



FEDERATION OF BRITISH AQUATIC SOCIETIES

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Editorial

Welcome to the second edition of the FBAS Newsletter, in this issue you'll find Pete's fishy thoughts 2, an article on *gambusias*, one regarding the increase in fish ownership, and a newly described species of *danionella* if anyone has anything they wish included in the next edition you can send them via email to

djalstevens@msn.com

FISHY THOUGHTS 2

We are, at last, coming out of Covid restrictions. Our society, Hounslow and District AS have had our first meeting, not too successful. We discussed what to do this coming year and how to advertise it. Afraid we were more about what we don't need to do with very little idea on something new and different. Maybe it's just post Covid blues, we all look forward to the society restarting but don't know with what. Anyone else having the same problems? Not just in aquatic clubs. Any thoughts on reviving our hobby. How to convince on-line fish-keepers that visiting a club may be worthwhile.

I have visited a couple of aquatic shops recently. I found the price of most of the fish on sale was eye watering. Perhaps it's time to get breeding fish again. Selling them within the hobby is a far better option than offering them to shops. Shops usually only offer a pot of food (if you're lucky) for a bag full of decent quality fish, which they then sell at the current market rate. I know they have overheads, but a decent price given would be an incentive to work more often with them. This would also cut massively on the air miles required for the fish.

Since my last letter, I have bought pond plants on-line. This was because my local shop had a very limited range and none that I wanted. I bought three different plants, a Water Hawthorn, a Typha minima and a Butoma. These are for a new, small wildlife pond. The plants all came from different suppliers. All were well packed, arrived in a matter of days and for two of them there were no postal charges. Well impressed with the quality of the plants and the service provided.

My fish-house was a bit run down, some empty tanks and quite a few were in need of a clean. Fish were fine, water changes had been done but not much else.

My son and his family visited us over Easter from Germany. My eldest grandson is also keen on tropical fish and after seeing the fish-house offered to clean all aquariums during his stay with us. I now have clean tanks and no excuse not to get started on a breeding program. My only real concern is the cost of heating the fish-house, I dread to think what it is now and what it will go up to later in the year. I have a Smart Meter but don't want to see what the cost is per hour. If I do check, it could be the end of the fish-house. Does anyone else have similar concerns?

More thoughts next time. You can also reply or raise comments to me at peter.anderson@uwclub.net

Keep safe

Peter Anderson HDAS and FBAS

Twin lives of the Gambusia fish: a protector against disease or a pest?

by Sneha Mahale on 24 March 2022

- To check the spread of diseases such as dengue and malaria and control the mosquito menace, several local district administrations of Uttar Pradesh are releasing fish, known as Gambusia or mosquitofish, into local water bodies.
- Researchers, however, are of the opinion that their introduction into local water bodies may actually be harmful to the ecosystem in the long run.
- They fear that the Gambusia may become more virulent and adaptable, and pose a larger threat to biodiversity and local livelihoods.



In 2021, several districts in the state of Uttar Pradesh battled a deadly outbreak of dengue and malaria. To check the spread of disease and control the mosquito menace, the district administrations of Kannauj, Moradabad, Firozabad, Lucknow and Amroha, among others, started releasing mosquitofish, a species of freshwater fish of the genus *Gambusia*, into local water bodies. These fish feed on mosquito larvae.

Firozabad's Chief Medical Officer Dinesh Kumar Premi had said to the media that this strategy was previously successful in the Bareilly and Baduan districts of the

state. As per his statements to the media, 50 packets of fish seeds had been acquired from Badaun to start with, and would be released into ponds and rural areas of the district.

Employing biological control measures, in the form of a natural predator to control the spread of a pest species, is not uncommon. For controlling mosquito numbers alone, to prevent the spread of diseases such as dengue and malaria that claim lives, local administrations across the world have turned to mosquitofish, dragonflies and aquatic turtles. Another species of fish, known as copepods, when introduced in large water-storage tanks, were successful in limiting the spread of dengue in Vietnam.

The *Gambusia*, however, remains among the most widely used biological control agent against mosquito larvae. According to the National Center for Vector Borne Disease Control (NVBDCP) - an umbrella programme for prevention and control of vector-borne diseases - this particular species has been in use in India since 1928. In NVBDCP's guidelines for larvivorous fish for vector control, the ***Gambusia affinis*** (western mosquitofish) is described as a "very hardy fish and can adapt to wide variations in temperature as well as to chemical and organic content of the water but does not tolerate very high organic pollution." It further states that a "single full-grown fish eats about 100 to 300 mosquito larvae per day". It has advised states in the past to upscale the use of this fish as a biological control method in rural areas.



The *Gambusia* is a hardy fish and is adaptable to wide variations in temperature as well as to chemical and organic content of the water but does not tolerate very high organic pollution

Photo by NOZO/ Wikimedia Commons.

