

A FISH-CENTRIC GUIDE TO ZOOLOGICAL NOMENCLATURE

Nearly every species of plant, animal, fungus, moneran, and protist known to science has been assigned a formal scientific name. These names are recognized by scientists and naturalists, whatever their native language, all over the world. According to the online Catalogue of Life (catalogueoflife.org), around two million species have been named so far. If the names of all these species were printed one to a line in the same font and size you see here, in the same column and page format, it would fill a book around 17,000 pages long.

But the book would be far from complete. Depending on the estimate, anywhere from 3–8 million living species (Costello et al., 2013) to a *trillion* (Locey & Lennon, 2016) have yet to be discovered. Simply put, our planet is teeming with so many different forms of life that there is no practical way of describing and cataloging them all.

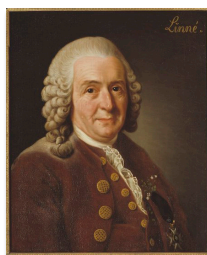
And yet we try. Presently 18,000–19,000 new species are described every year (Haelewaters, 2021). Most of them are small and hard-to-find, such as bacteria, fungi, nematodes, and insects. In the comparatively small world of fishes, an average of 409 new species have been described yearly since 2004 (Fricke et al., 2023). At the turn of the millennium, one ichthyologist predicted the total number of Recent fish species would max out at 31,500 (Berra, 2001). He was off by a few thousand. Right now there are over 5,200 described genera and 36,700 described species of fishes throughout the world. There's no telling how many more await discovery.

What follows is an introduction to zoological nomenclature illustrated with names from the world of fishes (but which apply to non-fish taxa as well). The first five sections explain how names are formed, how they are proposed or made “available,” why some names (synonyms) are set aside or not used at all, and why a name that's in use today may be replaced by a different name tomorrow. This is by no means a comprehensive treatment of the subject — just the highlights. Since naming organisms is a strictly human activity combining objective science with subjective self-expression, the final sections survey the various *types* of names an ichthyologist can consider when describing a new taxon.

The father of taxonomy

When new species are discovered and described, they are given a unique name using a system devised by Swedish naturalist Carl Linnaeus (1707–1778).

Linnaeus was frustrated by the inconsistent ways his fellow naturalists referred to various plants and animals. Some of the names they used were long and unwieldy. Others were changed at whim. The name of a well-known species in one publication had a different name in another. With a large increase in the number of species being brought into Europe from Africa, Asia and the Americas, Linnaeus saw a need for a workable and universal system of biological nomenclature. His solution was a binomial



(two-term) name consisting of a genus (the first part of the name) and the species (the second part). Linnaeus also devised a hierarchical taxonomic system (species, genus, family, order, etc.) in which organisms are classified based on anatomical similarities.¹ Although Linnaeus was not the first to use binomials, he was the first to use them consistently; for this reason the first validly described plants date from his *Species Plantarum* (1753), and the first validly described animals date from the tenth edition of his *Systema Naturae* (1758). Names proposed before these two works were invalidated unless Linnaeus had chosen to retain them.² As the father of taxonomy (the science of naming organisms and their classification), Linné got first dibs at naming rights.

Anatomy of a scientific name

Scientific names are sometimes referred to as “Latin” names. Since Latin was the language of scholarship in 18th-century Europe, scientific names were originally written in Latin or latinized Greek.

A scientific name must always be shown in *italics*, underlined (now rare but common in typewriter days), or else set apart in some fashion so that you know it's a scientific name. The generic name always starts with a capital letter; the specific name is always lower case. Sometimes the generic and specific names have the same spelling, e.g., *Hucho hucho* (a salmon) and *Alosa alosa* (a shad). These names are called tautonyms. Interestingly, tautonyms are prohibited in botanical nomenclature.

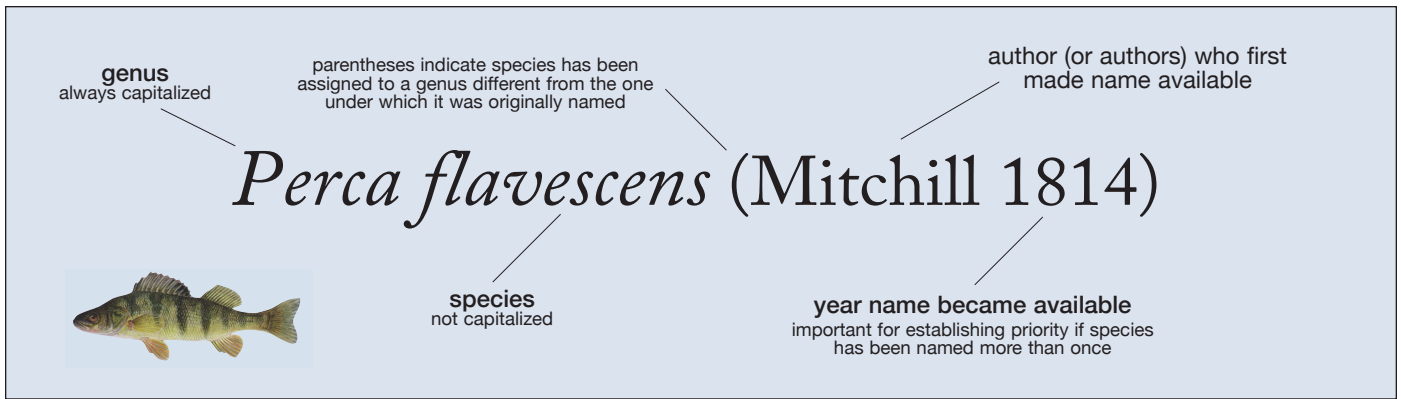
Often you will see scientific names with the author's name and the date of authorship following it. An author is the person (or persons) who first officially proposed the name in a publication. Sometimes listing the author's name helps in identifying the species, especially when two closely related species have similar epithets, as in the one-letter difference between *Neolamprologus leloupi* (Poll 1948) and *Neolamprologus leleupi* (Poll 1956), both from Africa's Lake Tanganyika. Having the date with the name helps researchers in locating relevant literature. Many times the author's name is given in parentheses (as in the Poll examples above). This means that the species has been assigned to a genus other than the one in which it was originally described.

When a species is divided into two or more subspecies, a third word is added to its name. The third name of the nominate, or original, form of the species repeats the specific name, as in Atlantic Sturgeon, *Acipenser oxyrinchus oxyrinchus*. Any newly described subspecies are assigned a third name that's different, as in the Gulf Sturgeon, *Acipenser oxyrinchus desotoi*.

The anatomy of a scientific name of a representative fish (Yellow Perch, *Perca flavescens*) is illustrated on the next page.

¹ This was by no means a perfect system, as unrelated animals of similar appearance — eels, snakes and worms, for example — were classified together, but it was an important first step to bringing some semblance of order to classification. Although plants and animals are now classified based on evolutionary relationships, not anatomy, Linnaeus' taxonomic categories remain.

² One exception: The first validly described spiders date from Carl Clerck's *Aranei Svecici*, also from 1758.



Forming names: a few simple rules

The rules for coining or forming a scientific name, as codified by the International Commission on Zoological Nomenclature (ICZN), are actually quite simple.

1. The name must be written using the 26 letters of the Latin (or Roman) alphabet (as opposed to Arabic, Chinese, and other languages that employ a different lettering system).
2. The name must be at least two letters long. Numbers and diacritical marks are not allowed. (But hyphens are okay, e.g., the North American minnow *Erimystax x-punctatus*, named for its x-shaped spots.)
3. The name must be pronounceable. *Tahuantinsuyoa macantzatza* (a cichlid from Peru) may be a tongue-twister, but that's okay. Naming a fish “*dpjilyzpyk*” is not.
4. The name is unique among animals. No two genera of animals can have the same genus name, and no two species within the same genus can share the same trivial epithet. In cases wherein a name is deemed to be “preoccupied,” a replacement name is to be proposed. Naming a new species of *Chromis* damselfish after legendary coral-reef fish expert John “Jack” E. Randall (1924–2020) would certainly be fitting, but the name “*Chromis randalli*” is already in use. To honor Randall for a second time within this genus you would need to propose a new construction (e.g., *randalliana*, *johnrandalli*, *jackrandalli*). Interestingly enough, homonymy between animals and organisms in other kingdoms is allowed. The fish genera *Lactarius*, *Mallotus* and *Zeus* have homonyms in mushrooms, flowering plants and sac fungi, respectively.

Although it's not a formal rule, just a strong recommendation, the name should be non-offensive. No profanities and no racial, ethnic, sexual, political, and religious slurs or connotations. Naming a fish after someone who harbors racist or other offensive views (and many plants and animals were in the 19th- and early 20th-centuries, when such views were the norm among the privileged) is acceptable (begrudgingly) as long as the description does not explicitly honor the person for such views.³

That's it, really. Coining a name for a new genus or species isn't all that complicated. Formally describing a new taxon, however, and properly publishing its name so that other zoologists know about it (i.e., making the name “available”), are other, more complicated, matters entirely. We'll summarize a few key concepts in the next two sections.

