



# Mid-rotation fertiliser trials - update

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# Background

- there is a need to determine whether stand growth following relatively intense thinning and pruning can be promoted by fertiliser application



# Project Overview

- in 2002, the Forest Science Centre established mid-rotation fertiliser trial in FFORNE plantations
- 4 plantations across north-eastern Victoria planted in 1998
- *Eucalyptus globulus* & *E. nitens*



# Site selection

- 2 x species (*E. globulus* and *E. nitens*)
- growth rates
- rainfall classes (700 & 800; 960 & 1170)
- soil types



# Treatments

Phosphorus (kg ha <sup>-1</sup> )	Nitrogen (kg ha <sup>-1</sup> )	
	0	200
0	Treatment 1	Treatment 2
60	Treatment 3	Treatment 4



# Fertiliser treatments

- 434 kg ha<sup>-1</sup> of urea (46% N), for 200 kg ha<sup>-1</sup> of N
- 352 kg ha<sup>-1</sup> of double super phosphate (17% P), for 60 kg P ha<sup>-1</sup>
- fertiliser was applied by broadcasting across the entire treatment plots in spring 2002



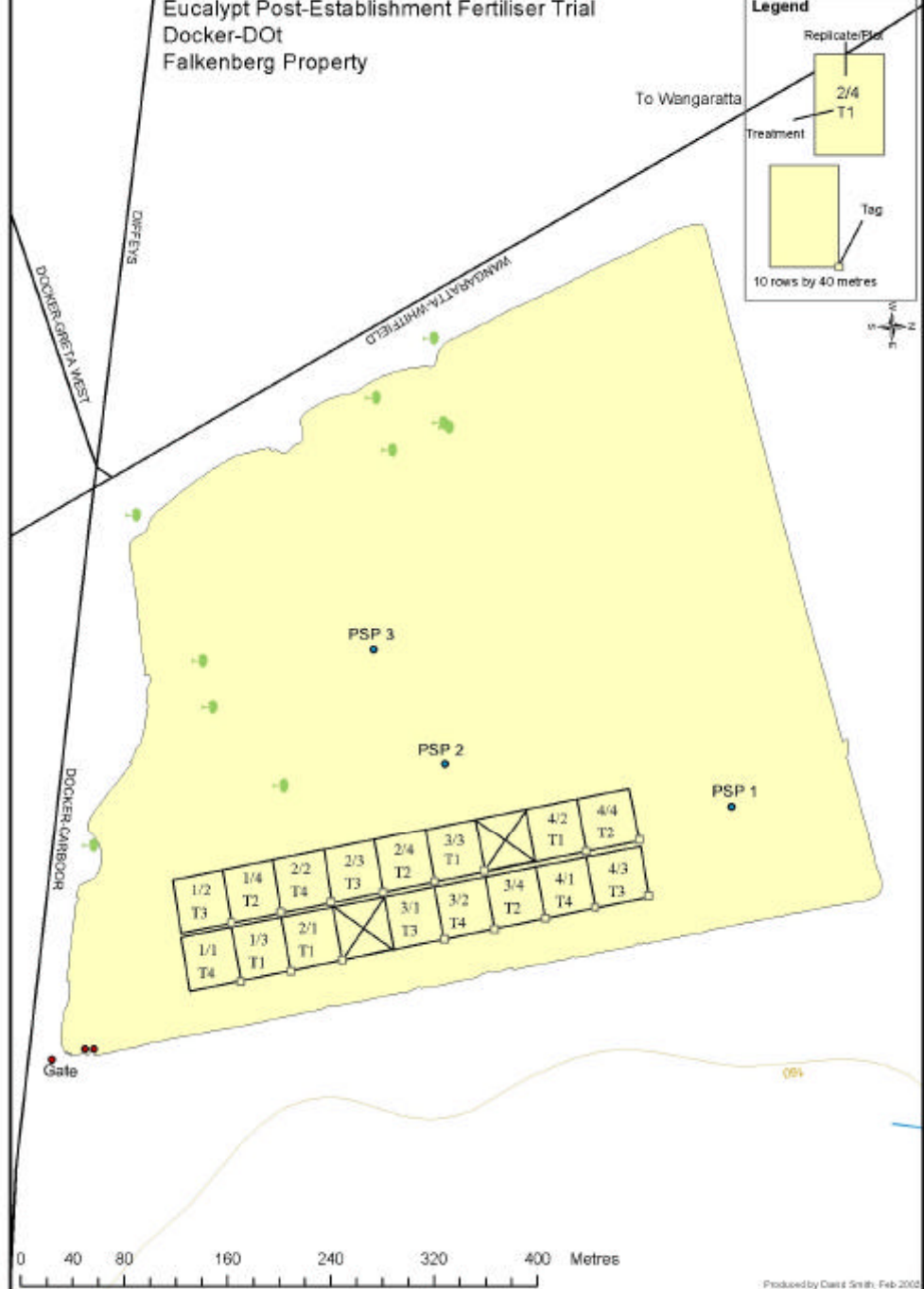
# Site layout

- four replicates of each of four treatments (4x4=16 treatment plots)
- arranged in a randomised block
- treatment plot size is 10 rows (~40m wide) by 40 m long
- measurement plot size is 8 rows (~32 m wide) by 35 m long
- between 25-35 trees per measurement plot

