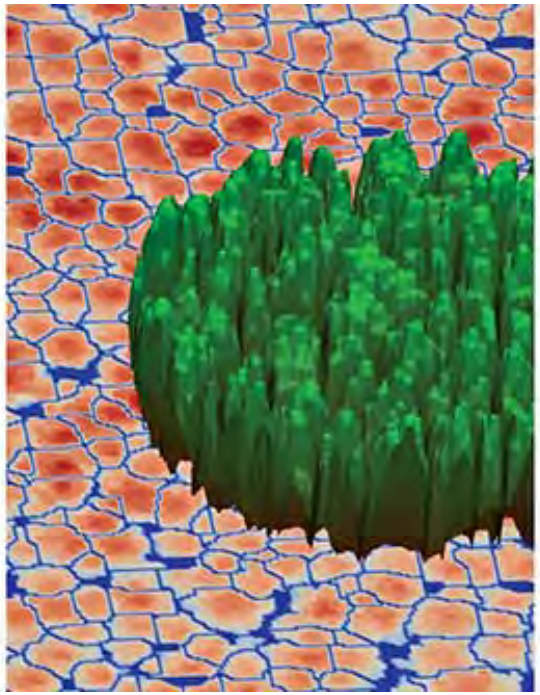
Growing confidence in forestry's future Research Programme

SCION
FORESTS • PRODUCTS • INNOVATION

Growing higher value pruned stands – what can we learn from long-term trials?

John Moore



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To prune or not to prune?

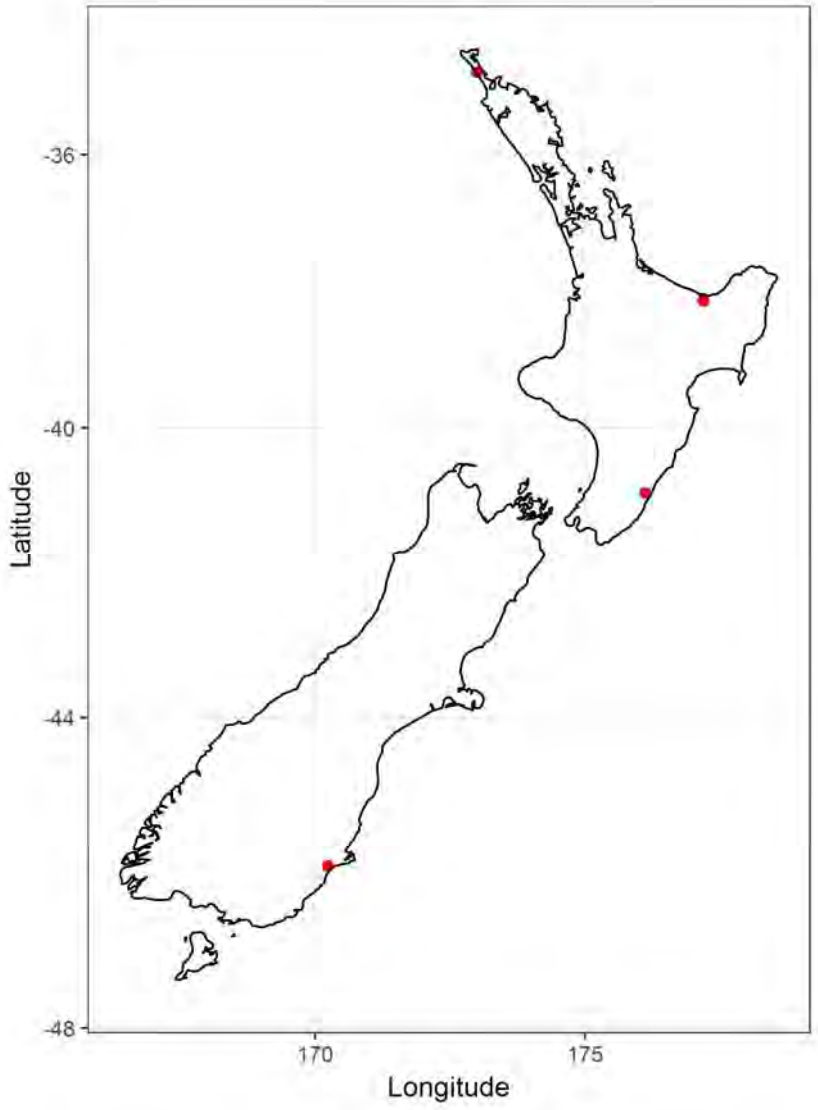
- If you are going to prune then there are a number of factors to consider:
  - How many trees should I prune per hectare?
  - What height should I prune to?
  - How many followers (unpruned trees) should I leave before final thinning?
- All of these factors affect the yields that can be obtained from stands as well as the silvicultural costs
- A number of different trial series were established by Scion to examine these factors

Trials established to look at aspects of pruning

- Ultra-high pruning trials
- Followers trials
- Pruning of improved breeds

Ultra-high pruning trials

- Established at 4 sites between 1985 and 1987
- Objective was to quantify the effect of pruning the second log on the growth of trees
- Data from the trials were used to develop pruning response functions in growth models
- Two of the trials are still standing

