

Nature's cheats—how animals and plants trick and deceive

March 15 2016, by Martin Stevens, University Of Exeter



The butterfly *Kallima inachus* resembles a dead leaf. Credit: Swallowtail Garden Seeds/flickr, CC BY

As night closes in across Kentucky a small chubby spider makes a silk line between two plants. She then moves along her "trapeze wire" and waits. After a while a moth approaches within range, and the spider unleashes a swinging sticky ball, ensnaring the moth and pulling him in to be eaten. The attacker is a bolas spider, and she hunts by releasing an odour that precisely matches the chemical composition of female moth mating pheromones. The male moth is lured in, but instead of getting a mate, he gets eaten.

Bolas spiders are just one of a plethora of animals and plants which are highly skilled at thriving through trickery and [deception](#). Charles Darwin and his contemporary [Alfred Wallace](#) both appreciated the functions of deception in their theory of evolution. However, modern science has started to uncover just how devious many species can be.

One of the main uses of deception in nature is to secure food. The fork-tailed drongo is a bird found in Southern Africa that lurks around group-living species, including meerkats, and might at first appear helpful because it sounds alarm calls when a predator approaches. However, much of the time the [drongo's calls are made when no predator is around](#). The drongo watches as a meerkat digs up a juicy beetle and then makes a false alarm call, which causes the meerkat to flee, allowing the bird to swoop down and claim the prey for itself. The alarm calls drongos use even mimic those made by the animals they [exploit](#).

Thieves and rogues

But stealing food seems benign compared to the deception of predators,

which use mimicry and enticement to lure victims directly into the jaws of death. Many web-building spiders use bright colours to attract prey, and carnivorous plants also use overt signals and mimicry to attract victims. The Venus flytrap produces smells that mimic food, luring in [flies](#), and some pitcher plants have been shown to use attractive [fluorescent glowing blue colours](#). These colourful signals work by exploiting "preferences" that many animals have in their sensory systems to be drawn to conspicuous stimuli.

The second use of deception is in survival, with the most common method being camouflage. This can involve matching the general colour and pattern of the environment, or can be much more specialist. On his eight-year voyage around the Malay archipelago, Wallace encountered the butterfly *Kallima* in Sumatra and was astounded at how closely its [wings matched the colour, shape, and structure of dead leaves](#). Many specimens even had markings mimicking patches of mould.

Resembling other objects for protection is common in nature. Some excellent early evidence for evolution and natural selection was provided by Henry Bates, an entomologist who travelled to the Amazon with Wallace. Bates noted that many [edible butterflies mimicked the colour and behaviour of toxic species](#), and were [avoided by attackers](#). Another striking example is jumping spiders, some of which mimic the appearance of ants, which predators often avoid owing to their strong defences.



A Mozambique nightjar (*Caprimulgus fossii*) from Zambia, camouflaged against the scorched bare earth. Credit: Martin Stevens, Author provided

Survival instinct

Organisms also cheat for reproductive reasons. Orchids have an astounding range of approaches which they use to get insects to pollinate their flowers, while offering no reward. One method is to lure male insects with smells and colours resembling a potential mate, like [bee orchids that attract male bees](#). Other species create the false promise of food. [One flower from Hainan Island, China, mimics the alarm pheromones and appearance of bees](#), thus attracting a ferocious

predatory hornet.

And once mating has been achieved there are young to be cared for. The common cuckoo, a notorious cheat, lays its eggs in the nests of other species, so the foster parents rear the cuckoo chick instead. The cuckoo often even lays eggs that mimic the colour and pattern of those of their host, so the host can't tell the difference.

Insects can be equally devious, seen in the behaviour of [cuckoo bees](#), and the audacious slave-maker ants. The workers of these remarkable animals often have one function alone – [to raid the nests of other ant species and steal the brood](#). The captured ants then integrate with the host colony, dutifully carrying out all the main tasks of the nest, from cleaning and rearing young to defence.

The struggle to survive and reproduce is intense for all organisms, and we should not be surprised that cheats are everywhere. What's remarkable is the extent to which animals and plants exploit one another and the level of sophistication involved. Nature is a brutal place, so it's a good idea to cheat and deceive if you want to be successful.

This article was originally published on [The Conversation](#). Read the [original article](#).

Source: The Conversation

Citation: Nature's cheats—how animals and plants trick and deceive (2016, March 15) retrieved 4 July 2024 from <https://phys.org/news/2016-03-nature-cheatshow-animals.html>

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