THE AGRONOMY COMMUNITY

Agronomic Insight

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Consider GRANULOCK® for deep P bands

By Bede O'Mara
Agronomist - subtropical farming systems

Agronomists working with northern summer crop growers will be familiar with the research of Professor Mike Bell and others to identify the need for deep phosphorus and understand the best ways to supply it.

Year after year of zero and minimum tillage cropping with phosphorus placed only at the surface has run down the soil's natural fertility in the 10-30 cm zone.

This can't be addressed by increasing phosphorus application with the seed because the high rates needed would compromise seed safety and because phosphorus is relatively immobile. Crop roots spend the majority of their life much deeper in the soil profile.

There is already a wealth of information from the broader research community on the costs and benefits of deep P applications.

Publications outline soil sampling strategies[1], so that once we have paddocks tested, we can interpret the results with some confidence[2].

There is modelling to show the likelihood of economic responses in parts of the Northern Grains Region[3] and there's even a deep P calculator[4] available.

Grower experience suggests that in northern dryland cropping systems, the payback time varies depending on the season experienced following the application.

Anecdotally, the drier seasons seem to generate greater yield benefits compared with current practice, faster than the wetter ones. We presume that's because crop roots are able to explore larger soil volumes to greater depths in wetter seasons, thus are able to naturally access more soil phosphorus anyway.

Given the high application costs involved with a deep P program, growers are also understandably keen for the treatment to last a number of seasons.

Product choice and rate are important decisions and should be considered on a case by case basis.

Application system

Deep P programs generally involve applying high rates of fertiliser on relatively narrow row spacings (more bands increase the chance of interception by crop roots) using specialised tillage to place the fertiliser deeper into the soil profile (i.e. >10 cm).

Research by the Central Downs Grower Group[5] indicates that deep P bands running along the plant line are more effective than those running across the rows, particularly in the years soon after application events.

Banding fertiliser deep under the soil is a very different strategy than the more widely-adopted starter fertiliser practice of applying low rates with the seed. Deeper applications present some different issues worth considering regarding nutrient availability.

Product choice and availability

There are a limited number of phosphorus fertilisers available to choose from.

The most commonly used sources of phosphorus for deep P applications are the ammonium phosphates, MAP and DAP. Although it was used for much of the initial trial work, triple superphosphate is not readily available.

There are also some good reasons to consider Granulock® Z and Granulock blends for deep P applications.

These fertilisers supply high rates of phosphorus, along with a range of other nutrients, in an easy to apply, high quality granulated form and are ideal for alkaline soils.

MAP-based products will generally give better results than DAP-based products on alkaline soils, because they promote an initial acidic reaction in the soil around the fertiliser band which potentially allows greater phosphorus availability.

However, DAP may offer advantages for growers looking to supply nitrogen deep into the soil profile at a higher rate as part of a deep P application strategy.

When DAP is applied, the pH of the fertiliser band will initially increase, although this is unlikely to affect a future crop in the way it would if it was applied in contact with seed in the row at planting.

In the longer term, the double ammonium on DAP will result in greater acidity around the fertiliser band as nitrification occurs. However, it is questionable how much impact fertilisers will have on local pH when applied into highly buffered clays.

A multi-nutrient strategy

As with any area of nutrition management, maximum responses may never be achieved from deep phosphorus applications unless adequate quantities of other plant nutrients are present and available.

In Central Queensland, researchers[6] found that applying some nutrients and not others inhibited uptake of the desired nutrient.

However, when multiple nutrients were applied together, the responses to all were often significant.

It pays to soil test well, using segmented sampling methods to determine which single or multiple nutrients may be limiting.

At Incitec Pivot Fertilisers' trial site at 'Tulloona', Northern NSW, we saw luxurious levels of soil phosphorus could induce a zinc deficiency.

This was especially evident in the sorghum crop of 2006/07, which required a foliar zinc application for correction.

Given this possibility, it makes sense to take a multi-nutrient approach and apply as many of the required nutrients as possible in the one pass, especially considering the application cost.

Granulock fertilisers are particularly effective on highly alkaline soils and offer a simple way to avoid exacerbating other nutrient disorders with a single high rate of phosphorus.

Consider recommending Granulock Z or Granulock Z Extra for more zinc. If potassium is needed, Granulock fertilisers can be blended with muriate of potash, and products like Cotton Sustain may also fit the bill. If additional nitrogen is required, consider DAP.

Our deep P research at the 'Colonsay' long term trial site on the Darling Downs is supporting similar results found by other researchers and farmers in the area and is ongoing.

Collaboration with machinery distributor Vanderfield Pty Ltd has also shown positive responses from deep P applied using various tillage machinery, including the strip tillage method.

We look forward to bringing you more guidance on deep P in the future, as nutrition research uncovers more about the system.

For more information feel free to call me on 0417 896 377 or email bede.omara@incitecpivot.com.au

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