TWINN CROP TRIAL

Sugarcane: Maryborough, Australia 2008-09

SUMMARY OF TRIAL

Over the 2008-09 sugar growing season, BSES, Australia's leading sugarcane field research organisation, conducted a trial to compare the efficiency of microbial product TwinN with lower rates of synthetic nitrogen against standard higher rates of nitrogen.

The trial was conducted on a farm near Maryborough, Queensland, Australia. The treatments were applied in a four replicate, randomised complete block design to a first ratoon of cv Q205[A] in 2008.

KEY RESULTS

- One or two applications of TwinN plus 50% of the normal rate of nitrogen (N) fertiliser produced statistically the same yield of cane harvested and total sugar per ha as the standard 100% N fertiliser application with no TwinN in a first ratoon trial.
- Application of only 22% N plus two TwinN resulted in a significant decrease in yields compared to the 100% N treatment, showing that N was a limiting factor.
- Early growth rate and shoot number/m^2 in the second ratoon were higher in all treatments that received TwinN in the first ratoon trial compared to the 100% N treatment with no TwinN applied.

RESULTS

Table 1: Yield and stalk population data at harvest

Treatment	TC/ha	CCS	TS/ha	Stalks/m^2
1 150 kgN/ha	81.9 (a)	16.38	13.4 (a)	7.7 (a)
2 75 kgN/ha + 1 x TwinN	82.0 (a)	16.56	13.6 (a)	7.3 (a)
3 75 kgN/ha + 2 x TwinN	73.8 (a)	16.98	12.5 (a)	7.0 (a)
4 33 kgN/ha + 2 x TwinN	58.9 (b)	16.85	9.9 (b)	6.4 (b)
LSD p=0.01	12.8	NS	2.3	0.9

Least Significant Difference (LSD) is the minimum difference between means that is statistically significant. Data values with the same letter - (a) or (b) - beside them, are not significantly different from each other.

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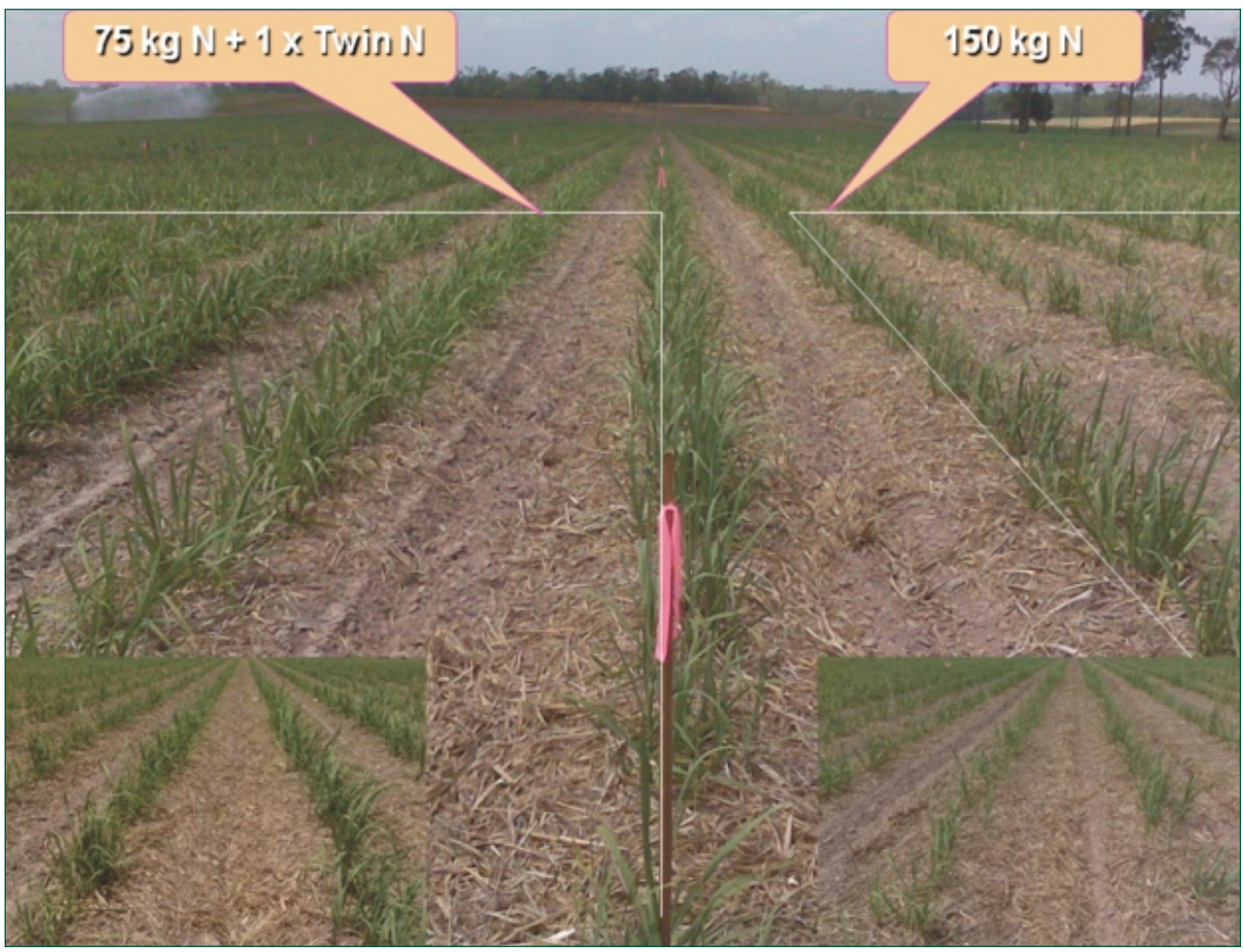
TABLE 2: Stalk population data at commencement of second ratoon

