Journal of the Catfish Study Group

June 2022 Volume 23, Issue 2

In this edition: Breeding *Corydoras hephaestus*; Breeding *Corydoras parallelus*; Breeding *Dekeyseria amazonica*.


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Cover image: *Aspidoras psammatides*. Photo: Hudson Crizanto Gonçalves

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- The Journal of the Catfish Study Group (JCSG) is a subscription-based quarterly published by the Catfish Study Group (CSG). The journal is available in print and electronic platforms. Annual subscriptions to JCSG can be ordered and securely paid for through the CSG website (www.catfishstudygroup.org).

- The JCSG relies on the contribution of content from its members and other parties. No fees or honoraria are paid in exchange for content and all proceeds from advertising and subscriptions are used to support CSG events and activities. At the end of the financial year, any remaining funds generated from subscriptions to JCSG are transferred to the CSG Science Fund. The Editor and other CSG personnel involved in the production of the journal do so voluntarily and without payment.

- Please support the CSG by contributing original articles concerning catfishes that might be of general interest to JCSG subscribers. Word processor files (e.g., .doc, .docx) and high-resolution images (at least 300 dpi and 8.5 cms wide) can be sent as email attachments to editor@catfishstudygroup.org. If necessary, the Editor will work with contributors to structure and polish text and format images for inclusion in the journal. The Editor reserves the right to edit submitted text and images to improve flow and comply with the layout and page limits of the journal. Any manuscripts that propose taxonomic or nomenclatural changes will be forwarded to a qualified professional for evaluation.

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Chairman's Report - Mark Walters

After a much-needed break from official CSG duties (after the hugely successful Convention), the committee are turning their attention to events for the forthcoming 9 months. On the agenda are the September Show and Auction, November and February Auctions, March Convention and January's Annual General Meeting. The next AGM is the end of the current 4-year cycle of committee roles for a number of key posts. The full list of Committee tenures is below:

Chairman - Mark Walters until January 2023; Treasurer - Danny Blundell until January 2023; Show Secretary - Brian Walsh until January 2023; Editor - Steven Grant until January 2024; Press Secretary - Michael Hardman until January 2023; Secretary - Mark Walters until January 2024; Convention Manager - Mark Walters until January 2023; Assistant Convention Manager - Jamie Horne until January 2024; IT Secretary - Mark Walters until January 2024; Assistant IT Secretary - Ben Nicholls until January 2024; Catering Manager - Brian Walsh until January 2023; Auction Manager - Mark Walters until January 2023.

This provides an opportunity for CSG members to take up a baton and give some of their time to running the club activities. After the last AGM I gave my intention to step aside for any eligible members to take on the Chairman responsibilities, or any of the other roles I currently hold due for renewal. Other posts are held by members on a voluntary basis and could become available within the year at short notice.

Eligibility is described in the Constitution: 'The positions of, Chair, Treasurer and General Secretary can only be held by permanent residents of Great Britain. Appointment to key committee positions (Chairman, Secretary and Treasurer) are subject to the candidate having held any other committee position for a period of three years or more. Appointment to any non-key committee position is subject to the candidate having been a CSG member for at least one year'.

If you are interested, and meet the criteria, please contact me or any other Committee members to discuss the role or make a formal expression of interest to stand for a position at the AGM by 15th November.

For your information, the following descriptions for available roles are in the Constitution, which can be read in full on the CSG website – catfishstudygroup.org

Committee positions: their roles and responsibilities

i. Chair: to serve as principal promoter of the group and to lead activity in terms of securing agreed levels of sponsorship. The chair provides committee oversight, arranges, coordinates and will lead the AGM and other committee meetings and enforce the CSG constitution. The Chair will prepare a summary of the reports provided by the other committee members prior to the AGM. The summary will be presented at the AGM and published in the second issue of the quarterly journal. The Chair will maintain an active dialogue with all committee members during the year and assist or delegate additional help as necessary. In the event of a tied vote on a committee decision, the Chair will cast the deciding ballot. The Chair is responsible for coordinating and delegating activity to secure sponsorship and advertisement revenue for CSG events and products (e.g., the quarterly journal).

ii. Treasurer: to receive, secure and issue monies related to official CSG activities and sales. The Treasurer will also establish and approve operating budgets with each committee member and monitor spending associated with all CSG activities and events. The Treasurer (in conjunction with the Chair) is responsible for ensuring all CSG events and activities have adequate public liability insurance. The Treasurer will prepare a financial statement for presentation at the AGM and to be published in the second issue of the quarterly journal. The Treasurer will have the authority to make payments on behalf of the CSG and will be a designated signatory. Payments made by the Treasurer more than £250 must be approved by the Chair and at least one other committee

member. Members with any conviction or history of financial impropriety will be prohibited from serving as the Treasurer. The Treasurer will provide a brief statement concerning CSG funds at each mandatory committee meeting and in response to a request for the same by a committee member at any reasonable time. The Treasurer is responsible for ensuring all CSG events and activities have adequate public liability insurance.

iii. Convention Manager: to arrange, coordinate and lead the annual CSG convention and its related activities. The Convention Secretary is responsible for identifying and inviting personnel to speak at the convention and other CSG events with adequate lead time (i.e., booking convention speakers up to two years in advance), but is required to estimate the cost of their travel and accommodation and obtain approval of the Treasurer and at least two other committee members prior to any invitation. The Convention Secretary will also help prepare a report on the convention in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM.

iv. Auction Manager: to arrange, coordinate and lead the CSG Spring and autumn auctions. The Auction Manager will prepare a report on CSG auctions and forward it to the General Secretary at least one month prior to the AGM. The Auction Manager will attend all auctions to oversee the running and management of the event and to ensure auction rules are followed. In their absence, the auction manager will arrange a deputy who can attend.

