

Some shape-shifting animals that can morph to fool others

April 2 2015, by Louise Gentle



Pretty impressive, mimicry octopus, but you don't fool us. Credit: Klaus Stiefel/flickr, CC BY-NC

Animals come in all different shapes and sizes, but only a few can change their shapes. Researchers in Ecuador recently reported a [new species of frog](#) that can change its skin texture from spiny to smooth – the first ever case of a shape-shifting vertebrate.

When an animal is about to be attacked by a predator, it has two choices: run or hide. Sometimes, though, running might actually make the animal more obvious to its attacker. An animal that happens to look the same as its environment, however, may survive by being camouflaged from the attacker, such as [moths that resemble fallen leaves](#), or even help to attract prey – a tactic the orchid mantis uses.

Many animals have evolved such permanent adaptations that help them to mimic their environments. However, along with the newly classified mutable rain frog, there are just a few animals known to be capable of changing their shape.

1. The mutable rain frog



The mutable rain frog - blink and it may have changed form. Credit: *Zoological Journal of the Linnean Society*, Author provided

This frog was discovered in the Ecuadorian rain forest in 2006 but was only recently reported in the [Zoological Journal of the Linnean Society](#) as it took several years to find a second specimen, and only then did the shape-shifting ability become apparent.

The frog visibly changes its skin in a matter of seconds, completely changing texture from spiny to smooth in a few minutes. This change is so rapid that when the first researcher captured the frog to photograph it she thought she had mistakenly taken the wrong frog specimen – the spines had disappeared. The researchers put moss in the container with the frog until they could return it to the wild, but when they checked on it later it had changed its [skin texture](#) to spiny again.

The team also identified a second [frog species](#), the [Sobetes robber frog](#), capable of the same shape-shifting behaviour. This indicates that this phenomenon could be present in many species of amphibian and is possibly just unrecorded as it happens so quickly. This is the first known vertebrate to shape-shift over such a rapid time frame – apart from werewolves and J.K Rowling's Professor McGonagall of course.

2. The golden tortoise beetle

This [species of beetle](#) is capable of changing its colour when mating or to blend in with its background and avoid predation, just as specialist colour changers such as chameleons do. But it can also change the finish of its colour, for example from a shiny gold to a dull red colour. It does this through an optical illusion whereby tiny grooves in the shell can create a shiny surface when filled with liquid and a dull one when drained.

The golden tortoise beetle also undergoes a metamorphosis from the larval to the adult stage (in the same way that caterpillars morph into butterflies). This process of metamorphosis occurs through cells growing

and specialising as the beetle grows to maturity and is brought about by hormonal change.

3. Cuttlefish

Cuttlefish are capable of [mimicking their background environment](#) by changing the colour, pattern and texture of their skin. They do this by altering pigments in their skin to change the way it reflects light. This is all controlled by [neurons in the brain](#) that transmit impulses and information to the rest of the body.

As well as camouflaging themselves, cuttlefish can alter their skin to startle predators or to communicate with other cuttlefish. Some cuttlefish have even been dubbed as [cross-dressers](#): the males have been known to imitate females in order to sneak past other males to mate with the females.

4. The mimic octopus

This octopus was discovered in 1998 off the coast of an Indonesian island, and is perhaps the greatest shape-shifter of all. Similar to the cuttlefish, it is capable of mimicking its background environment by changing the colour and texture of its skin. However, impressively, it is the only animal able to mimic a diverse range of species – at least [13 have been recorded so far](#) – including lion fish, sea snakes, jellyfish and sea anemones.

Most of the impersonated species are poisonous, giving the mimic octopus protection from predators, but it is also known to imitate members of the opposite sex in crabs, luring them in before feasting on them. The mimic octopus has remarkable dexterity, being capable of changing its colour, behaviour, shape and texture, and can alter its

mimickry according to the circumstances.

5. Pufferfish

[Porcupinefish](#) and [pufferfish](#) are a group of fish that puff themselves up rapidly when threatened. These fish can more than double their size by inflating their stomachs with water or air, making themselves much less attractive as a meal to predators – would you want to eat a large spiky ball? – and too large to be eaten by predators with smaller mouths.

Most porcupinefish and pufferfish also contain a deadly toxin, far more poisonous than cyanide, so if they are taken unaware the predators often won't last for long. The meat from these fish are considered a [delicacy in Japan](#), where it is carefully prepared by trained chefs, although it seems several customers [still die](#) each year.

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