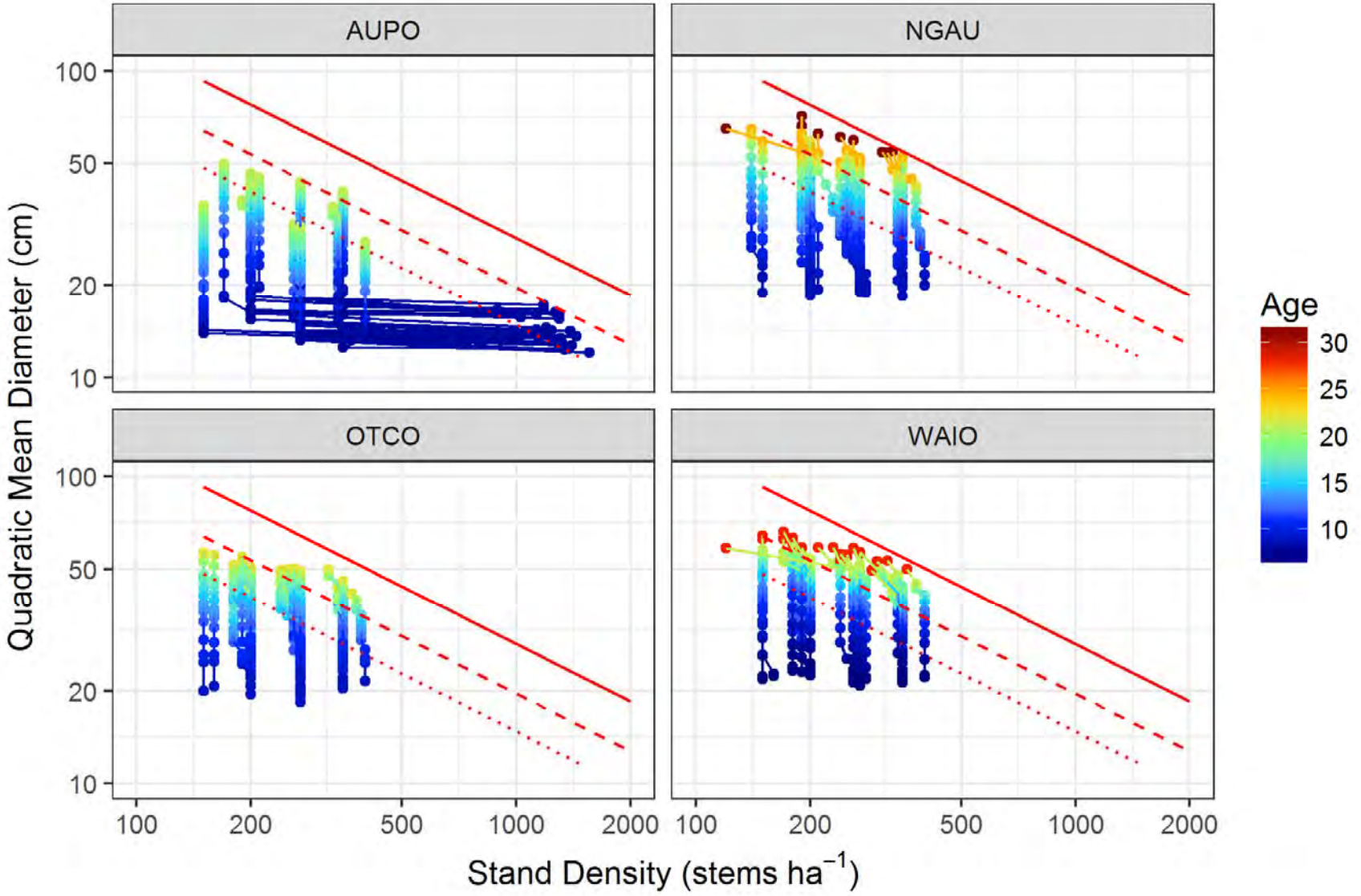


Treatments in the ultra-high pruning trials

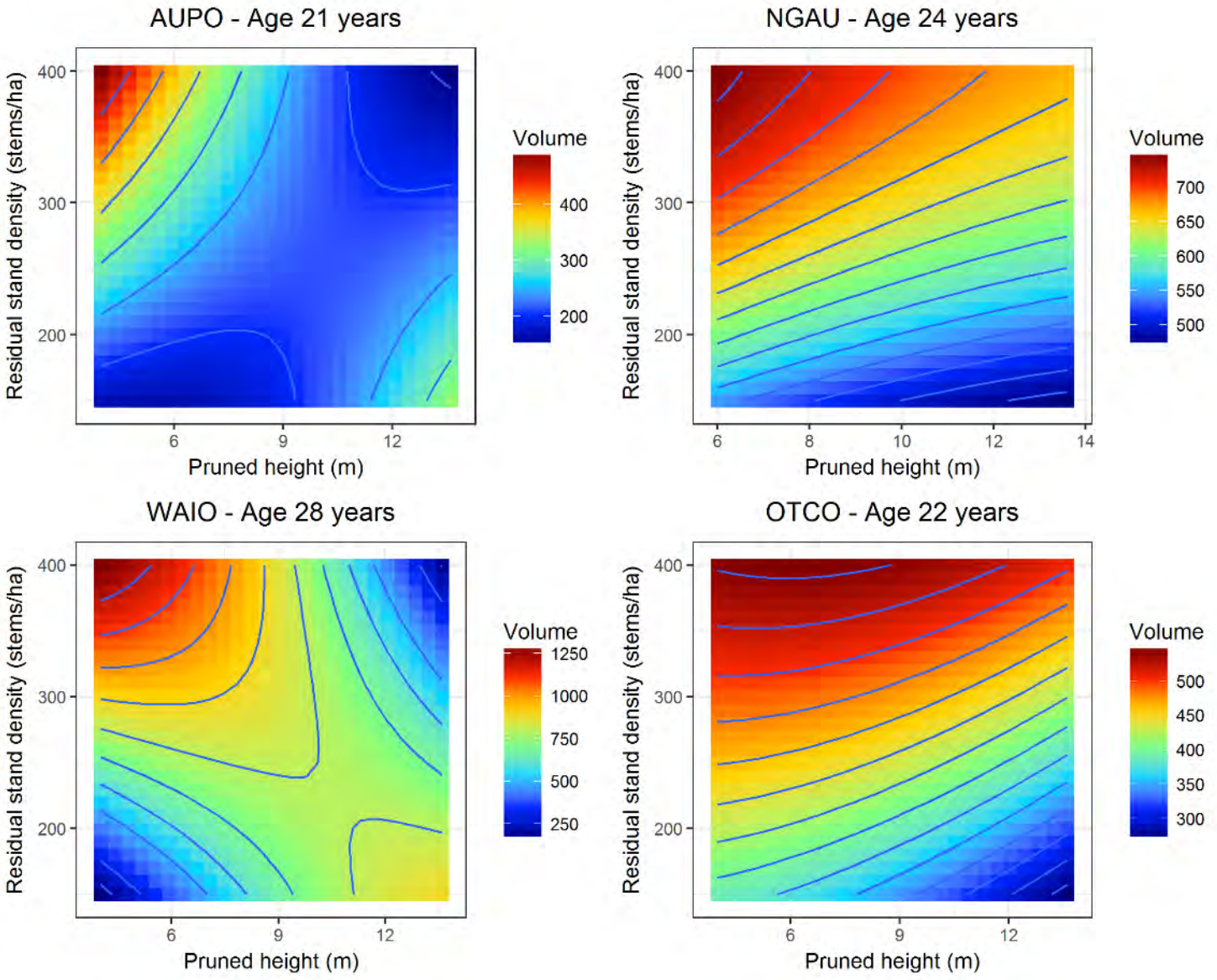
		Intervals				
Factor	Step length	-1.68	-1	0	1	1.68
Pruned height	3.0 m	4.0	5.8	8.8	11.8	13.6
Crown length	1.5 m	3.9	4.9	6.4	7.9	8.9
Final crop stocking	75 stems/ha	150	200	275	350	400