³ In 1937, Oskar Scheibel (1881–1953), an Austrian amateur entomologist, named a blind cave beetle from Slovenia *Anophthalmus hitleri*. Scheibel wrote (in German): “Dedicated to Reich Chancellor Adolf Hitler, as an expression of my reverence.” Naming a taxon after Hitler today, however, would not go over well. Journal editors would likely reject the manuscript and, should the name somehow make its way into print, the ICZN would likely be petitioned to officially suppress it.

Making names “available”

In order for a zoological name to be considered “available” — that is, permanently affixed to a taxon and available for use by other zoologists — it must be proposed in certain ways as required by the ICZN. These rules were non-existent in the early days of binomial nomenclature, when names could be proposed in the most casual and perfunctory of ways. The first ICZN “Code” of 1905 established hard rules. These rules have been revised over the years, and continue to be revised, especially now that the Internet and online media have changed scientific publishing (and not necessarily for the better).

To be considered available, a name published after 1999 must be explicitly indicated as intentionally new, usually by adding the descriptors *sp. nov.* (for new species) or *g. nov.* (for new genera) in the title, abstract, or elsewhere in the text. A type species (for a new genus) or a holotype (for a new species) must be identified along with the museum or fish collection where it is housed. The name must be accompanied by a description that is meant to distinguish the taxon from other taxa. And the publication in which the name and description appears must meet certain conditions. If printed on paper (using ink or toner), the publication must be obtainable when first issued, either free of charge or by purchase. If published electronically (after 2011 only), either for free or behind a paywall, the format must but be fixed (i.e., non-HTML, usually a PDF), with the date of publication stated in the work and the work itself registered in the Official Register of Zoological Nomenclature (ZooBank) with evidence of such registration (a ZooBank number) appearing in the text.

The nature of online publishing creates a few complications that can affect the availability of a name. Some printed journals release online the manuscript versions of accepted articles, presumably as a “heads up” to other zoologists who are studying the same taxa. Proposed new names in these versions are *never* available. Once typesetting and other formatting is complete, the journal then releases an “early view” version with temporary page numbers before its inclusion in a printed volume. If that version has a ZooBank number and all other conditions are satisfied, then the name is available and dates to that electronic release. If the ZooBank registration is missing (many taxonomists and publications appear to be unaware of or forget this requirement), then the name is not available until a printed version, or a revised electronic version with a ZooBank addendum, is published.

Most peer-reviewed publications play by the rules, but there are a growing number of “predatory” journals that apparently appeal to taxonomists who cannot get their work published elsewhere. Such journals don't really care about good science; they exist only to make money by charging their authors a publication fee. As spurious as these journals

may be, new taxa published in them would still be considered available — and would warrant inclusion in The ETYFish Project — except for a fatal combination: They are almost exclusively electronic and ZooBank registration is almost never included.

The nomenclatural purgatory of synonymy

It was an embarrassing blunder for one of America's greatest ichthyologists. In 1938, Henry Weed Fowler (1878-1965), curator of fishes at the Academy of Natural Sciences of Philadelphia, described a new

species of sea bass from Hong Kong. He named it *Pikea sericea*. Unfortunately, and inexplicably, Fowler did not recognize the fish for what it was, the common and familiar Largemouth Bass *Micropterus salmoides* of North America, a popular gamefish, which had been introduced into several Hong Kong reservoirs (Smith-Vaniz and Peck, 1997; Hay and Hodgkiss, 1981). Fowler's reputation survived, but the name he proposed, *Pikea sericea*, will forever be assigned to a nomenclatural purgatory called synonymy — available names for taxa that already have available names. The older name, which has priority, is called the senior synonym. Subsequent names are called junior synonyms.

Names so offensive, they were pulled from publication

Linnaeus famously named a few noxious plants after people he disliked. In 1857, Polish-German naturalist William (or Wilhelm) Blandowski (1822-1878) tried something similar. But he didn't get away with it. In a paper entitled "Natural History of the Lower Murray" to appear in *Transactions of the Philosophical Institute of Victoria*, Blandowski named the Silver Perch *Cernua eadesii* after Richard Eades (1809-1867), a physician at Melbourne Hospital and a co-founder of the Philosophical Institute. Blandowski said the fish was "easily recognized by its low forehead, big belly and sharp spine." Blandowski also described the River Blackfish *Brosmius bleasdalii*. He named it after the Revd. Dr. John Ignatius Bleasdale (1822-1884), who later became president of the Royal Society of Victoria. "A slippery fish," Blandowski wrote. "Lives in the mud."

Eades and Bleasdale took umbrage with these less-than-flattering descriptions. Institute officials accused Blandowski of deliberately lampooning or besmirching the reputations of two well-respected colleagues, pointing to the fact that Blandowski had a motive — simmering disagreements and financial tensions between he and the Institute. They asked Blandowski to change the names or revise the descriptions. Blandowski refused. So the Institute literally yanked the entire fish section from Blandowski's paper after it was printed but before it was released. Inserted in its place was a short note:

"Pages 131 to 134 inclusive, with four Plates, are omitted from this volume of the *Transactions*, by an order of the Council, of date, 7th April, 1858."

As it turns out, both offending names are junior synonyms of previously described species. *Cernua eadesii* is actually *Bidyanus bidyanus* (Terapontidae), described by Mitchell in 1838. And *Brosmius bleasdalii* is *Gadopsis marmoratus* (Percichthyidae), whose name dates to Richardson 1848. But Blandowski described seven other species for the very first time. Had he agreed to change the names (or descriptions) of *eadesii* and *bleasdalii*, the taxonomic portion of his paper would likely have been published, and Blandowski's authority would now forever be associated with these species:

Ambassia agassizi Steindachner 1867 = *Cernua wilkiensis*

Galaxias rostratus Klunzinger 1872 = *Uteranka irvingii*

Melototaenia fluviatilis Castelnau 1878 = *Jerrina dobrensis*

Craterocephalus fulvus Ivantsoff, Crowley & Allen 1987 = *Kohna mackennae*

Nemataloso erebi Günther 1868 = *Megalope caillentassart*

Morgurnda adspersa Castelnau 1878 = *Kurrina macadamia*

Retropinna semoni Weber 1895 = *Turritja achenson*

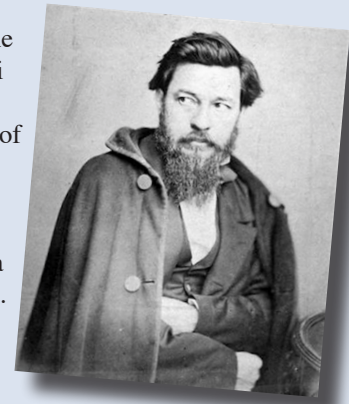
Amazingly, it took 130 years to complete the taxonomy that was redacted from Blandowski's paper.

Blandowski returned to Europe in 1859, where he tried to get his Australian research published, but to no avail. Quickly, however, he found success in the nascent art of photography. He opened a portrait studio, photographed the local gentry, and documented Prussian life as a 19th-century equivalent of a photojournalist. He never married and died at a psychiatric hospital in Poland.

Two fish genera have been named in Blandowski's honor: *Blandowskius* Whitley 1931 (Monacanthidae) and *Blandowskiella* Iredale & Whitley 1932 (Ambassidae). Continuing the theme of obscurity that plagued his career, both names have since been subsumed into synonymy.

At least one hard copy of Blandowski's fish descriptions has survived. If you access the Biodiversity Heritage Library's PDF of the *Transactions of the Philosophical Institute of Victoria* for 1858,¹ you'll see that the deleted pages have been reinstated. The original tipped-in note indicating that the pages had been removed is there as well.

¹ <https://www.biodiversitylibrary.org/page/34876976#page/156/mode/1up>



William Blandowski, undated self-portrait, albumen silver photograph.

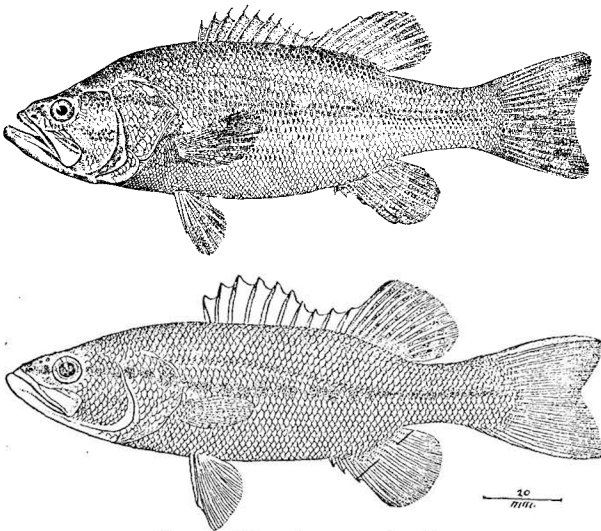


Figure 2. *Pikea sericea* new species. Type.

Top: historical image of Largemouth Bass *Micropterus salmoides* from North America. Bottom: *Pikea sericea* from Hong Kong (as published in Fowler 1938). Oops!

Among fishes, junior synonyms account for 50% of all available genus-level names and 41% of all available species-level names (according to data at Eschmeyer's Catalog of Fishes). Many of these synonyms date to the early days of nomenclature, when it was difficult for a taxonomist in one country to know what a colleague in another country had published. Printed books and journals were expensive and readily available only to a privileged few. Mail took months, even years, to cross continents and oceans. As a result, many species were described and named multiple times. It wasn't until the 20th century when taxonomists, with easier access to well-stocked libraries, began to sort through the names and establish which ones have priority. The sorting continues to this day, aided by the digitization and near-instant electronic availability of even the rarest, most obscure publications.

