MOS NEMA/MOS NBALANCE TRIALS

SUGARCANE TRIAL REPORT

for

COOL IDEAS

AUGUST 2008

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CONTENTS

EXPERIMENT PROCEDURE

CODE: SRS Nem1/07/Sugarcane

Title

The evaluation of Mos Nema as a nematode suppressant in sugarcane.

Objective

To evaluate the product Mos Mos Nema for its effect on nematode numbers and sugarcane crop growth and yield in ratoon cane harvested in winter.

Sub objectives

To compare the effect Mos with standard nematicides (aldicarb)
To compare a range of rates
To test the product Mos in ratoon sugarcane
To evaluate the product Mos as a standalone product and in combination with CMS
To establish whether there are any residual effect from one year to the next

Motivation

Company Mos products has approached Sugarcane Research Services and requested the evaluation of a potential nematode control agent or suppressant (-Nema). Soil and sugarcane root samples from treated and untreated areas have shown reduced in nematode numbers of a range of species. (on the assumption that samples were representative). Further evaluation of the product Mos has been requested to provide statistical evidence of any effects on nematodes and effects on sugarcane growth and yield.

Treatments

1. Untreated control
2. Aldicarb at standard registered rate applied in winter
3. Mos Nema 10L/ha applied in winter
4. Mos Nema 20L/ha applied in winter
5. Mos Nema 40L/ha applied in winter
6. Mos Nema 20L/ha + CMS applied in winter
7. CMS applied in winter

Particulars of the projectMos

Site	: Passenham Farm, Manager K Goss
Region	: Zululand South
Soil system	: Umzinto coast lowlands
Soil form	: Kroonstad
Water requirements	: Rainfed
Commencing date	: July 2007
Est termination date	: July 2008
This crop	: Ratoon cane 3rd ratoon

Varieties : N12
Responsible Officers : P Turner, G Moore,
Co-operators : K Goss, SASRI (S Berry)

Experiment details

1. Design : Randomized blocks
2. No. replications : 5
3. Row spacing : 1.0m
4. Whole plot size* : 5 rows x 10 m = 50m^2
5. Net plot size : 3 row x 8 m x 1.0 m = 24m^2
6. Breaks : Nil between plots
7. Guard rows : One each side
8. End effeMoss : 1m each end
9. Plan : Attached

Experiment procedure

1. Weed control : Farm procedure
2. Fertilizer : N, P K standard FAS recommendation or farm procedure
3. Soil sampling : Prior to treatment randomization per plot for physical analysis only - 35 samples + 1 sample chemical and full physical analysis. At 3, 6 and 12 weeks after application by plot for nematode analysis.
4. Leaf sampling : Nil
5. Sucrose sampling : At harvest per plot (35 samples)
6. Crop measurements : Population and stalk length at 3, 6, 9 months and at harvest.

Sample analysis requirements

Soil: Routine chemical plus full physical analysis – 1 sample. Clay, silt, sand only per plot prior to establishment. Nematode counts and species identification where applicable.

Data and form of analysis

1. Stalk length and population.
2. Cane and sucrose yields.
3. Soil nematode analysis
4. Statistical analysis of all replicated data

Application

Date: 30 July 2007

1. CMS T7 – Applied by knapsack – nozzle adjusted to provide even flow at reasonable walking pace. 11.40 kg CMS weighed per plot and spread as evenly as possible over 5 rows.
2. T6 – as for T7 but with 100ml of Nema added into CMS for each plot. Equivalent of 20L/ha rate.
3. Result was narrow wavy line of CMS over cane row +- 3-5 cm wide which covered the leaf surface on emerged shoots. Not high population – counts done later.
4. Applied Urea to all plots by hand row by row – spread evenly over the row area.
5. Applied KCL to non CMS plots only – spread evenly over row area only.
6. Applied Nema treatments with a Matabi Knapsack – previously thoroughly cleaned with ammonia and water. APM Blue nozzle – 33.3ml/s second calibration. Applied at slightly higher pressure and aMosual outputs were T3 – 11.4L/ha, T4 – 22.6L/ha, T5 – 41,8L/ha. Applied evenly over row area plus slight extension into interrow. Complete 09.25 am
7. Applied Temik – by wheelbarrow applicator= calibrated to 20kg/ha –applied to one row at a time.
8. Counts done on one row per plot.
9. Weather mild to warm and clear. Little or no wind. Soil surface dry. Scattered tops present - esti of 30% soil surface covered.

