NEW SPECIES 2021

THE FRESHWATER FISH SPECIES DESCRIBED IN 2021

IUCN SSC Species Survival Commission
FFSG Freshwater Fish Specialist Group
750 The FISHMONGERS' Company INCORPORATED 1272 FISHERIES CHARITABLE TRUST
CALIFORNIA ACADEMY OF SCIENCES

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Shoal would like to thank collaborators Ralf Britz, João Pedro Fontenelle, Praveenraj Jayasimhan, Cüneyt Kaya, Ad Konings, Nathan Lujan, Ken Maeda, Lucia H. Rapp Py-Daniel, Wentian Shi, and Leando Melo de Sousa for their support in the writing of this report.

Furthermore, we wish to thank Jon Fong and Richard van der Laan from the California Academy of Sciences and Eschmeyer's Catalog of Fishes for their support in providing the full list of freshwater fish species described in 2021, along with the IUCN SSC FFSG for guidance and support, and The Fishmongers' Company for providing the funding that enabled us to produce this report.

Citation: Edmondstone, M.R.J., Patricio, H.C., & M. Baltzer. (2022). New Species 2021: The Freshwater Fish Species Described in 2021 (Report 1). Shoal.

Shoal

Shoal is the global initiative to halt extinctions and recover populations of the most threatened freshwater species around the world. Learn more about their work at shoalconservation.org.

IUCN SSC Species Survival Commission FFSG Freshwater Fish Specialist Group

The IUCN SSC FFSG has a mission of achieving conservation and sustainable use of freshwater fishes and their habitats through generating and disseminating sound scientific knowledge, creating widespread awareness of their values and influencing decision making processes at all levels.

CALIFORNIA ACADEMY OF SCIENCES

Eschmeyer's Catalog of Fishes database was begun in the 1980s at the California Academy of Sciences by Bill Eschmeyer. It is the primary resource for current knowledge on the kinds of fishes, and is updated continuously as new species are described.

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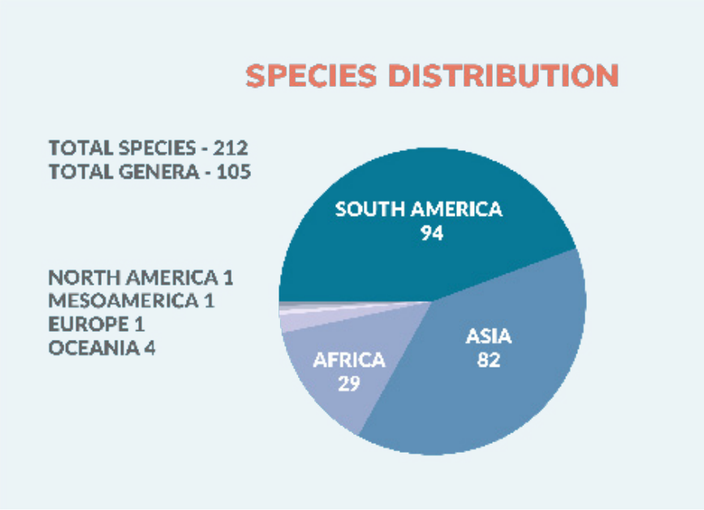
Funding for this report was provided by The Fishmongers' Company's Fisheries Charitable Trust, which engages in a wide range of projects and grant funding to support marine and freshwater conservation, fisheries, aquaculture and fish trading in the UK.

CONTENTS

OVERVIEW

Each year, hundreds of freshwater fish species are discovered and described by scientists for the first time.

The numbers may seem surprising - in 2021 alone, there were 212 species of freshwater fish that were formally recorded as new species – but each new discovery proves there is still much about the world of wonder underneath the surface of the planet's rivers, lakes and wetlands that remains unknown.



What can each of these discoveries teach us?

- Each new species description increases knowledge about the relationships among species and how long it has been since they diverged from common ancestors, deepening our understanding of evolution.

