Journal of the Catfish Study Group

June 2017

Volume 18, Issue 2

The CSG thanks our sponsors for their generous support of the 2017 convention

Contents

Cover image: Convention 2017 speaker Luiz Tencatt admires *Corydoras eversi* at the event Photo: Andressa Figueiredo de Oliveira

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Editorial

Welcome to the second issue of the 2017 journal. Many thanks to all our sponsors, subscribers and – especially – our contributors.

The Summer issue includes reports on our recent convention and meeting held in conjunction with Wiltshire Plecos. I think it's great to see online groups getting together in person and plenty of young faces to pick up the baton. Mark Walters has done an amazing job leading your committee through the dangerous waters of convention planning and serving another top-class event to those of you lucky enough to attend.

You will be pleased to know arrangements are underway and speakers are booked for the 2018 event. Mark has also given us his take on the lazer corys – definitely a group I need to look closer at. Steve Grant has come across a possible case of mistaken identity in *Loricariichthys* and I invite you into my fishroom with an article on creating the ideal conditions for algal growth.

As always, welcome to our new subscribers and members. I hope you find something new and interesting in these pages, and that you recommend us to your friends and colleagues.

Michael

editor@catfishstudygroup.org

Chairman's report

The Catfish Study Group went back on the road in May, to promote itself beyond the grasp of its historic homelands of northwest England. I had been in conversation with the founders of the Wiltshire Pleco Facebook group for a number of years, with the possibility of hosting a club event in the southwest, capturing the M4 corridor and south coast. It is apparent that the area is a hotbed for fishkeeping and seems to have a much higher than normal population of loricariid keepers, especially *Hypancistrus*.

I recall in the days of websites such as 'Pleco Planet', that Bristol and Bath seemed to be a mecca for *Hypancistrus* keepers and breeders, and much of the UK success stories seemed to stem from that region. The tradition has persisted and Nick Ridout and Bean Smith (CSG convention regulars) have done a fantastic job in promoting the hobby in the area, especially with their plecos. In addition to the Facebook group, the Wiltshire Pleco team have held a number of hugely successful 'club' meetings, bringing members together to hear talks and exchange their fish.

In this digital age, and as traditional clubs seem to be on the decline, the emergence of online aquatic communities has been a natural evolution. I am a 'member' of a dozen or so Facebook groups, with varying degrees of specialism in different areas of the catfish hobby, and know which one to turn to to contact certain people for advice or a particular purpose. Of course, I save most of my own posting to the CSG Facebook group to support the club and promote its content. The CSG has moved with the times and relies less on its own website, other than for static information, utilising social media as a more active means of communication with its members.

The main downside of this system is the 'here-and-now' nature of Facebook and the difficulty of archiving the information posted there. The upside is that so many people are plugged into social media on a 24/7 basis, that information keeps coming back as needed, usually updated with the latest findings or thoughts. Of course, the advice is only as good as the people who provide it.

For more reliable information, I still refer to more static sources including websites like Planet Catfish and books and publications, including the CSG Journal of course! This also extends to face-to-face interaction with other

fish-keepers through club events, which is why the extension from a Facebook group to a club meet is so appealing to so many. Traditional club meetings are not for everyone, especially younger hobbyists it seems, who quite understandably seem to acquire much of their information on-line rather than in person. Club meetings can be an intimidating environment, with impenetrable groups of seemingly unapproachable skilled (and usually much older) aquarists. But, there is a lot to be gained from meeting real human beings, not least to improve confidence, social skills and to spread your reputation amongst other people – ultimately to make new contacts and build friendships.

The mix of social media groups and informal club-meets seems to provide a great compromise for younger fish-keepers, who can participate on their terms and enrich their relationships that have developed on-line.

The joint CSG-Wiltshre Plecos event in May demonstrated the value of such events to bring younger aquarists together, with a greater cross-section of fish-keepers than usually seen at CSG club meetings, for example. After the success of a similar event in Scotland last autumn, club Secretary Julian Dignall and I were happy to travel 'down South' to present our experiences with loricariids, through breeding in my case, and Brazilian exploration in the Rio Xingu for Jools. The event was hosted by Maidenhead Aquatics in the town of Melksham, and we were made to feel extremely welcome by the proprietor James Gulliver. In addition to the talks, the Wiltshire team had arranged other attractions including breeder sales, a tank furnishing demo, raffle as well as lavish refreshments! James ensured his shop had plenty of nice catfish in stock too.

I counted around 50 attendees for the talks, which is a fantastic turn-out. People were surprised that a couple of guys had even travelled down from Yorkshire! From 10am through 'till after 4pm, members were chatting fish, listening to the talks, buying fish and travelled from the Midlands, Cornwall, Devon and from across the south of England. I enjoyed

interacting with people they usually communicated with only on-line. Jools and I felt very welcome and well-catered for, considering our collective round trips of over 1200 miles!

The meeting was enhanced by the outdoor feel of the marquee, in which the talks were held, and of course hosting the event within a shop – which led to conversations around the tanks and with the staff. A sea-change from the feel of traditional fish-club meetings held in community halls – which are certainly an intimidating and unfamiliar environment for many aquarists. I hope that through such events the CSG can promote its work to a wider section of the fish-keeping community, continue to provide aquatic entertainment and information, and encourage the next generation of fishkeepers to further the study of catfish!

Mark

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Confessions of a lazy aquarist: the guilty pleasure of an algal turf scrubber

By Michael Hardman

Juvenile *Sturisoma* sp. feeding on fresh-grown algae in the aquarium. Photo: M. Hardman

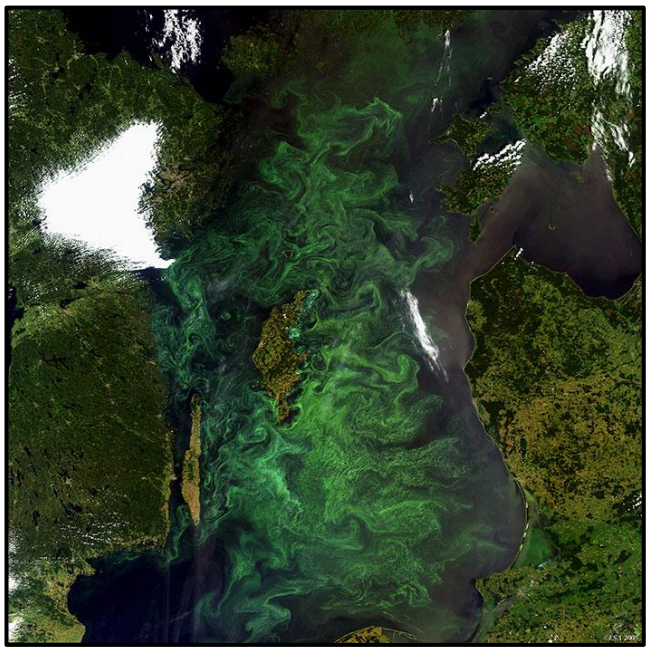
There are some CSG members that have accused me, not without reason, of being a lazy aquarist. I accept that large and frequent water changes are good for aquarium health, but the regime has always struck me as a waste of water. Furthermore, I wonder to what extent it stresses the fish to suddenly change the chemistry of their environment and upset any biological balance that may be in place. I know plenty of aquarists that have had created problems or lost fish as a result of over-zealous aquarium hygiene (myself included). But I also know lots of others that swear by them, especially when triggering their fish to spawn.

