

Livebearer News

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Data Protection Act

In order to comply with the requirements of the Data Protection Act, we need to inform members that their name, address, email address and telephone number are being maintained on a database, the purpose of which is for the distribution of the Association's magazine and to inform members of forthcoming events. This information will not be provided to any other organisation for any purpose whatsoever without prior consultation. The association agrees to remove any details at a member's request.

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Editorial

As you read through this newsletter you will notice something of a theme developing:- the articles it contains have either been written by Dan Fromm, been translated from the original French by Dan Fromm or forwarded to me by Dan having been written by Dr Paul V. Loiselle. My friends in the BLA will know that I have had a lot going on over the last several months and if it were not for the help that I have had from Dan then this newsletter would probably not have happened at all. To top things off, Dan is going to act as sub-editor and correct my mistakes (again). So, for all of that, a massive “thank you” to Dan.

But I can't rely on Dan forever, can I? And Dan himself has only a limited number of articles that he can supply for me. So please, get writing. Any aspect of livebearer fish. Collecting, keeping, breeding, systematics – I personally find all of these interesting. And don't worry about spelling or grammar – I will be responsible for those. And don't worry whether it is a short or a long article or even just a couple of photos – they all help to provide interest for all the other members of the BLA.

Some people sneer at those of us who keep livebearing fish species. “Guppies, mollies and swordtails – easy to keep and easy to breed, suitable only for beginners.” Well the articles in this newsletter prove them wrong. I had heard of the Tule perch before but knew virtually nothing about it. Having read the article sent to me by Dan I would love to have a go at keeping and breeding them. But does anyone out there know what the legal situation would be regarding importing them into the UK? I have a suspicion that the authorities would not be too happy if some were brought here but if you know differently then I would love to hear from you. I also know very little about the half-beaks and have seen very few articles about them so if you have kept or bred any of those species then I would love to hear about your experiences.

Finally, many congratulations to BLA members Richard and Holly, on the birth of their son, Richard Junior.

Snippets

1. During 2022 I was lucky enough to be given some *Allotoca zacapuensis* and joined the “Allotoca – Mesa Central Project” which is focussed on the conservation by captive breeding of the highly endangered fish of the *Allotoca* and *Neophorus* genera. This project was initiated and run by Michael Kock, though the work has now been spread amongst several people. A couple of months ago I received an email with a link to the website giving a report on the status of the species within the project. I would have loved to have reproduced the report here, especially the photos, but instead I will just give

you the link here so that you can read the report for yourself, if you find this sort of thing interesting:-

<https://www.conservation.oevvoe.org/de/jahresbericht-zum-projekt-allotocamesa-central-0>

2. Several weeks ago I received an email from Marketa Rejlkova, who started and co-ordinates the Xiphophorus Working Group. She included a link to an interview with Dávid Urbányi, a fish-keeper and breeder from Hungary, which I personally found very interesting. The link to the interview is here:-

<https://xipho.org/interview-david-urbanyi/>

I would have loved to have included the interview in this newsletter, especially the photos, but I hope that if you are interested you will have a look for yourself.

3. Have a guess how many new species of freshwater fish were scientifically described last year. Answer, according to the summary prepared by "Shoal", is 201. The summary of the new species is contained in a report which can be found on the "Shoal" website; see shoalconservation.org

Thanks to Clive Walker for forwarding the report to me.

4. I received an email in March:-

Dear Greg Roebuck,

Dan Fromm was kind to let me know your e-mail address.

I am a researcher on Cyprinodontiformes and I have published a full review of their livebearers forms in 2019.

Those results were incorporated into Killi-Data database which is a reckoned scientific database where members can register for free with a simple modelled mail.

Would you be so kind to inform your members and when possible to reference it in your journal ?

Best regards - Cordialement,

Dr Jean H. Huber (Paris, MNHN)

Specialized researcher on cyprinodontiform fishes

<https://www.killi-data.org/researchers-huber-pubs.php>

Editor (indexer and initiator) of Killi-Data project

<https://www.killi-data.org>

5. How are your electricity bills? Mine have been pretty horrendous this last winter. So which fish could you keep that would be happy in an unheated tank? Well, there are several species of *goodeid*, of course, but what else? In an email discussion with Dan Fromm he sent me these paragraphs:-

“About Paraguayan and, more generally, southern cone fishes. Paraguay and Uruguay have, I think, a few firms that export fish to the pet trade, mainly to Europe. The exporters in PY whom I knew told me that the good stuff went to Europe and especially Japan because importers there paid better than anyone else. But southern cone poeciliids and anablepids (think *Jenynsia*) aren't colourful and the market wants colourful ornamental fish. Also, these countries don't seem to attract many aquarist-collectors. Getting permits in Argentina is just impossible, few people have the imagination to think of PY, likewise UY and Brazil is completely off limits.

Gymnogeophagus are southern cone cichlids. I've found them in Paraguay in places where the water temperature falls to 3 degrees C in winter. We have a colony of *Ancistrus* from that location, we've had them since 1996.

There are cold water *Gambusia affinis*. Ours in NJ [New Jersey], which may be introductions, over-winter under ice. Most aquarists see them as "nothing fish."

There are a few cool water poeciliids in Costa Rica and Panama. In Costa Rica *Priapichthys annectens* occurs from sea level to ~ 6,000 feet. In Panama, *Brachyrhaphis terrabensis* attains at least 5,000 feet. In the Caribbean, *Poecilia hispaniolana* (I think that's what it is) has been collected near Constanza, the coldest town in the Dominican Republic, at around 4,000 feet.”

Thanks again to Dan for sending me this data. If you are keeping any of the fish species listed above then I would love to hear from you.

6. In the March newsletter I included a short piece on my thoughts about keeping and breeding *Allodontichthys polylepis*. I know that some BLA members who keep this species have good results by separating out gravid females to give birth whereas up until March I had had good fry survival by leaving gravid females in the main tank. However, since then two females in that tank have dropped fry with no survivors at all. I guess that I am going to have to start separating out the gravid females. Still on the subject of *A. polylepis*, Michael Kock has sent me the report on the initial phase of the *A. polylepis* captive breeding project. If you would like me to send you a copy of the report [well worth reading if you keep, or wish to keep, this species] then please get in touch and I will email it to you.

7. Plenty of other species are in just as much danger of extinction as *A. polylepis*. Which of us has the drive, the contacts and the knowledge to do for these species what Michael has done for the *polylepis*? Hmmm !!

Report on the BLA meeting in Bristol

From our Chairman, **Steve Oliver**:-

Sunday saw our first event in Bristol for many years and it certainly didn't disappoint. There was free tea and coffee for everyone whilst being able to buy hot/cold sandwiches and cakes from the kitchen. The sales table was also very popular with attendees able to buy and sell items throughout the day. A highlight of the event was Shaun from Tropiquaria leading a Q&A session with everyone encouraged to discuss their experiences (good and bad) and ask related questions. Our thanks go to Shaun for organising this; it was a great addition to the day. The last part of the day was the auction with an impressive 140 lots. There was certainly something for everyone with some very spectacular bargains to be had and others lots reaching good prices with some of the rarer species going for over £30 a pair. We are pleased that we had such a brilliant day and were able to make £110 donation to Tropiquaria. We have all made some new friends and confirmed what we thought, Bristol is a great place to hold our event. The Bristol event will undoubtedly grow into a major show venue in the years to come. Thank you everyone involved with putting this event together and everyone who attended and in the words of the great Arnold Schwarzenegger – We'll be back.

My own thoughts:-

Personally I really enjoyed the event in Bristol. The venue was perfect on the day, I was able to catch up with some old friends, it was great to be able to chat to Don, our former treasurer who rescued the BLA when it was in real trouble a few years ago – and of course there were the fish. There were plenty of people selling fish in the auction and enough fish on sale that prices were lower than the equivalent event a year ago. In fact there were some real bargains to be had and (as usual) I could have emptied all my tanks and filled them again just from the fish in the auction. A few stand-outs to whet your appetite for the next auction in Basingstoke in June:-

A group of *Girardinus metallicus* went for £32;

Six *Xiphophorus cortezi* sold for just £11 – what a bargain! How I wished I had room to take them home;

Two pairs of *Limia melanogaster* made £15 [I used to keep this species and would have loved to have had them again];

Eight juvenile *Poeciliopsis gracilis* sold for £13;

Two bags of ten male and ten female "Black bar Endlers" sold for just £12;

Some of the more unusual *Xiphophorus* species went for quite high prices but the highest amounts were paid for groups of *Characodon audax* from several different locations with the best price of all being for those from Laguna Seca.

