

cafre

‘Making the Most of What You’ve Got’

Steve Townsend

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00 44 1452 862696

www.soilfirstfarming.co.uk

Is Farming an Art or Science?

Contents

Role of Potash (K) in the Soil & Plant Health

- What K does in plants?
- Ensuring adequate availability
 - What is wrong with fertiliser recs?
- Magnesium (Mg)
- Need more accurate soil testing

What K does in plants

Catalyst  Makes things happen!

- Movement of plant sugars - photosynthesis
- Controls air exchange
- Controls respiration
- Water management, drought!
- Conversion of N into protein reducing NPN
- Cellulose production
- Regulation of over 40 plant enzymes



Ensuring Adequate Availability

Types of soil K

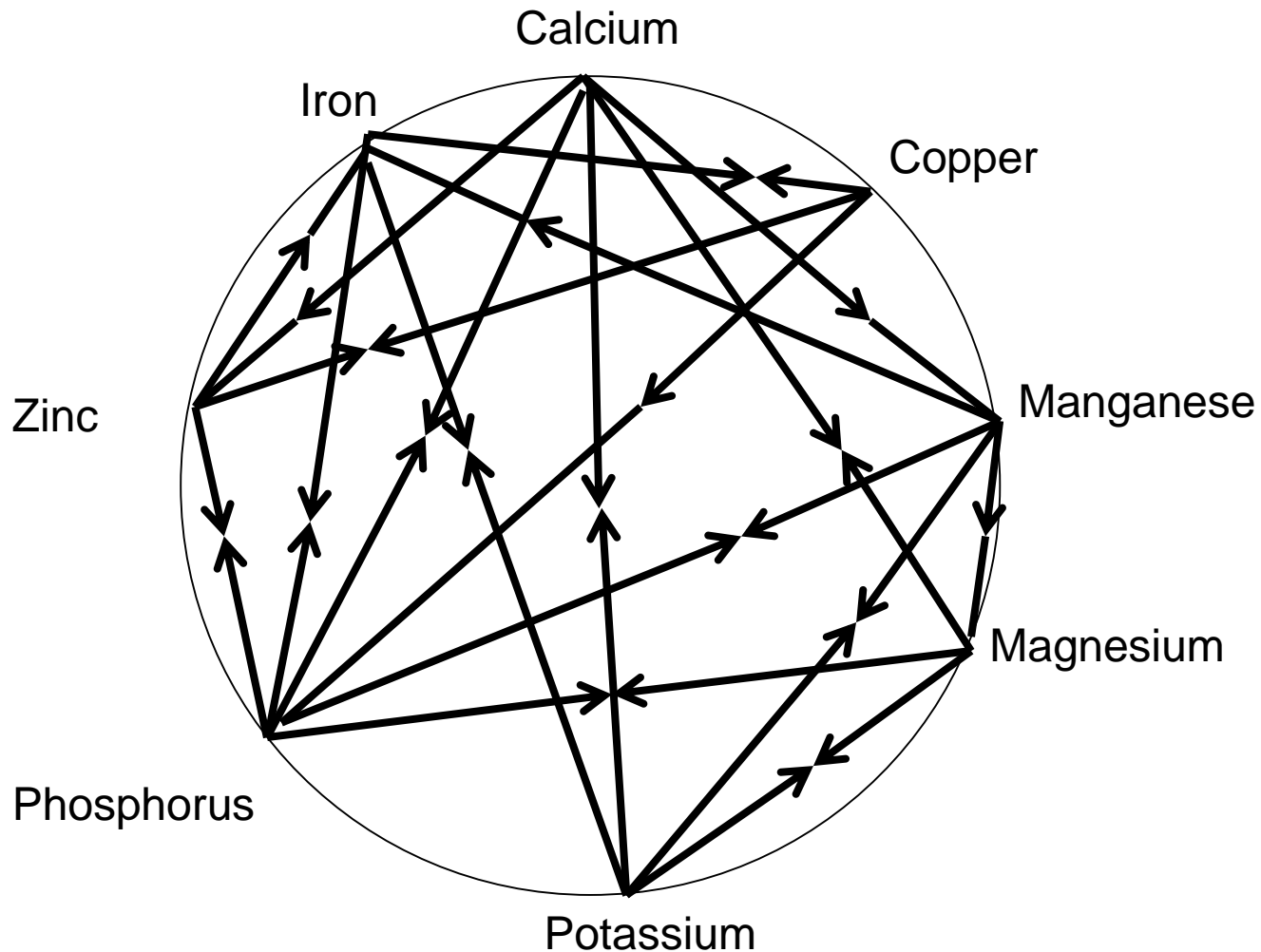
- Unavailable → strongly bound in soil part'
- Slowly available → potash releasing clays
- Readily available
 - Soil solution & cation exchange sites

