

WELL PLANNED & TIMELY EXECUTED FERTILISER APPLICATIONS

Lee Menhenett (Incitec Pivot)

Research by Agriculture Victoria has shown that there are no pasture yield differences whether phosphorous fertiliser is applied in Summer or Autumn.(1) The movement of water soluble phosphorous from single superphosphate granules into the soil is virtually complete within 24 hours of application, even when soil conditions are dry and rainfall does not occur.

Light dews are enough for the P to move into the soil where it is quite immobile (won't leach). The granule left behind is basically gypsum (Calcium Sulphate), this will dissolve and move into the soil with the next rain event.

While the Agriculture Victoria work also showed that applying phosphorus fertiliser earlier than the traditional autumn application did not increase the likelihood of phosphorus losses through run off, it is still important to follow best practice :

- Avoid applying fertiliser when ground cover is less than 70%. Bare soils are prone to shedding water leading to erosion, taking valuable soil holding P and other nutrients
- Prevent fertiliser entering waterways and water storages

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THE FERTILISER PROFESSIONALS

- Do not apply fertiliser if heavy rain is forecast within 4 days

Having phosphorus applied to the paddocks early allows for germinating annual grass, clovers and perennial pastures to access fertiliser P ensuring a rapid uptake following the autumn break. Clover plants growing nearer to a fertiliser granule were up to 4 times larger and contained 5 times as much P than those plants growing 2.5cm away.(2)

The same early application benefits apply for Lime – being quite insoluble Lime needs moisture and time to react in the soil to adjust pH. Generally 2-3 months prior to the autumn break.

Historically Lime and Super applications in pastures are skewed towards autumn and this causes –

- site dispatch delays
- road freight constraints
- contractor spreading constraints

Agronomically there are no penalties in applying early and logistically there are benefits in getting the product applied in timely manner and often early dispatch incentives to take advantage of.

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With confidence in when to time fertiliser spreading, the big question is what product, or suite of nutrients are required and at what rate.

The only way to determine these questions is with a well planned and executed soil testing program. Spending time planning a soil test regime around soil type and topographic variations and understanding past fertiliser and management history will allow for a solid sampling program that provides critical nutrient management detail for allocating nutrients across the farm. At least 30 soil cores should make up 1 soil sample from each zone identified on farm. Sampling depth needs to be consistent to 10cm, incorrect sampling depth will increase or decrease the nutrient concentration in the sample and give a false outcome.

Sampling in Spring is a great time of year to sample because soil moisture and temperature are typically constant, and any abnormal pasture growth is clearly visible. Urine and dung patches can be avoided and results will be available well before the summer/autumn fertiliser and lime applications, allowing plenty of time for planning and organising spreaders.

POST- HARVEST CEREAL STUBBLE MANAGEMENT

Rebecca Telford (nee Stewart)

The 2022 cropping season has thrown us some real curve balls. From a dry winter to a flooded spring, massive disease pressure and harvesting havoc, what a year indeed!

With most people now having completed harvest and some still with finishing touches to do, we now have one thing left to consider.

STUBBLE

The wet spring has meant that a lot of crops have produced a substantial amount of dry matter. As always, every situation is different, but hopefully some of the following information can assist you in deciding what to do with all the stubble that is left after harvest.

Typically the grain to straw ratio of cereals is 1:1.5 but can vary due to many factors.

The nutrient held in the stubble can be substantial. If we look at a 5t/ha wheat crop which will leave around 7.5t/ha of straw, it will equate to the following;

30-75kg/ha N (65-163kg/ha Urea)

3.75-10.5kg/ha P (43-120kg/ha SSP)

45-105kg/ha K (90-210kg/ha MOP)

8.25-9.75kg/ha S (9-11kg/ha Sulphur Bentonite S90)

Table 1. Amount of nutrients in 1t/ha of cereal stubble

Nutrient	Amount (kg/ha)
N	4-10
P	0.5-1.4
K	6-14
S	1.1-1.3

Ref: Stubble Retention in Cropping Systems in Southern Australia (2010)

With the cost of production ever increasing and the price of fertiliser where it is, these numbers must not be overlooked when considering whether to burn, bale, retain or incorporate the stubble.