Oh well, maybe next time!

California's native freshwater livebearer

Alfred D. Castro

Originally published in the May 1984 Golden Gate Aquarist

Reprinted in Livebearers #78, November/December 1984

Reprinted here with updates and revisions by Dan Fromm. The late Mr. Castro is not available for consultation about changes. All photographs courtesy of Paul Loiselle.



Male Tule Perch

Think of a fish that fits the expression “live-bearing fish”! Odds on you thought of a poeciliid, a goodeid, a halfbeak or an anablepid. Am I right? If so, you are missing many interesting hours of fascination. We who live in the Greater San Francisco Bay Area (including the Delta region) have a local live bearing fish that is unlike any other freshwater livebearer in the world. Can you think of it yet? I’ll give you a hint – it is a member of the family Embiotocidae or Surfperches.

This family of live bearing fish is composed of 13 genera with 27 species and subspecies (DF: <http://etyfish.org/ovalentaria/>, consulted 10/31/2022). Three species occur in the water surrounding Japan while the rest are found in shallow coastal water of the Pacific Coast of North America. Although generally considered to be marine fishes, several Embiotocids are found in brackish lagoons and one, *Hysterocarpus traski*, the subject of this article, occurs exclusively in fresh water. [DF: *Cymatogaster aggregata*, the Shiner Surf Perch, enters fresh water and has been found as far up the Sacramento River as Sacramento. Keeping it in fresh water might be possible and interesting.]

The six inch (15 cm) Tule Perch, as the only fully freshwater member of an otherwise marine family and endemic to central California, deserves special consideration. Until recently this species was considered the bane of freshwater aquarists but work

by, shared experiences and knowledge of local hobbyists has made it possible to maintain it successfully.

7



Female Tule Perch

First, a little history of the beast. The genus *Hysterocarpus* and *H. traski* were described by W. P. Gibbons (1854). The genus' name is derived from hystero and carpus, womb and fruit, referring to giving live birth. Gibbons named *H. traski* in honour of [his] friend, John B. Trask (1824 – 1879), physician, amateur geologist, and founding member of the California Academy of Sciences, who obtained type specimens “through the kindness of Mr Morris from the freshwater lagoons of the Sacramento river, and from the river [itself], where they are found as high up as the fishermen have yet been.” (<http://etyfish.org/ovalentaria/>, consulted 10/31/2022)

The common name “Tule Perch” refers to the habitat with which it is commonly associated (rushes) and was first given to the fish by William I. Follett, Curator Emeritus of the Department of Ichthyology of the California Academy of Sciences when, in the presence of an august body of renowned naturalists, he quipped “... since we have a Tule Elk, Tule Mouse and Tule Frog, we might as well call it Tule Perch.” I must admit that this is only a rumour but it comes from a very reliable source and I add it only to show how easy it sometimes is to give something a good (or bad) “common” or everyday name.

Hopkirk (1974) described two new subspecies: *H. traski pomo*, the Russian River Tule Perch, and *H. traski lagunae*, the Clear Lake Tule Perch, leaving the name *H. traski traski* to the form from the Sacramento and San Joaquin River systems. [DF: Not everyone accepts this split. Eschmeyer's Catalog, consulted 10/31/2022, regards the subspecies as invalid.]

Hubbs (1974) took exception to the validity of these new subspecies in “Review of J. D. Hopkirk, Endemism in Fishes of the Clear Lake Region,” *Copeia* 1974(3), pp. 808-809. As the concept of species is so poorly understood (or conceived to be so many different things by so many different people), I tend to side with Hopkirk because I

can recognize a difference between live Russian River Tule Perch and Sacramento River Tule Perch (I have never seen a live Clear Lake representative of this species although I have searched for them on many occasions). I also use the subspecific name for the population because it gives an indication of where the form originated. Far too few aquarists retain locality information with their fish while they will keep a subspecific name.

And now, since the systematics of this species is a little turbid we will switch to the ecological information known about the Tule Perch. It is much clearer (or maybe I should say that it is clearly a little turbid! Or maybe I should just forget the whole thing! ... NO!). It is important to understand the ecology to maintain a fish properly.

The Tule Perch is an inhabitant of low elevation rivers and streams in central California. Since its common name is derived from its association with tules or bulrush, we know that it is found in areas with only moderate-at-best current. On the few occasions that I have collected it in areas of more than moderate current, it has been found in the lee of the boulders or logs which have broken the major stream velocity. But, while the tule beds are found in a soft soil or mud sub-strate, the Tule Perch seem to prefer the peripheral areas where there is a slight current and a sand or gravel bottom.

An analysis of the waters in which a fish is found is very important in that it gives an indication of the water quality needed to successfully maintain the species in captivity; but be careful where the Tule Perch is concerned. The water in central California fluctuates dramatically depending on the season.

During late summer and fall, the mountain snow pack. is almost gone so there is little water velocity to the streams, the temperature rises (often the water temperature hits 80°F, or 27°C), the hardness and the pH go up (hardness of 200 ppm CaCO₃ and a pH of 8.3 - 8.4 is not uncommon and there are increases in dissolved organic matter.

During the winter and spring you will find drastically different conditions. An analysis of the same area can find water with these factors: temperature of 35 - 40°F (1 to 4.5°C), a hardness of 12 - 15 ppm CaCO₃, a pH of 6.2, and no dissolved organic material.

[DF: *The California Fish Website* (<https://calfish.ucdavis.edu/species/?uid=37&ds=698>) says

They typically require cool, well oxygenated water. These fish prefer water temperatures below 22°C and are scarce in water that exceeds 25°C. Tule Perch have a high salinity tolerance and have been found in water with a salinity as high as 30 ppt.]

As you can see, the Tule Perch is tolerant of a wide variety of conditions in nature, but it is difficult to keep in the aquarium. One peculiar fact that shows up in my collecting data is, although the Tule Perch is derived from a marine form, it seldom enters brackish water but does inhabit areas that receive infrequent tidal influxes;

therefore it does have an ability to withstand increases of salinity. Keep this point in mind for later!

The feeding habits of the Tule Perch are easy to describe. They feed on small invertebrates that live in or on the aquatic plants associated with the tules and they feed on zooplankton. An interesting later spring afternoon can be spent on the Russian River of California watching through a face mask as the Tule Perch hover in an eddy, darting into the current like a humming-bird, as they feed on "bugs". (But be sure to wear a wet suit as the water is extremely cold!)

Interestingly enough, during feeding time the Tule Perch band together but they are normally territorial, with the males defending a particular rock or log.

The future ecological status of the Tule Perch looks bleak. Drastic changes in the habitat in the Central Valley have caused a decline in all native species and the introduction of exotic game species have out-competed the peaceful endemics. [DF: *see below for a contrary view.*]

There are only a limited number of possibilities for the survival of the Tule Perch. The best insurance for survival is the setting aside of suitable "preserves" for native species and more concern over agricultural waste waters that drain into the public waters. But preserves do not just happen! They must be desired by a large segment of the population and this can only occur through a general appreciation of the fish. And that is the "catch". An appreciation of a fish is easy to come by if it is a large species of gastronomic interest, but, if it is of moderate size and requires more patience than the average "sportsman" possesses to catch, it needs something else. And, for once, we are dealing with a fish that has an interesting reproductive strategy.

As I have already stated, the Tule Perch is a live-bearing fish. This is a basic idea of how the life cycle takes place in the wild. It all starts in the summer. The Tule Perch is different from your average poeciliid or goodeid that is always ready and willing to breed. During July, August and September, when the water is at its warmest and water motion is at its least, the males stake out small territories. The reason for this is a little unclear, but it appears to be an effort to attract the attention of the females, but non-territorial males are quite successful with the ladies also. A courting dance is undertaken and occasionally a receptive female enters the arena. The male "attacks" and, when the female does not flee, the pair spends some time "getting acquainted" by pecking at the other's opercular region. They frequently interrupt the pecking to go head to tail and swim in tight circles. It has been reported that the pair will often go mouth to mouth, as kissing gouramies do, but I have not witnessed this. In any event, the actual mating soon follows. The pair assumes a side to side position, facing in the same direction. The caudal areas are pressed together and the fish tilt to bring the anal fins together. I must admit that the rest of the act is conjecture because it is hard to see what is happening from the surface. The male's anal fin, which is modified to act as an intromittent organ, is pressed against the females vent and sperm is injected into her. The actual act takes place very rapidly, 10 to 15 seconds from the time they start to take the head to head position. The entire process, starting with the "getting

acquainted" is repeated two or three times and then the male chases the female out of the nest area.

