The DARTER MINI MAG

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DARTER MAGAZINE
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THE PARADISE-FISH

Macropodus opercularis

by Mike Hellweg, CFN

Originally published Sept. 2018

THE PARDISEFISH has the distinction of being the first recorded "exotic tropical fish" imported solely for the purpose of the pleasure of observing them - and lead to the beginnings of the aquarium hobby as we know it today. Even more interesting, St. Louis, Missouri played a part!

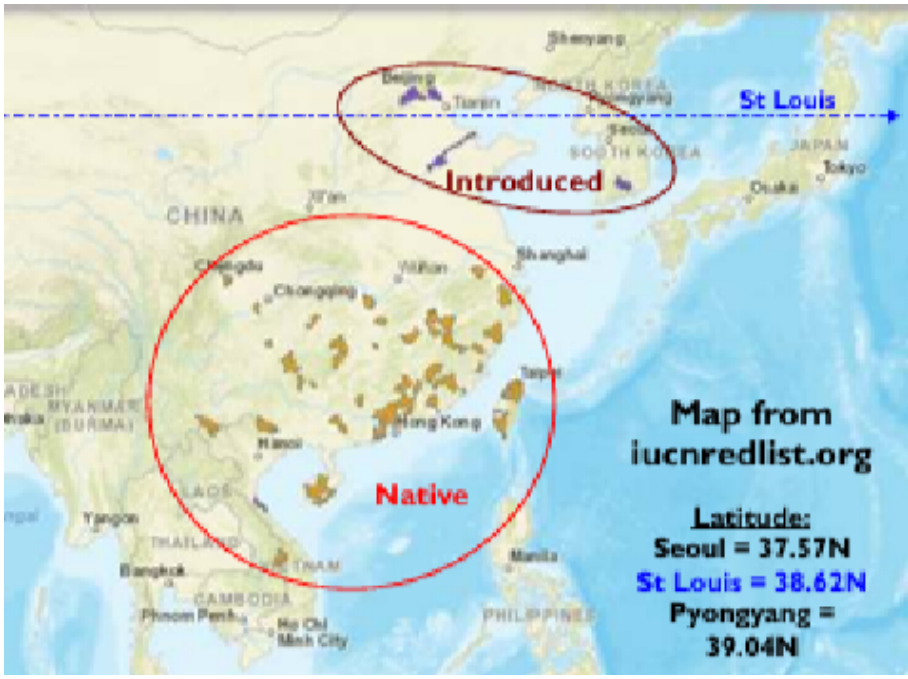
They were first imported to France from China in the mid to late 1860s, but by 1876 our own beer brewing magnate Adolphus Busch's penchant for exotic animals had brought them to St. Louis. They were considered a very attractive novelty, but the goldfish hobbyists of the day quickly labeled them as "nasty" as male Paradisefish tend to be a bit nippy and quickly shredded the fins of their beloved golden beauties when kept in the same pond or container. Unfortunately that label from nearly a century and a half ago has stuck, and even today you'll hear that they can't be trusted with other fish, which simply isn't true.

They make excellent community tank residents as long as there are no fish with flowing fins in the tank. Barbs, Rasboras, tetras, killies, Danios, rainbows, platies, swordtails, plecos, catfish and many medium sized cichlids all make excellent companions. Avoid angelfish, lyretail swordtails, Bettas and fancy guppies. Keep them as pairs, trios, or in groups of 5 or more. It is probably best to keep only one male to a tank unless the tank is large. You can mix color variants, but I would avoid mixing albinos with others as their poor eyesight will put them at a competitive disadvantage.

There are currently 7 recognized species of Paradisefish in the genus *Macropodus*, though in this article I'll stick to *Macropodus opercularis*, as THE Paradisefish. The other six species are also called Paradisefish, but with a location or color trait attached, such as *M. spechti* (the black Paradisefish), *M. hongkongensis* (the Hong Kong Paradisefish), etc.

Macropodus literally means "big foot", referring to their relatively long and large anal fin; and "opercularis" refers to the large spot on the operculum, or gill cover. Wild fish have a beautiful metallic blue and rusty orange striped pattern, with mostly rusty orange unpaired fins.

I don't see a reason to improve upon these wild beauties, but to each his own and of course some breeders have found sports in their grow-out tanks that have become established in the trade. There are several established color variants, including one where blue is more dominant, one where red is the dominant color, and an albino form.



In many areas they will do well in outdoor ponds and tub gardens for much of the year. I've even had them successfully spawn and raise fry outdoors in a tub garden in mid November in O'Fallon, Missouri- definitely not a tropical locale! I raised nearly 400 healthy fry from that massive batch, and didn't get a chance to remove them to the indoors until after Thanksgiving.

In case you've missed my Anabantoid talk where I discuss the myth of labyrinth fry needing warm air above the water, where it came from, and how it spread, this simple anecdote also once and for all should bust that hobby-myth! As most of you know, in November here in St. Louis there are many nights that the air temperature dips into the 30's and the water temperature drops to near 60° F. I did add a submersible heater to the tub set at 50 degrees to keep the water from freezing, but not to keep the water at a tropical temperature, and it definitely did nothing to warm the air above the water!

Paradisefish are stout fish for their size, with a thick, solid body. Females generally reach about 2-1/2 inches standard length (without the tail) and males are about a half inch or so larger, again not including the tail. The dorsal and anal fins of adult males can be huge, and their caudal fins can be half again as long as their body.

Males can be a bit scrappy amongst themselves, especially once they start thinking about mating, but they are nowhere near as aggressive as the fighting fish, and as mentioned above are generally not a threat to other species.

Males displaying for each other or for females are a sight to see. Fortunately they display like this frequently throughout the day, right in the front of the tank, putting on a spectacular show for their viewers. Pairs can be kept in the breeding tank, and oftentimes the female will help with brood care. Due to their larger size, Paradisefish do best in larger tanks. A 15 gallon tank would be the optimal minimum size for a pair, and a 20 long or larger would be even better. Being larger fish, they produce a correlating larger amount of waste than a fish of similar length but with less body mass. That means they need a good filter that is maintained on a regular basis as recommended by the manufacturer. That also means more water maintenance.

For Paradisefish, water parameters aren't too important, even for breeding. Given their wide natural distribution, they are incredibly adaptable and will likely prosper in your local water as long as you keep up on the water changes and keep their water clean.

