Phosphorus trial gives unexpected results

By David Dowling

Greg Morris of 'Cambooya', Boomi is a consistently high yielding cotton grower. His enthusiasm and attention to detail have seen him pull well over four bale averages off his 2500 hectares in most recent years.

But when he had some aerial yield estimates done in the 2001–02 season, he realised that some parts of his fields were not quite as high yielding as others.

"We always knew there was variation within and between fields," says Greg, "but we hadn't realised the extent of it."

Greg had soil tests done over most of the farm at the end of that season and one of the results was a low phosphorus level in some fields and quite a lot of variability in P levels. The recommendation was for 25 kg/ha of P, mostly applied pre-sowing, deep under the centre line.

"We wanted to get a better idea of the best rate of P to use as well as the best way to deliver it — banded deep under the seed line or spread across the bed," says Greg. "So we decided to do our own farm trial and to do it properly with replicated treatments and to take fruit counts and do plant mapping during the season as well as taking final yields.

"In the end we came up with some answers, but probably asked just as many new questions. Unfortunately, the trial fields were short of one full irrigation, but the response was fairly startling.

"There was a definite yield increase which continued even with very high rates of P. We were still getting a yield response with over three times the recommended rate of P. I tried

TABLE 1: Cambooya phosphorus trial — yield and quality

Starter Z rate*	Yield (bales/acre)	Turnout %	Length (32nds of inch) 33	34	35	36
Nil	3.09	39.25	20%	72%	8%	–
100 kg centre	3.76	41.3	–	24%	40%	36%
200 kg centre	4.00	40.5	–	17%	52%	31%
300 kg centre	4.14	39.9	–	–	64%	36%
200 kg spread	3.92	38.8	–	–	48%	52%
400 kg spread	4.34	40.7	–	–	8%	92%
600 kg spread	4.1–5.3#					

** Starter Z analysis: N 10%; P 20%; S ; Zn*

 # The variation in this treatment is thought to have been caused by localised field conditions. All other fibre qualities were similar.

one very high rate (600 kg/ha of Starter Z=120 kg/ha of P) and we still seemed to be getting a response, although the high rate treatment had a lot of variation due to field conditions.

“It didn’t seem to matter whether the P was applied in a band under the seed line or spread across the bed,” says Greg. “The traditional recommendation in alkaline soils is to apply P in a band so it is not tied up. But newer information is suggesting it should be spread. Our experience so far is that it doesn’t matter too much and it is certainly cheaper to spread it.”

The most unexpected result to come out of the trial was the improvement in fibre length with increased P rates and with the P spread across the bed.

All other fibre qualities were similar between treatments but the variation in fibre length was startling.

At one end of the scale, the plots with no P applied had 92 per cent of samples with length of 33 or 34. On the other hand, the plots with 400 kg of Starter Z (80 kg/ha of P) had 92 per cent of samples with length of 36.

“The effect on fibre length was unexpected,” says Greg, “and the shortage of water may have also had an impact, but its worth keeping in mind and looking at again.

“We have seen that you can learn a lot from on-farm trials, even if they are just done for your own reference. But they still have to be done properly.

“It also brought home to us that you can’t expect to keep taking off big yields without putting something back. There has been no response to potassium at this stage, but it is likely to be the next cab off the rank, so we need to keep a close eye on it.”