A II

South African Sugar Industry
Agronomists' Association

Trial code : BT1/39/5P
Cat. No: 185

Title: Trashing vs burning and raking vs leaving burnt tops scattered.

1. Particulars of the project:

This crop	: 5th Cycle plant crop			
Site	: Field 14, Expt Stn			
Region	: N. Coast coastal			
Soil system	: Umzinto, Coast lowlands			
Soil form/series	: Arcadia/Rydalvale			
Design	: Split plots x 4 reps			
Variety	: N16			
Fertilizer/ameliorants	: N	P	K	
i.f. (Kg/ha)	: 94	70	94	
t/d (kg/ha)	: 66		66	

Soil analysis: Date12/12/90

	pH	OM%	Clay%	Sand%
F0	5.89	5.28	58	28
F	5.42	5.49	57	26

(ppm)

	P	K	Ca	Mg	S
F0	4.6	92	1619	350	25.3
F	11.1	186	1572	350	41.9

Age: 19.1 m (26/11/91-30/6/93)
Rainfall (mm): 877
LTM: 1593
Irrigation : Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking burnt tops off the plots or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments:

Whole plots: B- Burnt
T- Trashed

Sub plots: t- tops scattered
to- tops raked off plots
F- fertilizer
Fo-no fertilizer

3.1 Note on treatments:

At the end of the 10th ratoon of the 4th cycle crop the regrowth was sprayed with glyphosate and the crop killed. The site was left fallow for one year.
The trial was ridged on 25/11/91 and planted with N16
Applied 662 kg/ha Single Supers (10.5) and 400 kg/ha 1.0.1.(47) in the planting furrow to the appropriate plots.
Top dressed with 1.0.1. (47) at 282 kg/ha on 17/1/92 to the appropriate plots.

Rainfall (mm)

Mnths	N	D	J	F	M	A	M	J	J	A	S	O
91-92	14	32	99	55	65	26	0	0	4	31	33	82
LTM	18	111	123	120	117	67	53	32	26	42	65	92
92-93	44	48	100	74	64	52	42	12	TOTAL=877 mm			
LTM	107	111	123	120	117	67	53	32	TOTAL=1593 mm			

4. Results:

Table 1. Yield and other crop characteristics at harvest.

Treatments	Cane (t/ha)	Suc%cane	Suc (t/ha)	Stalk popln. ($X10^{-3}$/ha)	Stalk length (cm)
BtoF	66	13.19	8.7	111	178
BtF	71	13.42	9.5	115	186
BtoFo	50	14.91	7.4	97	176
BtFo	54	14.67	7.9	97	173
TF	75	13.35	10.0	113	183
TFo	59	14.28	8.4	99	178
Mean	64	13.93	8.8	105	179

Table 7. Eldana and Sesamia survey

Treatment	% Stalks damaged	Eldana/ 100 stalks	Sesamia /100 stalks	Total joints	% Joints bored
BtoF-Burnt tops raked + Fert	75.0	14.0	2.0	23.8	12.4
BtF -Burnt tops scattered + Fert	76.5	15.0	3.0	22.8	14.0
BtoFo-Burnt tops raked - Fert	23.5	1.5	0.0	24.1	2.5
BtFo-Burnt tops scattered - Fert	32.5	3.5	0.5	23.7	3.9
TF - Trash blanket + Fert	72.8	27.5	3.8	25.7	10.5
TFo - Trash blanket - Fert	28.3	5.5	0.3	26.4	2.3
	51.2	12.5	1.7	24.8	7.3

Table 8. Treatment responses

Comparisons	Cane (t/ha)	Suc % cane	Suc (t/ha)	Eldana/ 100 stalks	% Stalks damaged
Trash - Burnt (Fertilized)	6.4	0.04	0.9	13	-3
Trash - Burnt tops scattered(Fert)	3.8	-0.07	0.5	12.5	-3.7
Burnt scattered - Raked (Fertilized)	5.3	0.23	0.8	1	1.5
Fertilizer - No Fertilizer (Trash)	16.1	-0.93	1.6	22	44.5
Fertilizer - No Fertilizer (Burn scatt)	17.2	-1.25	1.6	11.5	44

Table 8. Third leaf dm% analysis @ 2.9, 4.2, 5 and 12.2 months

Treatments	Feb 2.9 m	Mar 4.2 m	Apr 5.0 m	Dec 12.2 m
		N dm%		
BtoFo	1.71	1.79	1.72	1.44
BtFo	1.72	1.37	1.28	1.52
TFo	1.83	1.89	1.83	1.53
BtoF	1.87	1.91	1.87	1.54
BtF	1.85	2.00	1.85	1.55
TF	1.88	1.97	1.88	1.60
		P dm%		
BtoFo	0.10	0.10	0.10	0.09
BtFo	0.12	0.09	0.09	0.09
TFo	0.10	0.10	0.10	0.08
BtoF	0.16	0.17	0.16	0.13
BtF	0.16	0.18	0.17	0.14
TF	0.17	0.18	0.17	0.14
		K dm%		
BtoFo	0.73	0.78	0.73	0.68
BtFo	0.86	0.65	0.66	0.72
TFo	0.84	0.94	0.84	0.69
BtoF	1.27	1.29	1.27	1.19
BtF	1.33	1.37	1.33	1.21
TF	1.32	1.43	1.32	1.18

Comments

General

Rainfall was extremely low and amounted to only 55% of the LTM. This was the case throughout the crop life with no months having greater than LTM.

The field was left fallow after treating the cane regrowth with Roundup and only planted 12 months after the previous harvest.

Only residual effects of treatments could be measured in this plant crop in which a new variety N16 was planted.

Burnt tops scattered vs raked

Residual effects were apparent and there was an advantage in cane and sucrose yields to plots which had previously had tops left scattered.

Fertilizer

There was a much smaller response to fertilizer in this plant crop and plots which received no fertilizer yielded on average 77% of fertilized plots. However crop yields were generally low due to the dry conditions (3.33 tc/ha/m).

There was also evidence of a decrease in sucrose content associated with fertilizer treatments.

Trash

There was an advantage of 3.8 tc/ha and 0.5 ts/ha to trash over burnt tops scattered in terms of the residual effects.

Eldana and Sesamia

A considerable increase in numbers of both species was associated with fertilizer application. It is possible that this was to some extent responsible for the smaller difference between fertilized and unfertilized plots in this crop. There was also a clear increase in numbers in plots which had previously been trashed compared with those that were previously burnt.

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South African Sugar Industry
Agronomists' Association

Trial code : BT1/39/5R1
Cat. No: 185

Title: Trashing vs burning and raking vs leaving burnt tops scattered.

1. Particulars of the project:

This crop	: 5th Cycle Ratoon 1	Soil analysis: Date 9/7/93
Site	: Field 14, Expt Stn	pH Clay% Sand%
Region	: N. Coast coastal	F05.67 58 28
Soil system	: Umzinto, Coast lowlands	F 5.05 57 26
Soil form/series	: Arcadia/Rydalvale	(ppm)
Design	: Split plots x 4 reps	P K Ca Mg
Variety	: N16	F0 4 146 >1650>350
Fertilizer/ameliorants	: N P K	F 18 248 >1650>350
t/d (kg/ha)	: 140 60 140	Age: 14.9 m (30.6.93-28.9.94)
		Rainfall (mm):1018= 94%
		LTM: 1088
		Irrigation : Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking burnt tops off the plots or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments:

Whole plots: B- Burnt
T- Trashed

Sub plots: t- tops scattered
to- tops raked off plots
F- fertilizer
Fo-no fertilizer

3.1 Note on treatments:

Tops raked and scattered or trashed according to treatments. %Ground cover provided by treatments were:
TF=98, TF0=77, BtF=48, BtF0=51, Bt0F=5, Bt0F0=5
Top dressed with 5.1.5. (46) at 670 kg/ha on 9/7/93 to the appropriate plots.

Rainfall (mm)

Mnths	J	A	S	O	N	D	J	F	M	A	M	J
93-94	48	26	101	135	72	198	89	25	165	22	8	18
LTM	28	41	65	92	106	110	123	121	117	67	52	32
92-93	75	35	3	Total = 1018								
LTM	28	41	65	Total = 1087								

4. Results:

Table 1. Yield and other crop characteristics at harvest.