v. Sales Secretary is responsible for the development and sale of merchandise at CSG events. The Sales Secretary will also prepare a report on CSG auctions and other commercial activities in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM.

vi. Press Secretary: to develop, produce and distribute promotional material concerning the CSG, its products, events and other activities. To maintain the CSG “house style” and ensure its consistent use across all media. The Press Secretary will liaise with all committee members to develop a strong brand and consistent message regarding all activities and products. Promotional materials will be of a high standard, clear and approved by the Chair, General Secretary and Convention Manager, Sales/Show Secretary prior to widespread release well in advance of each event. The Press Secretary will prepare a report on promotional activities and impact in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM.

vii. Show Secretary: to arrange, coordinate and lead the annual CSG open show and its related activities. The Show Secretary will also prepare a report on the CSG open show in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM.

viii. Editor: to solicit contributions, generate content, and produce the quarterly CSG journal and related online content. The Editor will also prepare a report concerning journal activities and online content in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM. The editor will also interact with subscribers in general correspondence around subscriptions and back-issue orders.

ix. Breeders Award Programme (BAP) Secretary: to register and maintain breeding records entered into the BAP by CSG members, allocate points, alert the membership when members pass a new stage in the BAP, and promote the BAP among the membership and elsewhere.

x. Information Technology (IT) Secretary: to maintain and develop the presence of the CSG

online, including social media advice and managing the CSG website (including email provision). The IT Secretary is also responsible for continual innovation of methods in which the CSG, its committee and membership can interact remotely outside of physical meetings and events. The IT Secretary will prepare a report on online activity in conjunction with relevant committee members and forward it to the General Secretary at least one month prior to the AGM. The IT secretary is also responsible for managing the online CSG membership list.

xi. Catering Manager: to organize and serve food and drinks at CSG events when the venue does not provide this service. The Catering Manager is responsible for food hygiene and ensuring that facilities and equipment are cleaned and stored after the event. The Catering Manager will agree a budget with the Treasurer and Chair prior to the event. The Catering Manager is not required to provide an annual report but is welcome to do so.

In the event that key posts are not filled, a decision will need to be made on the continuation of the club. The constitution has a clause in the event of inability to continue due to lack of funds or lack of available committee members: "In the event of the CSG becoming financially insolvent or unable to attend to the minimum administrative requirements due to a lack of committee members, an Extraordinary General Meeting (EGM) will be held and the members in attendance will decide on the disposal of assets".

Mark

Editor's note

Thank you to those that sent me articles. In this Issue we have great breeding articles. The Journal can only be produced if there are people willing to provide articles. Please send any possible articles or ideas for them to editor@catfishstudygroup.org

Steve

Convention 2022 logo – *Corydoras fulleri* original artwork by Ian Fuller, courtesy of Corydoras World

The Successful Breeding of *Corydoras hephaestus* Ohara, Tencatt & Britto 2016 - A joint project by four dedicated aquarists

Bärbel Dornieden, Robert Budrovcan, Janosch Schütz and Viktor Teroerde

Images by Janosch Schûtz, Viktor Teroerde and Bärbel Dornieden

The first group *C. hephaestus* were owned by Robert Budrovcan and Bärbel Dornieden, as a common breeding project. They were still small, young animals with a total size of 2.5-3cm. Adult females were only added later.

The first breeding attempts could start. It took a few months for the females to start spawning. Finest insect-based granulated food, chopped up whiteworms, tubifex and grindal worms were included in the rich feeding regime. The finest ground food was eaten preferentially.

C. hephaestus are very agile fish, which also stay in the upper sections of the aquarium and look for food on roots or plants. If they feel safe, they move through the aquarium in small groups or individually. If disturbed by something, the *C. hephaestus* gather as a whole group and quickly seek shelter under the layer of leaves or shallow burrows.

Bärbel Dornieden and Robert Budrovcan regularly exchanged their observations regarding behavior with temperature changes, currents, light conditions and tank setup/size etc. In this way, data was jointly determined in order to record the most important husbandry conditions for these rare animals.

At the same time Janosch Schütz and Viktor Teroerde made the first breeding attempts with *C. hephaestus* too.

The four aquarists exchanged their experiences and collected data with each other in order to create the best possible conditions for breeding and rearing the young animals.

All parameters for breeding preparation were recorded, evaluated and implemented in practice. Initial difficulties in sensitivity to changing water parameters subsided after the animals had acclimated.

All breeding requirements were optimized so that almost all four breeders had the same conditions in the aquarium.

C. hephaestus should be kept in spacious aquaria in order to keep the water values stable and also to do justice to the active range of movement of the animals.

They reacted sensitively to bacterially contaminated water and showed changes in the mucous membrane through detachment, which can lead to the death of the animals if recognised too late.

All breeding groups showed very quickly the first courtship acts after the acclimatization. Groups of *C. hephaestus* of 4-10 animals. Males outnumbered the females.

Males: 3-3.2cm. Females: 3.8-4.5cm and were rounder bodied.

Breeding setup

Aquarium: 80x40x40cm

Water: Mixture of osmosis and tap water 50/50
Temperature: 25-26.9 degrees

Conductivity. 200-350. KH.2-3

Filtration: Powerfilter 800L/h filter sponge/ Spirorax /Hamburger mat filter. Two filter systems, which are cleaned alternately. Strong surface currents ensured sufficient oxygen saturation.
UV filtering 8 watts during acclimatisation
Water additive: Liquid Humin 3-5ml /50liter
Water changes: weekly :20-30%
Substrate: fine light sand
Plants: *Anubias*, *Cryptocoryne*, *Hygrophila polysperma*.
Aquarium decoration: pebbles, pieces of wood, flat clay bowls, clay caves, coconut shells, oak leaves.
Food: whiteworms and live Tubifex, chopped up, finest insect-based granulated food, krill paste, grindal worms, red mosquito larvae crushed and chopped.

