SEVENTY-NINTH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (2003-2004)

S B DAVIS

Sugar Milling Research Institute, University of KwaZulu-Natal, Durban, 4041, South Africa

Abstract

Performance, throughput and other relevant aspects of the sugar industries in southern Africa are presented and discussed. Data from sugar mills in South Africa, Swaziland, Zimbabwe and Malawi1 are included. The cane crop and factory performance are discussed, with Recoverable Value trends particularly mentioned. In contrast to the excellent 2002-2003 season, the 2003-2004 season suffered from drought conditions in several areas and a severe late frost in the Midlands areas. These contributed to a crop of less than 21 million tons of cane, compared to 23 million tons in 2002-2003, and poor cane supply and poor cane quality late in the season, leading to processing problems at some factories.

Introduction

This paper reviews the 2003-2004 milling season in southern Africa, including data from mills in South Africa, Swaziland, Zimbabwe and Malawi. As is the custom, detailed information on the factory performance figures of the last and recent seasons and details of cane varieties crushed and a summary of cane transport used in South Africa are presented in Tables B to J in the Appendix.

Cane crop

Cane varieties

The varietal distribution for southern African mills is shown in Table G for the 2003-2004 season. Notable changes since the 2002-2003 season are the decreases in percentages of NCo376 and N14 in certain areas (Umfolozi, Entumeni, Felixton, Umzimkulu, Mhlume, Simunye, Hippo Valley for NCo376 and Malelane, Komati, Nchalo for N14) and increases in the percentages of more recent varieties such as N19, N23, N25 and N27. N25 is slowly replacing N14 in the northern irrigated areas, while N27 is replacing NCo376 in Zululand.

Burning

In a reversal of the recent trend, the percentage of cane burnt increased slightly from 84.6% in 2002-2003 to 87.8% in 2003-2004. Mills that showed the largest increases in percent of burnt cane were Felixton, Darnall, Maidstone, Gledhow and Noodsberg.

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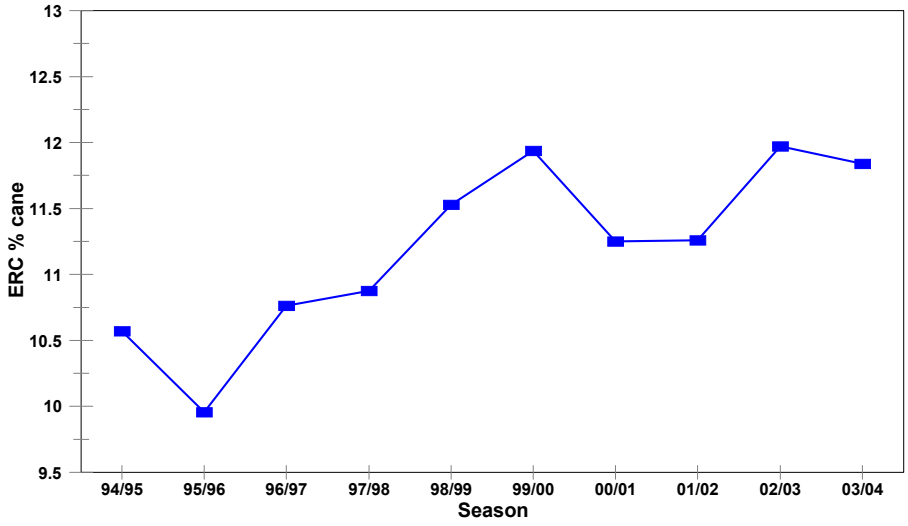
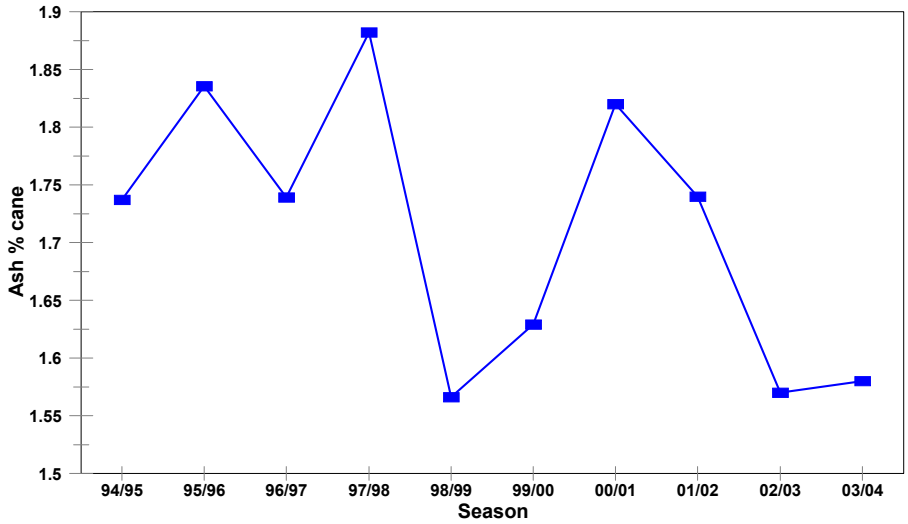
[1]South African sugar factories: AK = Amatikulu, DL = Darnall, EN = Entumeni, FX = Felixton, GH = Gledhow, KM = Komati, ML = Malelane, MS = Maidstone, NB = Noodsberg, PG = Pongola, SZ = Sezela, UC = Union Co-op, UF = Umfolozi, UK = Umzimkulu
Malawi sugar factories: DW = Dwangwa, NH = Nchalo
Swaziland sugar factories: MH = Mhlume, SM = Simunye, UB = Ubombo
Zambia sugar factories: NK = Nakambala
Zimbabwe sugar factories: HV = Hippo Valley, TR = Triangle





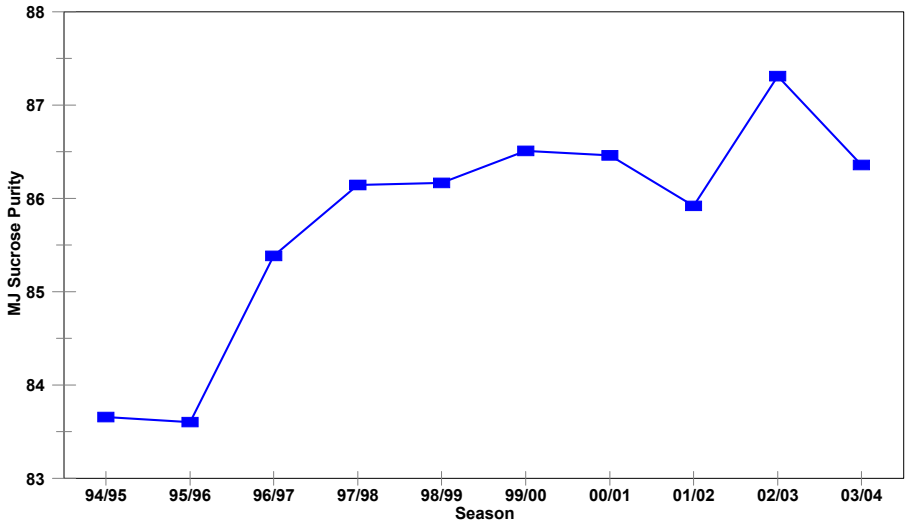


Figure 1. Cane quality trends in South Africa.

Cane quality

Trends in the cane quality indicators of Estimated Recoverable Crystal (ERC) % cane, Ash % cane and Mixed Juice sucrose purity are shown for the last ten seasons in Figure 1. Although ERC and Ash levels were little changed from the 2002-2003 season, the mixed juice purity dropped significantly from the previous season's excellent value. A comparison of the monthly values of Recoverable Value (RV) % cane for the last two seasons (Figure 2) shows that the 2003-2004 season's curve peaked later than in 2002-2003, but fell off sharply towards the end of the season. Two factors are responsible for this: the continuing dry conditions with a usually dry winter, and a severe frost in the Midlands area in the middle of August that affected a significant quantity of cane.

Overall, the season average RV % cane figures changed little from the previous season, with the South African industry average dropping from 12.55% to 12.46%, and the changes at individual mills being less than 1% in all cases (Figure 3). Similarly, the average ERC % cane for the Swaziland industry dropped slightly from 12.55% to 12.21%.

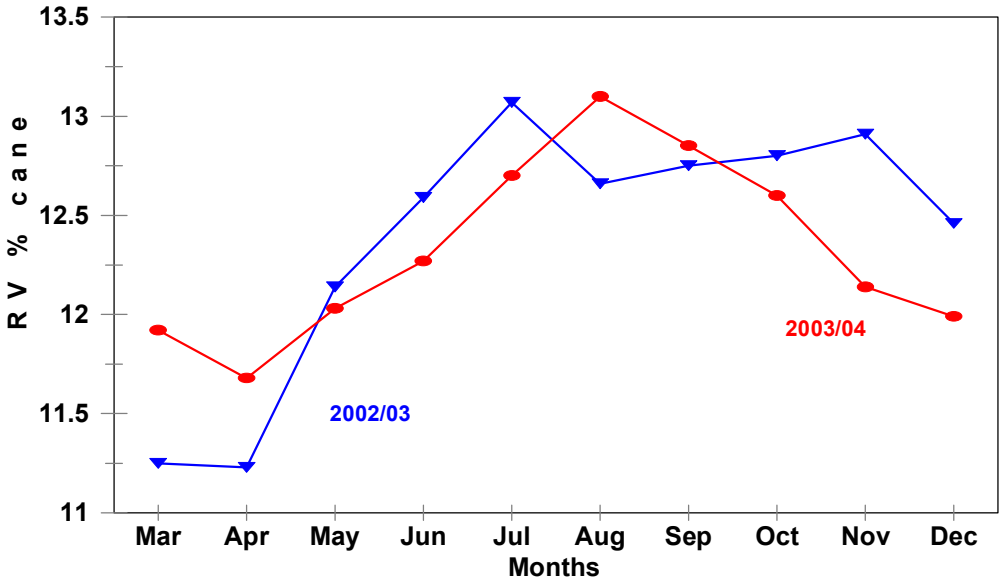


Figure 2. Monthly RV % cane in South Africa for the 2002-2003 and 2003-2004 seasons.

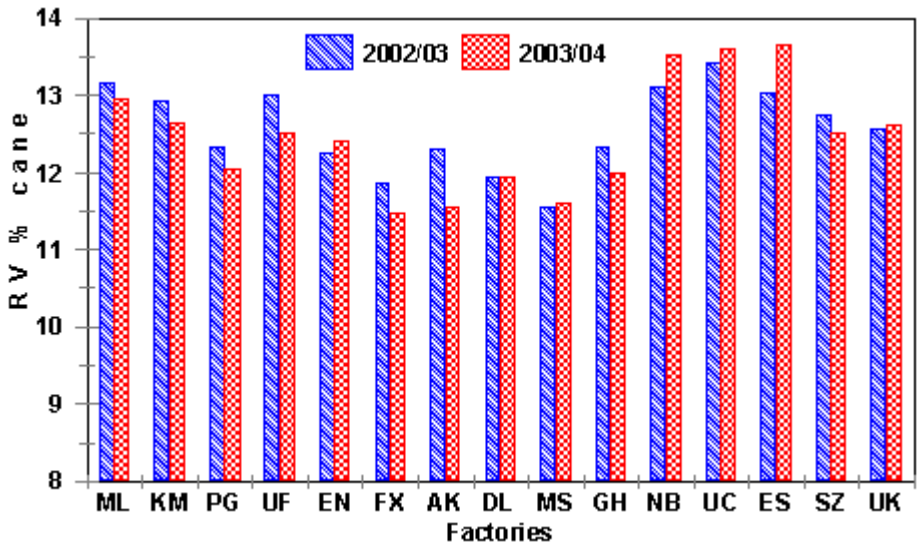


Figure 3. RV % cane for South African mills for the 2002-2003 and 2003-2004 seasons.

The weekly trends in mixed juice quality are shown in Figures 4 a-c, and they again show the initial high purity as the Midlands mills commenced crushing, followed by a sharp drop as the mills in the northern irrigated region started. Both Malelane and Komati had a shortage of cane during the season, and relatively immature cane was crushed early in the season, with resultant high reducing sugar contents in mixed juice causing the peak evident in Figure 4b. Cane quality dropped off towards the end of season, in contrast to the level quality in 2002-2003, as more cane growth was experienced following some rain. The reducing sugar to Brix ratio ended the season at 4.65%, in contrast to the low value of 3% at the end of 2002-2003.