Treatments	Cane (t/ha)	Suc%cane	Suc (t/ha)	Stalk popln. ($X10^{-3}$/ha)	Stalk length (cm)
BtoF	94	14.61	13.7	127	204
BtF	96	14.28	13.7	125	201
BtoFo	55	15.56	8.5	82	176
BtFo	55	16.01	8.8	94	181
TF	96	14.05	13.5	128	203
TFo	60	14.95	9.0	93	176
SED	1.52	0.45	0.55	1.53	1.37
LSD (0.05)	3.3	0.97	1.2	3.34	3.0

Table 2. Treatment responses

Comparisons	Cane (t/ha)	Suc % cane	Suc (t/ha)
Trash - Burnt (Fertilized)	1.4	-0.4	-0.2
Trash - Burnt tops scattered(Fert)	0	-0.23	-0.2
Burnt scattered - Raked (Fertilized)	2.7	-0.33	0.0
Fertilizer - No Fertilizer (Trash)	36,4	-0.9	4.5
Fertilizer - No Fertilizer (Burn scatt)	41.5	-1.73	4.9

Table 3. Eldana and Sesamia survey and flower rating.

Treatment	Flower rating	Eldana/ 100 stalks	Sesamia /100 stalks	% Joints bored
BtoF-Burnt tops raked + Fert	0.0	2.8	0.5	10.6
BtF -Burnt tops scattered + Fert	0.0	1.8	1.5	10.6
BtoFo-Burnt tops raked - Fert	5.0	0.3	0.0	0.65
BtFo-Burnt tops scattered - Fert	3.3	0.0	0.0	0.65
TF - Trash blanket + Fert	0.0	2.0	1.0	8.9
TFo - Trash blanket - Fert	1.8	0.8	0.3	2.5

Comments

General
Rainfall was 94% of LTM.

Burnt tops scattered vs Raked
There was no sucrose yield advantage to burnt tops scattered over tops raked.

Fertilizer
Non fertilized plots yielded 60% of fertilized plots in this crop. Trash plots without fertilizer outyielded burnt plots without fertilizer.

Trash
There was no advantage in sucrose yield to trash over burnt tops scattered.

Eldana
There was a clear although small increase in Eldana effects with fertilizer application. However there was no difference between trashed and burnt plots.

South African Sugar Industry
Agronomists' Association

Trial code : BT1/39/5R2
Cat. No: 185

Title: Trashing vs burning and raking vs leaving burnt tops scattered.

1. Particulars of the project:

This crop	: 5th Cycle Ratoon 2	Soil analysis: Date 7/10/94
Site	: Field 14, Expt Stn	pH Clay% Sand%
Region	: N. Coast coastal	F05.40 58 28
Soil system	: Umzinto, Coast lowlands	F 4.89 57 26
Soil form/series	: Arcadia/Rydalvale	(ppm)
Design	: Split plots x 4 reps	P K Ca Mg
Variety	: N16	F0 2 122 >1650>350
Fertilizer/ameliorants	: N P K	F 17 246 >1650>350
t/d (kg/ha)	: 167 33 167	Age: 11.5 m (28.9.94-12.9.95)
		Rainfall (mm) 969= 106%
		LTM: 915
		Irrigation : Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking burnt tops off the plots or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments:

Whole plots: B- Burnt
T- Trashed
Sub plots: t- tops scattered
to- tops raked off plots
F- fertilizer
Fo-no fertilizer

3.1 Note on treatments:

Tops raked and scattered or trashed according to treatments.
Top dressed with 5.1.5. (46) at 800 kg/ha on 7/10/94 to the appropriate plots.

Rainfall (mm)

Mnths	0	N	D	J	F	M	A	M	J	J	A	S
94-95	149	38	137	78	21	255	152	43	78	10	5	3
LTM	92	106	110	123	121	117	67	52	32	28	41	26
TOTAL Rainfall = 969 (106%LTM)												
LTM TOTAL = 915												

4. Results:

Table 1. Yield and other crop characteristics at harvest.

Treatments	Cane (t/ha)	Suc%cane	Suc (t/ha)	Stalk popln. ($X10^{-3}$/ha)	Stalk length (cm)
BtoF	67	12.86	8.7	125	157
BtF	75	13.41	10.0	143	171
BtoFo	33	14.35	4.7	99	131
BtFo	41	14.96	6.1	107	146
TF	91	13.17	11.9	147	191
TFo	50	13.93	6.9	106	152
SED	5.42	0.55	0.71	10.0	10.9
LSD (0.05)	11.8	1.2	1.56	21.8	23.7

Table 2. Treatment responses

Comparisons	Cane (t/ha)	Suc % cane	Suc (t/ha)
Trash - Burnt (Fertilized)	20	0.035	2.55
Trash - Burnt tops scattered(Fert)	16	0.24	1.9
Burnt scattered - Raked (Fertilized)	8	0.55	1.3
Fertilizer - No Fertilizer (Trash)	41	-0.76	5
Fertilizer - No Fertilizer (Burn scatt)	34	-1.55	3.9

Table 3. Leaf analysis

Treatments	N%	P%	K%	S%	Ca%	Mg %	Zn ppm
BtF	1.61	0.14	1.41	0.19	0.28	0.16	17
BtFo	1.36	0.10	0.89	0.16	0.25	0.17	19
BtoF	1.56	0.13	1.24	0.17	0.31	0.18	21
BtoFo	1.39	0.09	0.71	0.17	0.26	0.17	21
TF	1.73	0.17	1.56	0.17	0.25	0.15	18
TFo	1.60	0.11	0.96	0.17	0.29	0.17	21
F	1.66	0.15	1.44	0.17	0.27	0.16	19
Fo	1.49	0.10	0.81	0.17	0.27	0.17	21

Comments

General

Rainfall was 106% of LTM but was well below LTM for November, January,February and well above LTM for October, March, April and June.

Burnt tops scattered vs Raked

There was a response of 8 tons cane and 1.3 tons sucrose/ha to burnt tops scattered over tops raked.

Fertilizer

Non fertilized plots yielded 53% of fertilized plots in this crop. Trash plots without fertilizer outyielded burnt plots without fertilizer.

Trash

There was a large response to trash over burnt tops scattered in cane and sucrose yield.

A possible explanation of these favourable responses to trash is that the rainfall was particularly low in the good growing months of January and February and hence the benefits of conservation of the slightly above LTM December rainfall by the trash could have resulted in the superior yields.

Leaf analysis

There is some evidence of better leaf uptake of nitrogen and phosphorus in trashed plots. However phosphorus was below threshold in all treatments.

A 11

South African Sugar Industry
Agronomists' Association

Trial code : BT1/39/5R3
Cat. No: 185

Title: Trashing vs burning and raking vs leaving burnt tops scattered.

1. Particulars of the project:

This crop	: 5th Cycle Ratoon 3	Soil analysis: Date 18/9/95
Site	: Field 14, Expt Stn	pH Clay% Sand%
Region	: N. Coast coastal	F05.49 58 28
Soil system	: Umzinto, Coast lowlands	F 4.82 57 26
Soil form/series	: Arcadia/Rydalvale	(ppm)
Design	: Split plots x 4 reps	P K Ca Mg
Variety	: N16	F0 1.4 116 1624>350
Fertilizer/ameliorants	: N P K	F 10.5 213 1370 341
t/d (kg/ha)	: 140 21 0	Age: 11.9 m (12.9.95-10.9.96)
		Rainfall (mm) 1300 = 137% of LTM (950)
		Irrigation : Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking burnt tops off the plots or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments:

Whole plots: B- Burnt
T- Trashed
Sub plots: t- tops scattered
to- tops raked off plots
F- fertilizer
Fo-no fertilizer

3.1 Note on treatments:

Tops raked and scattered or trashed according to treatments.
Top dressed with Urea(46) and Single Supers (10.5) at 304 kg/ha and 200 kg/ha respectively on 28.9.95 to the appropriate plots.

Rainfall (mm)

Mnths	S	O	N	D	J	F	M	A	M	J	J	A
95-96	6	101	85	274	270	199	107	31	12	11	193	11
LTM	39	92	106	110	123	121	117	67	52	32	28	41
96	4	TOTAL = 1300 (137% LTM)										
LTM	22	TOTAL = 950										

4. Results:

Table 1. Yield and other crop characteristics at harvest.

Treatments	Rating *	Cane (t/ha)	Suc%cane	Suc (t/ha)	Stalk popln. ($X10^{-3}$/ha)	Stalk length (cm)
BtoF	5.0	93	14.16	13.1	148	194
BtF	4.6	96	13.93	13.5	140	188
BtoFo	2.8	30	14.51	4.4	123	145
BtFo	3.5	38	14.77	5.6	93	145
TF	4.6	84	13.50	11.3	126	168
TFo	3.1	40	14.50	5.8		
SED		5.33	0.42	0.77	16.6	11.3
LSD (0.05)		11.6	0.91	1.68	36.1	24.5

* Vigour rating at harvest 1-5, 1=very poor 5=very good.

