

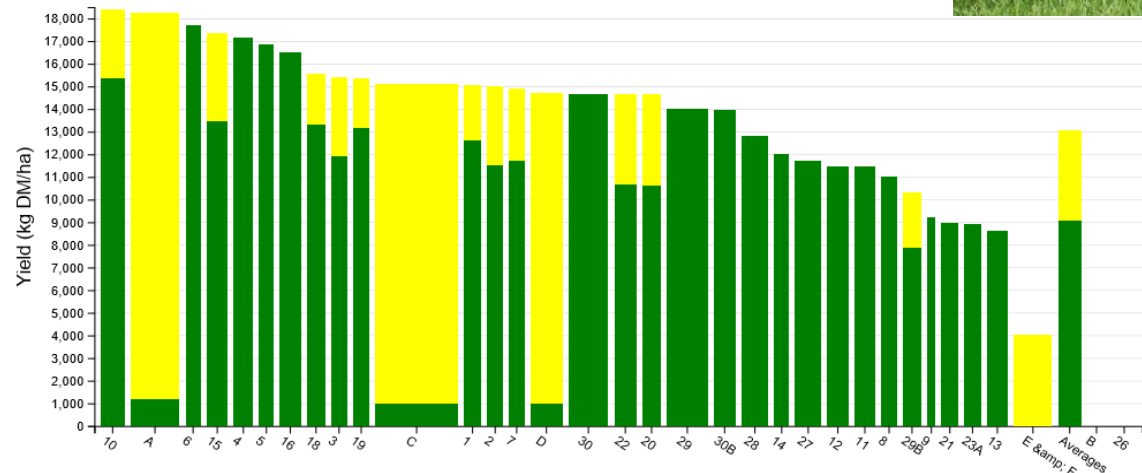


Optimising soil fertility for grass production on heavy soils farms

Heavy Soil Programme: AGM
27th January 2021
David Corbett



Farm Data: Grass Production Vs Soil Fertility



Farm Data includes:

5 Monitor Farms

- Sean O’Riordan
- John Leahy
- John O’Sullivan
- TJ Ryan
- Danny Bermingham

7 years of Data

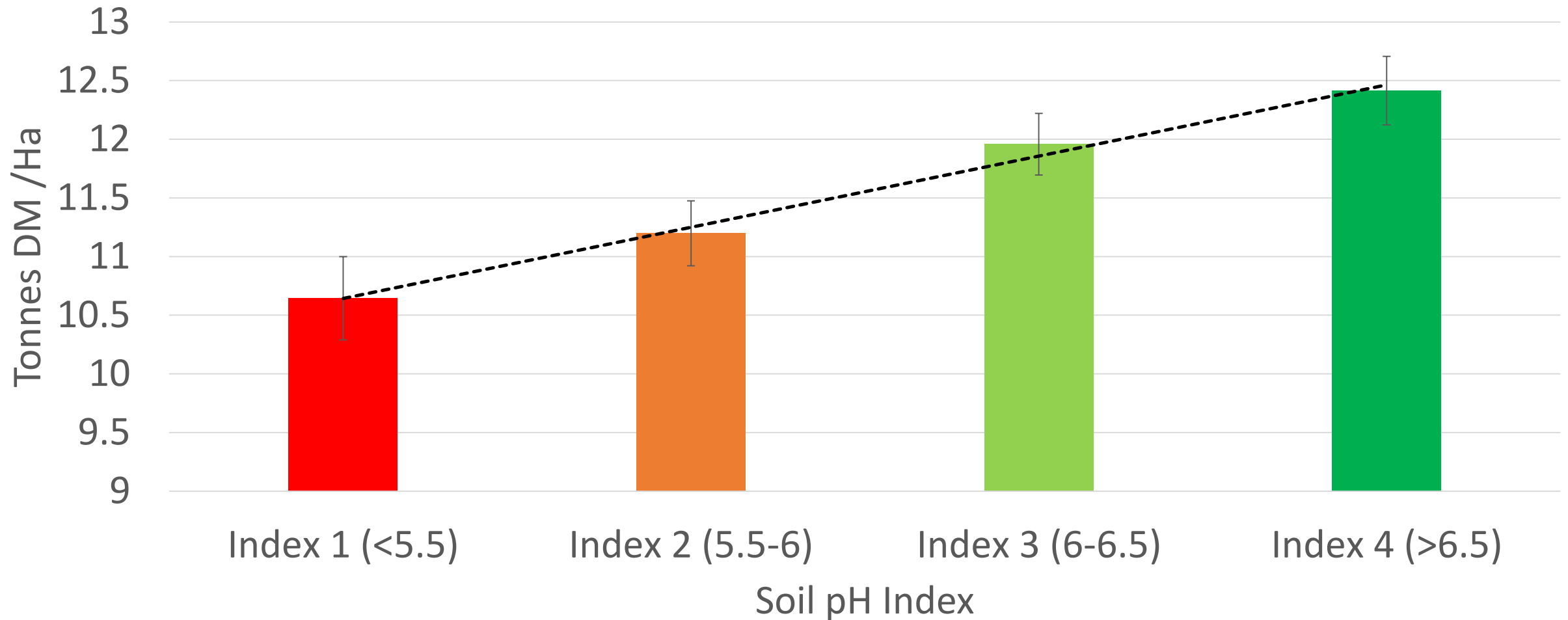
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020

Measurements

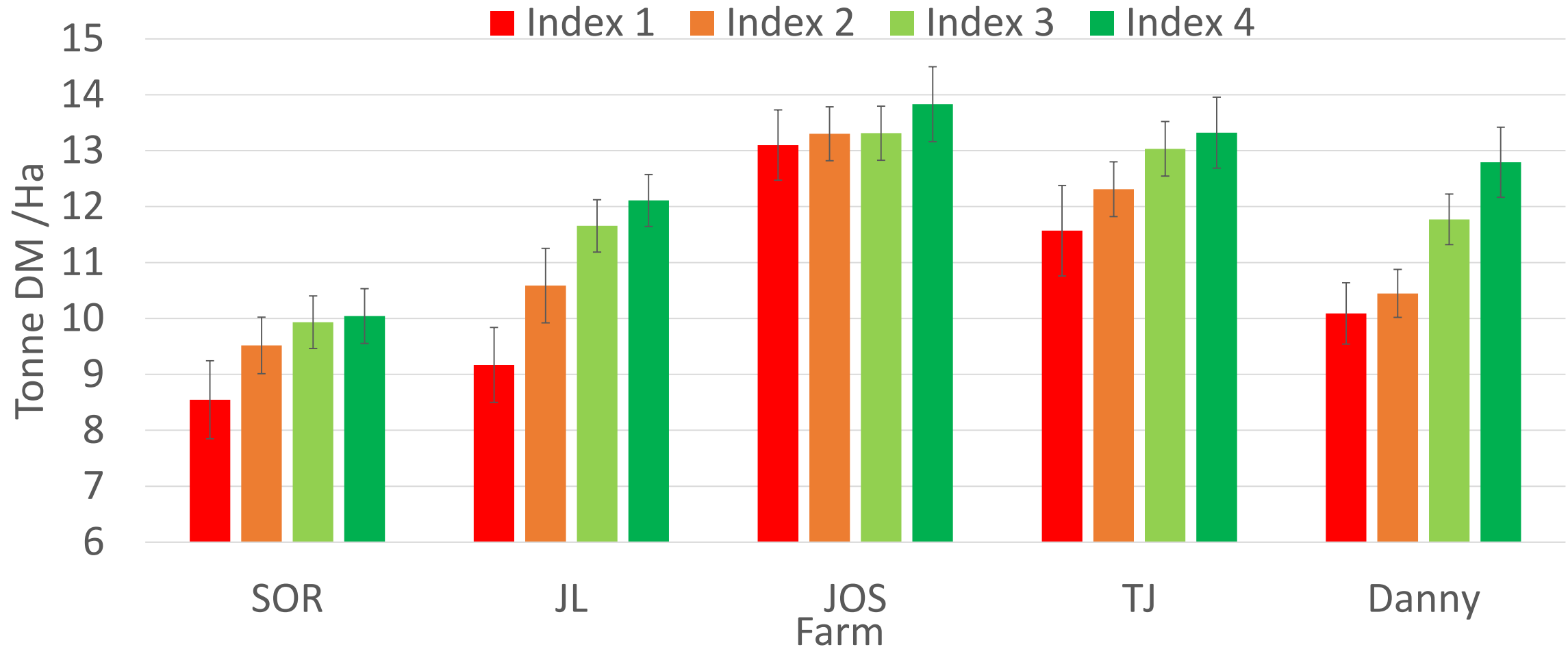
- Milking Platform Paddocks
138 Paddocks * 7 Years = 966 measurements
- Grass Growth (PastureBase Ireland)
- Soil Test Results (Soil pH, P, K)
- Total Nutrient Input (Fertiliser, Slurry, Concentrates)
- Total Nutrient Offtake (Milk, Silage, Meat)