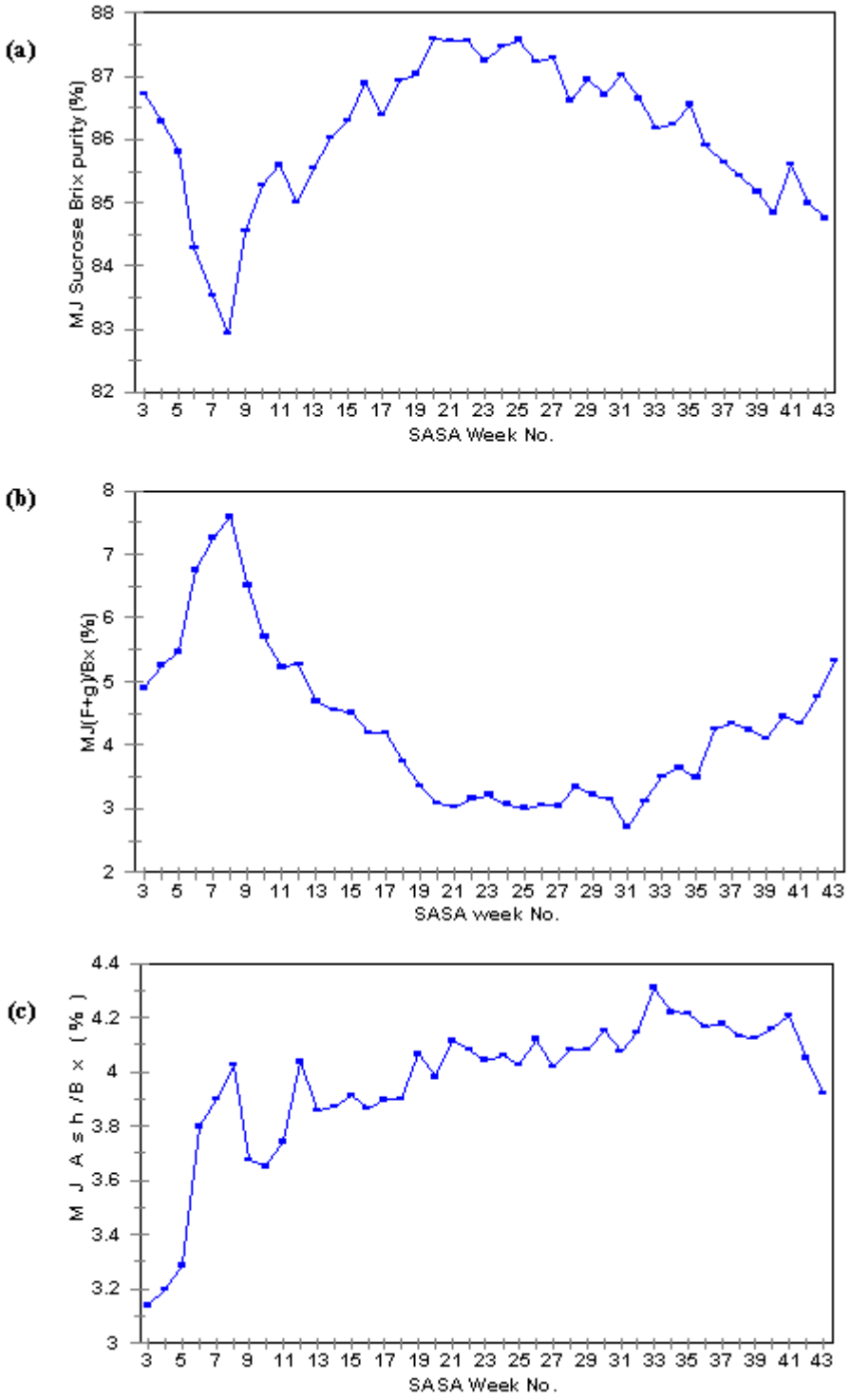


Figure 4. Weekly trends in mixed juice quality in South Africa for the 2003-2004 season: (a) sucrose/brix purity, (b) fructose + glucose on brix, (c) ash on brix.

Ash levels in mixed juice were slightly higher than in 2002-2003, but remained below 4.5% on Brix.

Cane tonnage

The sharp reduction in the crop size is evident in Figure 5, where the cane tonnages crushed for the last 10 seasons are plotted. The total tonnage crushed in 2003-2004 was 20.419 million tons, the smallest crop since the 1995-1996 season, the last year of the previous severe drought (Lionnet, 1996). The average crush rate (Figure 6) was also substantially lower than in previous seasons, as mills compensated for the predicted small crop. This can be seen in Figure 7, where the monthly average crush rates for the 2002-2003 and 2003-2004 seasons are shown. Again, all mills boiled off in late November to mid December as planned. The dry conditions and proper planning ensured that no-cane stops were kept reasonably low throughout the season (Figure 8), despite the problems caused by the frosted cane in the Midlands.

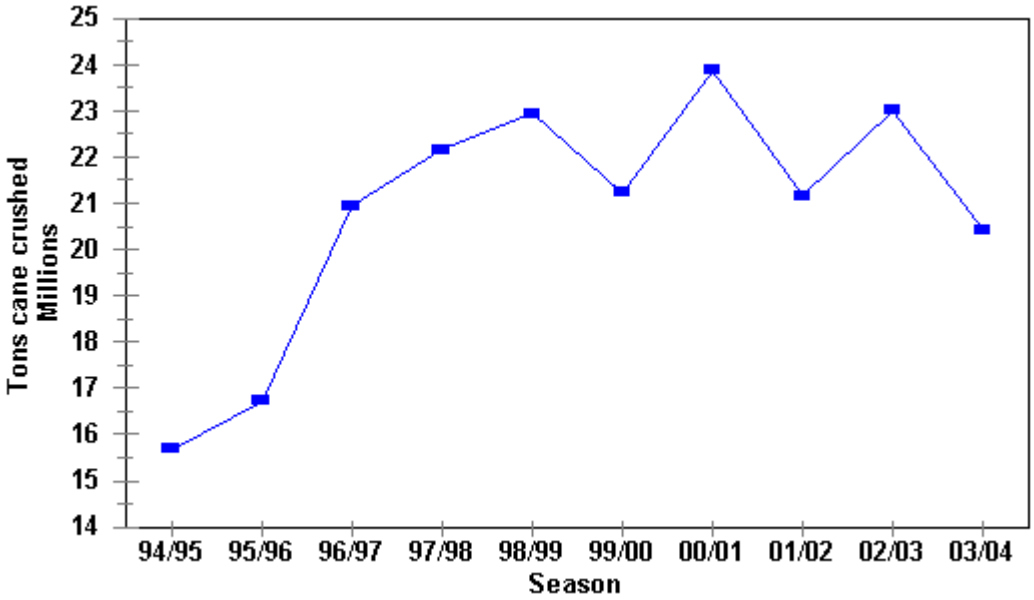


Figure 5. Cane tonnages in South Africa (drought years were 1993-1994 to 1994-1995).

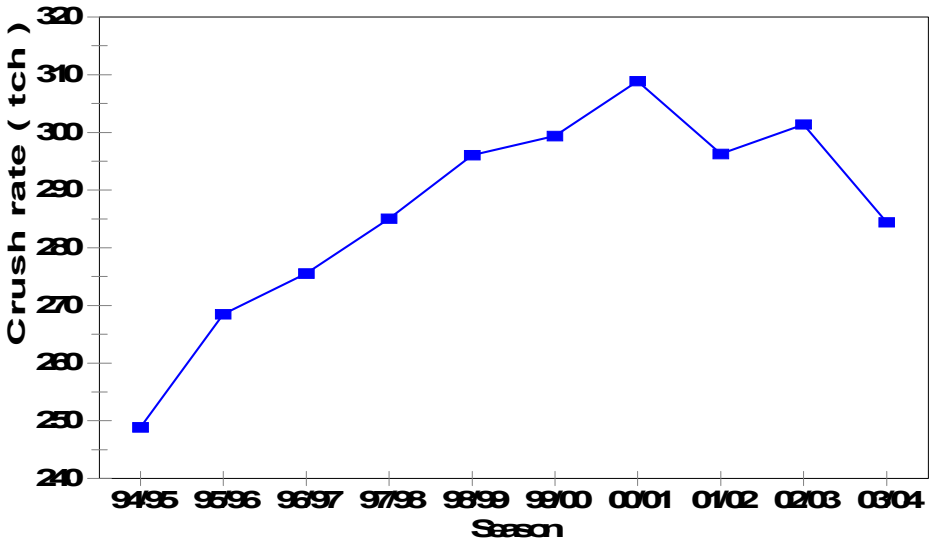


Figure 6. Average tons cane per hour (tch) crushed in South Africa.

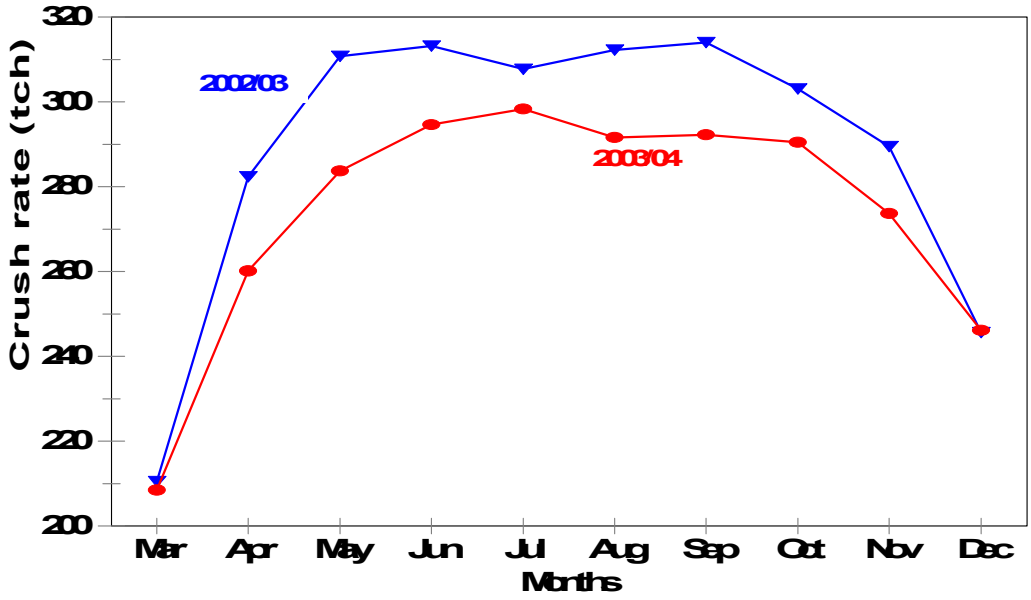


Figure 7. Monthly values of crushing rate (tch) in South Africa for the 2002-2003 and 2003-2004 seasons.

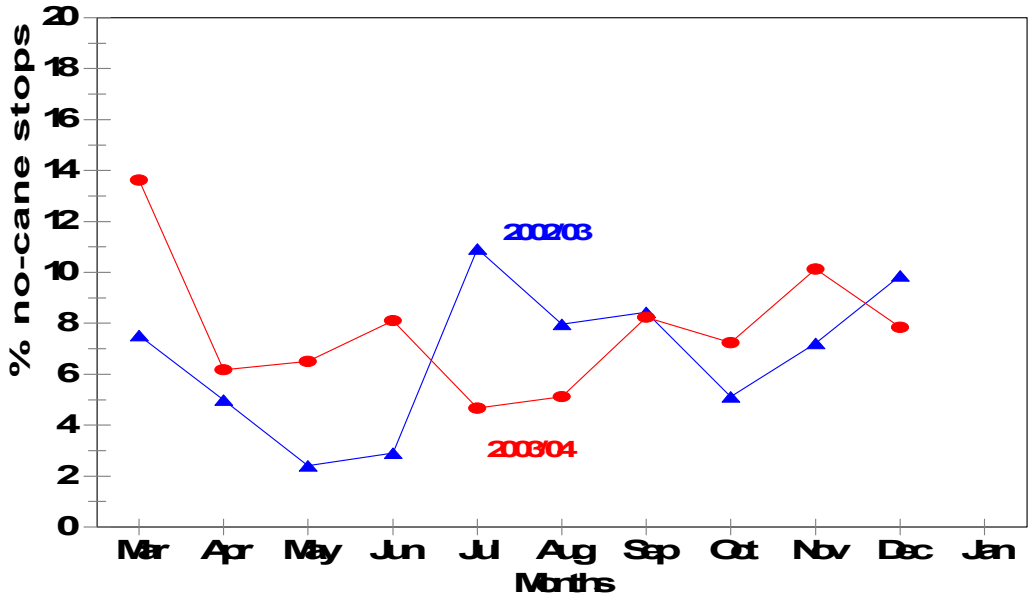


Figure 8. Monthly values of no-cane stops in South Africa for the 2002-2003 and 2003-2004 seasons.

Cane to sugar ratio

Although the climatic conditions remained dry, cane quality did not deteriorate severely, and as a result a good cane to sugar ratio of 8.42 was achieved in South Africa, slightly up from the previous season's value of 8.32 (see Figure 9). In other southern African countries, the cane to sugar ratio increased in both Swaziland and Zimbabwe, but improved to an excellent value of 7.77 in Malawi (Figure 10).

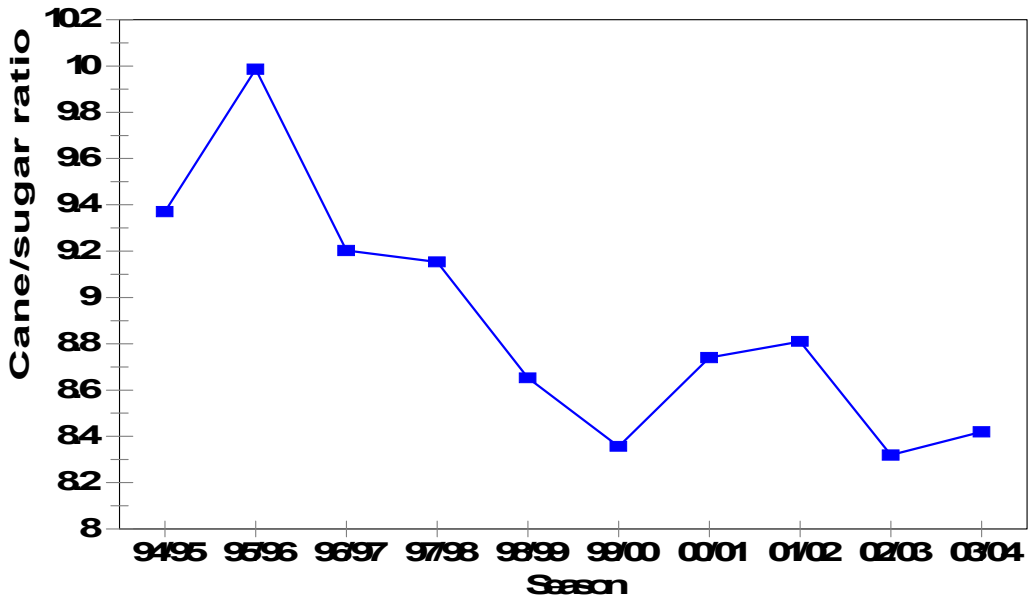


Figure 9. Cane to sugar ratio in South Africa for recent seasons.