Breeding of *C. hephaestus* - success by Janosch Schütz

Janosch Schütz had a very agile, well-established group beforehand. He optimized the breeding conditions and was the first of the four of us to record the first successful courtship and spawning activity. He happily told us about it and happily sent Bärbel the first pictures of the eggs and the later hatched larvae.

Viktor Teroerde tried breeding *C. hephaestus* with a lot of commitment. His group was quickly in spawning mode. The *C. hephaestus* also rewarded him with a large number of clutches/eggs and larvae, which developed into strong young *Corydoras*.

Robert Budrovcan and Bärbel Dornieden's group was divided into two smaller groups and after initial "starting difficulties" the females soon showed a clear approach to spawning. Due to the loan of two active adult males with breeding experience, there were courtship acts which lasted 3-5 days with a successful egg laying.

Courtship spawning behavior

There should be more males in the group to have an increased fertilisation rate. Smaller water changes encourage the animals to spawn. Live feeding just before spawning was given. The animals already show a lot of restlessness in the morning and evening hours a few days before spawning. Excited swimming in groups up and down the side windows in the flow of the filter "triggers" them.

Peculiarity of *Corydoras hephaestus*

A change in the darker bluish "color dress" of the *C. hephaestus* can be seen during courtship acts. Courtship spawning animals have a "silver, light scute dress" with white fin edges during the first pursuits of several males of the females.

Adult males and females show this bright scute pattern. The males follow specifically, almost exclusively these "silver" females to stimulate them to spawn.

On the day of spawning (in the morning to afternoon), the pace of courtship activities increases so that it is difficult to see them with the

naked eye. A wild ‘dance’ across the aquarium can now be observed.

The first T-position with the male takes place, oviposition and the female takes quite a long time to attach her eggs to plant leaves, roots, aquarium glass or in the gravel. The females very consciously hide their eggs, often one by one. The males chase each other away from time to time, only to impress ‘their’ female by dancing. After several hours, the wonderful spectacle is over. The subsequent search for the hidden eggs is a time-consuming task.

Egg size: approx. 1.3 mm
Number of eggs: 20-30

Egg substrate: plant leaves/gravel, moss, aquarium glass, and wood.

All four of us treated their clutches in different ways until the larvae hatched. None of the treatments brought significant benefits. All methods led to similar success.

The eggs are sensitive to contamination and quickly become moldy. Antifungal drugs helped somewhat. Also changing the pH value by adding Humin did not lead to better egg development.

Clutches were cared for by spawning ring, breeder box, plastic tray with and without antifungal agents, plastic bowl with addition of oak leaves/ alder cones, use of UV lamps until the larvae hatch. Daily water changes took place using the water from the parents' tank.

There were clutches where more larvae hatched and then again where there were many unfertilised eggs. The more often the animals spawned within a few days, the quality of the eggs decreased and fungus grew. Here again more males are important, who can prevent this through an increased fertilisation rate.

The larvae hatched after 3 days at 25 degrees.

1-day old

Daily cleaning of faecal dirt residues, larvae tend to get fungal infestation on the caudal fin due to water pollution.

Feeding: from the 3rd day microworms. *Artemia nauplii* from the 14th day.

Rapid growth of the larvae into young fish under optimal conditions is important to have unpolluted water and good filtering to avoid failures.

3-days old

7-days old

10-days old

18-days old

3-6-months old

3-6-months old

Conclusion

Viktor Teroerde already knew some *Corydoras* achieve sexual maturity 7-8 months. We were all surprised ourselves that at the age of 6-7 months some youngsters switched to 'silver dress' and showed their first courtship activities.

Our aim is to continue to propagate this species and to let many small, pretty *C. hephaestus* become 'native' in the aquarium hobby. The F1 generation has already laid its first eggs.

Experiences with *Corydoras parallelus* Burgess, 1993

Mark Walters

Corydoras parallelus. Daniel Konn-Vetterlein. All other images by Mark Walters

Hailing from the black waters of the Upper Rio Negro (Rio Içana), the Two-line Cory has been a very desirable and somewhat enigmatic species to keep in one's aquarium. This specific epithet refers to the parallel lines that run horizontally along the specimen's body, a feature shared by other 'stripey' Corys but executed to perfection in *Corydoras parallelus*.

The species has been rarely available in the hobby for at least the last 20 years, with a trickle of youngsters appearing from dedicated breeders in Europe. Most species arriving as wild caught imports, purporting to be '*parallelus*' have not been the case, but instead similar looking species such as CW127 (Rio Tapajos) or CW158. Despite being on the look-out, I have not seen wild imports of the genuine *C. parallelus*, at least for the last 15 years. Most in the hobby appear to arise from fish imported in the mid 2000's and bred and distributed by dedicated European hobbyists over the last few decades

My experience with *Corydoras parallelus* began in 2019 when Erik Johansen made his annual trip to the CSG Convention from Norway. Erik, who is a renowned breeder of Corydoradinae, had previously posted on the CSG social media site of his success with the species and the availability of youngsters for other CSG members. I secured a group, as did a few other CSG delegates. I had only previously been aware of tank-bred *C. parallelus* available from Ian Fuller at the 2013 Convention and in 2016 when Preston & District Aquarist Society member John Dean had youngsters available. It is possible / probable that Ian's earlier success with the species secured the fish in the hobby to this day.