Table 2. Treatment responses

Comparisons	Cane (t/ha)	Suc % cane	Suc (t/ha)
Trash - Burnt (Fertilized)	-10.5	-0.55	-2.0
Trash - Burnt tops scattered(Fert)	-12	-0.43	-2.2
Burnt scattered - Raked (Fertilized)	3	-0.23	0.4
Fertilizer - No Fertilizer (Trash)	44	-1.00	5.5
Fertilizer - No Fertilizer (Burn scatt)	58	-0.15	7.9

Table 3. Leaf analysis

Treatments	N%	P%	K%	S%	Ca%	Mg %	Zn ppm
BtF	1.51	0.18	1.14	0.17	0.27	0.19	18
BtFo	1.48	0.15	0.80	0.16	0.29	0.20	18
BtoF	1.51	0.17	0.91	0.17	0.29	0.19	19
BtoFo	1.50	0.11	0.64	0.16	0.29	0.20	21
TF	1.72	0.21	1.28	0.19	0.26	0.19	17
TFo	1.57	0.15	0.83	0.16	0.30	0.19	20
F	1.63	0.19	1.15	0.18	0.27	0.19	18
Fo	1.53	0.14	0.78	0.16	0.30	0.19	20

Comments

General
Rainfall was 137% of LTM and was well above LTM for December, January, February and July but below LTM for April, May and June.

Burnt tops scattered vs Raked
There was a response of 3 tons cane and 0.4 tons sucrose/ha to burnt tops scattered over tops raked.

Fertilizer
Results show a response of 58 tons/ha to fertilizer in burnt plots and 44 tc/ha in trashed plots.

Trash
There was a negative response in this crop (-10.5 tons cane and -2.0 tons sucrose/ha) to trash over burnt tops scattered in cane and sucrose yield.

Leaf analysis
There are clear differences between fertilized and non fertilized treatments in nitrogen, phosphorus and potassium values and a slight benefit in these values in trashed non fertilized compared with burnt non fertilized plots.

A(ii)

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code : BT 1/39/4R3
Cat. No.: 185

TITLE: Trashing versus burning and either raking or leaving burnt tops scattered.

1. Particulars of the project

This crop : 3rd ratoon

Site : Experiment Station
Mount Edgecombe

Region : North Coast Coastal

Soil system : Umzinto Coast
Lowlands

Soil form/series: Arcadia/Rydalvale

Design : Split plots
x 4 reps

Variety : NCo 376

Fertilizer : N P K
153 30 153

Soil analysis: Date: 6/11/81

	pH	Clay %
- Fert	6,0	>30
+ Fert	5,6	>30

	P	K	Ca	Mg	Al
- Fert	3	85	1760	>220	-
+ Fert	11	144	1744	>220	-

Age: 13,3 m Date: 2/10/81-10/11/82

Rainfall: 914 mm L.T.M.: 1107 mm

Irrigation: NIL

2. Objectives:

To evaluate the longterm effects of trashing compared with burning and either raking off the burnt tops or leaving the burnt tops scattered on the plots, in the presence and absence of fertilizer.

3. Treatments:

Whole Plots: B = Burnt
T = Trashed

Sub Plots t = burnt tops left scattered
to = burnt tops raked off
F = fertilizer applied
Fo = no fertilizer applied

3.1 Notes on treatments

- Burnt tops left scattered covered about 35% of the soil surface.
- Burnt tops were either raked or scattered 13 days after harvest on 15/10/81 and fertilizer applied to the F treatments on 6/11/81

Rainfall (mm)

Month	O	N	D	J	F	M	A	M	J	J	A	S	O	N
81/82	74	149	43	165	53	103	45	20	9	6	3	31	174	38
LTM	85	104	107	115	113	113	71	51	32	25	41	62	85	104

4. Results

4.1 Yield and crop characteristics at harvest

Treatments	t/ha cane	Suc % cane	t/ha suc	Stalk counts $x10^{-3}$/ha	Stalk length (cm)
BF to :Burnt tops raked + fert	80	13,6	10,9	114	173
BFt :Burnt, tops scattered + fert	94	13,7	12,9	121	184
BFo to :Burnt, tops raked, no fert	45	14,2	6,3	86	150
BFo t :Burnt, tops scattered, no fert	41	14,9	6,2	83	145
TF :Trash + fert	96	14,0	13,5	118	189
TFo :Trash no fert	55	14,8	8,1	89	158
Mean	70	14,2	9,9	102	168

4.2 Burnt and trashed x fertilizer

Tons cane/ha

Treatments		F0	F1	Response (F1-F0)	LSD
Burnt	Tops raked	45	80	35	14,6 (0,05)
	Tops scattered	41	94	53	19,9 (0,01)
	Mean	43	87	44	10,3 (0,05)
Trashed		55	96	41	

Suc % cane

	Treatments	F0	F1	Response (F1-F0)	LSD
Burnt	Tops raked	14,2	13,6	-0,6	0,88 (0,05)
	Tops scattered	14,9	13,7	-1,2	1,60 (0,01)
Mean		14,5	13,6	-0,9	0,62 (0,05)
Trashed		14,8	14,0	-0,8	0,84 (0,01)

Tons Sucrose/ha

	Treatments	F0	F1	Response (F1-F0)	LSD
Burnt	Tops raked	6,3	10,9	4,6	2,60 (0,05)
	Tops scattered	6,2	12,9	6,7	3,55 (0,01)
Mean		6,2	11,9	5,7	1,84 (0,05)
Trashed		8,1	13,5	5,4	2,50 (0,01)

4.3 Trash versus burn

Treatments	tc/ha	Suc %	t suc/ha
Trash	75	14,4	10,8
Burn	65	14,1	9,1
SE±	2,5	0,20	0,33
LSD (0,05)	11,3	0,88	1,48

4.4 Burnt tops scattered versus tops raked off

Treatments	tc/ha	Suc % cane	t/suc/ha
Burnt tops left scattered	68	14,3	9,5
Burnt tops raked off	62	13,9	8,6
SE±	3,46	0,21	0,62
LSD (0,05)	10,3	0,62	1,84

3rd leaf nutrient values: Sampled at 4,4 months(12/2/82)
5,7 months(23/3/82)

Treatments	% D.M.									
	N		P		K		Ca		Mg	
	4m	6m	4m	6m	4m	6m	4m	6m	4m	6m
Unfertilized raked	1,46	1,53	0,16	0,17	0,68	0,71	0,33	0,31	0,31	0,27
Unfertilized scattered	1,52	1,48	0,18	0,18	0,87	0,82	0,32	0,28	0,28	0,24
Unfertilized trash	1,52	1,58	0,17	0,18	0,92	0,93	0,32	0,28	0,27	0,24
Mean	1,50	1,53	0,17	0,18	0,82	0,82	0,32	0,29	0,29	0,25
Fertilized raked	2,06	1,81	0,24	0,21	1,11	1,26	0,43	0,26	0,36	0,26
Fertilized scattered	1,94	1,77	0,23	0,21	1,19	1,19	0,40	0,26	0,35	0,26
Fertilized trash	2,04	1,86	0,24	0,21	1,28	1,24	0,37	0,27	0,36	0,28
Mean	2,01	1,81	0,24	0,21	1,19	1,23	0,40	0,26	0,36	0,27

Comments

- Trash: Rainfall was close to average during the first four months of the crop and thereafter it was well below the L.T.M. Being a summer start the crop responded well to trash.

  From Table 4.1: response to trash in the presence of fertilizer TF-BFto = 16 tc/ha or 14,4 tc/ha/annum

  From Table 4.3: overall response to trash = 10 ± 2,5 tc/ha or 9,0 tc/ha/annum

  Cane in trashed plots was slightly superior (n.s.) in cane quality than was the case in the burnt plots, and the same was true where tops had been left scattered compared with raked. Yield in ts/ha was therefore superior (P=0,05) in the trashed plots. Stalk populations were lower (118 thousand $^{-ha}$ is low for NCo 376) but stalks were longer in the trashed plots compared with those where the trash was burnt.

- Burnt tops left scattered or raked: from Table 4.1: response to scattered tops compared with tops raked in the presence of fertilizer BFt-BFto = 14 tc/ha or 12,6 tc/ha/annum

  From Table 4.4.: response to scattered tops compared with raking in the presence and absence of fertilizer = 6 ± 3,5 tc/ha or 5,4 tc/ha/annum.