- Morphological descriptions help us to understand adaptations, which informs knowledge of the relationships and interactions of species with their environment and other organisms. For example, morphology can indicate feeding behaviours or habitat preferences, and that information is essential for managing fisheries, assessing potential impacts of environmental changes on species, and conserving threatened species.

- Knowledge of the levels of species richness in specific locations can help conservationists prioritise where to focus their work in order to get more bang for buck when implementing actions on the ground.

- An understanding of taxonomic relationships enables us to identify species that are especially genetically unique. These species should be prioritised for conservation, as they may represent the only (or one of very few) species in an entire genus.

- And each finding may lead to new research that could literally help the future of humanity. Turn to p.10 to see how *Danionella cerebrum* has already helped research into neuroscience.

Scientists go to great lengths to discover and describe our amazing fish diversity, facing huge challenges along the way, including lack of resources and lack of government interest, not to mention the difficulties and risks associated with field work in regions such as the Amazon and the jungles of Southeast Asia. And they face an uphill battle to describe this incredible biodiversity before it is lost forever. In this Age of Extinction, it is freshwater ecosystems that are the sharp end of the wedge. With myriad threats including dams, pollution, unsustainable fishing, and invasive species, around 1 in 3 freshwater fish species are threatened with extinction.

This 2021 edition will be the first of an annual release of New Species reports. Shoal is compiling the newly discovered freshwater fish species to help raise awareness and increase the chances of freshwater biodiversity conservation receiving much needed funding before it is too late.

WOLVERINE PLECO

Species: *Hopliancistrus wolverine*

Researchers: de Oliveira, RR., Zuanon, J., Rapp Py-Daniel, LH., Birindelli, JLO., Sousa, LM. - see reference 1.

Location: Rio Xingu basin, Brazil.

Highlight: Possesses three strong spikes that it uses for defence.

The name Wolverine conjures up images of aggression, powerful physicality and claws that are likely to damage unlucky attackers, and this pleco owes its charismatic name to three stout curved spikes, or odontodes, concealed beneath the gill covers which act as a defence mechanism when it is harassed.

The species was originally thought to be *Hopliancistrus tricornis*, which was described in 1989, but Renildo R. de Oliveira analysed the anatomical differences of fish from different drainages and realised that the *tricornis* was in fact five separate species, including the Wolverine pleco.


© Mark Smith

It grows up to 15cm long and inhabits rock crevices in the rapids of the Rio Xingu, where males are likely to guard their offspring.

Despite their tough-sounding name, Wolverine plecos are herbivorous and graze algae and detritus. But their 'super strong' odontodes can inflict real damage: Lucia H. Rapp Py-Daniel, one of the researchers on the 2021 description paper, said: "When I first collected *tricornis* in the Tapajós river basin, we all had our fingers injured or bleeding by the violence of them trying to pinch us with their big lateral hooks on the head. At the field in the Tapajós, the fishermen started calling them 'Buffalo Bill'".

She added that this behaviour has not been observed in any other loricariid (a family of armoured catfish), even those that possess large spines[1].


Hopliancistrus wolverine © Leandro Melo de Sousa

The species described from research into the *tricornis* have been popular in the aquarium trade for many years, without it being known that they are distinct species. Many are bred in captivity, but they face possible threats in the wild from the construction of dams that are being planned in the Tapajós River basin.

JUELIN and KISHI LIQUORICE GOURAMIS

Species: *Parosphromenus juelinae* and *Parosphromenus kishii*

Researchers:
Shi, W., Guo, S., Haryono, H., Hong, Y., & Zhang, W. - see reference 2.

Location:
o Juelin: island of Bangka, Indonesia.
o Kishi: Kalimantan, Indonesia.

Highlights: Adapted to gulp oxygen from the air, allowing them to live in oxygen poor peat swamps. Researchers calling for both species to be listed as Critically Endangered.

Both of these species are liquorice gouramis: tiny, jewel-like fish that inhabit tea coloured tannin-stained peat swamps in Southeast Asia.

They are labyrinth fish – that is, they have a supplementary breathing structure known as the labyrinth which enables them to use oxygen from the air, gulped from the mouth. This adaptation allows them to survive in the oxygen-poor waters of peat swamps.

