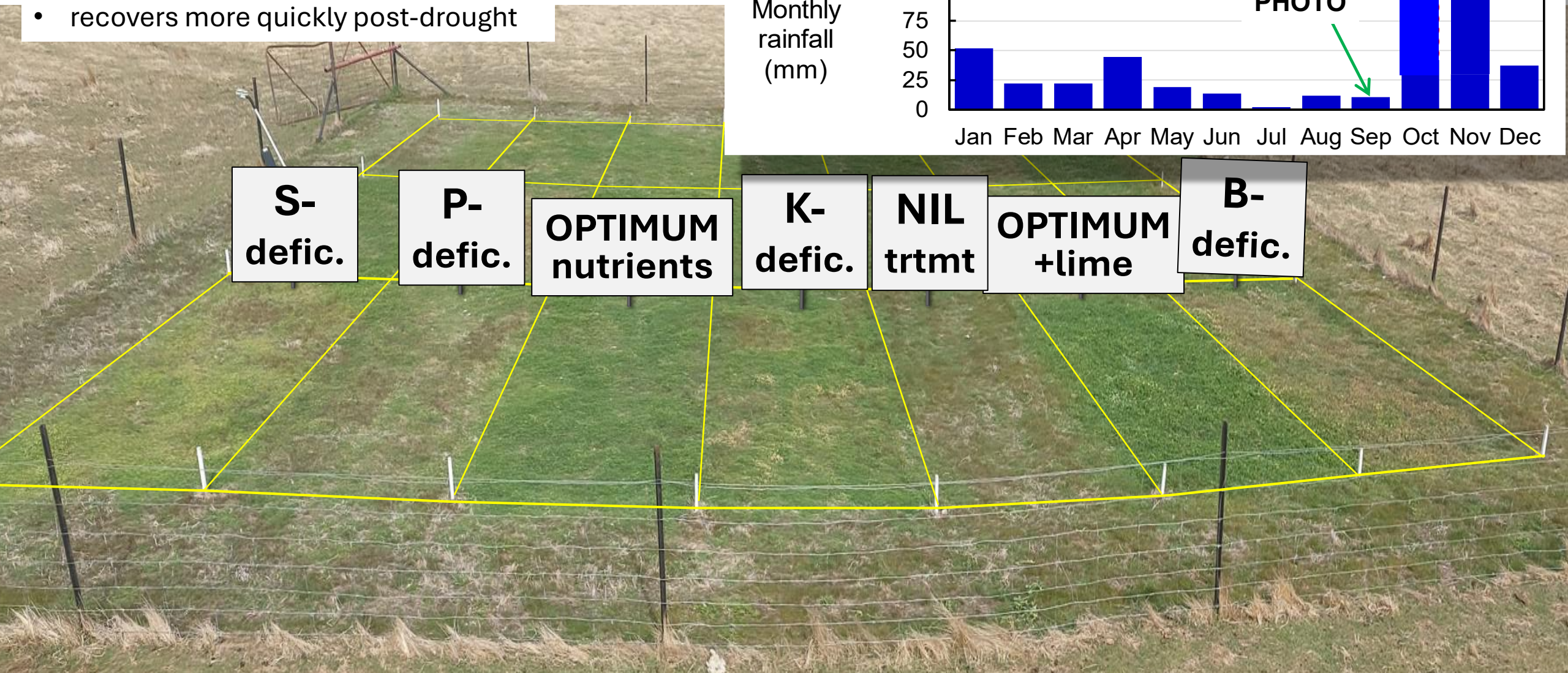
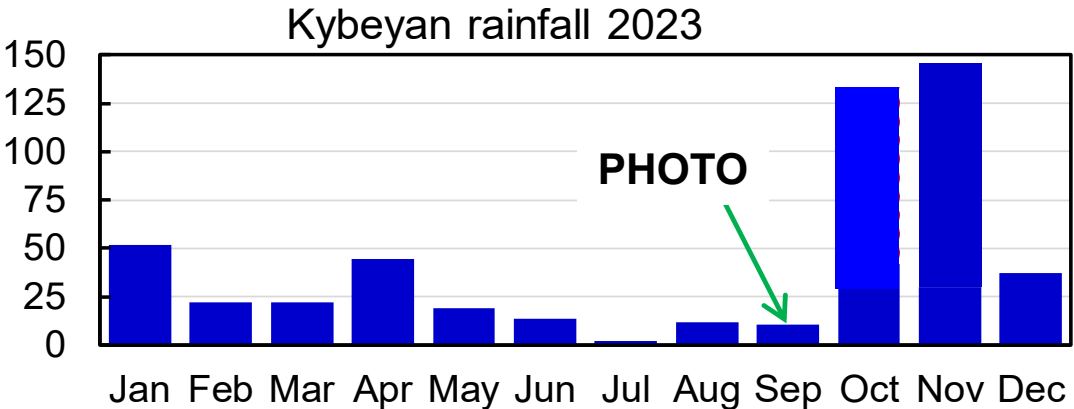