Influence of Soil pH on Grass production

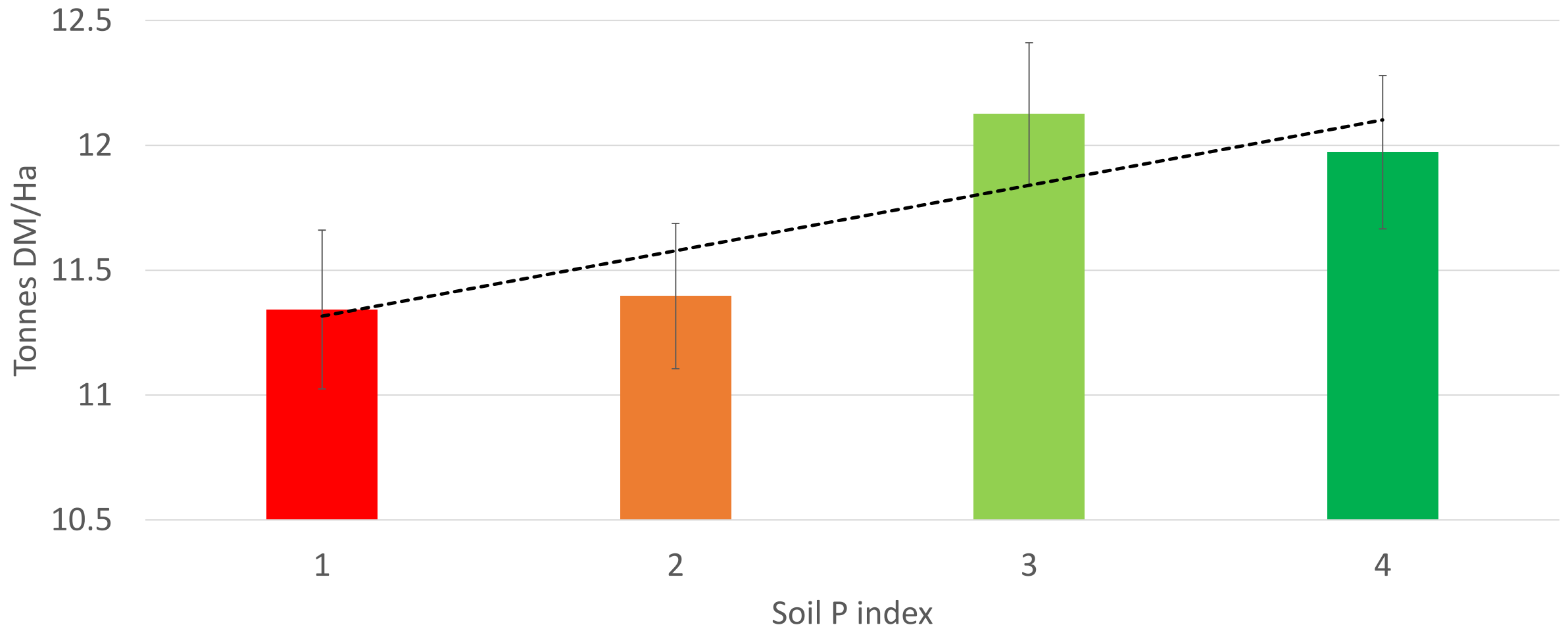
(Average across all farms & years)



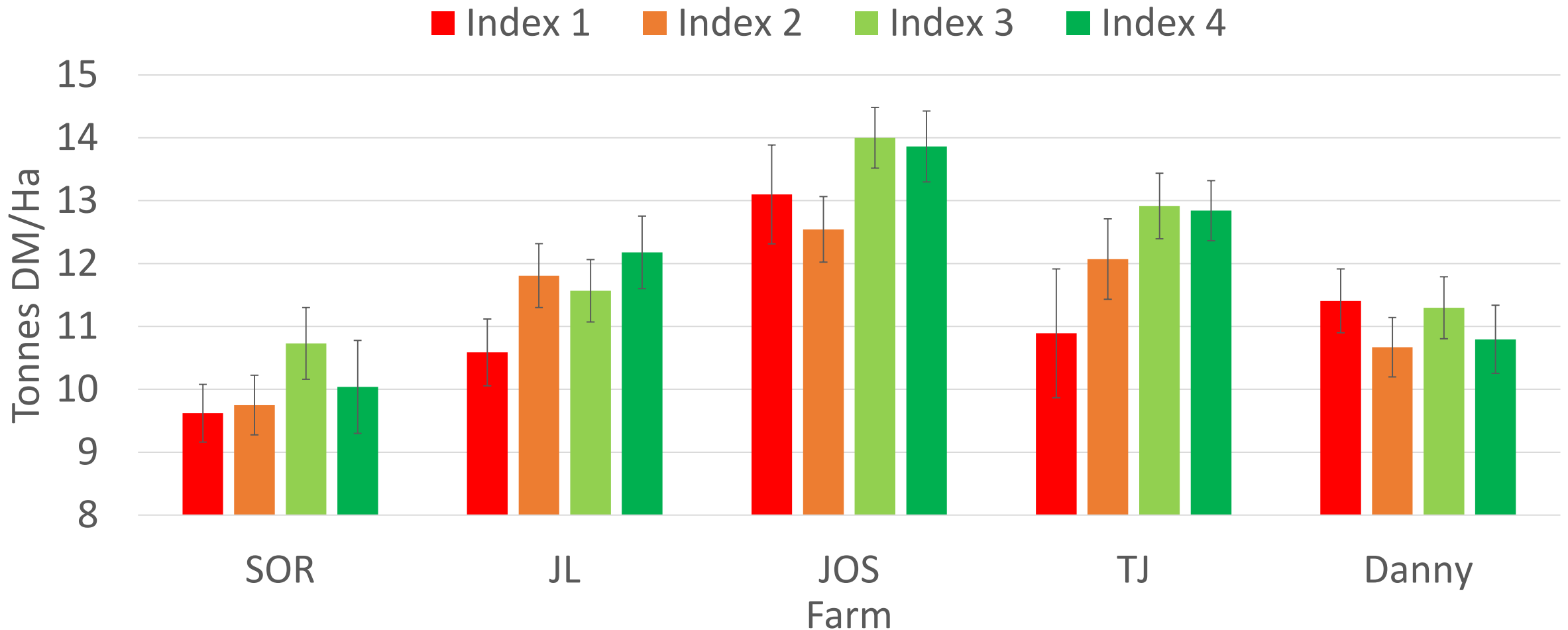
Influence of pH on Grass production across Farms



Effect of Soil P index on Grass production



Influence of Soil P on Grass Production



Phosphorus Plot Trial

Data includes:

3 Heavy Soil's Monitor Farms

- Sean O'Riordan
- John O'Sullivan
- John Leahy

3 years

- 2018
- 2019
- 2020

Lime Treatments

<u>Products</u> (Ton/Ha)	<u>High</u>	<u>Medium</u>	<u>Low</u>
• Ground Lime:	7.5	5	2.5
• Granulated Lime:	7.5	2.5	1.5