Synonymy happens for other reasons also. Sometimes poor descriptions are rushed into print because of competitiveness, ego, or the academic pressures of publish-or-perish. Sometimes taxonomists are mistaken about the distinctiveness of what they're describing. And sometimes, as in the case of Fowler's *Pikea sericea*, they're just plain sloppy. Be that as it may, a newly published available name is treated as a senior synonym until a competent taxonomist says otherwise in a follow-up, preferably peer-reviewed, publication. There is no official arbiter or referee in taxonomic disagreements, although the editors of Eschmeyer's Catalog of Fishes do an admirable job in weighing the evidence and choosing a side for their database. Ultimately, the final judges are fellow taxonomists. If a new name or taxonomic decision is considered worthy, it will be repeated in subsequent publications by different authors and the name will be accepted by consensus rather than decree. That's how taxonomy works.

Taxonomic and nomenclatural disagreements can drag on. In 1997, American ichthyologist Jay R. Stauffer argued that the African cichlid genus *Maylandia*, proposed by two European aquarists in 1984, was an unavailable name. Stauffer proposed *Metriaclima* as a replacement name. Other ichthyologists weighed in and concluded that *Maylandia*, while imperfectly proposed by amateur taxonomists was despite its shortcomings a validly formed and available name, thus rendering *Metriaclima* a junior synonym of *Maylandia*. William N. Eschmeyer, the creator of the online Catalog of Fishes (ECoF) that now bears his name, and one of the world's foremost authorities on fish taxonomy and

nomenclature, reviewed the evidence and sided with *Maylandia*. Yet Stauffer continues to use his name, describing or co-describing 13 new species of *Metriaclima* since 1997 (including two in 2021), which ECoF editors dutifully record and then place in *Maylandia*, adding parentheses around Stauffer's and his collaborators' names, indicating that the species are now in a genus different from the one it which they were proposed. Neither side has budged.⁴

Not every junior synonym stays a synonym forever. Every year, a dozen or so synonyms escape their nomenclatural purgatory and are revalidated or resurrected as "new" old species. This usually happens when a taxonomist takes a fresh look at an old museum specimen and discovers morphological differences that predecessors had overlooked and/or genetic evidence that the specimen in question represents a discrete evolutionary lineage and hence warrants recognition as a distinct (though closely related) species. This is where the availability of "available" names comes into play. If an old name isn't available, a new name is proposed.

Synonymy is a two-way street. Just as an old name can be given new life, an existing, even long-established name can be sunk into synonymy. Which is the topic of our next section ...

Why scientific names change

For all the work taxonomists put in making sure their names stand the test of time, many of them do not. Taxonomy is a dynamic process, which means, for better or worse, that names change. This can be frustrating to non-scientists and scientists alike. Still, such changes usually occur for good reason and not at the whim of a bookish academic with nothing else to do. Most name changes occur for one of three reasons:

1) *A previously available but overlooked name has priority.*

Example: In 1968, James D. Williams described the Pygmy Sculpin *Cottus pygmaeus* from Alabama, USA. Little did he know that a Finnish sculpin, *Cottus quadricornis pygmaeus*, had been described in an obscure Finnish journal in 1932. Although the Finnish sculpin's name is no longer used, it's considered "preoccupied" and forever fixed to its specimen. Williams assigned a replacement name, *Cottus paulus*, in 2000. The new name (Latin for little), like the old one, refers to the fish's small size (4.5 cm TL, or total length) relative to other members of the genus.

2) *A species is shown to be the same species as one already described.* Example: The Rainbow Trout of North America's Pacific Northwest was known for more than a century as *Salmo gairdneri*. But in 1989, new biochemical and anatomical data revealed that the Rainbow Trout is the same species as *Oncorhynchus mykiss* from the Kamchatka Peninsula in Siberia. Since the Kamchatkan species was described first (1792 vs. 1836), its name has priority. *Salmo gairdneri* is now *Oncorhynchus mykiss*.⁵

3) *The species is placed in a different genus.* This is the most common cause of nomenclatural changes, although it can be said that the name doesn't change, just the genus. Generic changes are usually the result of systematists continuing to explicate the phylogenetic relationships between closely related taxa. Sometimes when the genus is changed, a slight change in the spelling of the specific name is required

⁴ What's my take? I'm still researching the issue, but based on the evidence and arguments I've seen thus far, *Maylandia* has the edge.

⁵ The epithet *gairdneri*, in honor of surgeon-naturalist Meredith Gairdner (1809–1837), who collected the first specimens and wrote a detailed account of them, lives on in the name of the subspecies *Oncorhynchus mykiss gairdneri*.

if it is an adjective. Per Latin grammar, adjectival names must agree with the gender (feminine, masculine, neuter) of the generic name.⁶ Example: When the Indo-West Pacific goby *Ctenogobius nocturnus* (an adjective, meaning nocturnal or of the night, presumably referring to its occurrence in dimly lit sections of coral reef) was relocated to *Priolepis*, the spelling was emended from the masculine *nocturnus* to the feminine *nocturna* to match the shift from a masculine to a feminine generic name. (A shift to a neuter genus would change the spelling to *nocturnum*.) Names based on nouns do not face this issue; their spellings remains unchanged. If *Ctenogobius nocturnus* had been named “*Ctenogobius nox*” (a nominative noun, “the night”), or “*Ctenogobius noctis*” (a genitive noun, “the night’s *Ctenogobius*”), then its spelling would not have changed when moved to *Priolepis*.

Names may change for other reasons too arcane to discuss here. And names may change only to be changed back for the sake of nomenclatural stability. The Topeka Shiner, an endangered minnow from the central United States, is a case in point. Its name was changed from *Notropis topeka* to *Notropis tristis* when two ichthyologists found a specimen labeled *Notropis tristis* in a Paris museum that had been described in 1856 but subsequently lost and forgotten. Examination showed it to be identical to *N. topeka*, described 27 year later. Since *N. tristis* was described first, its name had priority. Thus the two ichthyologists (Mayden and Gilbert, 1989) published a brief note recommending that *Notropis topeka* should henceforth be called *Notropis tristis*. Other ichthyologists later petitioned the ICZN to suppress *tristis* in favor of *topeka* since virtually every text on North American fishes was using the latter name. Unlike the change of *Salmo gairdneri* to *Oncorhynchus mykiss*, which reflected that Rainbow Trout naturally occur on both sides of the Pacific, changing *topeka* to *tristis* demonstrated nothing and would cause more confusion than it was worth. Common sense prevailed and *Notropis topeka* was officially retained to keep the nomenclatural apple cart from tipping unnecessarily (ICZN, 1995).

Eight ways to name a fish

An ichthyologist sits in her lab examining a fish that represents a new genus, a new species, or perhaps both. What to name it? She considers the fish itself for inspiration. What’s the first thing you notice about it? What makes it different from other fishes? Where is it from? How does it spawn? Or maybe she considers something not about the fish but about herself. Who does she love? Who does she admire? Who nurtured her interest in ichthyology? What were the circumstances, personal or professional, that led to *this* fish ending up in *her* lab awaiting its formal inclusion in the grand registry of Life on Earth?

Whatever name she decides upon, it will likely fall into one of these eight broadly defined categories: Descriptive. Biological. Systematic. Anthropocentric. Commemorative. Toponymic. Vernacular. And a miscellaneous category I call “nonsensical.” These are informal categories of my own invention based on my analysis of over 42,400 currently valid genus- and species-level fish names. There is a lot of variation within these categories, and some names borrow elements from more than one. My objective is simply to illustrate — and in so doing take pleasure in — the diversity of ways ichthyologists have named the fishes of the world.

⁶ How do you tell if a fish’s generic name is masculine, feminine or neuter? Usually this involves looking up the primary word that forms the name — or the final component of a compound name — in a Greek or Latin dictionary. But there’s a much easier way. Simply visit Eschmeyer’s Catalog of Fishes and enter the name in the genus field. You’ll see the gender (Masc., Fem., or Neut.) after the hyperlinked reference number.



A DESCRIPTIVE NAME: *Balistoides conspicillum* (Bloch & Schneider 1801), the Clown Triggerfish, is a conspicuously colored fish, but that’s not what “*conspicillum*” refers to. “*Conspicillum*” is Latin for lens or spectacles. Although the authors did not explain the meaning of the name, it probably refers to the broad stripe between the snout and eyes, like a pair of spectacles perched on the nose. Photo taken at uShaka Sea World Aquarium (Durban, South Africa), courtesy of Wikipedia.

Descriptive names

Descriptive names are those that refer in some way to a physical characteristic possessed by the genus or species in question. This could be color, color pattern, size, shape, anatomy, proportion, peculiarity, general appearance, and more. There’s even a Bangladeshi minnow-like fish, *Devario coxi*, named, in part, for a gene fragment used to identify the species (*cytochrome c oxidase subunit 1*, often shortened to COXI). Not surprisingly, most zoological epithets are descriptive in nature. That’s what “describing” a species is all about. While many such names indicate a diagnostic character that helps to distinguish a taxon from its nearest relatives, this is not a requirement. If spots are the most noticeable feature of a fish but all of its closest relatives are spotted as well, there’s no rule against naming it *maculatus* or *punctatus* (assuming, of course, those names have not already been used in the genus).

