

Planning for cotton in 2022-23

There's a lot to like about the start of the irrigated cotton season – healthy cotton prices, available irrigation water and full soil profiles. As a result, the confidence to invest in ground preparation and pre-plant fertiliser activities has increased.

However, stubbornly expensive input prices and a short turnaround time to planting mean that fertiliser decisions for this season will have to be prudent and timely.

SOIL SAMPLING – WORTH IT'S WEIGHT

A successful crop starts with understanding the nutrient status of each field. To do this it is important to design an appropriate post-harvest soil sampling program. This season your program should include a segmented sample to investigate not just the magnitude of residual nutrients, but their location in the soil profile.

Nutrients such as nitrogen, sulphur and boron are mobile in the soil profile and are likely to have moved further down the profile in the wetter conditions. Also of interest is chloride, which is also mobile.

Nutrients like phosphorus, potassium and zinc are immobile, so uptake is reliant on them being in the same part of the profile as the actively growing roots. If the profile has physical restrictions the location of these nutrients become increasingly important.

Given most valleys had a wet harvest in 2021-22, it is likely that heavy harvest machinery caused soil compaction and structural damage. So, a physical assessment of the soil should be conducted at the time of sampling.

The Nutrient Advantage® Health1 test can help you understand the physical, chemical and biological properties of your soil. It is a useful benchmark that can be added onto any comprehensive surface soil analyses. We suggest including Health1 every 5 to 7 years.

PRODUCT CHOICE

Cotton growers can choose from a wide variety of pre-plant fertilisers to meet the needs of their operation and rotation. There is also the opportunity to create a custom blend tailored to the requirement of each crop.

Granulock Z®, Granulock Z Extra and Cotton Sustain® are the backbone of IPF's offer to the cotton market. These products

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have the right balance of plant available nutrients for cotton and are easy to handle on-farm.

NITROGEN

Nitrogen management and timing will be key this season. It is important to apply nitrogen fertiliser with enough time for the product to convert to nitrate and be well distributed in the soil profile. This will be a challenge this year with less time to prepare paddocks, fewer opportunities to apply fertiliser pre-plant, higher risk of N loss through denitrification due to wet soil profiles and likely higher rates being applied in-crop.

Big N

BIG N® (anhydrous ammonia) continues to be a product suitable to many application systems and conditions, and whilst wet soils provide their own challenges, application adjustments can be made to allow for adequate banding.

In wet pre-plant conditions, losses from denitrification can be significant and at current N prices, these losses can be a bottom-line penalty we can do without. Nitrogen stabilisers and inhibitors can be applied to or with different products during pre-plant operations. Fertilisers treated with eNpower® or ENTEC® should be banded or soil incorporated during application.

The Incitec Pivot Fertilisers nitrogen stabiliser product IX2001 can be co-injected with BIG N. If using pre-treated granular urea or Easy N®, products such as eNpower or ENTEC are



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appropriate choices and can be viewed as insurance against conditions that are conducive to denitrification losses.

Depth of application of pre-plant N fertiliser and its placement relative to intended plant lines can also be a factor. The distribution of applied N as nitrate deeper in the soil profile after application will be limited in wet soil conditions.

Losses of pre-plant N through water movement in the 1st and 2nd irrigations can be significant as reported by McDonald *et al* 2017. Deeper placement of N, 10-15 cm below the bottom of the water furrow in combination with eNpower or ENTEC will help to reduce this issue.

Green Urea NV & Easy N

Broadcast Green Urea NV® or water run Easy N are also effective N application strategies. Green Urea NV reduces ammonia volatilisation from surface applied urea, allowing growers more time to incorporate N by irrigation or rainfall.

POTASSIUM

Where subsoil limitations affect root depth, exacerbate compaction or limit nutrient uptake, a pre-plant basal application of potassium will ensure the nutrient is available in the top layer of the soil.