After a few months in a mixed catfish community tank, they were transferred to their own 100 litre tank with powerful airflow through a 'Hamburg matten filter' (HMF). I added sand and lots of oak leaves – to add some tannins and plenty of cover. I tend to do regular water changes using rain water so my tanks are pretty low in hardness, The now adult fish don't tend to hide much and are one of the showiest *Corydoras* in the fish house, they tend to hover in a shoal almost mid-water over the tank substrate rather than skulking around the bottom. To enjoy their presence even more, I moved them to an identical set up on the

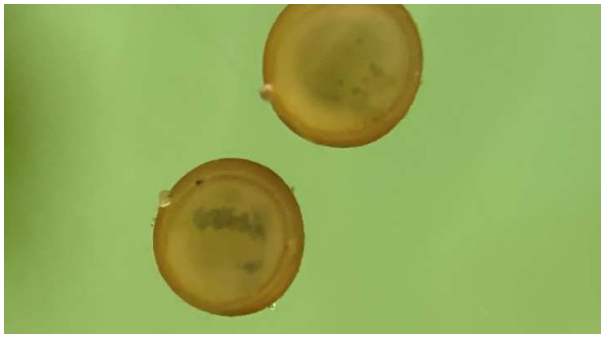
top rack at the entrance of the fish house – the first fish to greet me when I open the door! They enjoy a varied diet including Tetra Prima granules, Ebo soft foods, Fish Science *Corydoras* tablets, Vitalis pellets, daily Artemia and occasional *Daphnia*.

After 9 months of care, I spotted the first few eggs deposited on the glass of the tank. Usually singly place and along the corners. I also found a few more eggs attached to leaves, on the HMF and on the underside of floating *Anubias* plants. Over the last 2 years, the floating plants appear to be the most preferred spawning substrate and I regularly find eggs at roughly one-month intervals.

Egg on *Anubias*

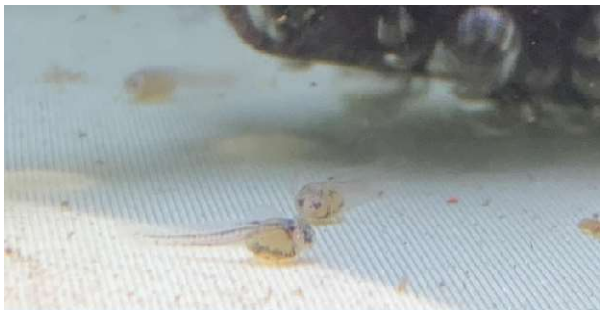
For the first few spawnings, I removed as many eggs as I could find and transferred them to a self-contained Perspex hatching tub with vigorous aeration and a few drops of methylene blue. Although a few eggs hatched, the success rate was low and for the next spawnings I tried alder cone extract as a fungal inhibitor. Again, I experienced a very low hatch rate and fry were very challenging to raise.

Fungused egg



Newly laid egg

My interest in their subsequent spawnings waned and I pretty much left them to it. I was very surprised a few months later when I started spotting young *C. parallelus* emerging from the leaf litter. From this point on (early 2020) I left them to their own devices and the shoal increased nicely to a group of 30+. The subsequent Covid outbreak stopped any fish club activities and opportunities to distribute my offspring, so I enjoyed the ever-increasing shoal of stripey Corys all to myself!



Newly hatched fry

1-week old fry

3-weeks old fry

4-weeks old fry

6-weeks old

8-weeks old

10-weeks old

12-weeks old

I noticed after a few months of development that some of the group had reduced barbels – adults and youngsters alike. Although there was plenty of sand and other soft substrate, something was amiss – the usual culprit for barbel loss being high bacteria levels. It has taken nearly a year, but after more regular water changes and keeping a close eye on tank-bottom coverage, the fish have regrown their barbels almost completely. I suspect these blackwater species are quite sensitive to excess bacterial levels, probably not an issue in their usual acidic wild environment.

New fry and youngsters have not been affected by barbel erosion, so I have managed to move a few on to new homes. I have observed that the new regime of improved tank maintenance has also benefitted egg development and hatching success. I now follow a process where I leave eggs until day 3 or 4 – close to hatching, before carefully transferring to a floating ring with perforated base and strong aeration. Using this method, I am achieving a much higher percentage hatch rate and fry survival. After hatching, I add a few oak leaves to the hatching ring and start feeding with microworm and fry paste after day 4. Newly hatched brine shrimp are added to the diet after the first week and the fry are released to the main tank after 6 weeks, where they continue to grow, competing with the adult population. The presence of fry does not seem to diminish the adults' desire to spawn, and I am continuing to notice spawning events every 4-6 weeks.

I hope more hobbyists manage to get hold of this beautiful species which until quite recently was pretty much unobtainable. With the right conditions and a fair amount of patience they should reward you with a great display and hopefully plenty of fry.

Keeping and breeding Loricariids in my fishroom

Craig Whitehead (all images by the author)

Keeping plecos has been a hobby of mine for quite a few years now. I'm a little bit boring when it comes to fishkeeping as my only real interest are Loricariids/plecos. I do keep a couple of *Corydoras* species but not many.

My love for fish keeping grew the more interested I got in the hobby and like we all do we start with a couple of tanks but that's never enough.

The fishroom started roughly about 2015 / 2016 after my 4ft tank leaked in my dining room at home early one Sunday morning, which lead to the Mrs. being a little upset with me as it left a fusty smell of fish water for a little while in the house. After the leak I decided to put a couple of tanks in my garage which is located at bottom of my garden and that's where the fishroom kicked off.

After putting about 8 or so tanks in the room and running the room with poor insulation I decided I wanted to completely upgrade the fishroom and make it the best I could. During the first Covid lockdown of 2020 I managed to save up some money and upgrade all the insulation and add more tanks to the existing 8 (now 22 in total) and I also added an air ring system to the room for the HMF filtration.