The difference in terms of ts/ha was 0,9 ± 0,62 (n.s.)

- Fertilizer : there was a response to fertilizer of 43 tc/ha or 91% and because of the depressing effect of fertilizer on S% C the response to fertilizer was slightly less, 81% or 5,56 ts/ha. The response to fertilizer appeared to be greatest where tops were left scattered, a slightly lower response in the presence of a trash blanket and the lowest response where the tops were raked off.

  Leaf analyses showed severe deficiencies of N & K with marginal P levels where no fertilizer had been applied in contrast to adequate levels where the cane had been fertilized. There appeared to be no interaction with the burning/trashing treatments.

  The soil P and K levels have been reduced in the no fertilizer plots to 3 and 85 ppm respectively over the last 43 years of cropping. Despite the low levels, 47 tc/ha were produced or 42 tc/ha/annum with no fertilizer applied.

PKM/IS
15 November 1983

A(ii)

BURNING VS TRASHING, WITH AND WITHOUT FERTILIZER.

Tm

Catalogue No.: 185
Code No.: BT1/39/3R4
This crop: 4th Ratoon
Site: Mt. Edgecombe
Altitude: 300ft.
Soil: Rydalvale clay
Design: Split plot (4 reps.)
Variety: N:Co.376
Fertilizer: N P K
100 34 100
Water regime: Dryland.

Soil Analysis:

pH	OM%	p.p.m. P	K	Ca	Mg
519	8.15	7.5	160	2456	699

Age: P : 21 mths. (10/57-7/59)
1R : 24 mths. (7/59-7/61)
2R : 24 mths. (7/61-7/63)
3R : 12 mths. (7/63-7/64)
4R : 23 mths. (7/64-6/66)

Object: To evaluate the long-term value of trashing compared with burning, and to determine whether trashing conserves nutrients.

Treatments: Whole plots: (i) Trashing
(ii) Burning

Sub-plots: (i) Fertilized as given above.
(ii) No fertilizer applied.

Results:

Treatment	Tons cane per acre			Sucrose % Cane			Tons sucrose per acre		
	Burnt	Trashed	Mean	Burnt	Trashed	Mean	Burnt	Trashed	Mean
Fertilized	37.1	57.2	47.1	14.6	14.2	14.4	5.42	8.15	6.78
Not fertilized	24.7	39.9	32.3	14.6	15.1	14.8	3.60	6.02	4.81
Mean	30.9	48.5	39.7	14.6	14.7	14.6	4.51	7.08	5.79
L.S.D. trash means, P = .05:			9.53			0.86			1.13
P = .01:			17.49			1.58			2.07
L.S.D. fert. means, P = .05:			4.45			0.57			0.80
P = .01:			6.17			0.79			1.11
C.V. %			14.8			5.2			18.2

Treatment	Length of stalk,cm.			Mean stalk diam.,mm.			Stalks/ac. x 10^{-3}		
	Burnt	Trashed	Mean	Burnt	Trashed	Mean	Burnt	Trashed	Mean
Fertilized	134.7	177.1	155.7	22.4	25.6	24.0	58.2	53.7	55.9
Not fertilized	107.0	154.2	130.8	20.8	22.8	21.8	51.6	51.0	51.3
Mean	120.8	165.7	143.3	21.6	24.2	22.9	54.9	52.3	53.6
L.S.D. trash means, P = .05:			29.5			2.34			5.06
P = .01:			54.6			4.30			9.28
L.S.D. fert. means, P = .05:			10.4			0.61			2.79
P = .01:			14.6			0.84			3.87
C.V. %			9.6			3.5			6.9

COMMENTS:

These are the largest responses to trashing ever obtained in this experiment, from which ten crops have now been harvested. The mean response to trashing compared with burning is now 4.82 tons cane/acre per annum or 0.66 tons sucrose/acre per annum. The gypsum block data continue to indicate that the benefit due to trash derives mainly through moisture conservation.

31st August, 1966.

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code No : BT1/39/4R5
Cat No : 185

Title: Trashing versus burning and either raking or leaving burnt tops scattered.

1. Particulars of the project

This crop	:	5th ratoon
Site	:	Exp Station - Mt Edgecombe
Region	:	North Coast - coastal
Soil system	:	Umzinto Coast Lowlands
Soil form	:	Arcadia/ Rydalvale
Design	:	Split plots x 4 reps
Variety	:	NCo376
Fertiliser	:	N P K 153 30 253

Soil analysis date: 2/7/84

pH	OM%	Clay%	PDI
5,54	5,32	>30	

ppm

P	K	Ca	Mg	Zn	Aℓ
7	112	>1800	>220	2,1	1,0

Age: 13,9 months Dates: 26/6/84 - 22/8/85

Rainfall: 1060 mm LTM: 1003 mm

Irrigation: Nil

Soil description: Black montmorillonitic clay topsoil with tongues of clay merging with rocks.

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking off the burnt tops or leaving them scattered on the plots, in the presence or absence of fertiliser.

3. Treatments

Whole plots:
B = burnt
T = trashed

Sub-plots:
t = burnt tops left scattered
to = burnt tops raked off
F = fertiliser applied
Fo = no fertiliser applied

3.1 Notes on treatments:

- Burnt tops left scattered, covered ± 70% of the soil surface depending on whether the plot was fertilised or not
- Burnt tops were either raked or scattered 6 days after harvest
- Fertiliser was applied in the form of 5:1:5 (42) + KCL, 8 weeks after harvest

4. Rainfall (mm):

Year	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1984/85	105,4	53,2	14,5	77,5	73,0	40,5	162,7	467,7	11,4	3,6	30,0	14,7
LTM	26,8	41,7	61,3	86,9	106,5	107,7	123,1	114,7	111,5	70,7	51,4	32,1
1985	3,0	2,5	Total:		1059,7 mm							
LTM	26,8	41,7	Total:		1002,9 mm							

5. Results:

5.1 Yield and crop characteristics at harvest.

Treatments	Cane (t/ha)	Sucrose (% cane)	Sucrose (t/ha)	Stalk count (x 10^{-3}/ha)	Stalk length (cm)
BFto : Burnt tops raked + fert	83,6	14,01	11,8	115	159
BFt : Burnt tops scattered + fert	92,2	14,61	13,5	125	182
BFoto : Burnt tops raked, no fert	34,4	14,84	5,1	103	157
BFot : Burnt tops scattered, no fert	34,4	15,44	5,3	116	169
TF : Trash + fert	92,4	13,30	12,4	138	198
TFo : Trash, no fert	46,4	15,51	7,2	95	150
Mean	65,3	14,56	9,3	116	170

5.2 Burnt and trashed x fertiliser.

Cane (t/ha)					
Treatments		Fo	F1	Response (F1-Fo)	SE
Burnt:	Tops raked	34,4	83,6	49,2	± 5,4
	Tops scattered	34,4	92,2	57,8	
	Mean	34,4	87,9	53,5	± 3,9
Trashed:		46,4	92,4	46,0	

Sucrose (% cane)					
Treatments		Fo	F1	Response (F1-Fo)	SE
Burnt:	Tops raked	14,84	14,01	- 0,83	± 0,80
	Tops scattered	15,44	14,61	- 0,83	
	Mean	15,14	14,31	- 0,83	± 0,56
Trashed:		15,51	13,30	- 2,21	

Sucrose (t/ha)					
Treatments		Fo	F1	Response (F1-Fo)	SE
Burnt:	Tops raked	5,1	11,8	6,7	± 1,28
	Tops scattered	5,3	13,5	8,2	
	Mean	5,2	12,6	7,4	± 0,91
Trashed:		7,2	12,3	5,1	

5.3 Trash versus burn

Treatments	Cane (t/ha)	Sucrose (% cane)	Sucrose (t/ha)
Burn	69,4	14,41	9,8
Trash	61,1	14,72	8,9
SE ±	3,6	0,40	0,83
LSD (0,05)	11,4	1,28	2,63

5.4 Burnt tops left scattered versus tops raked off

Treatments	Cane (t/ha)	Sucrose (% cane)	Sucrose (t/ha)
Burnt tops left scattered	63	15,03	9,4
Burnt tops raked off	59	14,42	8,4
SE ±	3,5	0,0	0,75
LSD (0,05)	8,4	1,23	1,98

5.5 Third leaf nutrient values (DM %) at 3,9 m October and 7,1 m January

Treatments	N		P		K		S		Ca		Mg	
	4 m	7 m	4 m	7 m	4 m	7 m	4 m	7 m	4 m	7 m	4 m	7 m
Unfertilised raked	1,88	1,18	0,16	0,14	0,58	0,51	0,20	0,15	0,33	0,25	0,21	0,23
Unfertilised scattered	1,88	1,20	0,16	0,16	0,70	0,67	0,19	0,15	0,31	0,23	0,19	0,21
Unfertilised trash	1,86	1,30	0,15	0,16	0,69	0,68	0,17	0,15	0,30	0,25	0,18	0,21
Fertilised raked	2,61	1,47	0,20	0,20	0,83	1,06	0,21	0,15	0,33	0,19	0,19	0,31
Fertilised scattered	2,63	1,47	0,24	0,20	1,24	1,09	0,20	0,15	0,31	0,19	0,16	0,25
Fertilised trash	2,57	1,51	0,24	0,21	1,22	1,10	0,20	0,15	0,31	0,19	0,18	0,27

Comments

Rainfall was above average for the summer period but below average for the later stages of the crop with the total being 106% of long term mean.

