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SUGAR CANE TRIALS

CLIENT: KISMET INTERNATIONAL PTY. LTD.

For And On Behalf Of

GUANO AUSTRALIA PTY. LTD.

49 FIELD ST, SHEPPARTON 3630, VICTORIA

RESEARCH COMPANY: CROP TECH PTY LTD

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RESEARCH AGRONOMIST: Robert Doyle

OVERVIEW

A field trial was conducted in Bundaberg to evaluate the effectiveness of Reefsafe®/Agrispon®, a soil Bio-stimulant product made from natural plant extracts, on commercial cane sugar (CCS) and yield in sugar cane. The objectives of the trial were to ascertain whether reduced levels of nitrogen, combined with an application of Reefsafe®/Agrispon®, could maintain sugar cane yield and CCS levels.

Previous studies of the use of Reefsafe®/Agrispon® in sugar cane have shown nitrogen inputs to cane plantings can be reduced by up to 50%, while still maintaining sugar yield and CCS levels.

The trial was conducted in plant cane blocks. Both normal and reduced levels of nitrogen were used.

INTRODUCTION

Three trial sites were established around the Bundaberg region. The sites were representative of the wide diversity of soil types, irrigation methods, and crop rotation systems.

All sites were planted in the spring of 2003. They all had a sugar cane ratoon crop ploughed out in the 2002 sugar cane crushing season.

Table 1 shows the soil types and crops grown on each field between the previous cane crop, and the trial planting.

Table 1: Soil types and fallow crops of each site.

Site	Soil Type	Fallow Crop
1	red medium clay	sweet potatoes
2	grey fine sandy	sorghum followed by a crop of oats
3	grey sandy loam	caloona peas

TRIAL DESIGN

The trial was designed to duplicate previous Agrispon trials that have been conducted throughout the world. The reports from these trials can be viewed at the Agrispon website www.agrisciences.com The common fertilizer practices that are employed in the sugar industry were considered.

The trial areas were laid out as a randomised complete block design, four treatments by four replications, giving a total of 16 plots. The four treatments are shown in Table 2.

Table 2: Treatments applied.

Treatment 1	Industry standard fertilizer
Treatment 2	Industry standard fertilizer + Reefsafe®/Agrispon® @ 1L/ha
Treatment 3	Industry standard fertilizer (N @ 75%) + Reefsafe®/Agrispon® @ 1L/ha
Treatment 4	Industry standard fertilizer (N @ 50%) + Reefsafe®/Agrispon® @ 1L/ha

Each plot was 20m long, by three rows wide. The plots were laid out consecutively along the length of the rows. A buffer zone of at least 10m was left at the beginning of each row, before the first treated plot. At least two rows were left as 'buffer rows' beside the headland.

METHODS AND MATERIALS

Planting

During land preparation each of the sites had a full soil test conducted. The results of the soil tests for sites 1, 2, and 3 are shown in Appendix 1, 2 and 3 respectively.

The standard pre-plant land preparation was conducted at each field. The respective treatments were marked out along the length of each row.

Planting was conducted at each of the sites using a conventional cane billet planter, as shown in Figure 1.

Figure 1: Planting of site two (dual row).

Reefsafe®/Agrispon® was applied to the plant billets as they were dropping through the planting chute. The Reefsafe®/Agrispon® rate of 1L/ha was determined by the width of the planter shoot furrow.

The four treatments at each site received the same basal application of fertilizer. The nitrogen differences were addressed at the time of side dress fertilizer application.

Post planting

Approximately one month after planting shoot emergence was monitored at each site. In each of the plots one root sample was dug up to compare root growth between the various treatments.

Side dress fertilizer application

One post plant application of fertilizer was applied at each of the sites. This was conducted approximately three months after planting, when the grower was side dressing the rest of the field.

Treatment 1 was applied by each grower with his own fertilizer rig. Treatments 2, 3 and 4 were applied by hand, positioning the fertilizer the same as in treatment one.

The total fertilizer applications for each site are shown in Table 3.

Table 3: fertilizer rates

Site 1	Treatments	N	P	K	Ca	Mg	S
Planting	1, 2, 3 & 4		22		50		28
Total (incl side dress)	1 & 2	116	32	88	50	0	51
	3	87	32	88	50	0	51
	4	58	32	88	50	0	51

Site 2	Treatments	N	P	K	Ca	Mg	S
Planting	1, 2, 3 & 4	15	20	16			10
Total (incl side dress)	1 & 2	141	20	93	0	0	24
	3	105.75	20	93	0	0	24
	4	70.5	20	93	0	0	24

Site 3	Treatments	N	P	K	Ca	Mg	S
Planting	1, 2, 3 & 4	20	22	20			10
Total (incl side dress)	1 & 2	149	22	134	0	0	36
	3	111.75	22	134	0	0	36
	4	74.5	22	134	0	0	36

Harvesting

Harvesting of the trial sites was aligned with commercial harvesting of the fields. The harvests were conducted during August and September. Due to the small scale of the trial, harvesting was carried out by hand.