They will prosper in planted tanks, and might even surprise you by spawning under the leaf of an out-of the-way plant. They will pick off young algae eating shrimp, so these are probably not good choices as tankmates.

They generally ignore adult snails, so any of the popular "fancy" aquarium snails will do well with them. They sometimes eat small snails, but with most of the snails (ramshorns, tadpole snails, pond snails) in the hobby, having a fish that munches on a few young snails is a good thing.

Feeding is easy. They will take all types of commercial foods. Feed them a variety of flake and floating pellet foods, and include some meaty frozen or freeze dried food several times a week. I usually feed them frozen bloodworms and brine shrimp two or three times a week each, and add live blackworms to their diet when I have them.

When well fed and provided with some sort of floating cover, a pair of Paradisefish will do what comes naturally and spawn. The male will build a large, sometimes massive, nest of mucus coated bubbles in amongst floating plant leaves. Plants like water hyacinth, water lettuce, water sprite, frogbit, Salvinia and similar floating plants work very well. A Styrofoam cup, cut in half from top to bottom, also works in a pinch. As they get ready to spawn, the male will begin constructing his nest of bubbles. He has a special gland in the roof of his mouth that excretes sticky mucus with which he coats the bubbles as he blows them. This allows the bubbles to remain intact for up to several weeks. The structure of leaves, roots or other materials also helps to hold the next together.

Paradise Fish Bubble Nest

When his nest is ready, he will coax the female under the nest. If she is ready to spawn, he will wrap around her body in a U shape, they will do a barrel roll and with her vent right under the nest, she will lay up to a couple dozen eggs and he will immediately fertilize them. Some breeders report the eggs will float, but I have seen just the opposite - the eggs sink and scatter as the pair breaks apart from the spawning embrace.

The male, sometimes aided by the female, will gather the eggs and spit them into the bubblenest. After the female is spent, the male will sometimes court another female and add her eggs to the nest, too. With smaller females, a couple dozen eggs is about what to expect, but with large females, a couple hundred eggs is not unheard of. The male, again sometimes aided by the female, will take up a position under the nest and begin to guard the eggs.

Depending on temperature, they will hatch in one to three days. As they hatch, the fry will hang from the nest for another day or two. They have a special sticky gland that allows them to stick without exerting any effort. On the second or third day they will begin trying to swim. At this point the male will try to catch them and spit them back into the nest. After a couple days he gives up and starts looking for food. As long as there is plenty of surface cover and the adults get a good feeding each day, they pretty much ignore the fry. It is probably best to remove the adults and let the fry grow on their own.

The fry are large enough to eat baby brine shrimp when they start swimming. I usually mix in some infusoria and some fine powdered egg layer food for the first few days to make sure the runts get some food, too. Otherwise you'll get a few fry that get most of the food and thus grow more quickly.

AT A GLANCE

Macropodus opercularis

The Paradise Fish

ORIGIN

Habitat: Streams, paddies, ditches

Biotope: China, Taiwan, Vietnam

STOCKING + HUSBANDRY

Size: 2-2.5"

Temperament: Fin-nippers, Males can be aggressive

Tank: 15-20+ gal

Group: Pair or harem

Diet: Omnivore

Breeding: Bubblenesters

Lifespan: 5-6 yrs.