Phos. Treatments

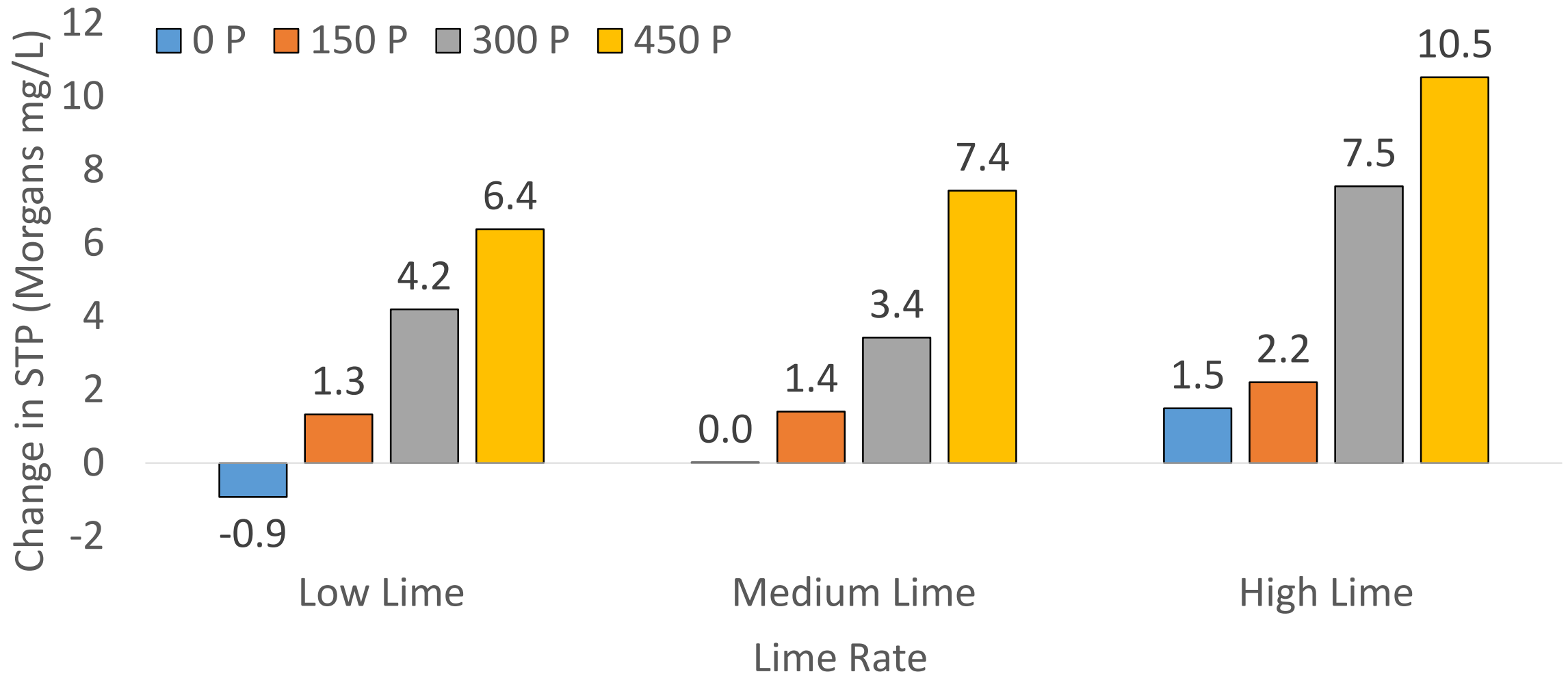
- 0 P (0 kg/Ha)
- 50 P (150 kg/Ha)
- 100 P (300 kg/Ha)
- 150 P (450 kg/Ha)

Measurements

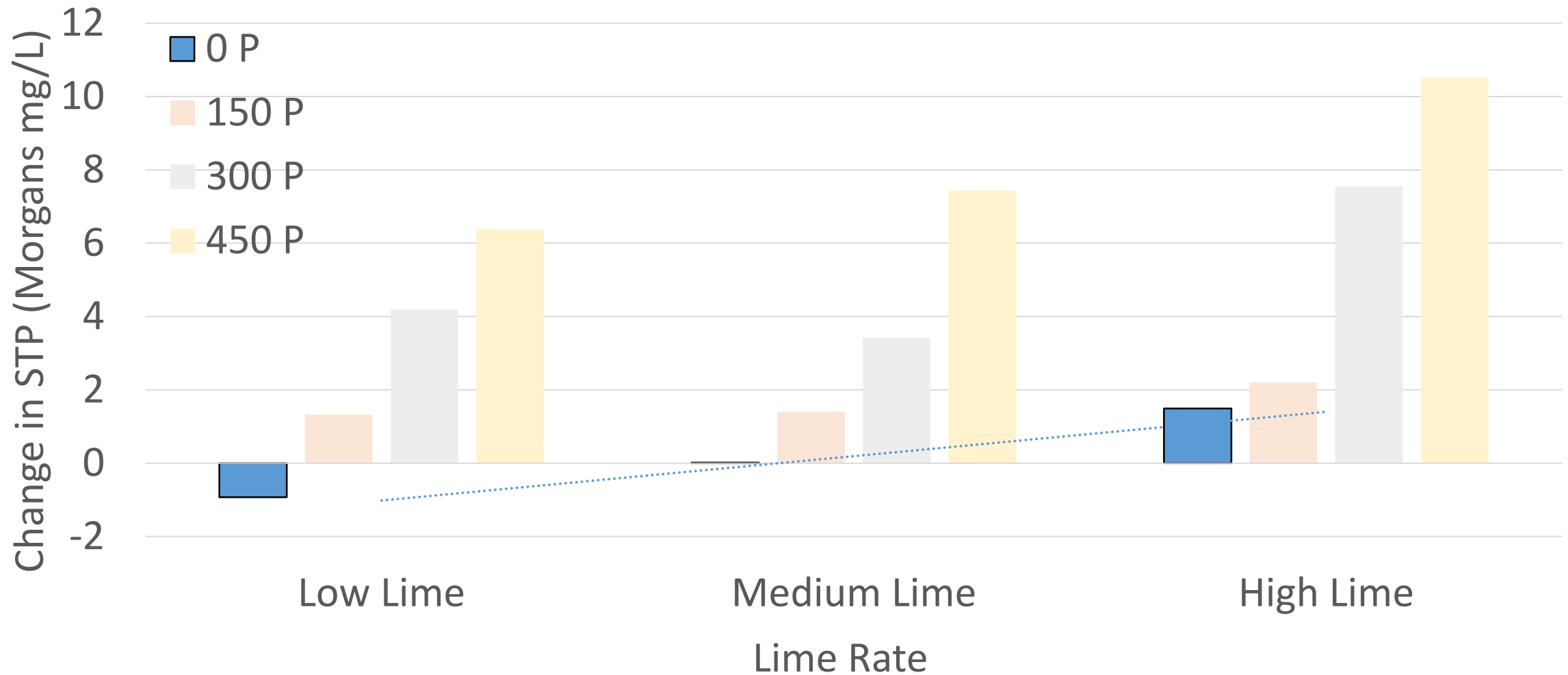
- Soil pH Test
- Soil Test Phosphorus
- Grass Quality
- Grass Production



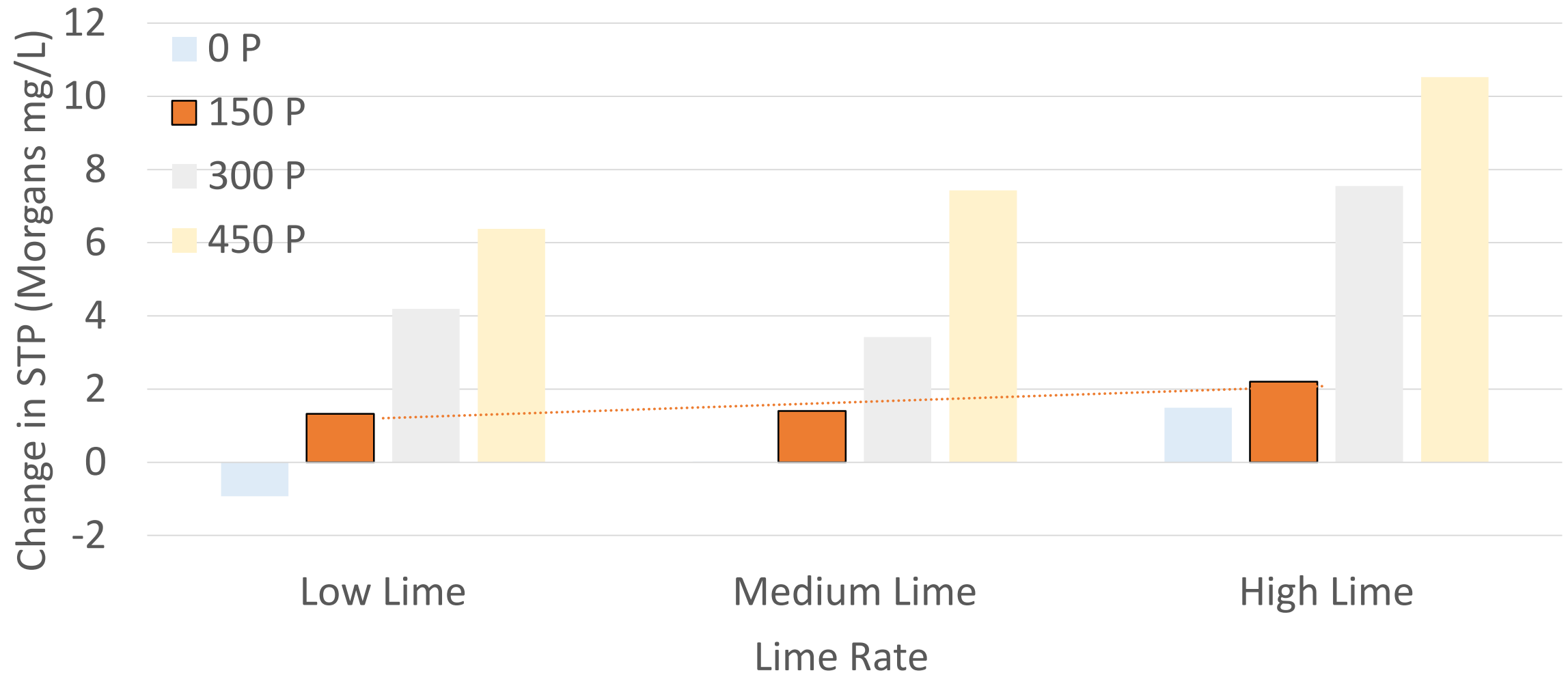
Effect of P and Lime Rates on change in STP