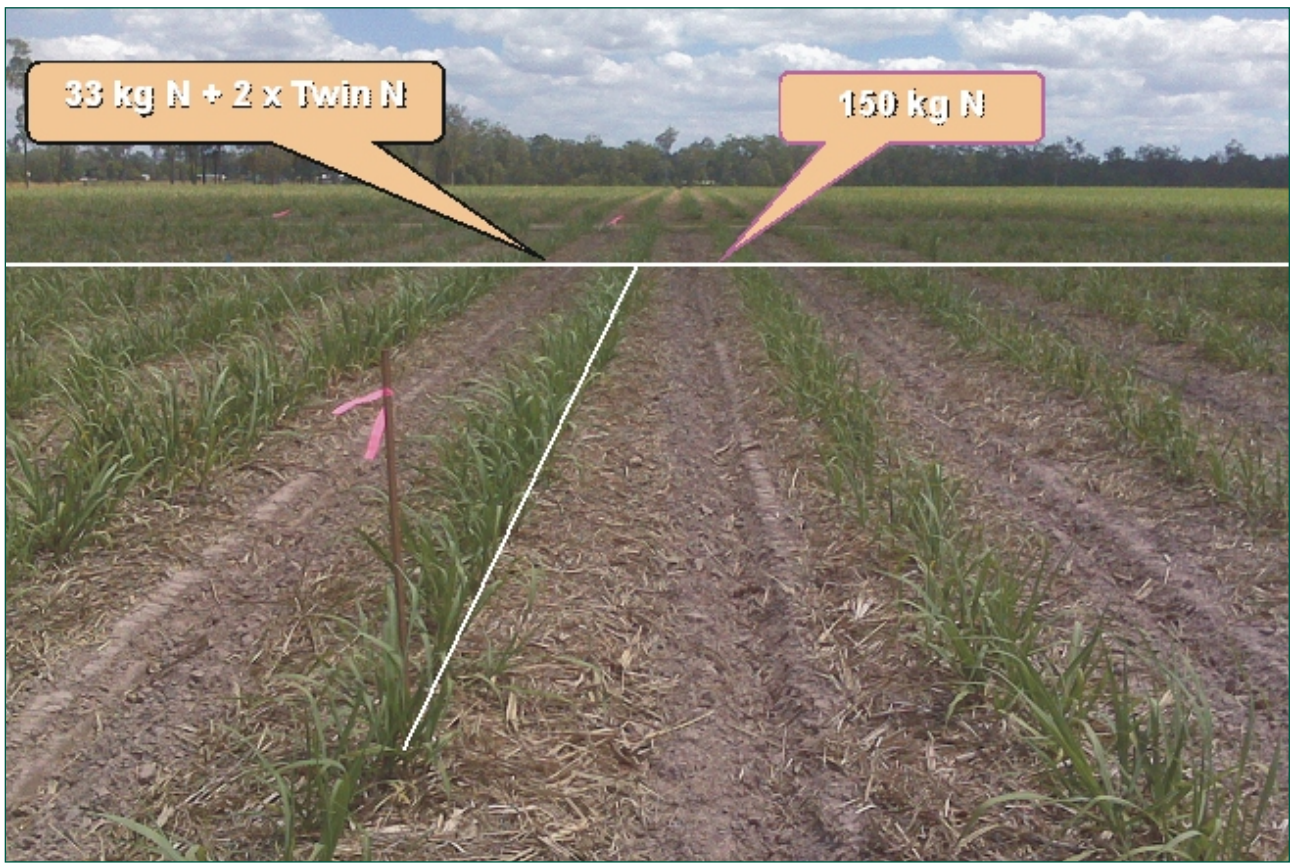
Treatment	Shoots/m^2
1 150 kgN/ha	8.86 (b)
2 75 kgN/ha + 1 x TwinN	12.42 (a)
3 75 kgN/ha + 2 x TwinN	11.51 (a)
4 33 kgN/ha + 2 x TwinN	11.14 (a)(b)

