



No yield gain in cotton trial still a good result

Barry Haskins

Hillston District Agronomist, NSW Department of Primary Industries

in a nutshell

- Liquid foliar nutrients have many claimed benefits such as increased crop vigour, waterlogging tolerance and increased yield potential
- In a trial conducted at Hillston in 2006, foliar fertiliser treatments did not result in a significant increase in crop yield over the control
- The trial was conducted in a very high yielding field, which may have had an impact on the results observed by additional fertilisers

Irrigated cotton is a highly productive summer cropping option for much of the western New South Wales irrigation region. Paddock yields in recent seasons have smashed previous benchmarks, reaching up to 14.4 bales/ha, with some farm averages being well over 12 bales/ha.

The increased yield results are most likely due to better varieties, better irrigation management and higher nitrogen inputs. Other influences such as liquid foliar trace element fertilisers have also been questioned and trialled in order to boost yield further.

A trial was set up in a paddock 40 km north west of Hillston, aiming to measure the effect of various foliar fertilisers (predominantly zinc, phosphorus, nitrogen and potassium) on cotton vigour, health, yield and quality, in a cool season environment.

The paddock

The paddock chosen was expected to show deficiencies in zinc and phosphorus, and also exhibit nutrient tie-up as a result of sodic subsoils. The section of the paddock in which the trial was sited was chosen for its evenness of soil type and plant stand. Soil tests were taken (0–10 cm and 0–60 cm), indicating very low nitrogen, phosphorus and zinc levels. In addition, the test highlighted sodicity in the surface and subsurface of the soils.

The paddock was fallowed in 2006. In late April hills were formed and centre busted with 150 kg/ha MAP + 2% Zn and 115 kg N/ha (as ammonia gas). It was then sown with the variety Sicot 43BR on 3 October and watered up. A further 66 kg/ha of nitrogen was water run in December, and 2 L/ha Microsol® (a foliar fertiliser) flown on following a watering. The crop used 12.5 ML/ha of water.

The trial

A number of foliar fertilisers were chosen as a result of soil tests and anticipated deficiencies, and applied at recommended growth stages (following or prior to irrigating).

Each plot was sprayed using an electric backpack with a 2 m boom, incorporating four Hardi F-02-110 nozzles, at 1.3 m/s, spraying a water volume of 85 L/ha (Figure 1).

Each application was done as close to sunrise or sunset as possible, to aid in nutrient uptake through the leaf.



Figure 1: The author spraying the trial with the electric 2 m boom



Details of the treatments are given in Tables 1 and 2. The trial started 100 m into the field (from the tail ditch), and each plot then ran 50 m in length across two rows.

In between each plot there was a buffer row, aimed at preventing product drift between plots. Each treatment was replicated three times.

Table 1: Trial treatments and application growth stages

Treatment	Product	Application timing			
		8 leaf 1 Dec	10 leaf 12 Dec	Start flowering 28 Dec	Mid flowering 11 Jan
1	Broadhectare Zn	*			
2	Broadhectare Zn	*	*		
3	Quickstart hitrace	*			
4	Quickstart hitrace	*	*		
5	Fiz	*			
6	Fiz	*	*		
7	Liquifert Zinc	*			
8	Liquifert Zinc	*	*		
9	Knite			*	*
10	Quickstart hitrace and Knite	*	*	*	*
11	Control	Nil	Nil	Nil	Nil

Table 2: Products rates and nutrients applied

Product	Rate/ha	kg nutrient/ha					
		Zinc	Nitrogen	Phosphorus	Potassium	Sulphur	Magnesium
Broadhectare Zn	3 L	0.3					
Quickstart hitrace	7.5 L	0.3	0.675	0.45	0.19	0.45	0.24
Fiz	2.2 L	0.31		0.37	0.07		
Liquifert Zn + Urea	1.35 kg + 0.85 kg	0.297	0.46			0.14	
Knite	30 L		1.2		3.6		