Many fishes are named for their similarity to other fishes. Many (but not all) such names include the Greek suffix *-oides*, meaning like, resembling, or having the form of. At least six currently valid fish species bear the monicker *cyprinoides* (*cyprinus* = carp), referring to their carp-like shape or appearance.

Fishes may also be named for non-fish animals. This practice is found in virtually every language and dates to the ancient Greeks, indicating that it was common to name unfamiliar fishes based on their resemblance to familiar animals that live on land, including dogs (*canis*), cats (*felis*), pigs (*porcus*), horses (*equinus*), zebras (*zebrina* and *quagga*), weasels (*mustelinus*), hedgehogs (*erinceus*), eagles (*aquila*), guinea fowl (*meleagris*), parrots (*psittacus*), snakes (*ophis*, *serpens* and *vipera*), frogs (*batrachus*), butterflies (*papilio*), and many others. No one has named a land animal after a fish.

Names that compare fishes to everyday objects are also common. Zoological nomenclature began in the day when horses were the primary mode of transportation, which may explain why saddles and bridles are evoked so often in fish names proposed in the 18th and 19th centuries. I count at least eight fishes named for the saddle-like markings on their backs and 18 for the bridle-like markings on the sides of their heads.⁷ Other items common in these times are also well-repre-

⁷ SADDLES: *Amphiprion ephippium* (Bloch 1790), an anemonefish; *Chaetodon ephippium* Cuvier 1831, a butterflyfish; *Thorogobius ephippiatus* (Lowe 1839), a goby; *Stigmatogobius sella* (Steindachner 1881), a mudskipper goby; *Apogon retrosella* (Gill 1862), a cardinalfish (*retro* = back); *Dascyllus albisella* Gill 1862, a damselfish (*albus* = white); *Microcottus sellaris* (Gilbert 1896), a sculpin; *Argyripinus ephippiatus* Gilbert & Cramer 1897, a bristlemouth. BRIDLES: *Scarus frenatus* Lacepède 1802, a parrotfish; *Sufflamen fraenatum* (Latreille 1804), a triggerfish; *Scolopsis frenata* (Cuvier 1830), a threadfin bream; *Pristiapogon fraenatus* (Valenciennes 1832), a cardinalfish; *Sparisoma aurofrenatum* (Valenciennes 1840), a parrotfish (*auro* = gold); *Oxynoemacheilus frenatus* (Heckel 1843), a stone loach; *Paramonacanthus frenatus* (Peters 1855), a filefish; *Amphiprion frenatus* Brevoort 1856, an anemonefish; *Crenicichla frenata* Gill 1858, a pike cichlid; *Rypticus sub-*

sented, including knives (*culter*), swords (*xiphos*), saws (*serra*), plowshares (*vomer*), and wool cards (*carminifer*, i.e., bearing a wool card). Do you think any contemporary ichthyologists will name a fish after a gadget that's in vogue today? Earbuds, maybe? A webcam? A wireless gaming mouse?

Some ichthyologists get creative with their descriptive epithets, naming them for their supposed resemblance to characters from film, literature and popular culture. Examples include Batman, Gollum from "The Lord of the Rings" trilogy, Quasimodo from *The Hunchback of Notre Dame*, Sycorax warriors from the BBC sci-fi series "Dr. Who," Luke Skywalker from the "Star Wars" franchise, and Malvolio, Lady Olivia's steward in Shakespeare's *Twelfth Night*.

Here's a descriptive name that's intentionally non-descriptive: In 1980, Anita George and Victor G. Springer described a new clinid blenny (genus *Ophiclinus*) from Australia. They named it *ningulus* from the Latin word for "nobody," referring to its "lack of distinctive characters that might otherwise serve as a basis for a scientific name." (The blenny is instead identified through a unique combination of characters.)

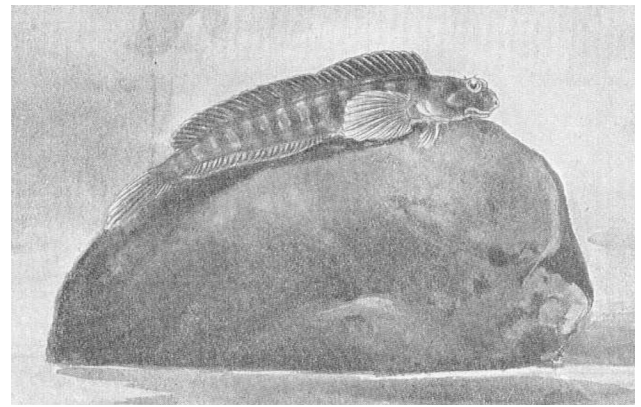
Biological names

Many fishes are named for some aspect of their biology — how they eat, what they eat (and what eats them), how long they live, how they swim, what habitat they prefer, if and when they migrate, and so on. Biological names presuppose that the describer has observed the fish in life (in an aquarium or ideally in the wild), but this isn't always the case. Inferring behaviors from dead specimens in jars have led to unfortunate names. For example, in 1897 German-Dutch zoologist Max Weber (1852–1937) named an African minnow *Barbus* (now *Enteromius*) *viviparus*, believing it represented the first documented instance of viviparity (giving birth to live young) amongst an otherwise oviparous (egg-laying) group of fishes. In 1943, South African zoologist Keppel Harcourt Barnard (1887–1964) set the record straight when he discovered that fry with yolk sacs from a mouth-brooding cichlid, presumably collected at the same time, had been preserved in the same tube as the minnow! Although a misnomer, the name remains nomenclaturally valid.

Many fishes are named for their habitat, e.g., *fluviatilis* for river, *lacustris* for lake, *fontinalis* for spring, *thermalis* for hot spring, *silvicola* for jungle or forest, *rupestris* and *saxatilis* for rocks, *torrenticola* for rapids, *cataractae* for waterfall, *marinus* for sea, *littoralis* for sea shore, *profundus* for deep, *abyssalis* for deep sea, *monticola* for mountain, *subterraneus* for underground.

The African cichlid *Haplochromis cronus* Greenwood 1959 is named for Cronus (or Kronos), the leader of the Titans in Greek mythology, who devoured his sons as soon as they were born to prevent the prophecy that they would overthrow their father just as Cronus had overthrown his; the name alludes to how this cichlid feeds almost exclusively on the embryos and larvae of other cichlids. The genus *Scatophagus* Cuvier 1831 (*skatos*, dung; *phagein*, to eat) is named for what Cuvier described as a "singular taste for human excrement" (translation) — although it should be noted that their alleged scatophagy has not been confirmed in modern studies. And the feeding behavior of *Plectrochilus diabolicus* (Myers 1927) is indeed diabolical; this parasitic catfish from South America was discovered burrowed through body wall and into

bifrenatus Gill 1861, a soapfish (*sub* = somewhat, *bi* = two); *Brachyistius frenatus* Gill 1862, a surfperch; *Stegastes rectifraenum* (Gill 1862), a damselfish (*rectis* = straight); *Coryphopterus glaucofraenum* Gill 1863, a goby (*glauco* = hoary blue); *Arenigobius bifrenatus* (Kner 1865), a goby (*bi* = two); *Notropis bifrenatus* (Cope 1867), a shiner or minnow (*bi* = two); *Gymnocranius frenatus* Bleeker 1873, a large-eye seabream; *Zaniolepis frenata* Eigenmann & Eigenmann 1889, a combfish; *Sarritor frenatus* (Gilbert 1896), a cardinalfish.



A BIOLOGICAL NAME: Leapin' Lizard Blenny! Both parts of the name of *Alticus saliens* (Lacepède 1800), a combtooth blenny from the Indo-West Pacific, refer to how, when grazing on algae outside the water on exposed lava rocks of the tidal zone, they skip and jump like wet lizards. "*Saliens*" is Latin for jumping or leaping. "*Alticus*," also proposed by Lacepède, is a combination biological-vernacular name, derived from the French name *l'altique sauteur*, meaning "high jumper." Illustration from: Jordan, D. S. 1907. *Fishes*. Henry Holt & Company, New York. i–xv + 1–789 + 18 plates.

the belly of a large river catfish (*Pseudoplatystoma*), where it was distended with blood.

Not all fishes are predators, of course. Many are prey. The South Australian snailfish *Paraliparis infeliciter* Stein, Chernova & Andriashev 2001 is known from only one specimen eaten by an Orange Roughy *Hoplostethus atlanticus*. Its Latin name means "bad luck."

A handful of biological names refer to a fish's abundance or scarcity in the wild. The specific name of the Rio Grande Sucker of the American Southwest, *Pantosteus plebeius* (Baird & Girard 1854), means commonplace, referring to its abundance in the 1850s; it is far less abundant today. *Xylophius anachoretus* Figueiredo & Britto 2010, a banjo catfish from Brazil, is named for a recluse or hermit; only two specimens are known, each one found alone and far from the other.