Juelin has intense red down the flanks and white stripes along the fins, set against a black background.

Researchers note that the population density was once very high: in 2017, over 100 specimens were collected from a water pool around 20m² in size in just 40 minutes, using three handheld nets. However, the edge of the distribution area is under growing pressure from encroaching agriculture, and one of the swamps where the species was formally collected was drained and converted to a paddy field in 2019, likely causing an extirpation of that population[3].

The species is restricted to a few adjoining forest streams and swamps belonging to the same river.

Researchers are calling for it to be listed as Critically Endangered[2]: in their 'Diagnoses of two new species of Parosphromenus (Teleostei: Osphronemidae) from Bangka Island and Kalimantan, Indonesia' paper, published in 2021, they said they based this on the species': 'very restricted distribution area in a single river system on a single small island (<50 km2) with less than three known locations; and the fact that this habitat has been facing direct threats from human activities since 2018. Since there are no significant environmental conservation projects in this area, the survival of this species in the near term is clearly imperilled'.

Kishi, like Juelin, is a bright and beautiful species, with a reddish colour on its tail fin.

It is confined to a single river in Kalimantan, Indonesia, which has been converted into an irrigation canal for a large oil palm plantation. Its range is so small that the location has been kept hidden in an attempt to make it more difficult for collectors to remove the species. The habitat is described as 'extremely impacted', and 'any further works on the plantation may eradicate the only known location of this species' .


Parosphromenus juelinae © Wentian Shi


Parosphromenus kishii © Wentian Shi

SALMO BALIKI

Species: *Salmo baliki*

Researchers: Turan, D., Aksu, I., Oral, M., Kaya, C., Bayçelebi, E. - see reference 4.

Location: Murat River, Turkey.

Highlights: Thought by some to be a 'healer fish' that cures stomach ailments. One of 16 trout species to have been described from Turkey.


Salmo baliki © Turan, D., Aksu, I., Oral, M., Kaya, C., Bayçelebi, E.

While investigating the taxonomy of the Euphrates in August 2019, a new species of trout was discovered in the Murat River.

Research suggests that *Salmo baliki*'s range is confined to the Sinek Stream in the Murat River's drainage. Due to trout being a desireable food source for humans, overfishing is already putting serious pressure on the species.

Cüneyt Kaya, one of the researchers involved in describing *S. baliki*, said, "Ghost fishing is the most common threat. The second most common threat to all trout species in Anatolia is the use of casting nets, which destroy the fish nests carrying future generations due to the heavy sinkers. They are a major threat, especially to salmonids that that spawn on the stream floor. The use of casting nets is forbidden in Turkey: the regulations are strict, but unfortunately not practiced. People either do not know about them, or there are not many penalties issued".

Kaya added that, "Pollution and habitat degradation due to human alterations of the area are further threats to the trout species in Anatolia".

S. baliki is also threatened by a local belief that it is a 'healer fish' which helps cure stomach ailments. There is no scientific evidence to back this up, but the belief has led to the species being sold for high prices throughout Turkey. 16 native trout species have now been identified in Turkey, six of which have been identified from Tigris and Euphrates drainages[4].

Müneever Oral, a research fellow at Recep Tayyip Erdogan University, explained why Anatolia is such a hotspot for trout species: "Turkey harbours remarkable biodiversity, as it is geographically located at the intersection of three global biodiversity hotspots: the Caucasus, the Mediterranean and the Irano-Anatolian. Anatolia provided a secure refuge for species throughout the Ice Age, while most counterparts were facing extinction further north".


Stream Sinek, Murat River, Turkey; type locality of *Salmo baliki* © Cüneyt Kaya

KIJIMUNA and BUNAGAYA GOBIES

Species: *Lentipes kijimuna* and *Lentipes bunagaya*

Researchers: Ken Maeda, K., Kobayashi, H., Palla, H.P., Shinzato, C., Koyanagi, R., Montenegro, J., Nagano, A.J., Saeki, T., Kunishima, T., Mukai, T., Tachihara, K., Laudet, V., Satoh N., & Yamahira, K. - see reference 5.