PARAMETERS

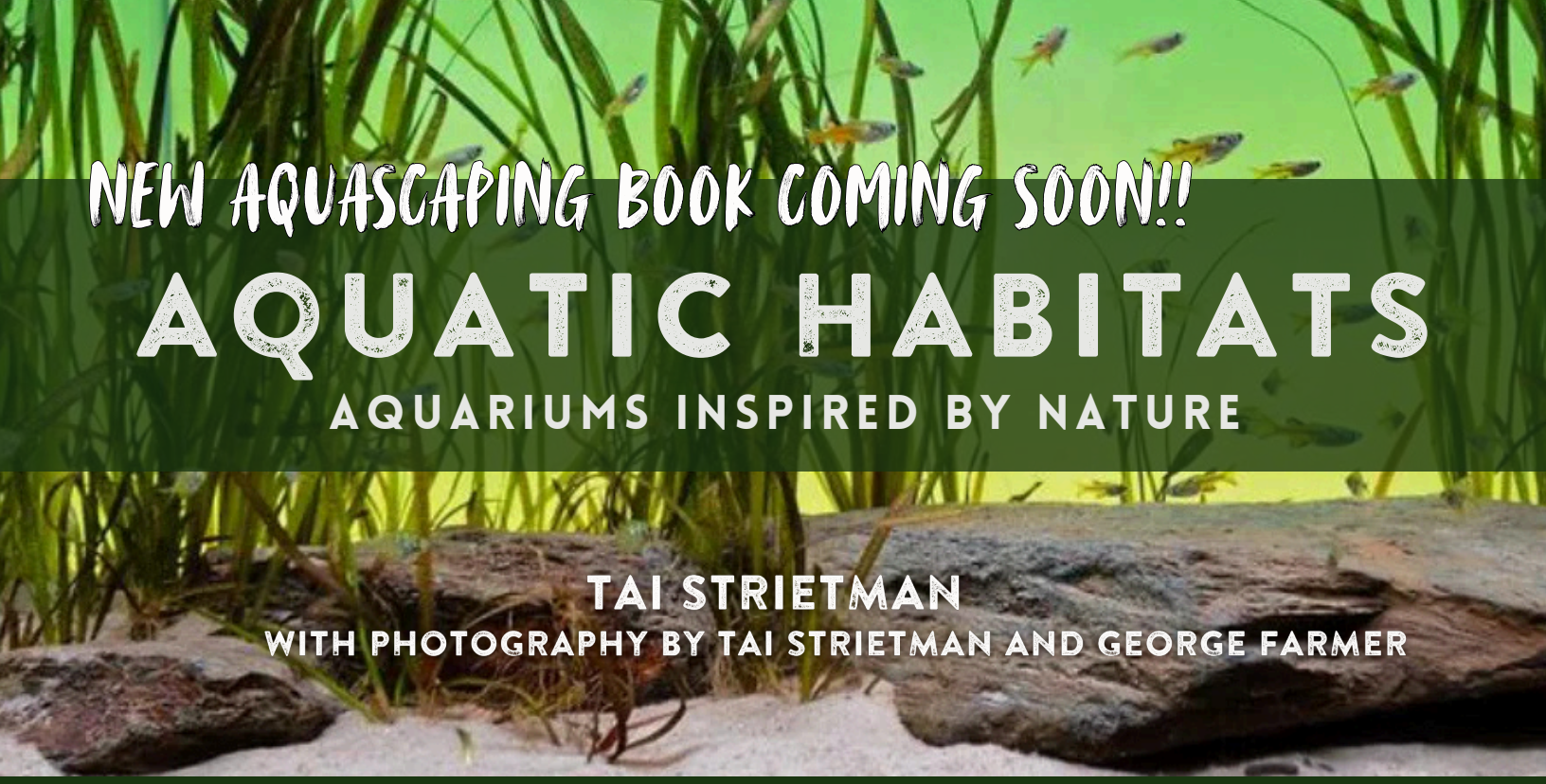
Temp: 60 - 78˚F

pH: 6 - 8

dGH: 5 - 19

After a week or so, they are large enough to eat their smaller siblings. This is natural behavior with Anabantoids as often they spawn in isolated areas where food is scarce. Consuming their siblings (**adelphophagy**) is a quick way for fish to get a good meal until they are big enough to hunt insects, etc. There is little need to raise a large batch of fry as Paradisefish are always available in the trade. If you raise a small, high quality batch with good color and size, it is likely you'll be able to find a shop that will be willing to accept them in trade for food or other fish. You can also find a ready market for healthy young fish with your fellow club members.

The Paradisefish is an interesting and beautiful fish, with fascinating spawning behavior, good parental care, and will do well in a larger community tank. Why not give them a try



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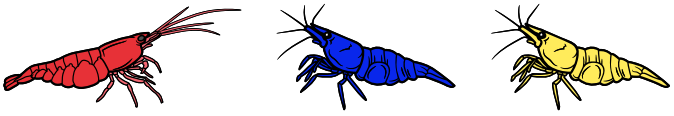
NEOCARIDINA BASICS

Neocaridina davidi

by Holly Paoni

Originally published Nov. 2019

THERE HAVE BEEN A LOT of questions lately about keeping shrimp. Some answers try to make something simple and easy too complicated. It's not complicated at all. A simple low tech set up is all that is really needed. My best advice is to begin with a cycled and well established tank. Shrimp do not handle spikes in ammonia, nitrites or nitrates well at all. They are not fond of jumps in PH, GH or KH either. Even though they have a very, very low bio- load on the tank, it needs to be very stable. To get a very stable tank, nothing beats time to establish plenty of beneficial bacteria and make it past the fluctuations a newer setup goes through. Once past those, go ahead and add some colorful shrimp!



I'm focusing on shrimp of the genus *Neocaridina*, as they thrive in our area's tap water. Needs of the genus *Caridina* vary species to species. A few *Caridina* can handle or even like harder water, but the majority have very specific needs requiring specialized substrates, and RO/DI water formulated within their preferred range. Not all dwarf shrimp are the same, so I'm sticking with what will work with our St. Louis tap water and do well. You can branch out with your own research after getting some experience with the Neos.

By a well-established tank, I mean more than just cycling: biofilm or some trace algae growing somewhere in the aquarium; water parameters testing nice and steady for a couple of months; no mini ammonia spikes; GH and KH holding steady; and nitrates are staying low with normal water changes. In other words, a nice, stable tank.

For shrimp tanks, I prefer to use plain old sponge filters because there is no place for the shrimp or li'l shrimplets to get stuck or trapped. Box filters can have holes small enough for the wee ones to get into. I've had shrimp climb into the chamber on the back of hang-on-back filters to presumably feed on the goodies on the media. I've had shrimp climb right over mattenfilters and stay in the back.... finding dozens living in that small pocket in the back. Shrimp can get into the tiniest nooks and crannies. Sponge filters keep them from being lost or trapped - and shrimp can also feed off of a seasoned sponge filter.

Substrate can be anything inert. Pick whatever color of inert substrate that contrasts with your shrimp: light substrate for your deeper reds, blacks, deep blue shrimp; or darker substrate for your light colored shrimp such as lower grade cherries, all yellows, rillis, snowballs and blue pearls to make them show up best. When the substrate contrasts with the shrimp, the shrimp POP.

Decoration for the shrimp tank should include something with lots of nooks and crannies. When shrimp molt (which they do routinely) they are vulnerable until the new exoskeleton hardens. During this time they prefer to go hide in a safe place. Driftwood with small crevices, cholla wood with some decent sized holes and specialized shrimp caves all work well, as do thickets or mats of Java ferns, Bolbitis ferns, Anubias or Buce. In those well established mats of live plants there are dozens of places under the leaves to hide out for a few days. Mosses also work well. I have a moss wall in one of my shrimp tanks formed by adding moss to a few small sticks and letting it grow together and thicken.

I leave shed exoskeletons that make their way into the open areas of the tank. If the shrimp need calcium they will eat them, and they are an easy visual indicator of what the colony may need. If the shrimp are not eating the shed exoskeletons, no need to do anything - all is well. If you see them grazing on them, your tank lacks minerals such as calcium.

I add crushed coral to the tank to supply calcium. I use a few nano sized pieces and put a piece over by the filter where it will slowly release calcium and trace minerals. The shrimp will pick at it as needed - similar to a salt lick for livestock. Another way is adding a natural cuttlebone piece, used for pet birds, which works the same way. Some folks use a homemade food recipe usually referred to as snail jello. It adds extra calcium into their diet. All these work well, without needing to mess around with water chemistry by re-mineralizing water.