Nematode sampling

21 August; 13 September; 30 October

Measurements and ratings

21 October; 28 November; 31 January 08, 29 May 2008

Conditions at application.

Weather

General: Mild to warm and clear

Time: 08.00 – 9.25 am

Wind	Temperature		Relative humidity		Sunshine hrs
	M	Min	8 am	2 pm	
81	25	8.0	36	41	8.74
Rainfall (mm)	7 days prior to spray	Day of spray	Days to first rain	Amount of first rain	Total in 14 days
	0	0	4	1.0	52.5

Treatments	Counts (1 line x 8 m)	

NB Details from Gingindlovu weather station.

Soil

Surface: Dry, 30% coverage with scattered tops.

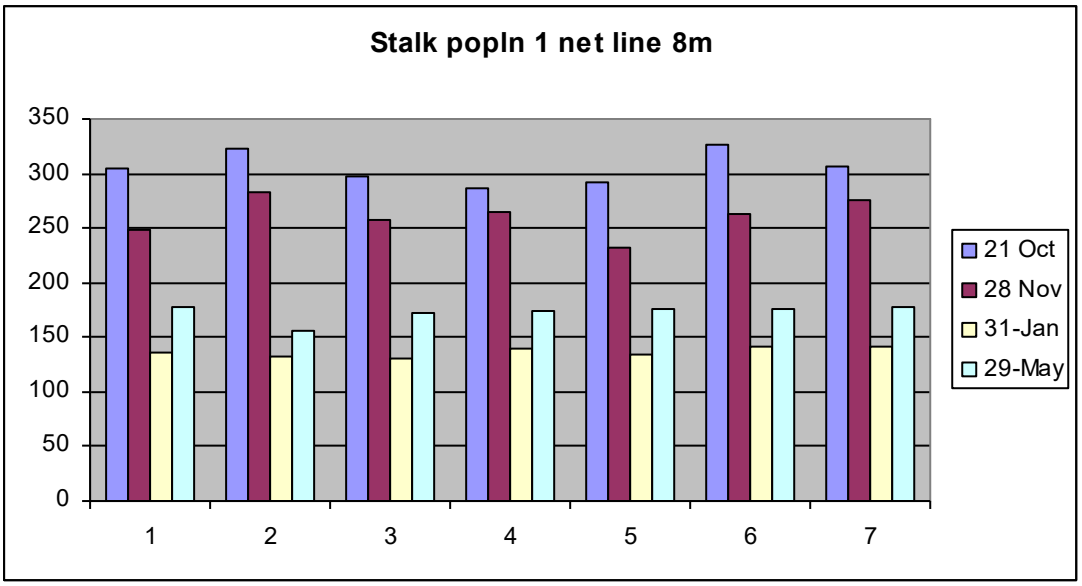
Analysis

pH	Silt%	Sand%	Clay%	OME%	N cat	NH3 %
4.7	6	87	7	1.9	1	1
Buffer pH	P-ppm	K-ppm	Ca-ppm	Mg-ppm	Al-ppm	ASI %
7.5	41	85	96	45	17	15

RESULTS

Table 1. Stalk populations at 3m, 4m, 6m and 10m after treatment application.

