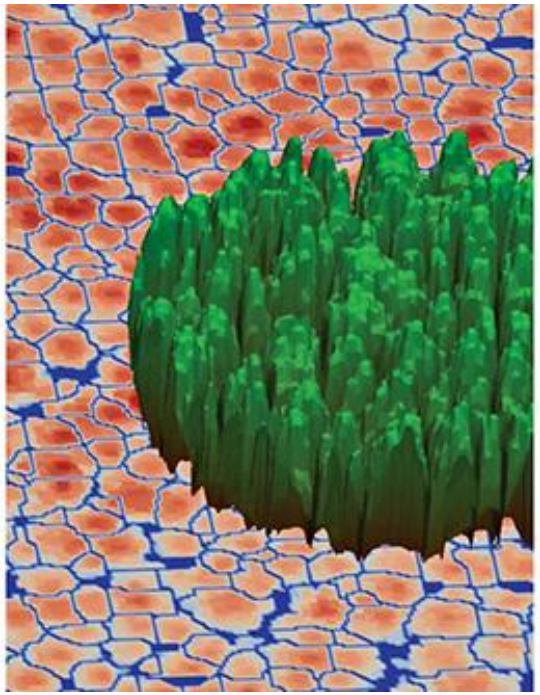
Growing confidence in forestry's future Research Programme

