

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code: Rip 3 E.Tv1/88/R

Cat. No. : 1701

Title ; Ripping in ratoon cane in Shortlands form soil.

1. Particulars of the project

This crop : Ratoon  
Site : Mhlati - Block 9  
Region : Northern area  
Soil system : Komatipoort  
Soil form : Shortlands  
Design : Randomised blocks  
Variety : N14  
Fertilizer                    N     P     K  
                                         kg ha<sup>-1</sup>     125     -     125

<u>Soil analysis:</u>		<u>Date:</u>			
<u>pH</u>	<u>O.M.%</u>	<u>Clay %</u>	<u>P.D.I.</u>		
ppm					
P	K	Ca	Mg	Zn	Al
<u>Age:</u> 12,2 months		<u>Dates:</u> 21.10.88 - 26.10.89			
<u>Rainfall:</u>		<u>L.T.M.:</u>			
<u>Irrigation:</u> 42mm/7 day cycle					

2. Objectives

To determine the effects of shallow ripping (300mm) in the interrow on the yields of a ratoon crop cut in summer and grown in a Shortlands form soil.

3. Treatments

1. Compacted - not ripped
2. Compacted - ripped
3. Not compacted - not ripped
4. Not compacted - ripped

Notes on treatments:

Compaction: Compacted plots were superimposed over the area used by trucks during loading operations after harvesting. Not compacted plots were superimposed over an area which had no traffic over it. The plots were all within the 18m area (12 rows) covered by two rows of sprinklers.

Ripping: 15 days after harvesting, interrows of some plots were ripped to a depth of 300mm using a Mercedes Benz tractor drawing a twin tine flanged ripper (± 2000 rpm - 3rd gear).

### Soil bulk density measurements

- Using a Troxler density gauge the bulk density of soil in compacted and non - compacted plots was measured on 3rd November, 11 days after harvesting (one day before ripping).
- Measurements were taken to provide a comparison of bulk density from one pass vs two passes of vehicles over the same interrow.

### Results

- Changes in soil bulk density and moisture content of compacted and non - compacted plots up to a depth of 300mm are shown in figure 1.
- Bulk density of interrows subjected to one pass and two passes are shown in table 1.
- The average width of ruts in the interrows subjected to two passes was 990mm and 167mm deep.
- Average heights and numbers of stalks for each treatment at various times are shown in table 2 and yields at 12,2 months in table 3.

### Comments

- Ruts caused by infield loading were confined to interrows so it is probable that there was no 'on row' disturbance.
- The soil bulk density and moisture content in compacted interrows was substantially greater than in uncompacted areas at all depths upto 300mm. The interrows subjected to two passes were only slightly more compacted than those subjected to one pass.
- Growth measurements show small differences between treatments and upto 7 months of age correlated with final cane yields. It is unlikely that ripping could have had the desired effect of alleviating compaction at the high soil moisture levels recorded on the day prior to ripping. It was clearly evident from surface water after heavy rainfall that compaction had reduced infiltration rates. In plots which were compacted and ripped there was no surface water after rainfall.
- Yields of compacted plots were no different from those of non compacted plots. The slightly lower yields in ripped plots of 4,6t cane ha<sup>-1</sup> (SED ± 6,1) were not statistically significant.

RAD/  
6 March 1990

Table 1 Bulk density (kg/m<sup>3</sup>) of interrows subjected to one and two passes of loaded vehicle ( $\pm$  50 tons).

<u>Soil depth (mm)</u>	<u>One pass</u> <u>Wet density</u>	<u>Two passes</u> <u>Wet density</u>
0	1581	1543
50	1648	1681
100	1728	1751
150	1777	1788
200	1797	1811
250	1814	1830
300	1799	1829

Table 2 Growth measurements at various times after ripping

	<u>Stalk heights (cm)</u>						
	<u>24/11</u>	<u>14/12</u>	<u>9/2</u>	<u>29/3</u>	<u>5/5</u>	<u>12/6</u>	<u>7/9</u>
Compacted/ripped	16,5	27,0	114,2	213	247	270	296
Compacted/not ripped	16,2	31,4	120,2	202	253	277	262
Not compacted/ripped	15,3	30,3	123	223	263	276	298
Not compacted/not ripped	16,0	29,0	123	222	257	275	295

	<u>Stalk populations(x 1000 ha<sup>-1</sup>)</u>						
	<u>24/11</u>	<u>14/12</u>	<u>9/2</u>	<u>29/3</u>	<u>5/5</u>	<u>12/6</u>	<u>7/9</u>
Compacted/ripped	323	306	177	152	148	133	131
Compacted/not ripped	304	388	164	151	148	137	132
Not compacted/ripped	355	304	160	169	153	140	133
Not compacted/not ripped	328	286	178	160	148	135	128

Table 3 Effects of compaction and ripping on yields after 12,2 months

	<u>t cane ha<sup>-1</sup></u>	<u>pol % cane</u>	<u>t sucrose ha<sup>-1</sup></u>
Compaction/ripped	138,9	15,4	21,4
Compaction/not ripped	144,7	15,6	22,6
No compaction/ripped	141,1	15,6	22,0
No compaction/not ripped	144,4	15,3	22,1
<u>MEAN</u>	<u>142,3</u>	<u>15,4</u>	<u>22,0</u>
C.V. %	12,1	5,1	12,6
<u>Group means</u>			
Compacted	141,8	15,5	22,0
Not compacted	142,8	15,4	22,0
Not ripped	144,6	15,5	21,7
Ripped	140,0	15,5	27,3
S.E. †	4,3	0,19	0,69
S.E.D. †	6,1	0,28	0,98

Figure 1 Soil bulk density (kg/m<sup>3</sup>) and moisture content (%)  
in compacted and non compacted interrows