Role of optimum soil fertility in drought resilience

- better ground cover
- better response to rain events
- recovers more quickly post-drought



Monthly
rainfall
(mm)



Site characterisation

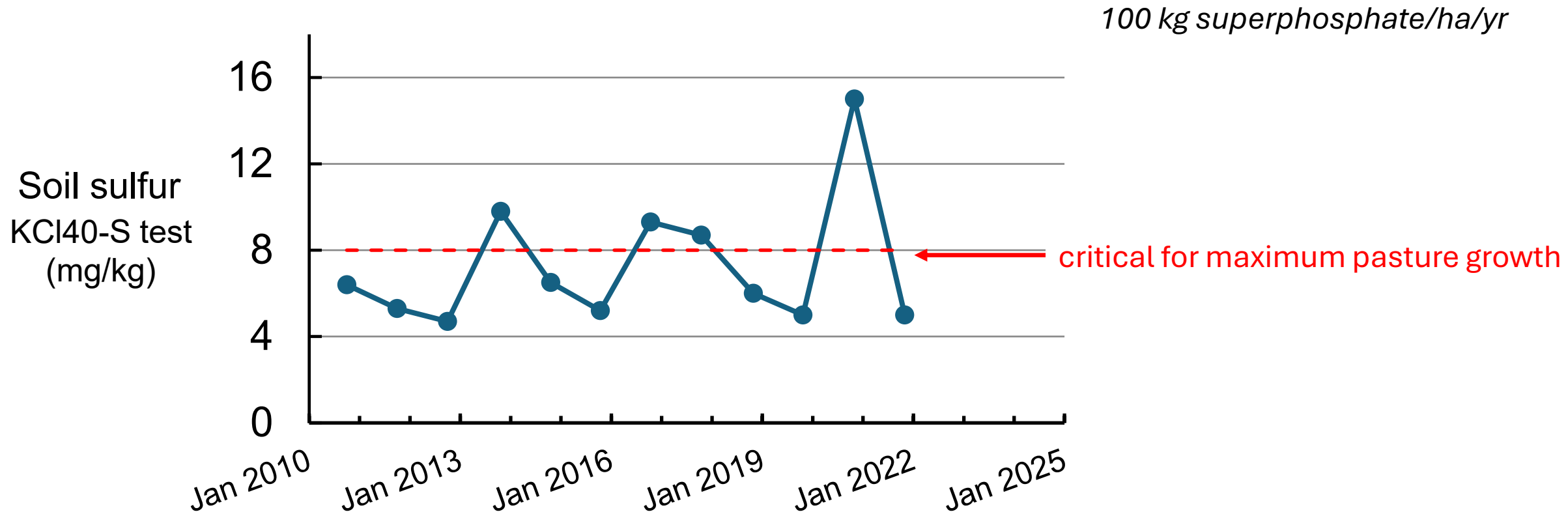
Alluvial soil; existing grass+clover pasture