At each property harvesting commenced from the headland, with each plot being harvested in succession along the treated rows. The harvested section from each plot was the central 14m, of the middle row, of each plot.

The yield of each plot was measured on a weigh trailer. CCS readings were measured from the top, middle and bottom of each stalk, using a refractometer. The total number of stalks in each harvested area was also recorded.

The results of the yield and CCS readings from each site were statistically analysed.

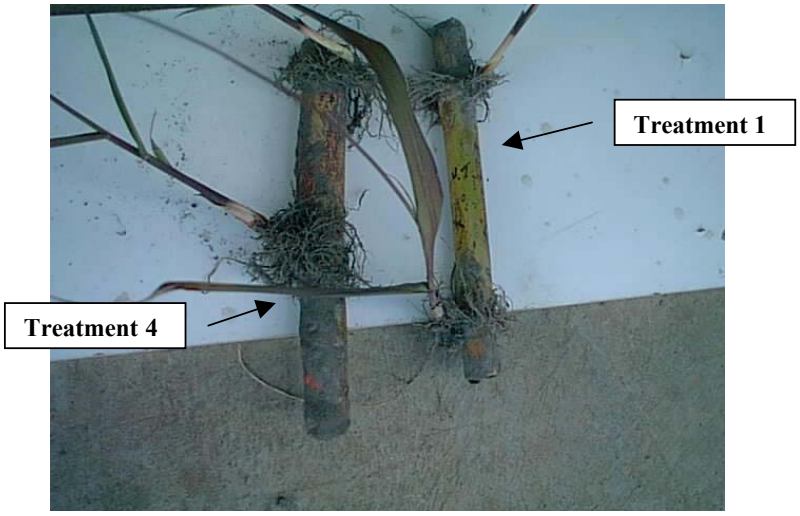
RESULTS

Shoot emergence and root appearance

The results obtained when monitoring shoot emergence and root appearance, were from observations made and measurements recorded. The results were not statistically analysed.

At the spiking stage of the crop, and on the lighter soils (sites two and three), total shoot numbers on the average were slightly lower on the Reefsafe®/Agrispon® treated plots. However on these soil types the plants appeared to have a more aggressive root system. Figure 2 shows a comparison of roots from site 3.

Figure 2: Aggressive root growth on Reefsafe®/Agrispon® treated plots.



On the heavier red volcanic soil (site 1), the plant root systems appeared to be similar across all treatments, one month after planting. Shoot count assessments made at this time on treatments one and four only, show counts were up to 33% better on treatment four.

However, when statistically analysing the total millable stalks at harvest time, there was no significant differences found between any of the four treatments, at any of the sites. Figure 3 shows the progression of shoot counts over time of treatments one and four only, at site 1.

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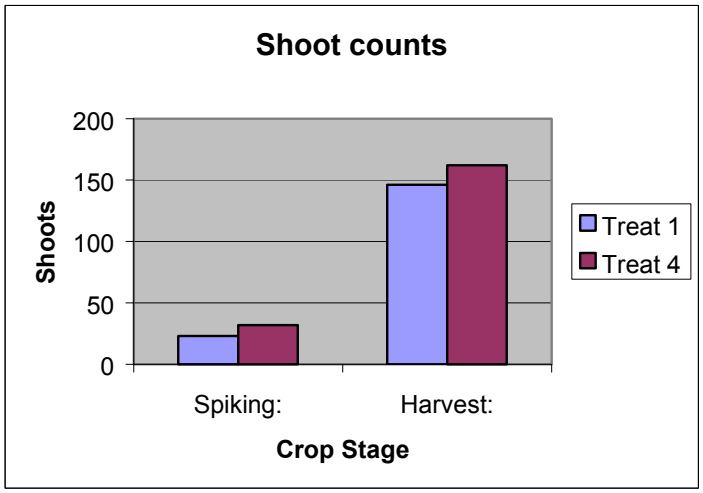
Figure 3: Shoot counts over time.



HARVEST

When statistically analysing the parameters of yield, CCS, and total millable stalks, no significant differences were found between any of the four treatments, at any of the sites. The analysed results from sites 1, 2 and 3 are shown in Appendix 4, 5 and 6 respectively.

DISCUSSION

Nitrogen application studies to many crops can produce varying results, due to the cycle of the nitrogen element. The recent history of crops on the site, length of fallow periods, and environmental conditions, can influence both the amount of residual nitrogen, and the form it is present in.

Crop performance will be limited by the most limiting ingredient. When nutritional elements or water are limited, or if pests and diseases are present above a threshold level, crops will not perform to their full potential, regardless of how much they may have of any one ingredient.

CONCLUSION

Under the conditions of this trial, nitrogen inputs to a plant crop of sugar cane can be reduced by up to 50%, without compromising sugar content or cane yield, when an application of Reefsafe®/Agrispon® is incorporated.

However, in an environment where all elements of the crops are monitored regularly, and the balance of crop inputs adjusted accordingly, Reefsafe®/Agrispon® could have worked to it's full potential, and the trial may have produced different results.