Location: Okinawa, Japan.


Lentipes bunagaya © Ken Maeda


Lentipes kijimuna © Ken Maeda

These highly attractive gobies are named after wood spirits of Okinawan folk mythology Kijimuna and Bunagaya, who are usually described as having red skin and hair.

They both have a similar body form to a known species - *Lentipes armatus* - but Kijimuna and Bunagaya goby males display unique colour patterns with the bright red markings that give the species their names. DNA research proves they are all separate species.

Although adults of each of the three species live and reproduce in small freshwater streams, it is thought that their larvae are carried downstream into the ocean and can be transported by ocean currents to different remote islands[5].

"*Lentipes kijimuna* and *L. bunagaya* are rarely seen in Okinawa," explained Dr. Ken Maeda, first author of the study and staff scientist in the Marine Eco-Evo-Devo Unit at the Okinawa Institute of Science and Technology Graduate University (OIST). "So we think that these species we encountered here were born somewhere else in Southeast Asia and transported to Okinawa when they were larvae."

Maeda added that, "Their migration and larval life are not fully understood yet. More research is required to reveal them".


Dr Ken Maeda next to a statue of Kijimuna © Ken Maeda

DANIONELLA CEREBRUM

Location: Turbid streams on the southern and eastern slopes of the Bago Yoma mountain range, north of Yangon in southern Myanmar.

Researchers: Britz, R., Conway, K., Rüber, L. - see reference 6.

Highlight: Used in neurophysiological studies as they display complex behaviours and their brains are observable without harming the fish.

Danionella cerebrum male © Ralf Britz

This tiny critter has been sitting under the noses of neuroscientists for at least five years before it was discovered as a new species. Displays of complex behaviour, coupled with a remarkable anatomy where the skull roof is missing and the brain is covered by a thin layer of skin, has made *Danionella cerebrum* a model organism in neurophysiological research.

Until 2021, it was thought that *D. cerebrum* was *D. translucida*. The species are tiny, only slightly longer than a thumbnail, and identical to the naked eye. But molecular analyses confirmed not only that they were separate species, but only distantly related, having split from each other around 13.3 million years ago.

With the spreading popularity of *D. translucida* as a model organism in neuroscience, Ralf Britz, from the Senckenberg Natural History Collections, Dresden, and lead author on the paper describing the species, decided to do some research into the tiny fish. He studied the skeleton with his colleague from Texas A&M, Kevin Conway, and Lukas Rüber from the Natural History Museum in Bern looked into the genetics. Britz said: "We compared published genetic data and additional genetic samples, as well as the skeleton of preserved lab *Danionella* with our samples and found that what neuroscientists had called *translucida* was actually an undescribed species. It swam unrecognized in tanks in several labs in the US and Europe".

He added that, "In the end it was detective work. Once you have this hypothesis that you are dealing with two things, you start to look more thoroughly and then discover more and more morphological differences. These are times when you have a Eureka moment, and these are really satisfying".

Danionella species have proven useful to scientists. According to Britz, "They combine characteristics that you would not find in any other vertebrates: They are tiny and transparent and have the anatomical condition of a larval fish in some parts of their body, and the condition of an adult fish in others. They do not have a skull roof and their brain, as in larval fish, is only covered by skin. This makes it optically accessible in the live animal without much problem. But they also have a complex apparatus to receive sounds and to also produce them, and these sounds are important for their intraspecific communication, which results in quite a complex behavioural repertoire. You would not find this in a larval fish. Both these characteristics are ideal for a vertebrate animal whose brain function you want to study. If you had to invent a vertebrate model animal, it would be very much like *Danionella*".

The sounds the fish produce is a drumming, possibly produced by strip of cartilage that works like a drumstick on the swim bladder. All *Danionella* males can make this sound, but the females do not have the necessary physiology. The sound is so loud, that aquarists have reported hearing the drumming coming from the fish tanks. Impressive, for such a tiny species.