Figure 2: Leaf damage from zinc sulfate heptahydrate, which is common with this product



Figure 3: Ben Laird in the trial paddock prior to picking, which yielded 12.95 bales/ha



Measurements

1. Comprehensive soil tests (0–10 cm and 10–60 cm) were taken on the first application (1 December).
2. Leaf tissue analysis and petiole tests were taken in the control on 12 December, and then in some treatments on 28 December, aiming to observe the influence of the foliar fertiliser in both petiole and leaf tissue.
3. Hand-picking at maturity was done for 4 m of two rows in each plot.
4. Quality was processed for each treatment after picking.

Good paddock, no response

The yields in the chosen paddock chosen were exceptionally high, averaging 12.95 bales/ha at 38.2% turnout (Figures 4 and 5). This alone suggests that the crop was not held back by any nutrient deficiencies that would cause significant yield losses. As a result, there was no significant difference in yield between any of the treatments. The tissue tests showed unexplainable variation, which didn't coincide with any of the nutrient treatments. Further, only small amounts of nutrients can be taken into the plants through leaf tissue.

In this field, it would have been a waste of time and money

to apply the foliar fertilisers used in this trial as a means to boost yield and profit. There are no replicated trial results that have found otherwise in southern NSW in cotton, hence the importance of trials like this to test the role and value of such products. It will be important to undertake this trial again next season, as many of these products are anecdotally claimed to benefit crop vigour, waterlogging tolerance and yield, and such benefits may be dependent on certain seasonal conditions. [link](#)

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Further information

Barry Haskins
 T: 02 69 601 320
 M: 0427 007 418
 E: barry.haskins@dpi.nsw.gov.au

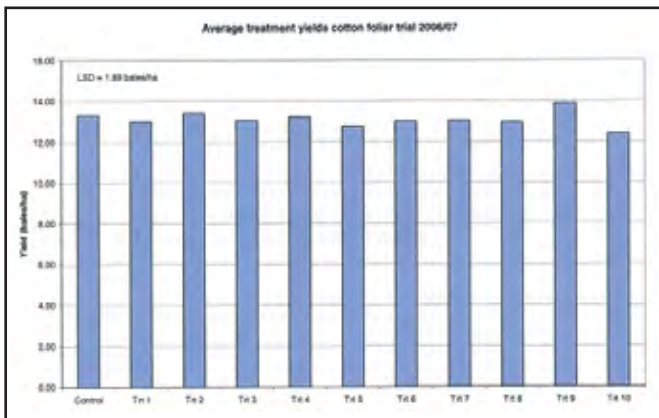


Figure 4: The average yield of the paddock was 12.95 bales/ha, and there was no significant differences between treatments (LSD 1.89 bales/ha, CV 4.4%).

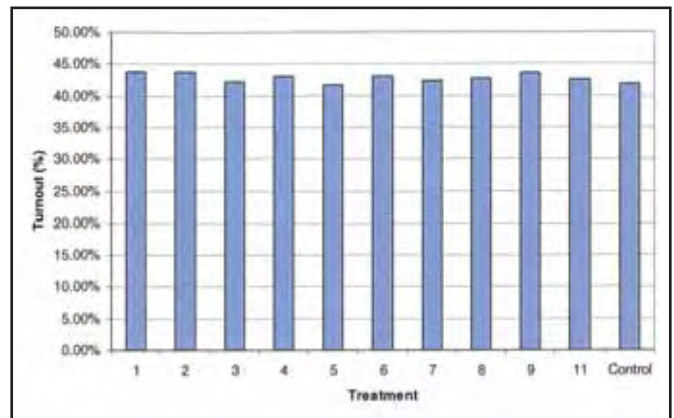


Figure 5: The turnout figures for the trial showed no significant difference (note that the trial cotton was ginned by a research gin that causes slightly higher turnout results than commercial gins).