Ensuring Adequate Availability

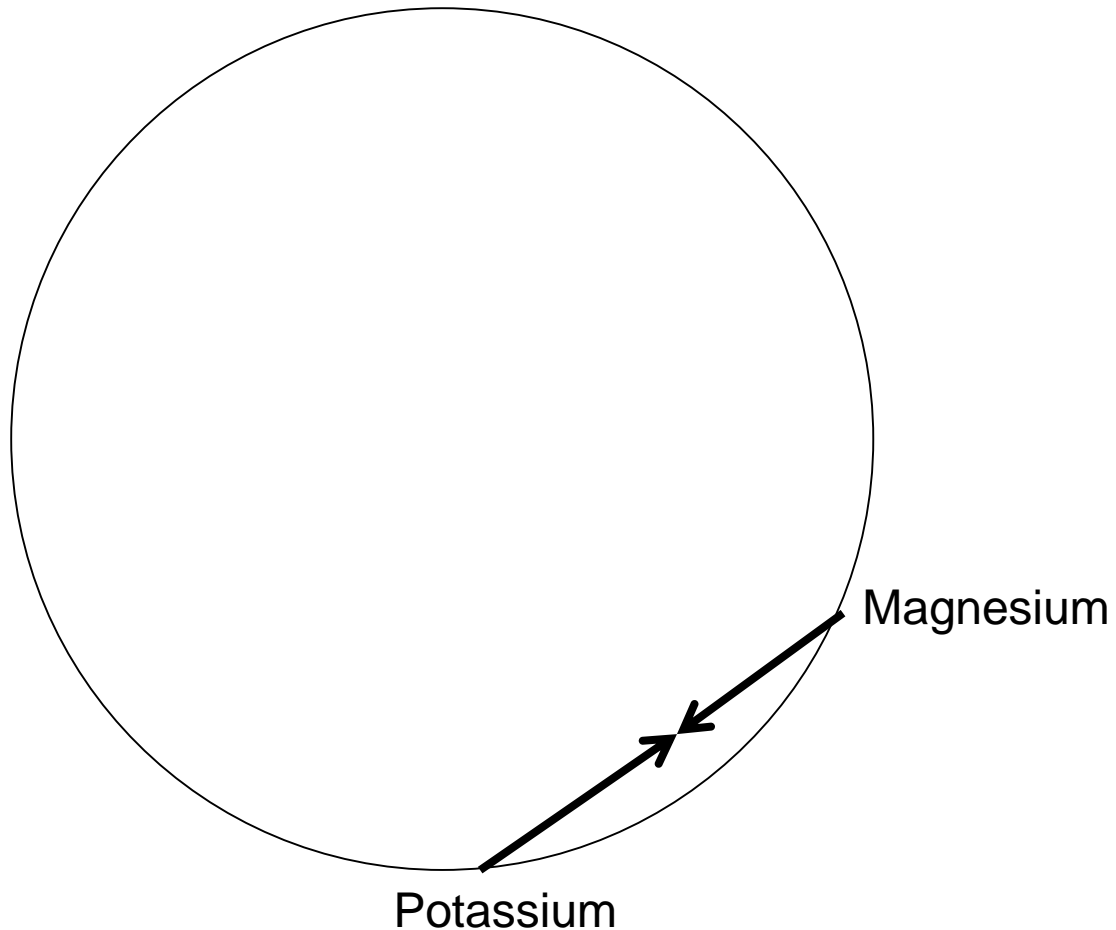
What is wrong with current fertiliser rec's?

