Towards a plant flammability list for the Port Hills and Banks Peninsula

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Wildfires in NZ

• 3000 wildfires occur in New Zealand each year, burning around 5900 ha of rural land

In NZ forest fire danger predicted to worsen by the end of the century due to climate change, particularly along east coasts, especially Marlborough and Central Otago
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- Biomass, arrangement, and flammability of plants determines fire behaviour
- Fuel is main component that humans can manipulate to manage fires
One tool for managing fuel is green firebreaks: strips of vegetation of species with low flammability which reduce fire spread across the landscape. Green firebreaks are being deployed in places like Porirua and Wellington City Councils at the wildland-urban interface.
Green firebreaks have also been used in restoration: Cannon Ck Restoration. Here green firebreaks have been planted to protect parts of the reserve from flammable vegetation dominated by gorse, and along public paths to protect against ignitions.
So we can see that green firebreaks can be useful, but how do we identify the species to use? To do that we need to rank plant flammability.

With funding from the National Rural Fire Authority we are measuring the flammability for a wide range of native, weedy and garden plants.
To measure flammability we collected 70 cm long shoots, air-dried them for 24 h, placed them on our ‘plant BBQ’ and measured several variables.
We used a statistical procedure known as principal components analysis to reduce our three variables down to one major axis (Axis 1). Species on the left of the figure are highly flammable, species on the right have low flammability. These analyses are hot off the press.
Flammable species
Found on Banks Peninsula
Flammable species

Found on Banks Peninsula

- Dacrydium cupressinum
- Eucalyptus viminalis
- Alectryon excelsus
- Leptospermum scoparium
- Dicksonia squarrosa
- Malus x domestica
- Pseudowintera colorata
Green firebreak species

Found on Banks Peninsula

- Melicytus ramiflorus
- Griselinia littoralis
- Fuchsia excorticata
- Corynocarpus laevigatus
- Coprosma robusta
- Ripogonum scandens
- Pennantia corymbosa
- Pseudopanax arboreus
- Myrsine australis
- Plagianthus regius
- Pseudopanax crassifolius
- Coprosma propinqua
- Solanum laciniatum

LOWEST FLAMMABILITY
Green firebreak width should reflect slope of adjoining land (fires are faster and more intense on steeper slopes) and flammability of adjacent vegetation. Steeper slopes and more flammable vegetation will require wider green firebreaks.

So green firebreaks offer potential to help manage fire and, if natives used, improve biodiversity, but...there is no such thing as a fire-proof plant. Given the right conditions (e.g. extreme fire weather), any plant will burn.
Watch this space for the full updated list of plant flammability and brochure that we are preparing for the National Rural Fire Authority.
How have others ranked flammability in NZ? Liam Fogarty’s research was used to produce this brochure.

Fogarty (2002)

- Qualitative survey, used to rank 42 spp.
- Acknowledged ranking needs to be tested


http://www.fire.org.nz/Research/Published-Reports/Documents/89fa12a030b48531cf396dcdba52c6e2.pdf
We compared rankings from our shoot flammability measurements to Fogarty’s ranking based on expert opinion. Species in blue denote those that had lower flammability ranking in our tests, red colours are those species that have higher flammability ranks in our tests. Boxes represent those species that differed considerably in ranking between the two studies.

Spearmans rank correlation found a significant positive relationship between our rankings and those of Fogarty, suggesting expert opinion is largely supported by our tests.

There were, however, some important differences for certain species; e.g. rimu (DACcup) and silver beech (LOPmen) had considerably higher flammability in our tests, while flax (PHOten), kauri (AGAus) and akeake (DODvis) had lower flammability.