Trial has a response surface design, which means that only selected treatment combinations are represented

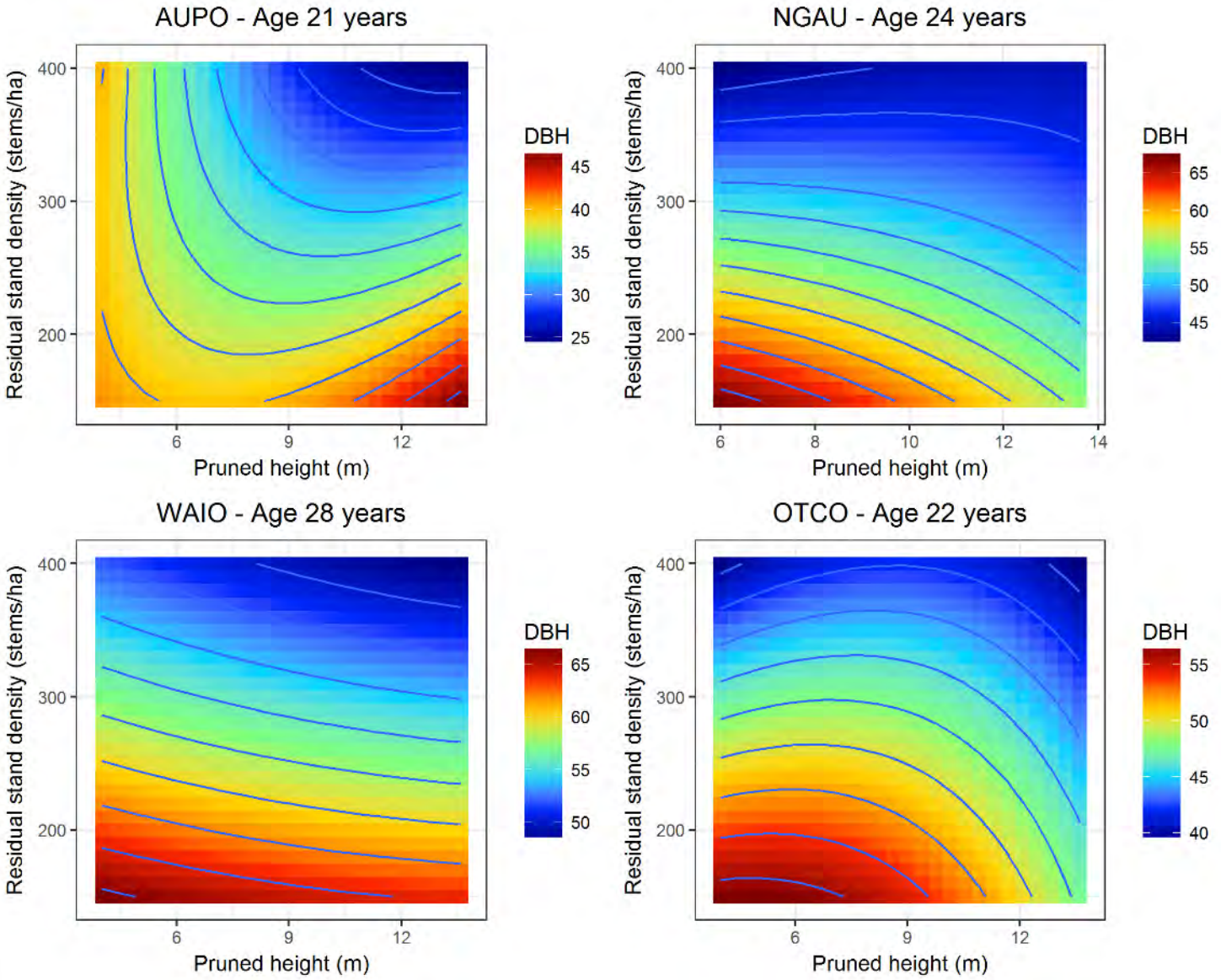
Stand development in the ultra-high pruning trials