In my fishroom I have species of *Ancistrus*, *Peckoltia*, *Scobinancistrus*, *Hypancistrus* and *Baryancistrus*.

My tanks are just very basic, lots of caves, slate pieces, and bogwood. I always like to give a variety of different sized caves in each tank. The filtration is all HMF Sponge blocks with jet uplifters giving out plenty of flow to each tank, which is ran a by Charles Austen et100 air pump on my air ring system, and with the current situation with energy prices I'm glad that I switched to HMF filtration as the air pump only costs £15 a month to run all 22 tanks

My water in my area where I live is pretty soft so I just use HMA filtered water which is stored in water butts. As I'm a bit of an early bird I tend to do water daily first thing on a morning anything from 5.30am onwards, as this allows me to manage 22 tanks over the course of the week, so all water changes are done before I start work every day.

So, my current list of species I keep in the fishroom are:

<u>*Hypancistrus*</u>

L046 *zebra*. (Breeding)

L136

L174. (Breeding)

L236 Super Whites.

L260 Queen Arabesque.

L333. (Breeding)

L340 Mega Clown.

L501 Black Phantasms (Breeding)

Hypancistrus contradens (Breeding)

Peckoltia

L076 / L099

L134 *Peckoltia compta*

Ancistrus

L032 *aguaboensis*

LDA 74 *macrophthalmus*

dolichopterus (Breeding)

Wabenmusters

Super reds (Breeding)

Scobinancistrus L082. Recently spawned but not successful.

Baryancistrus demantoides L200 Hi-fin Green Phantoms.

I tend to buy from fish from reputable shops like CSG sponsors Pier aquatics and GM Aquatics as the shops local to me tend not to have a huge variety of Loricariids.

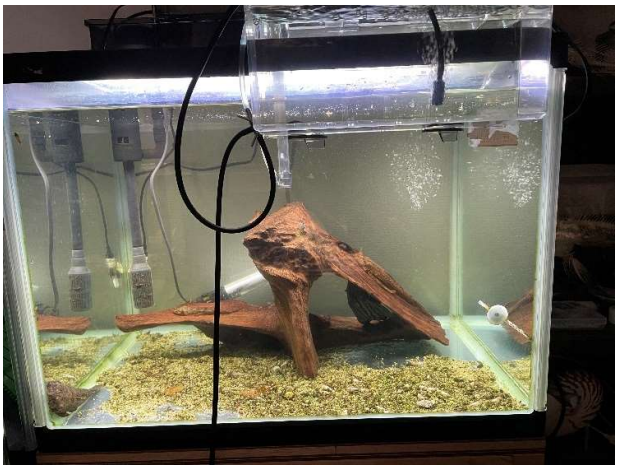
Breeding *Dekeyseria amazonica* Rapp Py-Daniel, 1985

T. Shohei

Dekeyseria amazonica male. All photos by the author

Aquarium Data

Water temperature is 25℃~26℃.
pH is 6.8~7.4
Trickle filtration
NO3- was 25 mg/L, GH was 4°dH, and KH was 3°dH (water quality during breeding).



Layout

Sand mixed with small stones (no pH fluctuation), one large piece of driftwood.

Aquarium management

Water changes 2-3 times a week depending on how dirty the water is.
Fed 2-3 times a week with Pleco tablets from Hikari.

The tank is covered with a blackout curtain while the light is off because the fish do not eat much when it is bright.

The process of breeding

The behaviour of males and females snuggling up on the spawning surface lasts about a week, followed by spawning. This can be triggered by a change in water temperature if the female is embracing the eggs. A flat surface hit by water flow is necessary for spawning, and in my environment, they spawned a total of five times in two years in the same location. The males need to like the flat surface and guard the eggs.

Male sat on eggs

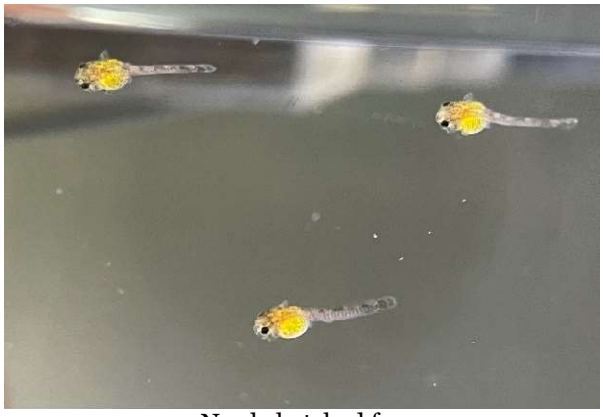
About the eggs

The eggs are about 2mm in diameter and are laid on the surface of the tree in a solid mass of about 200 in total.

4-day old eggs

The adhesion to the wood is so strong that even when the eggs are removed from the wood, the adhesive surface remains on the wood.

Fry starting to hatch



Newly hatched fry

2-days old

2-days old

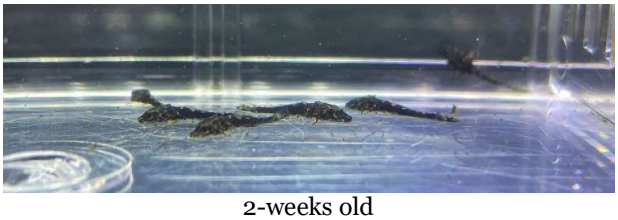
<u>About fry</u>

At hatching, fry are about 1cm in length, very small compared to adults. Egg sacs are also quite small and fry are very weak.

