DEMONSTRATION

Irrigated Cotton: Hillston, NSW, Australia, 2010-11

INTRODUCTION

In the summer of 2010, a replicated farm demonstration compared a single soil application of TwinN with reduced nitrogen inputs against the standard farm practice. The trial area was over a total of 23 hectares on the one irrigation block, with each treatment applied to alternate groups of 24 rows to give nine repeats of each treatment. The variety was 71 BRF.

KEY RESULTS

- With a reduction of 47 units N/ha, the TwinN treated rows outperformed the standard practice rows by a full half bale per hectare.
- Where the price of urea was $540/t landed on farm, the extra 47 units of N costs the grower $55/ha.
- The added yield is worth $375/ha @ $500/bale.
- Quality measurements showed a small improvement in micronaire in TwinN bales. While this only translated into a small premium it did move the grower away from the discount cutoff for low micronaire (<3.5).

RESULTS

Treatment	Standard Practice	TwinN Treated
Total N units/ha (excluding composts and chicken litter)	190.2	143 (75%N)
Yield average per hectare	10.91 Bales	11.66 Bales
Yield increase compared to standard		6.9%

METHODOLOGY

The entire 23 ha field was planted on 22/9/10 into a medium-heavy grey clay. The entire block received chicken litter, mineralised compost, 180 kg urea, plus humates and trace elements. It was segmented into 24 rows per segment, alternating the standard practice treatments from the TwinN application. There were a total of 18 segments, giving nine repeats of each treatment in strips down the block.

Mapleton Agri Biotec Pty Ltd
137 Obi Obi Road, Mapleton Qld 4560 Australia
Phone: 1300 989 470 or +61 7 5445 7151
Email: TwinN@mabiotec.com
www.mabiotec.com

Mapleton International Ltd
EU, UK, USA & Africa
Phone: +44 1666 849415
Email: info@mapletoninternational.com
www.mapletoninternational.com
OR LOCAL DISTRIBUTOR

All other countries
Phone: +61 7 5445 7151
Email: TwinN@mabiotec.com
www.mabiotec.com
OR LOCAL DISTRIBUTOR

On 20/12/10, an additional application of liquefied urea was applied to the standard practice areas, totalling 60 units N/ha. At the same time, TwinN was applied to the soil in lieu of the 47 units of N. During an early in crop weed cultivation TwinN was injected under knife point to depth of 50-75mm with 225 litres water per hectare. This allowed inoculation of the plants via the roots.

On 1/1/11 an additional 60 units N/ha was applied to all treatments in the form of liquefied urea.

The crop was harvested on 19/5/11. All standard practice rows were harvested separately to the TwinN treated rows and transported to the gin separately. This allowed accurate recording of yield data and segregated the bales for quality assessments by the gin.

TwinN RECOMMENDATIONS FOR COTTON

- Apply standard pre-plant and early N fertiliser rates.
- Apply TwinN between 2 and 3 months after planting.
- Apply TwinN by liquid injection in enough water to deliver the microbes into the moist part of the root zone, under knife point (disc blade), to a depth of 50- 75mm into the root zone. Ideally, apply into moist soil. In this demonstration the farmer used 225 L/ha.
- OR, apply Twin by overhead irrigation to water TwinN into the root zone.
- Do not apply TwinN via flood irrigation water.
- Do not mix TwinN with agrochemicals in application water.
- Reduce later applications of N fertiliser to give a total of 25% N reduction (up to a maximum reduction of 50 U of N).
- Keep other nutrients at standard levels.

SOIL HEALTH EFFECTS

TwinN microbes act to improve soil health in several ways:

- Reduced nitrogen fertiliser results in less burning off of soil carbon, less acidification of soils and better soil health in general.
- Increased root growth and soil microflora result in increased soil carbon over time. This improves retention of nutrients and water.
- TwinN assists in developing a more 'balanced' soil microflora. Cotton producers face a growing *Fusarium* problem and TwinN can assist with this problem. The US results overleaf show a reduction in *Fusarium* infection in soy bean with use of TwinN.

MAB does *not* claim that TwinN is a disease control product, but these results indicate that TwinN can reduce the negative effects of some agrochemicals on soil microflora and this is followed by a reduction in *Fusarium* infection in roots. Control of soil pathogen problems such as Fusarium in cotton is best approached using an integrated management program and TwinN seems to have a place in such a program.

US Fusarium Trial

The table below shows data collected by researchers with US Dept of Agriculture, in Illinois, from an independent soy bean trial. Similar results were collected in corn and the trial was repeated in a subsequent year with similar beneficial effects of TwinN on *Fusarium* numbers. The purple cell shows a normal level of *Fusarium* in soy bean roots and the cell below it shows the high infection levels (106.4) after application of Roundup herbicide (the soy bean variety was Roundup resistant). Roundup reduced numbers of soil fluorescent pseudomonads (beneficial microbes) drastically and, since these are partially responsible for controlling soil pathogens, the *Fusarium* numbers increased greatly.

Application of TwinN was able to recover the population of beneficial root pseudomonads and reduce the number of *Fusarium* infections (see green cell) back to the level in a healthy soil. These changes were statistically significant. The increase in manganese (Mn) oxidising bacteria with TwinN use is of interest since this class of bacteria assist in making some micronutrients (eg. Mn) available for plant uptake.

Treatment	Fusarium root colonisation	Fluorescent pseudomonads	Mn-reducing bacteria	Mn-oxidising bacteria
No herbicide	67.5 a	116.9 a	73.25 a	104.75 a
+ Roundup	106.4 b	28.2 b	35.12 a	169.5 b
+ TwinN + Roundup	64.0 a	80.0 a	56.25 a	101.5 a

MAB does not advocate removing herbicides from cotton production, since they are a practical farm management tool. However, we do recommend that any negative effects from long term use of herbicides and other agrochemicals can be partially countered by use of TwinN.