

Evolutionary capacity of many fruit fly species will lag behind pace of climate change, researchers say

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Fruit flies are ill-equipped to adapt to increases in global temperatures.

(Phys.org)—Many species of fruit fly lack the ability to adapt effectively to predicted increases in global temperatures and may face extinction in the near future, according to new research.

In a study published today in [Proceedings of the National Academy of Sciences](#), researchers from Monash University, The University of Melbourne and Danish collaborators showed that many species of fruit

fly appear to be constrained within an evolutionary straitjacket and can't readily adapt to climate change-related temperature increases.

Dr Vanessa Kellermann from Monash University's School of Biological Sciences said current projections predict a 3°C increase in mean [annual temperature](#) in the next century and even greater increases in extremes.

"Given our findings, these expected increases pose a major threat to biodiversity in the near future. Particularly as *Drosophila* or fruit fly findings are often more broadly applicable," Dr Kellermann said.

By examining nearly 100 species of fruit fly from around the world, the researchers showed that species had evolved to the [temperature extremes](#) and humidity of their environments. However, they had very little flexibility in being able to change their levels of [heat resistance](#) and seem unable to adapt to increased temperatures in the future.

High heat resistance is a feature of only some branches of the phylogeny - the tree that shows how species are related through evolution - of *Drosophila*. Other branches had very limited ability to change their levels of heat resistance; even when flies native to cooler areas grew up in a warm environment, their [heat tolerance](#) was not significantly altered.

"The problem is that only a handful of species have adapted to hot environments while most species have not and it seems very difficult to switch once you are stuck on a phylogenetic branch," Dr Kellermann said.

The researchers looked at species' prospects for dealing with projected temperature increases in the near future.

"If a species can only withstand temperatures of 36°C and the maximum temperature of the environment is already 36°C, an increase of even 1°C

would already put this species over the edge towards extinction," Dr Kellermann said.

Using this method, the researchers identified at-risk species and found that most tropical and mid-latitude species fell into this category.

"Without rapid adaptation, which now seems very unlikely, a lot of species may fall over under even a mild increase in temperature," Dr Kellermann said.

Provided by Monash University

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