Two fishes have names that indicate they were described after they had recently gone extinct. The La Trinidad Pupfish *Cyprinodon inmemoriam* Lozano-Vilano & Contreras-Balderas 1993 vanished from existence shortly after its discovery in 1983. It occurred in Ojo de La Trinidad, an isolated desert spring in Nuevo León, Mexico. The spring was already drying up, so the authors collected only a single specimen to minimize impact, intending to collect additional fish later. Upon their return in 1986, the spring was dry due to water extraction and the species was gone. "*Inmemoriam*" means "in memory." A species of whaler (or requiem) shark, *Carcharhinus obsoletus* White, Kyne & Harris 2019, was described based on two specimens from Borneo and Vietnam, collected in 1897 and 1934, respectively, and a third specimen collected from the Gulf of Thailand, date unknown. These are the only known specimens. The authors note that the shark's historic range is under intense fishing pressure and fear that it has been lost for good. They call it the "Lost Shark." Its specific epithet means "extinct."

Systematic names

Systematics is the science of naming and classifying organisms based on their common ancestry (i.e., evolutionary relatedness). Basically, systematics is the same as taxonomy — the formal process for categorizing life that Linnaeus kicked off in 1758 — but with a post-Darwin, evolutionary spin. I define systematic names as those dealing in some way with how the taxon in question was identified, described, named, classified, or placed in a phylogenetic tree.

In zoological nomenclature, a type species is the species to which the name of a genus or subgenus is considered to be permanently tax-



A SYSTEMATIC NAME: The specific name of the Corrugated Darter *Etheostoma basilare* Page, Hardman & Near 2003 from Tennessee (USA), means “at the base,” referring to its relatively basal phylogenetic position in a clade of closely related darters known as the barcheek darter group. A basal lineage is one that evolved early from the root and from which no other branches have diverged. Illustration © Joseph R. Tomelleri.

onomically associated. In the 19th century, several ichthyologists, while proposing new genera, named the type species “*typus*.” For example, the world’s largest fish-like vertebrate, the Whale Shark, *Rhincodon typus*, is one such “type.” Dutch Army surgeon and ichthyologist Pieter Bleeker (1819–1878) was the unquestioned master of this name, accounting for 28 of the 41 times this name has been used (including species now in synonymy). The practice has fallen out of favor; the last fish named “*typus*” for being a type species — *Aphyocyprionides typus*, a Chinese minnow, now a junior synonym of *Aphyocypris chinensis* — dates from 1942.

Here are three examples of fishes named for the sometimes challenging work of taxonomy. *Bathylagichthys problematicus* (Lloris & Rucabado 1985) is a deep-sea smelt named for the difficulties the authors encountered while studying it; these difficulties included unstable nomenclature, uncertain higher-level classification, scarce literature, unavailable type specimens of related taxa, and a year-long editor-driven delay in getting the description to press (Domingo Lloris, pers. comm.). *Diaphus confusus* Becker 1992 is a lanternfish whose name means confused or unclear, reflecting both the “absence of any clear diagnostic trait” defining this species and the “author’s state of mind when searching for a name” (translation). The barbled dragonfish *Eustomias deofamiliaris* Gibbs, Clarke & Gomon 1983 has an unusual name: the Latin *deo* (dative of *deus*, god) plus the adjective *familiaris*, knowing intimately, an “allusion to the fact that we mortals are uncertain whether this specimen represents a valid species or a wildly different anomalous condition of some other species.” In other words, only God knows if this species is really a species.

The above examples are interesting outliers. Most systematic names, however, deal with evolutionary relatedness, often depicted on a phylogenetic “tree” or diagram that depicts the lines of evolutionary descent of different species from a common ancestor. Among genera, phylogenetic names are often coined with prefixes such as *proto-* (first), *para-* (near), and *plesio* (primitive). *Protanguilla* (“first eel”), known only from a deepwater cave off the coast of Palau, is named for its presumed early divergence among other eel genera. *Paragobiocichla*, a cichlid genus from Ghana, is named because it is phylogenetically close to *Gobiocichla*. The name of *Plesiobatis* (“primitive ray”), a deepwater stingray from the Indo-Pacific, refers to its being the most primitive (least derived) ray of the Order Myliobatiformes.

Some systematic names reflect uncertainty regarding a fish’s phylogenetic position. The name of the mostly cartilaginous Ragfish *Icosteus aenigmaticus* Lockington 1880 means “puzzling”; Lockington classified it as a blenny (Blenniidae) but noted, “It can, however, hardly be referring to any of the current families, and should perhaps form the type of a separate one” (which it ultimately did). The similarly named Mexican catfish *Lacantunia enigmatica* Rodiles-Hernández, Hendrickson & Lundberg 2005 was named for both its unexpected discovery (a large

fish commonly caught and eaten by locals yet overlooked by ichthyologists in a relatively well-explored river system) and its obscure relationships and origin (it cannot be placed within or as a basal sister lineage to any known catfish family).

Anthropocentric names

Anthropocentric names are those that refer in some way to a fish’s importance to humans. Is it good to eat? Is it commercially important? Does it pose a danger to human health or safety? Not many names fall into this category, but those that do are interesting.

Pickled, smoked, salted, canned, or planked (broiled over a charcoal fire), the American Shad *Alosa sapidissima* (Wilson 1811) of the Atlantic Coast of North America (and introduced elsewhere) lives up to its name: *sapidissima* means “most delicious,” the very two words Wilson used to describe its palatability. The name of the closely related Hickory Shad *Alosa mediocris* (Mitchill 1814) means “mediocre,” referring to its taste or food value as compared with *A. sapidissima*.

Two fishes are named for their commercial importance. The Singida Tilapia *Oreochromis esculentus* (Graham 1928) was at the time an important food fish along Africa’s Lake Victoria; its name is Latin for “edible.” (Today the fish is critically endangered in Lake Victoria but stocked and commercially fished elsewhere.) *Stolephorus mercurius* Hata, Lavoué & Motomura 2021, an anchovy, is named for Mercury, the Roman god of financial gain and commerce and guardian deity of merchants, referring to the anchovy’s commercial importance in Southeast Asian fisheries.

Although sharks and piranhas may be the most feared fishes in the world, pufferfishes have inspired the most fearful names. The toxicity of “fugu” is now well documented but was poorly known among European explorers in the 18th century. In 1774, two naturalists aboard Captain Cook’s second voyage on HMS *Resolution*, and Captain Cook himself, ate a small portion of a pufferfish purchased at a market at New Caledonia in the South Pacific, and got extremely sick for three days, reporting numbness, disorientation, and shortness of breath. Had they eaten more of the puffer they probably would have died. The puffer was eventually named *Lagocephalus sceleratus* (Gmelin 1789). The Latin adjective *sceleratus* has multiple meanings. Accursed. Criminal. Wicked. Villainous. Infamous. Polluted. Heinous. Harmful. Noxious. All seem to apply. Two centuries later, a Polynesian pufferfish, *Anchisomus multistriatus* Richardson 1854, was placed in its own genus: *Feroxodon* Su, Hardy & Tyler 1986. The name translates as *ferox*, ferocious, and *odon* (from the Greek *odoús*), tooth, referring to its “fierce” biting hab-



AN ANTHROPOCENTRIC NAME: Some fishes are named for their value on the dinner plate. *Danionella cerebrum* of Myanmar is named for its value in the lab. At just 10–15 mm in length, members of the genus are among the smallest vertebrates in the world, with some of the smallest adult brains. But their tiny brains are big among neuroscientists. One of the striking morphological features of *Danionella* is that the roof of the skull is missing. Instead, it’s covered by skin, which allows researchers to study neurophysiological questions by deep imaging the fish’s brain activity while the fish is still alive. Having a tiny, larval-like brain makes *D. cerebrum* a “promising new model species” for neuroscientists studying brain activity and function. The specific epithet *cerebrum* means brain. Photo: An adult male *D. cerebrum*, ca. 10 mm SL. From: Britz, R., K. W. Conway and L. Rüber. 2021. The emerging vertebrate model species for neurophysiological studies is *Danionella cerebrum*, new species (Teleostei: Cyprinidae). *Scientific Reports* 11: 18942: 1–11.

its and unprovoked attacks on human toes. In one such attack, near Proserpine, Queensland, Australia, a girl lost three of her toes.

Commemorative names

A diverse category of animal names are those that honor or commemorate people. A taxonomist is free to name a genus or species after anyone she desires: colleague, collector, mentor, benefactor, philanthropist, helper, spouse, lover, parent, sibling, offspring, mythical or fictional character, favorite writer, composer, musician, painter, actor, the list goes on and on. Such names are called eponyms (or matronyms for women and patronyms for men).

Some zoologists dislike eponyms. They believe such names do not reveal useful information about the taxon being described. Instead, eponyms reveal information about the describer, as if the taxon *belongs* to the person who decided it needed a name. Other zoologists take a middle ground. They don't mind taxa being named after someone who has a legitimate connection with the new species or the taxonomic group to which it belongs: a goby expert, perhaps, for a new species of goby, or an intrepid explorer who risked life, limb and dengue fever to bring an unknown jungle catfish back to the lab. What they do find irritating are eponyms they consider irrelevant. Yes, Bach and Vivaldi are great composers. But what precisely have they to do with deepwater catsharks?⁸

In recent years, zoologists have used eponyms for another purpose: fundraising. It has become fashionable for museums and conservation organizations to auction off the naming rights to new species in order to raise money for environmental and taxonomic research. In 2007, the names of 10 newly discovered fishes⁹ from eastern Indonesia were auctioned off at a black-tie gala in Monaco, raising more than US\$2 million for conservation efforts in the area where they occur. The winning bids ranged from US\$50,000–\$500,000 (Eilperin, 2007). Some zoologists believe these auctions cheapen taxonomy but understand the motivation. (I hope none of these species fall into synonymy. Would the bidders get their money back?)

