

# Flipping fish adapt to land living (w/ Video)

July 5 2013

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Researchers have found that the amphibious mangrove rivulus performs higher force jumps on land than some other fishes that end up on land. This new study shows that unlike the largemouth bass, which makes very few excursions on land, the mangrove rivulus, which can live out of water for extended periods, has a strong jumping technique on land to locate new food resources, avoid predators, escape poor water conditions and also to return to the water.

A team of researchers headed by Benjamin Perlman at Wake Forest University in the United States, filmed juvenile largemouth bass and amphibious [mangrove](#) rivulus jumping off a force plate when startled with the end of a stick, and then compared the forces of their jumps.

The largemouth bass uses a common jumping technique to return to the water when stranded on land, a "c-jump", so called because it creates a "c" form with the body. The mangrove rivulus on the other hand does a "tail flip", whereby it flips its head over its body towards the tail end to jump away from a [stimulus](#).

The researchers found striking differences in these fish's jumping forces: the bass generates forces mostly in the vertical direction, which means that it basically just goes up without moving sideways; the mangrove rivulus generates the greatest forces in the antero-posterior (front-back) and medio-lateral (side-to-side) dimensions, which allows it to effectively move in a particular direction.

Benjamin Perlman said: "Bass are very poor performers at jumping on

land, as expected since they very rarely make terrestrial excursions. The amphibious rivulus is better adapted to land living and capable of directing its jumps on land using more forceful jumps".

Mangrove rivulus, which can live out of the water for extended periods of time (days or weeks, as long as the conditions are moist), uses its specialised jumping technique when water has low oxygen concentrations or high levels of [hydrogen sulphide](#), or to escape [predators](#) and search for terrestrial prey such as crickets. Bass are only temporarily stranded on land when chased out of the water by a predator, caught in a current and washed onto land, or leaping out of the water to catch a fly or other prey.

The juvenile largemouth bass "c-jump": the fish either lift the head and tail up off the ground toward each other or move them both into the ground, creating a "c" shape with the body. The mangrove rivulus "tail flip": the [fish](#) lie on the side or along the ventral surface and lift the head off the ground, rotate it over the body towards the tail end and jump away.

**More information:** This work will be presented at 10:30 on Friday 5th July 2013.

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