# Docker (Falkenburg)

*E. globulus*

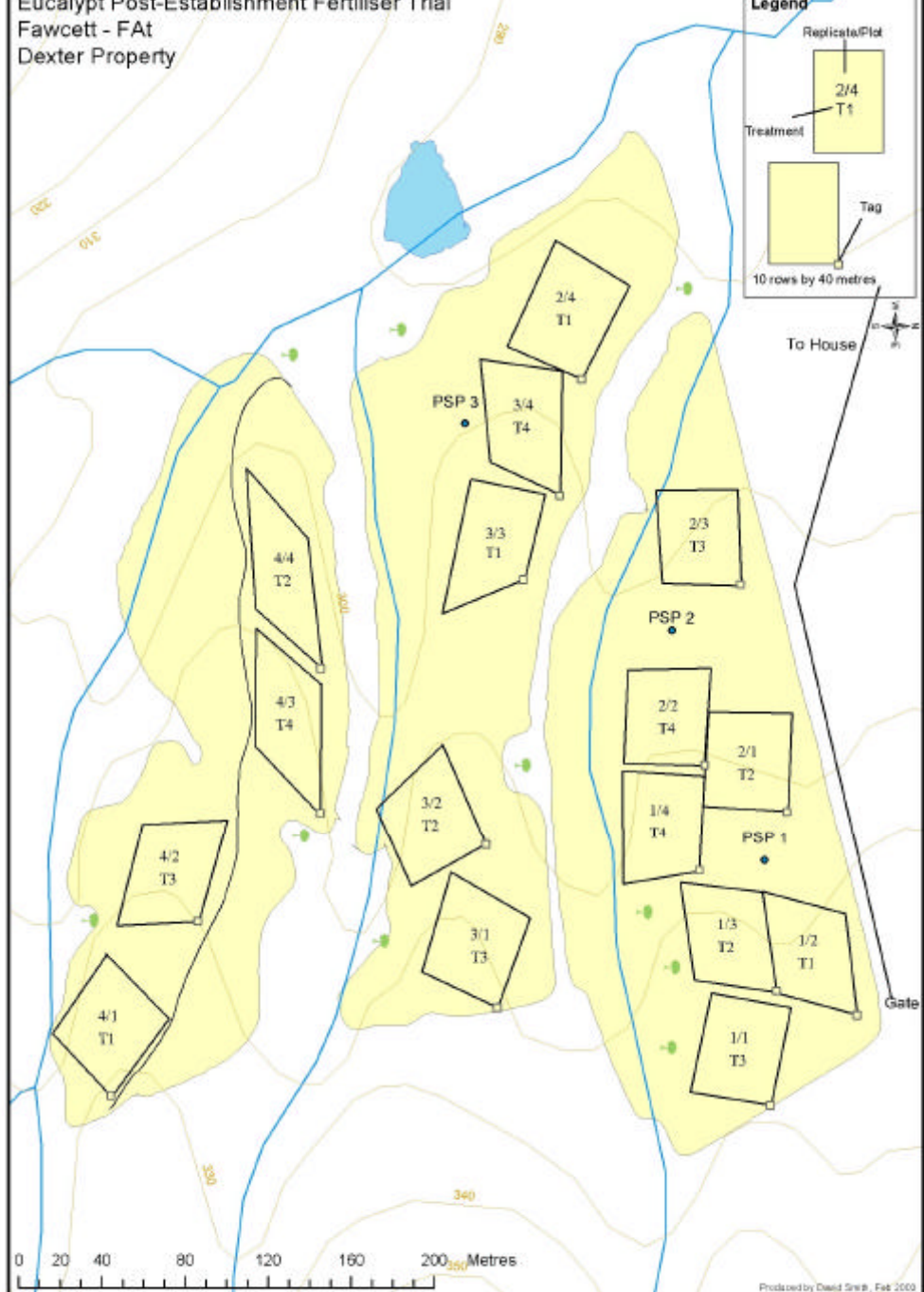
710 mm/yr





