

Phosphorus – what to do in 2007?

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Take Home Messages

- Phosphorus is an essential nutrient for plant development which cannot be effectively applied post sowing. Because of this it is imperative that decisions on its application are made now.
- P should be applied at rates necessary achieve the yields being targeted in a given paddock for a given year.
- Information to assist you in determining how much P is in your soil includes fertiliser history, removal through production previous yields, soil tests and paddock history.
- Prioritise your highest yielding paddocks and paddocks you know respond better to fertiliser.

Phosphorus – an overview

Phosphorus is an essential nutrient for plant development. It plays a critical role in the early stages of plant growth, affecting both vigour and maturation. Phosphorus cannot be effectively applied post sowing. Because of this it is imperative that decisions on its applications rates are made well in advance.

Given the failure of the 2006 season, reducing costs where possible will be important for most farm businesses during 2007. Phosphorus makes up a significant proportion of the input cost of cropping, so the decision of how much P to apply can play a big part in determining overall profitability and the long term viability of any farm business.

How much P should I apply in 2007?

The answer to this question will be different from paddock to paddock and person to person, depending on the amount of phosphorus currently available in the soil and how risk averse an individual is. Since P cannot be effectively applied post-sowing the decision of how much to apply needs to be made now.

It is essential that each paddock is assessed on its own merits. A blanket fertiliser strategy should not be applied across the whole farm. Use all the information you have on each paddock to make an informed decision about fertiliser application rates for 2007. The following factors should play a part in your decision of how much P to apply to each paddock:

How much money do you have to spend on P in 2007?

Do you need to cut fertiliser rates or can you continue with your ideal fertiliser program? It is important to remember that any decision you make to cut fertiliser rates in 2007 will impact the amount of P you have in reserve in your soil for 2008 and into the future.

What crop are you planning to sow in 2007?

Your P inputs in 2007 should depend on what crop you are planning to sow. The root system of cereal crops makes them much better at seeking out nutrients from the soil when compared to oilseeds and legumes. As a result cereals require less P than legumes and oilseeds.

How much P is available in your soil?

The amount of P available in your soil will be dependant upon several factors. Information to assist you in determining how much P is in your soil includes fertiliser history, removal through production previous yields, soil tests and paddock history.

These factors are outlined in detail below.

The fertiliser history of the paddock

When P is applied to the soil much of it becomes unavailable for plants to use as it binds to soil particles through the process of adsorption. It is estimated that only ten to fifteen percent of P fertiliser applied at sowing is taken up by plants in that same year, the remainder is left in the soil to be used by subsequent crops. A good fertiliser history can result in P building up in the soil to a point where only replacement rates are required. In other words only P removed from the previous year's production needs to be replaced at sowing as the soil has enough P in reserve to compensate for any that is "lost" post sowing to the soil through adsorption.

P should be applied at rates necessary achieve the yields being targeted in a given paddock for a given year.

The paddocks soil type

Highly alkaline soils have a greater capacity to fix phosphorus making it unavailable to be used by the crop.

The amount of P that has been removed from the paddock through production (grain, hay and grazing) or erosion

As a general rule of thumb for every one tonne of grain produced, the amount of P used by the crop is as follows:

Crop Type	Approximate P usage for 1 tonne of production (kilograms)
Cereals	3
Legumes	4
Oilseeds	Up to 7

The amount of P mineralisation that has occurred in the soil

This will be dependant upon the seasonal conditions leading up to sowing. If the 2007 season experiences a dry start the residual value of P from the 2006 season will be low as mineralisation will be minimal.

Soil tests

Soil samples are best taken in autumn when the maximum amount mineralisation has occurred. If soil samples are taken from within the previous year's drill-row they can give an unrealistically high reading of available P. When sampling it is important that samples are taken from both in and between the drill row from the previous years crop.

Colwell P interpretation: BCG results over a number of years suggest that responses to phosphorus applications above 6kg P/ha will be marginal on soils with good soil fertility (>15ppm Colwell P) and fertiliser histories (a positive P balance).

Plan of attack for 2007

- Prioritise your highest yielding paddocks and paddocks you know respond better to fertiliser.
- Do a fertiliser budget for these paddocks so you can approximate the amount of P available.
e.g. P inputs (fertiliser) – P exports (grain/hay/grazing)

Working Example

When making fertiliser decisions it is important to understand the ramifications of applying too much or not enough! Below is a worked example designed to help you better understand P applications. This is not to be taken as a blanket recommendation but rather as a guide to help farmers with their P fertiliser budgeting.

Seasonal conditions prior to the April-May can influence the amount of soil P available at sowing. A wet summer/autumn (>50mm) will mineralise P from previous applications. A dry summer will have less mineralisation and will require more P applied at sowing.

Assuming the cost of fertiliser is:

MAP (22.5% P) @ \$555 (ex-Geelong)

For 1kg P, it will cost \$2.50.

It will cost an additional \$0.20 for 1% Zn for every kg P.

If the targeted yield for wheat is 2t/ha (to grow 1 tonne of wheat the crop requires 3kg P)

Therefore you must ensure the crop has access to at least 6kg P.

Table 1: Working example for the Mallee

	Wet Summer/Autumn (assuming 3kg/ha is mineralised)	Dry Summer/Autumn (Assuming 0kg/ha are mineralised)
Scenario 1: Colwell P greater than 15ppm	3kg/ha P	6kg/ha P
Cost (\$/ha)	\$7.50	\$15.00
Scenario 2: Colwell P less than 15ppm	6kg/ha P	12kg/ha P
Cost (\$/ha)	\$15.00	\$30.00