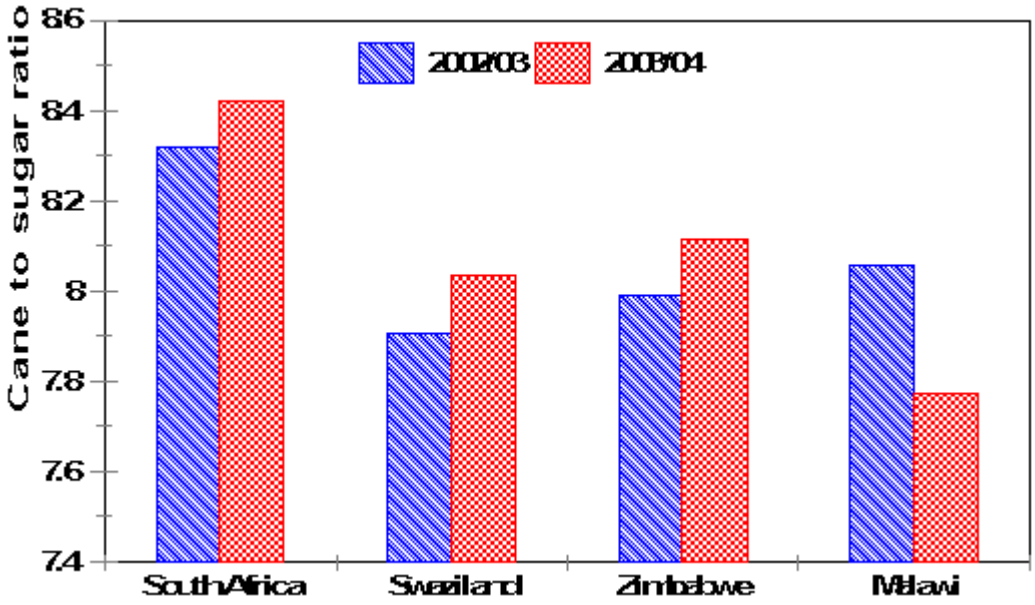


Figure 10. Cane to sugar ratio in Southern Africa for the 2002-2003 and 2003-2004 seasons.

Factory performance

Length of milling season

The dry conditions in South Africa resulted in shortage of cane generally, and the season was shorter at most mills than in 2002-2003. The season started at Pongola on 9 March 2003, and finished at Noodsberg on 21 December 2003. The longest season was 285 days at Pongola and the shortest was 196 days at Amatikulu, which had a poor season with significant processing problems. The weighted average season length was 242 days, 9 days shorter than in 2002-2003.

Time efficiencies

The time accounts for the 2003-2004 season in southern Africa are shown in Table 1. The overall time efficiency (OTE) in South Africa decreased by just over one percent from 2002-2003, mainly as a result of an increase in no-cane stops. This was most evident in the North Coast and Zululand mills, which suffered more than the South Coast and Northern Irrigated mills from the effects of the continued drought. Although the Lost time % available crushing time figure for South Africa increased slightly over the record low of the 2002-2003 season, at 4.90% it is still a good achievement. The poor figures for the Zimbabwe industry arose mainly from a severe cane shortage at the Triangle mill, with their second tandem recording no cane stops of 44.81%. As previously mentioned, the Malawi mills had an excellent season, with a high overall time efficiency allowing them to achieve good results from a short season, as shown in Figure 11.

Table 1. Time account in Southern Africa 2003-2004.

Parameter	South Africa	Swaziland	Zimbabwe	Malawi
Overall time efficiency (%)	82.72	80.12	76.82	87.75
Scheduled stops (%)	5.43	4.78	3.79	4.59
Other stops (%)	4.26	9.77	7.02	5.18
No cane stops (%)	7.12	4.99	12.24	2.42
Foreign matter stops (%)	0.47	0.33	0.12	0.14
Lost time % available	4.90	10.88	8.54	5.48

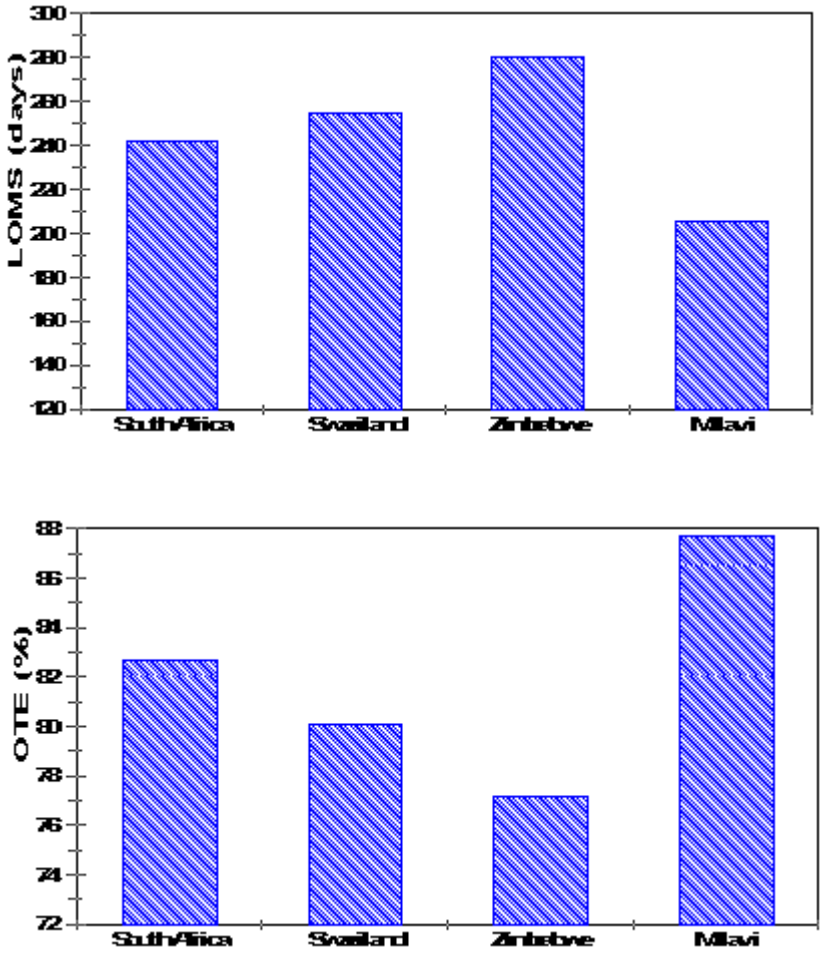


Figure 11. Average length of milling season (LOMS) and overall time efficiency (OTE) in Southern Africa for the 2003-2004 season.

Extraction and clarification

Extraction in the South African industry remained excellent, with an industrial average of 97.87% in 2003-2004. With the recent attention on factors affecting cane quality parameters such as ERC, RV and MERC, it is of interest to look at the effect of fibre % cane on sucrose loss to bagasse. According to van Hengel's (1974) original derivation of ERC % cane, the loss of sucrose to bagasse is proportional to the fibre content of cane; the factor involved being designated as 'c'. In Figure 12, the sucrose loss to bagasse as a percent of sucrose in cane is plotted for the South African mills against fibre in cane for the 2003-2004 season. It may come as some surprise to see that the regression line is virtually horizontal, that is, sucrose loss to bagasse is almost independent of fibre % cane. The 'c' factor to be used for the 2004-2005 season confirms this, being a very low 0.0194732. The factor that has a greater effect on the sucrose loss to cane is the imbibition % fibre added in the extraction line, as can be seen in Figure 13, and so the best extraction results can be achieved by using as much imbibition as the evaporation station and steam supply will allow, and cane fibre has relatively little effect. It must be noted, however, that the industry average imbibition rate of 375% on fibre is the highest for several years, and if imbibition rates have to be restricted because of a high required crush rate or energy considerations, then fibre % cane will again be important as a determinant of sugar extraction.

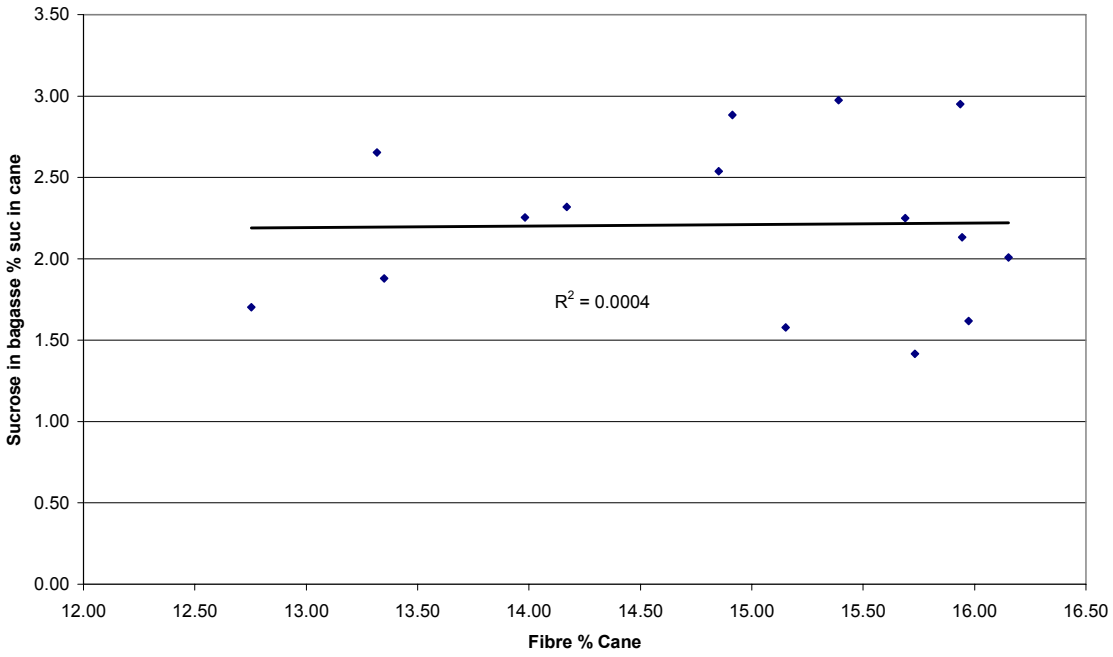


Figure 12. Loss of sucrose in bagasse related to fibre in cane.

As with the 2002-2003 season, six mills routed clarifier mud back to the diffuser for the entire 2003-2004 season, while PG and ES did so for part of the season. It is interesting to note the range of approaches to mud recycling in terms of insoluble solids % mud maintained, ranging from a season average of 6.19% at AK to 1.69% at KM.

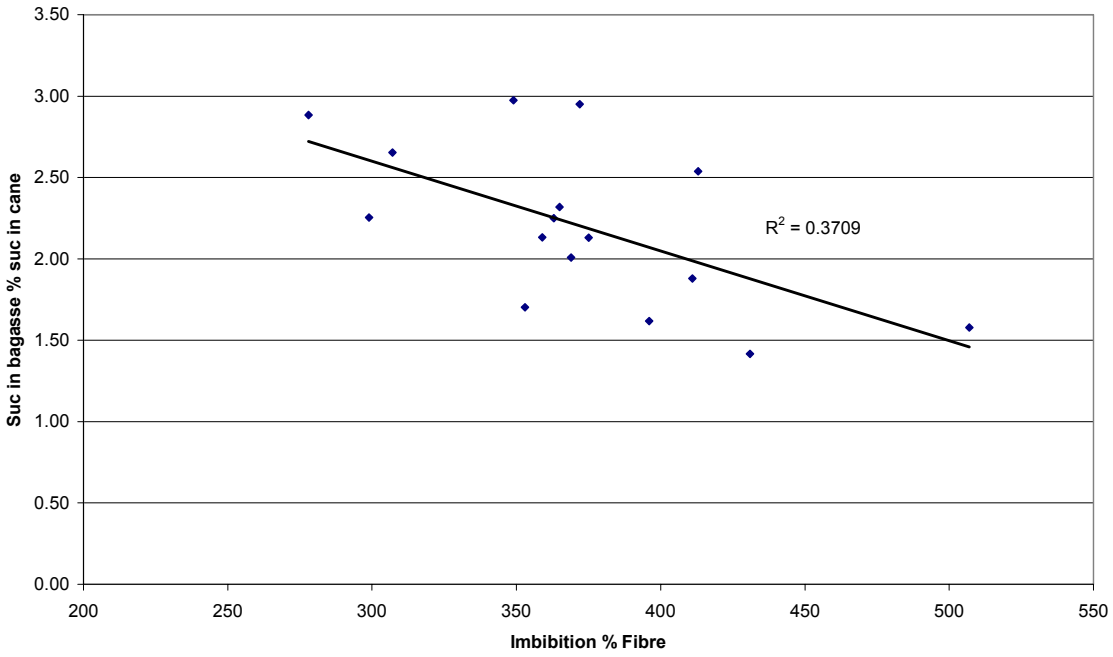


Figure 13. Sucrose loss to bagasse related to imbibition added.

