THE FEASIBILITY OF CUTTING RAINFED CANE AT A YOUNGER AGE ON THE NORTH COAST OF NATAL

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Abstract

The reasons for harvesting cane at a younger age are discussed. Field record data from the years 1983/84 to 1987/88 indicate that cane yielded more sucrose/ha/month when harvested at 12 months than at the conventional age. Additional advantages of cutting at a younger are are noted, as well as problems incurred. Possible solutions to the problems are proposed, including the use of a chemical ripener in the early part of the milling season. The role of planting in late summer to provide 15 month old cane with which to open the season is discussed and yields are given.

Introduction

The Darnall Estates of Tongaat-Hulett are situated on the coastal plain at an altitude varying from 0 to 220 meters above sea level between the Nonoti and Tugela rivers on the North Coast of Natal. The mean annual rainfall for the years 1983/84 to 1987/88 was 1 380 mm. The soils are derived principally from aeolion sands, Middle Ecca Shales and Dwyka Tillites, with clay percentage varying from 2% to more than 50%.

It has been traditional for the Darnall Estates to start the milling season with ratoon cane of 15 to 18 months of age, and this is termed "carry-over cane". Some of the advantages of carry-over cane were considered to be:

- An assurance of millable cane at the beginning of the milling season. Almost irrespective of the rainfall, "carry-over cane" was of a harvestable size and, being mature, was assumed to be of better quality than cane cut the previous season, which is termed "seasonal cane".
- It allowed the seasonal cane time to mature in the cooler, drier winter months, so increasing yields of sucrose per hectare.
- Cutting older cane meant that a smaller area under cane was harvested, which reduced ratoon management requirements and costs.

The reappearance of the pest *Eldana saccharina* Walker (eldana borer) on the North Coast in 1975 (Atkinson *et al*[1]), altered the above situation. Carnegie and Smaill[3] showed that there was a positive correlation between the age of cane and numbers of eldana larvae found. This evidence, together with encouragement from the Local Pest and Disease Control Committees, caused growers on the North Coast to harvest annually a larger proportion of their areas under cane. However, some cane was generally carried over to the following year to be harvested at the start of the next milling season, and this was invariably infested with eldana. The areas of carry-over cane thus yielded poorly and were a source of eldana infestation for the rest of the estate. After eldana had caused crop failures in fields with carry-over cane at the beginning of the 1987 season, two of the Darnall Estate managers decided to harvest annually all cane on the estates for which they were responsible.

Method

Age at harvest and gross margins

An attempt was made to establish the age at which cane should be cut to maximise profits. Field record data for the Darnall Estates for the years 1983/84 to 1987/88 were examined and a gross margin analysis carried out.

The mean costs for planting and ratoon management are given in Annexure 1; the mean gross margin was calculated using R269,15 as the value of a ton of sucrose and the mean marginal cost per ha was R1 105 × 12/age at harvest.

Late summer plant

Cane planted from December to March may be harvested at the start of the following milling season and it appears not to be badly damaged by eldana. A comparison was made between the mean yields of late summer planted cane, seasonal and carry-over ratoon cane when harvested in April 1988.

Use of ripeners

Chemical ripeners applied to young actively growing cane have been shown to be effective, particularly when applied to cane to be milled early in the season. In 1987 Ethrel (ethephon 48%) was applied to cane in parts of various fields in order to assess the ripening response.

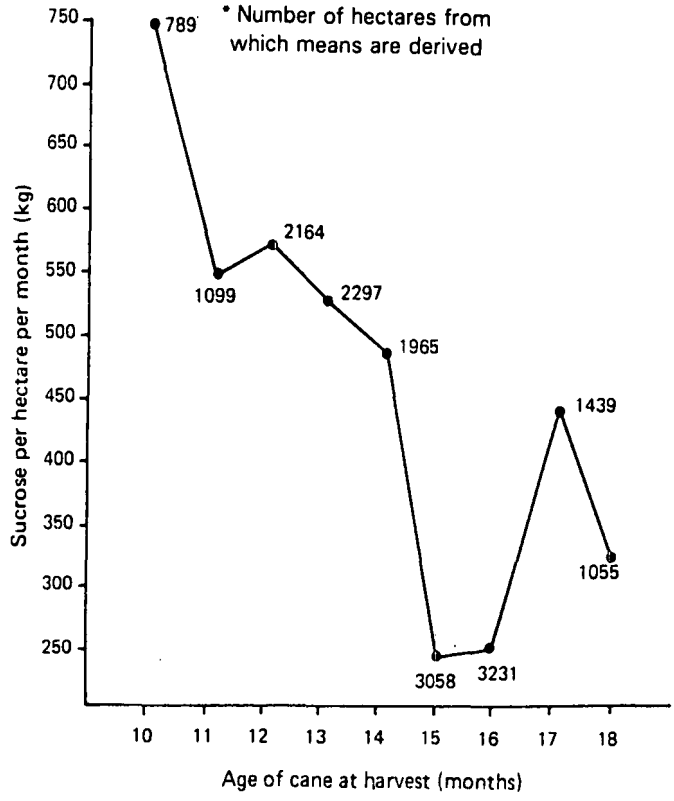

FIGURE 1 Sucrose/ha/month (kg) vs age of cane at harvest (months).

Results

Hand applicators used were the Spray King knapsack with a flood jet nozzle spraying four rows at a time; the CP3 knapsack spraying two rows with a TK2 fan jet nozzle, and in one trial the motorised knapsack sprayer developed at the SASA Experiment Station (Boevey and Fourie[2]) was used. In all cases the ripener was applied with one operator carrying the knapsack. When necessary a labourer walked ahead of the spray team to clear a path through the cane.