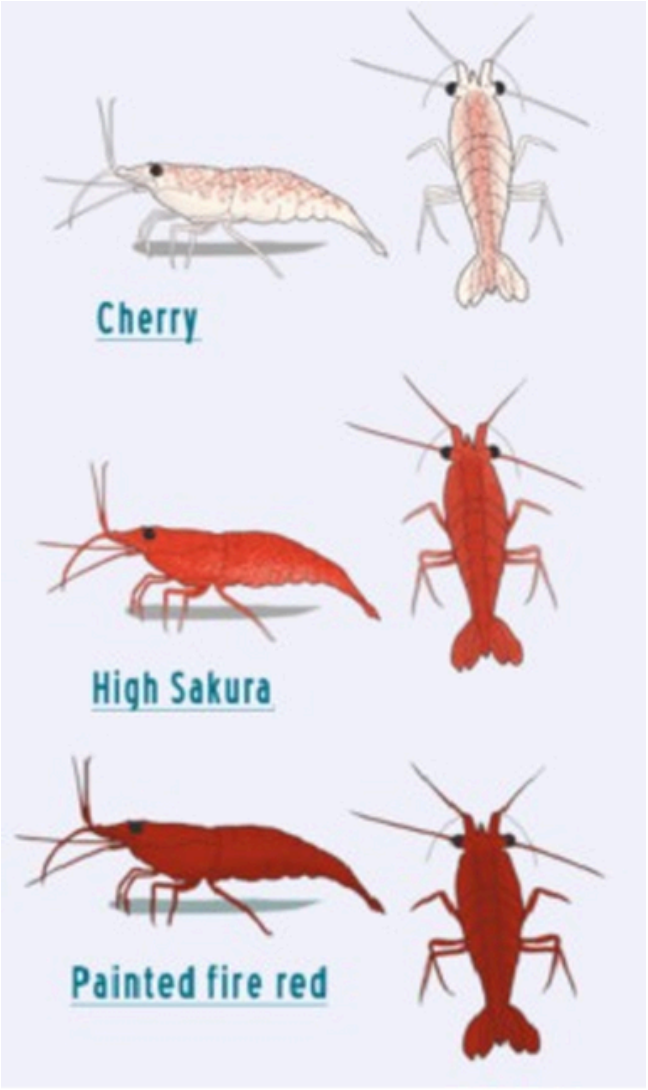
Water that is too hard is said to cause molting issues: the shrimp can't molt and dies trapped inside its older but too small exoskeleton. I have not had this issue, and my water can get extremely hard during dry hot months of summer. For me this is a Ph of 9.4 and TDS of 924 for a couple months. My water gets that high every few years during long dry summers. My shrimp so far haven't ever missed a beat. However, that increase came slowly over many months then slowly came back down to our typical St Louis water chemistry. It wasn't an overnight change, it was slow & gradual. Shrimp can't handle rapid change. They can go outside their typical parameters, but changes with shrimp must be slow and gradual.

Open space is needed in a shrimp only tank because you'll want to regularly sort through and grade or cull your shrimp to keep their colors up. With the colored shrimp, there are several grades of color intensity. Reds are the most popular, so I will use those as an example.

Grading goes from Low grade to High grade: Cherry, Super Cherry, Sakura, and Fire Red. Some break this down into even more grades of just red. Differences between grades can get as complicated as to how intense the color is even on their leg joints.

Even though the grades breed mainly true, you will still find higher or lower grade shrimp in your colony. Use the open area to view and sort your shrimp to keep the color you've got or to improve it. If you have lower grades popping up and don't remove them, over time they will interbreed and the colony color will degrade.

Shrimp are grazers, picking constantly at whatever they can find. They are omnivores that lean towards plant based foods. A specialized diet is not needed. Whether algae wafer bits, algae pellets, mini-sticks and pellets, a variety of flake foods, soft green algae off the glass tops, canned french cut green beans without salt, steamed spinach, zucchini, or microworms they will eat it. They aren't picky. Since shrimp are constantly grazing, it's a good idea to keep something in the tank for them to graze on. Usually the seasoned sponge filter is enough, but as the population grows, it needs to be supplemented.



I supplement with hardwood leaves, fresh cholla, or new driftwood. These get a slimy coating on them shortly after being introduced to a tank. The shrimp love to eat that stuff. Its can look pretty gross if it really blooms, as its white and slimy. Gross looking or not, the shrimp love it. It doesn't affect water quality, as it's a living micro fauna or fungus. Since shrimp are sensitive to water quality issues, its about the perfect food to keep in a shrimp tank. They can graze on it constantly and you are just feeding other foods as a supplement in small amounts to balance their nutrition. I feed the fish a varied diet, 2-3 times a day and my shrimp get a tiny bit of whatever the fish are getting once a day.

Tank maintenance on a shrimp tank is about the same as any other breeding tank. You don't want the tank spotless. It's okay, and actually preferred, to let a bit of algae grow. I don't clean the back or side glass on my breeding tanks. Microfauna live there and algae is something to be grazed upon and nibbled at. As for the sponge filters, I do check them routinely, but don't clean them often. When I do clean them, I only clean them partially as I want to save the goodies growing there. The shrimp graze on them and need the majority of that nitrifying bacteria.

Make water changes often enough to keep the pH, GH, KH from fluctuating wildly with each water change. You also want to keep nitrates at 20 ppm or lower. Each tank is different. My fish tanks get 50-75% water changes, usually weekly, whether they need it or not. My shrimp get treated the same but they would be fine getting a 25% - 35% water change once a month.

I change water in my shrimp tanks like I change my fish tanks, for one reason. My tap water is slowly but steadily always changing, and if I wait it will be even more different the next time. The change is non readable to minuscule with liquid test kits but over a couple months the change adds up to to much for them to handle. By giving my shrimp tanks constant water changes like the rest of the fishroom, it's not an issue.

Shrimp do very well at room temp, and even down into the low 60's without showing any change in activity level. They can go up to the high 70's to low 80's, but will cook at slightly higher temps very quickly. In a fish room, a heater isn't needed, as the water in the room maintains temp very well. For an household or office tank, a heater set in the low 70's to maintain the temperature will keep drafts or HVAC vents from making the tank temperature rise and fall repeatedly throughout the day.

Newer aquarium LED lighting puts off next to no heat, but lights and hoods from just a few years ago do. In small tanks, this is an issue, as the heat from some of these lights can raise tank temp as much as 4-8 degrees on a nano-tank when on, then drop again when off. If this is the case, I recommend upgrading your lighting to something that puts off very little to no heat.

Tank mates for shrimp are limited. Most fish want to eat them. Even some nano species will gang up on and eat shrimp if given a chance. Even if they don't eat the adult shrimp, the new shrimplets are still tiny enough for a 1" adult fish to eat. There are some species that can work, however, if you're just looking for shrimp numbers to maintain or slowly climb.

