

Study: Human impact throws tree seeding out of sync

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Aotearoa-New Zealand flax/harakeke (*Phormium tenax*) flowering heavily. Some years these plants have no flowers at all, others they have lots. Credit: Dave Kelly

Human impacts on the environment are changing many biological

responses, with effects on rare species and human health, but predicting such responses is complicated, according to a new paper by a University of Canterbury ecologist.

In his [research paper](#) published on 22 June, University of Canterbury (UC) scientist Professor Dave Kelly clarifies how [mast](#) seeding plants—those which produce occasional widespread seed crops—including southern beech forests throughout Aotearoa-New Zealand's South Island, respond to various environmental factors.

Professor Kelly's new paper shows that nutrients have a very limited and specific role, and cannot cause masting on their own. This work clarifies which factors have to be considered when predicting and managing mast seeding, including by the Department of Conservation (DOC) in New Zealand.

"Better predictions of mast seeding events have really helped DOC protect [native birds](#) and this new work lets us refine even further what factors could be having an influence, and how they act," Professor Kelly says.

It has long been known that the main drivers of mast seeding are seed predators and temperature cues.

"Seed predator outbreaks, such as huge numbers of rats and mice, in mast seeding beech forests compelled DOC to conduct aerial 1080 pest control over more than 600,000 hectares of conservation lands in each of 2014, 2016 and 2019. This was to protect rare bird species like mohua/yellowheads, pīwauwau/rock wrens and whio/blue ducks from pest mammals. Temperature cues—if a warm summer follows a cold one, for example—are known to trigger such mast events, too, but the impact of global warming on masting frequency is still unclear."

A 2019 paper claimed that a third factor, nutrient shortage, could drive mast seeding, separate from any effect of predators.

"This could complicate predictions, as human use of artificial fertilizers is causing a global increase in nitrogen deposition, even in natural habitats." But the new paper shows that nutrients have a very limited role, which makes predictions easier.

More information: Dave Kelly. Nutrient scarcity cannot cause mast seeding, *Nature Plants* (2020). [DOI: 10.1038/s41477-020-0702-7](https://doi.org/10.1038/s41477-020-0702-7)

Provided by University of Canterbury

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