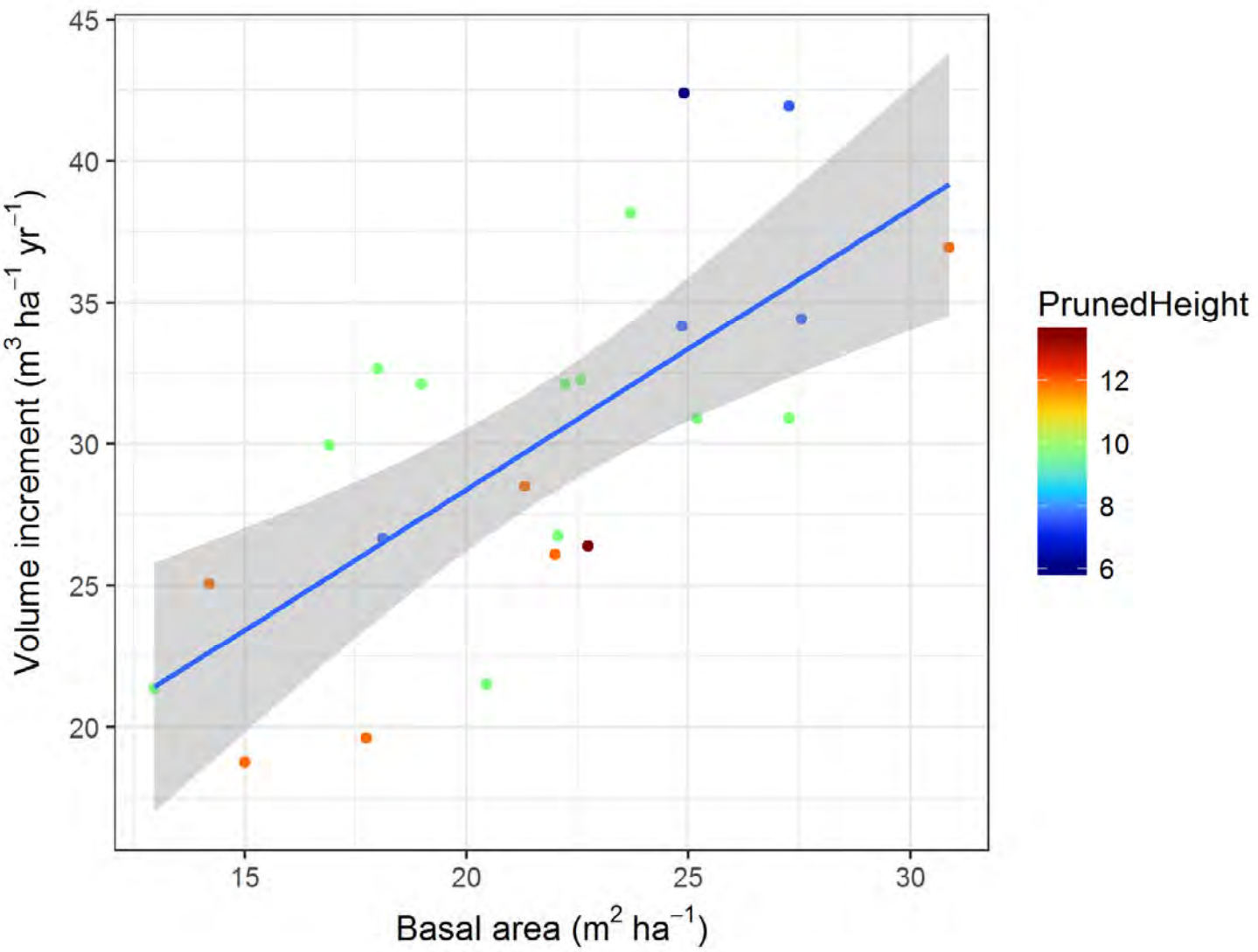
Effects of treatment on growth and yield

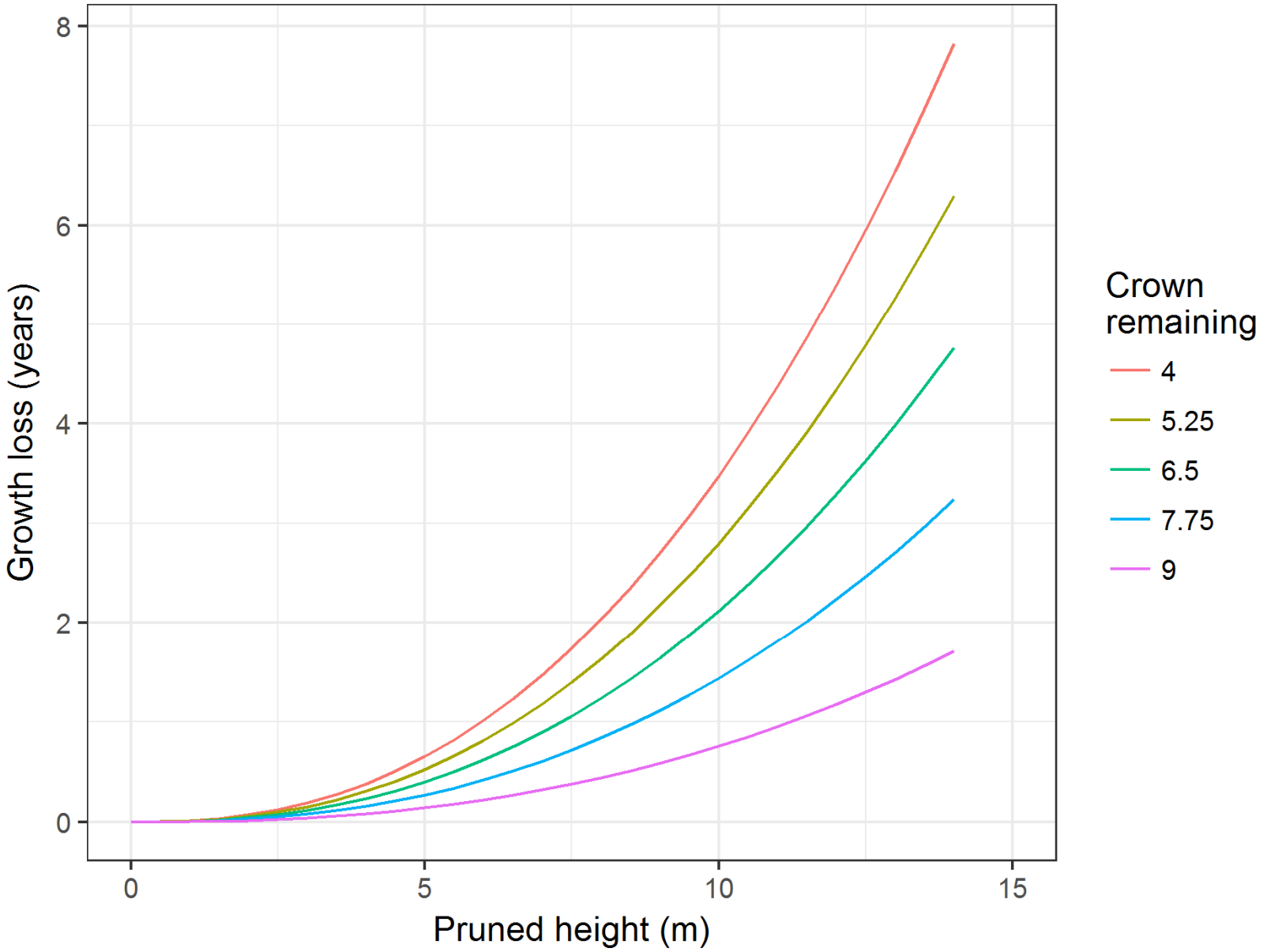


Effect of treatment on tree size (DBH)



What is the growth loss due to pruning?