**Fawcett**  
**(Dexter)**  
*E. globulus*

**800 mm/yr**



# Highlands

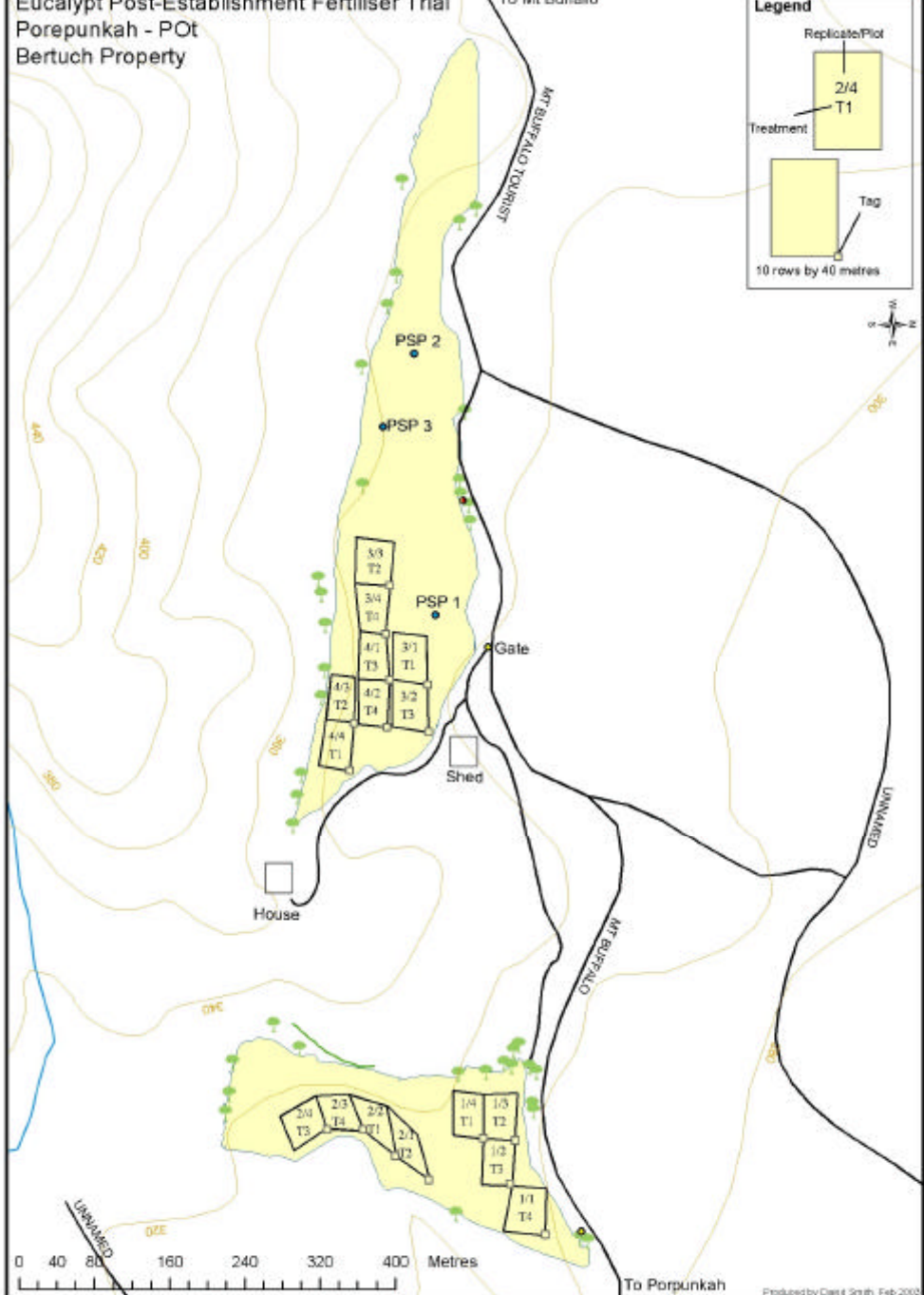
(Fern)