If you want to save most of the shrimp & their young you'll need a species only tank. The only totally shrimp safe species in my experience are common Otocinclus and Siamese Algae Eaters (SAE)- although SAE get way to large to have one in a shrimp tank, let alone a good shoal of them. Otos and most snails do work well, as they are shrimp sized but they do fill the same niche in the eco system as shrimp- clean up duty.

Mostly shrimp safe fish species are those that won't wipe out the entire population and will let the shrimp colony grow slowly or maintain. You will loose some, but not a big chunk of the shrimp population. This works best in a very well planted tank with a lot of thick cover. Examples of these species include the laid back to shy nano fish such as Chili Rasboras, *Microdevario kubotai* or other nanos with a similar temperament.

Smaller bristle nose, *Cory habrosus*, guppies and Endlers that do not ever predate on their own young may also work. Temperaments among fish vary considerably within the same species, so what works for one person may not work for all. It is trial and error for most.

Species that will thank you for providing a shrimpy treat as a meal include most large livebearers, all cichlids including angelfish, most anabantoids, most active schooling fish and medium sized to large catfish of all types. A vast majority of killies and rainbow fish will also eventually hunt down the majority of shrimp tank mates. The majority of our aquarium species do not do well with shrimp.

My rule of thumb is: if the fish even thinks the shrimp or shrimp baby will fit in its mouth, good chance the shrimp will be a fish snack. If the shrimp doesn't fit in the fishes mouth, but the species is outgoing or rambunctious, or would gang up and hunt it together, good chance the shrimp will be lunch if the fish get hungry or bored. Calmer, laid back to shy species that stay small are the best bet, but please have another place to move them to in the event they don't work out.

AT A GLANCE

Neocaridina davidi
Cherry Shrimp

ORIGIN

Habitat: Slow moving streams/rivers

Biotope: Eastern China and Taiwan

STOCKING + HUSBANDRY

Size: 1.5"

Temperament: Peaceful

Tank: 5+ gal

Group: Colony

Diet: Omnivore

Breeding: External egg care

Lifespan: 1-2 yrs.

PARAMETERS

Temp: 65 - 84˚F

pH: 6.5 - 8

dGH: 4 - 8

Shrimp do climb, and will even go on what I like to call a walkabout from time to time. To prevent this, keep the hole for your airline blocked, as shrimp can climb through that space. I watched one climb up the airline tubing, take a walk on the glass top and over to the next glass top on another tank still looking for a way into the neighboring tank. A scrap of filter pad or foam, wrapped around the airline, going into the tank prevents the walkabout. I also do not keep different colors of shrimp next to each other just to prevent contaminating color varieties and muddying their color.

That's my *Neocaridina* basics. If you want to branch into the Caridinas then *Caridina cf. babaulti*, and the Various Caridina Tiger varieties also do very well in the same conditions as Neocardinias. Some others types may survive but not thrive.

Shrimp keeping is fun and enjoyable. There are a multitude of colors and patterns available and care is not complicated. Every fish species has its own special needs, and shrimp aren't any different. Use a simple low tech set up that's matured with places to hide, tank mates that won't eat them, a constant food source for grazing, and good water quality, and they will breed like bunnies!

A 5-10 gal is all that's needed for a medium to large colony (50-300 shrimp). Larger tanks do give more buffering for water quality issues and look nice too, so go ahead and use that 20 long for your shrimp tank.

THE GOLD BARB

Barbodes semifasciolatus

by Mike Hellweg, CFN

Originally published July 2019

THE LEGEND OF the origin of the gold barb is an aquarium hobby mystery story that goes back to the early days of the hobby's great expansion after the Second World War, most likely it developed in the late 1940's.

The first reference to this fish in hobby literature I have found is dated 1951, which means it was well established by then. By the mid 1950's, it can be found in trade catalogs and was noted in books of the day. It is reported to have first appeared as a xanthic sport of *Barbodes semifasciolatus* from a spawn of wild type fish from southern China.

This is reported to have happened in the tanks of the well known New Jersey breeder Thomas Schubert. With careful tending and line breeding, Mr. Schubert was able to establish a true breeding strain. By the early 1960's the hobby literature was calling this golden strain *Puntius "schuberti"* in his honor, but this was never a valid name.

The golden form became so popular that by the late-1950's it had replaced the wild type fish almost completely in the trade. To add to the confusion, somewhere along the line the common name of gold barb also became attached to *Puntius sachsi*.

Recently it was moved to the genus *Barbodes* and now you can find the gold barb online and in literature as *Barbodes semifasciolatus, Puntius semifasciolatus, P. semifasciolatus shuberti, P. schuberti,* or *P. sachsi*! In addition, many European authors don't recognize the genus *Puntius* and put all barbs in the catch-all genus of *Barbus*! So this one little fish, a domestically developed strain, can be found by searching for as many as 9 different "scientific" names! Whew!

While their history is a bit cloudy, no one can argue that the gold barb is a striking aquarium resident that is a perfect fish for the community tank. Their bold yellow coloration highlighted with moss green on their flanks and bright orange to red fins, their friendly demeanor, and their bold nature that keeps them out in the open all day long, help to win them many fans. Many long time and advanced hobbyists, including me, keep them in at least one tank even to this day.

AT A GLANCE

Barbodes semifasciolatus
Gold Barb

ORIGIN

Habitat: Red River Basin, SW China

Biotope: Slow moving waters

STOCKING + HUSBANDRY

Size: 1.5-2.5"

Temperament: Generally peaceful, may nip fins

Tank: 10+ gal

Group: 6+

Diet: Omnivore

Breeding: "dawn spawning" egg-scatterers

Lifespan: 4-6 yrs.

PARAMETERS

Temp: 65 - 75˚F

pH: 6 - 8

dGH: 5 - 19

Like their distant cousin the goldfish, the gold barb is fun to watch and a great reminder that this is one of the main reasons for our hobby - the pure, relaxing joy of sitting in front of a tank of fish, just watching them. Gold barbs also do very well in tub gardens and ponds outdoors for much of the year, though they cannot overwinter in St. Louis, so they have to come in late in September. They can usually be among the first fish to move out in the spring, as soon as the water temperature hits the mid-60s.