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

Productivity gains from nursery research

Simeon Smaill and many others



supported by forestgrowers commodity levy

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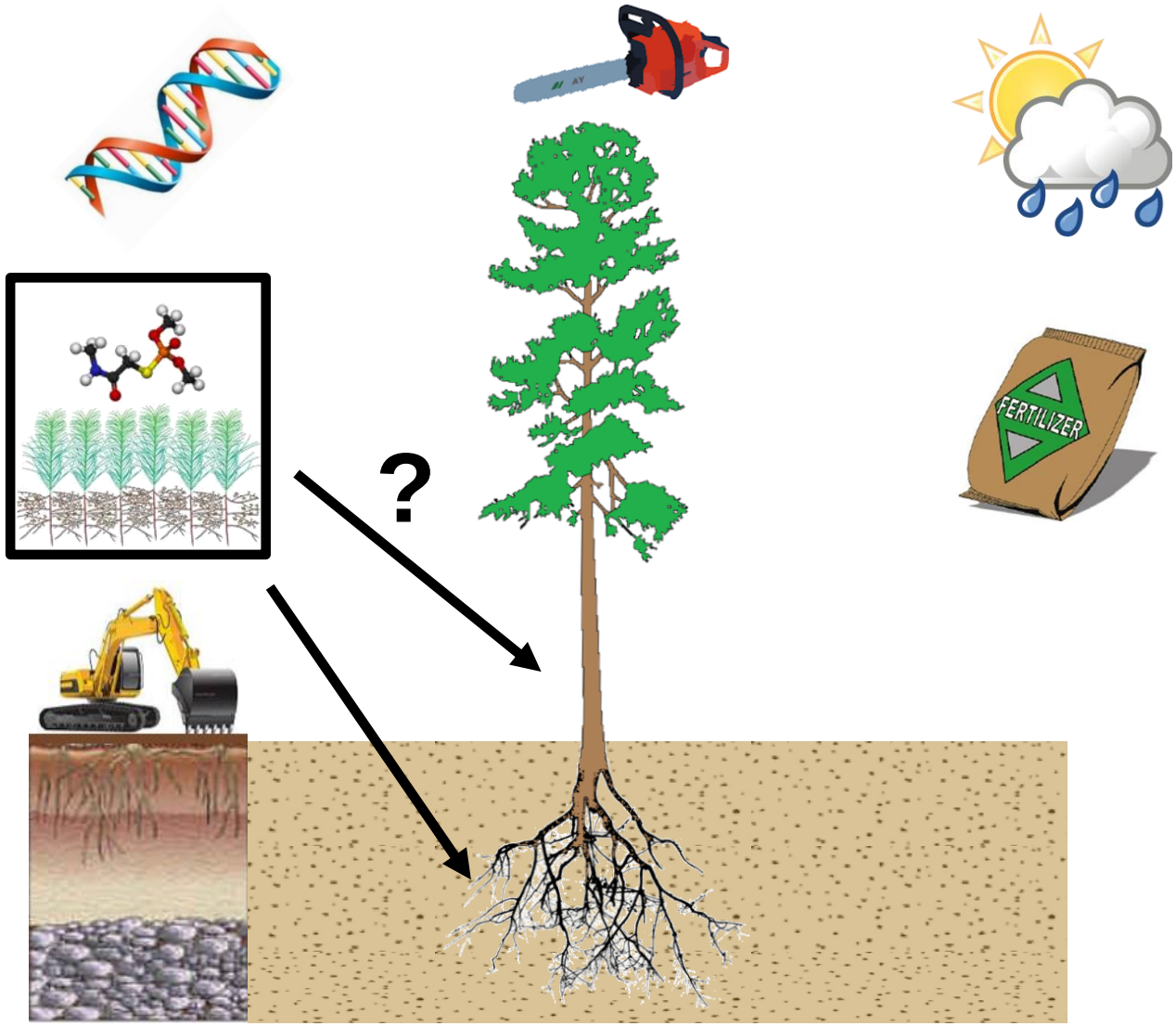
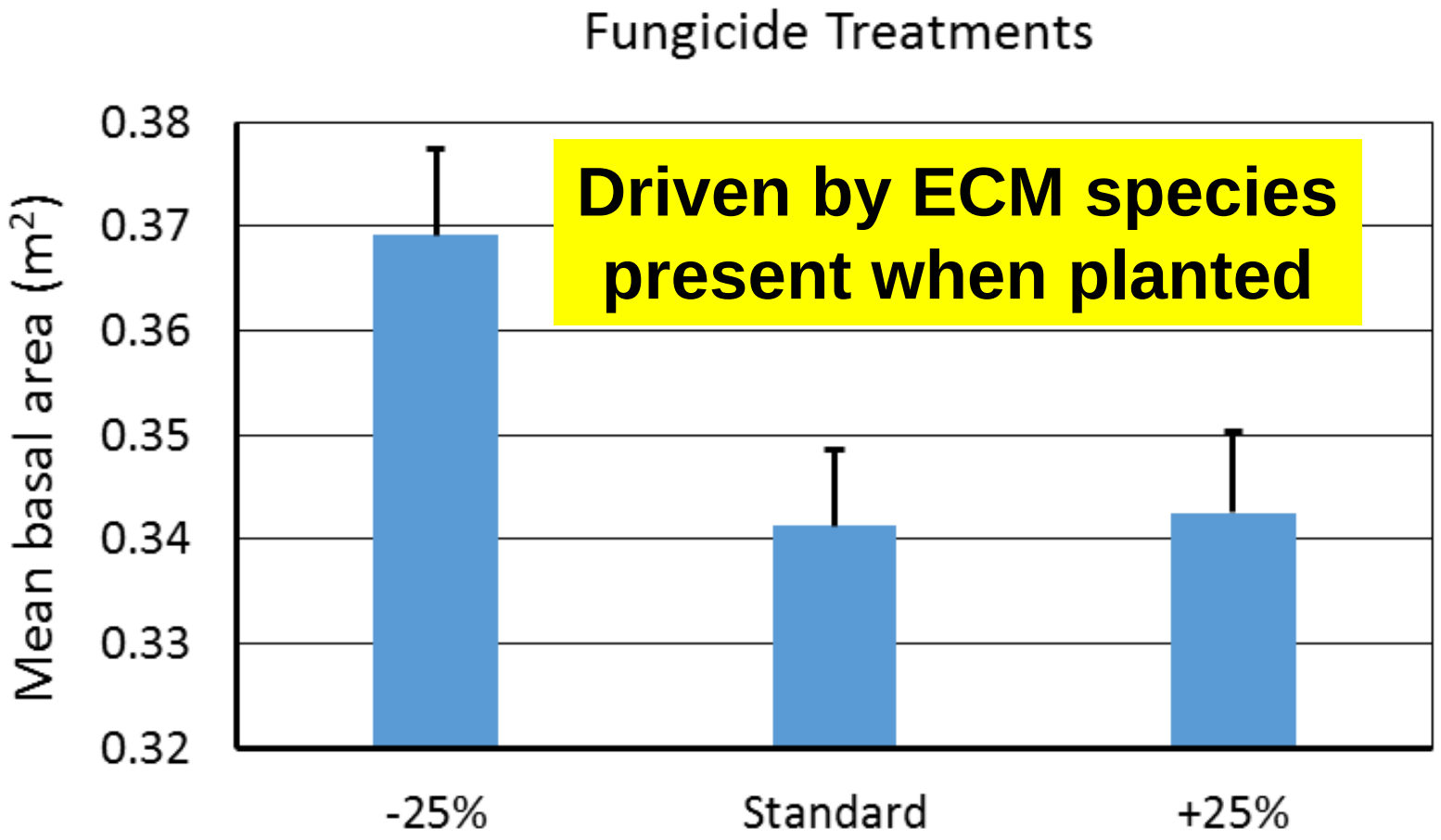
The contribution of nursery management



