Feast or famine:

For which species is masting being recorded in NZ?

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Masting datasets in New Zealand

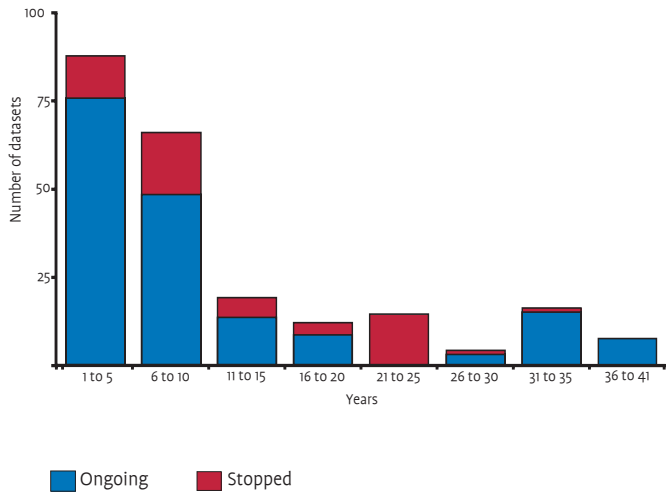
Mast seeding is common in New Zealand, but there are quantitative data for only a limited number of species (Schauber et al 2002). Annual counts of the fruiting or flowering (masting datasets) for native plants have been collected in New Zealand since 1954.

We are collating information for long-term phenology (fruiting or flowering) datasets of native plant species as part of the Landcare Research 'Ecosystems Resilience' project.

Results: Duration

* We have information for 226 datasets that use numerical counts, rather than subjective scores.
* In total 170 datasets are ongoing and 56 have stopped (Fig 1, 2 & 4).
* Of the 226 datasets, 140 (62%) have been running for less than 10 years (Fig. 1).
* 51 datasets have been running for less than five years.

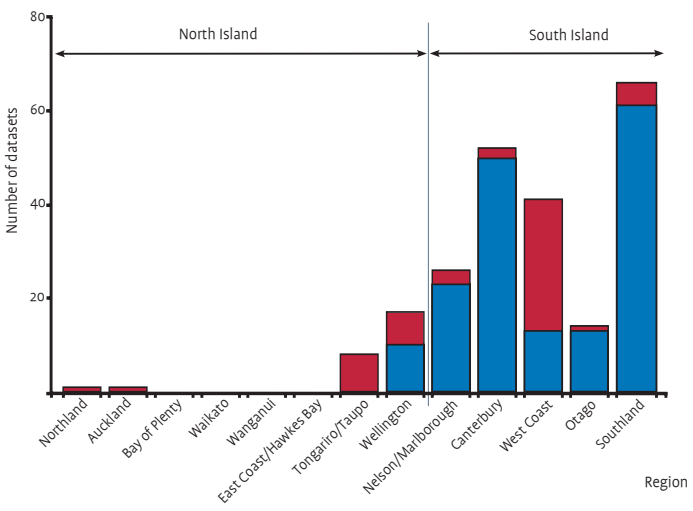
Figure 1. Length of time that datasets have been counted



Results: What and Where?

* Approximately 90% of all counts are in the South Island, see Figs. 2 & 4.
* The datasets cover 14 families, 21 genera, and 42 species.
* Most datasets are for trees (n=17 species) while the rest are: grass 11; herb 10; shrub 3 and palm 1.
* The most commonly counted genus is *Nothofagus* (Fig. 4), with 102 datasets (82 ongoing).
* Mountain beech (*N. solandri* var *cliffortioides*) is the most counted taxon (40 counts).
* *Chionochloa* is the second most counted genus (Fig. 4) with 39 datasets.
* Podocarps make up the third largest group (Fig. 4) with 36 datasets.
* Counts of podocarps are concentrated in the South Island, in particular the West Coast, and southern regions. Most have only recently been started, e.g. 19 datasets from Waitutu in the lower South Island, started in the early 2000's.
* Other counted taxa range from *Phormium* to mistletoes (Fig. 4).

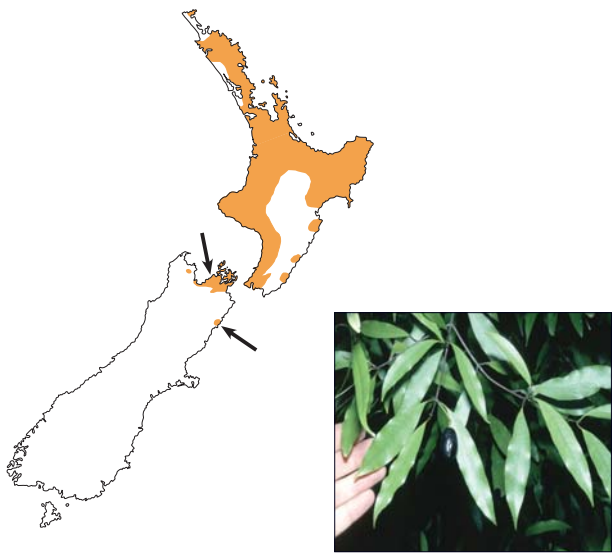
Figure 2. Regional distribution of datasets