[DF: *females store sperm, eggs are fertilized in January and fry are born in May-June.* <https://calfish.ucdavis.edu/species/?uid=37&ds=698>]

The embryology of embiotocids is a fascinating study. And while I admit that I know only the basics, I will try to share this with you. If you are interested in more information on the embryology of the Tule Perch, see Bundys (1970).

We know from "our" work with poeciliids that the egg develops within the female but receives little or no nutrition from the mother and is "born" at approximately the same weight as the unfertilized egg. [DF: *not true, maternal provisioning has been documented for some, not all, poeciliids.*] This method of reproduction has certain advantages because the fry are generally large; for all practical purposes they are about one month old, and better able to cope with the environment when they make their appearance. Goodeids have carried this process a little further and possess trophotaeniae, modified rectal processes of the embryo, which "connect" the young to the mother and are associated with respiration and nutrition. These trophotaeniae allow the embryo to spend more time in the female and to advance much further and these embryos emerge as very large individuals that are very well adapted for survival. After all, the young are already about two months old when they are "born".

The embiotocids do much the same thing, but instead of having trophotaeniae they use hypertrophied fins that are heavily vascularized and contain capillary tufts in skin flaps that fit into the highly pleated or folded ovarian cavity. These hypertrophied fins aid both respiration and nutrition but apparently much nutrition is also gained by the advanced young feeding on the ovarian fluid and epithelial cells that are sloughed from the ovarian walls. [DF: *this isn't quite correct. For more on how the embryos take up nourishment provided by their mother, see Bundy (1970) or, even better, Hubbs (1921).*] The embryos develop for 4 - 5 months within the female and are "born" in May or June. Perhaps some of you remember how the May 1977 meeting of the San Francisco Aquarium Society, held in Steinhart Aquarium, was interrupted, or perhaps I should say disrupted, to allow the members to witness the birth of several Tule Perch. Most of the young were born head first but an occasional individual came out tail first. Luckily no one wanted to adjourn the meeting until the "birthing" was over. It took three days for the 60 plus young to be delivered! The young, varying in size from 1¼ to 1½ inch SL (3 to 4 cm SL) when born, are capable of eating most aquatic insect larvae immediately. Although growth is relatively slow, young of the year males are active (although not very successful) in the July breeding arenas, but the females seem to wait a year before they breed.

Maintenance in the aquarium is relatively simple but for some inexplicable reason the Tule Perch has been considered an "impossible" species. Dr. Earl S. Herald, the late Director of Steinhart Aquarium, set a personal goal of establishing the Tule Perch as an aquarium species, at the time of his death in 1973, the longest period that it had survived was a month. He tried everything that he or anyone he knew could think of, including digging of the substrate over which it was found and transferring a section

of the actual habitat to the aquarium. Nothing worked! But, towards the end of 1976, several S.F.A.S. members had the fish in their personal collections and were maintaining them satisfactorily. But they were doing it "all wrong". They were keeping small quantities of salt in the aquaria. If they could do it, so could I.

In November, 1976, I set up a 50 gallon tank, added a dolomite filter and approximately 20% seawater and then added some Tule Perch. By December, 1976, I was still maintaining some of the same fish. I had observed a few births, several courtships and was awaiting my first second generation tank-raised young. When they arrived, I felt confident that the "secret" was the small amount of seawater. But I still had more to learn!

Feeding had proved very simple for aquarium specimens. Live brine shrimp, white worms and tubifex are nice for "treats" but the staple food is frozen krill, an euphausiid shrimp that is commercially available from aquarium dealers. (They will eat freeze-dried krill but do not thrive on this as they do with the frozen food.) Tule Perch also eat prepared dry foods.

I no longer have the ready access to seawater that I previously had but still have had success in maintaining Tule Perch. I found that San Francisco tap water, treated with Epson salts at 1 tea-spoon per 5 gallons plus bicarbonate of soda at 1 tablespoon per 10 gallons, buffered with a commercial marine buffer such as Sea-Lab Formula 28 works equally well. Perhaps the real "secret" is the trace elements found in seawater and not the salinity as previously thought. Since I no longer have a collecting permit that allows me to catch California fishes, I cannot do any more experiments on Tule Perch. Maybe at some time in the future I will again be able to work with this fascinating species.

[DF: *Al Castro was an aquarist at the California Academy of Sciences' Steinhart Aquarium. I usually visit Steinhart when in the bay area. I don't know how it's done, but every time I've been there Tule Perch have been on display.*]

That is, assuming that there are Tule Perch in the future. The Tule Perch has been extirpated from much of its former range by pollution and habitat degradation and withstood a serious drought that has caused havoc with all aquatic life. The California Department of Fish and Game has taken notice of the problem and has undertaken an active role in the recovery project. The Pajaro River system, habitat of a now-extinct population, has had a re-introduction of the Russian River form, some of which were collected from Lake Merced with the City Limits of San Francisco (obviously a previously introduced form). When the outcome of this transplant is finally known, perhaps other transplants will be tried or perhaps, just perhaps, wildlife preserves will be set up to insure critical habitat for all three known forms before the Tule Perch, a unique form of live-bearing freshwater fish, has to be put on the endangered species list.

Literature cited:

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Hopkirk, J. D. 1968 (July). Endemism in fishes of the Clear Lake region. Dissertation Abstracts International B Sciences and Engineering v. 29 (no. 1): 414-B.

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Moyle, P. B., and L. H. Davis. 2000. A list of freshwater, anadromous, and euryhaline fishes of California. California Fish and Game 86:244-258. https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/swrcb/moyle2.pdf

Addenda (all by DF):

Moyle and Davis (2000) recognized the three named subspecies and characterized their conservation status as:

Clear Lake tule perch, *H. t. lagunae* N3: Special concern. The species is in decline or has a very limited distribution, so special management is needed to keep it from becoming threatened or endangered.

Russian River tule perch, *H. t. pomo* N4: Watch list. The species appears to be declining but is not yet in serious trouble. Its populations need to be monitored to see if special protective action is necessary.

Sacramento tule perch, *H. t. traski* N5: Stable or increasing. The species is abundant or increasing in population.

The California Fish Website (<https://calfish.ucdavis.edu/species>) also recognizes the three subspecies. Go there to see more photographs of Tule Perch and for another account of the fish's habitat preferences and ecology.

Paul Loisel (pers. comm.) tells me that ponds in San Francisco's Golden Gate Park have robust populations of introduced Tule Perch. He also tells me that when he was a graduate student at the University of California, Berkeley the Barlow lab had a pair of Tule Perch in a large tank with, among others, Bluegill Sunfish. Bluegills are aggressive centrarchids that were introduced into California waters. Paul says that the 3.5" Tule Perch harassed the 8" Bluegills into hiding behind rocks. The Bluegills came out only at feeding time. Tule Perch, unlike most of California's native fishes, can hold their own against aggressive introductions from the eastern United States.

To the best of my knowledge, transporting live fish is now illegal in California. So is releasing live fish into California waters. Anglers who use live fish as bait must kill unused bait fish before dumping them. All this to prevent the spread of fish into places where they're not native. This kills my dream, born of seeing Tule Perch in Steinhart, of keeping the fish.

