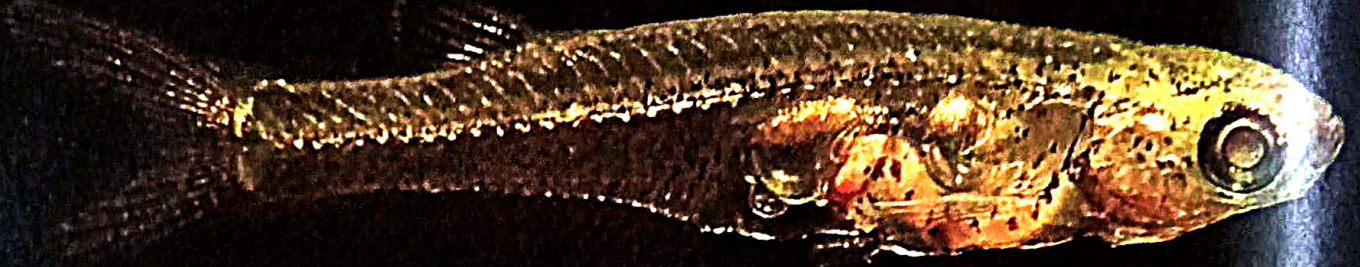


A Tiny Fish Loud as a Gunshot

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IN the murky rapids of streams running down the southern and eastern slopes of the Bago Yoma Range in Central Myanmar lives a minuscule marvel of the aquatic world — *Danionella cerebrum*, a species so tiny that it could rest comfortably on the tip of a finger. A study published in the *PNAS* describes that despite its diminutive size, the unassuming fish possesses an extraordinary ability to produce sounds louder than a gunshot.

Discovered in 2021 within the turbid low-altitude streams of the Bago Yoma mountain range and found in an irrigation canal near Hmawbi, a township just northwest of Yangon, this species swiftly captured the attention of researchers due to its unique attributes. Measuring a mere 10–13.5 mm in length, roughly the size of a peanut, and having a brain volume scarcely larger than a pinhead, *Danionella cerebrum* boasts the smallest known adult vertebrate brain. Despite its miniature dimensions, the fish harbours a rich behavioural repertoire and maintains optical transparency into adulthood, rendering it an invaluable subject for neuroscience exploration.

The species is closely related to *Danionella translucida*, which shares its endemic habitat. Their similarity resulted in the former being previously erroneously identified as the latter. The two species belong to the same family as zebrafish (*Danio rerio*), a widely popular aquarium fish native to South Asia and a model organism for scientific study. Being nearly completely transparent throughout its life, *Danionella*

cerebrum is housed in various research institutes and university departments of neurological studies.

Scientists passing by the fish tanks housing these fish at the Einstein Center for Neuroscience at the Charité University in Berlin repeatedly noticed conspicuous clicking noises emanating from the tanks. They were initially confused about the origin of the mysterious but prominent sound.

Males of the species possess the remarkable ability to emit sounds exceeding 140 decibels at a distance of one body length, i.e. about 12 mm. The distance gives an idea of how loud the fish in its vicinity perceive the sound. Such a sonic blast is comparable in intensity to a gunshot or a firecracker explosion. Since much of the sound emitted in a fish tank is reflected into the water, it would be heard as a continuous buzzing noise by someone standing next to it. Even 3 feet from the source, the sound intensity was 108 decibels, comparable to car horns and symphony orchestra. Such a feat defied conventional understanding, prompting scientists to delve deeper into their physiology.

The Einstein Center for Neuroscience researchers embarked on a multidisciplinary investigation employing advanced techniques ranging from high-speed video recordings to micro-computed tomography scans. They unveiled a unique and intricate sound production apparatus within *Danionella cerebrum*'s diminutive, ethereal frame.

Danionella cerebrum harbours a bespoke propulsion mechanism, allowing it to produce sounds far shriller and