Whatever your opinion of eponyms, they are structured in one of three ways, as illustrated in this hypothetical example, a freshwater eel named after the American marine biologist, author and conservationist Rachel Carson (1907–1964): “*Anguilla carsonae*” (a noun in the genitive case: “Carson’s eel”), “*Anguilla carson*” (a noun in apposition: “the eel Carson”) or “*Anguilla carsoniana*” (adjective: “the Carsonian eel”). Note that the genitive noun has the feminine case ending “-ae.” If an eel were named after Carson’s fellow biologist-author-conservationist Aldo Leopold (1887–1948), the masculine case ending “-i” would apply: “*Anguilla leopoldi*.” Eponyms named after multiple people receive a plural case ending: -orum for two or more men, -arum for two or more

⁸ *Bythaelurus bachi* Weigmann, Ebert, Clerkin, Stehmann & Naylor 2016 and *B. vivaldii* Weigmann & Kaschner 2017.

⁹ *Hemiscyllium galei* and *H. henryi*, bamboo sharks (Hemiscylliidae), named for underwater photographer and shark enthusiast Jeffrey Gale and underwater photographer Wolcott Henry, respectively; *Chrysiptera giti*, a damselfish (Pomacentridae), named for Giti Tire (a tire company) at the request of its chairman and his wife; two dotybacks (Pseudochromidae), *Pictichromis caiklinae*, in honor of Caitlin Elizabeth, on the occasion of her 16th birthday, at the request of her mother, and *Pseudochromis jace*, composed of the first letters of Jonathan, Alex, Charlie, and Emily, the children of Lisa and Michael Anderson, who won the bid; *Corythoichthys benedetta*, a pipefish (Syngnathidae), in honor of Benedetto “Bettino” Craxi (1934–2000), Prime Minister of Italy (1983–1987), named at the request of Baroness Angela Van Wright Von Berger of Monaco for her “beloved friend”; *Paracheilinus nursalim*, a flasher wrasse (Labridae), in honor of Sjamul and Itjih Nursalim, “beloved” parents of philanthropists Cherie Nursalim and Michelle Liem; *Pterocaesio monikae*, a fusilier (Lutjanidae), in honor of film producer and philanthropist Monika Bacardi; *Pseudanthias charleneae*, an anthias (Serranidae), in honor of Charlene, Princess of Monaco; and *Pterois andover*, a lionfish (Scorpaenidae), named for the Andover group of companies, which owns, builds and manages oceanaria and related operations, named at the request of its chairman.



A COMMEMORATIVE NAME: Several fishes are named after spouses. This one is my favorite. Soviet ichthyologist Lev (also Leo) Semyonovich Berg (1876–1950) named *Eudontomyzon mariae*, a lamprey from Ukraine, in honor of his second wife Maria (née Ivanova). She “examined many thousands of river lampreys from the mouth of the Neva and other streams,” Berg said, and fell “into the Finnish Gulf” (translation). Handling lampreys for your husband and falling into the water — now that’s love! Photo from Wikipedia.

women, and -orum for men and women. These are recommendations, not hard and fast rules. Although I believe it’s bad grammar to give a matronym an -i ending and a patronym an -ae ending (as many taxonomists have), the ICZN does not forbid it. Such spellings are considered “incorrect latinizations” and not subject to being corrected (although many, myself included, have tried).

Sometimes you’ll see -ae used in patronyms derived from names that end with the letter “a” — *Cobitis matsubarae* Okada & Ikeda 1939, for example, named for Japanese ichthyologist Kiyomatsu Matsubara (1907–1968), and *Bunocephalus doriae* Boulenger 1930, named for Italian herpetologist Giacomo Doria (1840–1913). Per Latin grammar, this is an acceptable correct way to form a genitive from masculine nouns (including surnames) that end in “a.” This was a common practice among ichthyologists of the 19th and early 20th centuries, who no doubt studied Latin (then a required subject for scholars), and, reflecting the gender bias of the time, rarely considered naming a fish after a woman (see below for first time). The masculine application of -ae is a relic, last used among fishes in 1956. Just to be clear, using -i for a-ending surnames is acceptable, as in *Polyipnus matsubarai* Schultz 1961, also named for Kiyomatsu Matsubara.

There is another seeming lapsus that should be explained. You will often see patronyms that end with -ii instead of -i for names that do not end in “i” (*agassizii* for Agassiz, *blochii* for Bloch, *kuhlII* for Kuhl, etc.). This is not a mistake. Some early taxonomists, still beholden to Latin as the official language of science, latinized their dedicatees’ names. The popular Coolie (or Kuhli) Loach of tropical aquaria, *Pangio kuhlii* (Valenciennes 1846), was named in memory of Heinrich Kuhl (1797–1821), who died while collecting plants and animals in Java, including this loach. Valenciennes latinized Kuhl to KuhlIus. The genitive spelling for latinized names like KuhlIus can take either the -i or -ii ending, but -ii is more common. Unlike the masculine use of the -ae case ending, this convention still sees use among contemporary ichthyologists who know their Latin, e.g., *Oxyneomacheilus theophilii* Stoumboudi, Kottelat & Barbieri 2006, in honor of Theophilus Chatzimichael (1873–1934), a prominent folk painter from Lesbos Island, Greece, where this fish (a stone loach) is endemic.

I could fill a book with the stories of interesting people who’ve been honored in the names of fishes. Indeed, you will encounter these stories in the etymological accounts that follow. For now, here are a few notable entries.

The only fish named after Linnaeus, the Father of Taxonomy: *Haplochromis vonlinnei* van Oijen & de Zeeuw 2008, a cichlid from Africa’s Lake Victoria, on the occasion of the 250th anniversary of the official start of zoological nomenclature. (Linnaeus became known as

What happens when a zoologist proposes an eponym but spells the name wrong?

If someone named a fish after you, you'd probably prefer your name to be spelled correctly. But what happens if it isn't? Does the incorrect spelling stand? Or should the spelling be changed to reflect the author's intention and properly identify the person who's being honored? It depends.

According to Article 32.5.1 of the International Code of Zoological Nomenclature, "If there is in the original publication itself, without recourse to any external source of information, clear evidence of an inadvertent error, such as a lapsus calami or a copyist's or printer's error, it [the name] must be corrected." In other words, if the original description does not contain internal evidence that the name was misspelled, the incorrect spelling must be retained — even if the author admits in a subsequent publication that an error was made. (Errata pages or cards that appear at the time of publication are exempt from this rule.)

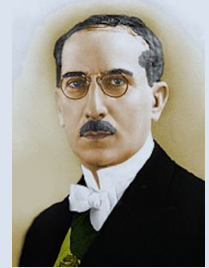
Here are two cases of how Art. 32.5.1 can apply and result in different outcomes, both using eponyms coined by Austrian ichthyologist Franz Steindachner (who demonstrated on more than one occasion that he was a bad speller when it came to his colleagues' or benefactors' names).

In 1875, Steindachner proposed the name *Prochilodus hartii* for a flannel-mouth characiform from eastern Brazil. Steindachner (or his typesetter) spelled the specific epithet with one "t," and did so every time in the description. But also within that paper is a statement from Steindachner that he named the species for Charles Frederick Hartt (1840–1878), an American geologist, paleontologist and naturalist, who helped collect the holotype during the Thayer Expedition to Brazil (1865–1866). Hartt, with two "t"s, is the correct spelling. So, despite Steindachner's consistent use of one "t" when referring to the fish, his correct use of two "t"s when referring to the man in the same paper means, per Art. 32.5.1, that changing the spelling from *hartii* to *harttii* is justified.



Charles Frederick Hartt

In 1907, Steindachner proposed the name *Psilichthys* (now *Pareiorhaphis*) *cameroni* for a neoplecostomine catfish from Theresopolis, Brazil. But Steindachner did not mention for whom the species was named, nor did he mention anyone named "Cameron" in his brief description. He also did not mention anyone named "Calmon," which is most unfortunate because one year later Steindachner changed the spelling from *cameroni* to *calmoni* and indicated that the species was named for Miguel Calmon du Pin e Almeida (1879–1935), Brazil's Minister of Agriculture, Commerce and Industry, as a "token of [Steindachner's] respect and gratitude" (translation).



Miguel Calmon du Pin e Almeida

In this case, Art. 32.5.1 preserves the original incorrect spelling because there is no internal evidence in Steindachner's first description that the name was misspelled. (Although it should be noted that some catfish taxonomists ignore Art. 32.5.1 and spell the name *calmoni*.)

Don't feel too bad for Calmon. Steindachner named another fish after him in 1908 — the piranha *Serrasalmo* (now *Pristobrycon*) *calmoni* — and this time he got the spelling right.

Carl von Linné after he was granted Swedish nobility in 1761.)

The first eponym among fishes: *Periophthalmodon schlosseri* (Pallas 1770), a mudskipper from Indonesia, named for Dutch physician-naturalist Johann Albert Schlosser (1733–1769), who provided a collection of Indonesian fishes for Pallas to study, including this species.