So the species' simple body, complex behaviour, and the chance for researchers to view the brain without intervention offers the possibility of making links between brain activity and behaviour. Britz said: "Brain function between a fish and a human is dramatically different at many levels, but there are some basic similarities. And it is these basic, general similarities one is interested in. How is information in the brain processed? This is a very general question for which the model organism *Danionella* can provide answers".

A net containing *Danionella* specimens (shown by arrows) © Ralf Britz

Ralf Britz and Oliver Crimmen catching *Danionella cerebrum* in Myanmar © Ralf Britz

Danionella cerebrum female © Ralf Britz

MUMBAI BLIND EEL

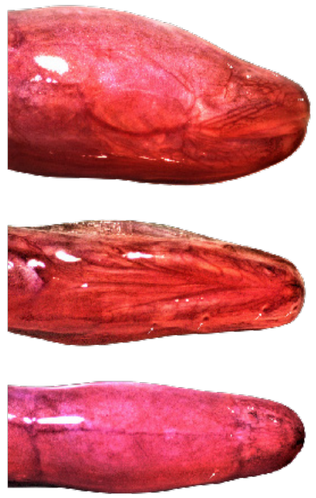
Species: *Rakthamichthys mumba*

Researchers: Jayasimhan, P., Thackeray, T., Mohapatra, A., Pavan Kumar, A. - see reference 7.

Location: Jogeshwari West, Mumbai, India.

Highlight: Has no eyes, fins or scales.

Location approx.


© J. Praveenraj

An incredible looking species with no eyes, fins, or scales, the Mumbai blind eel is the first completely blind subterranean freshwater fish species to be described from the Northern Western Ghats in India.

"Raktham" means "blood-red" in Malayam: a nod to its rich red colouration.

It was discovered by Tejas Thackery, a naturalist and the son of chief minister of Maharashtra, Uddhav Thackeray, in, somewhat ironically for a blind fish, a 40 foot well on the premises of a school for the blind[7].

Jayasimhan Praveenraj from the Division of Fisheries Science ICAR-Central Island Agricultural Research Institute, and the researcher who discovered the species, said: "The species might have split from its closest living relative, *Rackhthamichyths indicus,* more than 1 million years ago", and added that: "Due to its long isolation in a subterranean habitat, the Mumbai blind eel evolved to become remarkably unique".

Back in 2012, an image of an unrecognised pink, eyeless eel surfaced on social media. Thackery and his team contacted the person who posted the image but, due to the specimen having been poorly preserved in liqour (from a non-availability of ethanol), it was unable to be examined.

The researchers had an inkling this new fish species was out there, hidden in other wells in Mumbai. Thackery and his team - Yogendra Satam and Yogesh Satam - received a tip-off from a man who had observed the 'pink worm' fish many times in the grounds of a school for the blind. They drained the water from the well for three days, and when the water was about 1.5 feet, they collected the species which had flushed out through the aquifers. It was sent to Praveenraj for official description.

Many subterranean fish species have been discovered in India's Western Ghats over the past few years. Praveenraj explained why: "The Western Ghats is a biodiversity hotspot. The land mass was formed after the breakup from the ancient Gondwanaland, which led to formation of India as an isolated land mass. This has contributed a great deal to its speciation and biodiversity. Some of the amphibian and fish species in the Western Ghats are thus of Gondwanan origin and remain unchanged over millions of years".


Rakthamichthys mumba © Tejas Thackeray

ETOWAH BRIDLED DARTER

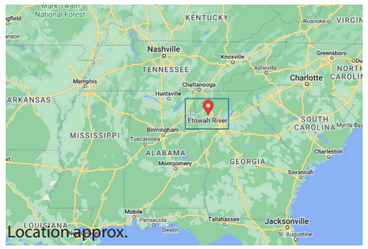
Species: *Percina freemanorum*

Researchers: Near, T.J., MacGuigan, D.J., Boring, E.L., Simmons, J.W., Albanese, B., Keck, B.P., Harrington, R.C., Dinkins, G.R. - see reference 8.

Location: Etowah River system in Georgia, specifically in Long Swamp Creek, Amicalola Creek, and the upper portion of the Etowah River, USA.