So as not to waste it, I used to siphon the old aquarium water onto the garden, especially in dry summers. But it was a long and boring job of moving the hose between plants and among the 50-or so aquaria I had at the time before refilling them and flooding the fish room.

As we all know, we change water to dilute the waste products that accumulate in the aquarium as a consequence of the nitrogen cycle. We are told that excess nitrates, phosphates and other stable organic compounds have a negative effect on fish health and must be removed from the aquarium.

Aquatic ecologists and environmental engineers deal with the same problem in natural settings too. Much of the fertilizer applied to agricultural land dissolves in water and eventually makes its way into streams, rivers and oceans where the nutrients (again nitrates and phosphates) cause havoc by overstimulating algal growth that upsets the natural balance in ecological systems.

For example, excess nutrients in the Baltic Sea cause blooms of cyanobacteria (or blue-green algae) every year. In addition to producing toxic compounds, these blooms can have serious and lasting consequences on aquatic systems if they occur too often or for too long. Such blooms occur because these organisms grow and reproduce rapidly when suitable conditions exist; in this case lots of nutrients and adequate light in water of a suitable temperature. It struck me that this environment exists in most of my aquaria, and if I could harness the algae to consume the excess nitrates and phosphates in my tanks, I could cut out some water changing



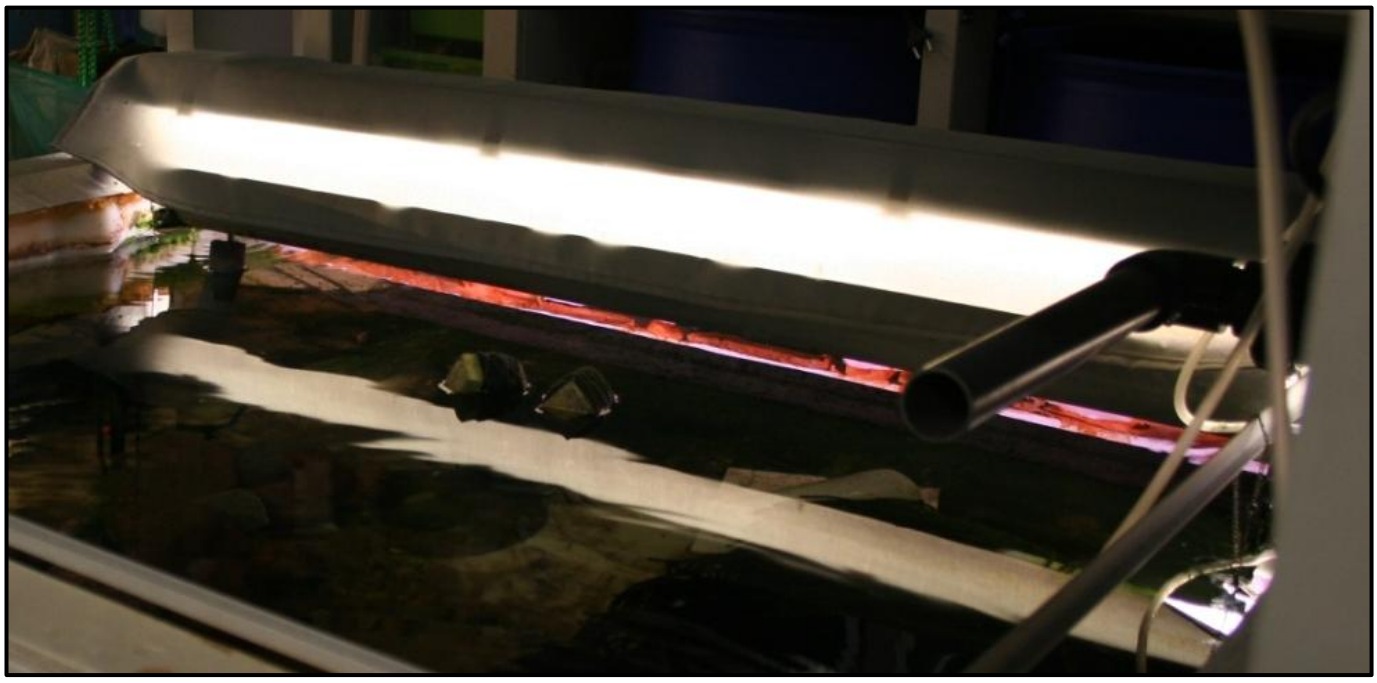
Algal blooms in the Baltic Sea (green swirls in centre of the image), as captured by Envisat. Photo: European Space Agency.

and maybe grow some fresh greens for my plecos at the same time.

Pretty much *all* of my good ideas have been had by someone else before, and after a short amount of time on-line I came across the amazing work in this area done by Dr. Walter Adey, a botanist at the Smithsonian Institution and pioneer of the "algal turf scrubber" (ATS), as he called it. ATS is a way of removing excess nutrients from fresh, brackish and saltwater by turning them into algae and periodically harvesting the algae to export the nutrients. In 2011, Dr. Adey and Karen Loveland published "*Dynamic aquaria: building living ecosystems*." This book is a must have for those keeping reef aquaria, and it quickly became a favourite on my bookshelf. *Dynamic aquaria* provides a complete explanation of how natural processes can be simulated in the aquarium, and if you're tired of cleaning filters and sucking siphon tubes, I highly recommend this book.

Armed with the information provided by Adey & Loveland (2011), I set about designing my own ATS. In addition to being lazy, I'm also really cheap and I spend a lot of time unnecessarily recycling or repurposing things. My ATS was made from an aluminium light reflector, four stainless steel kitchen S-hooks from a well-known Swedish home-furnishing store, a box of surplus tiles, some PVC pipe, and a workshop fluorescent light fixture.

The principle is simple enough: run a shallow layer of water continuously across a surface and flood it with light of a wavelength suitable for plant growth. Nutrients will then be absorbed by



Algal turf scrubber installed in a 150L tropical pool. Photo: M. Hardman

the growing algae and removed from the aquarium water. Nutrient absorption peaks in the early and middle stages of algal growth, so algae must be cropped regularly to maintain this phase indefinitely.

Adey & Loveland (2011) used removable plastic mats as a medium on which the algal turf could grow. They explained how the algal-covered mats needed to be washed every few days or so in order to keep the algae in the growth stage when it is most effective at absorbing nitrates and phosphates.