- Law of the Minimum
 - Test soil.....see what is missing!
 - Index system
- Law of the Maximum
 - Test soil.....see what is in excess!
 - Liming

Nutrient Interactions in Soil



Nutrient Interactions in Soil



Ensuring Adequate Availability

Gallops

Market Harborough, Midlands

pH

6.5

P

2-

16.6

K

2

170

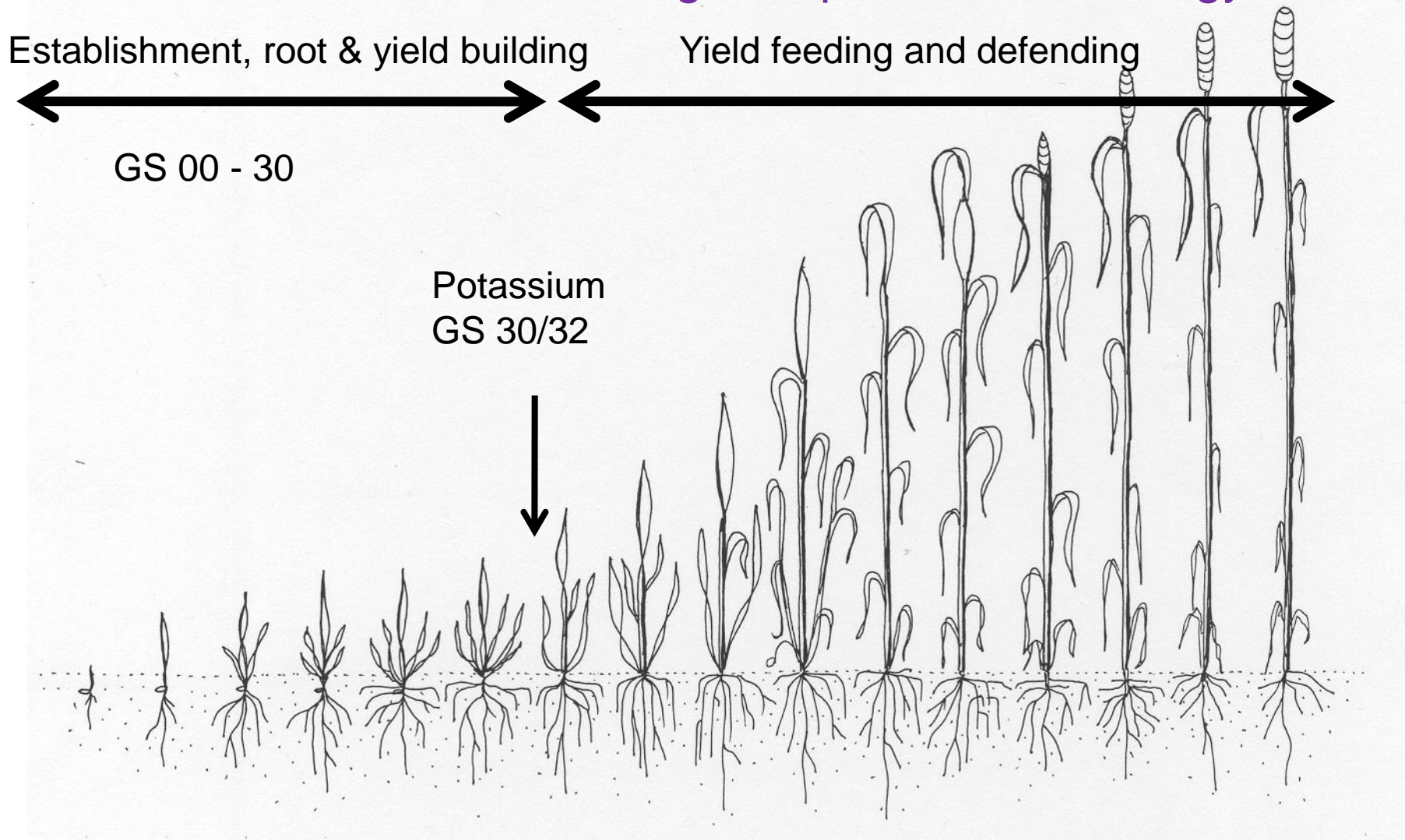
Mg

4

200 mg/l

- Crops look great don't yield!
- 175 mg/l K – x 2 Mg
- Timing critical \longrightarrow stem extension