Potential size of the gains after six years

Te Ngae fertiliser / fungicide trial, planted in Kaingaroa



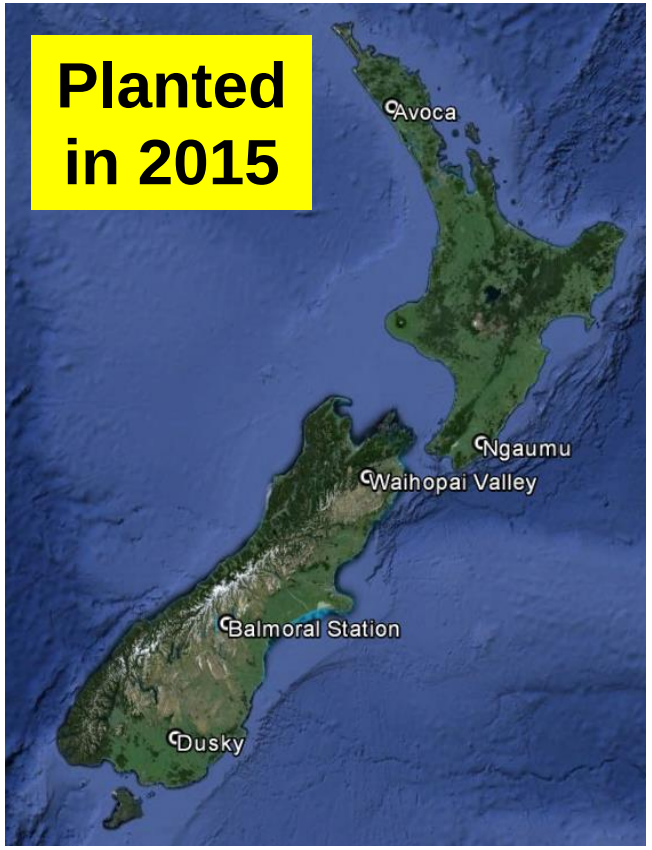
Extending the research

Need more data – limitations to the Te Ngae work

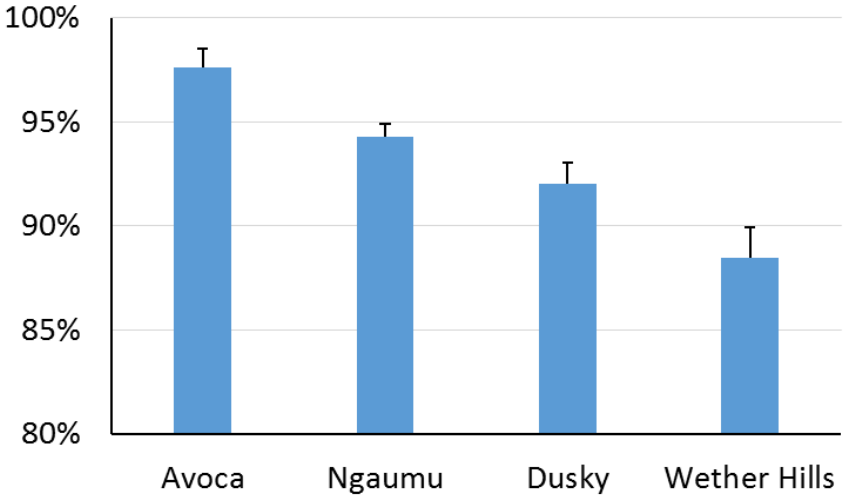
A new nursery trial was established at Scion in 2014 with altered chemical use, plus an attenuata hybrid