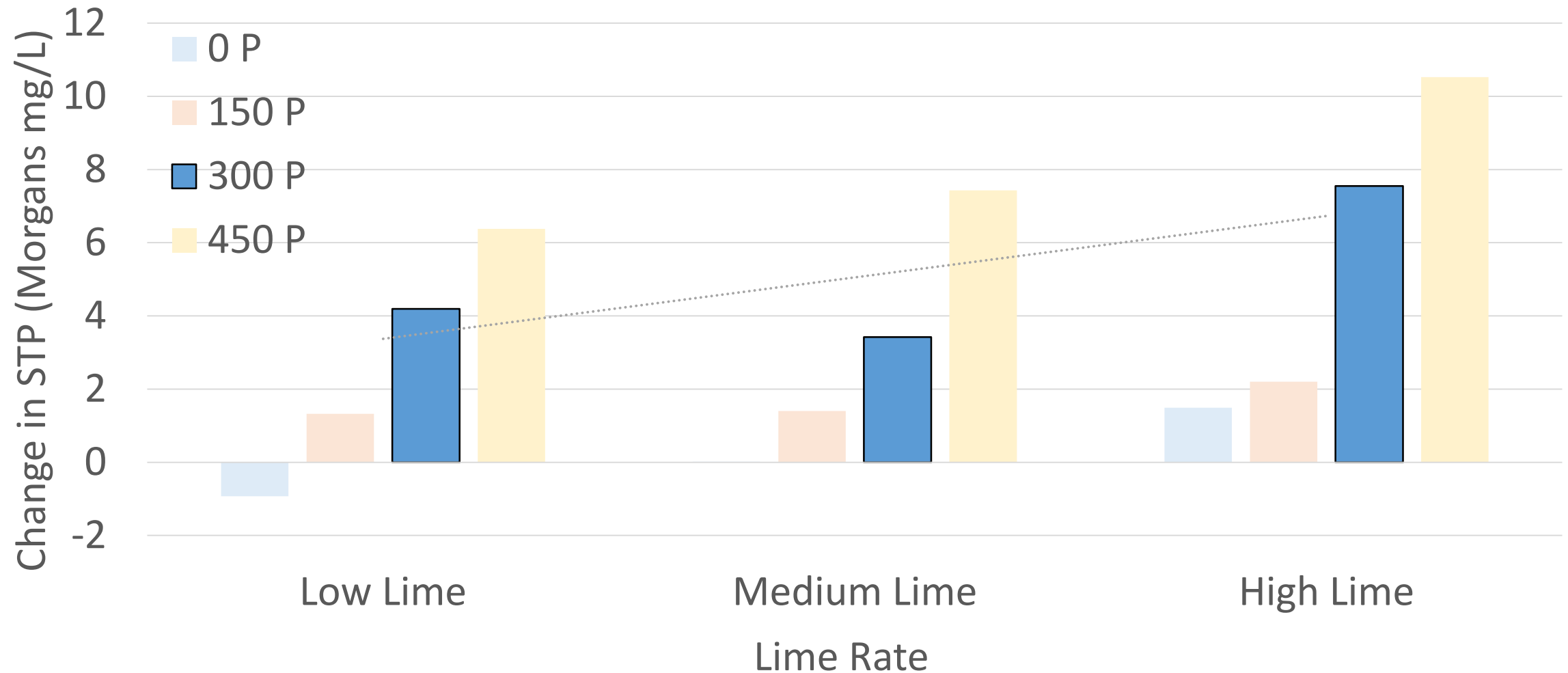
Effect of P and Lime Rates on change in STP



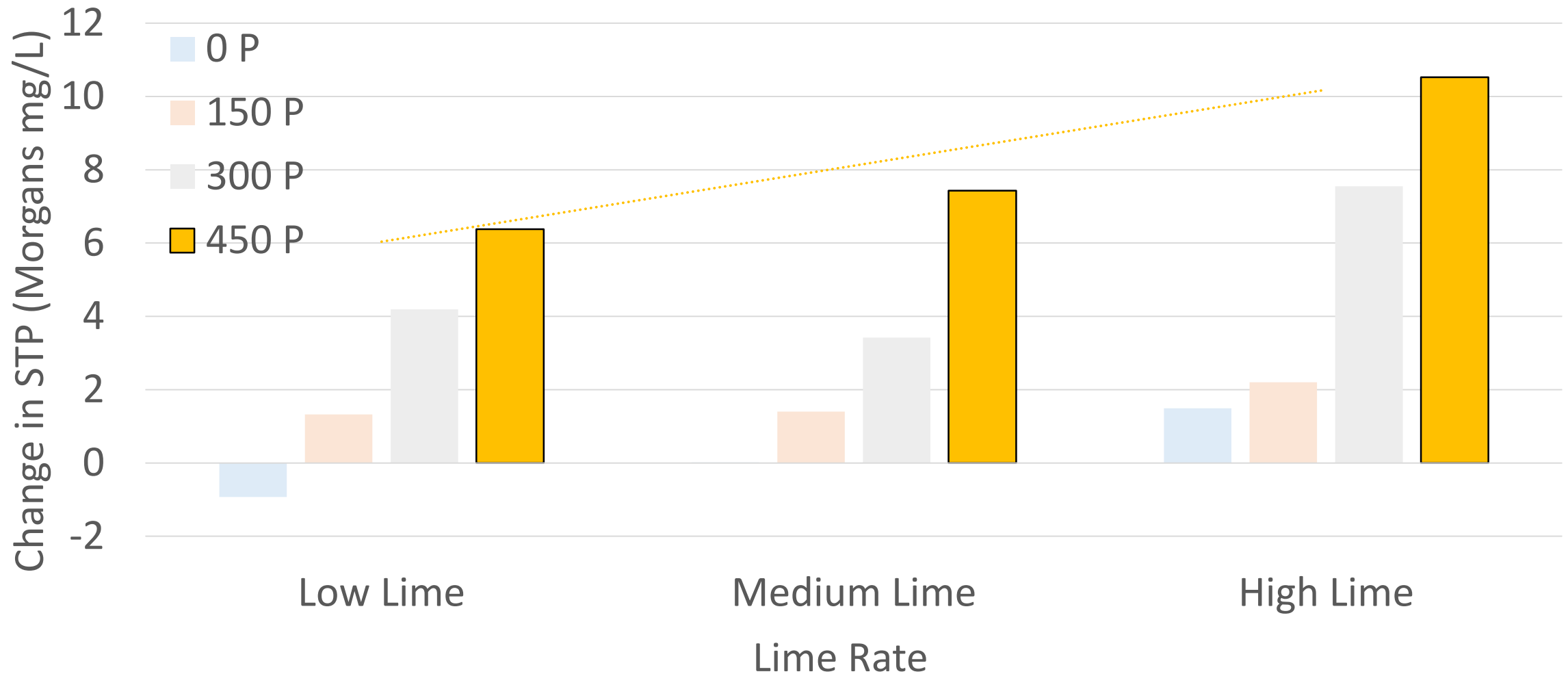
Effect of P and Lime Rates on change in STP