4-days old

1-week old

1-week old



2-weeks old

3-weeks old

4-weeks old

5-weeks old

6-weeks old

14-months old

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Ameiurus natalis: Aquatic Warrior

James E. Burgess, SSG(RET)

Freshly imported *Ameiurus natalis*. Steve Grant. All other pictures by the author unless stated

Abstract: Many aspects of the defensiveness of *Ameiurus natalis* are examined. These defensive attributes and behaviours are related to a military scenario. The musculature & power, teeth, fin spines are all considered to be weapons, but there are other attributes that are not readily apparent.

Introduction: *Ameiurus natalis* - a perceptively slow and sluggish bottom feeder is considered by most as worthless and ugly. Not worth fishing for or studying. These specimens are quite the contrary. They should be considered an Aquatic Warrior. The teeth and fin spines can inflict serious wounds, their lateral line and ampullae sensitivity is unmatched, and the sheer fear that they put into certain fisherman's minds can be devastating. To relate these attributes to my military experiences; I would have to say that with the conventional weaponry, the chemical and biological advantages, along with the power of the musculature, the tenacity, and survivability this animal can inflict some serious psy-ops on the human enemy.

Musculature: *Ameiurus natalis*, along with the rest of the Siluriformes, do not have scales so the excessive musculature can be prominently displayed. This musculature aids the animal in different ways. When collecting specimens using a rod and reel combination; the power exerted in the water attempting to escape is very strong. Even a small specimen has the ability to put up quite a fight. The power of the muscles is used in conjunction with the pectoral fin spines as well. After caught and while being handled the specimen will thrash side to side to wound the attacker and escape.

Bulging musculature

Teeth: For the most part to just look at the teeth patches on *Ameiurus natalis*; they do not look intimidating at all. The flesh and gums allow these teeth to be recessed to the point of feeling like a mouth with a file in it. Together with the excellent jaw musculature these teeth can inflict some very rash type wounds. These cardiform teeth are set in both jaws with multiple rows. The upper jaw has a smaller patch than the bottom jaw which happens to extend the width of the jaw itself. These teeth when looked at resemble a demon that you would normally see in a horror movie due to when the flesh and gums are removed; the teeth take on a different appearance. They look very dangerous in themselves and anything caught within their grasp would not have much chance of escaping.

Frontal view of the mouth with teeth after flesh and gums have been removed

Ventral view of mouth showing the top tooth patch and the teeth of the lower jaw extending the entire width of the lower jaw

Stained teeth

Teeth in the front is not the only dental weapon that *Ameiurus natalis* possesses. The oral cavity is full of teeth, but the throat is as well. These throat patches of teeth like organs are usually made up of similar structures as the ones in the oral cavity. Though small in size they are file like and can inflict some rasp type wounds if the flesh gets to that point.

Tooth patches from the throat

Fin spines: If the teeth were not scary enough; the dorsal and pectoral fins will add another type of weaponry. These fin spines at the front of each of the pectoral fins are not only very sharp at the tips, but also serrated to aid in cutting into the flesh. The serrations are angled backwards towards the body so that they can enter easily but rip the opponent's flesh on the way out. That is only one aspect of these trio of tragedies. All three fins (both pectoral and dorsal) are lockable. This means simply that they normally cannot be forced to close. The locking mechanism at the base of the fin spines are extremely well geared and poses extreme trauma.

Dorsal fin spine

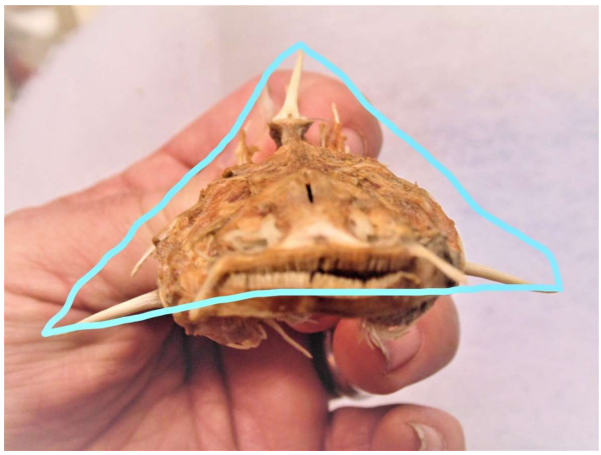
Pectoral fin spine

Locking mechanism on pectoral fin spine

The Defensive Triangle: Individually these serrated fin spines are lethal but when combined they form a triangle of tragedy. They lock into place and the following photo shows that when done so; the pectoral and dorsal fins actually construct a triangle.

Locking mechanism on pectoral fin spine

At the base of each of these fin spines is a small venom sac. When the coverings of the fin spines are damaged and the perforation occurs an amount of venom is injected into the wound. This wound which feels like a bee sting when superficial can be quite painful, but if the wound is more severe, then the pain is too.



Defensive triangle created by positioning of the dorsal and pectoral fins

Chemical weaponry: The first type of chemical weaponry has already been discussed—the

venom at the base of the pectoral and dorsal fins. There is another type. It is more of a warning signal to the rest of the troops to stay away. Commonly called the Fright Reaction or Schreckreaktion; it is the flight response of different species of fish in the Ostariophysi. Basically, it operates that when an *Ameiurus natalis* gets injured or angry this pheromone is released into the surrounding area. This is a chemical cue for the other fish of the same species to stay away or to take steps to avoid this area.