Boiling house performance

Boiling house performance was good at all factories, with a season average for the South African industry for 2003-2004 of 88.14%. The best figure was once again recorded at Union Co-op, with an excellent value of 91.65%, but only ES, DL and UK managed to improve Boiling House Recovery (BHR) from 2002-2003 to 2003-2004 (Figure 14). The general decrease in BHR was the result of higher losses of sucrose to molasses, from 8.62% sucrose in cane in 2002-2003 to 9.48% in 2003-2004, while the Undetermined Loss % sucrose in cane increased only slightly from 1.87% to 1.95%, still below the benchmark of 2.0% (Figure 15).

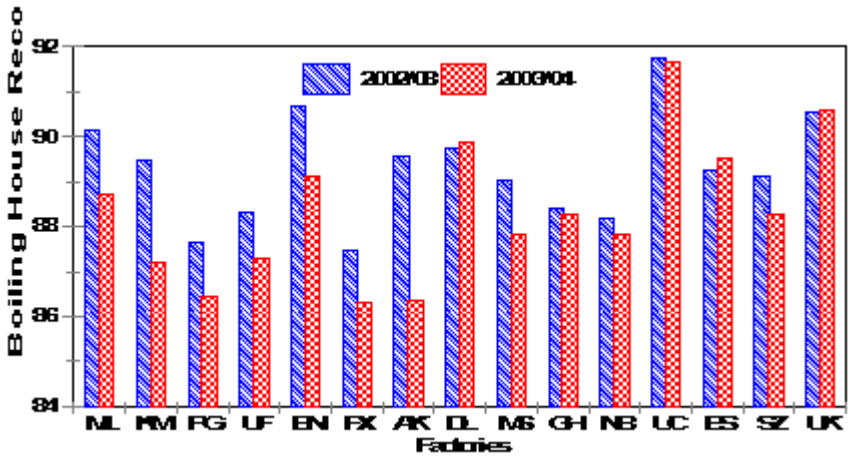


Figure 14. Boiling house recoveries for South African mills for the 2002-2003 and 2003-2004 seasons.

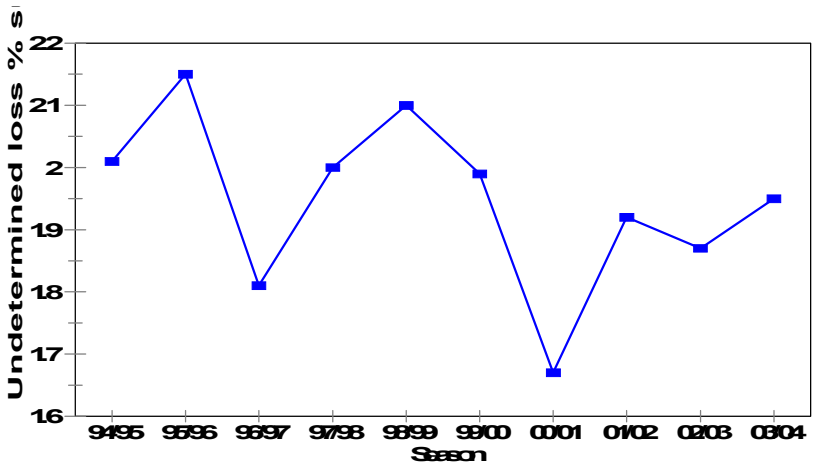


Figure 15. Undetermined loss in South Africa.

Sucrose loss to molasses is generally a function of the non-sucrose content of cane, as is shown in Figure 16, and so it is important to minimise non-sucrose in cane by ensuring optimum maturity and freshness. The trendline clearly shows the increasing percentage of sucrose in cane reporting to molasses as the non-sucrose content of cane increases, but an interesting aspect is the two points at the extreme right of the graph. These two mills, although they have the highest non-sucrose % cane in the industry, reported molasses losses significantly below the trendline. This can be ascribed to a high proportion of the non-sucrose being reducing sugars, which aid exhaustion, as a result of immature cane. However, the high non-sucrose content still meant that over 10% of the sucrose was lost to molasses. The mills represented by the cluster of points at the left all process a large proportion of inland cane, which is up to 24 months old, and hence mature. The lowest point of the cluster is, in addition, a mill that has generally very good cane management and hence fresh cane, and so its loss of sucrose to molasses is the lowest in the industry.

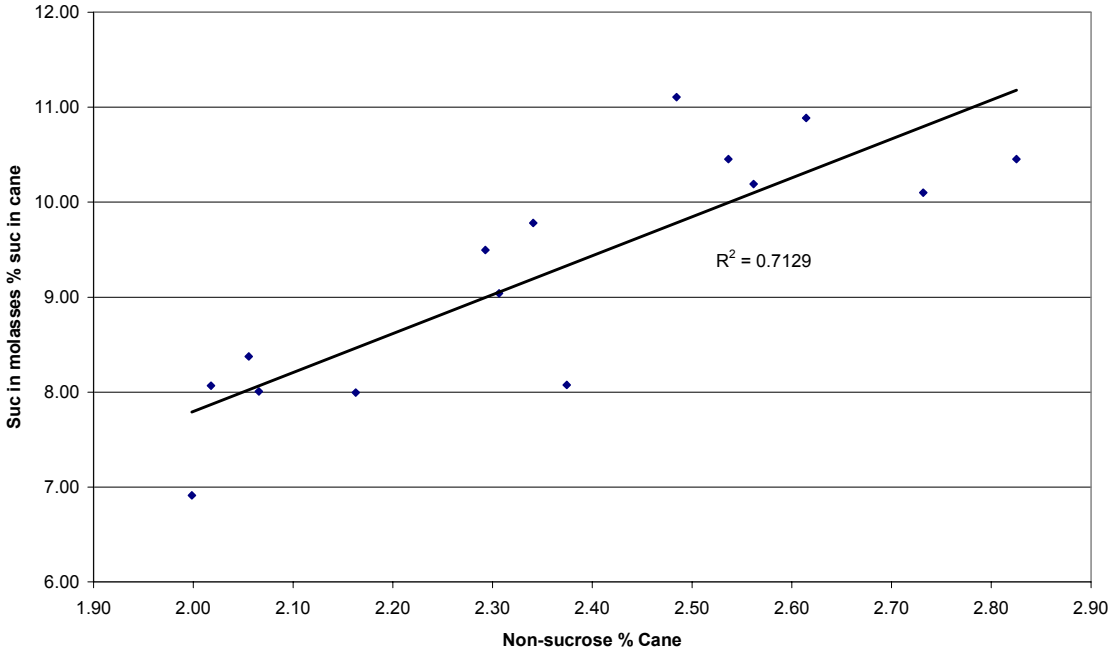


Figure 16. Sucrose loss to molasses related to non-sucrose in cane.

Most of the higher sucrose loss to molasses in the 2003-2004 season appears to be caused by higher Target Purity Differences, which were consistently higher throughout the 2003-2004 season compared to the previous season, as shown in Figure 17. The season average figure rose from 4.4 units to 5.1 units, while the reducing sugar to ash ratio, from which the target purity is calculated, remained the same at 0.82. Higher massecuite and molasses viscosities often lead to poor exhaustion, so the average monthly final molasses viscosities from a selection of South African mills covering all regions were calculated, using the viscosities corrected to 74% dry solids to enable comparisons to be made. These values for the past two seasons are shown in Figure 18. It can be seen that the viscosities were not generally higher in 2003-2004 compared to 2002-2003, but the consequences of weather conditions are quite clear. There is a distinct rise in viscosities from August 2002 following significant winter rainfall, only reducing towards the end of the year with the drier conditions. In 2003, by contrast, viscosities were typically low in mid-season, but rose sharply towards the end of the season as a consequence of warmer conditions, and also possibly as the result of processing frost-affected cane from the Midlands region.

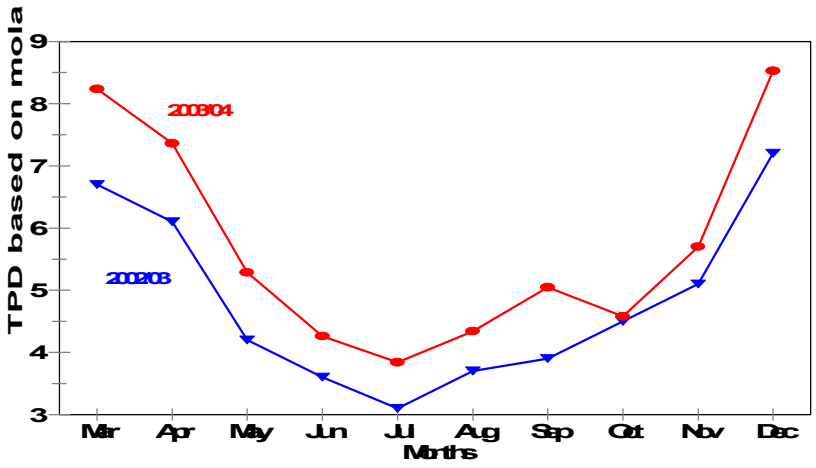


Figure 17. Target purity difference (TPD) of molasses in South Africa for the 2002-2003 and 2003-2004 seasons.

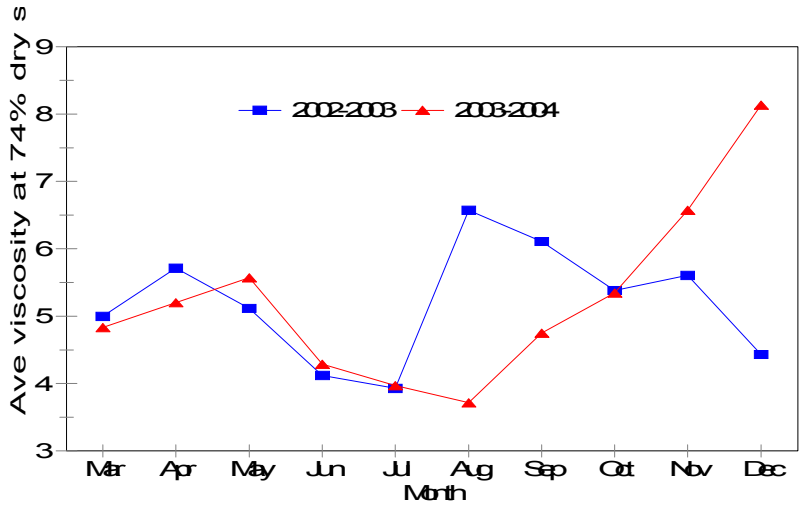


Figure 18. Average final molasses viscosities of 74% dry solids for selected South African mills for the 2002-2003 and 2003-2004 seasons.

As a consequence of higher TPD values, and a higher non-sucrose loading in mixed juice in 2003-2004, the molasses factor (tons sucrose in molasses divided by tons non-sucrose in mixed juice) rose sharply to its highest value in the last 10 years (Figure 19). This is an alarming trend and particular attention should be paid to improving molasses exhaustions to reverse it.

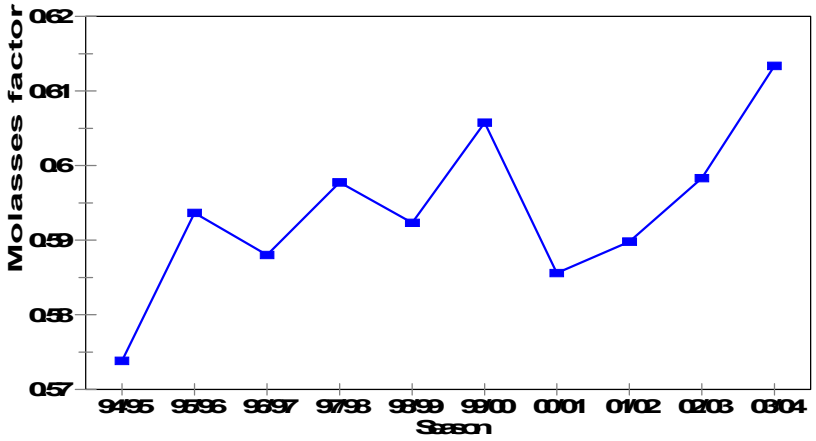


Figure 19. Molasses factor in South Africa.

Sugar quality

The average colour of VHP sugar produced by the South African industry in 2003-2004 was significantly higher than that of the 2002-2003 season, as shown in Figure 20. This increase is mirrored in the affinated sugar colours, indicating that juice colours were inherently higher in 2003-2004. This is mainly as a consequence of poorer cane quality, characteristic of drought-stressed cane. A special effort needs to be made to improve sugar quality and colour to maintain our share in an increasingly competitive world market, and all players in the industry must play their part.