The first woman honored in the name of a fish: *Vinciguerria poweriae* (Cocco 1838), named for Cocco's friend and colleague Jeanne Villepreux-Power (1794–1871), a marine biologist famous for her work on the octopus *Argonauta argo*. In addition, she was the first person to create aquaria for experimenting with aquatic organisms.

The first African-American honored in the name of a fish: *Rhinotocinclus collinsae* (Schmidt & Ferraris 1985), a catfish from Guyana, named for entomologist Margaret James Strickland Collins (1922–1996). She facilitated the senior author's collection of fishes in Guyana while she was stationed there studying termites.

The first fish named after a person who studied fish names was *Pseudobathylagus milleri* (Jordan & Gilbert 1898), a deep-sea smelt from the subarctic North Pacific; it was named in honor of Stanford University linguist and classicist Walter Miller (1864–1949), who

reviewed etymologies for American ichthyologist David Starr Jordan (1851–1931).¹⁰

Speaking of David Starr Jordan, he is the most-honored person among fishes. Thirty-six currently valid taxa bear his name.

My vote for the worst person honored in the name of a fish goes to Jeronimus Cornelisz (also spelled Cornelius, ca. 1598–1629), for whom *Kyphosus cornelii* (Whitley 1944), a sea chub (Kyphosidae), is named. Cornelisz led a bloody reign of terror after the merchant ship he was on shipwrecked at Houtman Abrolhos, a chain of 122 islands and associated coral reefs in the Indian Ocean off the coast of Western Australia. Cornelisz established a brutal rule among the survivors, killing 110–124 men, women, and children over a two-month period and forcing seven surviving women into sexual slavery. He was subsequently found guilty of mutiny and hanged along with six of his henchmen. Whitley named the fish after Cornelisz because it was discovered near where the ship was lost. I find Whitley's selection tone-deaf and distasteful. It may be

¹⁰ One-hundred and twenty-five years later a second fish species was named after a scholar of fish names: *Argyripnus scharpfi* Prokofiev 2023, a marine hatchetfish (Sternoptychidae) from the Bonin Ridge of the northwest Pacific.

appropriate to link the fish's type locality with the islands' infamous place in history. But why honor the man who committed these atrocities? Why not honor the ship, or the men, women and children who suffered and died on that island? Jeronimus Cornelisz represents the worst of humanity. He should not be commemorated in the name of a lovely fish.

Commemorative names are not limited to people. They can also honor expeditions, ships, cultures, schools, museums, organizations, or any other institution or event the describer deems worthy of recognition. Acronyms figure prominently in institutional names. The Australian rainbowfish *Melanotaenia angfa* Allen 1990 is named for ANGFA, the Australia New Guinea Fishes Association. The snake-eel *Apterichtus ansp* (Böhlke 1968) is named for the Academy of Natural Sciences of Philadelphia (ANSP). And the ridgehead or bigscale genus (Melamphidae) genus *Sio* Moss 1962 is named for the Scripps Institution of Oceanography (SIO). But what happens when the acronym for the institution you wish to honor forms an unpronounceable series of letters? In 1973, British ichthyologist N.B. Marshall named a new genus of grenadiers or rattails after the Marine Biological Association of the United Kingdom (MBAUK), whose research vessel *Sarsia* dredged the type species. But “mbauk” or “mbaotuk” are extremely difficult to pronounce. Marshall solved the problem by playfully rearranging the acronym to form *Kumba*.

A few of the more unusual commemorative names include *Polyipnus ruggeri* Baird 1971, a marine hatchetfish, named for rugger, a slang word for rugby football, in honor of New Zealand's national sport, referring to this species' occurrence off Wellington, New Zealand; *Spicomacurus adelscottii* (Iwamoto & Merrett 1997), a grenadier or rattail from the South Pacific, named for Adelscott, a “notably fine French ale” with which the authors celebrated its discovery; and *Parascopopsis qantasi* Russell & Gloerfelt-Tarp 1984, a threadfin bream from Sumatra, in honor of Qantas Airlines, for “invaluable assistance over three years given to the junior author by staff of the Denpasar (Bali) office of the Australian airline Qantas.”

A final note about eponyms: It's considered bad form to name a species after yourself. A few fish names appear to be self-eponymous but closer examination reveals otherwise. Italian ichthyologist and pharmacist Anastasio Cocco (1799–1854) described the lanternfish *Sopelus* (now *Gonichthys*) *cocco* (Myctophidae) in 1829. In 1838, Cocco published a more detailed description, wherein he revealed that he named the fish in memory of his father, “who died very prematurely, and whose loss will never stop bringing me to tears” (translation). A more typical example is *Paracetopsis bleekeri* Bleeker 1862. When Pieter Bleeker (see section on systematic names) included a brief mention of this Ecuadorian catfish in his nine-volume *Atlas Ichthyologique*, he used an unpublished name coined by Antoine Alphonse Guichenot (1809–1876), a naturalist at the Musée du Jardin des Plantes in Paris. Bleeker credited Guichenot with the name. But since Bleeker was the first to publish the name and a brief description of the fish, thereby making it available, he unintentionally became the author of a name that honors himself. Several other fishes are unintentionally named in a similar manner.¹¹

¹¹ *Paramisgurnus dabryanus* Dabry de Thiersant 1872, a loach (Cobitidae); *Nipponocypris temminckii* (Temminck & Schlegel 1846), an Asian chub (Xenocypridae); *Benthophilus leobergius* Berg 1949, a goby (Gobiidae); *Scriptaphyosemion roloffi* (Roloff 1936), an African rivuline (Nothobranchiidae); *Rivulus roloffi* Roloff 1938, a New World rivuline (Rivulidae); *Microctenopoma damasi* (Poll & Damas 1939), a gourami (Anabantidae); *Coris gaimard* (Quoy & Gaimard 1824), a wrasse (Labridae); *Pholis schultzi* Schultz 1931, a gunnel (Pholidae); and *Agonomalus jordani* Jordan & Starks 1904, a dragon poacher (Agonidae). Here is one case of



A TOPONYMIC NAME: *Sinocyclocheilus pingshanensis* is named for where it was discovered, a cave in Pingshan Town, Luzhai County, Guangxi Province, China. Toponyms are common in the names of fishes from China, presumably because the place + *-ensis* construction is the easiest way for Chinese ichthyologists to correctly coin names using a language and alphabet so different from their own. Indeed, without at least a working knowledge of Latin and its Romance-language descendants, words derived from Latin and Greek and the syntactical complexities of Latin grammar must seem confoundingly strange. By our count, 380 or so Chinese fishes have names such as *guangxiensis*, *lancangjiangensis* and *qiongzhongensis*, to list but three. Photograph from: Wu, Z.-L., C.-Q. Li, C. Lan and W.-X. Li 2018. Two new species of *Sinocyclocheilus* from Guangxi, China. *Journal of Jishou University (Natural Science Edition)* 39 (3): 55–59.

Toponymic names

Many fishes are named for where they occur — not their habitats or biomes, but where they are distributed across the regions and localities of the Earth. In other words, where they are found on a map. Often these names refer to a specific (e.g., creek, village, island) or general (e.g. ocean, river system, state) area where the fish was first collected (the type locality), although it should be noted that the fish may occur elsewhere. Such names are called toponyms, from the Greek *topos*, place, and *onoma*, name.

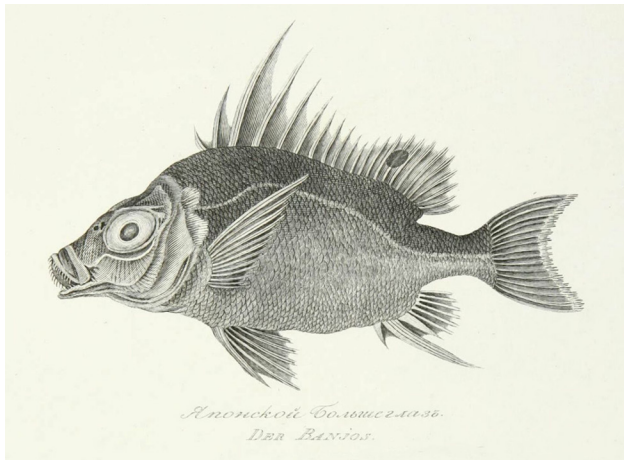
Toponyms usually end with one of three adjectival suffixes whose terminal spellings vary depending on the gender of the genus (masculine, feminine or neuter): *-anus*, *-ana*, *-anum*; *-icus*, *-ica*, *icum*; and the most commonly used toponymic suffix, *-ensis* or *-ense* (*-ensis* is both masculine and feminine). There are subtle differences between the forms but no rules dictating how they're to be used. Toponyms ending in *-anus* and *-icus* (meaning “belonging to”) tend to refer to larger geographic areas or political entities, whereas *-ensis*-style toponyms (meaning “from”) tend to refer to more specific locations. For example, fishes described from the Ryukyu Islands have been named for the ocean in which they occur (e.g., *Parapercis pacifica*), the country to which the islands belong (e.g., *Eviota japonica*), the island chain in general (e.g., *Plectranthias ryukyuensis*), or to a specific island within the chain (e.g., *Helcogramma ishigakiensis*, named for Ishigaki Island).