Highlight: The only freshwater fish species from to be described from the USA in 2021.


Live holotype male © Georgia Department of Natural Resources



Location approx.

Some may think the waterways of the USA are so well researched that new species wouldn't crop up there. Well, the Etowah bridled darter has other ideas!

The only freshwater fish species described in the USA in 2021 is named after University of Georgia freshwater ecologists Mary and Byron 'Bud' Freeman: two legendary ecologists who have worked for decades on fish and their ecosystems[9].

The Freemans have been at the forefront of freshwater species and ecosystem research for decades, and have authored hundreds of papers between them. According to UGA Today, 'Much of their work has been done in the Etowah River system, bringing attention to the region's status as a hotspot of aquatic biodiversity. Their findings have informed efforts to protect species diversity throughout the Southeast and beyond: Many of the freshwater species in the area, including *Percina freemanorum*, are found nowhere else in the world and are considered imperiled'[9].

Thomas Near, evolutionary biologist and the ichthyologist who identified the species, said: "The citizens of Georgia have a wonderful Etowah River watershed, and any limits to impacts from human activity are in a large part due to the efforts of Mary and Bud Freeman. From the very start of my career, both Mary and Bud were always encouraging, freely open with their observations and data, and helped set a tone of collegiality among the large community of scientists studying the species-rich North American aquatic biodiversity".

John Wares a professor of genetics and ecology and curator of genomics and aquatic invertebrates at the Georgia Museum of Natural History added that the Freemans, "have helped revitalise a pride for people in terms of what the diversity of the Southeast is about. They are a really unique resource for us here at the University of Georgia, and I think their impact has been huge across the Southeast and beyond."

Naming this little darter *freemanorum* is a nod to the appreciation and respect of the Freemans from the research team.

METRIACLIMA GALLIREYAE

Species: *Metriaclima gallireyae*

Researchers: Miller, T.A., Konings, A.F., Stauffer, J.R.J. - see reference 10.

Location: Lake Malawi.

Highlight: Live in gastropod shells on the lake bed.

Metriaclima gallireyae © Ad Konings

These attractive cichlids are rare in that they are one of only a handful of Lake Malawi cichlids that live in gastropod shells on the lake bed. This behaviour is well known from cichlids in Lake Tanganyika, but it is much less common in Lake Malawi.

Individuals can grow up to 100mm and are often seen in large groups of up to 20 individuals in the vicinity of empty shells of *Lanistes nyassanus*.

The researchers note that: 'Both sites where this small species was observed contained either many football-sized rocks (Gallireya Reef) or large slabs of sandstone (Chitimba Bay) that may provide additional shelter to individuals that were not able to secure an empty shell for protection'[10].

PARATRYGON ORINOCENSIS and PARATRYGON PARVASPINA

Species: *Paratrygon orinocensis* and *Paratrygon parvaspina*

Researchers: Loboda, T., Lasso, C., Rosa, R., Carvalho, M. - see reference 11.

Location: Orinoco basin, Venezuela

This report would not be complete without acknowledging the two species of stingray discovered in the Orinoco basin. Although information about the species is currently very limited, there are only 39 species of freshwater stingray, all of which are venomous. Of these 39, 14 were described in the past decade.

Part of the reason such a high proportion have been discovered recently is that there are more people working on freshwater stingrays than ever before. There are now three major centers of research: in Brazil, in Colombia, and in Toronto, Canada.

Paratrygon orinocensis holotype adult female © LOBODA, LASSO, ROSA & DE CARVALHO

All *Paratrygon* species are carnivores, feeding off fish and crustaceans.

Reproductive cycles of *P. orinocensis* and *P. parvaspina* are related to rainy seasons, and anthropogenic impacts on environmental conditions are the biggest threat to population viability.

NOTABLE MENTIONS

Capoeta raghazensis, Eagderi S., Mousavi-Sabet S. 2021. Capoeta raghazensis, a new species of algae-scraping cyprinid from the Raghaz Canyon in Hormuz basin, southern Iran (Teleostei: Cyprinidae). FishTaxa 22: 37-44.
Iran. Found only in a river in the Raghaz Canyon, which is approximately 4km long, with 64 cascades and over 100 natural pools).