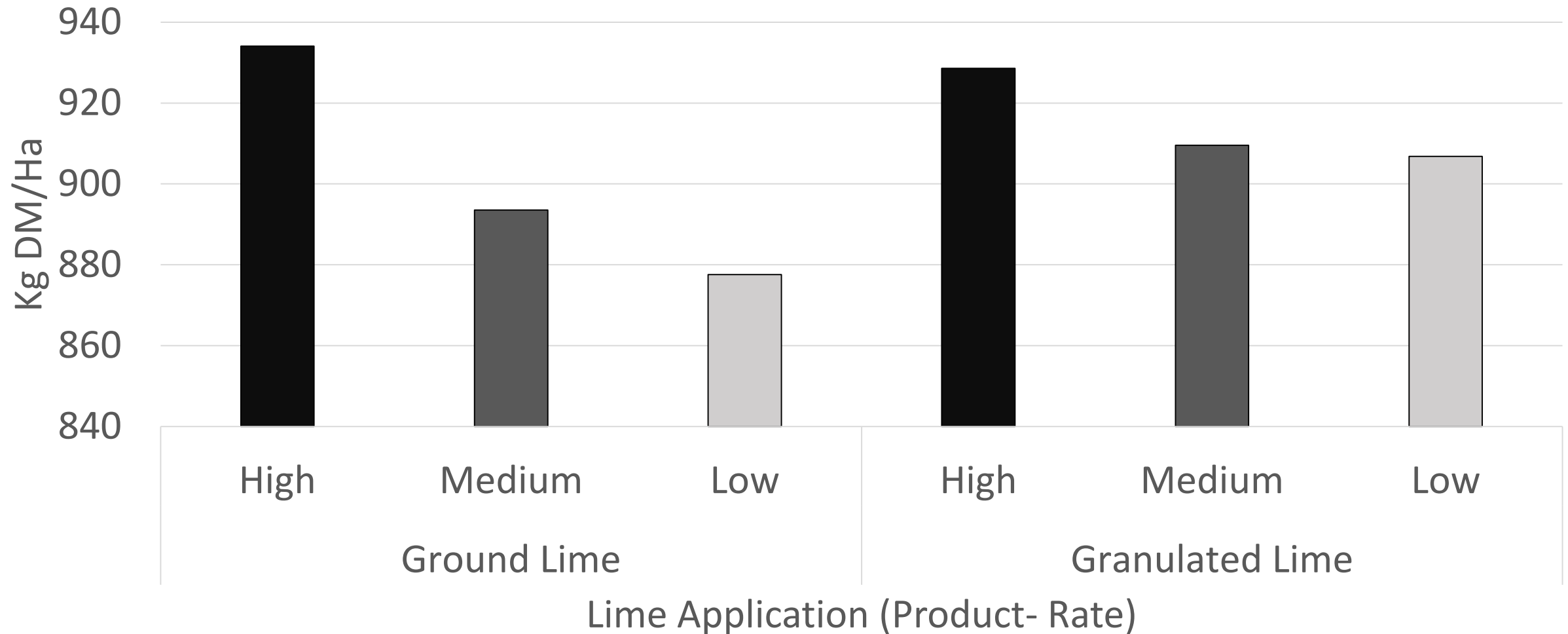
Effect of P and Lime Rates on change in STP



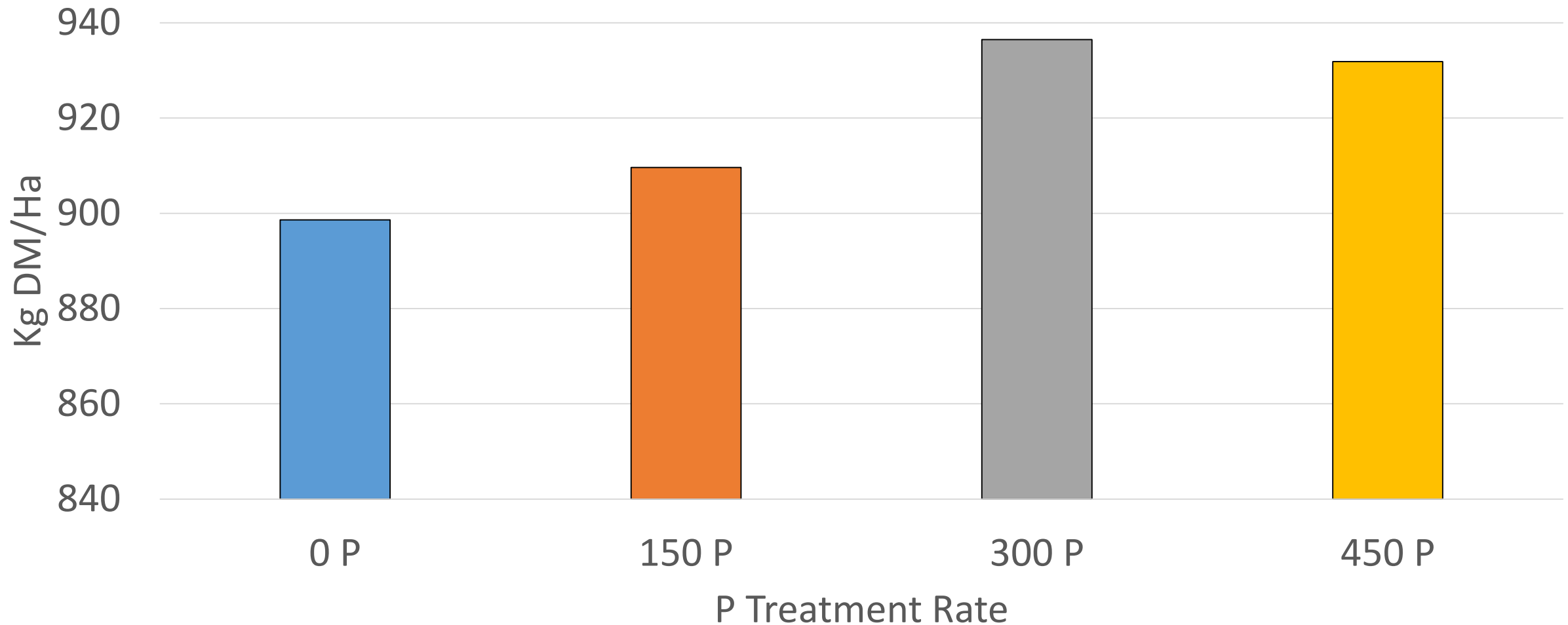
Effect of P and Lime Rates on change in STP



Effect of Lime Product- Rate on pre grazing cover



Effect of P rate on Pre Grazing cover



Phosphorus & Lime Incubation Trial

10 Heavy Soils Programme Monitor Farms

25 Soils :

- 12 Clay
- 18 Loam
- 5 Organic

Treatments:

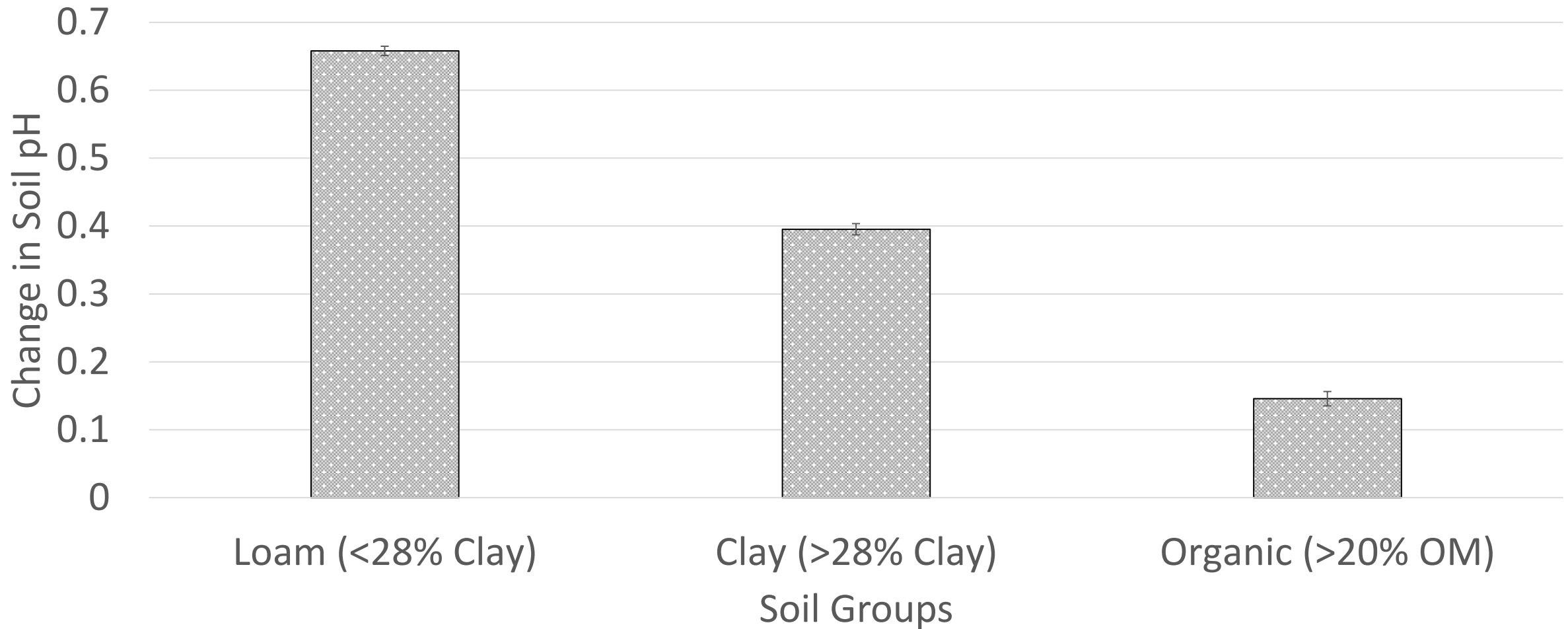
1. 0 kg P/Ha
2. 50 kg P/Ha
3. 150 kg P/Ha
4. 0 kg P/Ha + 5 tonne/Ha Ground Limestone
5. 50 kg P/Ha + 5 tonne/Ha Ground Limestone
6. 150 kg P/Ha + 5 tonne/Ha Ground Limestone

Measurements:

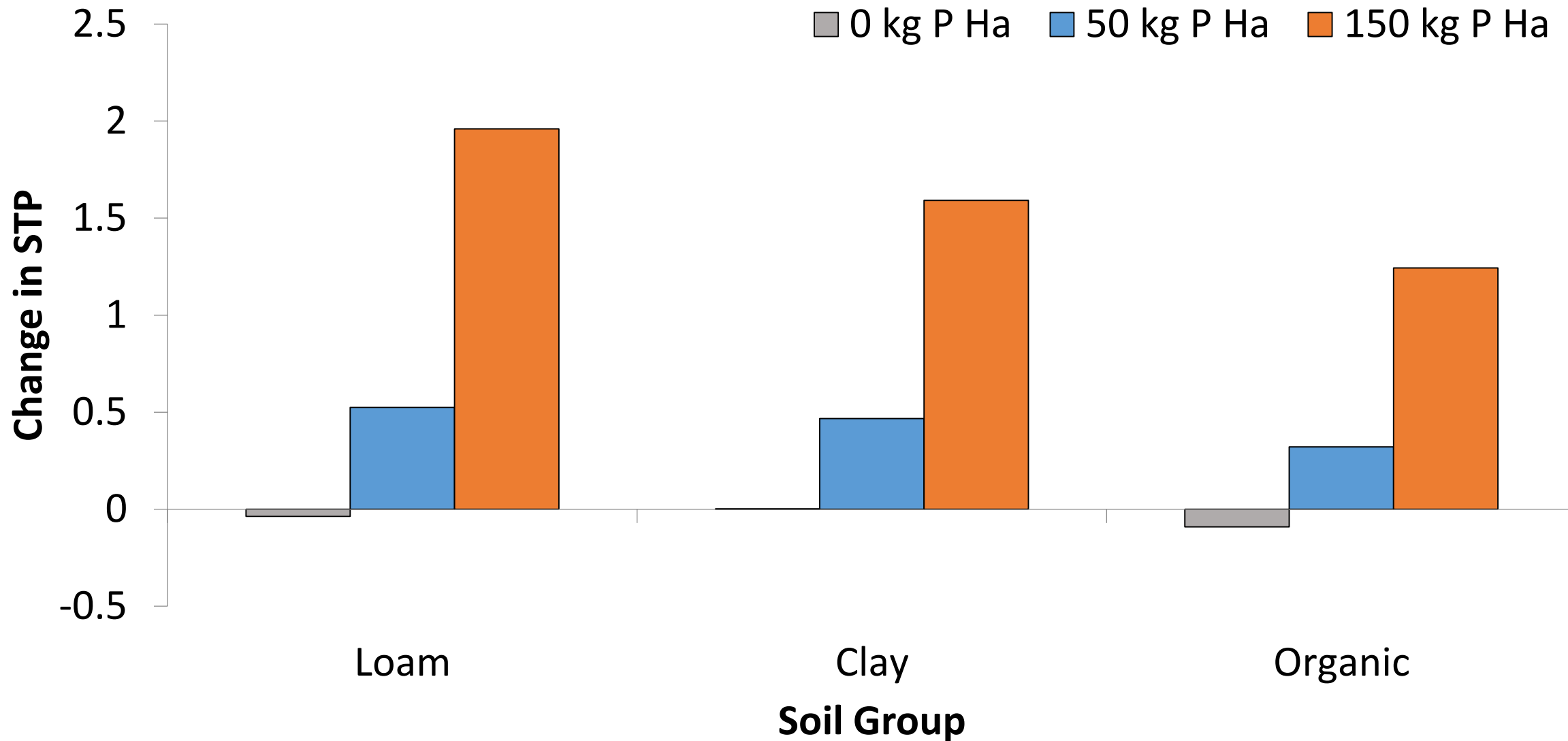
- Soil Test Results (pH, P, K, Ca, Mg)- Agronomic
- Water Soluble Phosphorus- Environmental



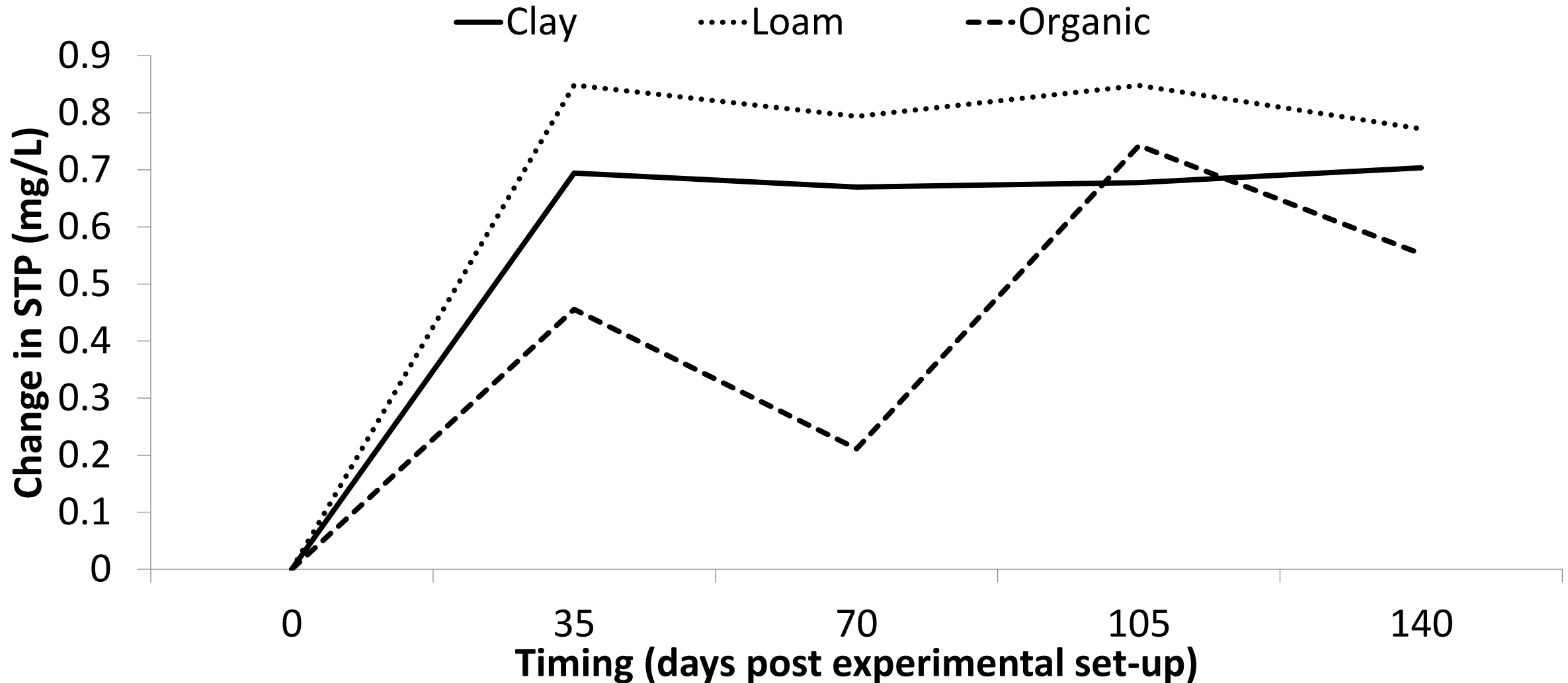
Change in soil pH @ 5 tonnes Ground Lime /Ha



