

MEDIA RELEASE

Loss of animal or plant species to climate change causes global ‘extinction domino effect’

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Short animation:

New research reveals the extinction of plant or animal species from extreme environmental change increases the risk of an ‘extinction domino effect’ that could annihilate all life on Earth.

This would be the worst-case scenario of what scientists call ‘co-extinctions’, where an organism dies out because it depends on another doomed species, with the findings published today in the journal *Scientific Reports*.

Think of a plant’s flower pollinated by only one species of bee — if the bee becomes extinct, so too will the plant eventually.

“Even the most resilient species will inevitably fall victim to the synergies among extinction drivers as extreme stresses drive ecosystems to collapse.” says lead author Dr Giovanni Strona of the European Commission’s Joint Research Centre based in Ispra in northern Italy.

Researchers from Italy and Australia simulated 2,000 ‘virtual Earths’ linking animal and plant species. Using sophisticated modelling, they subjected the virtual Earths to catastrophic environmental changes that ultimately annihilated all life.

Examples of the kinds of catastrophes they simulated included runaway global warming, scenarios of ‘nuclear winter’ following the detonation of multiple atomic bombs, and a large asteroid impact.

“What we were trying to test is whether the variable tolerances to extreme global heating or cooling by different species are enough to explain overall extinction rates,”

“But because all species are connected in the web of life, our paper demonstrates that even the most tolerant species ultimately succumb to extinction when the less-tolerant species on which they depend disappear.”

“Failing to take into account these co-extinctions therefore underestimates the rate and magnitude of the loss of entire species from events like climate change by up to 10 times,” says co-author Professor Bradshaw of Flinders University in South Australia

Professor Bradshaw and Dr Strona say that their virtual scenarios warn humanity not to underestimate the impact of co-extinctions.

“Not taking into account this domino effect gives an unrealistic and exceedingly optimistic perspective about the impact of future climate change”, warns Professor Bradshaw.

It can be hard to imagine how the demise of a small animal or plant matters so much, but the authors argue that tracking species up to total annihilation demonstrates how the loss of one can amplify the effects of environmental change on the remainder.

“Another really important discovery was that in the case of global warming in particular, the combination of intolerance to heat combined with co-extinctions mean that 5-6 degrees of average warming globally is enough to wipe out most life on the planet”, says Dr Strona.

Professor Bradshaw further warns that their work shows how climate warming creates extinction cascades in the worst possible way, when compared to random extinctions or even from the stresses arising from nuclear winter.

The study, “Co-extinctions annihilate planetary life during extreme environmental change”, is freely available at www.nature.com/articles/s41598-018-35068-1

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