This seemed like a lot of work to me, and I have lots of plecos, whiptails and other fishes that would thank me for feeding them fresh algae. Rather than a mat system, I opted for a series of 10×10cm light-coloured ceramic floor tiles with a rough finish. I reasoned that these would show the algal growth, stay in place, and give me an easy way to remove the algae and feed it to my catfishes.

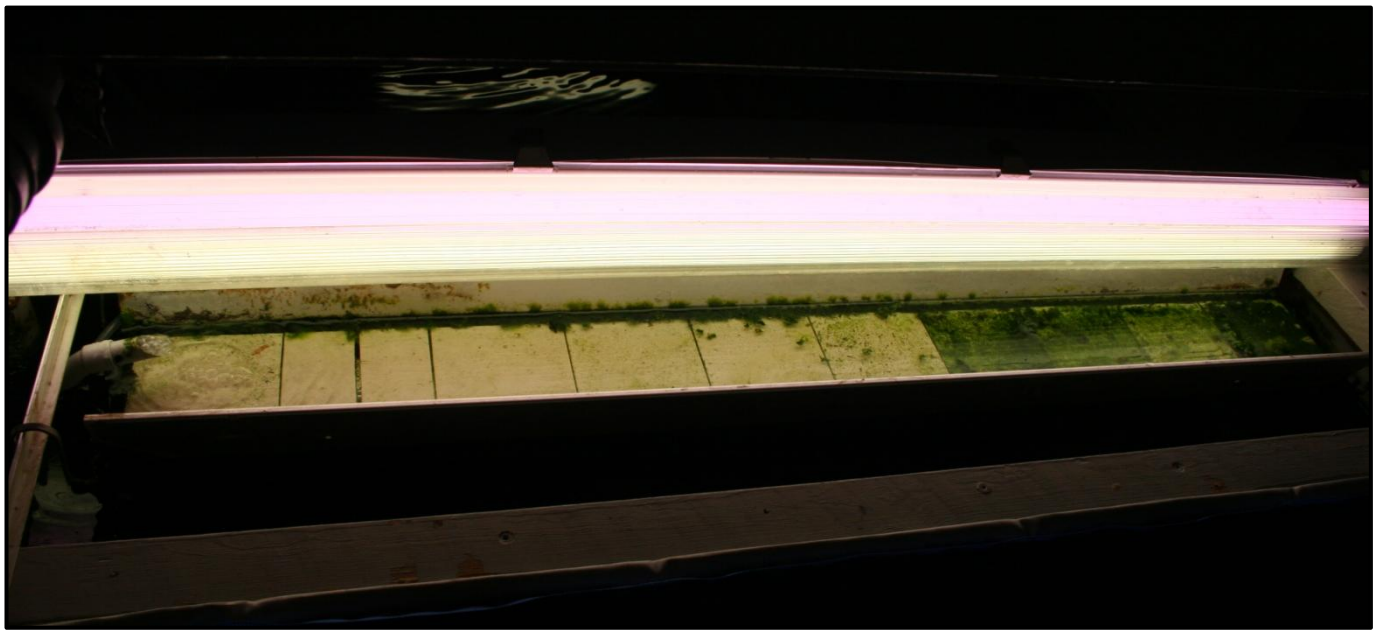
The light unit is an inexpensive workshop light containing 2x38W fluorescent lamps (one daylight, one gro-lux) controlled by a timer to be on 14 hours a day. The light unit was suspended directly above the algal plates and a curtain of reflective cloth was placed over the unit to reduce light spill and maintain strong illumination of the algal plates.

A small air-powered uplift tube was then installed and adjusted to supply a suitable amount of aquarium water to the high end of the aluminium trough, which had been modified at both ends to hold approximately 10mm of water depth. The trough was suspended with a fall of approximately 5mm over 1.2m. This was enough for a thin (2-3mm) layer of water to flow across the surface of the tiles and enjoy full light penetration; ideal conditions for algal growth.

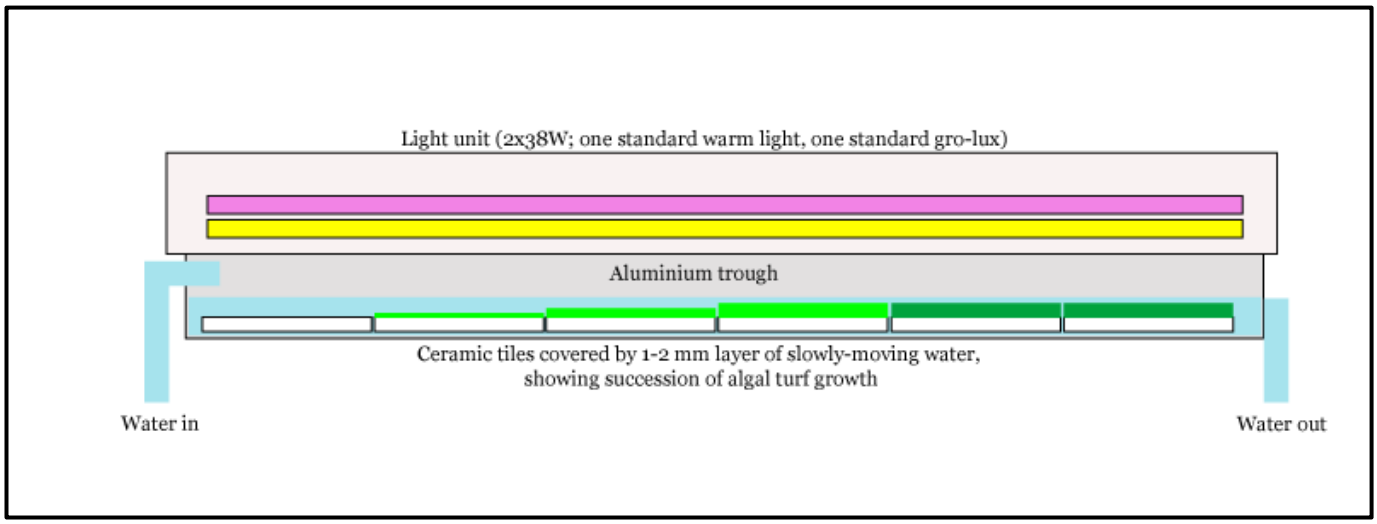
That's about it. Most aquaria have algal spores in them, even if they don't have heavy growth and I was delighted to soon see a greenish tinge developing on the surface of the tiles, and within a few days that tinge became a lush lawn of algae.

Having a series of tiles means that I could remove those with a full covering of algae for feeding to the fish and slide the rest down ready to receive the tile at the start of the series after it had been cleaned off. It is possible that the natural feeding action of plecos stimulates the algae that remains on the tile to grow back even more vigorously when returned to the trough.

After several weeks of this, I began noticing copepods, enchytraeids, gamarrids and young *Neocardina* shrimp living among and underneath the tiles in this fish-free environment.



Algal turf scrubber with curtain removed and light unit raised to show uplift tube (left) and series of 10×10cm ceramic tiles used as a substrate for algal growth. Tiles to the left have recently been returned to the trough, those to the right (3-5 days in the trough) support strong algal growth and are ready for feeding. Photo: M. Hardman



Schematic illustration of a simple algal turf scrubber.