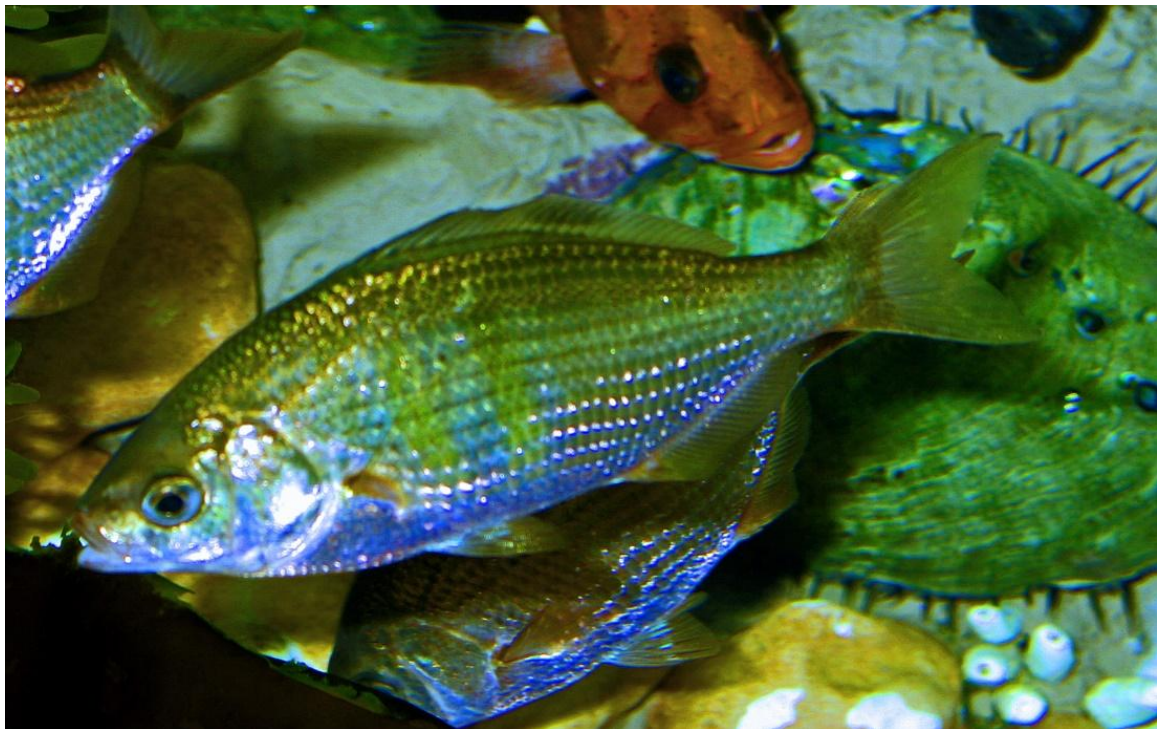


<https://databasin.org/maps/new/#datasets=06b831fb14bc4c96bbf08c76b603470e>

The Shiner Surf Perch (*Cymatogaster aggregata*) was mentioned above. Here are some photos:



Shiner Surf Perch, sexually quiescent male



Shiner Surf Perch, female



Shiner Surf Perch, consorting pair

***Limia sulphurophila* Rivas 1980**

Daniel W. Fromm

Limia sulphurophila was first collected in 1978 and was described in Rivas (1980). It has been introduced to the aquarium hobby in the U.S. and Europe several times. Even though it is attractive, easy to keep and breeds freely it doesn't seem to have stuck. Because of its restricted distribution the IUCN sees it as critically endangered. Although two university laboratories (<https://international-stock-center-for-livebearing-fishes.oucreate.com/blog/stocks-we-maintain/>, University of Oklahoma; Tobler lab, Kansas State University) hold stocks, I hope that hobbyists will rise to the occasion and maintain the fish too. Since it occurs in sulfidic and non-sulfidic habitats, keeping stocks from both kinds of locations, and keeping them well separated, would be good ideas. The more captive stocks the better.

***Limia sulphurophila*'s distribution:**

Limia sulphurophila is generally believed to be a point endemic that occurs only in the sulfidic spring and swimming pool Balneario La Zurza, its type locality. There is, however, credible evidence supported by preserved material that it occurred in La Azufrada (CUMV 96911), another sulfidic spring; in several non-sulfidic spring-fed

streams in the vicinity of Cabral (UF 110073 and 110095, ANSP collection # not available); and in the Río Las Damas (ANSP 208114). Marmolejo (2011) reports collecting it in Lago Enriquillo near La Azufrada. Although I've found no preserved specimens to support his report, Díaz (2002) collected it in a small stream in El Salado, southeast of Neiba; in Cabral; and in La Zurza. Díaz' map coordinates for his sites are very poor matches to the verbatims but the verbatims are credible. Isla (2000) offers less credible evidence that it lived in Los Borbollones, a non-sulfidic spring and marsh on the shore of Lago Enriquillo. Meyer (2015), also less credible, reports "*Limia cf. sulphurophila*" in a mangrove swamp on the Caribbean south of Barahona.

All of these locations are in the Valle de Neiba, the Dominican section of the gap between the two proto islands that came together to form Hispaniola. There may be other *L. sulphurophila* populations in the southwestern Dominican Republic. Although nearly all of the fishes that occur in the Valle de Neiba also occur in the Haitian portion of the gap, *L. sulphurophila* has not been reported from Haiti.

The headquarters of Parque Nacional Lago Enriquillo e Isla Cabritos is at La Azufrada. When Mark Sabaj of The Academy of Natural Sciences of Drexel University and I were there in June 2022, park staff told me that Los Borbollones and the sulfidic spring and swimming pool La Azufrada had been submerged by the lake's rise, that the spring was no longer sulfidic and that its fishes were in the lake or had been extirpated. Marmolejo (2011) found it near La Azufrada in Lago Enriquillo, in water whose salt content was 30 parts per thousand, so although these two sites have been inundated their populations of *L. sulphurophila* may still exist.



Known *Limia sulphurophila* locations.

***L. sulphurophila* in sulfidic habitats:**

Limia sulphurophila's type locality is Balneario La Zurza. In 1978, when the types were collected, the site was, according to Jose Rosado (pers. comm.), one of the collectors,

a sulphur spring, turquoise blue and if am not mistaken we got a number of fish from it. ... I do not remember seeing a pool there at all during that time. It was pretty much a clearing surrounded by forest.

The site has since been developed into a recreational facility and is a tourist attraction. People visit it to bathe in the sulfidic water, which is believed to cure a variety of ills, to swim and to picnic. Figure 1, a low resolution satellite photo from Google Earth Pro gives an overview of the site. Figure 2, taken in June 2022, shows a closer view of the sulfidic swimming pool.

The municipality of Duvergé (<https://ayuntamientoduverge.gob.do/turismo/>) says that La Zurza has sulfidic and non-sulfidic waters. The August 31, 2015 issue of El Jaya, a Dominican periodical, (<https://www.eljaya.com/30467/catalogo-turistico-el-sur-de-la-republica-dominicana/>) states that it has three pools, one with natural water and two with sulfidic. This doesn't seem right; there are now two largish swimming pools. Water enters the larger pool through two smaller wading pools.

Lara and García (2017) sampled water in La Zurza's large pool and reported on water chemistry. Parameters of interest to aquarists are: temperature, 22 °C/72 °F; pH 7.86; total dissolved solids 479 ppm; sulfur, which may include sulfate as well as sulfide, 5.97 ppm. On the assumption that all of La Zurza's sulfur is sulfide, I used Boyd (2014)'s Table 1 to calculate H₂S concentration as ~0.6 ppm given temperature, pH and sulfide concentration.

Lara and García reported concentration of "azufre," the element sulfur. According the 23^d edition of Diccionario de La Lengua Española (Real Academia Española, (2014)), "sulfuro" means sulfide and "sulfato" means sulfate. My interpretation of Lara and García's "azufre" as sulfide could well be mistaken.

The highest H₂S concentration at which normal fish can survive long term is ~ 8 ppb/0.008 ppm. Smith et al. (1986), U.S. EPA (1995). If I interpreted Lara and García's measurements correctly La Zurza's *L. sulphurophila* are clearly not normal fish. Neither are the spring's *L. melanonotata*, which were collected in 1978 with the *L. sulphurophila* types. And neither is its population of *Gambusia hispaniolae*; UF has specimens collected there in 1990 and 1991 and Mark Sabaj and I found it in 2022.

Mark and I visited La Zurza in June, 2022. While there we collected fish – *L. sulphurophila* and *G. hispaniolae*, no *L. melanonotata* -- and measured water chemistry. Although we could smell H₂S from both springs the odor was faint. At all points measured in the larger sulfidic pool and smaller supposedly non-sulfidic one, from where water emerged from the ground to the pools' outlets, concentrations were

below 50 parts/billion, the lowest my Chemets 9510 test kit can measure; I saw no colour change at all. This is far below the level of sulfur measured by the government lab that analyzed Lara and García's water samples. The pH I measured was 7.5, temperature was 26 °C/79 °F. Using Boyd's table 1, the H₂S concentration can't have been higher than 12.5 ppb and was almost certainly below the long-term lethal level. The *L. sulphurophila* we collected were consistent with this. They had small heads, indicating that their gills were not enlarged because of respiratory stress. The *Gambusia* also had small heads.

In the wild *G. hispaniolae* is sometimes a tail biter. Why only sometimes is an open question. The male holotype of *L. sulphurophila* (MCZ 54401) has an obviously chomped tail and so do the paratypes (UF 28925) I've examined. Their tails appear to have been bitten from behind and below. In La Zurza the *Gambusia* live with the *Limia*.

