Lime and Phosphorus — Lime

Chris Gazey, Senior Research Officer
Northam, WA

Fertilizer 2015
Mandurah 30 September 2015

Soil acidity program

• WA lime trials 15 – 20 years
• Major awareness and soil testing projects 2005 – 2012
• More effective use of agricultural lime
• 2014 Barley harvest, 1996 trial at Bindi Bindi, WA
  • Detrimental effects of soil acidity (low soil pH) can be overcome but may take years
  • Insufficient lime results in a declining soil pH profile
  • Yield penalties
  • Deeper and more severe acidity
Soil testing projects 2005 – 2012

• Major findings
  • Growers paddocks have mirrored the control or under-limed trial treatments
  • 72 per cent of surface soil samples below minimum target (pH_{Ca} 5.5)
  • 45 per cent of subsurface soil samples below minimum target (pH_{Ca} 4.8)
  • Project and commercial samples – over 93,000 sites
Agricultural lime use

• Insufficient
  • 2014/15 was 1.6 – 1.8 million tonnes
  • 65 per cent of the estimated annual lime requirement

• Target
  • 2.5 million tonnes per year for 10 years

Lime sources

- Limesand
- Limestone
- Dolomite
Soil profiles?

• **Stratified profile**
  - Lime typically topdressed
  - Often insufficient applied to raise pH adequately
  - Development of an acidified profile
  - No-till farming has decreased incorporation
  - Separation of the lime and the acidic layers

• **Implications**
  - Soil sampling
  - Fertiliser recommendations

Strategic tillage – multiple benefits

• **Complimentary benefits**
  - Puts lime where it is needed, creates pathways for roots
  - Can treat compaction
  - Redistributes nutrients
  - Ameliorates water repellency
  - Incorporates soil organic matter
  - Buries herbicide resistant weed seeds
Examples of engineered profiles

- Mouldboard Plough, incomplete inversion
- Rotary Spader, good mixing

Summary

- **Acidification is inevitable**
  - Export of food and fibre
  - Import nutrients, particularly nitrogen
  - There are leaks in the system

- **For soil not yet at critical levels**
  - Apply lime, maximise opportunity to incorporate into the soil
  - Monitor and maintain soil pH to maximise soil functioning

- **Agricultural lime needs to**
  - increase to around 2.5 million tonnes per year
  - be used wisely as it is effectively a finite resource

- **Integrate soil management techniques**
  - *address multiple constraints to achieve and maintain multiple benefits*
Acknowledgements

• Colleagues
• Growers
• Grower Groups
• Natural Resource Management Groups

chris.gazey@agric.wa.gov.au