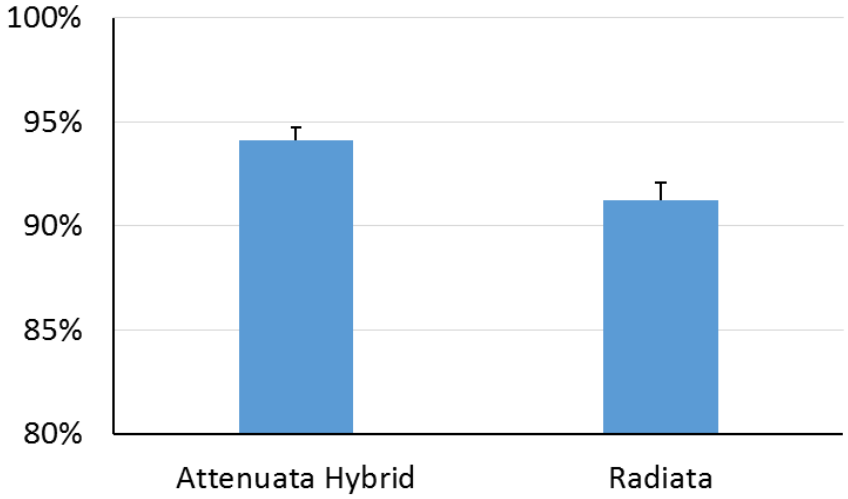
Similar results in the nursery

- More chemical use disrupted the most beneficial mycorrhiza (radiata only)
- No productivity losses, including the chemical free control
- No impact on disease and health

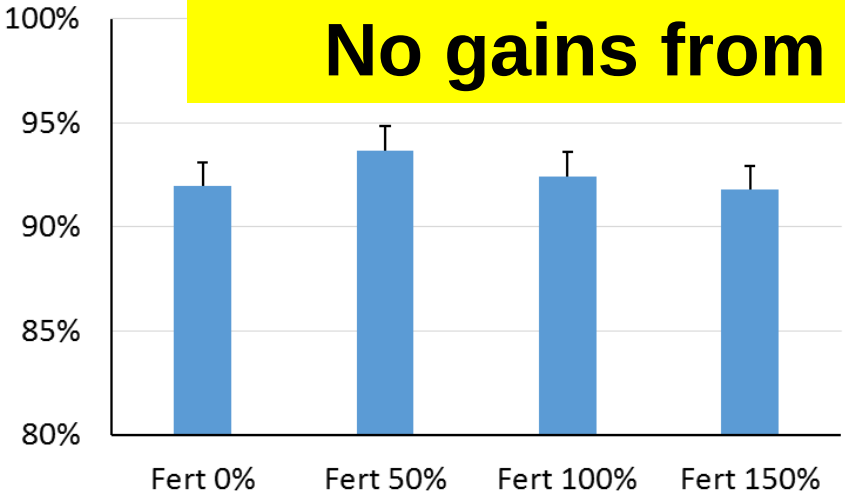


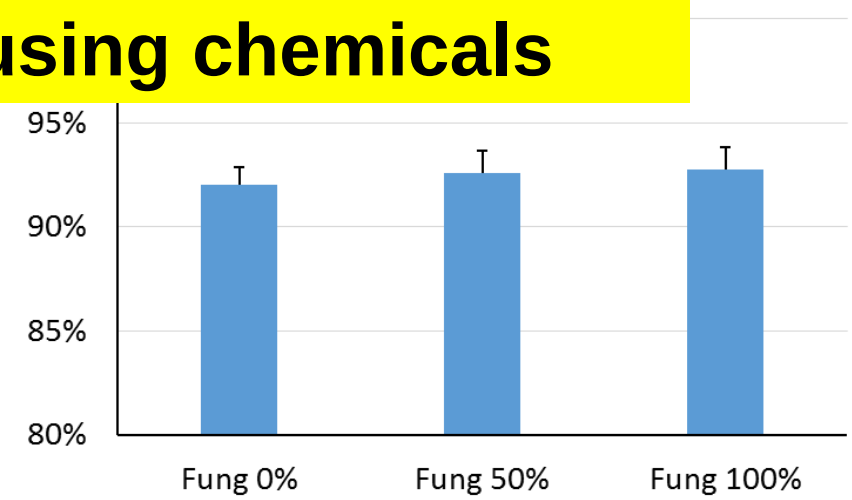
Latest results - survival after one year