Date		Jun-26	Sampled prior to setup of experiments
Site		Wantagong	
Depth (cm)		0-10	Surface samples only (deep cores will be taken in spring)
Gravel	%	0	
Texture		Loam/clay	
pH Level (CaCl ₂)		4.3	Top dressed 3 t/ha of lime at setup
Phosphorus Colwell	mg/kg	15	Critical value = 28 mg P/kg*
Potassium Colwell	mg/kg	86	Critical value = ~130 mg K/kg
Sulfur	mg/kg	7.7	Critical value = 8 mg K/kg
Organic Carbon	%	1.96	
Conductivity	dS/m	0.06	
DTPA Copper	mg/kg	0.5	
DTPA Iron	mg/kg	277	
DTPA Manganese	mg/kg	20	
DTPA Zinc	mg/kg	0.9	
Exc. Aluminium	meq/100g	0.15	
Exc. Calcium	meq/100g	2.7	
Exc. Magnesium	meq/100g	0.6	
Exc. Potassium	meq/100g	0.2	
Exc. Sodium	meq/100g	0.24	
Aluminium	% CEC	3.9	
Boron Hot CaCl ₂	mg/kg	0.24	Glasshouse studies found deficiency <0.34 mg B/kg
PBI		40	*Calculated using the PBI and online tool at: etools.mla.com.au/tools/ptool/v265/#/tool

critical value = soil test value that achieves 95% of maximum yield

Sulfur: How much S is required to predictably build and maintain soil S fertility?

Example: *producer maintaining soil P fertility through regular maintenance rate of SSP but large oscillations in soil S fertility i.e. between 'deficient' and 'adequate' S*



- observed these oscillations where no evidence of S leaching

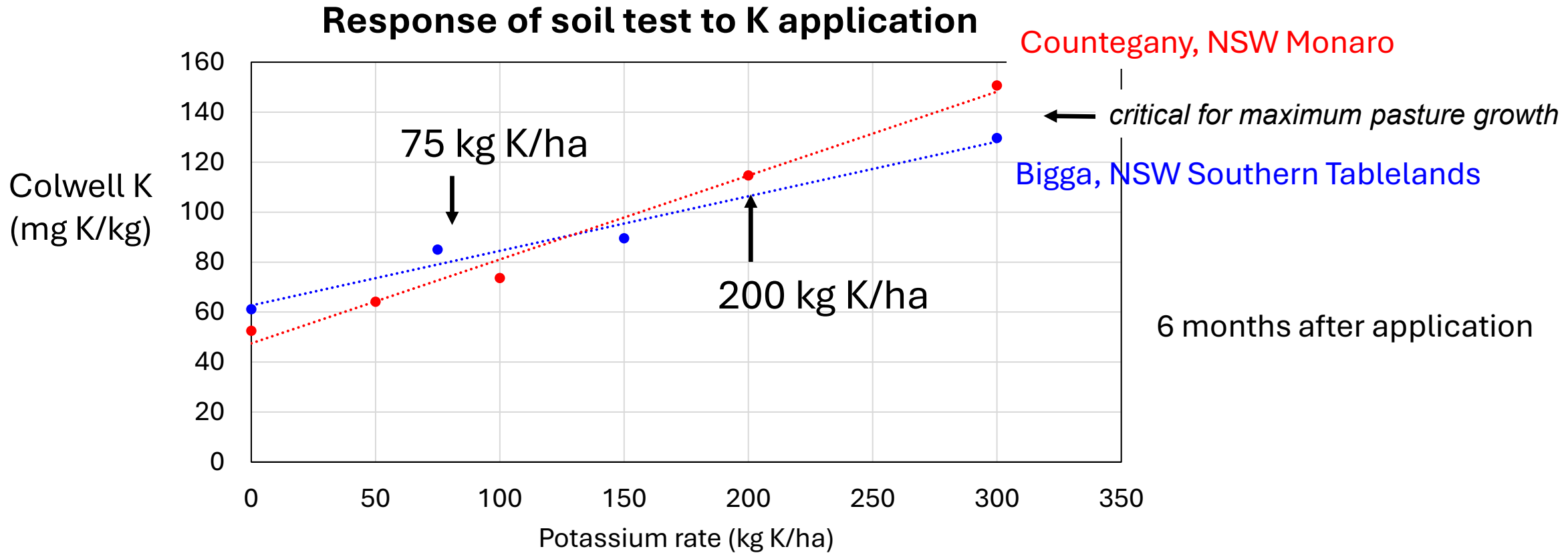
New project: network of small-plot experiments to test need for higher ratio of S → build & maintain soil S fertility