Centromochlus akwe, Coelho, F. L., Chamon, C. C., & Sarmento-Soares, L. M. (2021). A new species of driftwood catfish Centromochlus Kner, 1858 (Siluriformes, Auchenipteridae, Centromochlinae) from Tocantins-Araguaia River drainage. Zootaxa, 4950(1), 149-165.
Brazil. Found hidden in crevices within lateritic bedrock substrate covered by alluvial sediment.

Indoreonectes rajeevi, Pradeep Kumkar, Manoj Pise, Pankaj A. Gorule, Chandani R. Verma and Lukáš Kalous. 2021. Two New Species of the Hillstream Loach Genus Indoreonectes from the northern Western Ghats of India (Teleostei: Nemacheilidae). Vertebrate Zoology. 71: 517-533.(2021).
India. Named after Indian ichthyologist and Shoal advisor, Rajeev Raghavan.

Microctenopoma steveboyesi, Skelton, P.H., J.R. Jr. Stauffer, A. Chakona & J.M. Wisor. 2021. Two new species of African bubble-nesting Microctenopoma (Teleostei: Anabantidae) from Angola. Ichthyological Exploration of Freshwaters IEF-1134: 1-16. (2021).
Angola. Breeding males establish a territory, construct a bubble-nest, attract mates, and guard eggs and embryos.

Nannocharax hadros Manda, Katemo & Snoeks, Jos & Manda, Auguste & Emmanuel, Vreven. (2021). Ichthyological Exploration of Freshwaters An international journal for field-orientated ichthyology Nannocharax hadros (Teleostei: Distichodontidae), a new species from the Kalule Nord River in the Upemba National Park, Upper Congo basin. 10.23788/IEF-1098.
Democratic Republic of the Congo. Has bright red lips, largest species in the genus.

FULL LIST[12]