Some toponyms are similar to eponyms, with a terminal *-i* (for place names ending with a consonant) or *-ae* (for place names ending with a vowel), e.g., *Parabotia kimluani* Nguyen 2005 (of Kim Luân, a village in Tuyên Quang Province, Vietnam), and *Moenkhausia icae* (of the Iça River basin of Brazil). A variation is the genitive singular suffix *-is*, e.g., *Priolepis ascensionis*, named for Ascension Island in the South Atlantic.

Taxonomists may chose to dispense with adjectives in favor of nouns in apposition: *Gymnogeophagus setequedas*, named for Sete Quedas, a waterfall; *Enneapterygius niue*, named for Niue, an island country in the South Pacific, and the alepocephalid genus *Bajacalifornia*, named for ... you get the idea.

Some toponyms do not refer to a place but to a direction. Examples include *borealis* and *septentrionalis* (northern), *orientalis* (eastern), *australis* and *meridionalis* (southern), and *occidentalis* (western). Usually such names are given when describing a fish's distribution relative to one or more congeners. *Retroculus septentrionalis*, a cichlid

possible self-eponymy I cannot confirm nor dismiss: *Sillago panhwarei* Panhwar, Farooq, Qamar, Shaikh & Mairaj 2017, a sillago (Sillaginidae) from the northern Arabian Sea coast of Pakistan. It's named in honor of the senior author, Sher Khan Panhwar, “who pioneered work on Pakistani sillaginid fishes.” I've emailed Panhwar twice asking whether he named the fish after himself or if one of his four co-authors suggested the honor. I have yet to receive a reply.



A VERNACULAR NAME: *Banjos banjos* (Richardson 1846), the Banjofish, is not named after the instrument. Instead, the name of this fish, native to coastal waters of the western Pacific Ocean from Japan to the South China Sea, is derived from its Japanese vernacular, as illustrated in Tilesius' *Atlas zur Reise um die Welt* (1814, shown here). No one knows for sure what *banjos* means. Jordan & Thompson (1912) report that the name is derived from *banzai*, the traditional Japanese exclamation meaning "ten thousand years" (of life to you). Jordan & Hubbs (1925) report that its Japanese vernacular is *Banzai-dai*, which translates as the Hurrah Porgy. Why this fish inspired an exclamatory name is anybody's guess.

from the Oyapock River basin and Araguari River drainage in Brazil and French Guiana, is the northernmost member of its genus.

Occasionally a toponymic name is off the mark. The Razorback Sucker *Xyrauchen texanus* is named for its occurrence in Texas. Except that it doesn't. Charles C. Abbott, who described the species in 1860, apparently mistook the type locality — the Colorado River of Arizona — for a different Colorado River in Texas. The rules of zoological nomenclature do not require that names be biologically accurate in order to be nomenclaturally valid.

Vernacular names

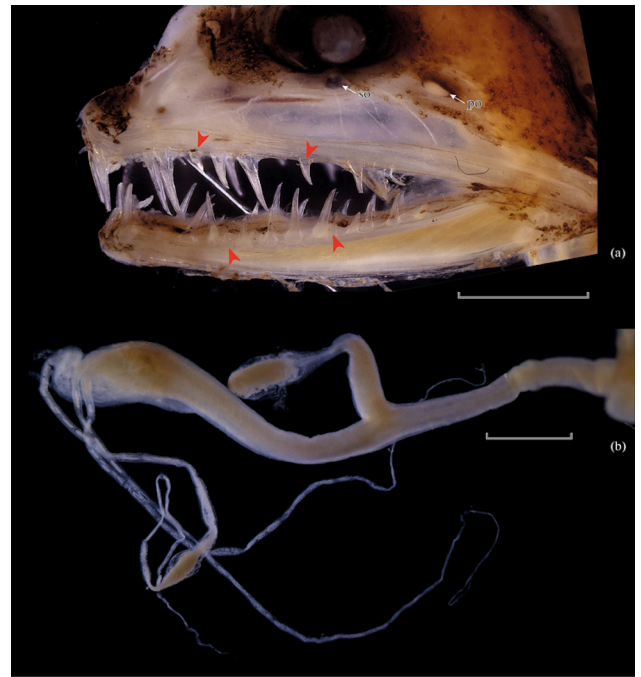
Many fishes are named after what they are called, or were called at the time they were described, in their countries of origin. Some of these names date to ancient times (e.g., *Anguilla* is Latin for eel). Others reflect local or indigenous names. Several Pacific salmon of the genus *Oncorhynchus* are named for what they were called in the Kamchatka Peninsula in the 16th century: *gorbuscha*, *keta*, *kisutch* (pronounced *keez-utch*), *nerka*, and *tshawytscha* (pronounced *cha-vee-cha* or *cho-wee-cha*). Sometimes vernacular names are latinized. *Tandanus tandanus* is a latinization of *Tandan*, the indigenous name for this eel-tailed catfish in New South Wales, Australia.

Indigenous names are increasingly popular among ichthyologists, especially among those studying the fishes of South America.

Nonsensical names

Sometimes taxonomists abandon their Greek and Latin dictionaries for names of their own devising, or borrow words or names from other sources without any significance to the taxon being described. Such nonsensical names are common among mega-diverse taxa (e.g., insects) but occur in fishes as well.

Georges Cuvier (1769–1832), the so-called "founding father of paleontology" and a pioneer of comparative vertebrate anatomy, was also an accomplished ichthyologist. Like other naturalists of his day, he was well-schooled in the natural-history writings of Aristotle, Pliny and other ancient scholars. Occasionally, these writers would mention the names of fishes that Cuvier could not identify. "Etelis," for example, is "quoted once in Aristotle," Cuvier wrote, "without any detail that can help us recognize to which fish it belongs" (translation). Cuvier repu-



A NONSENSICAL NAME: In 2020, Russian ichthyologist Artem Prokofiev described a new species of the scaleless black dragonfish genus *Eustomias* from the Coral Sea of New Caledonia. He gave this unpleasant-looking fish a rather pleasant-sounding name: *natalisa*. Was Natalisa a woman in his life? An ex-girlfriend, perhaps? An ex-wife? Did he name this mean-looking fish with a long barbel dangling from its chin as an act of revenge for the woman who broke his heart? I asked Prokofiev for the untold story behind the name. Alas, there is none. He told us he had simply grown weary of finding available, distinctive yet suitable names for such a diverse genus (127 species and counting), so he coined an arbitrary name instead, one that sounded nice to the ear. And thus *Eustomias natalisa* was born. Photo of holotype from: Prokofiev, A. 2020. New *Eustomias* species (Melanostomiidae) from New Caledonia. *Journal of Ichthyology* 60 (2): 331–334. Top: Fixed teeth are indicated by arrows, so = suborbital luminous organ, po = postorbital luminous organ. Bottom: Chin barbel.

posed "Etelis" as the name of a new genus of deepwater snapper (Lutjanidae). Cuvier did this several times, e.g., *Aphareus*, *Bembras*, *Blepsias*, *Boridia*, *Larimus*, *Pempheris*, *Peprilus*, *Salanx*. There are no apparent meanings in the selection of these names. It seems that Cuvier simply didn't want them to be forgotten forever.

My go-to textbook example of nonsensical naming belongs to French-American ichthyologist Charles Girard (1822–1895). In 1856, he named several North American minnow genera after Native American words (e.g., *Agosia*, *Algansea*, *Dionda*, *Nocomis*) simply because he liked the sound of them.

In 1940, American ichthyologist George S. Myers (1905–1985) made no secret of the fact that *Bario* — which he proposed as a replacement name for the neotropical characiform genus *Entomolepis* Eigenmann 1918, preoccupied by *Entomolepis* Bradley 1899 in Crustacea — has no meaning. It's a "coined name without significance," he wrote. *Bario* is the only nonsensical entry among the 200-plus names he proposed.

South African ichthyologist J. L. B. Smith was often enigmatic with the taxa he proposed. It seemed he took a puckish delight in coming up with names only he knew the meaning of. In 1949 and then again in 1952, he proposed several new genera of toadfishes (Batrachoididae) that appear to be derived from Latin words, but you won't find them in any Latin dictionary: *Chatrabus*, *Barchatus*, *Sanopus*, and *Tharbacus*. As far as I know, no one has heretofore explained the meaning of these names. I, too, was initially stumped, but the Scrabble® player in me saw a repeating pattern in the three of them. *Barchatus* is very similar to *Batrachus* Bloch & Schneider 1801, a toadfish name derived from the Greek word meaning frog. Although *Batrachus* is now a junior synonym of *Batrachoides* (=toad-like) Lacepède 1800, it was still in use when

Smith published his papers. With my pencil and a piece of scrap paper, I quickly worked out that *Barchatus* is an anagram of *Batrachus*. The same is true for *Chatrabus* and *Tharbacus* as well (note: the latter is now a junior synonym of the former). *Sanopus*, of course, is not an anagram of *Batrachus*. But it is an anagram of *Opsanus Rafinesque* 1818, another toadfish genus and the original genus of the type species, *S. barbatus*. My guess is that Smith resorted to anagrams to suggest that these genera are all closely related. I wonder if he ever suspected that someone decades later would bother to figure them out.

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