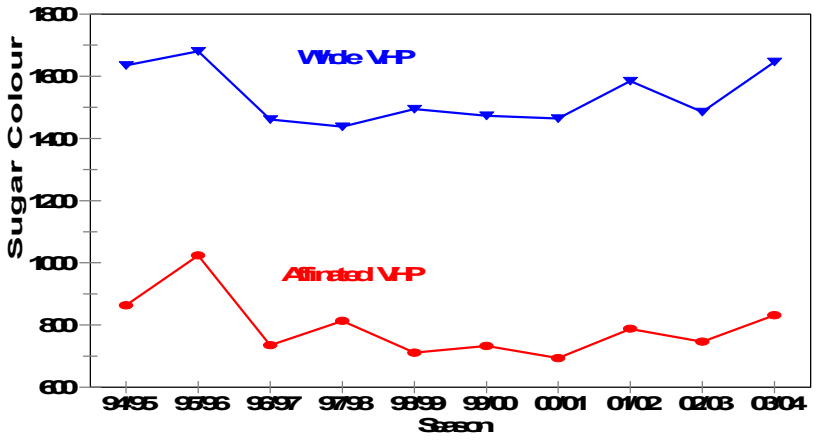


Figure 20. VHP and affinated sugar colours in South Africa.

Conclusions

The 2003-2004 season was poor by the standards of the previous season, with a 12% smaller production of sugar and higher average colour. The dry conditions and a severe frost in the Midlands region were mostly responsible for this, and the consequences are expected to persist into the 2004-2005 season. The dry conditions also affected Swaziland and Zimbabwe, while Malawi experienced an excellent season by contrast.

Acknowledgements

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Appendix: Data Tables

Table B1: Cane crushed and sugar made, cane composition and time accounts, performances and losses – South African mills (Season 2003-2004)

Table B2: Cane crushed and sugar made, cane composition and time accounts, performances and losses – Swaziland, Malawi and Zimbabwe mills (Season 2003-2004)

Table C1: Analysis of bagasse, juices, filter cake, syrup and final molasses – South African Mills (Season 2003-2004)

Table C2: Analysis of bagasse, juices, filter cake, syrup and final molasses – Swaziland, Malawi and Zimbabwe mills (Season 2003-2004)

Table D1: Massecuites, exhaustions, clarifying agents and additional fuels – South African mills (Season 2003-2004)

Table D2: Massecuites, exhaustions, clarifying agents and additional fuels – Swaziland, Malawi and Zimbabwe mills (Season 2003-2004)

Table E: Comparative manufacturing data of recent years (South African mills)

Table F: Average manufacturing results by monthly periods for South African mills (Season 2003-2004)

Table G: Cane varieties and rainfall (Season 2003-2004)

Table H: Transport summary – South African mills (Season 2003-2004)

Table J: Comparative data of reporting South African mills from 1925 onwards

TABLE B1

CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES

SOUTH AFRICAN MILLS (SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	ML *	KM-A *	KM-B *	KM-AVE	PG *	UF *	EN **	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *	MS-AVE
TONS SUGAR MADE AND ESTIMATED	230109	-	-	258210	160118	127229	42510	-	-	206591	126979	126947	-	-	156284
Refined % total sugar	-	-	-	-	73.64	67.33	-	-	-	-	-	-	-	-	-
Moisture all sugar	0.07	-	-	0.09	0.03	0.04	0.08	-	-	0.11	0.13	0.08	-	-	0.12
Pol all sugar	99.41	-	-	99.36	99.81	99.80	99.32	-	-	99.45	99.31	99.35	-	-	99.39
Tons cane crushed total	1837756			2137724	1426568	1087606	361203			1894726	1160625	1097397			1389215
Tons cane crushed per tandem		1037919	1099805					933644	961082				587780	801435	
Season started on	1 Apr 2003	-	-	2 Apr 2003	9 Mar 2003	25 Apr 2003	23 Apr 2003	-	-	7 May 2003	30 Apr 2003	24 Apr 2003	-	-	23 Apr 2003
Season completed on	19 Dec 2003	-	-	14 Dec 2003	19 Dec 2003	12 Dec 2003	8 Dec 2003	-	-	29 Nov 2003	12 Nov 2003	27 Nov 2003	-	-	22 Nov 2003
Length of season (days)	261	-	-	256	285	231	229	-	-	206	196	217	-	-	213
TIME ACCOUNT															
Overall time efficiency %	92.56	84.39	86.97	85.67	83.46	79.63	76.44	73.87	72.19	73.03	79.01	72.28	79.94	83.63	81.78
Scheduled stops% gross available time	0.22	4.57	4.02	4.30	5.18	3.06	9.14	7.20	8.00	7.60	7.95	8.07	4.41	4.00	4.21
Lack of cane % gross " " "	3.64	4.06	2.39	3.23	6.95	8.66	10.37	15.44	15.91	15.68	7.28	14.29	11.93	8.96	10.45
Other stops % gross " " "	3.42	6.37	5.67	6.02	3.19	7.08	4.03	3.31	3.53	3.42	5.22	4.73	3.50	3.11	3.31
Foreign matter % gross" " "	0.17	0.62	0.94	0.78	1.22	1.58	0.02	0.18	0.37	0.28	0.54	0.63	0.22	0.30	0.26
Lost time % available crush.time	3.56	7.02	6.12	6.57	3.68	8.16	5.00	4.29	4.66	4.47	6.20	6.15	4.20	3.58	3.89
Force majeure stops (hours)	3	3	8	5	4	3	32	0	0	0	14	0	7	7	7
THROUGHPUTS PER CRUSHING HOUR															
Tons cane	309.51	199.04	206.43	405.55	251.23	249.01	85.90	258.74	272.18	530.78	310.77	291.88	142.97	187.29	331.15
Tons fibre	41.32	25.28	26.42	51.72	33.03	33.71	12.36	42.00	43.76	85.74	49.55	43.24	22.44	29.35	51.93
Tons brix in mixed juice(adj.)	51.02	32.56	33.45	66.02	38.26	38.30	12.83	38.61	39.81	78.40	45.78	43.21	21.54	28.14	49.82
Tons sucrose in mixed juice(adj.)	43.42	27.54	28.26	55.80	32.57	33.31	11.27	32.88	33.82	66.71	39.09	37.32	18.23	23.81	42.04
Tons non-suc. in mixed juice(adj.)	7.60	5.02	5.19	10.21	5.69	4.99	1.56	5.72	5.99	11.71	6.69	5.88	3.32	4.33	7.67
Tons of sugar produced	38.75	-	-	48.99	28.20	29.13	10.11	-	-	57.87	34.00	33.76	-	-	37.25
COMPOSITION OF CANE CRUSHED															
Sucrose % cane	14.30	14.08	13.92	14.00	13.32	13.69	13.52	12.96	12.69	12.82	12.85	13.18	12.93	12.90	12.91
Pol % cane	14.13	13.93	13.77	13.85	13.18	13.63	13.43	12.89	12.62	12.75	12.81	13.10	12.85	12.83	12.84
Fibre % cane	13.35	12.68	12.83	12.75	13.32	14.17	15.39	16.23	16.08	16.15	15.94	15.94	15.81	15.67	15.73
Brix % cane	17.03	16.91	16.75	16.82	15.85	16.00	15.59	15.58	15.30	15.44	15.34	15.55	15.48	15.47	15.47
Ash % cane	1.48	1.27	1.27	1.27	1.51	2.19	1.59	1.93	1.89	1.91	1.38	0.00	1.33	1.39	1.36
ERC % cane	12.28	12.03	11.87	11.95	11.43	11.90	11.84	10.98	10.72	10.85	10.95	11.32	10.99	10.96	10.97
ERC % sucrose in cane	85.90	85.45	85.28	85.37	85.80	86.92	87.56	84.70	84.45	84.58	85.18	85.95	85.00	84.92	84.95
RV % cane	12.96	12.72	12.55	12.63	12.06	12.51	12.41	11.61	11.34	11.48	11.56	11.93	11.61	11.58	11.59
Merc % cane	12.53	12.19	12.02	12.10	11.61	11.93	11.94	10.96	10.70	10.83	10.93	11.37	10.98	10.94	10.96
EXTRACTION															
Extraction (sucrose based)	98.12	98.25	98.34	98.30	97.35	97.68	97.03	98.06	97.92	97.99	97.87	97.05	98.63	98.55	98.58
Corrected reduced extraction	97.63	97.69	97.84	97.77	96.74	97.22	96.72	98.17	98.04	98.10	97.95	96.90	98.66	98.58	98.61
Imbibition % fibre	411	359	348	353	307	365	349	377	362	369	359	372	444	422	431
Preparation index	93	93	93	93	93	-	90	91	90	91	92	91	91	90	90
Pol factor	99.00	100.21	99.44	99.81	99.10	99.47	99.12	100.40	98.85	99.62	99.90	99.58	99.65	100.15	99.93
Brix factor	100.44	101.31	100.58	100.94	100.59	101.16	99.94	103.29	101.87	102.57	101.30	101.11	100.86	101.30	101.11
RECOVERIES															
Boiling house recovery (sucrose)	88.73	-	-	87.21	86.42	87.28	89.10	-	-	86.30	86.37	89.88	-	-	87.83
C. R. B.	86.73	-	-	86.47	85.50	86.17	86.12	-	-	86.36	86.10	88.56	-	-	88.25
Overall recovery (sucrose)	87.06	-	-	85.73	84.13	85.26	86.45	-	-	84.56	84.53	87.23	-	-	86.59
Ton cane per ton sugar	7.99	-	-	8.28	8.91	8.55	8.50	-	-	9.17	9.14	8.64	-	-	8.89
Ton cane per ton 96 pol sugar	7.71	-	-	8.00	8.57	8.22	8.21	-	-	8.85	8.84	8.35	-	-	8.59
Value Recovery %	100.70	-	-	99.68	98.49	98.32	98.14	-	-	99.38	98.73	100.46	-	-	101.15
Crystal Recovery Efficiency (XRE)	101.15	-	-	100.98	99.04	100.40	99.61	-	-	102.14	101.31	102.92	-	-	104.00
BALANCES															
Sucrose lost % sucrose in cane															
- lost in bagasse	1.88	-	-	1.70	2.65	2.32	2.97	-	-	2.01	2.13	2.95	-	-	1.42
- lost in filter cake	-	-	-	-	0.11	0.60	0.17	-	-	-	-	0.35	-	-	-
- lost in final molasses	10.10	-	-	10.45	10.45	9.04	8.01	-	-	10.89	11.11	8.07	-	-	10.19
- undetermined losses	0.96	-	-	2.12	2.65	2.79	2.40	-	-	2.54	2.23	1.40	-	-	1.80
Non sucrose ratio	1.03	-	-	0.99	1.09	1.05	1.05	-	-	1.04	1.05	0.98	-	-	0.99
Fructose ratio FM/MJ	0.93	-	-	0.89	0.92	0.86	0.92	-	-	0.95	0.97	0.83	-	-	0.89
Glucose ratio FM/MJ	0.79	-	-	0.60	0.69	0.60	0.72	-	-	0.68	0.65	0.60	-	-	0.67

*** Cane diffuser** **** Bagasse diffuser**

TABLE B1 (continued)

CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES SOUTH AFRICAN MILLS (SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
TONS SUGAR MADE AND ESTIMATED	-	-	134324	201728	102536	169102	-	-	241320	140260	2424247
Refined % total sugar	-	-	100.00	100.00	-	-	-	-	-	-	-
Moisture all sugar	-	-	0.02	0.02	0.08	0.11	-	-	0.10	0.07	0.08
Pol all sugar	-	-	99.93	99.93	99.50	99.42	-	-	99.47	99.48	99.53
Tons cane crushed total			1175622	1614763	777306	1307274			2014283	1136866	20418934
Tons cane crushed per tandem	417415	758207					983963	1030320			
Season started on	-	-	24 Apr 2003	12 Mar 2003	13 Mar 2003	13 Mar 2003	-	-	23 Apr 2003	23 Apr 2003	9 Mar 2003
Season completed on	-	-	6 Dec 2003	21 Dec 2003	19 Dec 2003	1 Dec 2003	-	-	19 Dec 2003	7 Dec 2003	21 Dec 2003
Length of season (days)	-	-	226	284	281	263	-	-	240	228	242
TIME ACCOUNT											
Overall time efficiency %	83.10	86.70	84.90	84.10	84.68	85.68	85.82	90.98	88.40	83.30	82.72
Scheduled stops% gross available time	4.36	5.66	5.01	5.12	7.48	4.00	4.66	4.68	4.67	7.03	5.43
Lack of cane % gross " " "	7.93	1.58	4.76	4.83	2.45	5.13	8.33	2.84	5.59	8.06	7.12
Other stops % gross " " "	3.96	5.72	4.84	5.61	5.28	4.91	0.99	1.25	1.12	1.50	4.26
Foreign matter % gross" " "	0.65	0.34	0.50	0.34	0.11	0.28	0.20	0.25	0.23	0.11	0.47
Lost time % available crush.time	4.54	6.19	5.39	6.25	5.86	5.42	1.14	1.36	1.25	1.77	4.90
Force majeure stops (hours)	2	2	2	12	1	10	0	0	0	0	93
THROUGHPUTS PER CRUSHING HOUR											
Tons cane	92.45	161.44	255.25	282.68	135.74	242.56	198.80	196.71	395.45	249.83	284.40
Tons fibre	13.86	24.13	38.19	39.43	18.80	35.75	31.39	31.22	62.61	37.85	41.35
Tons brix in mixed juice(adj.)	14.10	23.96	38.26	45.29	21.83	39.08	30.67	30.66	61.33	38.53	44.15
Tons sucrose in mixed juice(adj.)	12.14	20.70	32.85	40.18	19.44	34.84	26.70	26.68	53.38	33.85	38.13
Tons non-suc. in mixed juice(adj.)	1.96	3.26	5.24	5.11	2.39	4.24	3.96	3.98	7.94	4.69	6.02
Tons of sugar produced	-	-	29.16	35.31	17.91	31.38	-	-	47.38	30.82	33.77
COMPOSITION OF CANE CRUSHED											
Sucrose % cane	13.38	13.15	13.23	14.64	14.65	14.74	13.66	13.78	13.72	13.77	13.70
Pol % cane	13.32	13.10	13.18	14.58	14.59	14.67	13.60	13.72	13.66	13.69	13.61
Fibre % cane	15.25	15.93	15.69	14.91	13.98	14.85	15.93	16.02	15.97	15.15	14.81
Brix % cane	15.74	15.48	15.57	16.69	16.65	16.75	15.93	16.09	16.01	15.93	16.11
Ash % cane	1.37	1.35	1.36	1.86	1.07	2.09	0.00	0.00	0.00	1.34	1.58
ERC % cane	11.54	11.33	11.40	12.95	13.01	13.07	11.85	11.95	11.90	12.03	11.84
ERC % sucrose in cane	86.27	86.12	86.17	88.46	88.80	88.67	86.77	86.71	86.74	87.40	86.42
RV % cane	12.15	11.92	12.00	13.53	13.59	13.65	12.45	12.56	12.51	12.62	12.46
Merc % cane	11.60	11.38	11.46	13.09	13.13	13.19	11.92	12.01	11.97	12.08	11.93
EXTRACTION											
Extraction (sucrose based)	98.18	97.51	97.75	97.12	97.75	97.46	98.33	98.43	98.38	98.42	97.87
Corrected reduced extraction	98.08	97.41	97.65	96.54	97.24	97.10	98.32	98.43	98.37	98.32	97.64
Imbibition % fibre	361	364	363	278	299	413	392	400	396	507	375
Preparation index	91	90	90	91	93	91	88	89	89	92	91
Pol factor	99.65	99.36	99.47	99.30	99.06	99.08	99.38	99.44	99.41	99.27	99.43
Brix factor	100.75	100.19	100.39	100.59	100.62	100.21	100.90	101.23	101.07	100.53	100.91
RECOVERIES											
Boiling house recovery (sucrose)	-	-	88.28	87.83	91.65	89.54	-	-	88.27	90.59	88.14
C. R. B.	-	-	87.62	84.51	87.77	85.09	-	-	86.13	88.13	86.52
Overall recovery (sucrose)	-	-	86.29	85.30	89.58	87.27	-	-	86.84	89.16	86.26
Ton cane per ton sugar	-	-	8.75	8.00	7.58	7.73	-	-	8.35	8.11	8.42
Ton cane per ton 96 pol sugar	-	-	8.41	7.69	7.31	7.47	-	-	8.06	7.82	8.12
Value Recovery %	-	-	100.56	97.13	100.23	98.04	-	-	99.66	101.28	99.58
Crystal Recovery Efficiency (XRE)	-	-	102.60	98.11	101.81	99.26	-	-	101.47	103.49	101.25
BALANCES											
Sucrose lost % sucrose in cane											
- lost in bagasse	-	-	2.25	2.88	2.25	2.54	-	-	1.62	1.58	2.13
- lost in filter cake	-	-	0.22	0.98	0.08	0.08	-	-	0.10	-	0.17
- lost in final molasses	-	-	9.78	8.38	6.91	8.07	-	-	9.49	8.00	9.48
- undetermined losses	-	-	1.45	2.46	1.17	2.04	-	-	1.94	1.27	1.95
Non sucrose ratio	-	-	1.00	1.03	0.97	1.05	-	-	1.05	1.00	1.03
Fructose ratio FM/MJ	-	-	0.86	0.99	0.87	1.02	-	-	0.97	0.95	0.92
Glucose ratio FM/MJ	-	-	0.57	0.73	0.48	0.70	-	-	0.70	0.69	0.67

*** Cane diffuser**

TABLE B 2

CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES

SWAZILAND, MALAWI AND ZIMBABWE MILLS

(SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	MH-A *	MH-B	MH-AVE	UB-A *	UB-B	UB-AVE	SM	NH *	DW *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE
TONS SUGAR MADE AND ESTIMATED	-	-	167675	-	-	215791	244757	156819	103059	-	-	236116	-	-	265014
Refined % total sugar	-	-	59.93	-	-	47.22	0.00	32.18	39.91	-	-	14.02	-	-	23.02
Moisture all sugar	-	-	0.09	-	-	0.13	0.11	0.12	0.07	-	-	0.13	-	-	0.22
Pol all sugar	-	-	99.61	-	-	99.39	99.27	99.25	99.44	-	-	99.04	-	-	98.96
Tons cane crushed total			1289405			1839923	1916924	1276678	743177			1963189			2102463
Tons cane crushed per tandem	578281	711124		978925	860998					1040663	922526		1660143	442320	
Season started on	-	-	10 Apr 2003	-	-	20 Apr 2003	31 Mar 2003	16 Apr 2003	5 May 2003	-	-	22 apr 2003	-	-	15 Apr 2003
Season completed on	-	-	18 Dec 2003	-	-	23 Dec 2003	19 Dec 2003	7 Nov 2003	27 Nov 2003	-	-	26 Jan 2004	-	-	21 Jan 2004
Number of crushing days	-	-	252	-	-	247	263	205	206	-	-	279	-	-	281
TIME ACCOUNT															
Overall time efficiency %	71.37	82.19	76.78	80.99	84.23	82.61	80.98	87.59	87.91	89.03	86.24	87.64	87.61	40.95	66.01
Scheduled stops% gross available time	5.30	7.04	6.17	4.69	4.28	4.49	3.69	4.60	4.58	2.64	3.04	2.84	3.81	5.82	4.74
Lack of cane % gross " " "	7.00	2.87	4.93	4.59	4.52	4.55	5.49	3.44	1.40	2.39	2.38	2.39	2.49	44.81	22.08
Other stops % gross " " "	16.21	7.78	11.99	8.97	6.39	7.68	9.63	4.13	6.06	5.68	8.20	6.94	6.09	8.30	7.11
Foreign matter % gross " " "	0.13	0.12	0.12	0.75	0.59	0.67	0.21	0.24	0.05	0.26	0.14	0.20	0.00	0.11	0.05
Lost time % available crush.time	18.51	8.65	13.51	9.98	7.05	8.51	10.63	4.50	6.45	6.00	8.68	7.34	6.50	16.86	9.73
Force majeure stops (hours)	0	0	0	307	301	304	117	94	0	0	0	0	0	0	0
THROUGHPUTS PER CRUSHING HOUR															
Tons cane	134.31	143.41	278.36	203.07	171.89	374.36	383.47	302.16	174.99	174.74	160.19	335.18	280.95	185.78	507.24
Tons fibre	19.49	21.17	40.78	23.74	20.71	44.39	45.64	40.29	27.01	25.21	22.94	48.19	40.39	24.39	71.58
Tons brix in mixed juice	22.02	23.98	46.13	32.01	29.43	61.38	61.70	47.46	29.98	28.44	25.71	54.20	44.62	28.88	80.20
Tons pol in mixed juice	19.02	20.67	39.80	26.71	24.31	50.97	52.97	41.50	26.44	24.59	22.16	46.80	38.79	25.17	69.76
Tons non-pol. in mixed juice	3.00	3.31	6.33	5.30	5.12	10.41	8.73	5.96	3.54	3.85	3.55	7.40	5.83	3.71	10.44
Tons of sugar produced	-	-	36.20	-	-	43.91	48.96	37.11	24.27	-	-	40.31	-	-	63.94
COMPOSITION OF CANE CRUSHED															
Pol % cane	14.64	14.64	14.64	13.69	14.47	14.05	14.23	14.17	15.46	14.60	14.34	14.47	14.20	14.13	14.18
Fibre % cane	15.28	15.06	15.16	12.59	12.51	12.55	13.43	13.51	15.44	14.78	14.66	14.72	14.81	14.13	14.67
Brix % cane	17.17	17.17	17.17	16.76	17.74	17.22	16.85	16.48	17.72	17.14	16.96	17.06	16.83	16.68	16.80
Ash % cane	-	-	-	1.34	0.97	1.17	1.32	1.31	-	-	-	-	0.93	0.97	0.94
ERC % cane	12.68	12.70	12.69	11.51	12.18	11.82	12.27	12.38	13.63	12.65	12.35	12.51	12.21	12.19	12.21
ERC % pol in cane	86.64	86.71	86.68	84.11	84.16	84.13	86.24	87.38	88.16	86.65	86.17	86.42	86.00	86.32	86.06
EXTRACTION															
Extraction (pol based)	96.76	98.40	97.66	96.09	97.74	96.89	97.11	96.94	97.77	96.43	96.48	96.45	97.25	95.92	96.97
Corrected reduced extraction	96.27	98.18	97.33	94.47	96.80	95.59	95.93	96.17	97.52	95.85	95.92	95.88	96.85	94.86	96.46
Imbibition % cane	51.01	53.97	52.64	39.33	43.16	41.12	43.13	40.27	53.87	45.56	42.96	44.34	39.22	33.07	37.92
Imbibition % fibre	351	366	359	336	358	347	362	302	349	316	300	308	273	252	269
Preparation index	93	93	93	92	95	93	90	91	89	91	92	91	91	91	91
Pol factor	100.41	99.65	99.99	-	-	-	99.12	99.28	99.79	95.97	94.05	95.07	-	-	-
Brix factor	102.55	101.54	101.99	-	-	-	100.12	101.21	100.59	98.15	96.91	97.56	-	-	-
RECOVERIES															
Boiling house recovery (pol based)	-	-	90.59	-	-	85.62	91.75	88.76	91.26	-	-	85.32	-	-	90.70
Overall recovery (pol based)	-	-	88.47	-	-	82.96	89.09	86.04	89.23	-	-	82.30	-	-	87.96
Ton cane per ton sugar	-	-	7.69	-	-	8.53	7.83	8.14	7.21	-	-	8.31	-	-	7.93
Ton cane per ton 96 pol sugar	-	-	7.41	-	-	8.24	7.57	7.87	6.96	-	-	8.06	-	-	7.70
BALANCES															
Pol lost % pol in cane															
- lost in bagasse	-	-	2.34	-	-	3.11	2.89	3.06	2.23	-	-	3.55	-	-	3.03
- lost in filter cake	-	-	0.20	-	-	0.48	0.41	0.12	0.08	-	-	0.05	-	-	0.16
- lost in final molasses	-	-	7.78	-	-	10.48	7.17	8.65	6.87	-	-	8.69	-	-	7.28
- undetermined losses	-	-	1.21	-	-	2.97	0.43	2.14	1.60	-	-	5.42	-	-	1.57
Non pol ratio	-	-	1.07	-	-	1.02	1.00	0.91	1.01	-	-	1.10	-	-	0.98