Since gold barbs are domestically produced fish, all fish are farm or hatchery raised. While they don't bring a lot of money, they breed easily and are always in demand, so many local breeders produce them. This means that you can often buy locally raised fish from your local aquarium store. They can also be found at local aquarium club auctions and even from online sellers. Like most popular barbs, they are not picky about water parameters and are greedy feeders. They will eat any type of aquarium fare. To enhance their colors, you should feed them with special foods designed to bring out colors by the addition of natural pigment enhancing foods like astyxanthin, spirulina, and carotene. I feed my gold barbs a staple diet of spirulina based flakes along with fresh vegetables a couple of times a week.

To bring them into spawning condition, separate the females from the main tank. I enhance their diet with frozen meaty foods like brine shrimp, mysis, and bloodworms along with live foods like white or black worms, small earthworms, and daphnia for a week to ten days prior to spawning.

A simple spawning setup will produce all of the gold barbs you could ever want. Give them a 5 to 10-gallon tank with a bare bottom in a room that gets some natural light early in the morning. Add a half dozen or so yarn spawning mops, some floating and some sinking, at one end of the tank. Make sure the tank is covered, too, as the spawning frenzy can become hectic and fish have been known to wind up on the floor otherwise.

Add the female to the tank and give her time to settle in. Add the male in the evening before the lights in the room are turned off for the night. Some breeders like to add two males, but I've found that the extra fish often winds up eating eggs!

They will spawn at first light the next morning. If the male doesn't begin courting, the female will often begin courtship, nudging the male. After a hectic chase, the pair will move into the spawning mops and quiver together side by side, the female releasing a dozen or so eggs and the male fertilizing them. This will be repeated several times over the next couple of hours until from a couple hundred to as many as 400 eggs are laid in the spawning mops. At this point, remove the parents as they will now be tired and hungry and are not above eating their own progeny.

The eggs take two to three days to hatch, depending on temperature. The fry remain on the bottom for a day or two after that, then are found hanging on the glass and mops for another day or two. Then they begin the first attempts at swimming in short hops. By the next day, all will be up and swimming, looking for their first meal. They will take commercial fry foods for egg layers, microworms, and by the third or fourth day, newly hatched brine shrimp. When all are eating brine shrimp, you can discontinue the commercial fry food.

From this point on, growth is rapid and by the age of two months the fry will be large enough for you to have to find homes for them. Fortunately they are always in demand and you can usually trade them in at local shops in exchange for food and other supplies - if you have built up a good relationship with the owner and they know you as a good customer.

THE GOLDFISH

Carassius auratus

by Mike Hellweg

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THE GOLDFISH IS the oldest of all fish that have been kept simply for human appreciation of their appearance, with images of them on Chinese pottery going back to the early Dark Ages, but the actual date has long been lost to the mists of time. Originally developed in China, the first fish were kept for pleasure by the imperial family. The fish fish were kept in homes in ceramic tubs simply for their beauty, and the idea that they brought good luck to their owners. Eventually lower quality fish made it from the imperial gardens into the homes of the common folk partly because they are so fecund.

Goldfish have traveled the world with man, even heading into space in the last decade of the last millennium! Unfortunately, their adaptability has allowed them to become established in the wild on 6 continents, as escapees from pond culture, dumped unwanted pet fish and survivors of released fish used for bait. In the USA, there are feral populations in all 50 states.

Let this be a lesson, never release fish kept in an aquarium into the wild- anywhere! Finding Nemo was a cute fictional story with a happy ending but in reality domestic fish released into the wild quickly become, at best, food for predators - especially brightly colored, slow swimming fish like fancy goldfish.

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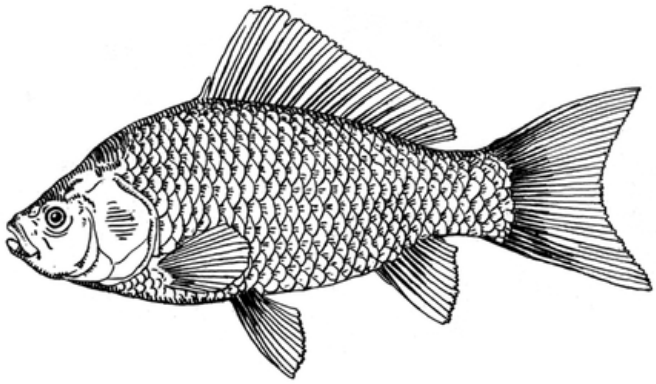


All goldfish varieties are the same species, *Carassius auratus*. They have been selectively bred for color, size, body shape, eye shape, head growth, fin size and shape, and appearance from above for more than 1000 years. We've only started looking at them from the side in the past 150 years or so. Because of the large numbers in each spawn and the goldfish's natural plasticity in color and shape and proclivity for variation, in nearly every spawn there are opportunities for something new and different to appear.

Through selective breeding, new characteristics become fixed - though in goldfish nothing is ever completely fixed. If allowed to reproduce without human interference, in a few generations they will revert to their wild appearance – a carp-shaped, relatively narrow bodied, dark colored fish with single, regular, "fishy" fins. Occasional wild fish will produce a goldish coloration, which is where our many colors and varieties have come from.

Goldfish have been popular pets in Europe since the 1600s, and soon became established pets in the colonies, including the United States, long before the Founding Fathers were born. By the Civil War, goldfish had become such popular pets that there were clubs already established in larger cities of the US and Europe that set up breeding and showing standards. A few decades more and goldfish were so commonplace in American homes that they were often found in advertising and the newspaper comics of the day. By the 1890s the proclivity of hobbyists to place goldfish bowls in sunny windows was actually known as potential source of fires in homes!

***An Idle Moment,* John White Alexander**

Over the last half century or so, goldfish have become a victim of their own success and something of a pariah to some. Ask many hobbyists now and they'll tell you that goldfish are "feeders" or "test" fish used for starting a tub or pond, to be replaced when the tub or pond is established by "better" fish. Some states have even banned them from within their borders in hopes to "prevent" goldfish becoming established in the wild, even though they have been established just about everywhere for over a century. In fact, some the same government agencies now advocating their ban not too long ago actually sold goldfish as bait fish with a note on the side of the bait containers that remaining fish at the end of the day should be dumped into the fishing area so local predatory fish would get used to feeding on them, and thus enhance future fishing trips!