Helps in mosquito trouble, but is an invasive species



Researchers, however, are of the opinion that introduction of *Gambusia* fish into local waterbodies may actually be harmful in the long run. The IUCN lists the ***Gambusia affinis*** among 100 of the world's worst invasive alien species, calling it a pest in many waterways around the world following initial introductions in early last century as a biological control of mosquito. It further

states that it is no more effective than native predators of mosquitoes and that one of the main avenues of its spread is continued, intentional release by mosquito-control agencies. The *Gambusia* remains the most widely used biological control agent against mosquito larvae. However, it is also among some of the worst invasive species. Photo by Clinton & Charles Robertson/Wikimedia Commons.

Mosquitofish are difficult to eliminate once established. "It is really difficult to manage the species because female *Gambusia* can get impregnated and lay fries whenever the situation is favourable. It has also been reported that *Gambusia* can delay or prepone their sexual maturation and alter their body size based on the environment," says Nobin Raja, a researcher at the Ashoka Trust for Research in Ecology and the Environment, who co-published a paper in 2020 on the invasion and management of *Gambusia* in peninsular India.

Gambusia fish are often referred to as plague minnows due to their explosive spreading, higher reproduction rate, and their negative impact on local ecosystems. They compete with other fish for resources and evidence suggests that they predate on other fishes' fries and frog larvae. "After introduction, the *Gambusia* fish hijacks the food web and breaks the existing cycle, causing an imbalance in the ecosystem. The fish also negatively affect the aquaculture industry as they prey on the eggs of and compete for resources with economically-important fish," says Raja.

The invasiveness of the fish has led some countries introducing laws to control them. *Gambusia* were first introduced into Australia from North America as a biological control for mosquitoes. However, this was unsuccessful. Instead, the species had a detrimental effect on native fish through competition for resources and their aggressive behaviour. In 2019, the Department of Agriculture and Fisheries in Queensland, in its guidelines stated that "*Gambusia* are a category 3, 5, 6 and 7 restricted invasive fish under the Biosecurity Act 2014. They must not

be kept, fed, given away, sold, or released into the environment without a permit. If caught, *Gambusia* must be humanely destroyed immediately and disposed of as soon as practicable by burying a suitable distance from the waterway where it was caught or placing it in a rubbish bin."

What can be done?

Invasive alien species are the second biggest threat to the environment following habitat degradation. Researchers and nature enthusiasts have been building awareness about invasive alien species.

"In recent years, the National Biodiversity Authority (NBA) has declared *Gambusia* as an invasive alien species in India, but the communication gap between governmental agencies and a general lack of awareness on the negative impacts of invasive alien species has led to the continued introduction of *Gambusia* in local water bodies," says Raja.

Read more: [Checking spread of invasive alien fish as India faces climate extremes](#)

There are several tools such as chemical/pheromone-based traps and physical removal of individuals from the infested area that can help limit the invasive species. But more needs to be done, explain experts. First, the current distribution of the species must be mapped. Then, one needs to measure the socio-economic and environmental impacts with scientifically-backed studies. Third, there's a need to devise effective control methods based on the landscape and the impact the species is having on local ecology.

"But before everything else, we need to stop introducing *Gambusia* into our waterbodies. They will become more virulent (gain genetic diversity) and pose a larger threat to our biodiversity and local livelihoods. They may become more adaptable and spread more widely into protected areas where they may pose a threat to endemic and endangered aquatic fauna," says Raja.

Banner image: A single full-grown mosquitofish eats about 100 to 300 mosquito larvae per day. [Photo](#) by Toby Hudson/Wikimedia Commons.

by [Sneha Mahale](#) on 24 March 2022

Pet fish ownership jumps during the pandemic years



Latest pet population statistics show that pet fish ownership has shot up over the past couple of years.

This backs up industry experiences which revealed a high interest in setting up new indoor tanks and digging garden ponds since 2020, as a response to more time in lockdown to spend on home-based hobbies.

Pet Food Manufacturers Association Pet Population data reveals that in 2022 there are 8 million indoor tanks which equates to 17% of the population and 6.5 million households have outdoor ponds (12% of households). This compares to 5 million fish tanks (12% of households) and 4 million garden ponds in 2021.

"Sadly, PFMA's report also reveals that pet relinquishment is on the rise as people return to the office or change their living arrangements. However, these are not issues that tend to affect people who keep pet fish and illustrates the need to ensure a wide variety of pet species are available for people to enjoy," remarked OATA Chief Executive Dominic Whitmee.

"The key is for people to pick the right pet for their lifestyle and care for it properly. Dogs, cats and small furrries undoubtedly make great pets but they are not always the right pet for everyone. Other pets, like fish, might make better pets for some people with busy lifestyles."