*** Cane diffuser**

TABLE C1
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN MILLS (SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	ML *	KM-A *	KM-B *	KM-AVE	PG *	UF *	EN **	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *	MS-AVE
FINAL BAGASSE															
Pol % bagasse	0.92	1.01	0.92	0.96	1.26	1.12	1.28	0.69	0.74	0.71	0.83	1.21	0.52	0.56	0.55
Moisture % bagasse	52.26	45.79	46.72	46.28	50.89	49.91	51.96	53.50	53.21	53.35	49.79	51.68	52.53	51.39	51.88
Fibre % bagasse	45.87	51.95	51.12	51.52	46.89	47.89	45.95	44.70	44.90	44.80	48.37	46.00	46.26	47.27	46.84
Ash % bagasse	3.35	-	-	1.89	4.26	5.13	3.16	-	-	-	2.95	-	-	-	3.77
LCV in kJ per kg bagasse ##	6739	-	-	8238	6847	6891	6829	-	-	-	7327	-	-	-	6760
MIXED JUICE															
Mixed juice(adj.) % cane	125.88	121.20	119.63	120.39	112.37	121.19	118.96	125.11	122.53	123.80	124.74	122.87	135.82	133.23	134.33
Brix % mixed juice(adj.)	13.10	13.50	13.55	13.52	13.55	12.69	12.55	11.93	11.94	11.93	11.81	12.05	11.09	11.28	11.20
Sucrose purity (MJ adj.)	85.10	84.60	84.47	84.53	85.12	86.97	87.85	85.18	84.96	85.07	85.40	86.38	84.61	84.62	84.61
Apparent purity(MJ adj.)	84.09	83.67	83.52	83.59	84.25	86.55	87.24	84.70	84.50	84.60	85.08	85.87	84.12	84.10	84.11
Purity difference(MJ adj. - DAC)	-0.09	0.37	0.37	0.37	-0.16	-0.08	0.36	-0.44	-0.50	-0.47	0.41	0.33	0.07	0.25	0.18
(Glucose + fructose) % sucrose	6.89	-	-	6.67	6.33	3.80	3.67	-	-	4.49	3.94	4.21	-	-	4.41
Suspended solids % MJ(unadj.)	0.12	0.06	0.06	0.06	0.15	0.52	0.84	0.15	0.14	0.14	0.33	0.91	0.13	0.15	0.14
Pol/sucrose ratio (mj unadj.)	0.9881	0.9890	0.9888	0.9889	0.9898	0.9952	0.9931	0.9945	0.9946	0.9945	0.9963	0.9940	0.9942	0.9940	0.9941
CLARIFIED JUICE															
Brix % clarified juice	13.37	-	-	13.36	12.76	12.23	12.12	-	-	11.59	11.71	11.40	-	-	11.36
Apparent purity	83.53	-	-	83.10	83.82	86.21	86.00	-	-	83.78	84.47	85.63	-	-	82.40
Purity difference(CJ - MJ)	-0.56	-	-	-0.49	-0.43	-0.34	-1.24	-	-	-0.82	-0.61	-0.24	-	-	-1.71
Average pH	6.9	-	-	7.0	7.2	7.7	7.0	-	-	7.1	7.1	7.0	-	-	7.0
CLARIFIER MUD															
Tons clarifier mud	61988	64201	31982	96183	286	-	-	62911	59986	122897	80950	-	14066	93107	107173
Pol % clarifier mud	10.89	11.49	11.08	11.35	9.79	-	-	8.70	8.70	8.70	8.92	-	9.65	10.09	10.03
Brix % clarifier mud	13.40	14.05	13.65	13.92	12.24	-	-	10.55	10.56	10.56	10.80	-	11.76	12.26	12.19
Insoluble solids % clarifier mud	4.45	1.69	1.69	1.69	7.34	-	-	2.87	2.87	2.87	6.19	-	7.37	1.95	2.67
FILTER CAKE															
Pol % filter cake	-	-	-	-	1.18	2.14	0.62	-	-	-	-	1.15	-	-	-
Moisture % filter cake	-	-	-	-	70.45	70.00	66.23	-	-	-	-	-	-	-	-
Filter cake % cane	-	-	-	-	1.26	3.83	3.71	-	-	-	-	4.00	-	-	-
Filter wash index	97.9	-	-	101.2	106.2	103.8	103.6	-	-	102.9	100.8	105.7	-	-	98.6
Purity difference(CJ - filtrate)	-	-	-	-	2.43	2.22	0.73	-	-	-	-	0.85	-	-	-
SYRUP															
Brix % syrup	67.49	-	-	68.58	66.79	64.79	59.07	-	-	65.33	65.85	65.49	-	-	67.31
Apparent purity	83.47	-	-	82.52	84.17	86.53	86.67	-	-	84.06	84.64	86.21	-	-	84.04
Purity difference(Syrup - MJ)	-0.62	-	-	-1.07	-0.08	-0.02	-0.57	-	-	-0.54	-0.44	0.34	-	-	-0.07
Average pH	5.9	-	-	5.8	6.3	6.4	6.5	-	-	6.0	6.2	6.2	-	-	6.0
FINAL MOLASSES															
Refractometer brix	85.68	-	-	83.24	87.85	86.63	83.82	-	-	85.83	88.72	87.60	-	-	84.13
Pol/refractometer brix purity	34.10	-	-	32.74	33.16	35.82	35.85	-	-	36.37	37.95	33.76	-	-	35.31
Sucrose/refractometer brix purity	36.86	-	-	37.58	36.14	37.37	37.20	-	-	38.23	39.30	35.79	-	-	37.11
Conductivity ash %	13.37	-	-	15.64	15.07	17.25	15.68	-	-	16.15	16.52	17.61	-	-	16.02
(Glucose + fructose)/ash ratio	1.39	-	-	0.96	0.99	0.56	0.73	-	-	0.70	0.63	0.65	-	-	0.69
Fructose %	9.48	-	-	8.55	8.30	5.73	6.65	-	-	6.60	6.30	6.70	-	-	6.40
Glucose %	9.13	-	-	6.48	6.68	3.96	4.81	-	-	4.72	4.10	4.69	-	-	4.62
TPD based on molasses (made)	8.1	-	-	3.9	5.0	3.5	3.4	-	-	4.5	5.2	1.2	-	-	3.5
TPD based on mixed juice	8.4	-	-	5.4	6.7	5.2	4.8	-	-	5.1	6.1	2.9	-	-	4.3
Final molasses @ 85 brix % cane	4.61	-	-	4.58	4.53	3.90	3.42	-	-	4.30	4.27	3.50	-	-	4.17
Pol/sucrose ratio	0.9253	-	-	0.8711	0.9175	0.9586	0.9637	-	-	0.9515	0.9656	0.9434	-	-	0.9513

*** Cane diffuser**

**** Bagasse diffuser**

Net Calorific Value(LCV) = 18260 - 31,14 Bx % bagasse - 207,63 moisture % bagasse - 182,6 ash % bagasse

TABLE C1 (continued)
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN MILLS (SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
FINAL BAGASSE											
Pol % bagasse	0.79	1.07	0.97	1.45	1.09	1.22	0.74	0.69	0.71	0.70	0.96
Moisture % bagasse	49.80	49.34	49.50	49.88	52.49	49.70	47.57	47.73	47.65	49.70	50.34
Fibre % bagasse	48.61	48.59	48.60	47.83	45.65	48.20	50.79	50.66	50.73	48.68	47.73
Ash % bagasse	-	-	2.30	3.80	2.74	4.58	-	-	3.03	3.38	2.82
LCV in kJ per kg bagasse ##	-	-	7503	7139	6804	7039	-	-	7763	7274	7233
MIXED JUICE											
Mixed juice(adj.) % cane	123.27	123.60	123.49	109.67	111.12	130.59	130.81	132.10	131.47	145.96	124.13
Brix % mixed juice(adj.)	12.37	12.01	12.14	14.61	14.48	12.34	11.79	11.80	11.80	10.57	12.51
Sucrose purity (MJ adj.)	86.12	86.40	86.30	88.71	89.03	89.14	87.07	87.03	87.05	87.84	86.36
Apparent purity(MJ adj.)	85.70	86.07	85.94	88.38	88.64	88.75	86.66	86.61	86.64	87.32	85.79
Purity difference(MJ adj. - DAC)	0.19	0.72	0.53	-0.13	-0.35	0.16	0.03	-0.16	-0.07	0.31	0.05
(Glucose + fructose) % sucrose	-	-	4.19	3.43	2.95	2.94	-	-	3.66	3.22	4.65
Suspended solids % MJ(unadj.)	0.21	0.80	0.59	0.88	0.12	0.26	0.11	0.11	0.11	0.21	0.30
Pol/sucrose ratio (mj unadj.)	0.9952	0.9962	0.9958	0.9962	0.9955	0.9956	0.9953	0.9952	0.9953	0.9941	0.9934
CLARIFIED JUICE											
Brix % clarified juice	-	-	11.75	14.72	15.02	12.46	-	-	11.13	10.10	12.36
Apparent purity	-	-	85.96	88.09	88.06	88.42	-	-	86.72	86.92	86.58
Purity difference(CJ - MJ)	-	-	0.02	-0.29	-0.58	-0.33	-	-	0.08	-0.40	-0.50
Average pH	-	-	7.1	7.0	7.0	7.2	-	-	7.1	6.9	7.1
CLARIFIER MUD											
Tons clarifier mud	-	-	-	437	-	37239	-	-	-	72861	580014
Pol % clarifier mud	-	-	-	12.13	-	10.30	-	-	-	5.16	9.31
Brix % clarifier mud	-	-	-	13.73	-	11.90	-	-	-	6.14	11.29
Insoluble solids % clarifier mud	-	-	-	5.26	-	8.07	-	-	-	4.90	3.86
FILTER CAKE											
Pol % filter cake	-	-	0.93	2.44	1.45	2.93	-	-	1.18	-	1.71
Moisture % filter cake	-	-	71.68	75.00	72.70	70.28	-	-	71.15	-	72.24
Filter cake % cane	-	-	3.21	5.87	0.82	0.40	-	-	1.20	-	1.40
Filter wash index	-	-	103.3	99.3	96.4	99.0	-	-	106.0	104.6	101.2
Purity difference(CJ - filtrate)	-	-	0.95	1.11	2.98	3.50	-	-	1.42	-	1.82
SYRUP											
Brix % syrup	-	-	64.80	68.73	67.99	61.46	-	-	65.19	64.46	65.96
Apparent purity	-	-	85.87	87.53	88.55	88.33	-	-	87.00	86.93	85.46
Purity difference(Syrup - MJ)	-	-	-0.07	-0.85	-0.09	-0.42	-	-	0.36	-0.39	-0.34
Average pH	-	-	6.0	6.2	6.4	6.2	-	-	6.1	6.0	6.1
FINAL MOLASSES											
Refractometer brix	-	-	82.02	82.77	85.27	82.00	-	-	84.26	82.39	84.79
Pol/refractometer brix purity	-	-	37.42	37.56	35.73	38.57	-	-	37.56	36.86	35.70
Sucrose/refractometer brix purity	-	-	38.63	39.70	38.03	40.17	-	-	38.88	37.63	37.92
Conductivity ash %	-	-	15.35	12.76	14.42	11.92	-	-	14.24	14.52	15.00
(Glucose + fructose)/ash ratio	-	-	0.62	0.89	0.64	0.86	-	-	0.73	0.72	0.82
Fructose %	-	-	5.87	6.86	6.23	6.25	-	-	6.27	6.17	7.08
Glucose %	-	-	3.70	4.51	3.03	4.03	-	-	4.18	4.35	5.22
TPD based on molasses (made)	-	-	4.5	7.3	3.9	7.9	-	-	5.6	4.1	5.1
TPD based on mixed juice	-	-	6.4	8.0	5.8	8.3	-	-	6.6	4.7	6.2
Final molasses @ 85 brix % cane	-	-	3.94	3.63	3.13	3.48	-	-	3.94	3.44	4.03
Pol/sucrose ratio	-	-	0.9687	0.9459	0.9395	0.9603	-	-	0.9661	0.9796	0.9414

*** Cane diffuser**

**** Bagasse diffuser**

Net Calorific Value(LCV) = 18260 - 31,14 Bx % bagasse - 207,63 moisture % bagasse - 182,6 ash % bagasse

TABLE C2

ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SWAZILAND, MALAWI AND ZIMBABWE MILLS
(SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	MH-A *	MH-B	MH-AVE	UB-A *	UB-B	UB-AVE	SM	NH *	DW *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE
FINAL BAGASSE															
Pol % bagasse	1.52	0.76	1.10	2.02	1.31	1.70	1.60	1.58	1.17	1.53	1.58	1.56	1.23	2.04	1.39
Moisture % bagasse	51.12	50.48	50.77	52.01	49.16	50.72	50.67	48.71	45.74	54.99	52.27	53.75	51.56	49.58	51.18
Fibre % bagasse	46.39	48.05	47.30	44.20	48.36	46.08	46.38	48.50	52.26	42.47	44.87	43.56	45.45	46.41	45.64
Bagasse % cane	31.29	30.71	30.97	26.45	24.91	25.73	25.66	27.49	29.54	33.97	31.91	33.00	31.62	28.29	30.92
Ash % bagasse	-	-	-	-	-	2.60	2.86	-	-	-	-	-	-	-	-
LCV in kJ per kg bagasse ##			-			7154	7125	-	-			-			-
MIXED JUICE															
Mixed juice % cane	119.71	123.26	121.67	112.87	118.25	115.39	117.47	112.78	124.33	111.59	111.05	111.33	107.65	104.78	107.05
Brix % mixed juice	13.69	13.57	13.62	13.96	14.48	14.21	13.70	13.93	13.78	14.59	14.45	14.52	14.75	14.84	14.77
Apparent purity	86.39	86.18	86.27	83.44	82.61	83.03	85.85	87.44	88.20	86.47	86.20	86.34	86.93	87.16	86.98
Purity difference(MJ - DAC)	-0.66	-0.72	-0.69	0.00	0.00	0.00	0.56	-0.23	0.30	-0.63	-0.90	-0.76	0.00	0.00	0.00
Suspended solids % mixed juice	0.64	0.25	0.42	0.80	0.39	0.60	1.30	0.15	-	0.31	0.31	0.31	0.46	0.96	0.56
CLARIFIED JUICE															
Brix % clarified juice	-	-	13.51	-	-	14.27	13.72	13.22	13.28	-	-	15.21	-	-	14.34
Apparent purity	-	-	86.90	-	-	83.15	85.33	87.85	87.73	-	-	85.73	-	-	86.44
Purity difference(CJ - MJ)	-	-	0.63	-	-	0.12	-0.52	0.41	-0.47	-	-	-0.61	-	-	-0.54
Average pH	-	-	7.1	-	-	7.8	7.1	7.0	6.8	-	-	6.7	-	-	7.0
CLARIFIER MUD															
Tons clarifier mud	-	-	-	-	-	-	-	-	-	-	-	-	13772	-	13772
Pol % clarifier mud	-	-	-	-	-	-	-	-	-	-	-	-	9.93	-	9.93
Brix % clarifier mud	-	-	-	-	-	-	-	-	-	-	-	-	11.88	-	11.88
Insoluble solids % clarifier mud	-	-	-	-	-	-	-	-	-	-	-	-	7.30	-	7.30
FILTER CAKE															
Pol % filter cake	-	-	1.21	-	-	2.72	1.39	1.17	0.63	-	-	2.41	-	-	1.00
Moisture % filter cake	-	-	66.80	-	-	-	73.82	72.89	72.26	-	-	73.51	-	-	-
Filter cake % cane	-	-	2.41	-	-	2.47	4.25	1.44	1.95	-	-	0.29	-	-	2.33
Filter wash index	-	-	100.8	-	-	99.6	99.8	105.4	103.8	-	-	95.5	-	-	103.0
Purity difference(CJ - filtrate)	-	-	1.03	-	-	-0.55	2.34	2.69	-	-	-	3.53	-	-	1.72
SYRUP															
Brix % syrup	-	-	66.30	-	-	64.85	66.30	64.99	65.18	-	-	49.83	-	-	65.91
Apparent purity	-	-	86.70	-	-	83.06	85.72	88.09	88.08	-	-	86.35	-	-	86.65
Purity difference(Syrup - MJ)	-	-	0.43	-	-	0.03	-0.13	0.65	-0.12	-	-	0.01	-	-	-0.33
Average pH	-	-	6.1	-	-	6.3	6.2	6.4	6.3	-	-	5.9	-	-	6.2
FINAL MOLASSES															
Refractometer brix	-	-	80.94	-	-	84.46	84.40	86.32	82.95	-	-	84.41	-	-	87.02
Pol/refractometer brix purity	-	-	32.30	-	-	34.61	31.66	41.51	35.05	-	-	34.96	-	-	34.92
Purity difference(true-target)	-	-	-	-	-	-	-	-	-	-	-	8.39	-	-	-
Reducing sugars % #	-	-	21.33	-	-	-	17.89	-	-	-	-	17.00	-	-	-
Sulphated ash %	-	-	-	-	-	-	13.46	-	-	-	-	12.16	-	-	-
Reducing sugars/ash ratio	-	-	-	-	-	-	1.33	-	-	-	-	1.40	-	-	-
Final molasses @ 85 brix % cane	-	-	4.15	-	-	5.01	3.79	3.47	3.56	-	-	4.23	-	-	3.48

