Imitation is not just flattery for Amazon butterfly species

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Many studies of evolution focus on the benefits to the individual of competing successfully – those who survive produce the most offspring, in Darwin's classic 'survival of the fittest'. But how does this translate to the evolution of species? A new paper, published in this week's issue of *PLoS Biology*, studies an aspect of the natural world that, like survival of the fittest individual, is explained by natural selection: namely, mutualism – an interaction between species that has benefits for both. The work shows that some species of butterfly that live alongside one another have evolved in ways that, surprisingly, benefit both species.

Researchers from the University of Edinburgh, the University of Cambridge, the University of Wyoming and the Florida Museum of Natural History studied the behaviour of several species of colourful butterfly in the Amazon jungle. It is often theorised that similar species living in the same environment would best succeed by evolving different preferences and behaviours – to minimise the amount that they have to share resources and compete for survival.

However, this is not always the case. The researchers show that butterfly species that have evolved similar wing patterns – which act as a warning to predators that they are poisonous – are often not evolutionarily close to each other. Thus the similarity is not due to shared ancestry but is an evolutionary adaptation. The similar pattern benefits both species, as predators will only need to learn once to avoid the signal – 'learn', in this context, being a euphemism for eating a poisonous butterfly. The researchers found that species with similar warning patterns have

evolved to live in the same territory – flying at the same height and preferring the same forest type - in order to maximise the benefits of their similar appearance. The new paper shows that issues other than pure competition, such as protection from predators, can play an important role in evolution.

Marianne Elias, of the University of Edinburgh's School of Biological Sciences, who led the research, said: "We knew that unrelated animals often develop a similar appearance to reinforce the warning to other animals not to eat them, but until now we didn't know that they would live alongside each other, reinforcing this message to predators to stay away."

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