I don't have any precise instruments to measure how effective my scrubber is at removing dissolved nutrients, but the 150L tropical pond on which it was installed was among the most stable, productive and self-sustaining systems I have ever kept. Livebearers often gathered around the outlet, presumably hoping for a few copepods or small shrimp to be washed out.

I fed the algal plates to all my fish, and they all loved it. I found the plates especially useful as a first food for *Sturisoma*, *Farlowella* and (of course) *Ancistrus* fry and also as a natural food to entice newly-imported fish to start feeding. I fed algal plates to a small group of *Lamontichthys llanero* as a base and slowly weaned them onto gel foods and eventually tablets and flakes. And they grew!

I wouldn't consider my design in any way optimized, but it worked and I consider it a success. If I were to build a new one, I would probably do it much larger and use LED grow-lamps or perhaps rely on a natural light source. We have plans to build a greenhouse later this year – but I have a feeling it might be better at growing algae than tomatoes.

Lamontichthys llanero in the aquarium. Photo: M. Hardman

The enigmatic *Loricariichthys hauxwelli* Fowler, 1915 (Siluriformes: Loricariidae).

By Steve Grant

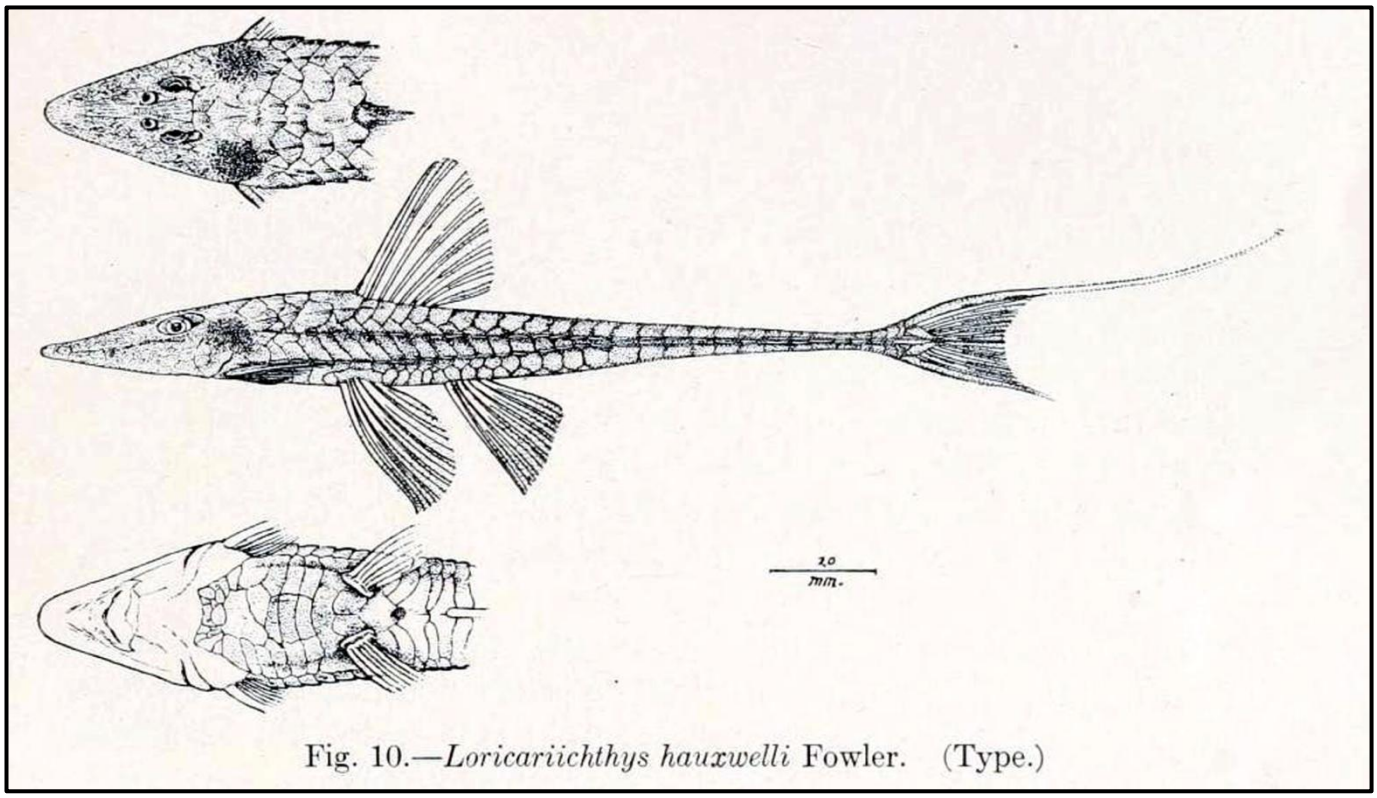


Fig. 10.—*Loricariichthys hauxwelli* Fowler. (Type.)

Fig. 1. Illustration of holotype of *Loricariichthys hauxwelli* Fowler 1915.

Whilst trying to identify a species of *Loricariichthys* from Rio Putumayo, Colombia I came across the description of *Loricariichthys hauxwelli* Fowler 1915. It became immediately obvious that *L. hauxwelli* is not a species of *Loricariichthys*.

Original description

Fowler's description includes a lateral figure with a dorsal and ventral view of the anterior portion of the head and body (fig. 1). This has proven important as the holotype and only known specimen is badly damaged (fig. 2).

Generic placement

Anyone familiar with *Loricariichthys* will know that the holotype does not correspond with other members of that genus. Daniel Konn-Vetterlein, Richard Smith and I caught *Loricariichthys platymetapon* in Bolivia (fig. 3) and that genus has a large rounded head in dorsal view, and a perfect elliptical area of abdominal plates at the level of the pectoral girdle (fig 4, reproduced from Covain & Fisch-Muller, 2007). Both of these are absent in *L. hauxwelli* as it has a triangular and more extended head in dorsal view and the abdominal plates at the level of the pectoral girdle are angular with a depression in the anterior edge (see fig 1).

Despite these apparent differences, it has been retained in *Loricariichthys* by Isbrücker (1980) and Ferraris in Reis *et al.* (2003).

According to the taxonomic key in Covain & Fisch-Muller (2007), *L. hauxwelli* does not fall into any of the listed genera.

The combination of a triangular head shape, short lips with no filaments and smooth surfaces, short and feeble pectoral fins, relatively few and large abdominal plates, dorsal fin inserted posterior to ventral fin insertion and low body profile does not fit into any known genus. The morphology is reminiscent of

Fig. 2. Current state of holotype of *Loricariichthys hauxwelli* Fowler 1915 (ANSP 8301). Photos: Kyle Luckenbill (ACSI type image database)

Sturisomatichthys leightoni (Regan, 1912) and some species of *Rineloricaria* Bleeker. 1862.