**1 of 2 sites in Holbrook region; 9 sites in total; across a range of locations and soil types in NSW Southern Tablelands, Monaro and Holbrook regions*

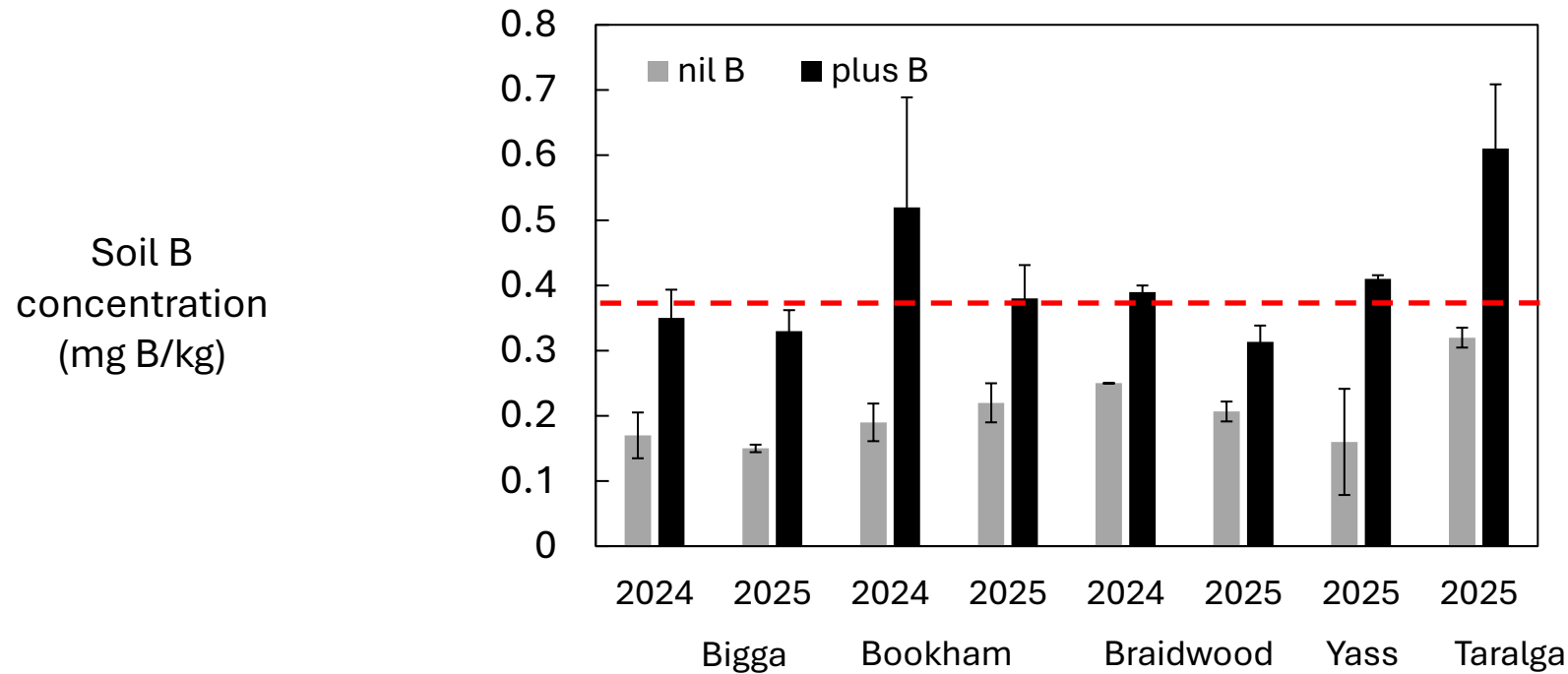
Potassium: How much K is required to build soil K fertility?