° **Trash:**

The responses to trashing or burning and leaving tops scattered versus burning and raking tops (all under fertilised conditions) were:

Treatments	% Cover	Cane (t/ha)	Sucrose (% cane)	Sucrose (t/ha)
Burnt - tops scattered	70	+ 8,6	+ 0,6	+ 1,7
Trashed		+ 8,8	- 0,71	+ 0,6
Net response* to trash		+ 0,2	- 1,31	- 1,1

*Versus the best alternative practice of burning and leaving the tops scattered.

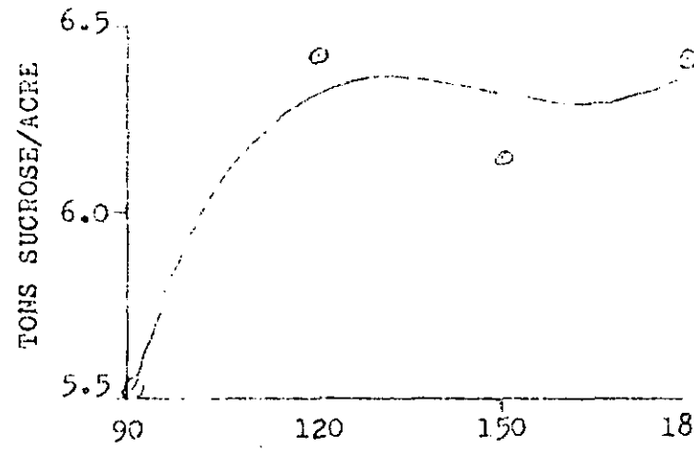
° **Fertiliser:**

Large responses were evident in both trash and burnt cane to added fertiliser. Trashed cane yielded better than burnt cane (tops raked or scattered) with no added fertiliser.

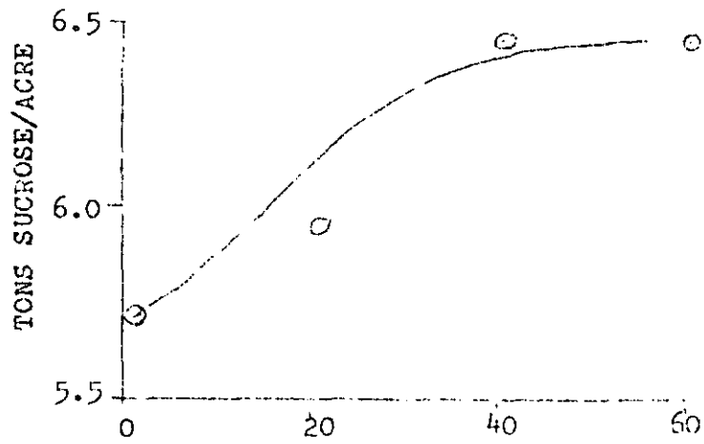
AGR/PROP/BT4R5/PETT/gb
16 July 1993

Interactions

There were no significant interactions.



RESPONSE TO NITROGEN



RESPONSE TO SULPHUR

A 11

South African Sugar Industry
Agronomists' Association

Trial code: BT 1/39/4R8
Cat. No. : 185

Title: Trashing vs. burning and either raking or leaving burnt tops scattered

1. Particulars of project:

This crop : 8th ratoon
Site : Fld 14 Expt. Station
Mt Edgecombe
Region : N. Coast Coastal
Soil system : Umzinto C lowlands
Soil form/series: Arcadia/Rydalvale
Design : Split plots x 4 reps.
Variety : NCo.376
Fertilizer/
Ameliorants : N P K
Kg/ha :160 32 160

Soil analysis: Date:09/12/1987

	pH	OM%	Clay%	TSand%
F0:	5.72	5.78	59	28
F1:	5.26	5.77	60	26

ppm

	P	K	Ca	Mg	Zn
F0:	4.0	70	1748	350	2.99
F1:	10.0	155	1694	350	2.76

Age:10.8 months (10/12/87–04/11/1988)
Rainfall: 1333mm 152% of LTM: 876mm
Irrigation: Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking off the burnt tops or leaving the burnt tops scattered on the plots, *in the presence or absence of fertilizer.*

3. Treatments: Whole plots. : B – Burnt
: T – Trash blanket

: Sub plots. : t – Burnt tops left scattered
:to – Burnt tops raked off the plots
: F – Fertilizer applied
:Fo – No fertilizer applied

3.1 Notes on treatments:

* Burnt tops left scattered covered an average of about 50% surface of the plots. Assessment on 22/12/1987
* Burnt tops were either raked or scattered 2 days after harvest on 14/12/1987
* Fertilizer @ 780Kg/ha 5 . 1 . 5(45) was top dressed to the appropriate plots on 08/01/1988 at 1.3 months after harvest.

Rainfall, L.T.M. (mm)

Months	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
1987–88	35	64	195	387	20	346	49	23	82	28	93	11	1333
L.T.M.	89	134	116	56	70	23	24	53	88	98	111	14	876

4. Results:

Table 1. Yield and other crop characteristics at harvest

Treatment	Cane (t/ha)	Suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
BtoF –Burnt tops raked + Fert	95	14.05	13.4	194	182
BtF –Burnt tops scattered + Fert	93	14.35	13.3	185	186
BtoFo–Burnt tops raked no fert	28	13.69	3.9	116	99
BtFo –Burnt tops scattered no fert	32	14.07	4.4	105	107
TF –Trash Blanket + Fert	93	13.62	12.7	193	180
TFo –Trash Blanket no fert	36	13.18	4.8	116	122
Mean	63	13.72	8.7	152	147

4.1 Burnt x trash x fertilizer

Table 2. Cane tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	28.2	95.2	61.7		67.0	}
	Tops scattered	31.5	92.7	62.1		61.2	} 3.8
	Mean	29.8	94.0	61.9		64.1	}
Trash blanket		36.0	93.0	64.5		57.0	} 2.7
Mean		32.9	93.5	63.2		60.6	1.9
Response	Scatter – raked	3.3	–2.5	0.4		–5.8	5.4
	Trash – burnt	6.2	–1.0	2.6		–7.2	3.8

Table 3. Sucrose tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	3.9	13.4	8.6		9.5	}
	Tops scattered	4.4	13.3	8.8		8.9	} 0.54
	Mean	4.2	13.4	8.7		9.2	}
Trash blanket		4.8	12.7	8.8		7.9	} 0.38
Mean		4.5	13.0	8.8		8.5	0.27
Response	Scatter – raked	0.5	–0.1	0.2	0.43	–0.6	0.77
	Trash – burnt	0.6	–0.7	–0.1	0.56	–1.3	0.54

Table 4. Pol % cane

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	13.69	14.05	13.87		0.36	}
	Tops scattered	14.07	14.35	14.21		0.28	} 0.26
	Mean	13.88	14.20	14.04		0.32	}
Trash blanket		13.18	13.62	13.40		0.44	} 0.18
Mean		13.53	13.91	13.72		0.38	0.13
Response	Scatter – raked	0.38	0.30	0.34	0.24	–0.08	0.36
	Trash – burnt	–0.70	–0.58	–0.64	0.29	0.12	0.26

4.2 Trash vs Burnt

Table 5.

