

(role of pH in plant growth and nutrient availability, optimum and target pH, liming policy, comparison of liming materials, trends in lime use)

Meaning of pH

- Definition and scale
- Acidity and alkalinity

Effect of pH on crops

- Nutrient availability
- Optimum pH for different crop species

Soil pH issues

- Trends in soil pH (grass, arable, PAAG reports,)
- Regional issues and initiatives (eg NI Soil Nutrient Health Scheme, Farming Rules for Water)
- GHG emission (CO₂, N₂O)

Causes of soil acidification

- Leaching of basic cations
- Offtake of basic cations in crops
- Release of hydrogen ions by roots
- Nitrification of ammonium-N in organic matter and fertilisers
- Addition of acids in low concentrations in rainfall

Optimum and target pH

- Definition of, and relationship between, optimum and target pH
- Use in liming recommendations (RB209, Technical Note TN714, tables)

Measuring soil pH

- Sampling soil (timing after cultivations and lime application, depth, frequency, within-field variation, potential for pH stratification with direct drilling and zero- or min-till, with potential surface layer acidification between limings)
- Laboratory and field analysis (pros and cons of each, presence of chalk particles, pH variability within field)
- Analytical methods (water extraction (E/W/NI), CaCl₂ solution (S))

Use of lime to raise pH

- Mode of action and how lime is utilized
- Liming recommendations
- Trends in amount of lime used and probable causes
- Liming intervals for arable and grassland
- Use of liming calculators:
 - Rothamsted liming calculator www.rothamsted.ac.uk/rothlime
 - ALA liming calculator: https://aglime.org.uk/lime_calculator.php
- Soil buffering

Liming materials and quality aspects

- Limestone, chalk, sugar beet waste
- Granular lime
- Neutralising value (NV)
- Particle size and reactivity
- Fertilisers Regulations and liming materials
- Aglime Quality Standard
- Calcium lime vs magnesian lime

Applying lime

- Spreaders used (including variable rate)
- Rates of application
- Timing of applications in the rotation
- Frequency of applications (maintenance or 'reactionary', as affected by soil type)
- Incorporation (ploughing down effects, stratification)