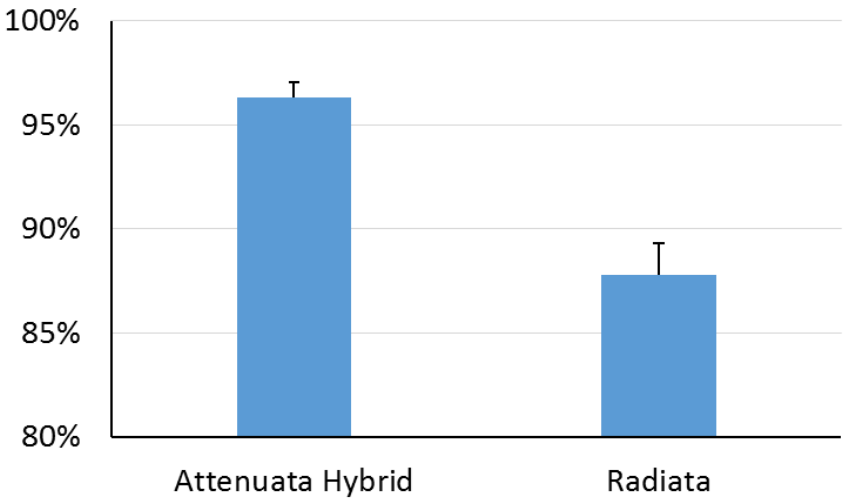


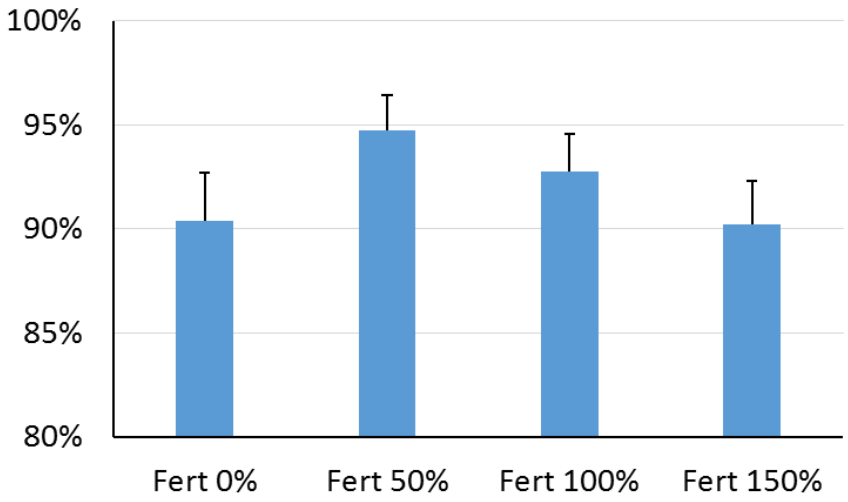
No gains from using chemicals

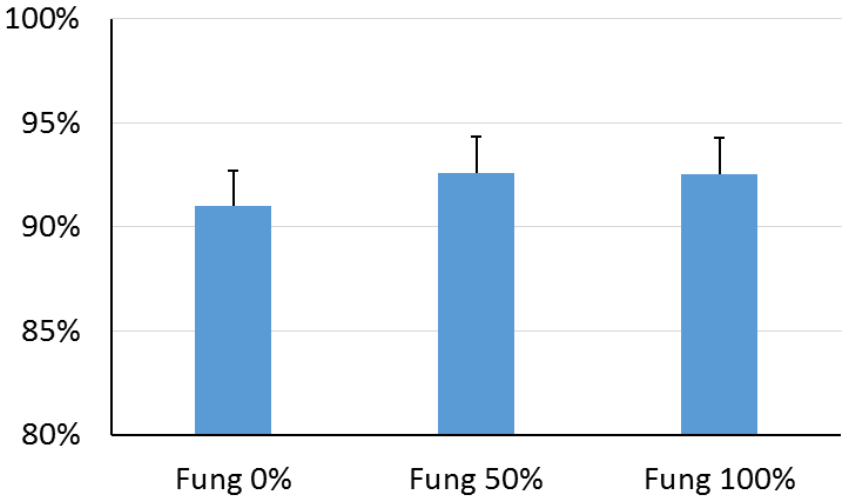




Latest results – survival at Dusky Forest



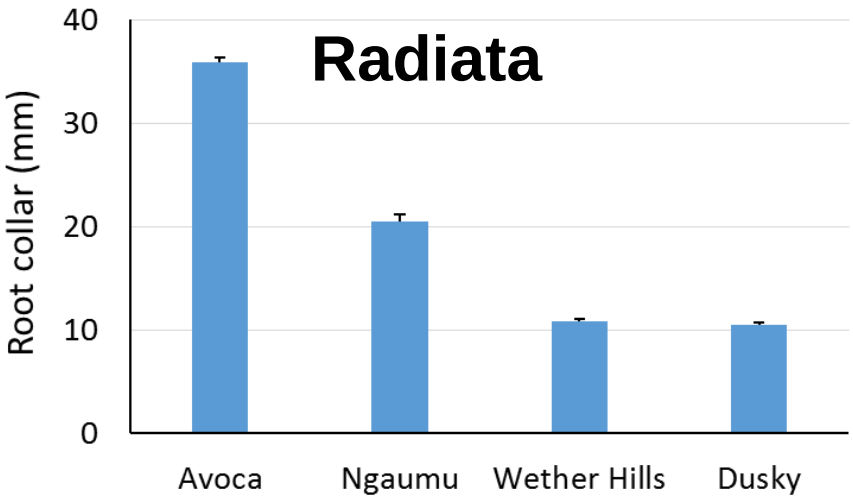


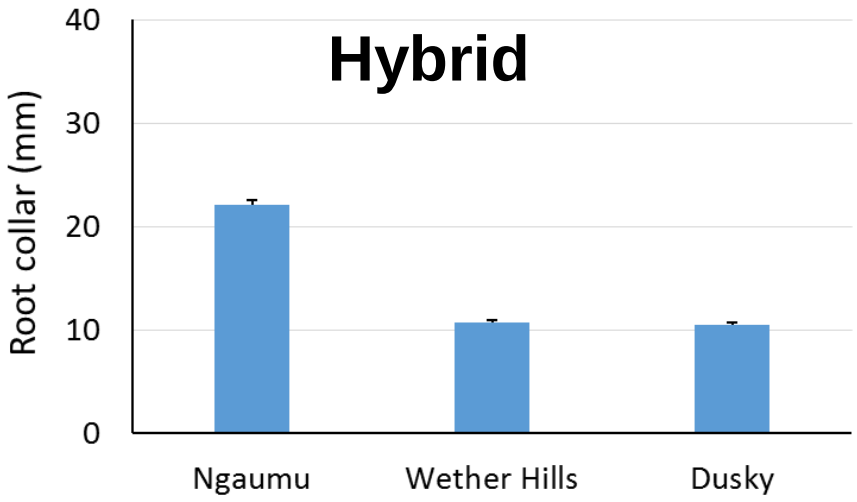


Site specific responses

- Attenuata did particularly well at this site
- Peak survival at 50% fertiliser use - more marked at this site