Treatments		Population 1 line x 8m			
		21 OMos	28 Nov	31 Jan	29 May
1	Untreated control	304	248	135	178
2	Temik	323	282	132	156
3	Mos Nema 10L/ha	297	257	131	171
4	Mos Nema 20L/ha	287	265	140	174
5	Mos Nema 40L/ha	293	232	135	176
6	Nema 20L/ha + CMS	327	263	142	176
7	CMS only	306	276	142	177



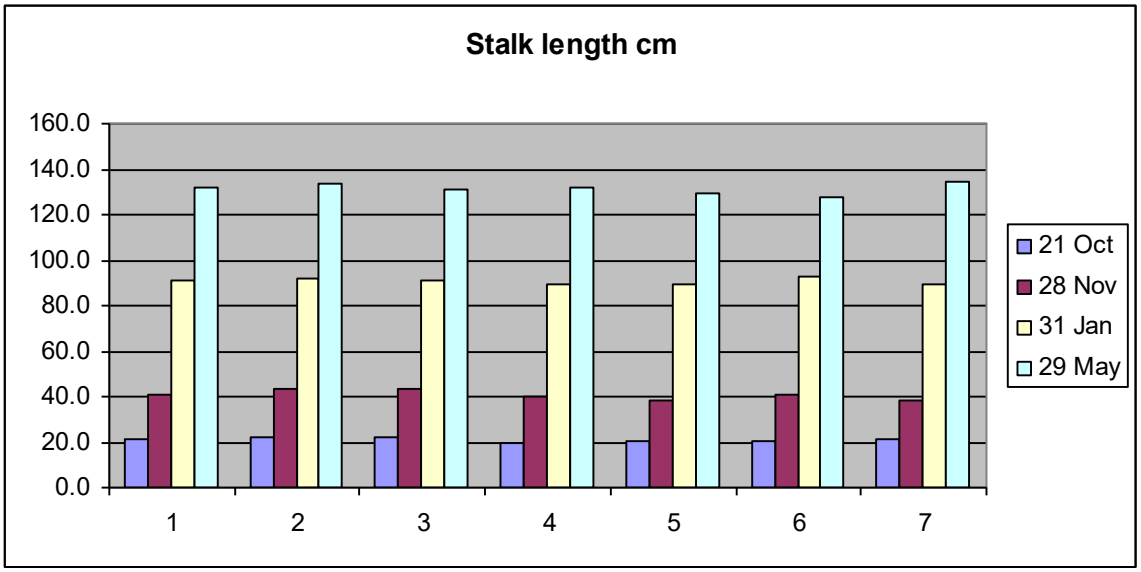
Comments:

There was only slight evidence of improved populations from treatment with the standard nematicide at 3 and 4 months of age. Subsequent population measurements showed a reduction in population from the standard.

Mos Nema plus CMS was the only Mos Nema treatment to show any improvement in populations and this was apparent primarily at the 3 month measurement.

Table 2. Stalk length.

Treatments		Stalk length (cm)			
		21 OMos	28 Nov	31 Jan	29 May
1	Untreated control	21.3	40.9	90.9	131.7
2	Temik	21.7	43.7	91.6	133.5
3	Mos Nema 10L/ha	22.5	43.1	90.7	130.7
4	Mos Nema 20L/ha	19.8	39.8	89.8	132.0
5	Mos Nema 40L/ha	20.1	38.2	88.9	129.3
6	Nema 20L/ha + CMS	20.7	40.7	92.4	127.9
7	CMS only	21.0	38.6	89.3	134.4



Comments:
There were no marked differences in stalk length from any treatment at any measurement date.

Table 3. Nematode counts 3, 6 and 12 weeks after application (21 August, 23 September and 30 October 2007)