New fish identified after years in scientific studies Newly classified *Danionella cerebrum* hides in plain sight

SEPTEMBER 29, 2021

Scientists identify and name new fish species around the globe practically every week. Some turn up in unlikely places like the soil of riverbanks. Some display characteristics and behaviors that are not what most people would call fish-like, such as not having fins and breathing through their skin rather than gills.



The Danionella cerebrum's translucent body is clear, and its skeleton is stained to allow better viewing for researchers. (Photo by Ralf Britz)

But it is rare for an unidentified and unnamed fish to have played such an important role in scientific research for several years before being officially identified and named.

Kevin Conway, Ph.D., associate professor in the Department of Ecology and Conservation Biology and curator of fishes at the Biodiversity Research and Teaching Collections in the College of Agriculture and Life Sciences at Texas A&M University, Bryan-College Station, is among a team of three international scientists from Germany, Switzerland and the U.S. who have discovered and classified a fish that has been swimming in the tanks of neuroscientists for years.

Danionella cerebrum discovered

Danionella cerebrum is the newly described species with an open skull roof and small brain that is easily studied in situ at the cellular level under a microscope.

"They are a very important little fish in terms of potential scientific breakthrough," Conway said. "It was a surprise find, but one that is important for science and to give this tiny fish the credit it deserves."

Danionella fish are just a little longer than a fingernail and come from Myanmar and northeastern India. Researchers assumed for years they were looking at *Danionella translucida*, named for its translucent body, which was identified in the 1980s.

Conway said both fish look very similar, but a scientist, Ralf Britz, Ph.D., head of ichthyology at the Senckenberg Natural History Collections in Dresden, Germany, noticed a few characteristics that were distinct from other *Danionella* on record.

As a result, the fish that researchers believed to be *Danionella translucida* have now been named *Danionella cerebrum*, as a nod to their exposed brains and importance to neuroscience.

Danionella cerebrum is the fifth fish species in the genus to be discovered so far.

Despite the physical similarities that delayed the discovery, *Danionella cerebrum* and *Danionella translucida* are only distant relatives within the genus — more distant than the team of international researchers expected.

By studying DNA sequences, the team was able to show that the two almost identical looking species *Danionella cerebrum* and *Danionella translucida* have been separate for around 15 million years and exhibit large genetic differences, Conway said.

"They are almost identical, even under the microscope," Conway said. "But there are lots of internal details that reveal they are indeed different species, which is corroborated by differences in DNA sequences."

Danionella cerebrum's importance to science

The introduction of a new name is important because it differentiates the species of *Danionella* for the purpose of scientific record keeping, in the past and in the future.



An adult female Danionella cerebrum is just under half an inch long. Males are even smaller. (Photo by Ralf Britz)

The importance of studying *Danionella cerebrum* to humans could be significant, Conway said. Scientists have learned much more about human development and physiology and how the body's intricacies function by studying model

species like mice and the zebra fish.

Danionella cerebrum will likely play a similar role, Conway said. Previous research has revealed complex behaviors involving the production of sound, which is extremely useful to neuroscientists interested in learning more about brain activity and function.

Beyond visual communication, *Danionella cerebrum* males communicate by making a drumming sound, Conway said.

Scientists' ability to view the brain and pinpoint activity related to communication and behavior will guide their understanding of brain circuitry and how these functions relate to the fish's activity.

It is too early to know what breakthroughs neuroscientists will make by studying the fish, but Conway cited incredible potential for understanding how the brain works in *Danionella* and in other adult vertebrates, including humans.

"They started as a model for neuroscientists because they have very simple bodies, display very complex behaviors and give researchers the ability to view the brain in situ and make links between brain activity and behavior, which is not easy to do," he said. "Human applications are not there yet, but you can imagine the important role these little fish could play in our understanding of how the adult vertebrate brain works."

Danionella cerebrum joins the growing list

Conway said he is proud to be a part of the international team that introduced *Danionella cerebrum* to the world so it can take its place among the almost 36,000 freshwater and marine fish species identified so far. *Danionella cerebrum* is the 43rd fish species Conway has played a role in classifying.

This is the second *Danionella* species he has helped name scientifically. The other, *Danionella dracula*, classified in 2009 by the same international research team, got its name because the males have large fang-like structures that stick out of the mouth.

As a taxonomist, Conway said these discoveries and classifications are a critical step toward answering questions about each species' past, present and future. His interest lies in the fish, what they look like and how they behave, how widely distributed they are and whether they need conservation and/or protection.

Conway said scientists are nowhere near a complete inventory of fish species on Earth.

"We really have no idea about how it goes about life in the wild in southern Myanmar," he said, "But we're excited about this new species of tiny, strange fish, and want people to be excited about them too — their place here on this planet and their potential to teach us more about ourselves."