Loricariichthys hauxwelli differs from *Sturisomatichthys leightoni* by the shorter and more feeble pectoral-fin spines, and differing cranial and snout plates in the former.

Loricariichthys hauxwelli appears closer to *Rineloricaria* according to the key of Covain & Fisch-Muller (2007) as it has a non-circular mouth, deep post orbital notches, abdomen plates imperfectly arranged in rows, and pronounced pre-dorsal keels (fig. 5, reproduced from Covain & Fisch-Muller, 2007). The pectoral-fin spines on *L. hauxwelli* are feeble and short but this could be explained if the holotype represents a female specimen.

Until further investigation is completed of preserved material, I suggest that the species should tentatively be placed in *Rineloricaria* and

Fig. 3. Lectotype of *Loricariichthys maculatus* (Bloch 1794) (ZMB 3163). Photos: Mark Allen (ACSI type image database)

therefore referred to as *Rineloricaria hauxwelli* (Fowler, 1915).

Acknowledgments

Many thanks to Raphael Covain for permission to reproduce copyrighted images published in Covain and Fisch-Muller (2007), and ACSI photographers Kyle Luckenbill and Mark Allen.

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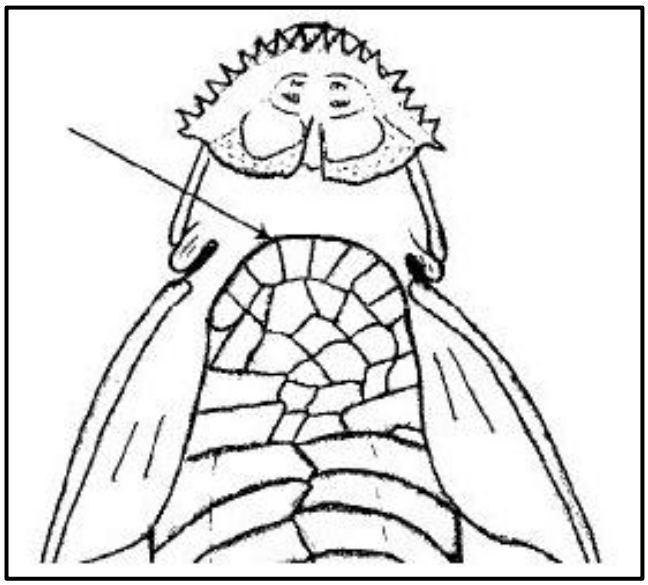


Fig. 4. Illustration of elliptical plate series typical of *Loricariichthys* according to Covain and Fisch-Muller (2007). Reproduced with permission, copyrighted material all rights reserved.

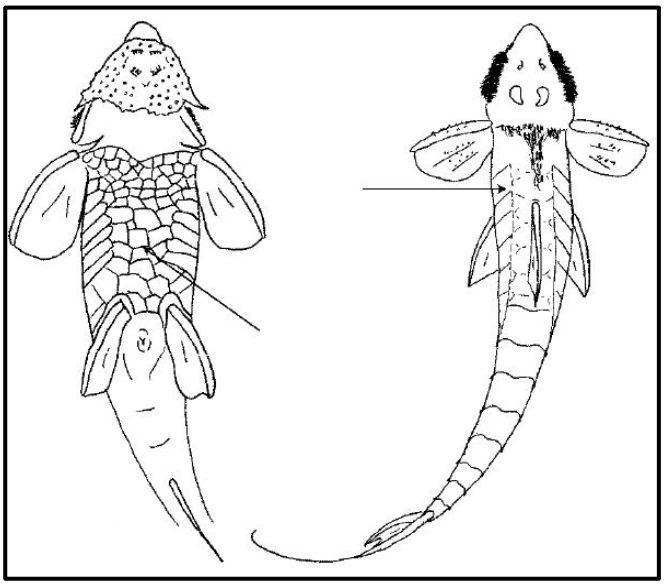


Fig. 5. Illustrations of imperfect plate series and predorsal keels typical of *Rineloricaria* according to Covain and Fisch-Muller (2007). Reproduced with permission, copyrighted material all rights reserved.

Report on the 2017 Convention

By Mark Walters

2017 Convention speakers. Left to right: Pete Liptrot (UK), Jacqueline Heijmen Bennett-Leaver (Netherlands), Peter Petersen (Denmark), Hans-Georg Evers (Germany), Melanie Stiassny (USA), Luiz Tencatt (Brazil) and Andreas Tanke (Germany). Photo: Andressa Figueiredo de Oliveira

I've been a member of several fish clubs over the last 30-odd years that have followed similar formats with their activities based around monthly talks, table-top shows and auctions. They all had the same underlying ethos to bring like-minded enthusiasts together to share their knowledge and learn from their friends and colleagues. As a young aquarist, this provided an invaluable learning experience but as my knowledge increased I needed to expand my horizons.

Membership of the Catfish Study Group in 2005 certainly provided this extra dimension to my hobby with a new bunch of friends from across the country (it was still a UK-based club back then) who knew a lot more about catfish keeping than I did. At the same time, social media and web-based resources were filling other knowledge gaps with a wealth of information to be found at my finger tips, plus the ability to communicate across the world with fellow fishkeepers who shared a passion for catfishes.

Shortly after joining the CSG, I attended my first convention as a day delegate, and enjoyed interacting with many overseas fishkeepers I had been in touch with on-line. I also enjoyed interacting with people for whom the study of fish was a profession and realised there was another thread to the hobby I hadn't previously explored – sharing our amateur insights into fish behaviour with scientists who actually took an interest in what we were doing!

Over the next ten years I immersed myself in the club through various committee positions, providing great opportunities to increase my network across the hobby and science, fulfilling everything I could possibly get out of the hobby, whilst having a career as an environmental biologist and raising a family.

Twelve CSG conventions later and I find myself with the shared responsibility of CSG Chairman and Convention Manager. Despite a supportive and hard- working committee, I couldn't help but feel the pressure to ensure the 2017 Convention was delivered as professionally as possible, keeping nearly 80 delegates as entertained, comfortable and informed as I had been over previous years. Thankfully, I received a comprehensive handover from our previous

Corydoras cf. *urucu*. Photo: Andressa Figueiredo de Oliveira

Convention Manager, Ian Fuller, who had developed a successful formula to build on. Speakers had been booked almost two years in advance and it didn't take too much persuading to fill the final speaker slots over the course of my first year in charge.

Nevertheless, delivery of any convention requires an immense amount of planning, preparation and execution, with reputations and CSG funds at stake. Most of our committee meetings focussed on event planning with a fair number of difficult decisions to be made, mainly to control the spiralling costs of serving this event! In addition, we needed to ensure IT was managed effectively, merchandise arranged, sponsors secured, display tanks assembled, speakers catered for and, of course, delegate requirements met as professionally as possible.