La Zurza was not the only sulfidic spring in the Enriquillo basin with a population of *L. sulphurophila*. The fish was also present in La Azufrada, a sulfidic spring on the north shore of Lago Enriquillo. Isla, (2000); CU 96911; M. Tobler (pers. Comm.). McCoy et. al. (2011) used *L. sulphurophila* from "La Zufrada." *L. melanonotata* and *G. hispaniolae* have also been collected there. I haven't examined specimens from La Azufrada so don't know whether its *Limias*' tails have been chewed.

I have found no reports on La Azufrada's water chemistry. A smell test would have been sufficient to determine that it was sulfidic.

Isla (2000) reports that by 2000 the spring at La Azufrada, like the one at La Zurza, had been developed into "a public swimming pool." Recent satellite images of La Azufrada on Google Earth Pro show no swimming pool there. As mentioned above, the spring has been inundated by the rise of Lago Enriquillo and its water is no longer sulfidic.

***L. sulphurophila* in non-sulfidic freshwater habitats:**

Isla (2000) mentions that *L. sulphurophila* as present in "Los Borbuhones," which I believe is Los Borbollones, a freshwater spring and marsh at the shore of Lago Enriquillo 4.5 km south of La Descubierta.

<http://darwin.uky.edu/~sargent/Bio607/BIO607Final.htm> has a photo of Los Borbollones.

When I was trying to understand *Limia tridens* better I borrowed UF 110095, collected in Cabral, ~ 40 km east of La Zurza, and catalogued as *L. tridens*. These specimens are striking. They so impressed me that I went to Cabral to see what live ones look like, collected some and now have a colony. My Cabral *Limia* non-*melanonotata* (I also found *melanonotata*, which has a distinctive gonopodium, at Cabral; the non- have a different one) looked much like pictures I'd seen of *L. sulphurophila* so I borrowed *L. sulphurophila* paratypes UF 28925 for comparison to check my finds' identity. My Cabral fish are *L. sulphurophila*. What a lucky accident!

My site in Cabral is perhaps 300 m downstream from where UF 110095 was collected. When I visited Cabral, the UF site was inaccessible because of a chain link fence and heaps of trash. Mine was in a vacant lot with a cow and was easy to get to. It had a low concrete dam. Above the dam, where I collected, the substrate was silt and stones. A plant that I don't recognize grew at the pool's edges. I saw fish in the water. Below the dam the stream was quite shallow and rapid, the substrate was coarse gravel, and no fish were visible. Water temperature was 27 °C/81 °F, TDS was 268 ppm. I collected *Gambusia hispaniolae*, *L. melanonotata*, and "Tilapia" as well as *L. sulphurophila* there. ANSP has specimens, including tissue, of the poeciliids.

I'm not the first person to have collected a *Limia* at Cabral and recognized it as *L. sulphurophila*. M. Tobler (pers. comm.) was there before me and has a colony. Díaz (2002), who was there before both of us, also collected it.

I also found *L. melanonotata* and *G. hispaniolae* at my Cabral site. As at La Zurza, the *Limia* had chewed tails.

I wondered whether other *Limia* from that area cataloged as *L. tridens* might also be *sulphurophila*. While visiting UF I examined all of their *L. tridens* from the southwestern Dominican Republic. I found two more lots of *L. sulphurophila*, both from the same complex of spring-fed streams in Cabral as mine and UF 110095. The other UF "*L. tridens*" that I looked at, including some from a roadside ditch near La Zurza, were something else entirely. I found no roadside ditches in the Valle de Neiba in early June 2022 and late April 2023.

<https://www.inaturalist.org/observations/24234336>, a page on *L. sulphurophila* at inaturalist.org, has two photos, a dot map, coordinates and a notice that the location has been obscured. The dot's location matches the coordinates. As published it is on the Río Las Damas, which flows to Lago Enriquillo through Duvergé, a town between La Zurza and Cabral. The inaturalist photos are poor but I think the identification is correct. In 2022 Mark Sabaj and I found *L. sulphurophila* in the upper Las Damas near Puerto Escondido. In 2023 we found no fish at all in the lower Las Damas at Balneario El Segundo Puente, approximately two km above the center of Duvergé.

***L. sulphurophila* in saline habitats:**

Marmolejo (2011) collected *L. sulphurophila* in Lago Enriquillo near La Azufrada 5m from shore in water 80 cm deep. She reports that salinity was 30 ppt, pH 7.9. The fish is euryhaline.

Meyer (2015) reports that *L. sulphurophila* has been collected from a mangrove swamp ~ 4 km south of Barahona. Mangrove swamps are typically brackish.

M. Tobler (pers. comm.) has expressed concern that the La Azufrada population of *L. sulphurophila* may have been extirpated when the hypersaline Lago Enriquillo rose and flooded the site. Marmolejo (2011)'s information indicates that this concern is

misplaced. However, she found *L. sulphurophila* at only one of 36 stations taken in Lago Enriquillo.

We have to remember that Lago Enriquillo is very young. Until between ~ 2800 and ~ 2,500 years ago it was connected to the sea so its surface was at or above mean sea level. Buck et al. (2005), Schubert (2003). The springs in which *L. sulphurophila* now occurs were under sea water then. Since it was cut off from the sea the lake has shrunk and its level has fallen to ~ 40 m below msl. The Enriquillo basin's founding stocks of *L. sulphurophila* were probably euryhaline, as are *L. melanonotata* and *G. hispaniolae*.

Male *L. sulphurophila* are polymorphic

The male holotype has a clear dorsal fin with no dark basal spot at the rear. Fig. 5. However, Rivas (1980)'s description reads "Dorsal fin not mottled or speckled, with a conspicuous, basal dark spot on hind portion" and images of male and female paratypes in that paper show fish with a basal spot in the dorsal. Two of the eleven mature male paratypes in UF 29825 have the spot. Six of the seven mature males in ANSP 208793, collected from La Zurza in 2022, have the spot. ANSP 208816, *L. sulphurophila* from the upper Río Las Damas (2022), has 5 fully mature males. All have the spot, are good matches to spotted males from La Zurza. Forty-three of forty-four males in UF100095, collected in Cabral in 1991, have the spot. And none of my aquarium specimens, whose ancestors were collected in 2019 from a site in Cabral ~ 300 m downstream from UF100095, have the spot.

Females and juveniles of most Hispaniolan *Limia* have a basal spot in the dorsal. UF 29825 (La Zurza) and UF 100095 (Cabral) have 164 females and juveniles, of whom only one female lacks the spot. None of my female aquarium specimens has the spot. I can't explain this surprise.

***L. sulphurophila* in the United States aquarium hobby:**

Isla (2000) remarks that he visited the type locality in 1998. Coletti (2007)'s fish apparently came, perhaps indirectly, from Isla; Ted obtained his stock in 1998. Ferdenzi (2005) reports that his came from Coletti and that their ancestors had been collected by Isla. However, Kohler (1999) says that he obtained the fish at the 1992 ALA convention. I have no idea which fish Kohler's were or how and when they came to the U.S. He could very well have had *L. sulphurophila* but this isn't certain. Robinson (no date) reports a brood of 107 *L. sulphurophila*. Based on my experience with the *L. sulphurophila*, 107 is an improbably large brood, so Robinson's fish may be something else.

Reports by US aquarists on keeping *L. sulphurophila* agree that it is attractive, peaceful, easy to keep and prolific. This matches my experience. I flock breed mine, have more than I can distribute. Females will deliver their first brood, given the chance, at around four months of age. Subculturing -- starting a new brood -- every six to nine months is good practice. Mine happily eat Tetramin® Tropical Flake and

are flourishing at temperatures around 75 °F. My tanks run slightly alkaline. I keep my fish in Cherry Hill tapwater; tds ranges from 130 – 150 ppm.

***L. sulphurophila* in the European hobby:**

Meyer, Wischnath and Förster (1995) were aware of the fish but say that it “has not yet been imported.” Kempkes and Schäfer (1998) published two photos, one by Manfred Meyer, so it had arrived in Germany by then. No mention of provenance. A Hungarian aquarist who posted as Melanochro wrote about his *sulphurophila* in the blog section of Akvarista.hu. Melanochro (2009). The author reports brood sizes around 16-20, finds the fish attractive but not garish and recommends it. Meyer (2015) has photos of *sulphurophila*, also of collectors at La Zurza and of a mangrove swamp where the fish occurs but says nothing about it as an aquarium fish.

