

## Jamaicans Would Say "Dis Fayva One Duppy Fish"

Scientists call it the 'spookfish', and for the good Jamaican unless you fancy yourself as a 'bull buck and duppy conqueror', rather than try to catch it, you would be running in the next direction- 'coward man kip sound bone'.

In nearly 500 million years of vertebrate evolution, and many thousands of vertebrate species living and dead, this is the only fish known to have solved the fundamental optical problem faced by all eyes - how to make an image - using a mirror.

The brownsnout spookfish, which has no 'real' eyes, but has a pair of mirrors instead, has been known for over 120 years. Now the first live specimen has been captured off the coast of Tonga, by scientists from Germany's Tuebingen University.

According to Professor Julian Partridge, of Bristol University, who conducted tests on the specimen of the fish. The Pacific fish uses mirrors as well as lenses to help it see in the murky ocean depths, by focusing light from below into its eyes.

Tests confirmed the captured fish is the first vertebrate known to have developed mirrors to focus light into its eyes. Spookfish is a name often given to Barreleyes - a group of small, odd-looking deep-sea fish species, found in tropical-to-temperate waters of the Atlantic, Pacific, and Indian Oceans. A rare live brownsnout spookfish, *Dolichopteryx longipes*, was caught last year between New Zealand and Samoa, by Professor Hans-Joachim Wagner, of Tuebingen University.

While the animal appears to have four eyes, it technically has two, each of which is split into two connected parts. The spookfish needs one half to point upwards, to capture faint glimmers of light from the sea surface 1,000m above.

The other half, which looks like a bump on the side of the fish's head, points downwards. These "diverticular" eyes are unique among all vertebrates in that they use a mirror to make the image. Prof Partridge said: "Very little light penetrates beneath about 1,000m of water and like many other deep-sea fish, the spookfish is adapted to make the most of what little light there is. "At these depths it is flashes of bioluminescent light from other animals that the spookfish are largely looking for.

"The diverticular eyes image these flashes, warning the spookfish of other animals that are active, and otherwise unseen, below its vulnerable belly." The mirror uses tiny plates, probably of guanine crystals, arranged into a multi-layer stack. Prof Partridge made up a computer simulation showing that the precise orientation of the plates within the mirror's curved surface is perfect for focusing reflected light on to the fish's retina.

He added: "The use of a single mirror has a distinct advantage over a lens in its potential to produce bright, high-contrast images. "That must give the fish a great advantage in the deep sea, where the ability to spot even the dimmest and briefest of lights can mean the difference between eating and being eaten."

Source : BBC.com