity to show off your fish. Each month different categories of Cichlids and Catfish will be judged. Points will be given and prizes will be awarded. All members are welcome to participate. This is great practice for our yearly Extravaganza show! See Scott Myers, at a meeting for more information.

Here are the details for this year's Bowl Show:

>Cash prizes: $15 for 1st place in each class and an additional $15 for Best of Show.

>Points: In each class, 10 for 1st, 7 for 2nd, 5 for 3rd, 1 for any non-placing entry, and an additional 5 for Best of Show.

>Best of Show will be awarded only if there are 2 or more show entries.

>Grand Prize for 2018: 75 gallon aquarium or cash equivalent.

>Size restrictions refer to full-grown adult sizes as reported by Cichlid Room Companion or Planet Catfish.

June Classes:

Central Americans over 6"
Tanganyika Mouthbrooders, exclude Frontosa
Frontosa

2018 BOWL SHOW CLASSES

February 2
Victoria Basin
Loricariids (Pleco types) 6” or under
South Americans 6” and under, exclude Angels, Apistos

March 2
Mbuna
Catfish,exclude Mochokids, Loricariids, Callichthyids
Fish Photography

April 6
Tanganyikan Shell Dwellers
Angels
Callichthyids (Cory types)

May 4
Loricariids (Pleco types) over 6”
Peacocks
Open New World

June1
Central Americans over 6”
Tanganyikan Mouthbrooders, exclude Frontosa
Frontosa

August 3
Mochokids (Synodontis types)
Discus, Uaru
Old World, exclude Rift Lakes, Vic Basin

September 7
Apistos
Open Tanganyika
Malawi Haps

October 5
Central Americans 6” and under
Open Catfish
Female cichlids

November 2
South Americans over 6”
Open Old World, exclude Malawi, Tanganyika
Loaches and Botias

December 7
Julidichromis, Telmatachromis, Chalinochromis
Tanganyikan Lamps, exclude Shell Dwellers
Open Malawi

All classes are for cichlids, unless otherwise specified.