Current recommendations for K application are based on ‘rules of thumb’:

- 1-2 kg K/ha to increase the Colwell K value by 1 unit depending upon soil texture but not based on published evidence, and some soils ‘break’ these rules

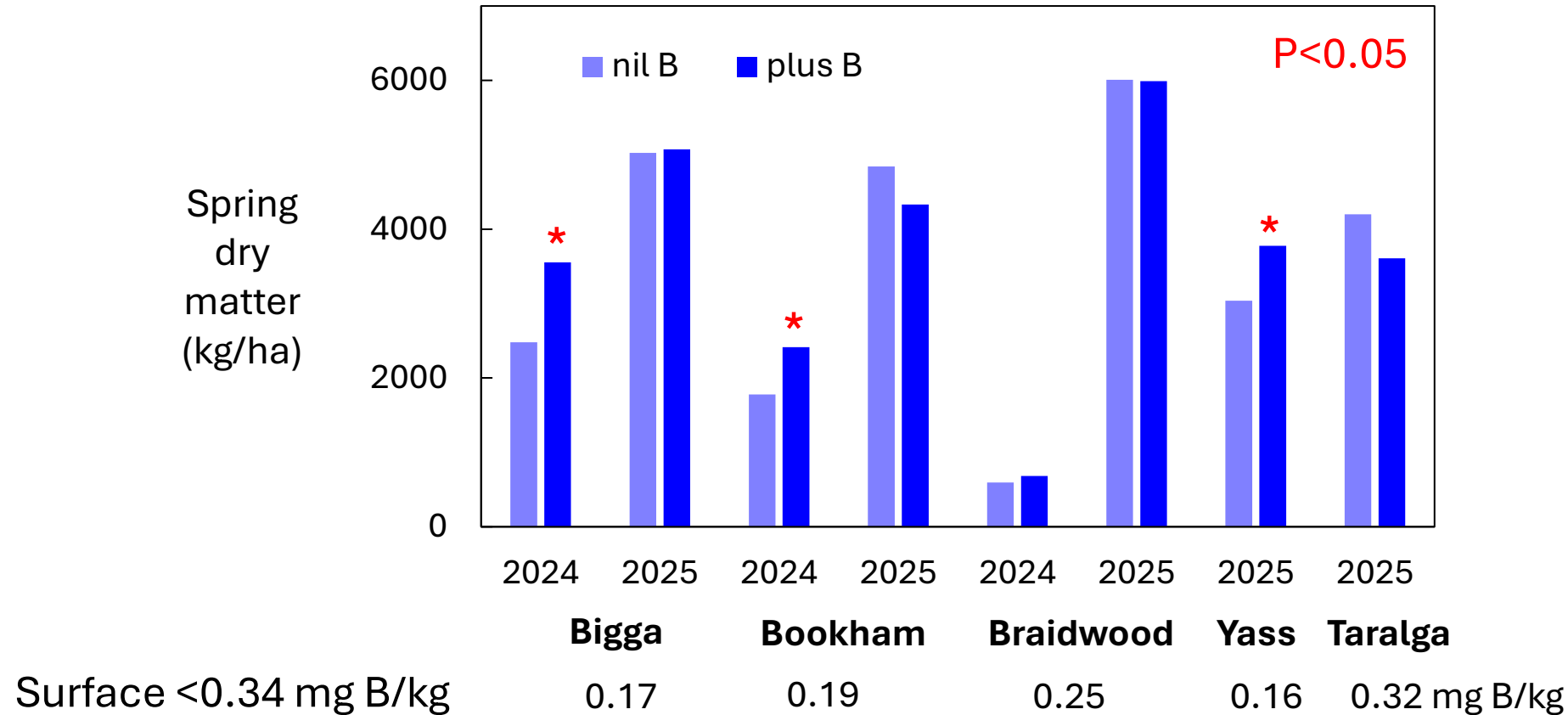


Results to date: soil test response to B application



- All sites had a soil B concentration less than the tentative critical value (0.34 mg B/kg in glasshouse study)
- Measured a significant increase in the soil B concentration after application of B