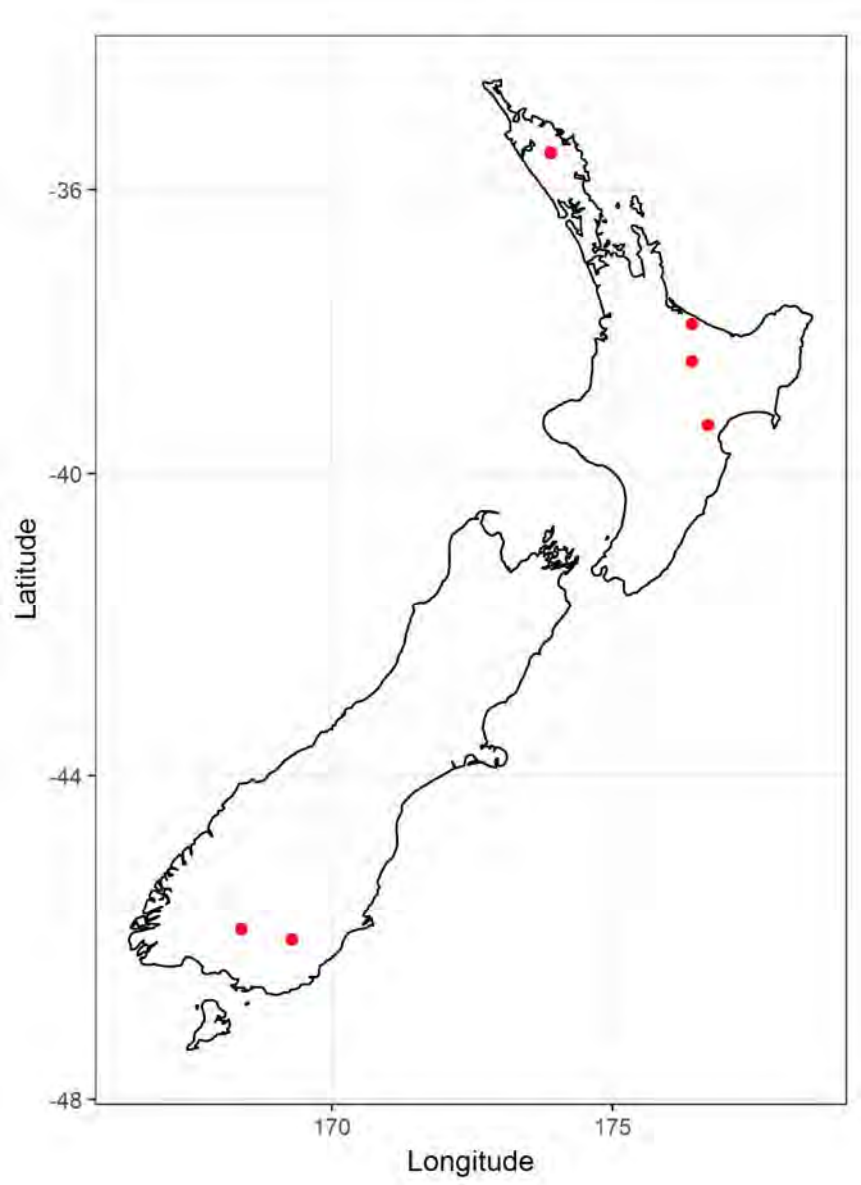



Growth loss (years)
8
6
4
2
0
0
5
10
15
Pruned height (m)
Crown remaining
4
5.25
6.5
7.75
9

Followers trials

- Established at 6 sites between 1986 and 1989
  - 4 ex-farm sites
  - 2 ex-forest sites

- Objective was to quantify the effect of the number of followers and the timing of thinning on tree growth and log quality



Treatments in the followers trials

Forest Sites (n=2)