Treatment	Cane (t/ha)	Suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
Burnt	61.9	14	8.7	150	144
Trashed	64.5	13.4	8.7	155	151
S.E. +−	2.27	0.2	0.39		
L.S.D. (0.05)	10.2	0.92	1.77		

4.3 Burnt tops scattered vs tops raked off

Table 6

Treatment	Cane (t/ha)	suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
Burnt tops left scattered	62.1	13.9	8.6	129	166
Burnt tops raked off	61.7	14.2	8.6	128	159
S.E. +−	2.15	0.17	0.3		
L.S.D. (0.05)	7.44	0.58	1.05		

4.4 Third leaf dm% analysis @ 2.1, & 3.7 months

Table 7. Sampled in Feb, & Mar of 1988

Treatments	dm %					
	N		P		K	
	2m	4m	2m	4m	2m	4m
Unfertilized						
Burnt tops raked	1.89	1.75	0.14	0.13	0.57	0.77
Burnt tops scat	1.74	1.68	0.15	0.16	0.69	0.95
Trash blanket	1.82	1.77	0.13	0.13	0.78	0.95
Fertilized						
Burnt tops raked	2.32	2.34	0.22	0.25	1.06	1.25
Burnt tops scat	2.34	2.22	0.24	0.24	1.28	1.38
Trash blanket	2.53	2.29	0.25	0.24	1.35	1.42

4.5 Flowering assessment

Table 8. Flowering in the presence and absence of fertilizer in the following crops:– Plant crop @ 11.3 months 16/08/1978, 1st ratoon @ 8.3 months 19/07/1979, 2nd ratoon @ 15.2 months 02/10/1981, 5th ratoon @ 12.1 months 28/06/1985, 7th ratoon @ 10.8 months 02/10/1987, and 8th ratoon @ 7.4 months 21/07/1988.

Treatments	Flowering %					
	PI	R1	R2	R5	R7	R8
Absence of fertilizer						
Burnt tops raked	15.0	1.0	1.3	16.1	*	1.8
Burnt tops scat	15.0	1.0	2.0	14.9	*	0.9
Trash blanket	16.0	1.0	1.0	19.4	*	2.9
Presence of fertilizer						
Burnt tops raked	0.0	0.0	0.2	2.4	*	1.5
Burnt tops scat	0.0	0.0	0.2	4.5	*	1.8
Trash blanket	0.0	0.0	0.2	3.7	*	1.2

* = rating not precise eg; some and few flowers

COMMENTS

General

Although this crop received 152% of LTM rainfall it was relatively dry in the first two months.

Burnt tops scattered vs raked

There is little evidence of benefits to leaving tops scattered in this crop (Table 2) which is not surprising under the good moisture conditions.

Fertilizer

As in all previous crops a large response is evident to fertilizer under trash, burnt tops scattered and burnt tops raked situations. The least response was under trashed conditions but differences were marginal.
Non fertilized plots yielded on average 35% of fertilized plots.

Trash

There is no benefit to trash compared with either burnt tops scattered or raked. Again this is not surprising considering moisture conditions. The average effect of trash in fertilized plots was −0.6t suc/ha compared with burnt tops scattered, which has become the normal alternative practice.

Flowering

Flower numbers were not affected by trash management treatments but were affected by fertilizer treatment which suppressed the number of flowers.

South African Sugar Industry
Agronomists' Association

Trial code: BT 1/39/4R9
Cat. No. : 185

Title: Trashing vs. burning and either raking or leaving burnt tops scattered

1. Particulars of project:

This crop : 9th ratoon
Site : Fld 14 Expt. Station
Mt Edgecombe
Region : N. Coast Coastal
Soil system : Umzinto Coast lowlands
Soil form/series: Arcadia/Rydalvale
Design : Split plots x 4 reps.
Variety : NCo 376
Fertilizer/
Ameliorants : N P K
Kg/ha :164 33 164

Soil analysis: Date:18/11/1988

	pH	OM%	Clay%	TSand%
F0:	5.99	5.78	59	28
F1:	5.49	5.77	60	26

ppm

	P	K	Ca	Mg	Zn
F0:	6.0	102	1650	350	2.99
F1:	17.0	212	1632	350	2.76

Age:12.6 months (04/11/88–21/11/1989)
Rainfall: 1118mm 104% of LTM:1080mm
Irrigation: Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking off the burnt tops or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments: Whole plots. : B – Burnt
: T – Trash blanket

: Sub plots. : t – Burnt tops left scattered
:to – Burnt tops raked off the plots
: F – Fertilizer applied
:Fo – No fertilizer applied

3.1 Notes on treatments:

* Burnt tops re–burnt on 11/11/1988 then treatments applied.
* Burnt tops left scattered covered an average about 45 % of the plots. Assessment on 11/11/1988 7 days after harvest.
* Fertilizer @ 800Kg/ha 5 . 1 . 5(45) was top dressed to the appropriate plots on 25/11/1988 3 weeks after harvest

Rainfall, L.T.M. (mm)

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
1987–88	102	165	63	297	21	108	22	12	33	15	63	114	103	1118
L.T.M.	96	107	138	134	116	56	70	23	24	53	88	98	77	1080

4. *Results:*

Table 1. Yield and other crop characteristics at harvest

Treatment	Cane (t/ha)	Suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
BtoF –Burnt tops raked + Fert	95	13.55	12.9	157	200
BtF –Burnt tops left scattered + F	103	13.81	14.2	153	209
BtoFo–Burnt tops raked no fert	24	13.01	3.1	99	118
BtFo –Burnt tops left scattered no fe	28	13.23	3.8	104	123
TF –Trash Blanket + Fert	98	12.85	12.5	151	215
TFo –Trash Blanket no fert	37	13.20	4.9	100	148
Mean	65	13.21	8.6	127	172

4.1 Burnt x trash x fertilizer

Table 2. Cane tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	23.8	95.5	59.6		71.7	}
	Tops scattered	28.1	102.7	65.4		74.6	} 3.8
	Mean	26.0	99.1	62.5		73.1	}
Trash blanket		37.0	97.6	67.3		60.6	} 2.7
Mean		31.5	98.4	64.9		66.9	1.9
Response	Scatter – rakec	4.3	7.2	5.8	3.1	3.1	5.4
	Trash – burnt	11.0	–1.5	4.8	3.8	–12.5	3.8

Table 3. Sucrose tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	3.1	12.9	8.0		9.8	}
	Tops scattered	3.8	14.2	9.0		10.4	} 0.77
	Mean	3.4	13.6	8.5		10.2	}
Trash blanket		5.0	12.6	8.8		7.6	} 0.54
Mean		4.2	13.1	8.6		8.9	0.38
Response	Scatter – rakec	0.7	1.3	1.0	0.51	0.6	1.09
	Trash – burnt	1.6	–1.0	0.3	0.51	–2.6	0.77

Table 4. Pol % cane

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	S.E. +–
Burnt	Tops raked	13.01	13.55	13.28		0.54	}
	Tops scattered	13.23	13.81	13.52		0.58	} 0.52
	Mean	13.12	13.68	13.40		0.56	}
Trash blanket		13.20	12.84	13.02		–0.36	} 0.37
Mean		13.16	13.26	13.21		0.10	0.26
Response	Scatter – rakec	0.22	0.26	0.24	0.35	0.04	0.74
	Trash – burnt	0.08	–0.84	0.38	0.20	–0.92	0.52

4.2 Trash vs Burnt

Table 5.

Treatment	Cane (t/ha)	Suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
Burnt	62	13.4	8.5	128	163
Trashed	67	13.02	8.7	126	181
S.E. +-	2.7	0.14	0.36	0.73	
L.S.D. (0.05)	12.16	0.64	1.62	3.29	

4.3 Burnt tops left scattered vs tops raked off

Table 6

Treatment	Cane (t/ha)	Suc % cane	suc (t/ha)	Stalk count (th/ha)	Stalk Length (cm)
Burnt tops left scattered	65.4	13.52	9	128	166
Burnt tops raked off	59.6	13.28	8	128	159
S.E. +-	1.3	0.17	0.26	2.3	
L.S.D. (0.05)	4.49	0.6	0.88	7.96	

4.4 Third leaf dm% analysis @ 3, & 5.2 months

Table 7. Sampled in Feb, & Apr of 1988

Treatments	dm %					
	N		P		K	
	3m	5.2m	3m	5.2m	3m	5.2m
Unfertilized						
Burnt tops raked	1.50	1.62	0.14	0.16	0.64	0.91
Burnt tops scattered	1.48	1.50	0.16	0.15	0.77	0.90
Trash blanket	1.58	1.63	0.15	0.15	0.85	0.97
Fertilized						
Burnt tops raked	1.94	1.71	0.20	0.20	0.98	1.20
Burnt tops scattered	1.90	1.78	0.22	0.24	1.16	1.41
Trash blanket	1.99	1.82	0.24	0.25	1.29	1.46

COMMENTS

General

Rainfall was 104% of LTM and reasonably evenly spread through the year

Burnt tops scattered vs raked

Average benefit to scattering tops was 4,3 and 7,2 tc/ha in non fertilized and fertilized plots respectively when compared to raking tops off.