Gaps in the coverage of the terrestrial ecosystems of New Zealand

* Only 12 % of the datasets are from the North Island and most of these are around Wellington (Figs 2 & 4) .
* There are only six datasets for the important, and common, canopy tree genera; *Weinmannia* (2), *Quintinia* (2) and *Metrosideros* (2).
* Information for plants that are important fruit and nectar sources for native birds is also lacking. Tree species such as *Beilschmiedia tawa, B. taraire* and *Vitex lucens* (puriri) are important food sources for the New Zealand pigeon (Kereru). Tawa has a wide distribution (Fig 3.) But there are only 2 masting datasets for it, that we know of, both at the southern limit of its range.
* There are few shrubs and small trees being monitored.

Figure 3. Distribution of *Beilschmiedia tawa*, and its two datasets (arrows)



Ripe fruit and leaves of *Beilschmiedia tawa*. Photo by Dave Kelly.

Do we know about your dataset?

This is an ongoing project to compile all known masting datasets in New Zealand. If we don't have the information for data that you know about please let us know.

Acknowledgements

Department of Conservation, Landcare Research and individuals for supplying us with information about their masting datasets.
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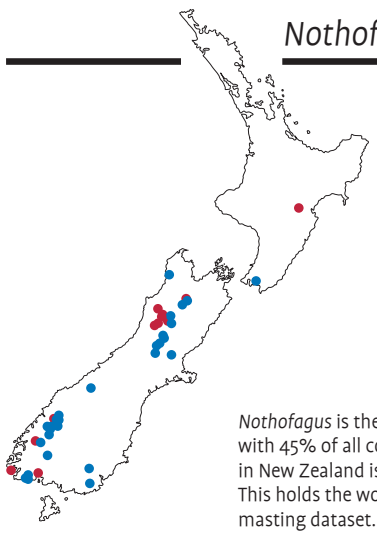
Matt Walters for poster design.

Reference list

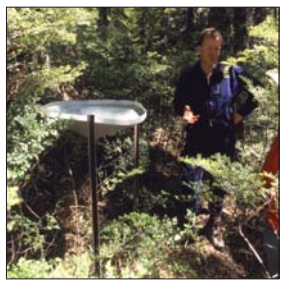
Norton, D.N. & Kelly, D. 1988. Mast seeding over 33 years by *Dacrydium cupressium* Lamb. (rimu) (Podocarpaceae) in New Zealand: The importance of economies of scale. *Functional Ecology* 2: 399-408.

Schauber, E.M.; Kelly, D.; Turchin, P.; Simon, C.; Lee W.G.; Allen, R.B.; Payton, I.J.; Wilson, P.R.; Cowan, P.E. & Brockie, R.E. 2002. Masting by eighteen New Zealand plant species: The role of temperature as a synchronizing cue. *Ecology* 83: 1214-1225.

Figure 4.
Distribution of masting datasets



Nothofagus



Seedtrap, and Rob Allen, under Mountain beech forest, Craigieburn. Photo by Dave Kelly.

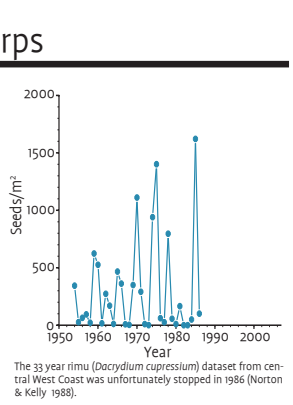
Nothofagus is the most commonly counted genus, with 45% of all counts. The longest running dataset in New Zealand is for Mountain beech at Craigieburn. This holds the world record for the longest continuous masting dataset.

Chionochloa

Flowering *Chionochloa teretifolia*, Takahe Valley, Fiordland. Photo by Jenny Ladley.

Eleven species of *Chionochloa* are counted, all in the South Island. All the datasets are from only 8 sites. The longest dataset is for Takahe Valley which has been continuously counted since 1973 (33 years of data).

Podocarps



The 33 year rimu (*Dacrydium cupressium*) dataset from central West Coast was unfortunately stopped in 1986 (Norton & Kelly 1988).

Information about the mast fruiting of specific podocarps is important in the conservation efforts of endangered birds, such as the fruiting of rimu for Kakapo breeding. Unfortunately few the datasets are long.

All other datasets

Flowering spikes of *Phormium* are counted at 17 sites around the country. Photo by Dave Kelly.

Distribution of all 'other' datasets. Note the paucity of datasets over the North Island. *Cordyline*, *Aciphylla* and *Phormium* are the most counted 'other' genera. Most of these counts have been carried out by just two people (Dave Kelly and Bob Brockie).

Poster design by Matt Walters