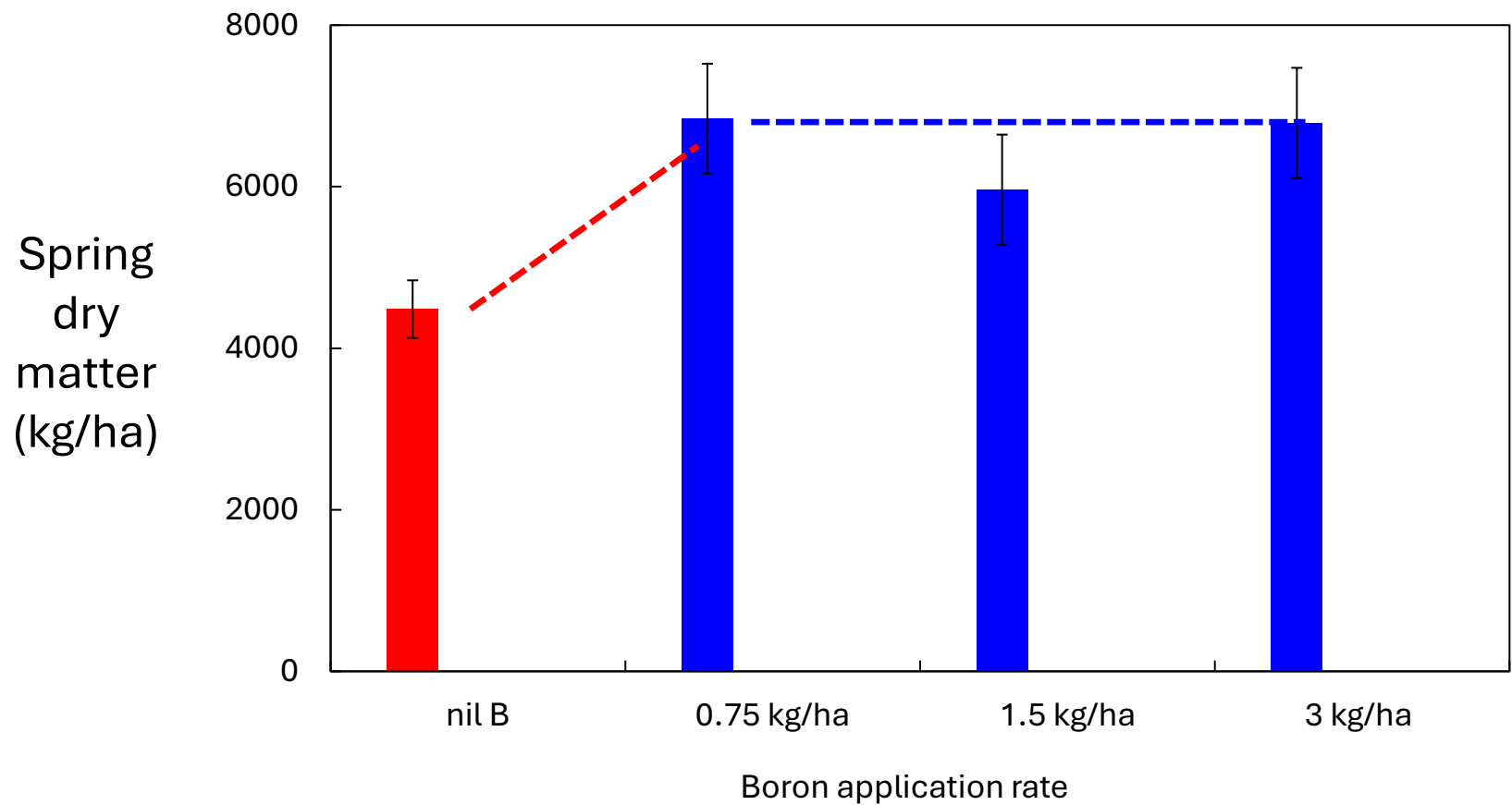
Results to date: pasture response to B application



- significant response to B application at 3 sites; 20-30% yield constraint
- responses did not occur in both years → seasonally dependent; more pronounced in dry conditions
- only measured herbage production → seed production is more sensitive to B deficiency

Results to date: pasture response to B rate

Yass, 2025



Maximum yield at lowest rate of B → How do these treatments track over time?

*reminder that B is a micronutrient and is only required in small amounts; only apply B if you have confirmed deficiency with plant tissue testing