The preparation also provides a great opportunity to engage with our members, particularly through social media. At every available opportunity, the committee launched new information about the Convention including attendees, speaker talks and merchandise, providing a vehicle for social interaction with our members and discussion about catfish. The spin-off electronic interaction is almost as valuable as the face-to-face meetings, and is a natural consequence of having an event to look forward to.

As I write, I am looking forward to a CSG event in southwest England, which has generated a huge amount of interest in the club on social media. Other CSG events have a similar outcome, which usual results in more members and more catfish discussion!

All of this planning ensured delivery of the convention was as straightforward as possible, notwithstanding the set-up of the event and ensuring speakers were collected from airports and made it to the fantastic hotel. Finally, by 7pm on the Friday, with pint-in-hand we were ready to start with the usual welcome dinner.

Arriving early (Thursday in my case), gives plenty of time to meet and greet all of my friends from across the world, and of course to welcome speakers to the CSG. This year saw two speakers for whom it was their first CSG Convention, and a further three for whom it was their first time presenting to the group. For three of them it was their first time presenting a talk in English.

Realising the efforts these guys had gone to in

Home of the CSG convention for the past few years, The MacDonald Kilhey Court in Standish. Photo: Andressa Figueiredo de Oliveira

Ready for anything; your hard-working CSG committee. Left to right: Mark Walters, Julian Dignall, Brian Walsh, Ann Blundell and Danny Blundell. Photo: Andressa Figueiredo de Oliveira

preparation of the event, travelling thousands of miles and presenting in a foreign language to a bunch of catfish geeks, for the sake of their travel costs and a bed for the weekend put things into perspective!

Our resident IT guru and CSG Secretary Julian Dignall was put through his paces from the off, with a challenge to transfer the presentation of our after-dinner speaker **Pete Liptrot** from his mobile phone to a suitable laptop! The audience had no idea of the technical goings-on in the bar during dinner, which resembled the Apollo 13 attempt to return to Earth with a toolbox of rusty spanners.

A similar challenge was presented on Saturday night with our first presentation delivered from the Cloud, which left Jools in a permanent state of panic in case the Wifi connection failed. In all cases, Jools pulled out all the stops and ensured talks were delivered without a hitch.

The after dinner talks have always presented a great opportunity for audience participation and a bit of humour. I was so pleased Pete agreed to fill our Friday-night live slot, renowned as he is for his dry sense of humour and wit. He also manages one of the of the best public aquaria in the UK and his tour of the Bolton Museum Aquarium, behind-the–scenes expose and student recruitment policies were both educational and highly entertaining.

Pete was joined on the rostrum by our other speakers who received presentations of catfish carvings, club badges and the annual Convention T-shirt with the 2017 *Batasio fluviatilis* logo. Brian Walsh has for countless years spent many nights in his workshop prior to the Convention creating masterpiece carvings for our speakers. Brian produced *Corydoras* CW049, *Parauchenoglanis guttatus* and *Platynematicthys notatus* for our new speakers, and beatiful *Batasio* plaques for our returning and evening speakers.

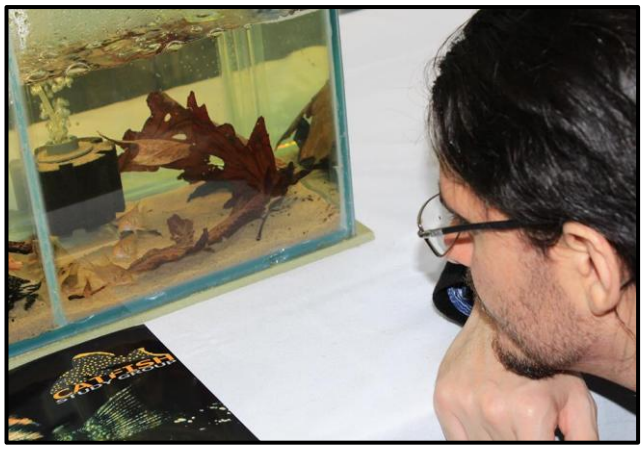
An early rise on Saturday to check our show and sales tanks and help set up additional sponsor displays, prior to the usual relaxed morning of greeting day delegates and photography of the rare species on display.

The Saturday also provides the best opportunity to visit some of our local sponsors; Pier Aquatics and Aqualife – each a short car journey away. It was great to see our delegates with transport helping out with shuttle runs, with the added benefit of sharing their journeys with some of the best aquarists in the world!

Back to base on Saturday afternoon, and back to our busy schedule of talks. First up was the much-awaited **Luiz Tencatt,** a Brazillian ichthyologist who has been very active with the CSG for the last couple of years through articles in the journal and sharing his Corydoradinae research through our Facebook group, which has included the description of a number of new species. I started transcribing Luiz's talk, but got drawn into other activities and ultimately managed not to save my laptop notes! In any case, I think if you want to know what our speakers have to say you need to attend the Convention!

Luiz Tencatt in full flow. Photo: Andressa Figueiredo de Oliveira

We try to get as much value out of speakers as possible, especially those who travel the furthest! So Luiz presented two fact-filled talks including his announcement that two *Corydoras* species will soon be described in honour of CSG members! Luiz attended the event with his partner Andressa, and they took the opportunity after the event to spend a week at the British Natural History Museum in London examining specimens behind the scenes, including Andressa's much loved leaf-hopping insects!



Lots of rare catfishes on display and available for sale. Photo: Andressa Figueiredo de Oliveira

Our second double-header speaker joined us from the American Museum of Natural History in New York City. **Melanie Stiassny** delivered two fascinating talks with full video and sound effects of her experiences in West Africa studying the fishes of the Lower Congo. The much anticipated talks were met with lots of positive feed-back from delegates. Melanie and her partner Jackie fully immersed themselves in the convention and clearly enjoyed the experience to share their knowledge with the catfish crowd.

To compliment Pete's talk on Bolton Aquarium, the CSG was pleased to welcome Convention regular **Peter Petersen** to present his experiences managing one of the largest public aquaria in Europe. Peter has overseen a massive investment and construction project in Copenhagen, resulting in a breath-taking architectural and scientific institution. Everything seems to be done on a massive scale with swimming-pool size aquaria simulating natural environments, resulting in livestock room to exhibit a full range of their behaviour. The breeding successes are incredible, although Peter takes the results in his stride modestly admitting he does little to encourage spawning.

We managed to squeeze another two talks into Saturday evening, traditionally our aquarist slot. This year we were privileged to have **Jacqueline Heijmen-Bennett Leaver** accept our invitation to give her first public lecture. Jac is well known in CSG circles and has had incredible success encouraging tough plecos to spawn.

Amongst her most recent achievements has been the breeding of *Panaqolus albivermis* – the 'flash panaque' or L204. Although commonly kept, I am only aware of two successful spawnings in the last 10 years. Jac's perseverance and dedication is a lesson to anyone attempting to encourage difficult species to reproduce in captivity.

After a massive sigh of relief that the wi-fi was holding, Mr. *Panaqolus* himself – **Andreas Tanke** took up the baton for a journey across South America, or more specifically the locations he had visited to see his precious dwarf wood-munchers in their wild habitats.