Stubble Retention and Incorporation:

From the mid 90's, farmers have been recognizing the benefits of stubble retention in Victoria. Stubble retention differs between districts and seasons. Following a wetter season last year, the challenges faced with retaining stubble may be too difficult to overcome for some.

Retaining stubble usually works best with lower stubble loads of between 2 and 3t/ha. At around this 2-3t/ha stubble load, a ground cover of 70% will be achieved. Maintaining this 70% ground cover is essential when trying to minimize soil erosion and capture maximum water during the summer. Where there are higher stubble loads, incorporating stubble may be a better option. However, there are always factors to consider.

The impact stubble retention has on our nitrogen and microbial system is somewhat understood, although trying to measure the nutrient cycling from these microbes is difficult. There are a lot of factors involved in the breakdown of stubble and nutrients. With cereal stubble providing carbon to the soil, this has a 90:1 Carbon-Nitrogen Ratio. Microbes have a Carbon-Nitrogen Ratio of 7:1, meaning that they compete with the crop for N in order to digest the carbon in the stubble. In long term trials, results have shown that in wetter years (mainly on successive cereal crops), crop yield has been reduced in stubble retained systems, causing yield penalties of between 0.3 and 0.5t/ha.

To overcome these yield penalties in a retained stubble system, it is recommended that nitrogen rates of 5kgN/t/ha of cereal residue are applied. These should be applied early to avoid early nitrogen deficiencies in crop. In the above example (7.5t/ha stubble) to replace the N deficiency this will cost \$92/ha.

The upside of retaining the stubble is the value of nutrients retained. This will become available for the subsequent crops. The value of all the nutrients in a 7.5t/ha stubble will range between \$239-\$570/ha (NPKS Blend).

As technology within our industry grows, there are a number of farmers using different systems and implements to tackle the issues faced with stubble retention. From changing row spacing, tines to discs, and inter row sowing; no two systems are the same. If you are thinking of changing or need to adjust your system, make sure that you do plenty of research and talk to others with a similar system to see if it will work for your situation.

Burning:

Burning has both its advantages and disadvantages - as with most things! Being a quick and easy fix, burning is quite a large cost effective solution to remove all the stubble as well as helping with other things such as weed and pest burdens.

The disadvantages when burning your stubble, can be quite negative for your production system. When cereal stubble is burnt, 80% of the Nitrogen and Sulphur and 40% of the Phosphorus and Potassium can be lost in gaseous forms to the atmosphere. Depending on how hot the burn gets to in the paddock, some of the little surviving Phosphorus and Potassium can be lost to ash when it is windblown. Putting a price on the these nutrients in a 7.5t/ha stubble will mean you are losing \$60-\$145/ha of N, \$8-\$10/ha of S, \$55-\$128/ha of K and \$10-\$27/ha of P. You can also expect to lose up to 80% of the carbon from within the standing stubble.

In lower rainfall regions, which are quite reliant on keeping organic carbon levels up, burning may be lower on the list of stubble management options. However, in the higher rainfall areas which have higher organic matter levels and can have a lot more issues with pests and disease harbouring within the retained stubble, burning may be the best option.

Other Options:

As always there is no “one size fits all” category in this farming business and depending on what sort of enterprise you are running you may have other options such as grazing, slashing, baling, mulching and cultivating.

Whatever path you choose to take, ensure that it’s what’s best for your system.

The knowledge gained by a simple soil test can’t be underestimated and to make the numbers “work” you have to know what you are dealing with in the soil profile. So to ensure you are putting out what your crop and soil requires, do a soil test.

As the 2023 season gears up, I hope it all runs as smoothly as it can and if you have any enquiries please check in with your local agronomist!

References for Lee Menhenett Atricle.

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