

Nowhere to hide: Some species are unable to adapt to climate change due to their genes

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Species living in restricted environments such as the tropics may lack adequate variation in their genes and be unable to adapt to climate change, according to a new study.

Adaptation is a physiological or behavioural change that makes an organism better suited to its environment, and more likely to survive and reproduce. Because adaptations usually occur due to a change (or mutation) in a gene, species with a more varied set of genes to begin with, are likely to have a better basis for adaptation.

Professor Ary Hoffmann from the Centre for Environmental Stress and Adaptation Research (CESAR), Bio21 Institute, University of Melbourne says the new findings suggest specialist species have a fundamental evolutionary limit, and will be unable to respond to future climate changes.

The work was conducted by a team of Melbourne and Monash University researchers from CESAR, and will be published in the journal *Science* this week.

"Just as variety is the spice of life, the more varied a species' genetic make-up, the better arsenal it has to respond to change," says Professor Hoffmann.

Habitat specialists make up most of our earth's biodiversity, suggesting that this inability to adapt will affect many species including groups of



insects, and potentially other groups including mammals and fish.

"This work is important because establishing the genetics linked to species distributions will be useful in assessing and predicting the evolutionary potential of species particularly under <u>climate change</u>. This may in turn assist in conservation efforts and identifying vulnerable groups."

The team used various species of the vinegar fly (Drosophila) as a model, examining different species that lived in tropical and more widely distributed environments. They revealed that the flies living in tropical conditions possessed a narrower set of genes for traits such as tolerance to drying (desiccation) and cold resistance, effectively preventing adaptation.

Although it is well-documented that species distributions become narrower towards the tropics, it was previously thought that all traits are highly variable. Instead the new study has found that a species' range is closely linked to its genetic variation for key traits.

"In essence, we now have a genetic explanation for why <u>species</u> are restricted."

Source: University of Melbourne (<u>news</u> : <u>web</u>)

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