Andi provided lots of useful information for hobbyists, including the advice to not read too much into parameters published in aquatic books as a de-facto chemistry to adhere to. A case in point being the *P. albivermis* commonly referred to as recorded from alkaline waters (from a single collection recording), but not necessarily a condition they enjoy for prolonged periods.

Saturday night is time for everyone to let their hair down and enjoy the social side of the Convention, where only fish-geeks understand what the conversation is about! It is here where you realise that there are plenty of other people

Local aquatics retailers and convention sponsors such as Pier Aquatics and Aqualife import some amazing fish for sale over the convention weekend. Photo: Andressa Figueiredo de Oliveira

just like you, who not only spend most of their waking hours elbow deep in warm water, but also have an acute understanding of the existence and biology of species ignored by 99.9% of the human population (until the effects of the bar kick-in!).

A change in the itinerary for 2017, saw three talks on Sunday to enable an earlier finish and more time to visit shops on the way home. We also introduced our joint-most-regular speaker **Hans-Georg Evers**. This was Hans's 6th talk in 15 years to the CSG and another brand-new and extremely informative topic – biotopes of Loricariidae, to get us up early on Sunday morning.

After the second talks from Melanie and Luiz, the Convention was brought to a close, thanks given to all involved and the process of clearing out of the hotel started! Another year, another hugely successful CSG Convention. See you all in 2018!

CASTLEFORD CATFISH STUDY GROUP AQUARIST SOCIETY

Your next chance to meet up with fellow CSG members is on **Sunday 9 July** at the Castleford AS Catfish and Loach Show and Auction. Lock Lane Centre, Back William Street, Castleford WF10 2LW (12:30-17:30)

Lot reservations and more information on 0783 340 0924

The laser corys

By Mark Walters

Juvenile Green laser corys (*Corydoras* sp. CW009). Photo: M. Walters

I often spend time reflecting on why I do this, that or the other in relation to the benefit I get from whatever it is I'm doing. A case-in-point is writing articles for the Catfish Study Group Journal.

I could spend an equal amount of time writing for book-stand publications and get paid for the hard work I put in, or I could make some idle rambling posts of my experiences on social media to be lost after a few days (which I often do anyway) or I could keep my thoughts to myself and not bother committing anything to print.

Instead, I choose to take the time, research and think a little bit harder about some of the things that interest me, not for personal gain but to make a genuine contribution to the wealth of knowledge already committed to print for eternity, and support the CSG!

In the case of this article, I am writing in order to try and better understand for myself the complexity of a related group of Corydoradinae catfish which started to emerge in the hobby around 20 years ago. My eagerness to find out more was as a result of acquiring a new group of fish from Hans-Georg Evers at the 2017 CSG Convention.

The group of fish were presented in the cory 'bible' - *Identifying Corydoradinae Catfish* (Fuller & Evers, 2005), as being closely related to *C. melanotaenia* in body shape if nothing else. Hailing from Peru, these fish shared a striking characteristic of an iridescent or almost metallic pair of stripes (or lasers) running from behind the head to the caudal peduncle. At least three forms were identified at the time by their stripe colour – green, orange and red.

Corydoras melanotaenia. Photo: M. Walters

Ten years earlier, the same species were catalogued in the Corydoras Aqualog (1996),

although surprisingly they weren't subsequently assigned 'C' numbers. At the time, I recall aquarists who couldn't quite believe that these new forms were wild caught and not the consequence of dye injection or being otherwise man-made. Maybe this was a reason for them to escape the attention of serious aquarists.

Confusion

Although at least two dozen new species of Corydoradinae have been described over the last 10 years, the 'laser' *Corydoras* have not enjoyed much attention from ichthyologists, which adds to the confusion often experienced by aquarists in trying to decide if their fish are gold-, orange-, red-, green- or blue-laser corys. To have some reference material from reliable and precise localities would no doubt help. Unfortunately, locality information is usually restricted to vague descriptors such as 'Peru', no doubt protecting the catch locations from rival exporters.

In my experience, the greatest confusion has arisen with the orange and red forms, rather than the gold and green lasers occasionally available in the hobby.

The first supplement to *Identifying Corydoradinae Catfish* (Fuller & Evers, 2010) helps to separate the types through the CW coding system introduced by Ian Fuller in the late 2000's, although some questions remain.

Laser diversity

In my opinion, there are three distinct laser corys which correspond to available codes (CW009, CW010, and CW023) and common names (lowercase).

CW009 – green laser cory

Corydoras sp. CW009, green laser. Photo: S. Grant.

Sometimes referred to as 'Peru green stripe', as the common-name implies the first form has a distinctive metallic green laser. Selective breeding in the last few years has revealed the variability in this form and its propensity to generate new colour forms. Green lasers are probably the most desirable of the three main forms and wild-caught fish of this phenotype are readily available.

It is surprising that there are not more captive-bred green lasers in the hobby, considering their appeal and needs. I have maintained a few breeding groups and raised hundreds of youngsters that more than satisfy the local demand for these fish – another failed get-rich-quick scheme!

Corydoras sp. CW009, blue laser. Photo: M. Walters.

Captive breeding has led to some variations in colour form being established and a 'blue laser' form has been made available through Ian Fuller's efforts with the species.

CW010 – gold laser cory

Corydoras sp. CW010, gold laser. Photo: S. Grant.

The next species is the gold laser, with a solid gold/orange stripe. In certain light, these could be confused with the green laser cory and juveniles of both species are very similar in appearance.

A new albino form of CW010 has also been seen recently in the hobby, another indication of the selective taking place with this group.

Depending on the substrate the fish live on, and perhaps influenced by diet, the CW010 can vary in the intensity of the gold laser which can range from yellow through to approaching the red laser types. I have seen CW010 sold as red

lasers, but they soon revert to gold once they are housed on lighter substrates such as sand.

Subadult *Corydoras* sp. CW010, gold laser. Photo: S. Grant.

CW023 – orange stripe cory

Corydoras sp. CW023, orange stripe. Photo: M. Walters.

As a consequence of the dorsal stripe being more similar to the base colour, orange forms have less contrast which has prevented them from receiving the 'laser' moniker. As a result, when first documented in their book, Fuller and Evers preferred to name the fish "orange stripe", rather than "orange laser". The fish seems to be less desirable in the hobby compared to CW009/010.

CW023 – red laser cory

Corydoras sp. CW023, red laser. Photo: S. Grant.

I picked up a spawning group of this type at the 2017 CSG Convention and began looking into laser corys to try and unravel some of the confusion. In one of the sales tanks was a group of *Corydoras* which could only be described as gob-smacking! Obviously belonging to the 'laser' group, but with the most intense red stripe I had seen on any of the forms. Indeed, the body also exhibits strong red pigmentation, unlike many other Corydoradinae species.

