



Optimal soil pH Management

As the combines roll and cultivation work follows, **Tim Kerr** (Hutchinsons Nutrition Manager) explains that it is worth remembering the importance of soil pH management.

Don't overlook the need for lime – it can be the most cost effective means of maximising nutrient availability, but also can improve soil conditions for plant growth.

Soil pH effects

Soil pH is of fundamental importance not only to nutrient availability, but also for optimal plant root growth. The recognised ideal pH for most arable crops is between 6.5 and 7.5, within which most plant nutrients are at their most available.

Some soils will be naturally acidic and will need regular liming to maintain a suitable pH, whilst most soils will become more acidic over time – particularly through applications of fertilisers and manures, and with the decomposition of crop residues.

Nitrogen fertilisers will increase the rate at which pH is reduced, as the ammonium converts to nitrate. Plants absorb most of their nitrogen in the form of nitrate, of which availability depends on the activity of nitrifying bacteria. The micro-organisms responsible for nitrification are most active when the pH is between 6.5 and 7.5. They are adversely affected if the pH falls below 5.5. Nitrogen fixing bacteria also cease to function below pH 6.0. The decomposition of organic matter, which is a primary source of nitrogen, is also slowed down under acidic conditions.

Phosphate availability is closely linked to soil pH - its availability is at its highest when the pH is between 6.5 and 7.5. When the pH is above or below this range, availability is significantly reduced. In strongly acidic soil (pH 5.0 or less), iron, aluminium, manganese and other base metals are present in a soluble state and in greater quantities. The phosphates of these elements are formed and become

unavailable to plants. These compounds once formed can keep the phosphate within them unavailable for years.

Potassium and sulphur are not considerably affected by soil pH and most micronutrients, with the notable exception of Molybdenum, are readily available in low pH soils.

Soil stratification

Where reduced tillage is practised for successive years the top soil carries a higher concentration of nutrients than the sub-soil – this can have benefits and potentially negative effects.

It will mean more macronutrients are in the area needed by plants in the early growth stages. However, it also means an increase in the components that acidify soil. It is important to understand the risk of pH stratification, where the soil will need checking for pH in the top 10cm, irrespective of the pH at depth. Soil sampling needs to be well thought through in reduced tillage systems, as there could be significant differences seen through the soil profile – and be careful of the relevance of pH results from standard loam tests taken at 15cm – the recommended depth for normal arable cropping.

Think ahead

The application of ground limestone remains the most effective means of raising soil pH – but it does take time to work. In wheat/rape rotations, growers often try to squeeze the lime in before the rape is drilled. This is a narrow window in a busy period and the lime will not work immediately, especially if the soil is dry.

A bit of forward planning will help – applying the lime in the preceding year to oilseed rape will avoid the bottleneck and allow the lime to actually amend the pH in readiness for the following crop.

Cultivations prior to following crops - know the implications

Dick Neale (Hutchinsons Technical Manager) warns about the residue risks from spring applied herbicides.

- With a large area of spring cropping and multiple applications of herbicides applied late in the spring this season, the residue risk to following crops such as WOSR or beans must be taken into account when planning cultivations.
- Ploughing or thorough cultivation to 15cm is a requirement on many herbicide labels prior to establishing the following crop. This has to be balanced against a loss of seed bed moisture when establishing WOSR in particular, but auto-cast or very shallow direct drilling following two late spring applications of ALS herbicides, such as Atlantis with, or in sequence with AllyMax, does potentially expose the crop to high risk of failure.
- With growers keen to re-establish rotations after a difficult cropping year, following crop restrictions must be observed for all herbicide applications.
- Use of imazamox in pulse crops for instance, will exclude WOSR as a following crop in the autumn and restrict sugar beet to a 12 month interval.
- Applications of clopyralid in the previous crop will exclude the planting of winter beans.
- Ensure you have spoken to your agronomist regarding appropriate cultivations and planting intervals post use of spring herbicides, to fully understand the risks you are taking.

For more information on any of our products or services please contact your local Hutchinsons agronomist or contact us at:

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