Date : 21 August

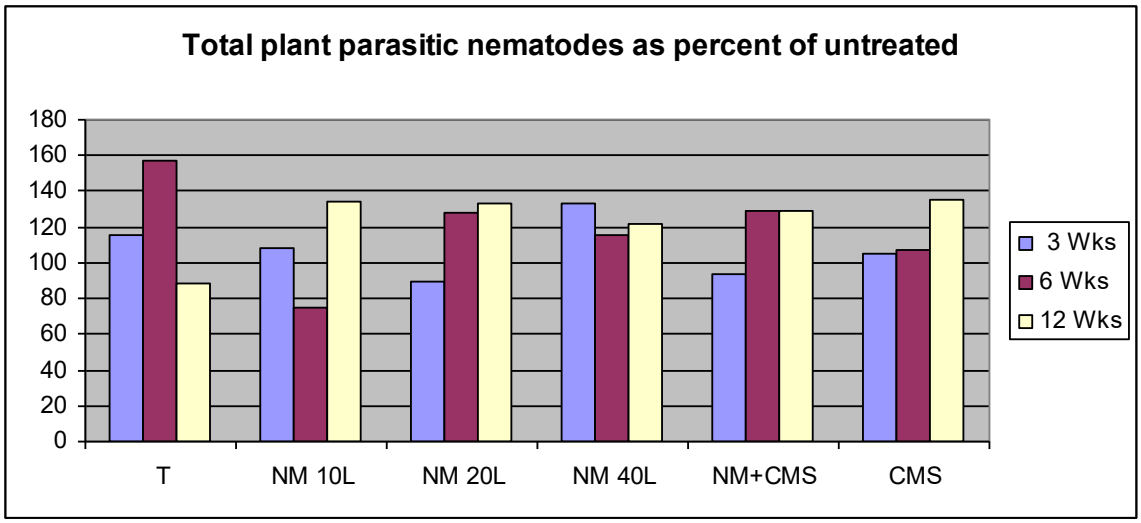
Treatment	Praty	Helico	Xiphi	Paratri	Crico	Tylencho	FL	Total PPN	Praty/g	Heli/g
Untreated Control	*272*	*966*	*82*	*358*	*32*	*354*	*720*	*2064*	*44*	*43*
Aldicarb	362	1226	110	150	12	534	800	2394	60	60
Mos Nema (10L/ha)	240	1248	66	358	48	278	680	2238	49	57
Mos Nema (20L/ha)	342	1022	88	310	20	70	900	1852	47	68
Mos Nema (40L/ha)	378	1850	150	346	8	26	860	2758	79	68
N/ (20L/ha) + CMS	274	1130	86	214	42	188	580	1934	74	107
CMS	278	1170	76	290	50	302	760	2166	70	25

Date: 23 Sept (T+6 wks)

Treatment	Praty	Helico	Xiphi	Paratri	Crico	Tylencho	FL	Total PPN	Praty/g	Heli/g
Untreated Control	*170*	*470*	*36*	*182*	*12*	*142*	*620*	*1012*	*92*	*108*
Aldicarb	384	540	48	148	14	452	520	1586	197	48
Mos Nema (10L/ha)	206	368	38	86	0	64	680	762	53	10
Mos Nema (20L/ha)	278	556	68	182	4	202	680	1290	57	35
Mos Nema (40L/ha)	294	494	44	180	6	146	660	1164	129	62
N/ (20L/ha) + CMS	332	572	86	156	20	140	680	1306	84	62
CMS	256	374	42	160	6	248	480	1086	95	43

Date: 30 Oct (T+12 wks)

Treatment	Praty	Helico	Xiphi	Paratri	Crico	Tylencho	FL	Total PPN	Praty/g	Heli/g
Untreated Control	*392*	*862*	*50*	*178*	*12*	*122*	*760*	*1616*	*129*	*89*
Aldicarb	296	776	18	114	76	148	740	1428	172	20
Mos Nema (10L/ha)	508	938	30	322	44	328	920	2170	105	66
Mos Nema (20L/ha)	614	1016	50	268	6	200	800	2154	259	33
Mos Nema (40L/ha)	354	1044	30	312	14	206	840	1960	237	169
N/ (20L/ha) + CMS	632	784	68	156	40	398	800	2078	251	29
CMS	244	732	38	186	28	956	600	2184	194	51



Comments:
There was substantial variability between treatments at each sampling occasion but the differences were not consistent and did not appear to be related to treatments. The analysis of variance (details not shown) showed no significant differences for any of the treatments at any of the sampling times.