Aborichthys barapensis
Aborichthys palinensis
Acheilognathus mengyangensis
Amphilius engelbrechti
Amphilius leopardus
Amphilius marshalli
Amphilius zuluorum
Anablepsoides origuelai
Apteronotus albertoi
Apteronotus quilombola
Astyanax pardensis
Astyanax viridis
Astyanax argentum
Austrolebias botocudo
Austrolebias cheffei
Austrolebias lourenciano
Austrolebias nubium
Badis kaladanensis
Bagarius vegrandis
Barbodes pyrpholeos
Barbodes sellifer
Barbodes zakariaismaili
Barbus ida
Barbus samniticus
Brachyhypopomus degy
Bryconops florenceae
Cambeva barbosae
Cambeva botuvera
Cambeva cauim
Cambeva diffusa
Cambeva duplimaculata
Cambeva grisea
Cambeva imaruhy
Cambeva longipalata
Cambeva notabilis
Cambeva orbitofrontalis
Cambeva panthera
Cambeva pericoh
Cambeva urubici
Capoeta raghazensis
Centromochlus akwe
Cetopsorhamdia clathrata
Cetopsorhamdia hidalgoi
Cetopsorhamdia spilopleura
Chaetostoma chimu
Characidium duplicatum
Characidium kalunga
Characidium onca
Characidium wangyapoik
Chiloglanis msirii
Chondrostoma smyrnae
Corydoras bethanae
Corydoras fulleri
Cottus nudus
Creagrutus ardilai
Creagrutus jordanensis
Creagrutus mariposa
Creagrutus martinezi
Danionella cerebrum
Dinotopterygium diodon
Dinotopterygium uniodon
Diplotaxodon dentatus
Distichodus mbiniensis
Distichodus microps
Eigenmannia dutrai
Eleotris douniasi
Eleotris sumatraensis
Eleotris woworae
Enteromius baleensis
Enteromius mandelai
Epiplatys cashneri
Ernstichthys taquari
Esomus nimasowi
Garra hormuzensis
Garra jaldhakaensis
Garra langlungensis
Garra meymehensis
Garra orontesi
Garra tiam
Garra triangularis
Glyptothorax alidaeii
Glyptothorax daemon
Glyptothorax galaxias
Glyptothorax hosseinpanahii
Glyptothorax pallens
Glyptothorax pedunculatus
Glyptothorax rupiri
Glyptothorax shapuri
Gobiomorphus dinae
Gobiomorphus mataraerore
Hemichromis camerounensis
Heteropneustes fuscus
Homatula dotui
Homatula guanheensis
Hoplias auri
Hopliancistrus munduruku
Hopliancistrus wolverine
Hopliancistrus xavante
Hopliancistrus xikrin
Huigobio heterocheilus
Hypergastromyzon abditus
Hypergastromyzon sambas
Hyphessobrycon cantoi
Hypophthalmus celiae
Hypophthalmus donascimientoi
Hypostomus bimbai
Hypostomus cafuringa
Hypostomus crulsi
Hypostomus freirei
Hypostomus froehlichi
Hypostomus guajupia
Hypostomus pastinhai
Hypostomus robertsoni
Indoreonectes neeleshi
Indoreonectes rajeevi
Knodus obolus
Knodus rufford
Lacustricola pygmaeus
Lentipes bunagaya
Lentipes kijimuna
Lentipes palawanirufus
Leptobotia brachycephala
Liobagrus pseudostyani
Listrura macacuensis
Listrura macaensis
Loricaria turi
Loricariichthys melanurus
Mastacembelus kadeiensis
Mastacembelus ubangipaucispinis
Megaleporinus prochiloides
Metriaclima gallireyae
Metriaclima ngarae
Microcambeva watu
Microcharacidium bombioides
Microctenopoma steveboyesi
Microctenopoma stevenorrisi
Moenkhausia andrica
Moenkhausia cambacica
Mustura subhashi
Mustura taretensis
Nandus banshlaii
Nannocharax hadros
Nasutoryzias ataranensis
Nemacheilus argyrogaster
Nothobranchius elucens
Nothobranchius nikiforovi
Oryzias andrewi
Oxynoemacheilus amanos
Oxynoemacheilus fatsaensis
Oxynoemacheilus isauricus
Oxynoemacheilus nasreddini
Oxynoemacheilus phasicus
Oxynoemacheilus sarus
Oxynoemacheilus shehabi
Paracanthopoma cangussu
Paracanthopoma saci
Paratrygon orinocensis
Paratrygon parvaspina
Paravandellia alleynei
Parosphromenus juelinae
Parosphromenus kishii
Parotocinclus jacksoni
Parotocinclus kwarup
Percina freemanorum
Pethia castor
Pethia pollux
Phenacogrammus concolor
Phenacogrammus flexus
Platysmacheilus wangcangensis
Poptella fuscata
Potamotrygon roulini
Priocharax britzi
Pristella crinogi
Profundulus adani
Pseudobagarius eustictus
Pseudogobius cinctus
Pseudogobius hoesei
Pseudolaguvia vespa
Psilorhynchus magnaoculus
Pungitius modestus
Rakthamichthys mumba
Rhinogobius estrellae
Rhinogobius tandikan
Rhyacoglanis rapppydanielae
Rineloricaria rodriquezae
Rivuluscollieri
Salmo baliki
Schismatogobius limmoni
Schizodon trivittatus
Serranochromis alvum
Serranochromis cacuchi
Serranochromis cuanza
Serranochromis swartzi
Synodontis abditus
Tachysurus lani
Trichomycterus anaisae
Trichomycterus chapadensis
Trichomycterus funebris
Trichomycterus humboldti
Trichomycterus ingaiensis
Trichomycterus jatobensis
Trichomycterus luetkeni
Trichomycterus sainthilairei
Triplophysa ferganaensis
Triplophysa huidongensis
Triplophysa jinchuanensis
Triplophysa shashiguii
Triplophysa wulongensis
Triplophysa yuzeshengi
Troglonectes hechiensis
Vanmanenia marmorata
Yunnanilus chuanheensis

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