Since the turn of the century, however, goldfish have been experiencing a renaissance as new generations of hobbyists discover their charms. Goldfish make ideal pets. They are colorful- often delicately beautiful- curious, intelligent, hardy, easy to care for, long lived and fit in well with our more hectic modern lifestyle. Watching their antics as they slowly swim or waddle through the tank is relaxing and will actually lower the observer's blood pressure and help relieve stress.

The Goldfish Seller, George Dunlap Leslie

Goldfish recognize and interact with "their" humans, often ignoring others outside the tank. They watch what goes on in the room around them and constantly beg for food. In spite of myths to the contrary, they have great memories and learn tricks - especially when motivated by food rewards, and love to play with toys. They don't bark or otherwise bother the neighbors, don't need to be walked or go to the vet, and can be left without worry for a weekend. Goldfish are social animals and best kept in small groups in species specific tanks. While it might sound like a great idea to have a tank of mixed varieties of goldfish, it is actually best to keep them in breed specific tanks, i.e. telescopes with telescopes, short bodies with short bodies, comets with comets, etc. Mixing colors of varieties is fine.

The most important care is to give goldfish enough room and clean water. Aim for 25 to 30 gallons per adult fish in a filtered tank or about twice that in an unfiltered pond or oversized tub. Change the water and vacuum the substrate regularly – at least once every 10 days. While they need the clean water, make sure filters don't create too strong a current as goldfish, except for single fin types, aren't strong swimmers.

Single finned types can live up to 25 or more years, but short bodied types live significantly shorter lives and some modern varieties rarely live more than 5 or 6 years. Even though popular today, it is best to avoid short bodied vertically egg shaped fish as they are prone to digestive and other health problems caused by misshaped internal organs. Horizontally egg shaped fish and those with longer bodies do much better health-wise over the long term.

Goldfish are gluttonous eaters. Given a large amount of food, they will eat until almost bursting. In the wild they graze continuously, so keep that in mind when feeding. Instead of once a day, feed them small amounts a few times a day and plan regular skip days during the week. Don't worry, they'll be fine!

Being primarily vegetarian, it is best to provide a veggie based diet. Commercial goldfish diets are excellent for them. In addition to a commercial staple diet, they can be fed just about any veggie their humans eat - before added toppings and spices, of course. They have a special preference for romaine lettuce, peas, squash, zucchini, green beans, kale, apple slices without seeds, and similar foods. Once a week, add a meaty food like frozen brine shrimp, Mysis shrimp or a small number of worms.

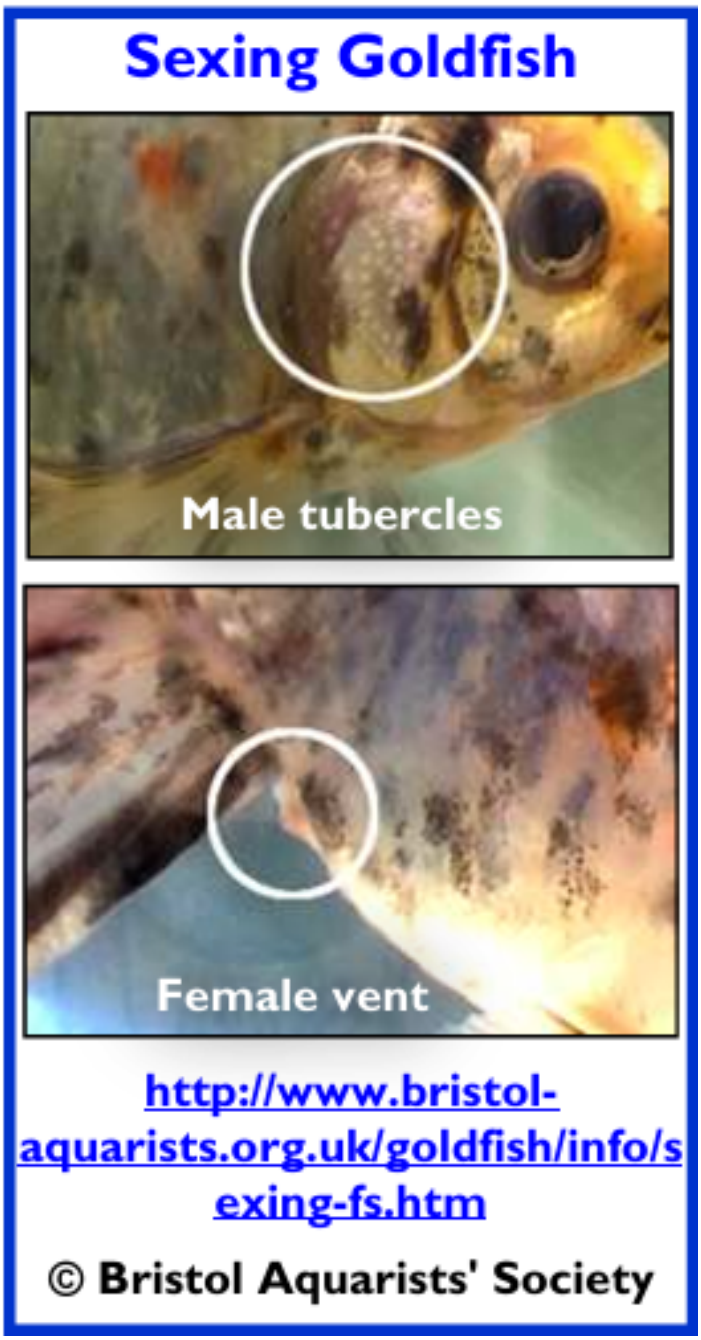
Sinking pellets are the best and keep the goldfish from ingesting large amounts of air with their meal. A short bodied fancy goldfish ingesting too much air while feeding will often have trouble swimming for several hours after eating. This usually resolves itself within a day or so if not being fed.

When conditioning fish for spawning, if possible separate the sexes for a week or so. This gives better control of when they will spawn. Feed the fish heavily with protein rich food like worms, insects, and specially designed commercial breeder diets

Goldfish generally reach sexual maturity in their third spring, and will spawn sometimes several times every year thereafter. Outdoor fish generally spawn once or twice in the spring, but indoor goldfish will often spawn throughout the year, sometimes after every water change!

It is easy to sex some goldfish varieties. Females of an age group are generally larger, thicker bodied fish that are very obviously ready to spawn when full of eggs. Females that are ready to spawn also show a small white colored tube extending from their vent called a spawning tube or ovipositor.