The group had been brought to the UK by Hans-Georg Evers, and after a short deliberation I decided they would be coming home with me. Not cheap, but not an opportunity to be missed either. Hans gave me the back-story on the group of fish – they were F2 from parent fish selected from a breeding group of wild orange stripe CW023. Out of the hundreds of eggs produced by the wild fish, a few offspring were more red than their siblings and were raised separately. These fish were then line-bred to produce the red laser CW023.

Corydoras sp. CW023, red laser, six week-old juvenile. Photo: M. Walters.

Similar to Ian's experience with the blue lasers, this represents another example of a variant being selectively bred and fixed. It is not known if any external factors were responsible for this genetic change or if there is high natural variation in the species, resulting in a small number of colour morphs being produced which might be naturally predated as a result of standing out from the crowd. Albinism is a another example of natural chromatic variation which usually isn't sustained due to the animals losing much of their camouflage ability to conceal themselves from predators.

Whatever the reason, I was now the proud owner of six adult CW023 red lasers, and two days after moving to their new home they were spawning like crazy. In fact, I had new spawns every day for five days, leading me to conclude my group was female heavy! The poor male had a job keeping up with the activity and could be part of the reason for the relatively low hatch rate. To date, I have raised a small shoal of juvenile red lasers, although I will need to wait

and see if they exhibit the same intense colouration of the adults.

CW014 – red stripe cory

Corydoras sp. CW014, red stripe. Photo: S. Grant.

Now this is where, in my limited understanding, it starts to get a bit messy. Despite reviewing lots of images and online discussion threads, I'm not sure if this fish represents a separate form or is actually one of the other forms exhibiting more red pigment than usual. I'm not going to speculate on what the species is actually represented by in the hobby, but certainly haven't seen any of the thousands of bags of *Corydoras* I have sold as an auctioneer described as CW014, or indeed those available in shop tanks.

If it was, or had been available as a distinct species, I would have expected it would be well established in the hobby by now, considering its desirable credentials.

I note that Ian Fuller gave this form, along with CW023 the name 'stripe' rather than 'laser', as an indication that the distinctive dorsal markings were not as defined as those in laser types.

Planet Catfish treats CW014 as a synonym of CW023, being the result of more vivid colouration being displayed on a dark substrate.

Corydoras sp. CW014, red stripe. Photo: M. Walters.

At this year's CSG Convention, one of the sponsors – Neil Hardy Aquatica, presented a small group of *Corydoras* which were obviously a part of the laser complex. They were labelled as CW014, although on what basis I am not sure.

Why laser?

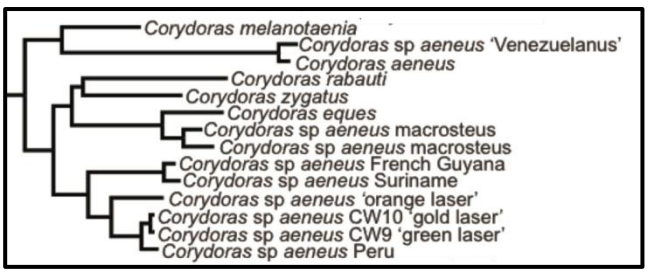
I can't think of many better examples of how catfishes present text-book shoaling signals as in the laser corys. Primarily from a defence perspective, the presence of thousands of highly-reflective stripes moving as one on the river bed serves as a classic example of disruptive colouration, confusing predators with a display of 'flashing' signals.

In addition, the security presented by thousands of individuals swarming in a crowd offers a distinct advantage that makes it less likely for an individual to be picked out by a fish-eating bird – unless you're an albino or a red laser morph, perhaps.

Most other Corydoradinae display chromatic adaptations that likely provide a similar function of keeping a shoal together and confusing a predator, although not necessarily as striking as the lasers. It is interesting that this striking pattern has seemingly evolved from a more cryptic ancestor that likely relied on camouflage rather than disruption.

Backed by science

Although not described, the group has not entirely escaped the attention of science. DNA analysis of typical examples of CW009, CW010 and CW023 have placed them in the *C. aeneus* clade of the Corydoradinae phylogeny, and suggests they are more-closely related to *C.* sp. "*aeneus*" in the Guianas (and a clade composed of *C. rabauti, C. zygatus, C. eques and C. macrosteus*) than the morphologically similar C. *melanotaenia*.



Excerpt from pruned mitochondrial DNA tree provided by Alexandrou *et al.* (2011).

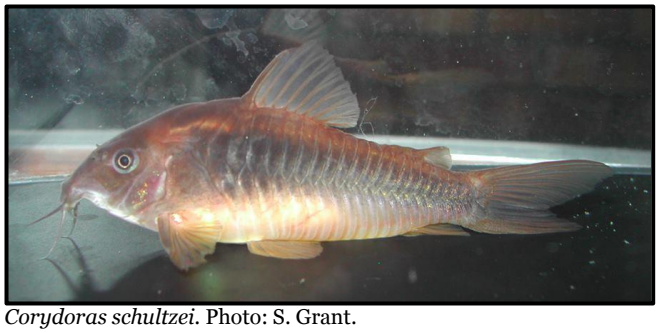
Availability

If you attend catfish auctions, you will often come across tank-bred laser corys, usually the gold laser (CW010) and orange stripe (CW023) types. Occasionally, I have also seen green (CW 009) and blue lasers (CW 009) pass through CSG sales events. Wild CW009 and CW010 are also commonly available from aquatic shops.

Again, the lack of any red stripe (CW014) *Corydoras* in shops or through auctions leads me to believe that they are one of the other species (probably CW023) exhibiting more intense colouration due to environmental conditions.

Not to be confused with…

There are a number of other *Corydoras* species which have been confused with the laser types, including *Corydoras schultzei* (gold shoulder), other regional variants of *C. aeneus*, *Corydoras* CW008 (an *elegans* type) and even some variants of *Scleromystax lacerdai* exhibit a gold dorsal stripe.



Corydoras schultzei. Photo: S. Grant.

Corydoras sp. CW008. Photo: S. Grant.

In summary

As hoped, putting pen to paper has helped me understand the laser cory group a little better. Maybe the confusion was only in my mind. I have similar problems identifying crows, ravens, rooks and other corvids, but don't know any journal who would publish my ornithological ramblings!

References

Alexandrou, M.A., C. Oliveira, M. Maillard, R.A.A. McGill, J. Newton, S. Creer and M. Taylor. 2011. Competition and phylogeny determine community structure in Müllerian co-mimics. *Nature* 469: 84-88.

Fuller, I.A.M. and H.-G. Evers. 2005. *Identifying Corydoradinae Catfish*. Verlag A.C.S. GmbH. 1-373.

Diary dates 2017

Date	*Event*	*Location*
9 July	Castleford AS catfish & loach show	Lock Lane Centre, Castleford WF10 2LW
24 September	Open show and auction	Derwent Hall, Darwen BD3 0DQ
27–29 October	L-number days	Hanover, Germany
19 November	Autumn auction	Derwent Hall, Darwen BD3 0DQ
10 December	Christmas meeting	Derwent Hall, Darwen BD3 0DQ

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