***L. sulphurophila*’s conservation status:**

Limia sulphurophila is listed in the IUCN Red List (Lyons and Schlupp (2021)) as critically endangered because of small extent of occurrence and area of occupancy and because of deteriorating habitat. Lyons and Schlupp found that it satisfies IUCN’s geographic range conditions B1ab(iii) and B2ab(iii) for classification as critically endangered. To make what this means clearer, IUCN’s geographic range conditions are, with the conditions cited by Lyons and Schlupp highlighted in yellow and my revisions highlighted in green:

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	=1	>= 3	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of:			
	(i) extent of occurrence;		
	(ii) area of occupancy;		
	(iii) area, extent and/or quality of habitat;		
	(iv) number of locations or subpopulations;		

	(v) number of mature individuals	
(c) Extreme fluctuations in any of:		
	(i) extent of occurrence;	
	(ii) area of occupancy;	
	(iii) number of locations or subpopulations;	
	(iv) number of mature individuals	

L. sulphurophila's presence in three separate sites – La Zurza, upper Río Las Damas, Cabral – is well confirmed. It no longer satisfies IUCN's conditions B1a and B2a for "critically endangered." Of the three well-confirmed sites, only La Zurza is highly disturbed. The Cabral sites are in and around an urban area but the streams seem to run clean and freely.

In addition, Lyons and Schlupp calculated the extent of occurrence's area using a small irregular polygon roughly centered on La Zurza. This makes little sense. The only surface water in that vicinity is the swimming pools' outlet streams. The area covered by a polygon whose vertices are La Zurza, our Río Las Damas site, Cabral, Meyer (2015)'s mangrove site and El Salado exceeds 700 km². Calculating area of occupancy is difficult. Ignoring the mangrove site, I estimate that < 10 stream km are available for *L. sulphurophila*; therefore, because the streams are narrow, area of occupancy is likely < 10 km². This estimate is crude; refining it with attention to where there's surface water will probably reduce it.

This increase in number of sites means that *L. sulphurophila* now satisfies IUCN's geographic range conditions for classification as endangered. Even if *L. sulphurophila* is still present at Díaz (2002)'s El Salado site and Meyer (2015)'s mangrove site it would still be endangered. My assessment was not produced following IUCN's procedures, has not been submitted to the IUCN and is not official.

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The Academy of Natural Sciences of Drexel University gave me access to the Ichthyology Department's resources. The Florida Museum lent me specimens and allowed me to visit. Mark Sabaj of the Academy joined me in the Dominican Republic in 2022 and 2023, put up with me and was more than helpful. P. V. Loiselle provided useful criticism of an early draft.



Figure 1. Low resolution satellite photo of La Zurza



Figure 2. At La Zurza, we found *L. sulphurophila* only in the wading pools. We found no fish in either swimming pool. The larger one is shown here. Mark Sabaj photo courtesy of The Academy of Natural Sciences of Drexel University



Figure 3. The upper Río Las Damas near Puerto Escondido where we found *L. sulphurophila*. Dan Fromm photo.



Figure 4. Spring-fed stream in Cabral where I collected *L. sulphurophila* in June 2019. Dan Fromm photo.



Figure 5. MCZ 54401. Male holotype of *L. sulphurophila*. Collected in 1978 from La Zurza. Photo courtesy of the Museum of Comparative Zoology, Harvard University.



Figure 6. ANSP 208814. *L. sulphurophila*, La Zurza 2022. Mark Sabaj photo courtesy of The Academy of Natural Sciences of Drexel University.



Figure 8. ANSP 208816-2 *L. sulphurophila*, Río Las Damas near Puerto Escondido. Mark Sabaj photo courtesy of The Academy of Natural Sciences of Drexel University.



Figure 9. *L. sulphurophila* Cabral 2019. Aquarium specimen. Dan Fromm photo.



Figure 10. Female *L. sulphurophila* Cabral 2019. Aquarium specimen. Dan Fromm photo.

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The Tricolor Splitfin, *Xenotoca doadrioi* Dominguez, Bernal-Zuñiga and Piller 2016

Paul V. Loiselle

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Livebearing fishes of the Family Poeciliidae are among the most popular and commercially available of ornamental aquarium fishes. The subject of this article, while also a livebearer, is a representative of a family of fishes that is neither. Endemic to the highlands of west-central Mexico, the Family Goodeidae comprises 47 described species in 16 genera. The distinct form of the anal fin of males, the andropodium, has earned these fishes their English vernacular designation of splitfins. Their reproductive pattern is characterized by highly advanced viviparity, the developing embryos being linked to maternal circulatory system via specialized structures known as trophotaeniae. In their degree of development, newly born young invite comparison to shark pups rather than to the fry of poeciliids.

While goodeids made their aquaristic debut in the early days of the hobby (Sterba, 1966), it was not until the 1960s that any species of the family began to win a small coterie of enthusiasts. This state of affairs was in some measure due to the fact that most goodeids have very restricted distributions in Mexico, a country that has not been - and still is not - an active focus of ornamental fish exportation. However, the fact that colouration of the first representatives of the family to be imported could be most charitably described as understated doubtless played an equal role in the failure of goodeids to win the affection of hobbyists on either side of the Atlantic.

The colouration of male *Xenotoca doadrioi* Dominguez, Bernal-Zuñiga and Piller 2016 cannot by any stretch of the imagination be described as understated! All known *Xenotoca* species are attractively coloured, but the Tricolor Splitfin, a sobriquet to which *X. doadrioi* can legitimately aspire, is the equal of any Mexican freshwater fish in this regard.



A male *Xenotoca doadrioi*. The distinct shape of his anal fin is characteristic of male goodeids and has earned the members of this family their English common name of splitfin. Paul Loiselle photo.

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Xenotoca doadrioi is a mid-sized splitfin, males growing to 2.5" (7.0 cm) SL. Females grow only slightly longer but are much more robustly built. This species is endemic to the endorheic Laguna Magdalena and lower Rio Grande de Santiago, affluents of the Rio Ameca in the State of Jalisco, Mexico. When the Tricolor Splitfin made its European aquaristic debut in 1982, it was thought to be merely a highly coloured population of the Redtail Splitfin, *Xenotoca eiseni* (Rutter 1896), a species known to hobbyists since the mid-1950s. Subsequent research found it to represent a distinct species, described in 2016 and named in honor of Dr. Ignacio Doadrio of Spain's Museo Nacional de Ciencias Naturales in recognition of his efforts in behalf of the conservation of Mexico's threatened freshwater fishes.

Provided one never loses sight of the fact that splitfins are most emphatically **not** tropical fishes, the maintenance of *X. doadrioi* is a relatively straight-forward proposition. In nature, goodeid species can experience water temperatures as low as 38° F. (4°C.) and as high as 85° F. (30° C.). Prolonged exposure to temperatures in

excess of 68° F. (20° C.) are highly stressful to these fish and results in significantly shorter life spans. These fish require at least two months at temperatures less than 68° F. (20° C.) to prosper. My group of Tricolor Splitfins live happily and breed freely in an unheated tank in my basement, whose water temperature can briefly drop as low as 50° F. (10° C.) during the winter months. Abrupt major increases in water temperature can result in mortalities and should be avoided at all costs when making water changes.

Goodeid habitats are characterized by hard, alkaline water. As long as the pH in their tank does not drop below 7.0, Tricolor Splitfins are not fussy with regard to water chemistry. My group are quite comfortable in Rahway's tap water, whose general hardness can measure up to 24 DH. Regular partial water changes will suffice to keep dissolved metabolites at acceptable levels. Omnivorous in the wild, *X. doadrioi* is not a picky eater in captivity. Prepared foods, either flakes or granules, frozen and live foods of an appropriate size are eagerly consumed. Live *Daphnia* and frozen *Chaoborus* larvae (glassworms) are particular favorites. This preference for animal foods notwithstanding, the Tricolor Splitfin's diet should contain a significant proportion of vegetable matter. Regular offerings of *Spirulina*-based foods are the easiest way of meeting this need.

While a few goodeids can be legitimately characterized as good community tank choices, the majority of species can be most charitably described as "boisterous". Given that their close relative *X. eiseni* has a well deserved reputation as an aggressive and persistent fin nipper, I have opted to house my group of *X. doadrioi* in their own tank. Indeed, taken with their preferred temperature regime, their somewhat problematic behavior towards tank mates argues that splitfins are best kept in single-species tanks. As males tend to compete for access to receptive females, multi-male groups are best afforded generous quarters. A twenty-nine gallon aquarium will accommodate several adult pairs comfortably.