*E. nitens*

960 mm/yr



**Porepункah**  
**(Bertuch)**  
*E. nitens*  
**1170 mm/yr**





# Measurements

- tree measurements (status, forking, diameter over bark, total height, green crown height, pruned height)
- nutrient foliage concentration
- soil samples
- soil profile descriptions



# Results - site summaries

Site	Species	Density		Survival	
		4 years	6 years	4 years	6 years
Lockyer	<i>E. globulus</i>	254	250	100	98
Lawcett	<i>E. globulus</i>	324	322	100	99
Highlands	<i>E. nitens</i>	195	195	100	100
Morepunkah	<i>E. nitens</i>	318	310	100	97



# Results - height

Site	Spp	Mean		Mean domin.		Pruned		Green crown	
		4 yr	6 yr	4 yr	6 yr	4 yr	6 yr	4 yr	6 yr
Lockyer	G	10.6	14.4	10.9	14.7	2.2	2.4	2.5	3.4
Lawcett	G	11.2	14.2	11.8	14.7	2.6	4.9	2.6	5.3
Highlands	N	13.1	16.7	13.1	16.7	4.6	6.6	4.6	6.7
Prepukah	N	15.9	18.7	16.4	19.2	6.3	7.3	6.4	7.5



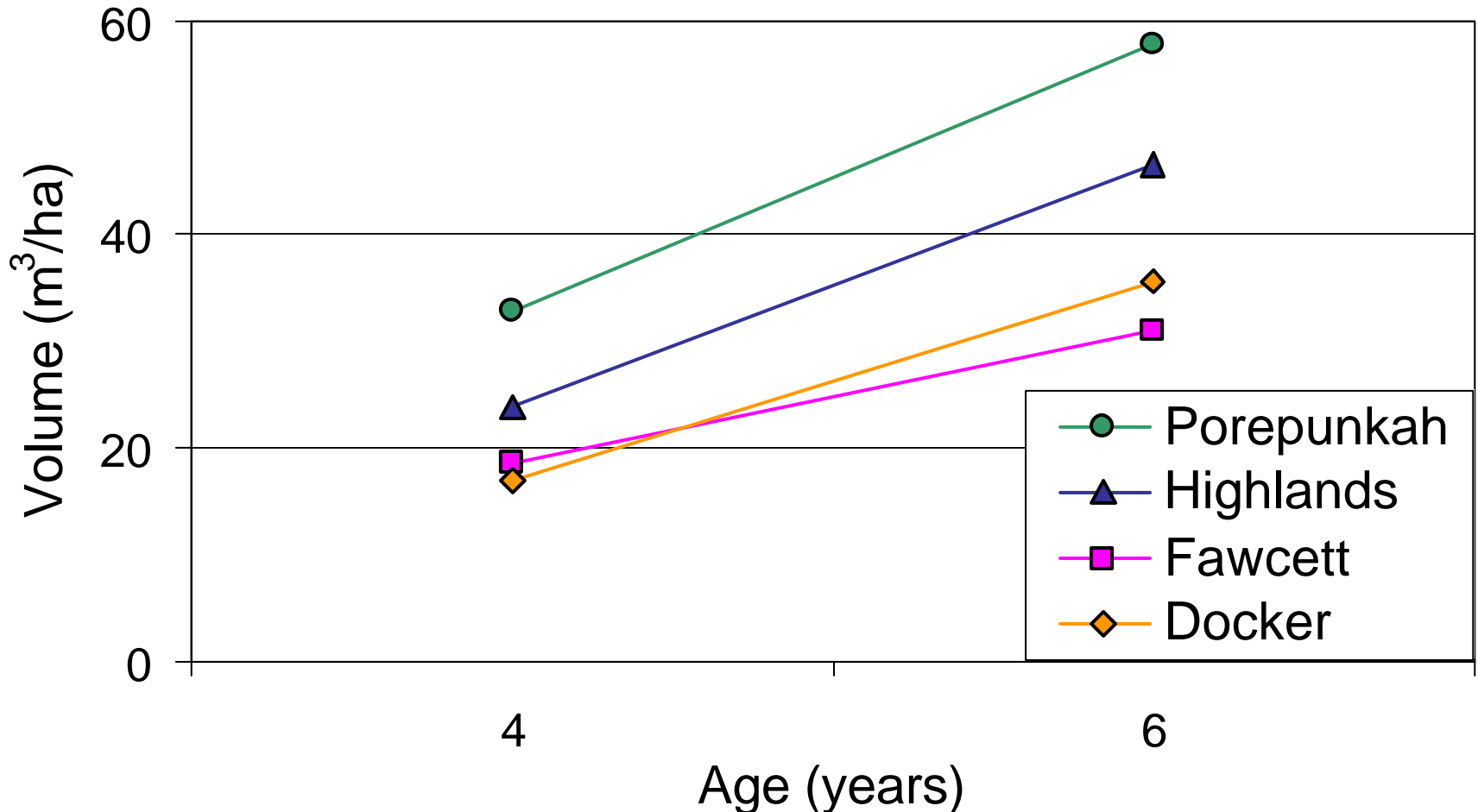
# Results - MAI

Site	Spp	MAI (m <sup>3</sup> / ha/ yr)			
		Total		Crop trees	
		4 yr	6 yr	4 yr	6 yr
Docker	G	4.9	7.2	4.3	6.2
Lawcett	G	6.0	7.3	4.4	5.3
Highlands	N	5.9	8.3	5.8	8.2
Morepunkah	N	10.8	13.3	7.8	10.0

\*Crop trees = 200 largest diameter trees per hectare



# Site crop volume







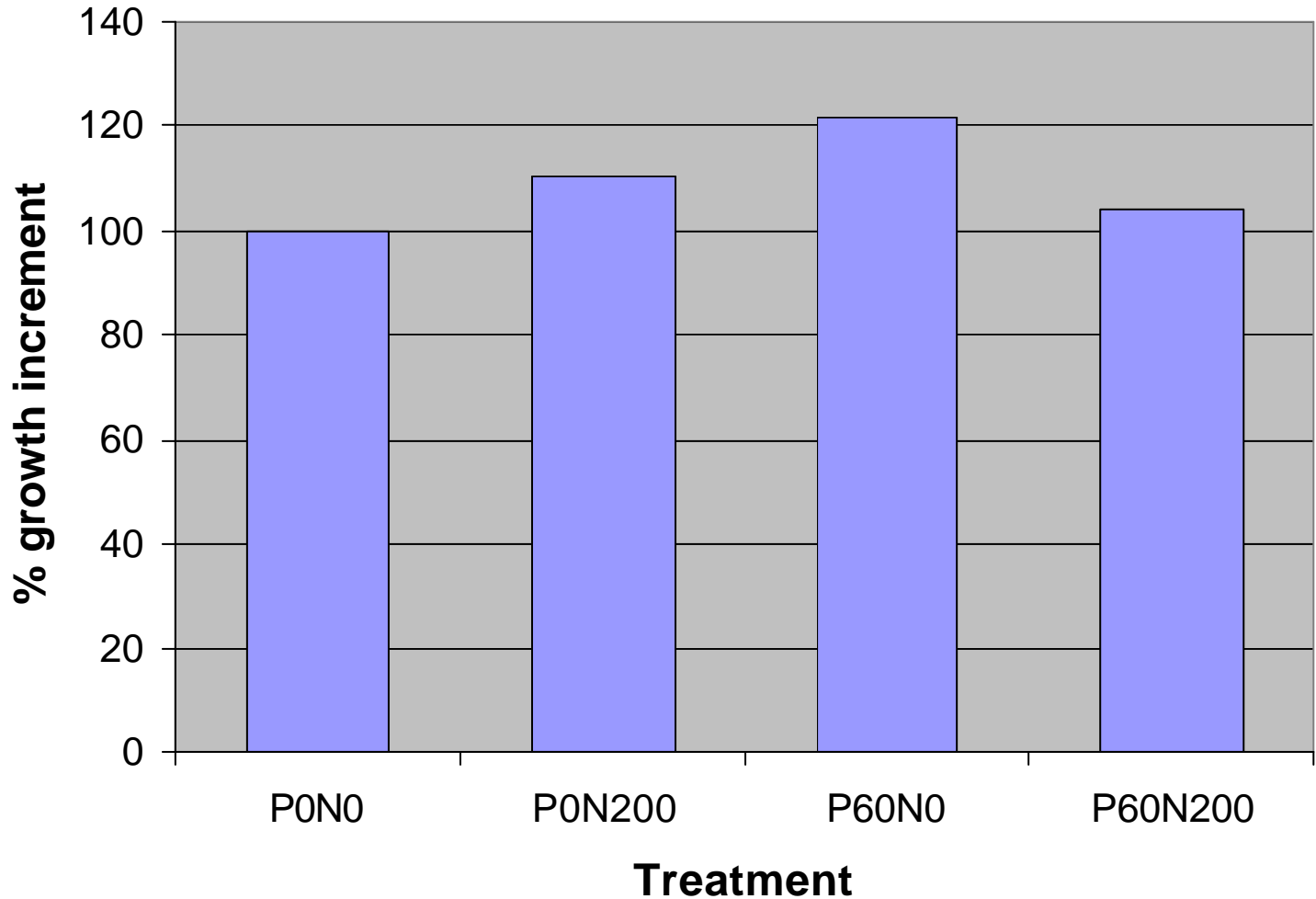
# Initial foliar nutrition (g/kg)