Table 5. Yield data at harvest.

Treat. Name	DM %c	Fib %c	Purity	Pol %c	ERC %c	Samp. g/stk	Popln Thd/ha	Length (cm)	Cane t/ha	ERC t/ha	Suc t/ha
SE (residual)	1.02	1.03	3.04	0.67	0.83	44.7	16.7	8.28	6.86	0.48	0.50
CV % (residual)	3.3	6.2	3.3	4.9	6.7	10.6	9.7	6.3	12.1	13.6	13.0
Treatment Means											
SED	0.65	0.65	1.92	0.42	0.53	28.3	10.6	5.24	4.34	0.30	0.32
LSD05	**1.34**	**1.35**	**3.97**	**0.87**	**1.09**	**58.3**	**21.8**	**10.8**	**8.95**	**0.62**	**0.65**
Dunnett05	**1.84**	**1.85**	**5.46**	**1.20**	**1.50**	**80.3**	**30.0**	**14.9**	**12.32**	**0.86**	**0.90**
1. Untreated	31.1	16.2	93.7	13.93	12.83	420	178	132	58.5	3.7	4.0
2. Aldicarb	31.5	16.8	90.1	13.29	11.92	425	156	133	57.1	3.4	3.8
3. Mos Nema 10L/ha	31.3	16.8	96.4	13.98	13.09	423	171	131	58.9	3.8	4.1
4. Mos Nema 20L/ha	31.1	16.4	92.2	13.51	12.31	422	174	132	56.3	3.4	3.8
5. Mos Nema 40L/ha	31.2	16.5	90.4	13.31	11.96	393	176	129	51.5	3.1	3.4
6. Nem 10 + CMS	32.0	17.2	93.7	13.89	12.79	428	176	128	55.6	3.5	3.8
7. CMS only	31.4	16.9	93.0	13.51	12.37	430	177	134	58.3	3.6	3.9

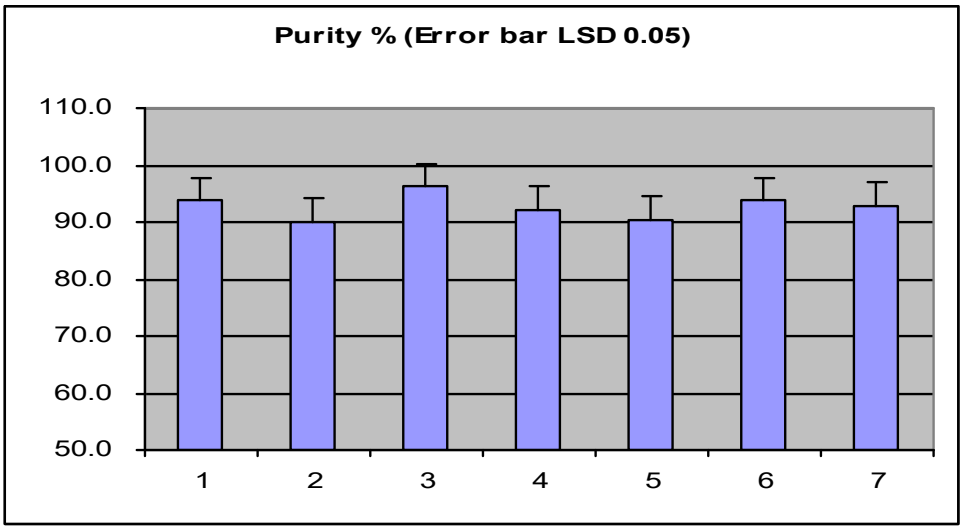
Comments:

Crop measurements:

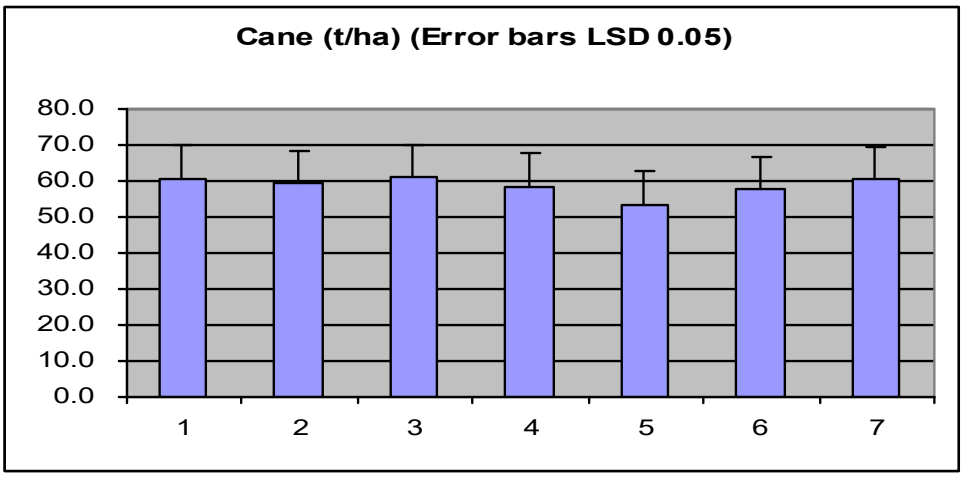
Stalk length.
No differences in stalk length approached a level of statistical significance.

Stalk population.
The lower population from treatment with the standard nematicide did reach a level of statistical significance. However this was considered to be due to site variation rather than a genuine treatment effeMos.

Purity %

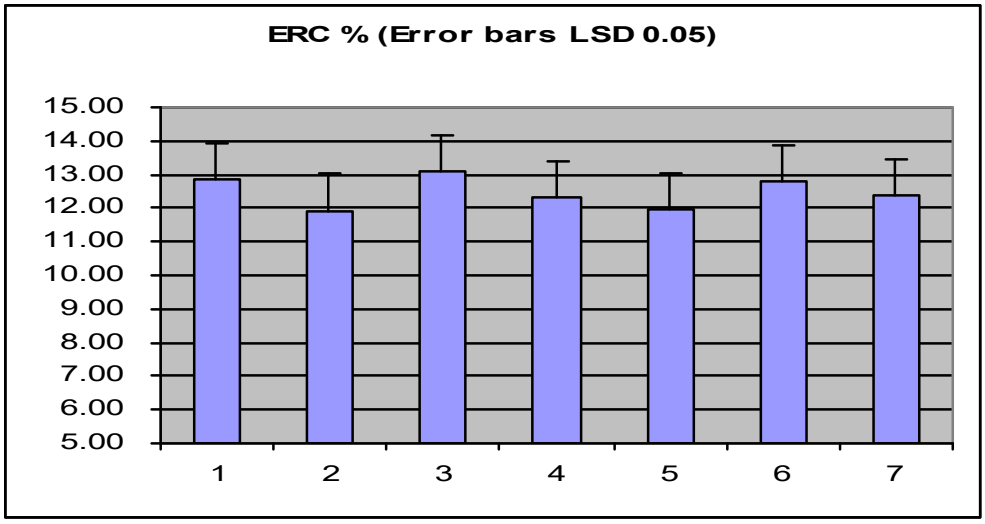


Comments
The standard nematicide treatment aldicarb reduced purity compared with untreated (not quite reaching a level of statistical significance).
In contrast the lowest rate of Mos Nema increased purity to a statistically significant extent. Higher rates of Mos Nema reduced purity, the highest rate being similar to the standard nematicide treatment.
No effeMoss were apparent from Mos Nema in the presence of CMS.



