



Knowledge grows

Yara Analytical Services
Technical Bulletin

Understanding soil pH

Soil pH is a measure of acidity or alkalinity of the soil, it has a direct effect on nutrient availability, microbe activity and overall plant health. A knowledge of the soil pH is fundamental to soil and crop management.

Measuring Soil pH

Soil pH is determined by measuring hydrogen ions in the soil solution and is shown on a scale of 0-14. At pH 7 the soil is neutral; < pH 7 the soil is acidic and > pH 7 it is alkaline. The pH scale is logarithmic; an increase from pH 7 to 8 means that the soil is 10 times more alkaline; a decrease from pH 7 to 5 means the soil is 100 times more acidic.

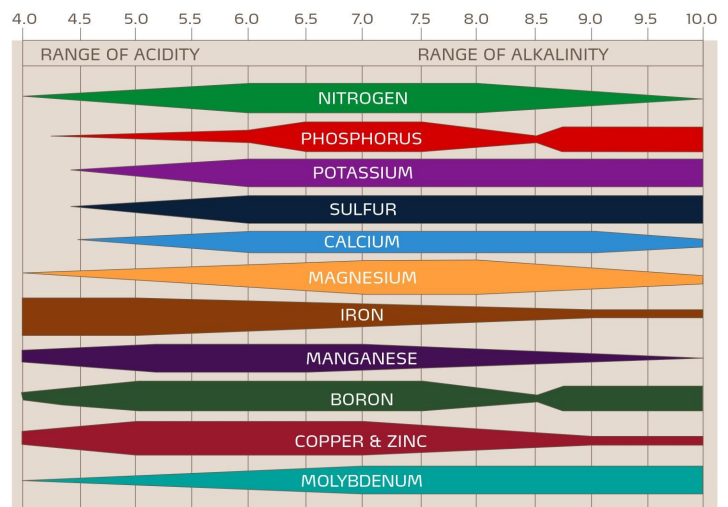
Managing soil pH

Agricultural crops, pastures, vegetables and fruit crops are grown in a wide range of soil pH. However, all species have a preferred pH range for optimum growth. Getting the pH wrong can have a significant effect on crop yield and quality, largely as a result of reduced nutrient availability.

Soils become acid from natural processes, such as weathering and leaching., and the change can be accelerated by climate, plant species and agricultural practices, meaning soil pH should be monitored at regular intervals. Fertilizer application can also accelerate the development of acidity, particularly urea and elemental S fertilizers. Liming is the only way to neutralise the acidity. The lime requirement depends on soil texture, crop and soil pH. The speed and duration of the effect depends on other factors e.g. quality (%CaCO₃), particle size and mode of incorporation. There is little that can be practically done to reduce pH in alkaline soils; fertiliser applications can be adjusted to ensure adequate supply of nutrients.

Soil pH and soil organisms

The ability of, and rate at which, micro-organisms break down organic matter and convert soil nutrients, including nitrogen, into plant available forms is directly influenced by soil pH. Bacterial populations and activity decline at low pH levels, whereas desirable fungal activity can drop off as pH levels rise and the common earth-worm will not survive at all in very acidic soils less than pH 4.5.



The availability of nutrients in the soil changes as soil pH changes. An acid soil can have reduced availability, for example, of potassium, calcium and molybdenum compared to an alkaline soil. An alkaline soil is more prone to zinc, iron, copper and manganese deficiencies.