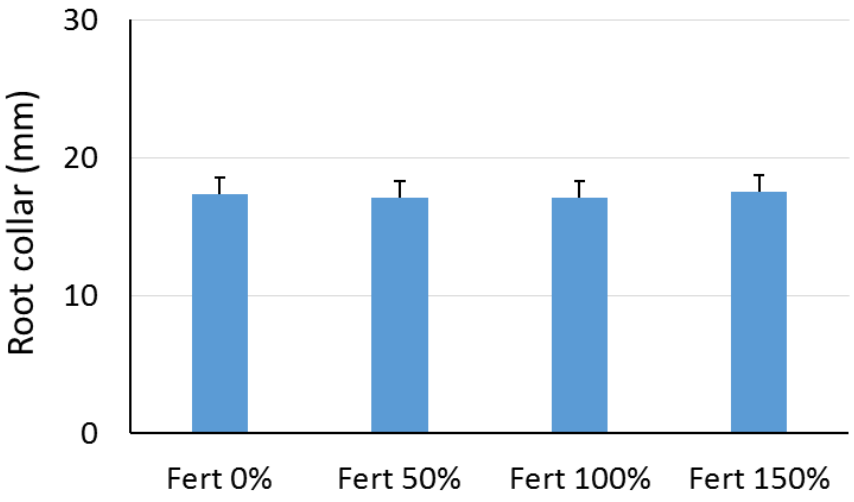
Latest results – growth after one year

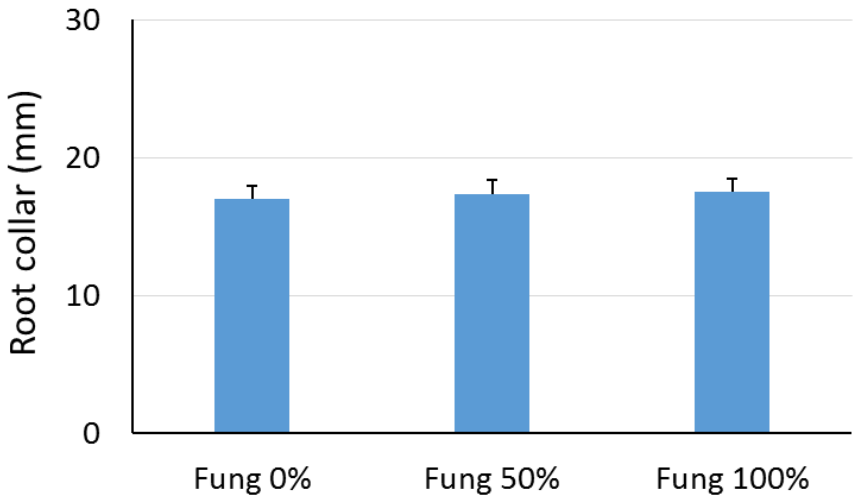




Strong site effects, and the Attenuata hybrid grew slightly faster at Ngaumu Forest – otherwise similar to radiata

Latest results – growth after one year





Across all sites, no differences in growth rates with chemical use in the nursery – more support for potential to optimise chemical use in the nursery

Will be tracking for several years – ECM effect?

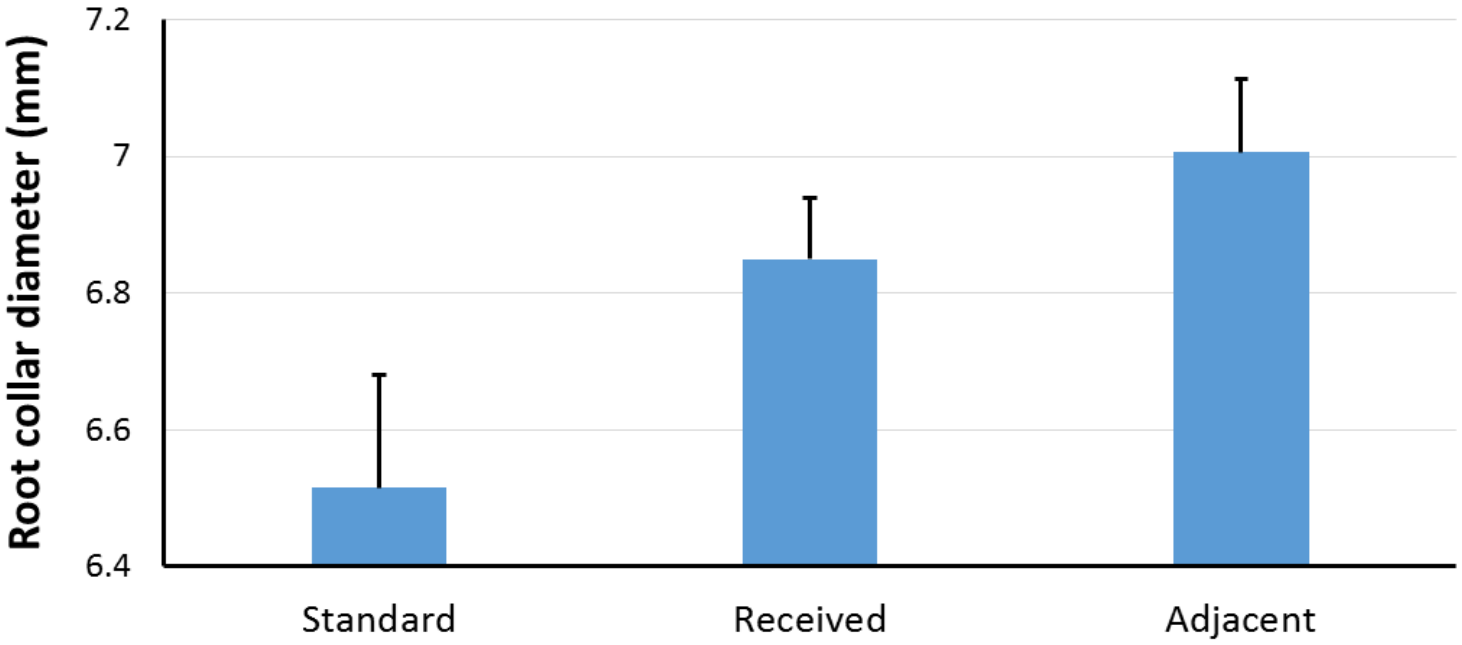
Next steps – operational implementation

- Can this research be used to provide new management options in commercial nurseries – focus on changing the form of nitrogen used and fungicide application methods
  - Can we maintain growth rates in the nursery with less nitrogen applied at this scale?
  - Can we maintain health in the nursery with less fungicide used at this scale?