Radar: Just about every species of fish has a lateral line that helps detect water pressure differences but just a few can detect electrical impulses. *Ameiurus natalis* can do just that. In Dr. D. Whitehead's work on the Ampullary organs of marine catfish and sharks he described the ones of *Ameiurus nebulosus*. When asked via email concerning *Ameiurus natalis*; he related that the structure should be similar. So now we have an electromagnetic receptor organ in *Ameiurus natalis* capable of receiving the electro impulses from their surroundings. In addition to the lateral line and the electroreceptors; *Ameiurus natalis* is covered in an estimated 200,000 taste buds. They use these multiple receptors to "taste" the water to locate and identify food in the murky depths. *Ameiurus natalis* can feel pressure differences in the surrounding water, receive electro impulses, and taste the water to find their prey, eat, and survive.

Survivability: *Ameiurus natalis* is the ultimate survivor. It has been known to inhabit some extremely polluted water with very low oxygen levels. It can withstand various extreme temperatures and can even bury itself in the mud of drying up ponds. All of this to sustain the species.

Ammonia poisoning is a direct threat to the health and wellbeing of any species, but *Ameiurus natalis* has the ability to withstand a higher amount of this poisoning than most other fish types. To start off was the water sample that I took when the specimens were captured. To put this into perspective: the perfect amount of ammonia in an aquatic environment should be zero. According to an article on Wikipedia trace amounts are acceptable for short periods. By using a standard aquarium testing kit; the ammonia content that these specimens are usually living in is 4 to 6 times what it should be. By living in an environment with such high ammonia content they are subject to a number of problems that would normally end their lives, but they thrive instead.

Extreme Temperatures: *Ameiurus natalis* has a normal temperature range of 41° to 77°F according to the PlanetCatfish factsheet, but the testing that I have done goes beyond those figures. In the Catfish Research Institute lab; *Ameiurus natalis* specimens have been subjected to extreme temperature variations that brings the low temp down to 34°F and the high was 97°F. Testing was completed once the specimens failed to show any interest in feeding.

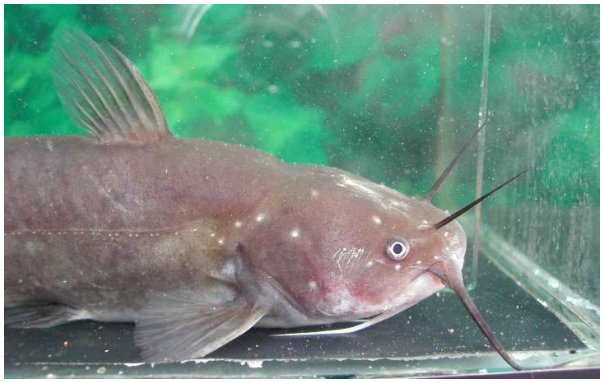
Oxygen deprivation: The best first-hand account for this occurred over in Central City, Kentucky. While searching for a suitable spot to cast a line; a man that was unknown to me asked me if I wanted an adult Mud Cat. It appears as though this specimen was caught a week earlier, put into a small cooler with a limited amount of water and was forgotten about. When the specimen was discovered a week later and the cooler was opened; it was still alive and recovered very well as I put him into my live well system. In the wild they are known to inhabit poorly oxygenated waters, but can they survive out of water. For several hours they can and do. I removed a 6-inch specimen from my tank, placed him in a basin with less than ¼ inch of water. After 8 solid hours of being basically out of water; the specimen was retrieved from the basin and recovered back in the tank.

Salinity: Even though *Ameiurus natalis* is a freshwater species, is it capable to surviving in a saltwater environment. To an extent the answer is yes. At the CRI lab a 10-gallon tank was set up with freshwater. After the dechlorinator was administered a specimen of *Ameiurus natalis* was allowed free roam. Every day; the tank would receive a small amount of Instant Ocean salt mixture. The specimen continued to thrive and eat until the salinity registered just below the range for normal saltwater. The literature says that it is intolerant of salinity, but then again per the experiment mentioned above proved that they could survive in at least brackish water.

Stunted Growth: How does one survive in population explosions, poor water quality, oxygen is low due to temperatures being high and Ammonia levels peaked? *Ameiurus natalis* has found a way according to Ross, 2001 and Murie *et al*., 2006. They simply stunt their growth. In the event of overcrowding the Yellow Bullhead can literally slow down their growth so that their fellows can still survive. In tests conducted at the CRI lab over a 2-year period; *Ameiurus natalis* has a variable growth rate. The eggs being laid and hatched at the same time has produced fingerlings that are not growing at the same speed. With this grouping; specimens after 2 years are from 2 inches to 4 inches being in a 75-gallon tank whereas the average would be 3 inches per year or 6 inches for the period of observation (2 years). They have all been fed the same diet of prepared shrimp pellets, worms, and small live minnows since they were born. By stunting their own growth; their survival percentage increases. Murie *et al*. goes on to conjecture that the stunted growth aids in the specimens living longer (up to 12 years instead of normal 8).

Hibernation: Imagine being in a pond that is slowly drying up. *Ameiurus natalis* survives by burying in the soft mud going into a type of hibernation until the water level rises. Talking about getting away from it all. Reports are that even in dried ponds being dug into; there have been specimens of *Ameiurus natalis* asleep in the soft moist mud whereas the other species have perished.

Conclusions: Throughout the lives of *Ameiurus natalis*; they undergo ridicule and shame as being a bottom feeder, scavenger, ugly, and worthless. This misunderstood Bullhead Catfish has taken this abuse and has overcome it as any warrior would. It can survive in the most austere environments, seek out prey using their radar system, inflict pain on their enemies by the strong lockable serrated fin spines and the venom at the base of those fin spines, and communicate warnings to their brethren to retreat with their fright reaction pheromones. There is a general consensus that when caught it would be better to cut the line than to deal with them. No fish other than sharks have been able to deliver the psychological impairments that *Ameiurus natalis* can. With these multiple attributes to survive it is no wonder it is AN AQUATIC WARRIOR.