The developmental interval of *X. doadrioi* is sixty days. Towards the end of this interval, the pregnancy of the female becomes very clearly evident. Moving gravid females so late in their pregnancy should be avoided. Females can deliver from six to twenty young. The very robust pups measure 1.5 - 1.7 cm TL and have no difficulty making an initial meal of *Artemia* nauplii or finely divided prepared foods.. Unlike 2 many splitfins, this species is not an avid predator of its progeny. Provided their tank enjoys a good layer of floating plants, the survival of most neonates can be anticipated. If due attention is given to maintaining water quality, the pups are easily reared.

Unlike female poeciliids, female goodeids do not store male sperm. Thus the female must be inseminated for each brood she carries. Female splitfins are fertile and receptive to a male's courtship for only a brief time after giving birth. Outside of this period of post-partem estrous they have little tolerance for male attention. As they are large enough to make their displeasure felt quite effectively, it is prudent to afford importunate suitors the possibility of escaping their consorts' ire! As reproduction ceases during the cool water rest period, Tricolor Splitfins usually only produce two broods each year.



The relatively svelte figure of this female *X. doadrioi* reveals that she has recently given birth. Gravid females are much heavier bodied. Paul Loiselle photo.

Like many of Mexico's desert fishes, *X. doadrioi* must cope with the loss of habitat and the impact of invasive exotic species. The International Union for the Conservation of Nature classifies it as Critically Endangered and as such it is also listed as a C.A.R.E.S. species.

Goodeids are the beneficiaries of active conservation efforts which have progressed to the point where the reintroduction of several species extirpated in the wild to their restored habitats has been successfully undertaken (Ramírez-García *et al.*, 2020). Hobbyists willing to work with this attractive splitfin can play a role in maintaining a viable insurance population until circumstances in Mexico allow for its reintroduction.

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Photos from *Holly Walford* and *Nigel Hunter*



***Limia nigrofasciata* mother and babies together. Photo posted on Facebook by *Holly Walford*.**



***P. catemaconis* turning a nice gold colour Photo: *Nigel Hunter*, posted on Facebook**



P. catemacensis Photo: Nigel Hunter, posted on Facebook

***Poecilia aff. sphenops* “Pichucalco, JB. Mex. 2011”**

Author: Jacques Blanc Photographs by Jérôme Blanc

Translation: Dan Fromm

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Two male *Poecilia aff. sphenops* “Pichucalco, JB. Mex. 2011” sparring

All aquarists know the Black Molly, the entirely black *Poecilia* found in the hobby since the 1960s. Several fancy forms are in the pet trade, lyretail, gold dust, speckled and so on. And even sailfin Black Mollies obtained by crossing with *Poecila latipinna*. [translator’s note: see Fromm (2022) for a different view of the Black Molly’s origins.] On various trips in Central America I’ve had the opportunity to observe and collect many livebearer species that are the origin of fancy types that we know, notably *Xiphophorus maculatus*, *variatus* and *helleri*, but also *P. velifera*. These fish are easily found in the wild, generally as wild types that aren’t very colourful. For *Poecilia* with short-based dorsal fins the situation is much more difficult. Recognizing the fish from which our “black molly” was developed turns out to be much more complex. In the course of my aquaristic collecting trips I’ve had the opportunity to collect many *Poecilia* species with the hope of tracing the history of that commercial strain. (translator’s note, in Association France Vivipares, the

French livebearer association, “strain” is an identifier made up of “species+place of origin+collector’s name+year collected.” *Poecilia Pichualco*, JB. Mex. 2011, this article’s subject, is a strain.)

The fish’s history:

In Polka, Mexico, near Laguna La Joya, southeast of Tonalá, in 2010 I found a few black speckled fish, but incidentally, and this marking wasn’t transmitted to the following generations (Note: see the discussions about the “Polka” strain on AFV’s forum (translator’s note: I can’t find the discussions)).

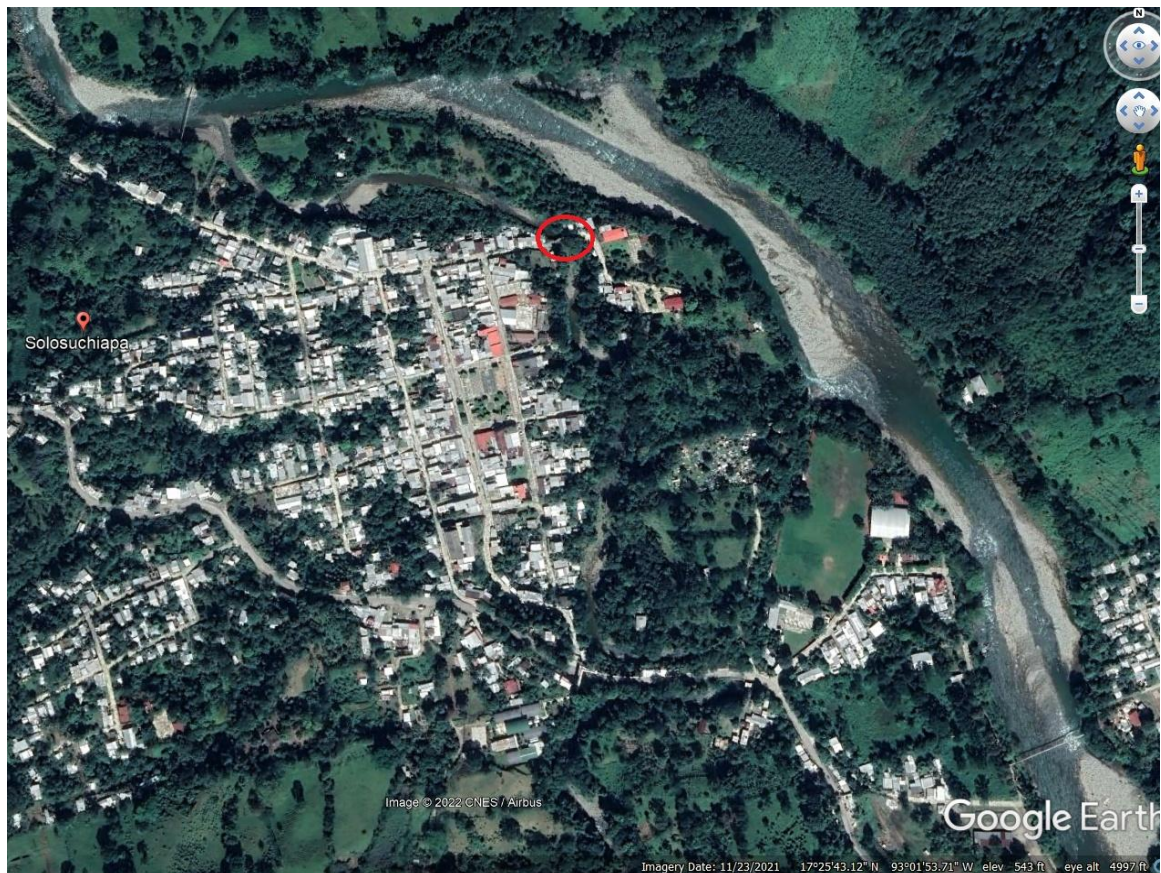
Photos by Uwe Werner in the Aqualog book All Livebearers (Kempkes and Schäfer (1998), p. 159) showing mottled and nearly black *Poecilia sphenops* gave me new hope of finding the fish. The photos’ captions referred to a collecting locality called “Pichualco.” I contacted the author Mr. Werner, who didn’t recall exactly where he’d collected the fish. As quickly as possible I organized a trip to Mexico to look over the area around the town of Pichualco. My idea was to search broadly in that region.



The sites: red dot, Pichualco and Solosuchiapa; blue dot, Polka

Collecting:

Observation and collecting in the Río Pichucalco, which passes near the town of that name, found only one *Poecilia* species, presumably *P. aff. mexicana*, but no individual with black speckling. In the Río Pichucalco's tributaries near Pichucalco I found no individual of that type either. The Río Suxchia [*translator's note: I can't find this river in www.geonames.org and Google can't find it either*], some fifteen kilometers away, also had none. But while returning from that river, I went through the small village of Solosuchiapa and stopped at a bridge to explore in a little brook: Río Mucimba [*translator's note I believe the stream's name is Río Maquimba, see the maps in <https://cichlidamerique.forumactif.com/t4125-poecilia-rio-pichucalco> and <http://www.viajetop.com/mx/mapas-satelite-chiapas.php?plano=Solosuchiapa>.*] This brook, which flows through the village, serves as a sewer. Our intrusion greatly surprised and upset the locals. Hundreds of *Poecilia* were present in the brook, several among them clearly speckled with black, like the fish we sought. Underwater observation (with a mask) let me see clearly and photograph several speckled males. We succeeded in collecting several speckled males and even a female at this spot. Other fish present were *Xiphophorus helleri*, a livebearer, as well as different cichlids such as *Rheoheros lentiginosum*, *Chuco intermedium*, *Vieja bifasciata*, and *Trichromis salvini*, as well as many *Astyanax*.