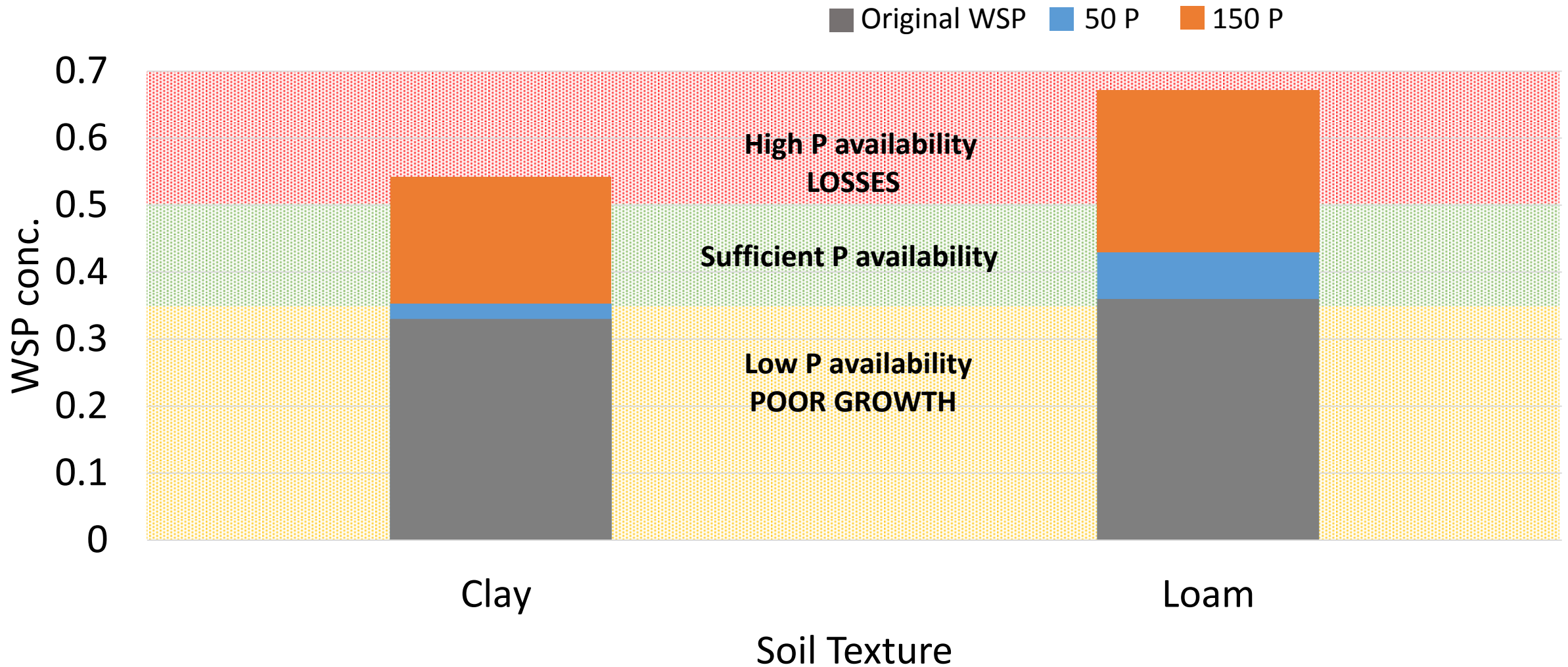
Change in Soil Test Phosphorus



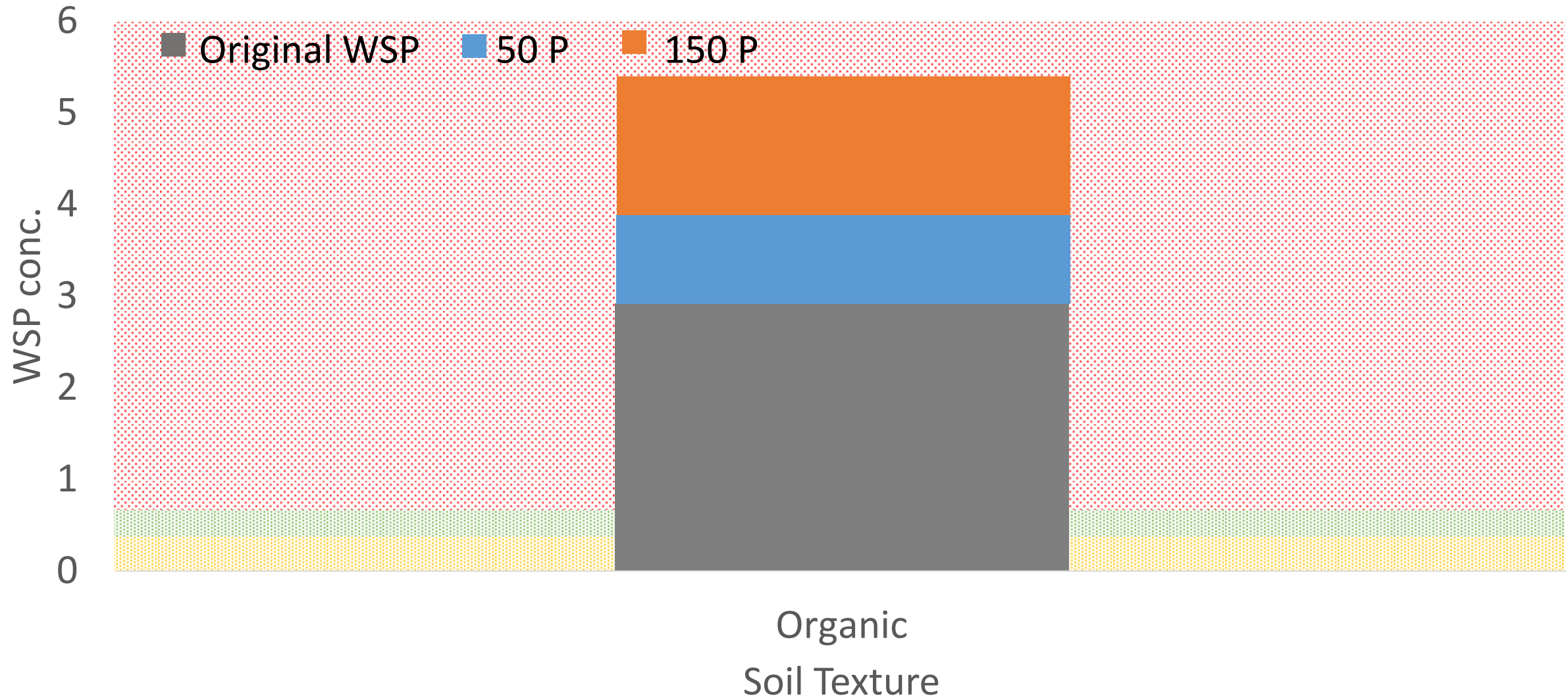
Phosphorus Availability over trial period