The sharp drop in yield shown at ages of 15 and 16-months was probably due to the effects of eldana on older cane. The higher yields from 17 to 18-month-old cane is thought to have been as a result of the cane being grown on better soils where eldana numbers would be lower.

The overall trend is a decline in yield with increasing age at harvest.

Yields and gross margins per hectar were greater when the cane was cut at a young age with the exception of cane cut at 17 months of age, when yields and gross margins were abnormally high.

Table 1

Mean yields, costs and gross margins for fields of cane cut at different ages

Age in months	Kg sucrose ha/month	Ton sucrose ha/crop	Mean cost/ha 1 crop	Mean gross margin/ha 1 crop
10	747	7,5	1105	1086
11	545	6,0	1105	554
12	568	6,8	1105	729
13	562	7,3	1105	795
14	482	6,7	1105	609
15	238	3,6	1105	-116
16	246	3,9	1105	- 34
17	439	7,5	1105	638
18	320	5,8	1105	297

Late summer plant

Yield and cane quality data of seasonal, carry-over and late summer planted cane cut at different ages but all harvested in April, are given in Table 2.

The comparison is restricted to a relatively small area, but the indications are that in terms of t/suc/ha/month, the cane planted in late summer yielded comparatively well, probably because it appeared to suffer little damage from eldana borer.

Figures for kg/suc/ha/month and ton/suc/ha show that the late summer plant cane outyielded the carry-over cane cut in April. The cane quality of both the seasonal and late plant cane was better than that of the carry-over cane.

There is a relatively high probability of poor germination due to drought when cane is planted in late summer, although this can largely be overcome by planting with filter cake in the furrow.

On the estate it has been found that only about half the annual replant programme can be carried out in the months January to March. This means that the plant cane accounts for only two weeks of the following years cutting programme. A further problem is that this method of management makes it impossible to cut certain varieties at the time of year when the highest sucrose yield can be obtained, eg cutting N14 late in the season.

Chemical ripening

Cane stalks from a 1m length of row were taken from 20 sites within sprayed and unsprayed parts of fields and submitted for sucrose analysis. The results from fields treated in 1987 and 1988 are given in Table 3.

A response to Ethrel was measured in both years but it was greater in 1988 when the treated cane was less mature at the time of spraying. Where the response was 1,3 t s/ha, the financial return would have been favourable even if the price of sucrose were only about R250 per ton.

Discussion

The following are seen as possible disadvantages to cutting younger cane:

- When cutting a larger percentage of the area under cane the standard of management has to be better. Operations have to be timed with greater precision as there is less time for the cane to 'recover' from mistakes, before it is harvested.
- Young cane harvested before June is so immature that it has to be topped very low to ensure an acceptable sucrose content in the stalk.
- Younger cane is short, especially if it has been stressed. This can lead to problems in making stacks, and may result in bundles being split under the gantry at the millyard.
- Greater annual fluctuations in yield are likely to occur when a large percentage of the area under cane is cut.

Advantages to cutting younger cane are as follows:

- Numbers of eldana larvae are undoubtedly much fewer.
- Cutter productivity may be increased as there is very little or no lodged cane.
- In years of prolific flowering larger areas of flowered cane are harvested before cane quality begins to deteriorate.
- Planting into the late summer season means that the labour demand is better spread.

Although there are some risks involved in harvesting rainfed cane at a young age these are more than offset by reduced damage caused by eldana, higher yields, and better quality of plant or seasonal cane compared with carry-over cane.

Table 2

Yield and quality of "seasonal", "carry-over", and plant cane harvested at various ages in April

	Age at harvest	Area (ha)	Rel sucrose % cane	Juice purity %	Fibre % cane	Brix % cane	Tons cane /ha	Tons cane/ha/ month	Ton suc/ ha	Kg suc/ ha/month
Carry-over	16,5	65,1	11,6	77,7	16,0	12,6	78	4,7	8,1	489
Seasonal	11,1	81,1	12,0	78,8	13,7	13,2	57	5,1	6,9	616
Plant	14,0	96,4	12,2	78,1	14,8	13	71	5,1	8,8	620

Table 3

Average analyses of cane unsprayed and sprayed with Ethrel at 1,5 ℓ/ha

	Year	Sucrose % cane	Tons/ cane/ha	Tons/ sucrose/ ha	Juice purity %	Rate of Ethrel l/ha	No. of fields
Control	1987	12,0	88	10,5	–		2
Ripened	1987	12,6	87	11,2	–	1,5	2
Variance		+ 0,6	− 1	+ 0,7			
Control	1988	10,9	68,0	7,2	80,9		4
Ripened	1988	11,8	71,5	8,5	84,3	1,6	4
Variance		+ 0,9	+ 3,5	+ 1,3	+ 3,4		

With the move to cutting younger cane cognizance must be taken of the new, faster growing varieties such as N14, N16 and N17. It is nevertheless recognised that a variety such as N12 may be preferred for its drought tolerance and relative eldana resistance, even though it should generally be harvested when slightly more than 12 months of age.

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ANNEXURE 1 Production costs used for calculating gross margins

	R/ha
Average planting costs	
Crop chemicals: Roundup, herbicides, fertilizer	280,00
Ridging	36,00
Labour to plant, weed, apply herbicide and fertiliser	193,50
Seedcane	368,00
Haulage	20,00
General	5,00
TOTAL	903,30
Average ratoon management costs	
Planting costs, allocated to 6 crops	150,55
Agricultural chemicals	484,00
Labour for weed control; herbicide and fertiliser application, digging drains and harvesting	327,72
Haulage	143,00
TOTAL	1 105,27