Soil First Farming - Crop Nutrition Strategy



Phosphorous, Mg, Mn, Zn, Cu

Potassium, Nitrogen, Magnesium, Sulphur & B

Ensuring Adequate Availability

Gallops

Market Harborough, Midlands

pH

6.5

P

2-

16.6

K

2

170

Mg

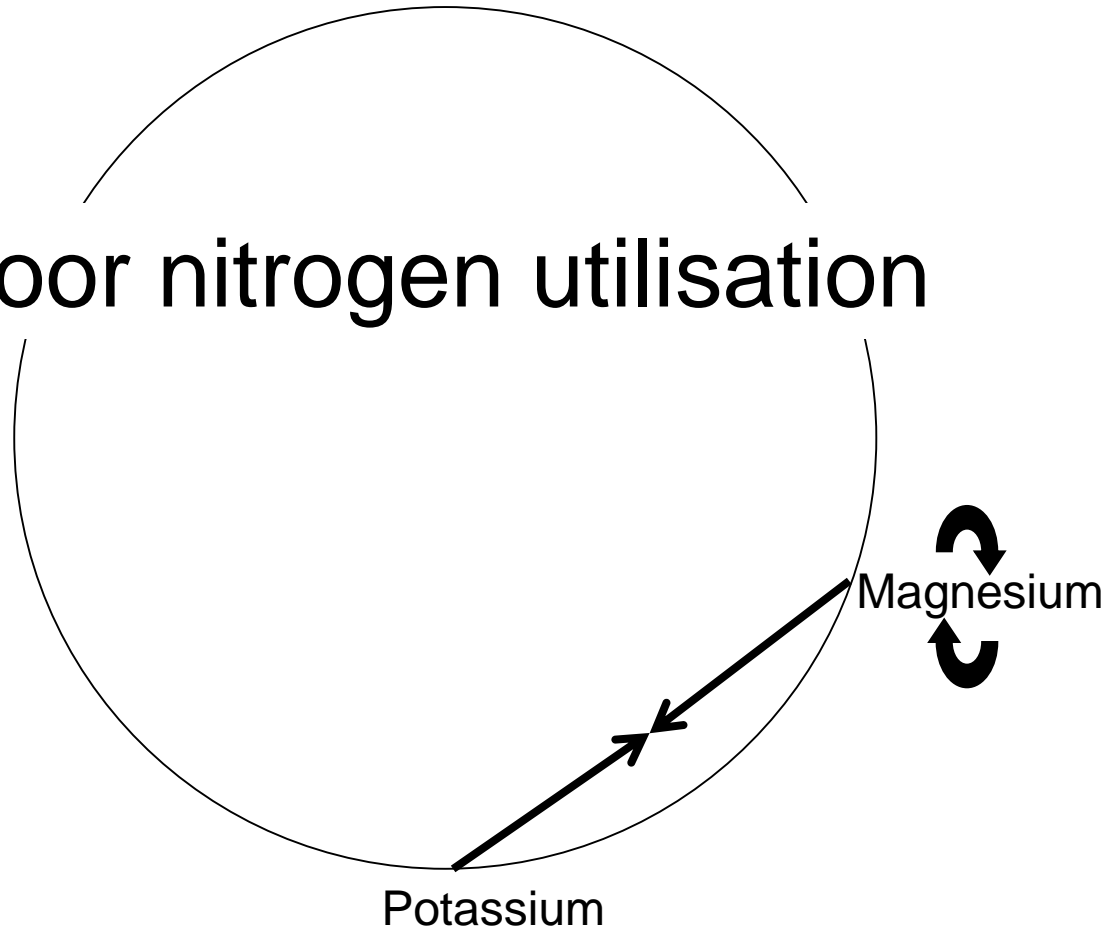
4

200 mg/l

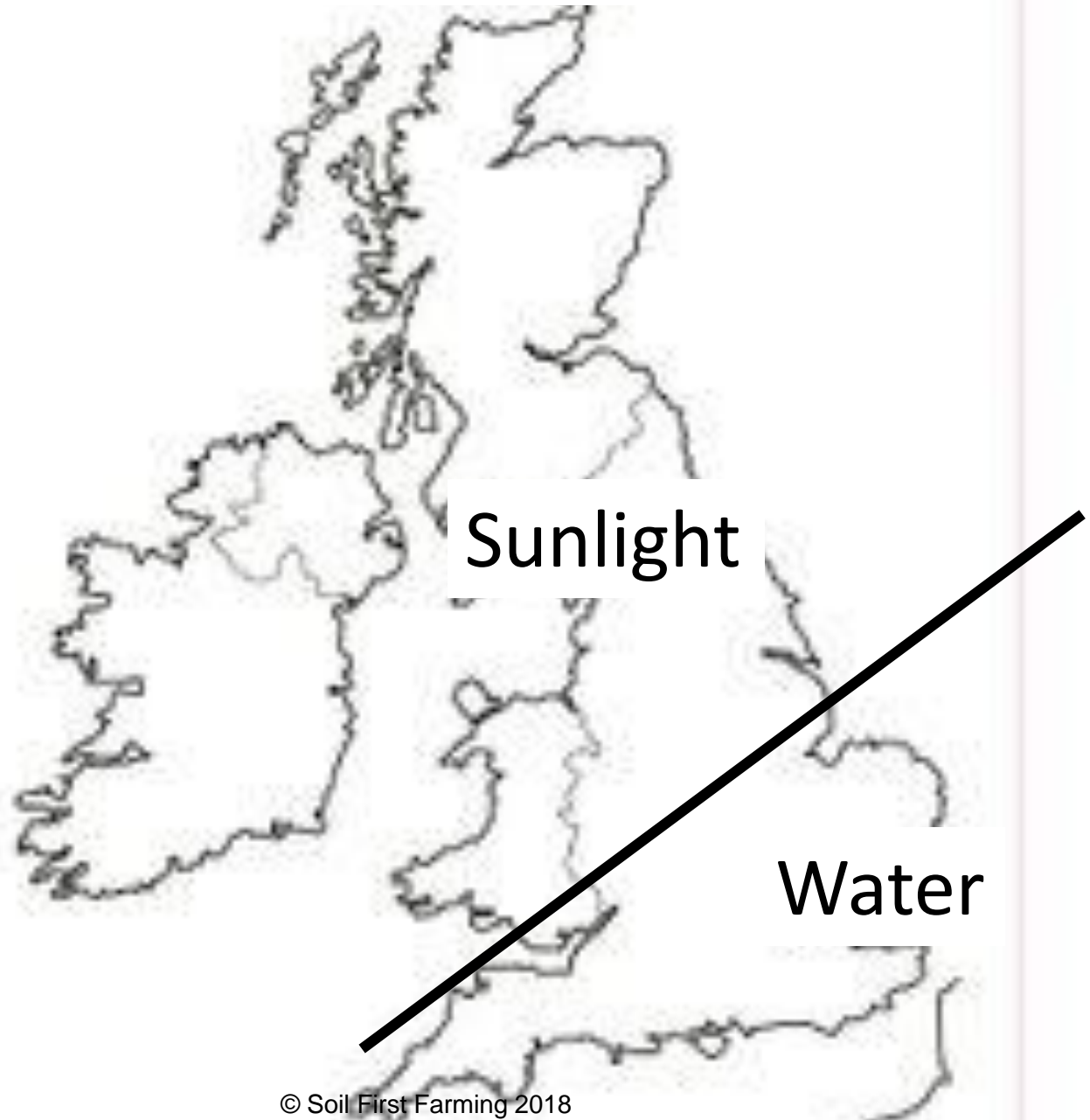
- Crops look great don't yield!
- 175 mg/l K – x 2 Mg
- Timing critical \longrightarrow stem extension
- Crops always hungry?