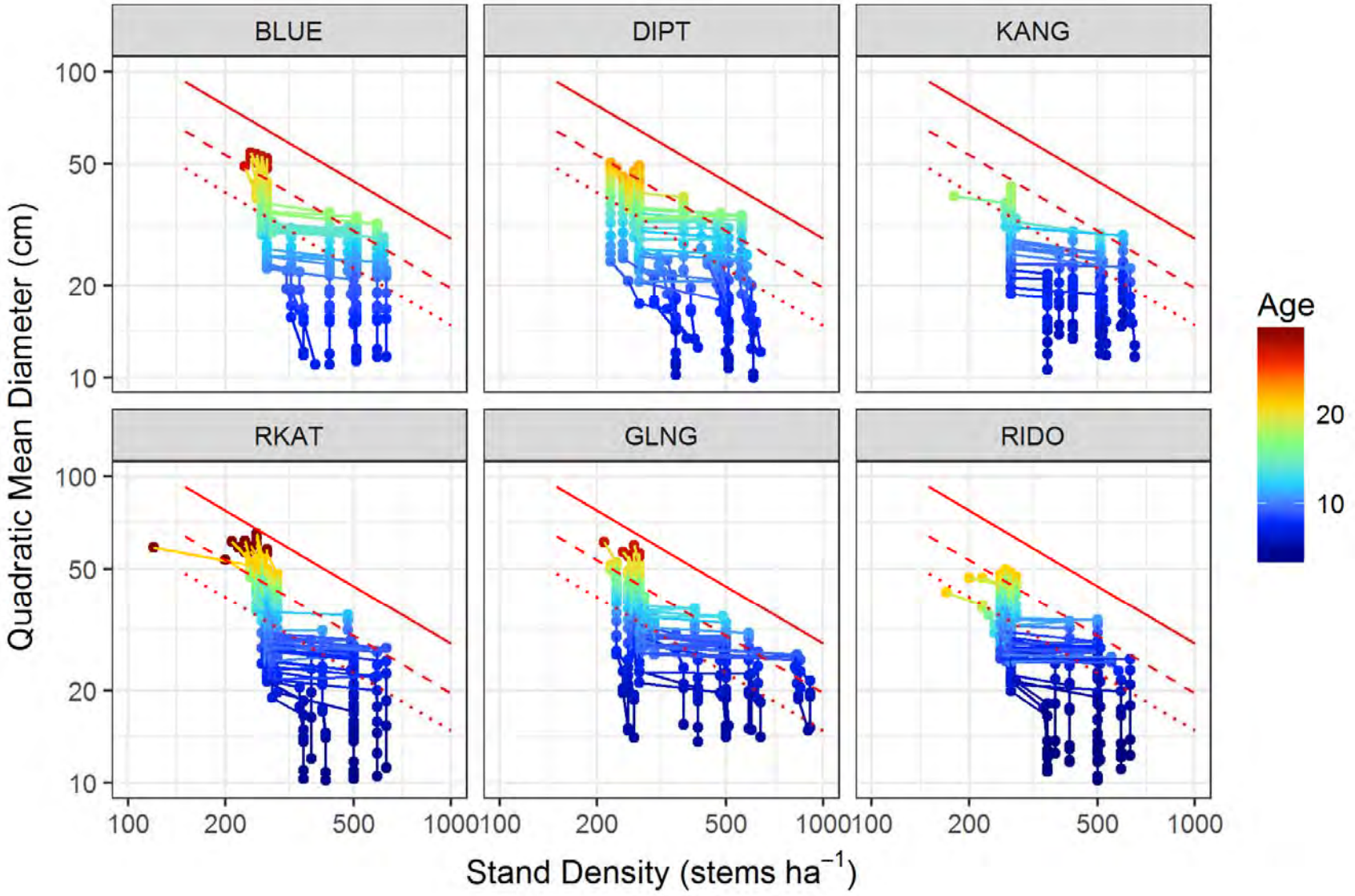
		Intervals				
Factor	Step length	-1.68	-1	0	1	1.68
Number followers	90 stems/ha	103	140	230	320	357
MTH at thinning	4.0 m	12.4	14.0	18.0	22.0	23.6

Farm Sites (n=4)

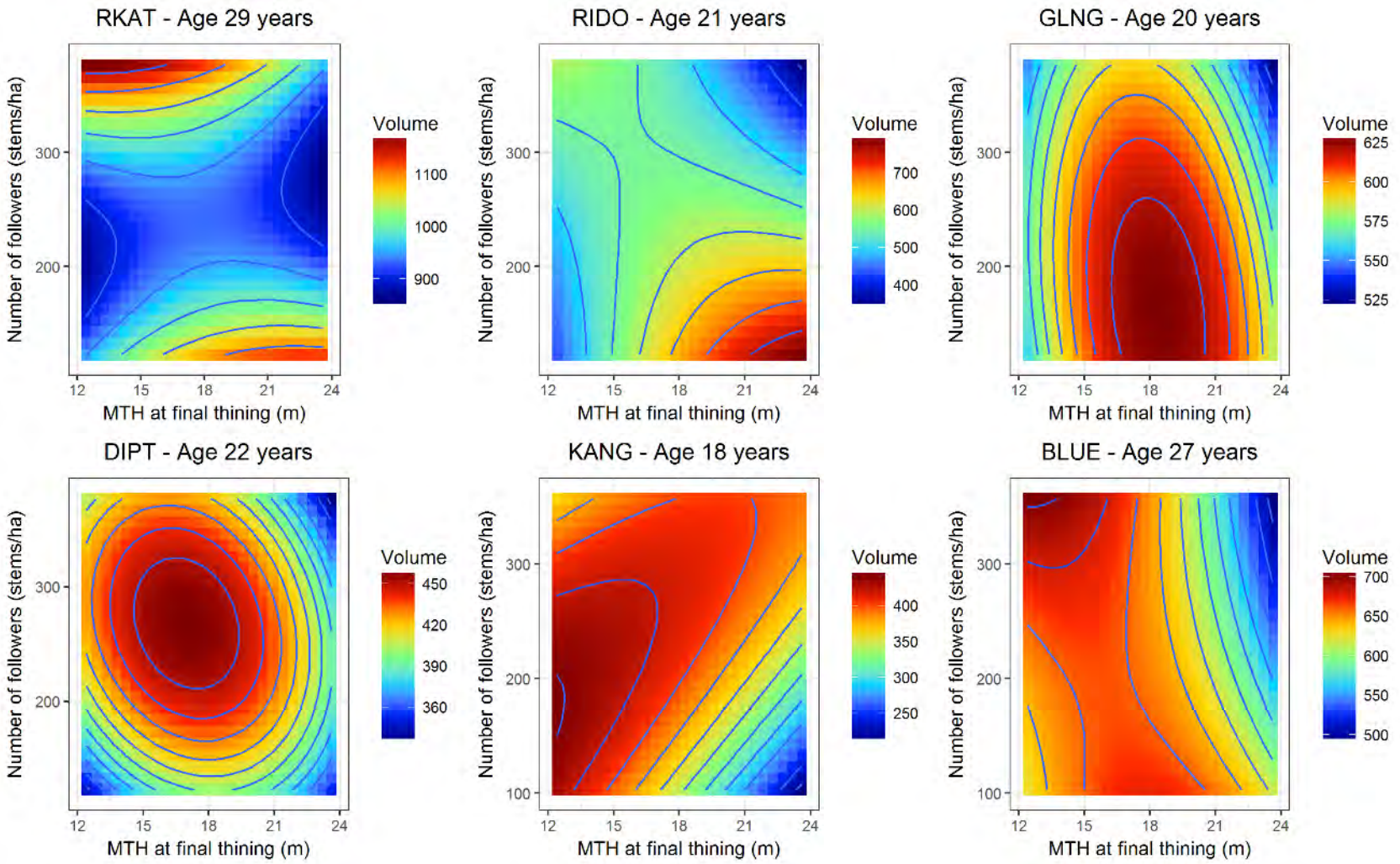
		Intervals				
Factor	Step length	-1.68	-1	0	1	1.68
Number followers	90 stems/ha	123	160	250	340	377
MTH at thinning	4.0 m	12.4	14.0	18.0	22.0	23.6