Site	Species	N	P
Docker (Falkenburg)	<i>E. globulus</i>	16.9	1.2
Fawcett (Dexter)	<i>E. globulus</i>	16.2	1.0
Highlands (Fern)	<i>E. nitens</i>	16.0	0.8
Porepunkah (Bertuch)	<i>E. nitens</i>	16.1	0.9

- no major macro or micro-nutrient deficiencies
- but P concentrations were marginal at Highland and Porepunkah site

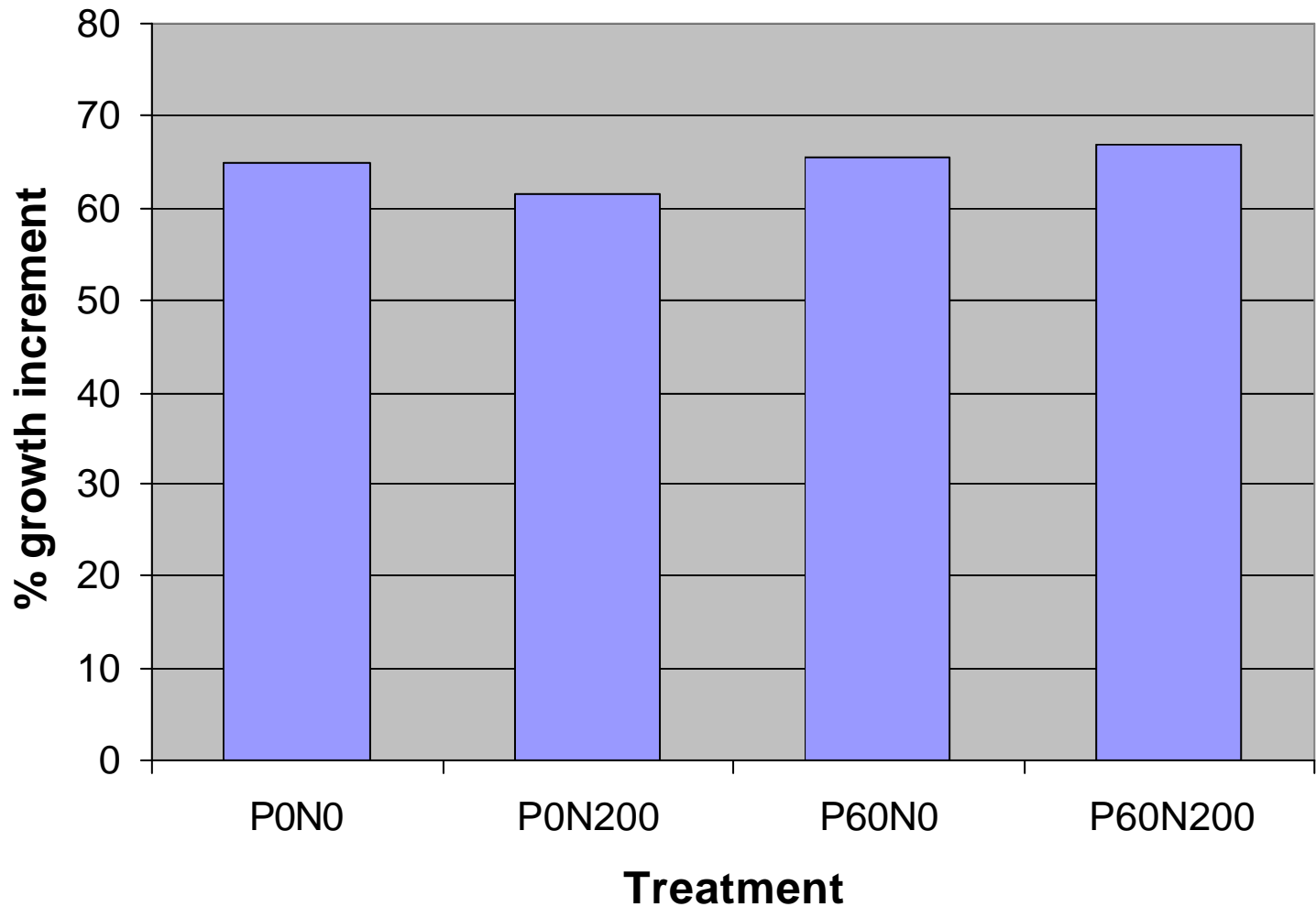


# Fertiliser responses - Docker



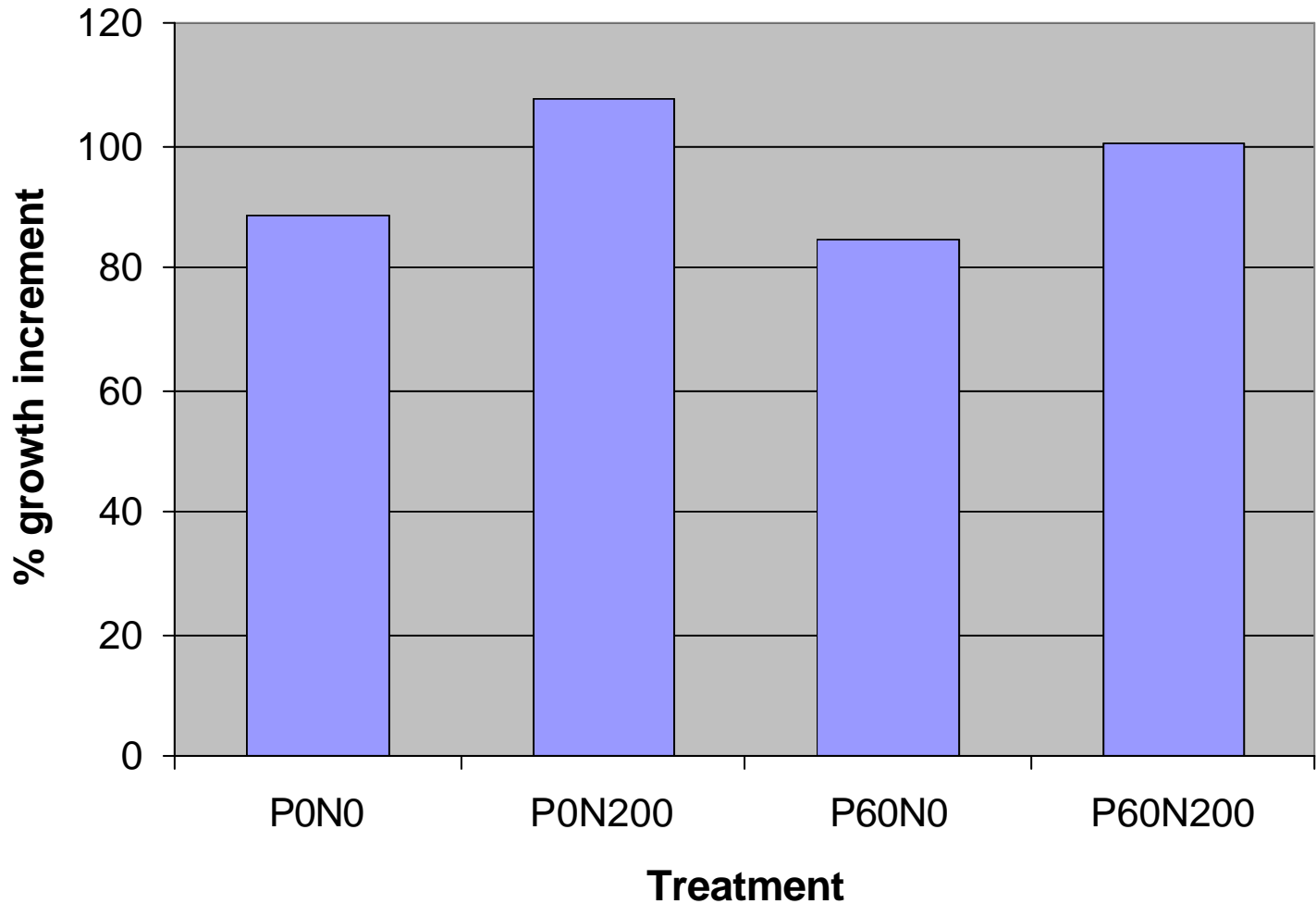


# Fertiliser responses - Fawcett



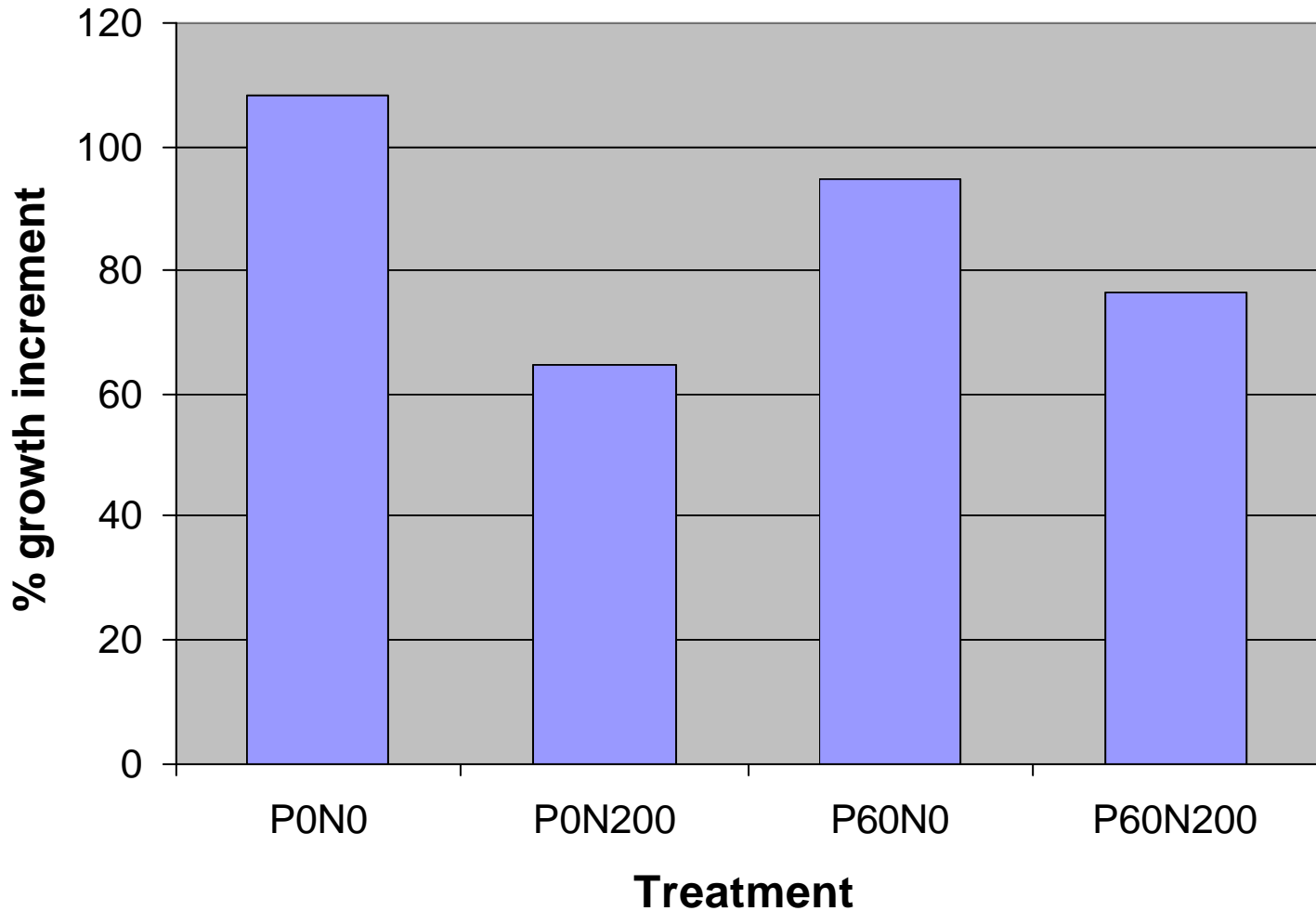


# Fertiliser responses - Highlands





# Fertiliser responses - Porepunkah





# Summary

- No responses to P fertiliser application
- Possibly a response to N fertiliser application to *E. nitens* at Highlands only
- continue measurements (next scheduled at age 8 years, 2006)