Hungry Crops

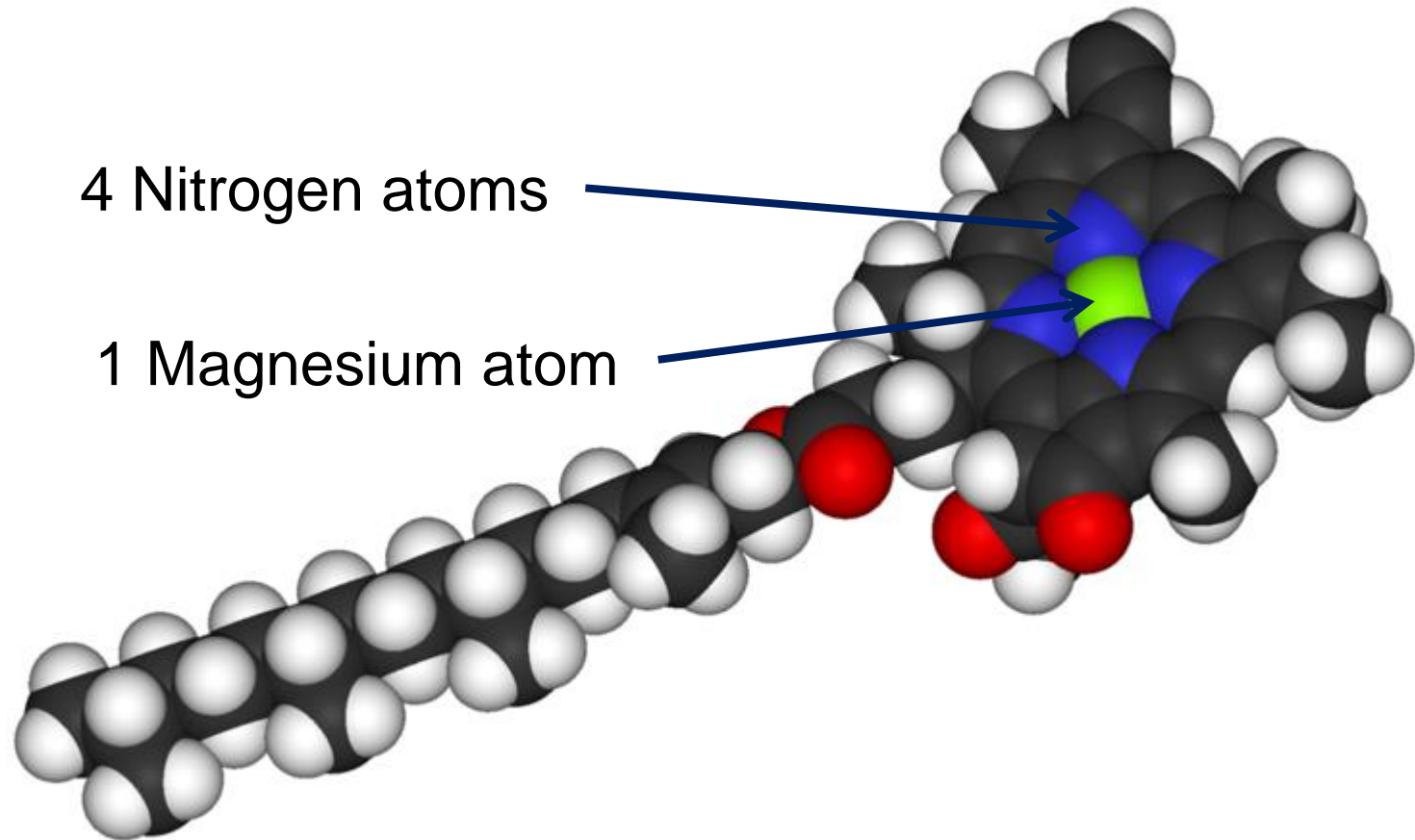
Poor nitrogen utilisation



AHDB/TAG yield plateaux



Chlorophyll 'a'