Freshly imported *Ameiurus natalis*. Steve Grant.

Rare *Corydoras* imports from Rio Branco, Roraima, Brazil

Steve Grant

Corydoras crimmeni female, Rio Branco, Roraima, Brazil. Images by Manyork Chow unless stated otherwise

In 1997 I described two species of *Corydoras* from aquarium imports: *Corydoras crimmeni* and *Corydoras kanei* Grant, 1997 (further information in Grant, 2014).

Corydoras cf. *crimmeni* 'Rio Branco', adult female, non-type specimen, 1999 import. Steve Grant

Corydoras cf. *kanei* 'Rio Branco', non-type specimen, 1999 import. Steve Grant

The specimens were said to be from near the town of Boa Vista, Roraima State, Brazil, so possibly from the Rio Branco. Since the import of the type specimens in 1997 and then in 1999, the author has not seen any images or specimens of true *C. crimmeni* (despite some imports and internet photos claiming to be that species), and similarly, most if not all images of *C. kanei* have been C026 (Rondônia, Brazil) or C048 (Rio Guamá, Pará, Brazil).

Corydoras C048, Steve Grant

Corydoras C026. Hans-Georg Evers

Unfortunately, the Brazilian government are planning to damn the Rio Branco and one of its tributaries. It is very likely that this will have massive implications for species of that basin, and we may well find that it could extirpate some of them (Grant, 2021).

This makes it even more important to know whether these two species are endemic to the Rio Branco basin. In 2022 the aquarist Manyork Chow posted videos of some specimens imported into China, which were said to be from the Rio Branco, Brazil. These specimens match *C. crimmeni* and *C. kanei* so this is further evidence that those species are in fact from the Rio Branco. Apparently, some had also been imported into Japan and Hong Kong.

Corydoras crimmeni male, Rio Branco

Corydoras kanei female, Rio Branco

Corydoras kanei male, Rio Branco

Because of the threats to their habitat and their rarity in the hobby and in scientific collections, it would be beneficial if Manyork and anyone else who obtained specimens from this true import could breed and distribute them in the hobby.

References

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Descriptions of two new species of *Corydoras*, Lacepede, 1803 (Pisces, Siluriformes, Callichthyidae). The Aquarist and Pondkeeper v. 62 (no. 10) (for 1998): 41-45.

Grant, S., 2014.
Notes on *Corydoras kanei* and *C. crimmeni*. Journal of the Catfish Study Group, Volume 15, issue 3: Sept. 2014, 20-22.

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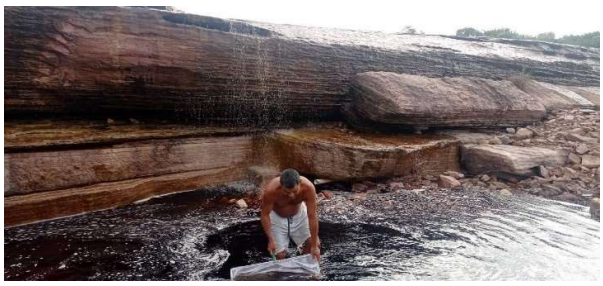
New and exciting first-time aquarium specimens from Northeast Region, Brazil

Steve Grant

Aspidoras psammatides. All photos by Hudson Crizanto Gonçalves unless otherwise stated

In June 2022, photos by Hudson Crizanto Gonçalves of some new and exciting first-time exports appeared on Facebook catfish groups. For some of the species it appears that it was the first time they have been photographed alive.

Ivan Silva



Ivan Silva

Hudson Crizanto Gonçalves (H&K Peixes ornamentais ltda) who is a partner in the project, provided the following text from Ivan Oliveira "Tanganyika Fish Farming with the objective of always bringing news to the world market, this time it went to the centre west of the state of Bahia in search of new species, in the tributaries of the Paraguaçu River, which has dark, acidic waters with very low conductivity at its headwaters. I (Ivan Oliveira), Marcos Venturieri

(company partner and creator) and the fisherman known as Naldo (Mr. João Batista) left the city of Aquiraz where the company is located in June 2022 and drove for more than 1300km to reach to collection points. Taking the collection authorizations to bring matrices to our aquaculture, issued by the Ministry of Agriculture and a professional fisherman with all the documentation to fish the species in the region that are authorised for fishing. Several of these species had never been photographed and placed in aquariums, from plecos such as *Hypostomus jaguar*, *Hypostomus chrysostiktos* [now in *Pterygoplichthys* Ed.], *Pareiorhaphis lophia*, *Parotocinclus adamanteus* and *Parotocinclus nandae*; Characids such as *Leporinus bahiensis*, *Astyanax hamatilis*, *Moenkhausia diamantina*, *Tetragonopterus franciscoensis* and *Characidium* cf. *bimaculatum*; Cichlids such as *Geophagus diamantinensis*; and catfish such as *Phenacorhamdia tenebrosa* and *Copionodon pecten*, and a much-desired species, *Aspidoras psammatides*. There were 5 days of travel in a total of almost 3000 km, very fruitful and tiring, with some fish collected in small quantities, which we took a while to find the correct place and which are not so abundant, but which deserve another trip to film and photograph their habitat and bring some more units."

Pareiorhaphis lophia Pereira & Zanata, 2014

Parotocinclus nandae Lehmann A., Camelier & Zanata, 2020

Parotocinclus adamanteus Pereira, A. Santos, de Pinna & Reis, 2019

Hypostomus francisci (Lütken, 1874)

Hypostomus lima (Lütken, 1874)

Hypostomus jaguar Zanata, Sardeiro & Zawadzki, 2013

Pterygoplichthys chrysostiktos (Birindelli, Zanata & Lima, 2007)

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