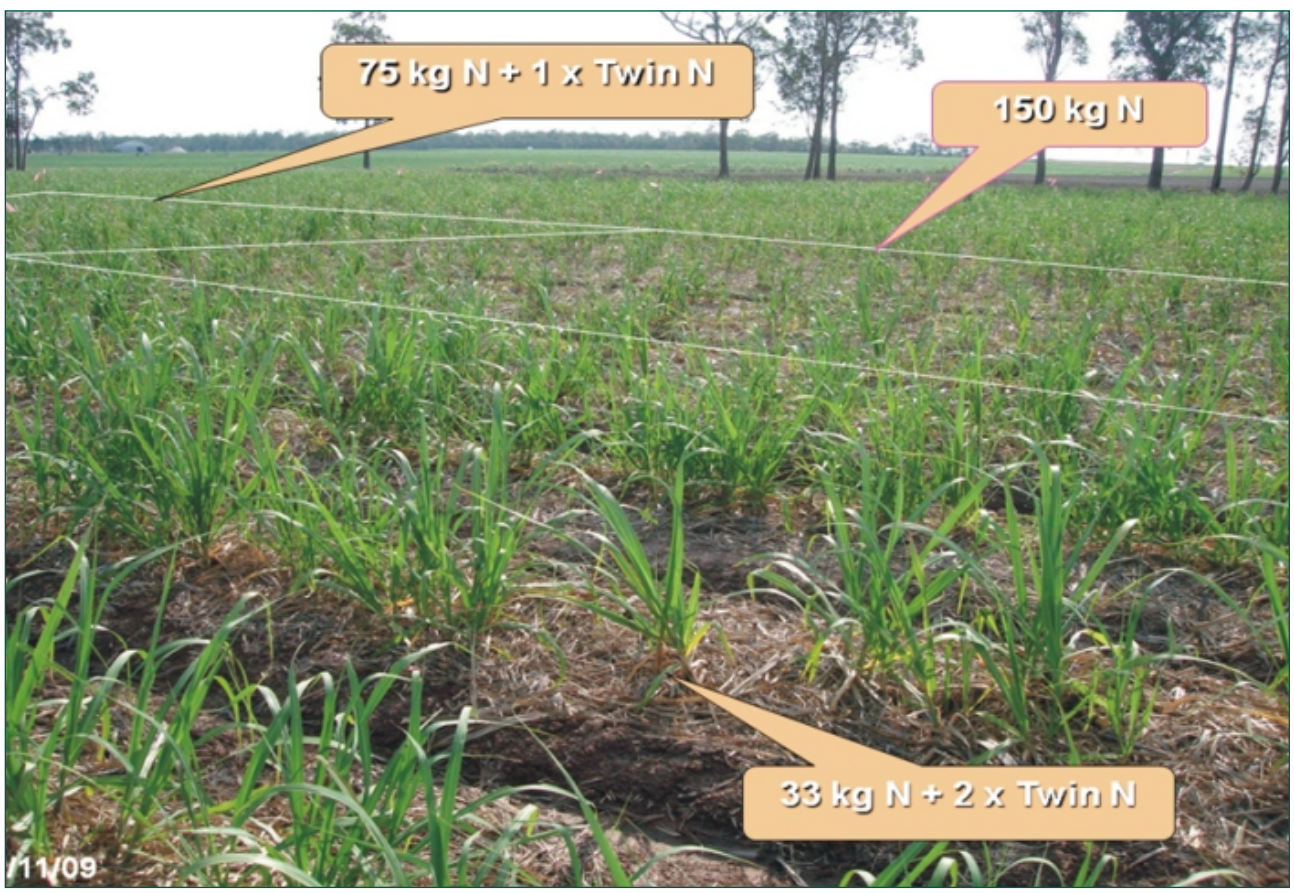
The trial was harvested on 16/9/09 and during preparation for continuation of the trial site for the 2009-10 trial on the second ratoon, it was noted that plant height and shoot number were both larger in all plots that received TwinN in the 2008-09 trial when compared to the 100% N and zero TwinN plots.