Males that are ready to spawn are more intensely colored, which is difficult to see in most already colorful varieties. They also develop breeding tubercles on their head and gill covers. Often, hobbyists who have never seen these before think their fish has some sort of parasites! On some of the varieties with thick head growth, the tubercles are not visible. On some breeds such as the telescopes, the tubercles are sometimes limited to the top of the head between the eyes.



The absolute easiest way to sex even fancy goldfish is to watch their behavior. Males near spawning season are constantly chasing females. They nudge them from below and behind, bumping at their vent area and lifting the female. The breeding tubercles help stimulate the female to begin to lay eggs. Males may be so rough that they literally lift the females out of the water – so it's a good idea to have a heavy cover on the tank or to keep the water at least a foot low in the tub or pond so females don't get thrown out of the tub or onto the bank! This is another reasons to keep like with like single tail males can be so rough on fancy bodied females that they can kill them.

Breeding goldfish is not too difficult, but raising beautiful fancy goldfish is not for the faint of heart. As mentioned, goldfish are very productive, with an adult female, depending on her size, able to lay hundreds or even thousands of eggs. As mentioned, goldfish are gluttonous eaters and absolutely love fish eggs, even their own.

Most breeders add some sort of target for the fish to spawn upon. A pile of artificial spawning grass, yarn mops, or a special spawning mats all work well. In ponds, they will spawn fairly regularly in the plants. Their eggs are adhesive, and will stick to whatever target item is available.

By using a spawning target, once spawning is complete the spawning target is moved to a hatching tank where the eggs can develop without the adults eating them. It is also much easier to monitor the growth and development of the fry in a separate tank. This separate tank can be a large tub, or even something like a 40 gallon breeder tank. Eggs hatch depending on temperature in from a couple days in 70 degree water to a week in 55-60 degree water.

The fry hang on nearly every surface in the tank for another 5 to 7 days, then are free swimming. Once fry are up and swimming, they are also ready to start eating. Like their parents, goldfish fry are gluttons. Many breeders like to keep the fry in green water for the first couple of weeks, adding commercial fry foods two or three times a day thereafter. Then switch them to a commercial diet fed two to three times a day. Add a few snails to the grow out tank to eat any missed food, and to consume any missed fry that have died. Change a third to half their water every other day or so.

Growth is amazing! They can reach nearly an inch in size in just a month.

AT A GLANCE

Carassius auratus

The Goldfish

ORIGIN

Habitat: Slow moving waters

Biotope: China

STOCKING + HUSBANDRY

Size: Usually 4-6" in aquaria

Temperament: Peaceful

Tank: 30+ gal.

Group: 3+ is ideal

Diet: Omnivore

Breeding: egg-scatterers

Lifespan: 5-25+ yrs., depending on type

PARAMETERS

Temp: 32 - 84˚F

pH: 6 - 8

dGH: 5 - 19

Soon “ruthless culling” begins to come into play. If you have a couple of adult females, it’s not hard to have well over 1000 mouths to feed and it’s not practical to raise that many fish. In the wild, predators would pick off most of the fry but in aquaria, we have to become the “predator” and thin out the fry as they grow. Many fry will not show the ideal characteristics that you seek. Some fry will have trouble swimming. Some telescopes will not have eyes developing equally and they will not even out as they grow. Some double tails will be unbalanced in size. Some double tail fry will only have a single tail. Some fish will have the wrong body shape. Some fish will lack a dorsal fin - or in breeds that shouldn’t have a dorsal fin will have one. All of these that don’t meet the standards for the breed should be culled

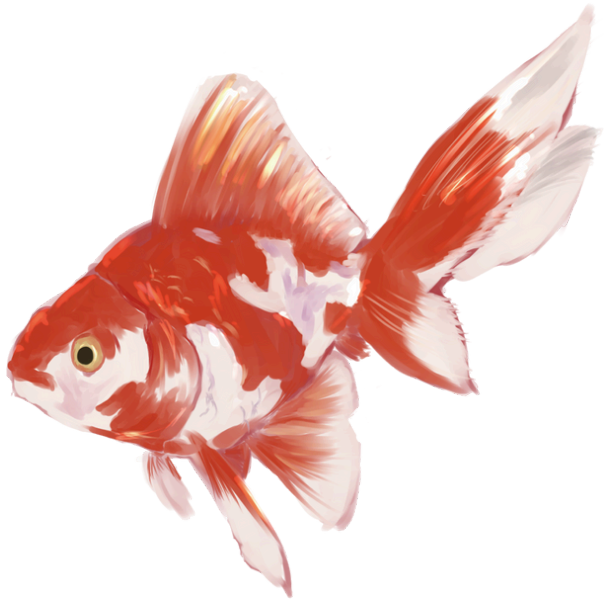
Ruthlessly Cull fry not meeting standards for the breed!

Cull Early for:

- **Swimming problems**
- **Unequal eye development**
- **Unbalanced double tails in size or only single**
- **Wrong body shape**
- **Lacking a dorsal fin**

Cull Later for:

- **Color**
- **Head/Wen growth**



Notice that color isn’t listed as color in goldfish doesn’t start to become fixed until they are older so it is less important when culling young fish. Head growth is also not listed for the same reason. Wens don’t develop until orandas and lionheads are older, so won’t show up in young fish. Cull for that later when the fish are older.

Imagine the time and space needed to raise a dozen excellent quality show fish! For every 1000 fish that are hatched, with some of the fancy breeds breeders expect only two or three that actually will mature into beautiful show fish. That’s why they are so expensive! Even without perfect growth culled fish can make excellent pets

You can cull less if only wanting to raise another generation of pond or tub fish - or if you want to get BAP points. However, it’s good to know what goes into producing top of the line goldfish to recognize why they’re worth what might seem exorbitant prices. ...and why it might be better to Ranchu, devoid of dorsal but with wen just enjoy your pet goldfish instead of trying to breed them.

As always, don’t forget to sit in front of the tank and spend time just watching and enjoying your fish! After all, isn’t that why we all got into this wonderful hobby in the first place?

MISSOURI AQUARIUM SOCIETY

THANKS FOR READING!

- The Mini-Mag Team

NEXT TIME:

on the Mini-MAG

Africa

I saw the rains.

The DARTER
magazine of the Missouri Aquarium Society

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