Satellite view of Solosuchiapa. The collection site is inside the red circle.



Solosuchiapa. Río La Sierra on the left, Río Maquimba to the right of it (above)

Río Maquimba, where the fish were collected (below)



Two males in the wild, one heavily speckled, the other plain.



In the aquarium:

Aquarium maintenance of *Poecilia* Pichucalco, JB. Mex 2011 resembles on many points that of other “Molly” species. However, it seems that it is particularly hardy and adapted to being kept in the aquarium. It accepts very well the various foods which we offer our fish. It tolerates different parameters of water quality, especially soft water. It usually reproduces freely, even in the presence of other species and of predators. It stands up very well to competition with cichlids and adapts itself perfectly to community tanks. Plan on a tank of 200 – 400 liters (50 – 100 gallons) because these fish are very active. Although the majority of strains of *Poecilia* have rapidly disappeared from the hobby, this one is hanging on well and delights the great majority of aquarists who have acquired it.

Colour varieties:

Besides maintenance, this strain’s variety of colouration is its major asset. Starting with the first generation, we have obtained many spotted individuals, males and some females. There are still some unmarked individuals after many generations, and in spite of careful choice of the most colourful breeders. But after the first generation (F1), where the number of spotless individuals exceeded 50%, this proportion remains around 15% even after seven generations. I don’t know enough genetics to

understand this phenomenon. The black spots appear more or less rapidly and make each individual unique. Although some individuals show these spots when born, the majority develop them as they grow. In this strain there are some “late developing males” who appear to be female for more than a year and then differentiate sexually at up to two years. During this change of appearance, a very large individual develops the characteristic male shape and adult colouration. As for colouration, this doesn't consist of simple black blotches that expand, but the overall colouration of the fish develops all its life. Some entirely black individuals have been seen, with additional orange, gold, blue and even green colouration. This fish's life-long development of these shapes and colours make each individual unique and share equally in the strain's uniqueness, as well as its story, which I wanted to share with you.

BEWARE OF CONFUSION! Strains' names in the French hobby:

I draw readers' attention to the risk of confusion between the fish discussed in this article, presumably *P. sphenops*, that I named “Pichucalco, JB. Mex 2011” (and distributed under this name) and another very similar strain (*P. mexicana*, speckled to nearly black) brought back some years later, in 2015, by two other collectors – Phillipe Beau cousin and Alain Koehl – from the same area. Changing a strain's name after its introduction is extremely complicated and risky, especially after it has had critical success among fanciers. *Poecilia* Pichucalco, JB. Mex 2011's beauty facilitated its success and the name “Pichucalco” has been associated with it, although it isn't precisely correct.

AFV's "Species maintenance list" team is now working on a complete review of all of the names of strains in the hobby. Again, we invite all collectors to fill in the strain forms as soon as possible. Thanks to clarification of the information handed in, they will allow us to publish strain tracking certificates. We invite all hobbyists to use and distribute these certificates. (*translator's note: AFV publishes a list of strains in the French hobby on its site. See <https://www.francevivipares.fr/vivipares/souches.html>. <https://www.francevivipares.fr/vivipares/certificats.html> (in French) presents and explains AFV's certificate program.*)

*Translator's note: the original article concluded with remarks on the confused state of *Poecilia* systematics and the difficulty of species recognition. Central American shortfin Mollies are especially difficult. This is echoed and amplified by Palacios et al. (2016), which seems to be the most recent systematic study of the subgenus *Mollienesia*. Their presentation is clearer than M. Blanc's, so I've taken the liberty of replacing his text with theirs:*

The subgenus *Mollienesia* is a diverse group of freshwater fishes, including species that have served as important models across multiple biological disciplines. Nonetheless, the taxonomic history of this group has been conflictive and convoluted, in part because the evolutionary relationships have not been rigorously resolved. We conducted a comprehensive molecular phylogenetic analysis of the subgenus *Mollienesia* to identify taxonomic discrepancies and potentially identify undescribed species, estimate ancestral areas of origin and estimate dates of divergence, as well as explore biogeographical patterns. Our findings confirm the presence of three main

clades composed of the *P. latipinna*, *P. sphenops*, and *P. mexicana* species complexes. Unlike previously hypothesized morphology-based analyses, species found on the Caribbean Islands are not part of *Mollienesia* but are more closely related to species of the subgenus *Limia*. Our study also revealed several taxonomic inconsistencies and distinct lineages in the *P. mexicana* species complex that may represent undescribed species. The diversity in the subgenus *Mollienesia* is a result of dynamic geologic activity leading to vicariant events, dispersal across geologic blocks, and ecological speciation.

Translator's comment: One terrifying, at least for aquarists, idea that leaps out of the paper is that identities of shortfin Mollies in the hobby are in some doubt. Identifying our fishes by their general aspect – eyeball IDs in the field, comparison with published photographs – is risky.



Male F2, 2012



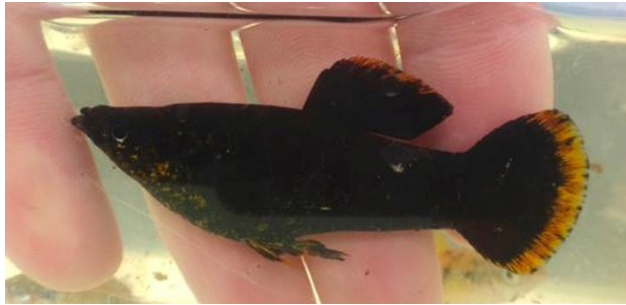
Male F2, 2014



Male F3, 2014



Young male F4, 2016



Male F4, 2014



Male "Yellow Head", 2021



Male, 2021



Wild female



Female F4, 2016



Female, 2021

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Palacios, M., G. Voelker, L. A. Rodriguez, M. Mateos and M. Tobler 2016 (Oct.) Phylogenetic analyses of the subgenus *Mollienesia* (*Poecilia*, *Poeciliidae*, *Teleostei*) reveal taxonomic inconsistencies, cryptic biodiversity, and spatio-temporal aspects of diversification in Middle America. *Molecular Phylogenetics and Evolution* v. 103: 230-244.

https://www.researchgate.net/publication/305510780_Phylogenetic_analyses_of_the_subgenus_Mollienesia_Poecilia_Poeciliidae_Teleostei_reveal_taxonomic_inconsistencies_cryptic_biodiversity_and_spatio-temporal_aspects_of_diversification_in_Middle_America

Photos of *Limia vittata*:

The photos below should have been included with the article about *Limia* species that was in the March newsletter.



Male (above) and female (below) wild caught *Limia vittata*. Photos courtesy of longtime BLA member *Don Kenwood*, who was on the trip to Cuba when these fish were caught.

Photos from *Holly Walford* – First posted on Facebook



Xenotoca doadrioi male.



Xenotoca variata "Jesus Maria"



“Spring is in the air as lots of new fry born this week.”



Xenotoca doadrioi female.



Xenotoca variata "Jesus Maria", female.

Diary dates

1. Sunday 18th June 2023

At:- Kempshott Village Hall,
Pack Lane,
Basingstoke,
Hampshire RG22 5HN

What is happening?

Guest speaker, A of A Livebearer Show, Livebearer Auction, Sales table, Raffle. Hot and cold drinks, cakes and sandwiches will be available.

2. Sunday 23rd July 2023

At:- Harraby Catholic Club,
Edgehill Road,
Carlisle CA1 3PQ

What is happening?

Guest speaker, Livebearer Auction, Raffle

3. Saturday October 21st and Sunday October 22nd 2023

At:- Shenstone Village Hall
Barnes Road,
Shenstone,
Lichfield WS14 0LT

What is happening?

The British Livebearer Association and Fancy Guppy UK Autumn Convention; Livebearer show, Fancy guppy show, Guest speaker(s) TBC, Sales table, Raffle and Auction [1.00pm on Sunday]