Table 2 shows that shoot counts were significantly higher in plots that received 75 kgN plus 1 or 2 applications of TwinN, compared to those that received 150 kgN with zero TwinN treatment. Plant height was not measured accurately but was estimated at 50-60 cm to the leaf bend position in TwinN plots and 40-50 cm in non-TwinN plots. The photos below also show the differences clearly.



Effects of TwinN applied to trial plots in 2008-09 on subsequent ratoon growth in next season's crop.


33 kg N + 2 x Twin N
150 kg N


75 kg N + 1 x Twin N
150 kg N
33 kg N + 2 x Twin N
11/09

CARBON FOOTPRINT

Treatment	Carbon Footprint kg CO_2/ha	Kg CO_2/T Yield
1 150 kgN/ha	600.0	7.3
2 75 kgN/ha + 1 x TwinN	303.2	3.7
3 75 kgN/ha + 2 x TwinN	306.4	4.2
4 33 kgN/ha + 2 x TwinN	135.2	2.3

The carbon footprint of TwinN applied in field to a crop is 3.2 kg CO_2/ha as rated by Carbon Associates, Australia. Urea carbon footprint applied in field to a crop is 4.0 kg CO_2 per kg of urea as per the International Fertiliser Society, Proceedings 639.

TRIAL DESIGN

BSES is Australia's leading sugarcane field research organisation. The trial was conducted on a farm near Maryborough, Queensland, Australia. The treatments were applied in a four replicate, randomised complete block design to a first ratoon of cv Q205[A] in 2008. Plots were 15 metres long by 7 rows with the centre three rows harvested. The season was relatively dry. The trial was harvested in September 2009 and will continue into the 2010 season.

Treatments

Standard P and K applications were applied across all plots.

Treatment 1	150 kg N/ha (100%N)
Treatment 2	75 kgN/ha (50%N) plus 1 application of TwinN
Treatment 3	75 kgN/ha (50%N) plus 2 applications of TwinN
Treatment 4	33 kg N/ha (22%N) plus 2 applications of TwinN

Trial Schedule

Fertiliser applied	03/10/08
TwinN applied	10/10/08
TwinN re-applied to T3, T4	28/11/08
Trial harvested	16/09/09
Fertiliser application to second ratoon	12/11/09

CONCLUSIONS

These results show that use of TwinN technology can enable high yields in sugarcane with reduced application rates of N fertiliser. A single application of TwinN plus 75 kgN/ha gave identical yields as 150 kgN/ha with no TwinN. This enables increased profitability due to reduced input costs.

These results also demonstrate how TwinN can be used to prevent loss of yield and profitability in areas where legislation has been introduced that reduces the amount of nitrogen fertiliser that can be applied to the crop.

The trial revealed a significant increase in the vigour of early shoot growth in the second ratoon crop in plots that received TwinN and the continuation of the trial into 2010 will enable measurement of whether this effect translates into increased yields, as expected.