

# PHOSPHORUS AND ZINC:

## Key to establishing crops

David McRae – IPF Technical Agronomist

Rapid plant establishment has always been important for cotton and sorghum. With the shift to new small-seeded varieties of cotton and the push to plant sorghum under cooler conditions, optimising plant establishment conditions are more important than ever.

Adequate phosphorus and zinc nutrition are key for quick establishment of cotton and sorghum seedlings. Applying these nutrients with the germinating seedling reduces the negative effects of early season stresses, allowing the plant's potential to develop.

Adequate early season phosphorus (P) and zinc (Zn) nutrition is vital for good plant establishment as P and Zn deficiencies will reduce seedling vigour, root development and decrease plant establishment. Affected plants appear ill thrifty and stunted, with a red/purplish colour and are less able to tolerate negative stresses such as insects, disease and adverse weather conditions.

Delays in early season development will delay flowering/fruitletting and crop maturity. Delaying flowering in sorghum crops generally causes issues with sorghum midge and as cotton moves into cooler areas, delayed crop may negatively impact cotton harvest.

The cotton plant needs to develop an extensive root system before flowering commences so it can acquire the required maximum nutrient uptake per day to allow potential yields to develop. Restricting early season root development will reduce the cotton plant's ability to access required nutrients from flowering onwards when a large proportion of nutrient uptake occurs (Table 1).

Table 1: Nutrient uptake rate and amount taken up by flowering for cotton.

	Maximum uptake rate (per day)	Percentage taken up during flowering (%)
Nitrogen	2.1 kg	55
Phosphorus	0.7 kg	75
Potassium	3.2 kg	61
Sulphur	0.8 kg	63
Calcium	2.6 kg	55
Magnesium	0.7 kg	61
Iron	24 g	46
Manganese	6.5 g	49
Boron	6.5 g	60
Copper	0.9 g	61
Zinc	3.7 g	73

Source: Australian Cotton Production Manual 2017

Phosphorus and zinc can be applied as a starter fertiliser with either granular or liquid fertilisers. Applying Easy Liquids Flowphos at seeding distributes nutrients evenly and accurately along the seed furrow. This ensures each developing seedling has access to adequate nutrition and will promote early growth.

The rate of high analysis solid P fertiliser is a major factor in determining evenness of application. The lower the rate, the higher likelihood that the application will be uneven or gappy. Table 2

illustrates the number of fertiliser granules per metre of row at different application rates and row widths.

Table 2: Number of MAP granules per metre of row at different application rates and varying row widths.

Fertiliser Rate kg/ha	Number of MAP granules per metre or row Average percentage of furrow treated (%)				
	Row spacing				
	25 cm	37 cm	50 cm	75 cm	100 cm
25	18 (5)	27 (8)	36 (11)	54 (16)	73 (22)
50	36 (10)	54 (16)	73 (22)	109 (32)	145 (44)
70	51 (15)	75 (23)	102 (31)	152 (46)	203 (61)

Research conducted by Mick McLaughlin at The University of Adelaide, showed that phosphorus applied as a liquid produced larger fertiliser bands in high P fixing soil. The benefit of larger fertiliser bands is greater phosphorus and zinc availability to a relatively inefficient root systems of developing seedlings.

Flowphos can be mixed with insecticides or fungicides to protect young seedlings. Products tested with FlowPhos 15 and 13Z in good quality water are;

- Rhizolex (Sumitomo Chemical)
- Bifenthrin
- Chlorpyrifos

Hard water, containing high levels of calcium, magnesium and/or carbonates, or high in EC may cause compatibility issues.

Changing the metering orifice used for applying liquid fertilisers can help manage some compatibility issues. If your liquids application system uses orifice plates, the small opening used to meter out the low applications rates for starter fertilisers can easily become blocked. Changing the metering device to friction tubing can reduce issues as the internal diameter of friction tubing is considerably larger than the equivalent orifice plate.

Contact your local liquid application suppliers, *Liquid Systems In furrow Liquid Application Systems* or *PSSAG | Straightforward Technology to Enhance Your Farm* for more information on type and sizes of friction tubing appropriate for your setup.



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### Further Information

For further information about Easy Liquids Flowphos, application rates or ag chem compatibilities, please contact your local Easy Liquids Sales Agronomists:

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### References

CRDC and CottonInfo. (2017). Australian cotton production manual. Australian Government; Cotton Research and Development Corporaton. <https://www.keywater.com.au/wp-content/uploads/2017/11/Cotton-Growers-Manual-2017-MR.pdf>

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