Early applications of potassium are useful, especially in cotton, which can take up excess amounts of potassium during periods of lower plant demand and release it later as demand from developing bolls increases.

Be aware that foliar potassium may be required if the soil cannot supply enough from early squaring right out to the peak of boll filling. Peak requirements of potassium can be as much as 4 kg/ha of potassium per day in a high yielding cotton crop.

Cotton Sustain

The nutrient balance in Cotton Sustain® reflects the nutrient removal ratios of high yielding cotton crops, particularly for phosphorus and potassium. Cotton Sustain contains 6.1% nitrogen, 12% phosphorus, 22.5% potassium, 2.2% sulphur and 0.55% zinc. This makes it a good option for higher application rates on fields that have tested low in potassium, marginal in phosphorus and low in zinc.

ZINC

Zinc is needed for a range of reasons. Some vertisols in Queensland and New South Wales are known to have high soil

pH levels, so plants can find it more difficult to access enough zinc.

Irrigated cotton crops may also find it challenging when they are planted into paddocks following a long fallow, which may have reduced arbuscular mycorrhizal fungi (AMF) populations. AMF colonise root systems and help plants absorb less mobile nutrients such as zinc and phosphorus. Where they are lacking, a good supply of phosphorus and zinc close to the plant row will promote root growth and foraging for nutrients from soil reserves.

Remember that zinc and phosphorus are immobile in the soil, so if distribution is patchy, plant uptake is patchy too.

Granulock Z

Granulock Z is used in pre-plant cotton recommendations for its plant available zinc and high phosphorus concentration. The fertiliser is made in Australia and contains 11% nitrogen, 21.8% phosphorus, 4% sulphur and 1% zinc in every granule. This carefully balanced formulation of nutrients promotes strong early root growth, vigorous establishment, healthy emergence and even crop growth.

Granulock Z has zinc in every granule, so provides a uniform distribution of plant available zinc in the application trench. MAP blends do not offer this! This is especially important if you plan to reduce rates due to high fertiliser prices – compounds are more uniformly distributed at low rates than are blends.

Granulock Z Extra

Granulock Z Extra is an economic and effective way of supplying higher rates of zinc to cotton crops. It contains 11.6% nitrogen, 19.8% phosphorus, 5.4% sulphur and 2% zinc. It is a combination of Granulock Z and Granulock Big Z.



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The advantage of the compound granules are that they have nitrogen, phosphorus, sulphur and zinc in every granule, and you avoid the nutrient segregation that can occur with MAP and zinc sulphate monohydrate blends. This means you get a more precise, even distribution. It is also easy to handle.

Granulock Z Extra contains a mix of water-soluble zinc that will go into soil solution for immediate availability; more sparingly available zinc oxysulphate to feed later root development; and some zinc oxide that will become available later in the crop and build soil zinc levels.

CUSTOM BLENDS

Agronomists are welcome to create custom blends with IPF fertilisers like Granulock Z, Granulock Z Extra or Cotton Sustain. Also consider adding GranAm®, Muriate of Potash, Sulphate of Potash, MAP, urea or Granulock Big Z (10% zinc and 16.1% sulphur) to address multiple or unbalanced nutrient needs using the one fertiliser application.

SEED SAFETY

Don't forget about seed safety. Pre-plant fertiliser containing nitrogen and/or potassium should be banded at least 10 cm below and 10 cm to the side of the intended plant line to avoid the potential for fertiliser burn at planting and root pruning later in the season. Whilst moist soils will allow some forgiveness (more so than dry soils), the risk can never be completely negated, so take care.

REFERENCES

B Macdonald, Y Chang, A Nadelko, S Tuomi and M Glover (2017). Tracking fertiliser and soil nitrogen in irrigated cotton: uptake, losses and the soil N stock. *Soil Research*, 264–272. <http://dx.doi.org/10.1071/SR16167>

FURTHER INFORMATION

For more information on any of these pre-plant fertilisers, please contact:

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