Trial has a response surface design, which means that only selected treatment combinations are represented

Stand development in the followers trials

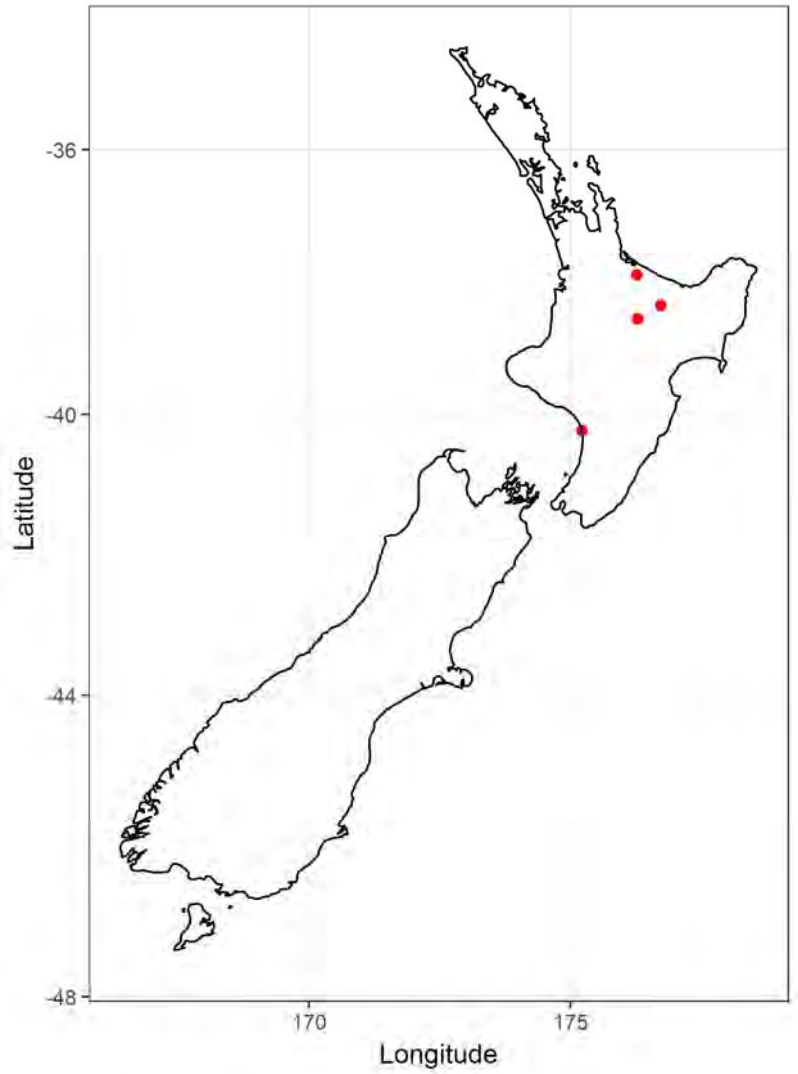


Effects of treatment on growth and yield

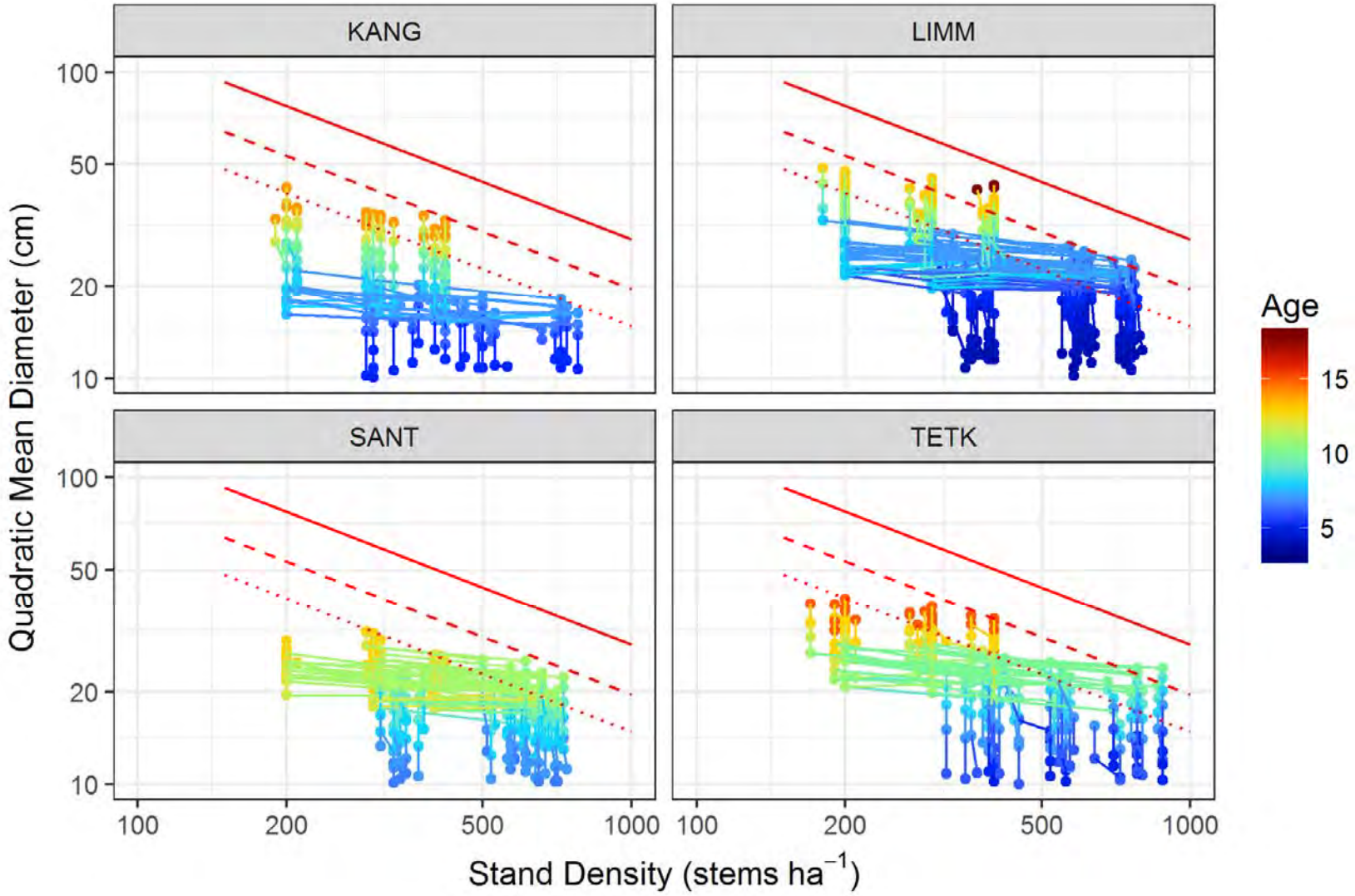


Improved breeds pruning trials

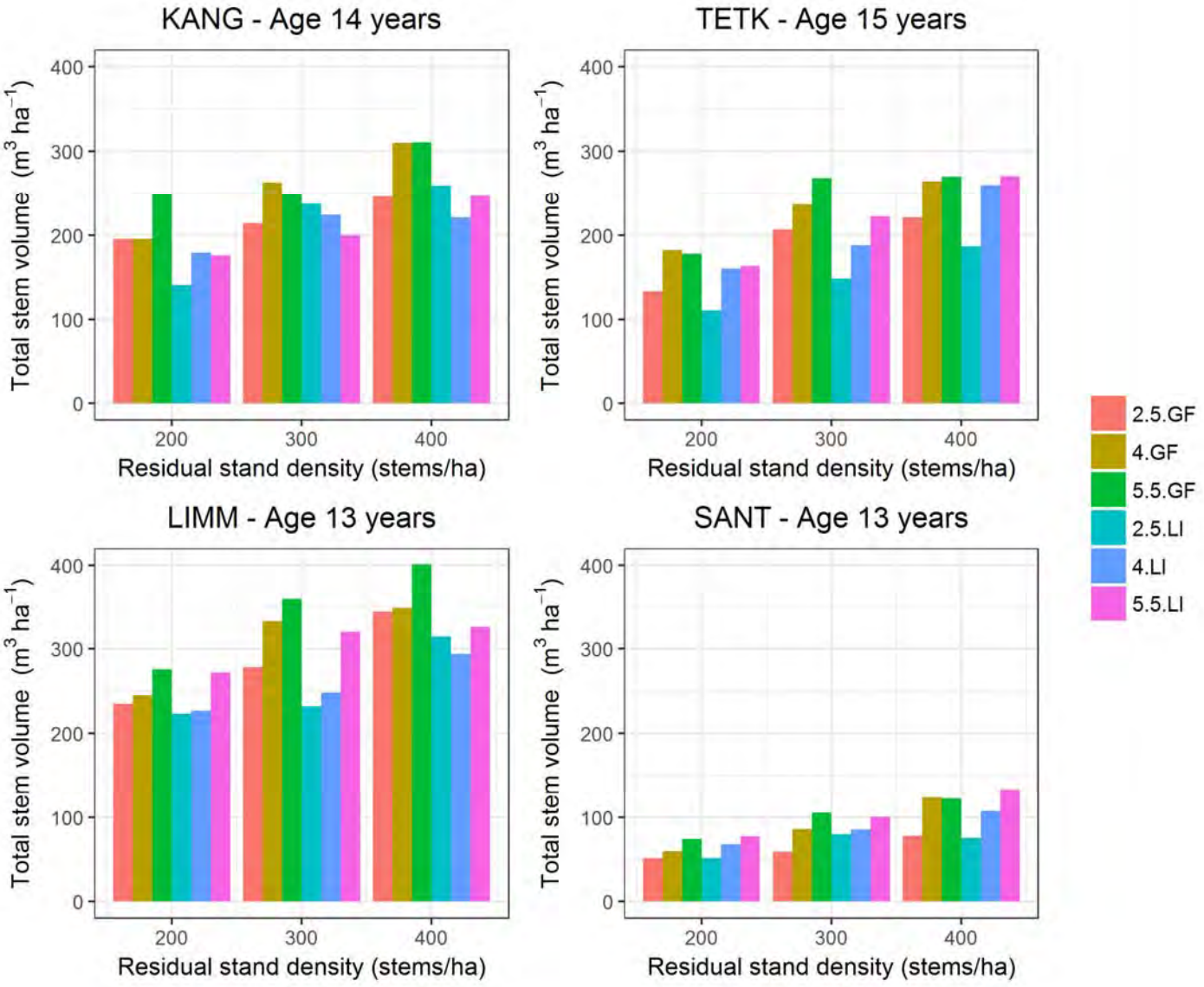
- Planted between 1994 and 1997 at four sites in the North Island
- Objective was to look at the response to pruning of trees with contrasting branch habit
- Trials contain the following treatments:
  - Two breeds (GF and LI)
  - Three stand densities
  - Three levels of crown removal
- Time studies were done to look at the effect of these factors on pruning cost



Stand development in the improved breeds pruning trials



Volume at most recent measurement ~ 2009-10



Summary

- As expected stand density is a major determinant of yield

- High pruning does reduce yield
  - Yield reduction is greatest when it is combined with low green crown retention

- While pruning costs are lower for the LI breed, there is a significant reduction in yield

- There does not appear to be any significant growth loss from retaining followers, but delayed thinning can impact yields

What's the future for these trials?

- Two installations of UHP trials still exist along with all IBP trials

- There are a number of potential options for these trials
  - Maintain growth measurements
  - Undertake PHI to look at value differences between treatments
  - Processing study on pruned logs to look at quality of appearance grade lumber
  - Undertake a more comprehensive analysis of growth data to better understand the relationship between crown size and stand dynamics

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