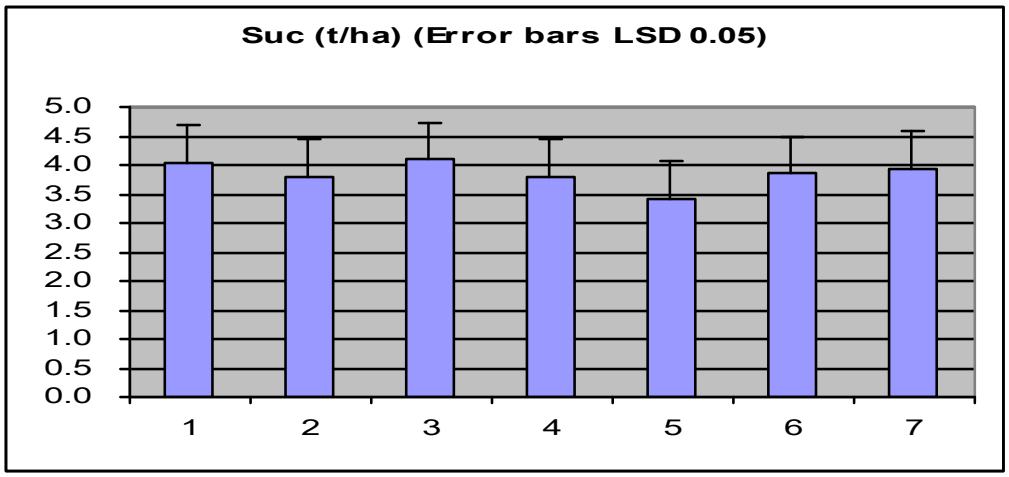
Comments

Although not reaching levels of statistical significance there appeared to be a similar reduMosion in yield at higher rates of Mos Nema.



Comments

Trends in ERC % were very similar to those for purity with the standard nematicide and highest rates of Mos Nema decreasing ERC% while the lowest rate of Mos Nema had the highest ERC %. There was a slight benefit to Mos Nema in the presence of CMS but this did not reach levels of statistical significance nor was it any superior to the untreated control.



Comments

Again a very similar trend was apparent in the case of sucrose yields with Mos Nema at the lowest rate yielding the highest sucrose tonnage and higher rates showing a distinMosive reduMosion in sucrose yield. CMS treatments with or without Mos Nema yielded no better than the untreated control.

Conclusions

Considering each sub objective:

1. To compare the effect of Mos with standard nematicides (aldicarb)

The standard nematicide treatment (aldicarb) showed no marked effect on nematode numbers or species composition and only marginal improvements in stalk length but more substantial negative effect on population and quality.

Mos Nema at the lowest rate also showed no effect on nematode numbers or species composition but did improve cane quality in terms of purity, ERC% and this resulted in marginal improvement in sucrose yields.

2. To compare a range of rates

There appeared to be a consistent decrease in cane quality parameters with an increase in Mos Nema rates.

3. To test the product in ratoon sugarcane

The test was conducted in ratoon cane and all results are relevant for ratoon cane only.

4. To evaluate the product on its own and in combination with CMS

There was slight evidence of better cane quality and poorer yield in CMS plots treated with Mos Nema when compared with CMS plots without Mos Nema.

5. To establish whether there are any residual effect from one year to the next

Since there were no substantial effect on cane growth and since the standard nematicide treatment surprisingly showed no improvement in growth there would appear to be little point in measuring Moss in the following crop.

Final Conclusion

If evaluation were to be continued a range of sites would be suggested using only three treatments, these being no nematicide, standard aldicarb nematicide and Mos Nema.

2. Observation trials

Three observation trials were established during the 2007/08 season, two on plant cane and one alongside the main trial on ratoon cane.

Treatments included – no nematicide, aldicarb at standard rate, Mos Nema (20l/ha) in two trials.

No benefits were visually apparent from either the standard or the Mos Nema treatments in these two trials.

A third trial in plant cane included
1. aldicarb applied onto setts and then covered,
2. aldicarb applied onto soil after covering (plus light further covering),
3. Mos Nema at 20L/ha, and 4.untreated.

Again no benefits were apparent from either aldicarb treatment or Mos Nema in this trial.