Fertilizer

Again very large responses are apparent to fertilizer.
Non fertilized plots yielded on average 32% of fertilized plots.

Trash

The response to trash compared to burnt tops scattered was −5 tc/ha and −0.7 tsuc/ha +−. However in the absence of fertilizer the response to trash was 9 tc/ha and 1,9 tsuc/ha suggesting that the trash contributed nutritionally. This is backed up by the higher leaf nitrogen and potassium levels in trashed plots. (Table 7)

A III

South African Sugar Industry
Agronomists' Association

Trial code: BT 1/39/4R10
Cat. No. : 185

Title: Trashing vs. burning and either raking or leaving burnt tops scattered

1. Particulars of project:

This crop : 10th ratoon
Site : Fld 14 Expt. Station
Mt Edgecombe
Region : N. Coast Coastal
Soil system : Umzinto Coast lowlands
Soil form/series: Arcadia/Rydalvale
Design : Split plots x 4 reps.
Variety : NCo 376
Fertilizer/
Ameliorants : N P K
Kg/ha :160 30 160

Soil analysis: Date:08/12/1989

	pH	OM%	Clay%	TSand%
F0:	6.01	5.25	59	28
F1:	5.47	5.35	60	26

ppm

	P	K	Ca	Mg	Zn
F0:	6.6	65	1630	350	2.99
F1:	15.3	169	1582	350	2.76

Age:11.7 months (21/11/89–13/11/90)
Rainfall: 1169mm 126% of L.T.M.: 925mm
Irrigation: Nil

2. Objectives:

To evaluate the long term effects of trashing compared with burning and either raking off the burnt tops or leaving the burnt tops scattered on the plots, in the presence or absence of fertilizer.

3. Treatments: Whole plots. : B – Burnt
: T – Trash blanket

: Sub plots. : t – Burnt tops left scattered
:to – Burnt tops raked off the plots
: F – Fertilizer applied
:Fo – No fertilizer applied

3.1 Notes on treatments:

* Burnt tops left scattered covered an average about 65% on no fertilizer plots and about 75% on fertilized plots. Assessment on 08/12/1989.
* Burnt tops were either raked or scattered 18 days after harvesting.
* Fertilizer 5 . 1 . 5(45) at 780Kg/ha was top dressed to the appropriate plots on 18/01/1990 at 1.9 months after harvest.

Rainfall, L.T.M. (mm)

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
1989–90	210	43	131	107	226	56	29	4	2	130	25	120	44	1169
L.T.M.	32	111	123	120	117	67	53	32	26	42	65	92	46	925

4. Results:

Table 1. Yield and other crop characteristics at harvest

Treatment	Cane (t/ha)	Suc % cane	Suc (t/ha)	Stalk count (th/ha)	Flower Rating
BtoF –Burnt tops raked + Fert	97	12.93	12.5	182	0.0
BtF –Burnt tops scattered + Fert	102	13.07	13.3	189	0.0
BtoFo–Burnt tops raked no fert	19	13.43	2.6	87	4.0
BtFo –Burnt tops scattered no fert	23	13.74	3.2	80	4.8
TF –Trash Blanket + Fert	101	13.08	13.2	180	0.0
TFo –Trash Blanket no fert	34	13.52	4.6	99	6.5
Mean	64	13.30	8.4	137	2.7

4.1 Burnt x trash x fertilizer

Table 2. Cane tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	Response S.E. +–
Burnt	Tops raked	19.1	96.7	57.9		77.6	}
	Tops scattered	23.3	102.0	62.6		78.7	}3.8
	Mean	21.2	99.4	60.2		78.2	}
Trash blanket		33.8	100.7	67.2		66.9	}2.7
	Mean	27.5	100.0	63.8		72.6	1.9
Response	Scatter –raked	4.2	5.3	4.8	1.4	1.1	5.4
	Trash – burnt	12.6	1.3	7.0	3.3	–11.3	3.8

Table 3. Sucrose tons/ha

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	Response S.E. +–
Burnt	Tops raked	2.6	12.5	7.6		9.9	}
	Tops scattered	3.2	13.3	8.2		10.1	}0.68
	Mean	2.9	12.9	7.9		10.0	}
Trash blanket		4.6	13.2	8.9		8.6	}0.48
	Mean	3.8	13.0	8.4		9.3	0.33
Response	Scatter –raked	0.6	0.8	0.7	0.36	0.2	0.96
	Trash – burnt	1.7	0.3	1.0	0.41	–1.4	0.68

Table 4. Pol % cane

Treatment		F0	F1	Mean	S.E. +–	Response F1–F0	Response S.E. +–
Burnt	Tops raked	13.43	12.93	13.18		–0.50	}
	Tops scattered	13.74	13.07	13.40		–0.67	}0.33
	Mean	13.58	13.00	13.30		–0.58	}
Trash blanket		13.52	13.08	13.30		–0.44	}0.23
	Mean	13.55	13.04	13.30		–0.51	–0.16
Response	Scatter –raked	0.31	0.14	0.22	0.28	–0.17	0.46
	Trash – burnt	–0.06	0.08	0.01	0.30	0.14	0.33

4.2 Trash vs Burnt

Table 5.

Treatment	Cane (t/ha)	Suc % cane	Suc (t/ha)	Stalk count (th/ha)	Flower Rating
Burnt	60.3	13.29	7.9	134	2.2
Trashed	67.3	13.3	8.9	140	3.3
S.E. +–	2.3	0.21	0.29	1.85	
L.S.D. (0.05)	10.5	0.95	1.31	8.3	

4.3 Burnt tops scattered vs tops raked off

Table 6

Treatment	Cane (t/ha)	Suc % cane	Suc (t/ha)	Stalk count (th/ha)	Flower Rating
Burnt tops scattered	62.6	13.41	8.3	134	2.4
Burnt tops raked off	57.9	13.18	7.5	134	2.0
S.E. +–	0.69	0.14	0.18	2.47	
L.S.D. (0.05)	2.39	0.48	0.63	8.54	

4.4 Eldana and sesamia survey

Table 7. Assessment on 50 stalks/plot

Treatment	Stalk Damage	Total Eldana /100	Total Sesamia /100	Total Joints	% Joints Bored
BtoF –Burnt tops raked + Fert	20.0	0.0	3.0	16.4	5.8
BtF –Burnt tops scattered + Fert	16.0	1.0	1.5	16.2	3.6
BtoFo–Burnt tops raked no fert	1.8	0.0	0.0	15.6	0.3
BtFo –Burnt tops scattered no fert	2.5	0.0	0.5	16.8	0.4
TF –Trash Blanket + Fert	20.0	0.8	2.3	15.5	5.2
TFo –Trash Blanket no fert	1.9	0.0	0.0	15.9	0.3
Mean	10.5	0.3	1.2	16.0	2.7

4.5 Third leaf dm% analysis @ 3.8 months sampled in March 1990

Table 8.

Treatments	dm %						N/S Ratio
	N	P	K	Ca	Mg	S	
Unfertilized							
Burnt tops raked	1.29	0.13	0.74	0.29	0.20	0.14	9.1
Burnt tops scattered	1.29	0.15	0.85	0.29	0.20	0.14	9.4
Trash blanket	1.32	0.12	0.81	0.29	0.17	0.14	9.7
Fertilized							
Burnt tops raked	1.97	0.22	1.15	0.32	0.26	0.19	10.3
Burnt tops scattered	2.03	0.22	1.48	0.29	0.24	0.19	10.6
Trash blanket	2.01	0.22	1.41	0.30	0.24	0.19	10.9

5 Comparing Trash vs Burnt tops scattered

Table 9. Yield plant to ratoon ten with fertilizer

Tons cane per hectare

Treatment	Ton cane/ha											Mean
	PI	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R1–R10
Trashed	129	97	120	96	146	92	109	105	93	96	101	105.6
Burnt tops scattered	114	86	121	94	127	92	113	101	93	103	102	103.2
Diff	15	11	−1	2	20	0	−5	3	0	−5	−1	2.4
S.E. +−	5.4	11.3	5.9	6.0	5.0	5.2	4.6	3.5	4.3	4.7	4.1	
L.S.D. (0.05)	14	33	15	15	12	14	11	8	12	13	11	