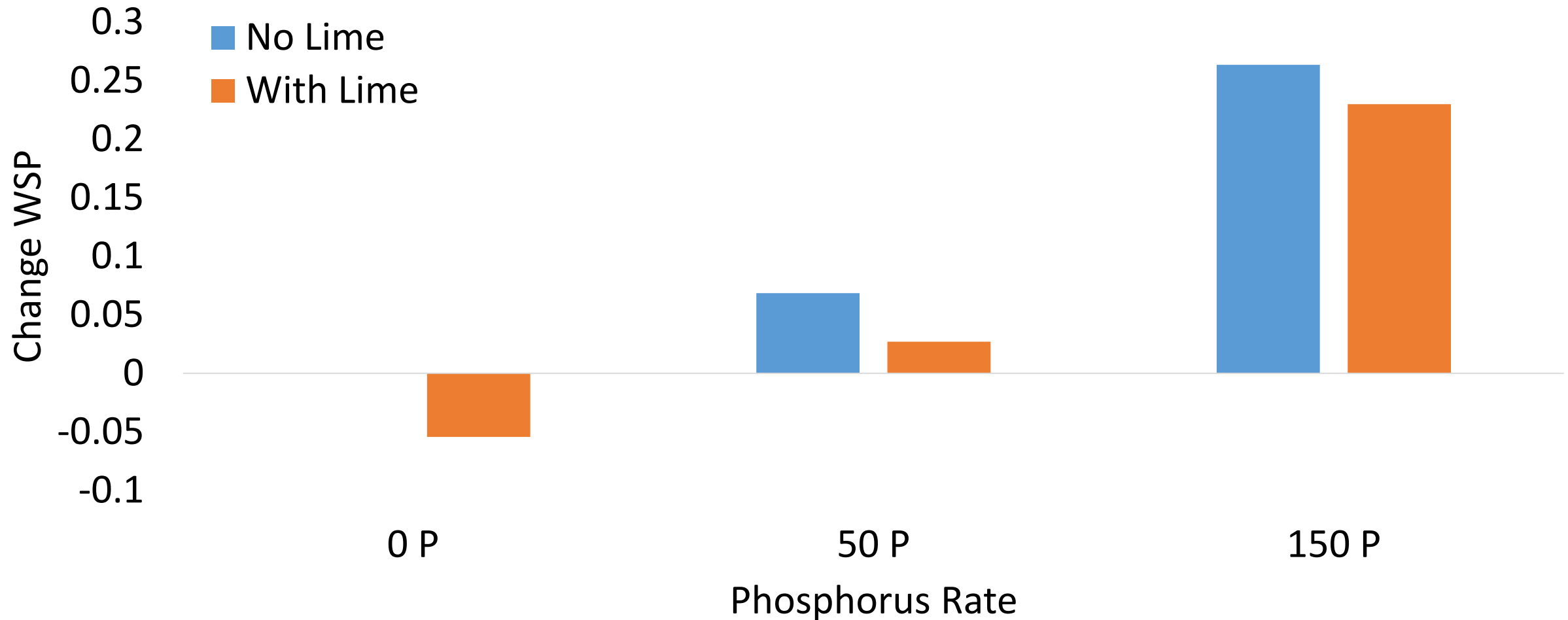
Mineral Soils: Effect of P rate on Water Soluble P conc.



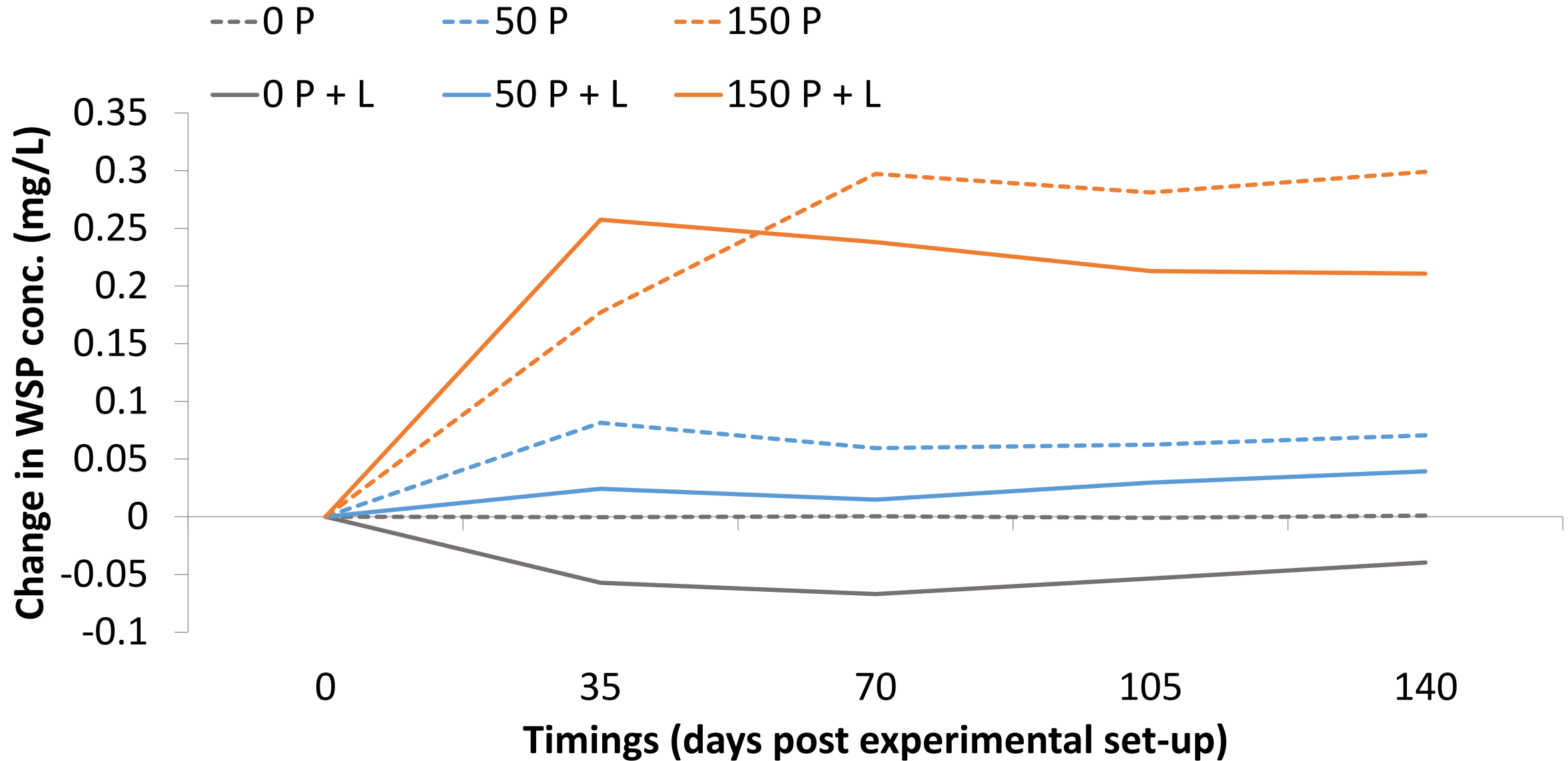
Mineral Soils: Effect of P rate on Water Soluble P conc.



Mineral Soils: Change in Water Soluble Phosphorus



Change in Water Soluble Phosphorus over trial Period



Change in Morgan's STP (mg/L) at contrasting P rates with the addition of Lime

Farmer	Paddock ID	Clay (>28% Clay)		Loam (<28% Clay)		Organic (>20% SOM)	
		50 P + Lime	150 P + Lime	50 P + Lime	150 P + Lime	50 P + Lime	150 P + Lime
David Brady	62	0.62	1.65				
	64	0.42	1.66				
	15	0.96	1.85				
Sean O'Riordan	7	0.37	1.61				
	3	0.49	1.56				
James McMahon	19	0.59	1.87				
	18	0.46	1.74				
John Leahy	23	0.51	1.94	0.84 2.49			
	15						
John O' Sullivan	14	0.42	2.40				
	21	0.50	1.80				
Alan Wood	28			0.32	1.36		
	14			0.70	2.19		
TJ Ryan	28			0.58	2.22		
	30			0.50	2.13		
Con Lehane	25			0.30	1.35		
	33			0.72	1.95		
Danny Bermingham	34	0.06	1.23			-0.05 0.82 0.89 2.04 0.25 1.24 0.17 1.21	
	37						
	18						
	19						
	17						
Donal Keane	3	0.41	1.34	0.58 2.35		0.38 0.96	
	13						
	14						

Take Home Messages:

Soil pH:

- pH index drives Grass Production
- Clay Soils (> 28% clay) much slower to increase soil pH

Soil Phosphorus:

- P index drives Grass Production
- P index 3 sufficient to support grown- strategic with maintenance
- Lime improves P efficiency