Trial 2013



40% more
Chlorophyll
per Ha

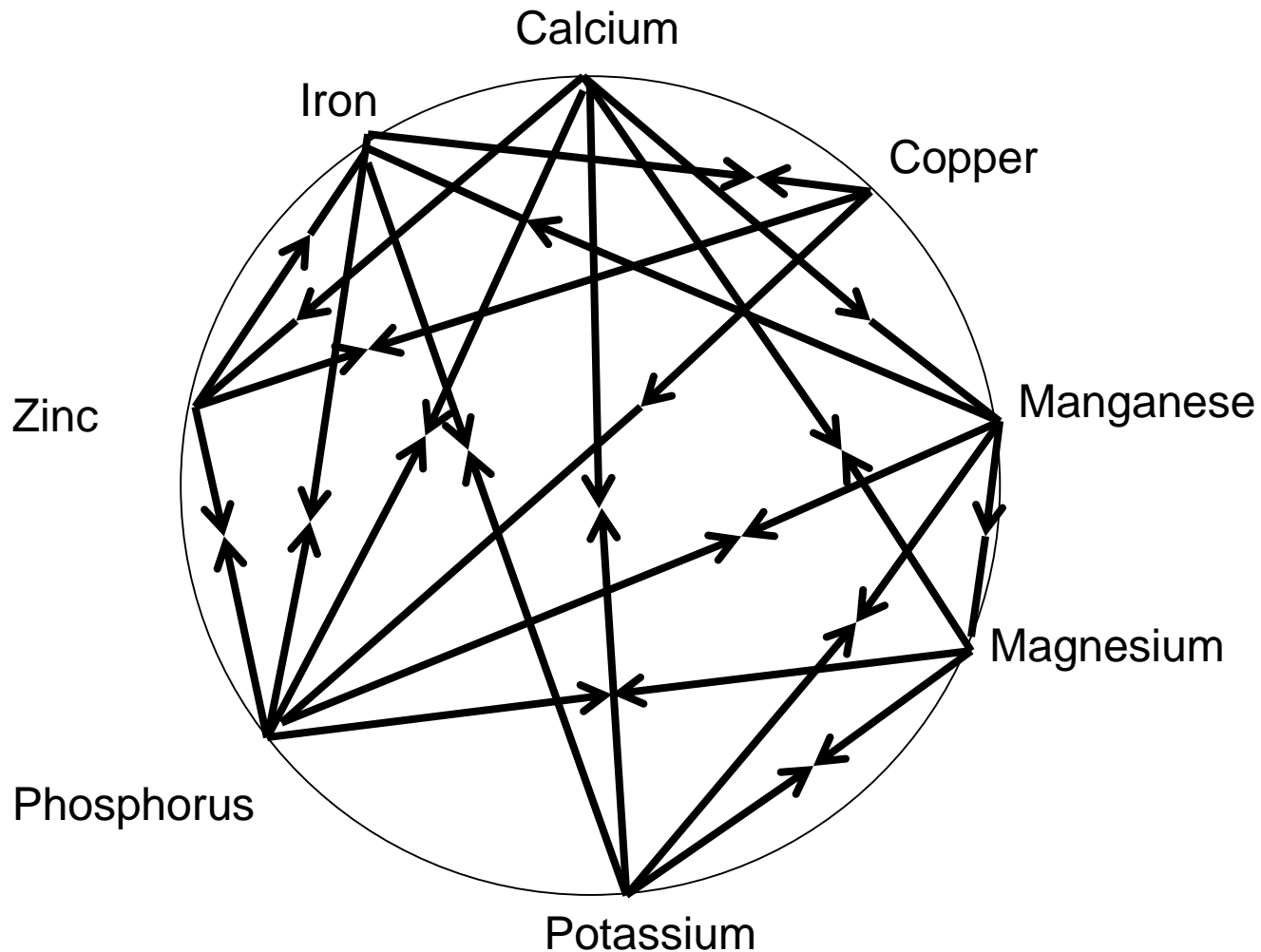


More Accurate Soil Testing

—————→ Cation Exchange

- Understanding of nutrient interactions

Nutrient Interactions in Soil



More Accurate Soil Testing

—————→ Accuracy

- Understanding of nutrient interactions
- How balanced is the soil?
- pH for example?

pH

- What does pH measure?

—————→ Hydrogen

- Assumption —————→ only Ca affects pH!
- All positive elements affect soil pH
 - Ca 1.0 Mg 1.4

Example 1

Sample reference		Example 1					
pH	6.8			Organic matter	4.40%	Low	
Major Nutrients		Index	Mg/l	Comments			
Phosphate		3	41				
Potash		3	389				
Magnesium		5	342				

pH 6.8

Mg
Index 5

Target Ca
60-68%

Actual
49%

Cation Exchange		meq/100g	Base Saturation		Target
CEC	Total	14.7			
Calcium		7.2	48.98%		68
Magnesium		3.76	25.58%		12
Potassium		1.18	8.03%		2-4
Sodium		0.06	0.41%		1-2

Soil Texture		Silty Clay	
	mm		
Sand	2.0-0.063	14%	
Silt	0.063-0.002	49%	
Clay	<0.002	37%	

Example 2

Sample reference		Example 2					
pH	7.8			Organic matter	6.70%	Good	
Major Nutrients		Index	Mg/l	Comments			
Phosphate		4	66				
Potash		2+	192				
Magnesium		7	950				

Cation Exchange		meq/100g	Base Saturation		Target
CEC	Total	16.8			
Calcium		3.8	22.62%	<div style="width: 22.62%; background-color: blue;"></div>	68
Magnesium		10.70	63.69%	<div style="width: 63.69%; background-color: red;"></div>	12
Potassium		0.49	2.92%	<div style="width: 2.92%; background-color: green;"></div>	2-4
Sodium		0.62	3.69%	<div style="width: 3.69%; background-color: red;"></div>	1-2

Soil Texture		Clay loam	
	mm		
Sand	2.0-0.063	42%	
Silt	0.063-0.002	30%	
Clay	<0.002	28%	

pH 7.8

Mg
Index 7

Target Ca
60-68%

Ca 23%

Conclusion

- What K does in plants
- Ensuring adequate availability
- Magnesium (Mg)
- More accurate soil testing

Thank you

Steve Townsend

Soil First Farming