Pol % cane

Treatment	Pol % cane											Mean
	PI	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R1–R10
Trashed	14	14	14	14	11.9	13.3	15	12.2	13.6	12.9	13.1	13.34
Burnt tops scattered	13	13	13	14	12.3	14.6	15.8	13.1	14.4	13.8	13.1	13.64
Diff	0.9	0.6	0.5	0.3	−0.3	−1.3	−0.3	−0.9	−0.7	−1.0	0.0	−0.30
S.E. +−	0.34	0.64	0.26	0.40	0.49	0.66	0.40	0.30	0.35	0.41	0.39	
L.S.D. (0.05)	1.0	1.9	0.6	1.1	1.3	1.7	1.1	0.6	1.0	1.0	1.1	

Tons sucrose per hectare

Treatment	Sucrose ton/ha											Mean
	PI	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R1–R10
Trashed	17.5	13.5	16.4	13.5	17.4	12.3	16.3	12.7	12.7	12.5	13.2	14.05
Burnt tops scattered	14.1	11.3	16.0	12.9	15.5	13.5	17.3	13.3	13.3	14.2	13.3	14.06
Diff	3.4	2.2	0.4	0.6	1.9	−1.2	−1.0	−0.6	−0.6	−1.7	−0.1	−0.01
S.E. +−	0.95	2.05	0.86	0.99	0.64	1.19	0.91	0.50	0.69	0.74	0.61	
L.S.D. (0.05)	2.8	6.0	2.0	2.3	1.5	3.1	2.3	1.2	1.9	1.9	1.6	

COMMENTS

General

Rainfall was 126% of LTM with very high rainfall in the first month of ratooning

Burnt tops scattered vs raked

A benefit in both fertilized and non fertilized plots was apparent to scattered tops. This was o,8 and o,6 tsuc/ha respectively.

Fertilizer

The response to fertilizer was very high with the non fertilized plots yieldind on average 27% of fertilized plots.

Trash

The response to trash over burnt tops scattered in fertilized plots was negligible (−1.3 tc/ha or +0,01 tsuc/ha) whereas in plots without fertilizer there was a considerable response to trash (+1.4 tsuc/ha) over burnt tops scattered. This was supported by higher leaf nitrogen in trash plots but not higher potassium or phosphorus.

Eldana

There was a very clear indication of lower eldana and sesamia numbers and damage where fertilizer had not been applied. (See Table 7)

A(ii)

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

TRASHING VERSUS BURNING

Code: BT1/39/R11
Catalogue No.: 185
This crop: 11th ratoon
Site: Field G2, Experiment Station, Mt. Edgecombe
Altitude: 100 m
Soil series: Rydalvale
Design: Split plots x 4 reps.
Variety: NCo 376
Fertilizer: Applied to sub plots F only
300 kg/ha Urea, 200 kg/ha S. Supers
250 kg/ha KCl
Water regime: Rainfed

Soil analysis at the end of the 11th ratoon

TREAT	pH	ppm P	K	Ca	Mg	Zn	PDI	O.M.%
BF	5,9	17	114	1920	250	1,7	0,13	5,0
BFo	6,2	3	70	2095	"	1,7	0,14	4,8
TF	5,5	9	110	1698	"	2,2	0,19	5,2
TFo	6,1	4	73	2150	"	2,2	0,09	5,4

Age: 19,5 months (8/11/74-24/6/76)
Rainfall: 1 705 mm (Effective rainfall)

OBJECT:

To evaluate the long term effects of trashing versus burning with and without fertilizer.

TREATMENTS:

Whole plots 1) Trashed (T)
2) Burnt (B)

Sub plots 1) Fertilized (F)
2) Unfertilized (Fo)

RESULTS:

TABLE 1. Yield, yield components and water use efficiency

Treatment	tc/ha	ERS %	t ERS/ha	Pop. x 10^{-3}/ha	Stalk Mass(kg)	Length (cm)	tc/ha/ 100 mm	t ERS/ha /100 mm
BF	122	12,1	14,6	130	0,93	266	7,1	0,86
BFo	59	12,1	7,2	103	0,58	181	3,5	0,42
TF	142	10,9	15,5	128	1,12	275	8,4	0,91
TFo	85	12,1	10,3	117	0,73	209	5,0	0,61
Mean	102	11,8	11,9	119	0,84	233	6,0	0,70
C.V. %	8,1	7,0	11,8					
S.E. Treat. Mean	2,9	0,29	0,5					
L.S.D. (0,05)	8,9	0,89	1,51					
L.S.D. (0,01)	12,3	1,24	2,10					

COMMENTS ON RESULTS:

1) t cane/ha

The response to both fertilizer and trashing is highly significant.

F - Fo = 60 tc/ha ± 2,1

T - B = 23 tc/ha ± 2,7

There is no evidence of an interaction between fertilizing and trashing.

2) ERS % cane

Fertilizing and trashing reduced ERS % significantly.

F - Fo = -0,6% ± 0,21

T - B = -0,6% ± 0,14

The interaction between fertilizing and trashing approaches significance.

3) t ERS/ha

Fertilizing and trashing increased t ers/ha

F - Fo = 6,4 t ers/ha ± 0,35 (highly significant)

T - B = 2,0 t ers/ha ± 0,33 (significant)

The interaction between fertilizing and trashing is significant.

4) Crop maturity

Percentage purity and dry matter were reduced by fertilizing and trashing, resulting in less mature cane.

% Purity

F - Fo = -1,7%

T - B = -1,2%

% D.M./cane

F - Fo = -1,3%

T - B = -0,7%

5) Effect of treatments on yield components

TABLE 2. % Increase due to fertilizing and trashing

	Stalk		
	Pop. x10-3/ha	Mass (kg)	Length (cm)
F - Fo	17	56	28
T - B	5	22	8
Mean	11	39	18

GENERAL

1) Leaf Analysis

TABLE 3. 3rd leaf analysis

	Date: 31/1/75 Age : 2,8 m						Date: 11/12/75 Age : 13,1 m					
Treat.	N %	P %	K %	Mg %	Ca %	Zn %	N %	P %	K %	Mg %	Ca %	Zn %
BF	2,14	0,22	1,10	0,23	0,24	-	1,25	0,14	0,82	0,17	0,32	18
BFo	1,51	0,17	0,79	0,23	0,27	-	1,23	0,14	0,70	0,21	0,29	20
TF	2,26	0,25	1,20	0,27	0,26	-	1,28	0,15	0,94	0,19	0,26	21
TFo	1,61	0,15	0,83	0,17	0,24	-	1,21	0,13	0,72	0,16	0,25	21
Mean	1,88	0,20	0,98	0,23	0,25	-	1,24	0,14	0,80	0,18	0,28	20

Date: 6/2/76
Age : 14,9 m

N %	P %	K %	Mg %	Ca %	Zn %
1,39	0,13	0,86	0,22	0,30	-
1,29	0,12	0,75	0,23	0,33	-
1,46	0,14	0,88	0,24	0,31	-
1,39	0,12	0,70	0,23	0,32	-
1,38	0,13	0,80	0,23	0,32	-

P and K values were very low at 13,1 and 14,9 months of age for all treatments.

2) Comparison of crop performance in the 1st and 11th ratoons

TABLE 4. Comparison of yield, sucrose % C and ers % C

	tc/ha/an		S % C	ERS % C	ts/ha/an	ters/ha/an
Treat.	R1	R11	R1	R11	R1	R11
BF	78	75	14,5	12,1	11,3	8,9
BFo	65	36	15,8	12,1	10,3	6,3
TF	89	88	14,3	10,9	12,8	9,5
TFo	81	52	14,7	12,1	11,9	6,7
F - Fo	11	38	- 0,9	- 0,6	1,0	2,7
T - B	14	15	- 0,6	- 0,6	1,6	0,5

3) Approximate nutrient uptake from the soil, plant crop - 11th ratoon, 3rd cycle.

TABLE 5. Nutrient uptake by the unfertilized treatments

Treatment	Total yield tc/ha	Nutrient uptake - kg/ha					
		N	P	K	Ca	Mg	S
BFo	787	472	142	708	157	197	157
TFo	980	588	176	882	196	245	196
BFo + TFo	1 767	1060	318	1590	353	442	353

Note: The above table is based on the average nutrient removal by 100 tc/ha under South African conditions which is: 60 kg N, 18 kg P, 90 kg K, 20 kg Ca, 25 kg Mg, 20 kg S.

4) The 3rd cycle was ploughed out after the 11th ratoon and a 4th cycle re-established.

ED/SN
26th April, 1977