

And God Created.....The Concave-Eared Torrent Frog

We know that God has created some amazing animals that we can see in the world around us. Some of those animals he has used in times past as agents of destruction and to show His might. This is very true of the mention of frogs in the biblical record when God used frogs to overrun the land of Egypt as one of the plagues as recounted by the psalmists. "And he turned their rivers into blood; and their floods, that they could not drink. He sent divers sorts of flies among them, which devoured them; and frogs, which destroyed them." Psalms 78:44-45

But, when we look at the thousands of frogs we see a marvelous host of amazing features that show God's power and might. This is never more true than in the Concave-Eared Torrent Frog of China. Let's look at the frog that can tune its ears like a tuner on a radio to different frequencies to listen to different wavelengths of sound like we change channels in our car radio.

Albert Feng, a professor of molecular and integrative physiology at the University of Illinois, along with other colleagues studied the eardrum of the Concave-Eared Torrent frog or (Odorrana tormota) and found that it is the only frog known to actively select what frequencies it hears tuning out all of the others just like our car radios.



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This frog lives in noisy fast flowing streams in central China and communicates by making birdlike calls in the audible and ultrasonic frequency ranges. This seems to be vital for locating mates in the roar of the streams and waterfalls where they live. But, how they do this took all of the researchers by surprise. But, to understand how the concave-eared torrent frog is different we need to understand just a bit about how all

other animals hear.

Normally sound waves strike the eardrum and cause it to vibrate which in turn is turned into sound that is transmitted to the brain. This had been true for all animals until this frog was found. God created in this frog a totally unique way of hearing like no other animal.

According to Mr. Feng, "This was contrary to everything that we knew about its auditory system." Or for that matter any other type of auditory system in animals.

But, the concave-eared torrent frog, is unusual in other ways. Most frogs have ears on the body surface, but the torrent frog's ears are recessed. Feng and his colleagues reported that this frog communicates in a very noisy environment by emitting high frequency calls that include ultrasonic sounds, and can locate sounds with astonishing precision. "Upon hearing a female call, a male will leap directly toward the sound with an error of less than 1 percent, a feat previously unheard of in frogs." How this is done was not understood by the researchers.

Further investigation revealed that the frogs were actively opening and closing their Eustachian tubes. "We said, 'Whoa! This is bizarre!'" Feng recalled. "In all textbooks on sound communication and hearing in frogs, it is plainly stated that the Eustachian tubes are permanently open!" Feng and his colleagues had observed that when open, the Eustachian tubes essentially connect the frog's ears. This

"acoustic coupling" between the ears makes them sensitive to sound direction, enabling the frog to locate sound with great accuracy.

Also "The frogs appear to be able to tune in to specific sound frequencies at will," Feng said. They can also shift to high frequency and ultrasonic hearing when the low frequency background noise of rushing water around them is too intense for them to pick out the calls of potential mates or rivals. This makes them effectivately a radio tuner selecting the frequency they want to listen to.

This research likely has implications for human health to improve hearing aide technology and would be just another example of biomimicry- man copying the marvelous designs of God creation. The Concave-eared Torrent frog is just one more example of the simply amazing designs in our Creators' universe.