- Established two trials over 2.4 km of seed bed in 2015 with in-kind support from Tokoroa ArborGen

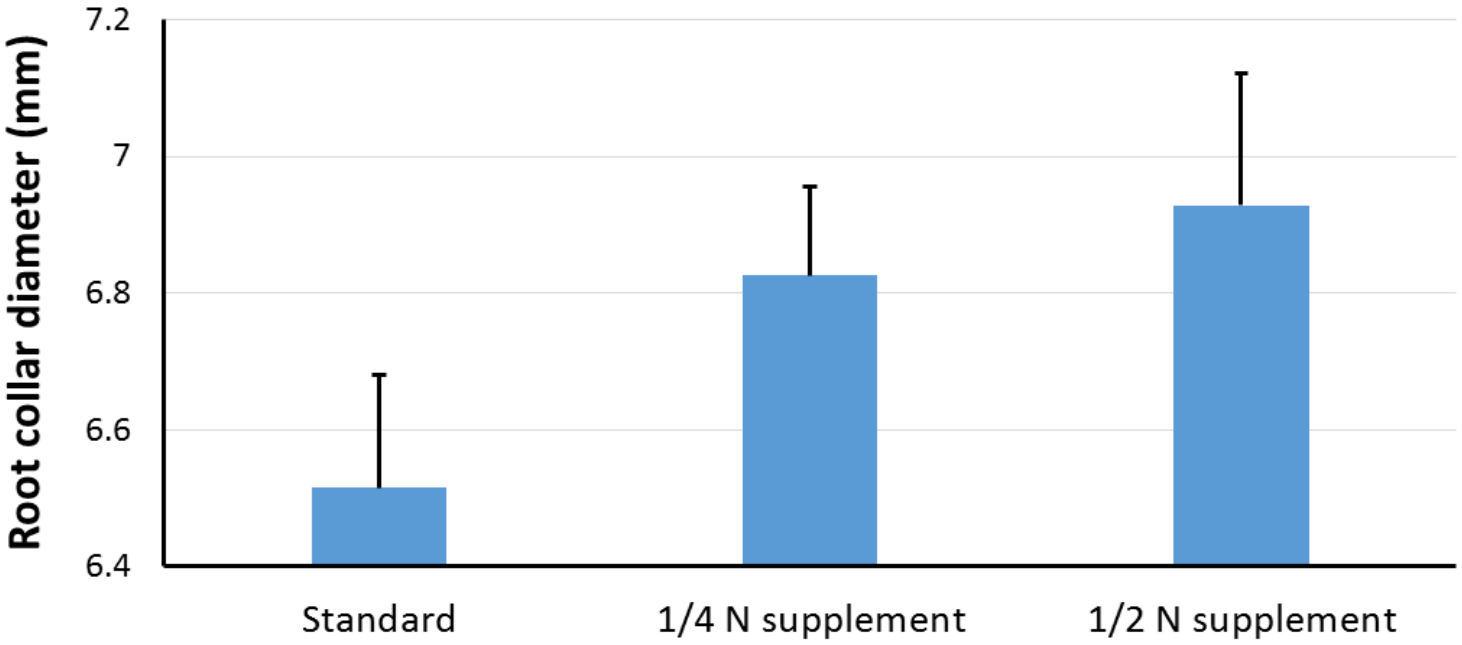
Seedling growth – May 2016

Growth results from fungicide trial



- Reduced fungicide use improved performance, with gains of 5.1% and 7.5% in root collar growth as exposure lessened
- No health impact at any point in the trial

Growth results from nutrition trial



- Gains in seedling growth rates with the use of less N
- Increased root collar growth with reduced N by changing source (4.8% and 6.3%)

What sites benefit the most from this?

Site specificity – can we target nursery management to suit a particular forest?

Established 46 new small scale trials – FGLT funding

- Planted in 2016, sourced from the 2015 Tokoroa ArborGen trials
- Seedlings from four operational treatments – 50% reductions in fungicide, different form of N application, reduced N use

Further nursery research

- A new operational trial is underway at Tokoroa
- Have recently secured additional FGLT funding to extend research further
  - Potential to use new N supplements for weed control
  - Test specific fungicides against beneficial mycorrhiza
- New research areas
  - Automation (also with FGLT support)
  - Tissue culture practices
  - New systems to integrate beneficial microbes
- Support closer nursery / forestry linkages

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