Cane diffuser

 # Reducing sugars determined by Lane & Eynon method.

Net Calorific Value(LCV) = 18260 - 31,14 Bx % bagasse - 207,63 moisture % bagasse - 182,6 ash % bagasse

TABLE D1
MASSECUITES,EXHAUSTIONS,CLARIFYING AGENTS AND ADDITIONAL FUELS.
SOUTH AFRICAN MILLS (SEASON 2003-2004)

SYMBOLS OF FACTORIES	ML	KM	PG	UF	EN	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	INDUSTRY
A - MASSECUITE																
m3 per ton brix in mixed juice(adj.)	1.16	-	1.23	1.22	0.94	0.95	1.01	0.91	1.01	1.11	1.24	1.02	1.04	0.99	1.00	0.95
Refractometer brix of massecuite	93.01	93.13	92.46	92.32	92.61	92.96	92.68	93.25	92.85	93.07	93.03	92.16	93.19	93.72	92.99	92.94
Purity of massecuite	84.95	82.38	85.69	86.61	86.29	85.39	84.48	86.37	84.53	86.05	87.71	87.64	87.01	85.80	86.73	86.02
Purity of A - molasses	69.19	61.75	70.25	70.31	70.07	67.70	67.85	65.95	67.06	68.69	71.58	72.49	71.17	66.49	66.04	68.90
Purity drop	15.76	20.63	15.44	16.30	16.22	17.69	16.63	20.42	17.47	17.36	16.13	15.15	15.84	19.31	20.69	17.12
Exhaustion	60.21	65.47	60.57	63.39	62.80	64.14	61.23	69.43	62.74	64.43	64.71	62.84	63.15	67.16	70.25	63.99
Pty of A-massecuite - purity syrup	1.48	-0.14	1.52	0.08	-0.38	1.33	-0.16	0.16	0.49	0.18	0.18	-0.91	-1.32	-1.20	-0.20	0.56
Pty of remelt	85.68	82.14	82.39	82.68	84.88	87.63	84.04	84.88	83.75	83.62	84.93	86.88	83.54	83.96	86.12	84.41
B - MASSECUITE																
m3 per ton brix in mixed juice(adj.)	0.48	-	0.65	0.48	0.30	0.36	0.37	0.23	0.25	0.40	0.67	0.35	0.29	0.30	0.36	0.36
Refractometer brix of massecuite	94.68	95.11	94.47	94.51	93.81	95.79	94.44	94.91	94.04	95.48	94.83	94.37	95.60	95.33	94.66	94.85
Purity of massecuite	68.57	63.62	70.08	70.72	70.22	70.68	68.79	67.23	66.39	68.92	72.02	73.02	72.03	67.40	69.78	69.86
Purity of B - molasses	51.67	41.58	50.31	49.61	49.71	48.38	50.81	46.09	47.80	47.88	52.29	48.70	48.54	45.25	47.76	49.47
Purity drop	16.90	22.04	19.77	21.11	20.51	22.30	17.98	21.14	18.59	21.04	19.73	24.32	23.49	22.15	22.02	20.39
Exhaustion	51.00	59.30	56.77	59.24	58.08	61.12	53.14	58.33	53.64	58.57	57.42	64.92	63.37	60.02	60.41	57.76
C - MASSECUITE																
m3 per ton brix in mixed juice(adj.)	0.10	-	0.44	0.26	0.23	0.30	0.26	0.25	0.25	0.30	0.24	0.16	0.21	0.22	0.30	0.22
Refractometer brix of massecuite	96.93	97.12	96.92	97.33	96.78	97.14	97.86	97.18	96.78	97.62	97.01	97.95	97.46	97.58	97.96	97.30
Purity of massecuite	56.44	49.67	53.06	54.51	54.12	56.32	57.01	53.14	53.09	54.73	56.79	54.83	56.04	53.91	56.59	55.00
Purity of C - molasses	34.10	32.74	33.16	35.82	35.85	36.37	37.95	33.76	35.31	37.42	37.56	35.73	38.57	37.56	36.86	35.70
Crystal content	32.86	24.45	28.86	28.34	27.56	30.45	30.06	28.43	26.60	27.00	29.88	29.11	27.71	25.55	30.61	29.21
Exhaustion	60.06	50.68	56.11	53.43	52.63	55.66	53.88	55.05	51.77	50.53	54.24	54.19	50.74	48.57	55.22	54.57
TOTAL VOLUME ALL RAW MASSECUITES																
m3 per ton brix in mixed juice(adj.)	1.73	-	2.32	1.96	1.47	1.61	1.64	1.38	1.51	1.81	2.15	1.52	1.55	1.52	1.66	1.53
WHITE SUGAR MASSECUITES																
Kg sugar per m3 massecuite	459	-	498	540	-	-	-	-	-	488	466	-	-	-	-	479
Tons limestone per 1000 tons white sugar	-	-	38.52	-	-	-	-	-	-	34.31	-	-	-	-	-	-
Tons coke per 1000 tons white sugar	-	-	0.58	-	-	-	-	-	-	3.76	-	-	-	-	-	-
Tons phosphoric acid per 1000 tons white sugar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tons sulphur per 1000 tons white sugar	-	-	0.31	-	-	-	-	-	-	0.28	0.18	-	-	-	-	-
Phosphoric acid ppm mixed juice(unadj.)	-	-	-	-	-	-	-	-	-	15.81	-	39.36	136.50	5.87	17.48	14.78
Flocculant ppm mixed juice(unadj.)	3.74	1.53	3.37	5.40	2.99	3.67	3.55	2.53	5.53	3.21	6.47	3.99	9.12	5.82	2.63	4.37
Tons lime per 1000 tons cane	0.23	0.28	-	1.25	-	0.62	0.66	0.58	0.69	-	0.66	0.52	0.58	0.49	0.57	0.48
Enzyme ppm sugar	-	-	-	-	13.74	-	-	29.04	4.51	15.94	-	-	23.24	23.93	11.58	7.61
ADDITIONAL FUELS PER 1000 TONS CANE																
Tons of coal	22.82	0.44	11.57	13.54	22.20	13.87	3.19	3.64	34.41	8.58	10.33	2.45	1.28	21.90	0.15	11.68
Tons of wood	-	-	-	-	-	-	0.19	0.27	0.03	-	-	0.27	0.24	-	-	0.05
Converted into bagasse **	91.26	1.76	46.27	54.15	88.78	55.50	13.00	14.91	137.67	34.30	41.33	10.14	5.41	87.59	0.61	46.79

**** 1 TON COAL EQUIVALENT TO 4 TONS OF BAGASSE**
1 TON FIREWOOD EQUIVALENT TO 1,2 TONS OF BAGASSE
 # 1 TON SULPHUR DIOXIDE EQUIVALENT TO 0,5 TONS OF SULPHUR

TABLE D2

MASSECUITES,EXHAUSTIONS,CLARIFYING AGENTS AND ADDITIONAL FUELS

SWAZILAND, MALAWI AND ZIMBABWE MILLS (SEASON 2003 - 2004)

SYMBOLS OF FACTORIES	MH	UB	SM	NH	DW	HV	TR
A - MASSECUITE							
m3 per ton brix in mixed juice	1.26	1.00	1.03	1.19	-	1.12	1.23
Refractometer brix of massecuite	92.65	93.38	93.09	93.83	91.09	91.67	92.64
Purity of massecuite	87.78	84.35	86.15	87.22	87.85	86.57	85.29
Purity of A - molasses	72.16	68.59	71.36	74.06	74.15	68.83	69.15
Purity drop	15.62	15.76	14.79	13.16	13.70	17.74	16.14
Exhaustion	63.92	59.48	59.94	58.17	60.33	65.74	61.34
Purity of A-massecuite - pty syrup	1.08	1.29	0.43	-0.87	-0.23	0.22	-1.36
Purity of remelt	85.35	86.27	86.87	85.78	87.79	86.40	82.41
B - MASSECUITE							
m3 per ton brix in mixed juice	0.48	0.35	0.38	0.41	0.66	-	0.54
Refractometer brix of massecuite	94.21	95.17	94.74	93.78	92.58	-	94.68
Purity of massecuite	72.63	68.91	71.66	72.65	68.27	-	69.71
Purity of B - molasses	51.62	47.21	48.38	55.39	50.26	-	50.58
Purity drop	21.01	21.70	23.28	17.26	18.01	-	19.13
Exhaustion	59.79	59.65	62.93	53.26	53.04	-	55.53
C - MASSECUITE							
m3 per ton brix in mixed juice	0.28	0.29	0.26	0.22	0.23	-	0.23
Refractometer brix of massecuite	97.35	97.63	97.55	96.77	95.34	-	97.15
Purity of massecuite	55.54	53.87	55.35	57.35	52.94	-	55.84
Purity of C - molasses	32.30	34.61	31.66	41.51	35.05	34.96	34.92
Crystal content	33.42	28.76	33.82	26.21	26.27	-	31.23
Exhaustion	61.81	54.68	62.63	47.23	52.04	-	57.56
TOTAL VOLUME ALL RAW MASSECUITES							
m3 per ton brix in mixed juice	2.01	1.64	1.68	1.82	-	-	2.01
WHITE SUGAR MASSECUITES							
Kg sugar per m3 massecuite	578	285	-	441	506	-	-
Tons phosphoric acid/1000 tons white sugar	-	-	-	0.85	-	-	-
Tons sulphur/1000 tons white sugar	0.17	0.10	-	-	0.14	-	-
Phosphoric acid ppm mixed juice	-	-	-	-	-	-	-
Flocculant ppm mixed juice	1.1	0.2	2.1	3.7	3.1	1.6	2.9
Tons lime per 1000 tons cane	1.8	1.1	0.3	1.0	1.1	0.7	0.6
Enzyme ppm sugar	-	-	-	-	-	-	-
ADDITIONAL FUELS PER 1000 TONS CANE							
Tons of coal	29.75	15.41	5.44	-	-	8.58	4.46
Tons of wood	-	-	-	1.67	0.94	0.06	-
Converted into bagasse **	119.01	61.66	21.75	2.01	1.13	34.39	17.84

**** 1 TON COAL EQUIVALENT TO 4 TONS OF BAGASSE**

1 TON FIREWOOD EQUIVALENT TO 1,2 TONS OF BAGASSE

 # 1 TON SULPHUR DIOXIDE EQUIVALENT TO 0,5 TONS OF SULPHUR

TABLE E

COMPARATIVE MANUFACTURING DATA OF RECENT YEARS

(SOUTH AFRICAN MILLS)

	2003/2004	2002/2003	2001/2002	2000/2001	1999/2000
Throughput and time efficiency					
Tons cane per hour	284.40	301.36	296.25	308.86	299.39
Tons fibre per hour	41.35	43.85	43.61	45.43	43.25
Overall time efficiency	82.72	83.97	80.46	79.47	82.76
Cane					
Sucrose % cane	13.70	13.71	13.11	13.08	13.77
Fibre % cane	14.81	14.80	14.97	14.98	14.76
Mixed juice					
Sucrose purity(MJ adj.)	86.36	87.31	85.92	86.46	86.51
(Glucose + Fructose)/ash in M.J.(unadj.)	0.98	0.98	1.11	1.14	1.15
Milling					
Imbibition % fibre	375	366	369	348	362
Extraction (sucrose based)	97.87	97.96	97.74	97.79	97.93
Pol % bagasse	0.96	0.92	0.95	0.95	0.94
Moisture % bagasse	50.34	50.08	50.81	49.95	50.81
Bagasse % cane	30.46	30.31	31.14	30.56	30.46
LCV bagasse kJ/kg	7233	7261	6989	7108	6904
Available kJ in bag./kg brix in M.J.(adj)	14192	14308	14594	14689	13493
Recoveries					
Boiling house recovery (sucrose based)	88.14	89.11	88.18	88.97	88.33
Overall recovery (sucrose based)	86.26	87.29	86.19	86.99	86.50
Tons cane per ton sugar	8.42	8.32	8.81	8.74	8.36
Filter cake					
Pol % filter cake	1.71	1.80	1.79	1.51	1.55
Filter cake % cane	1.40	1.36	1.32	1.29	1.72
Final molasses					
Brix % final molasses	84.79	85.09	84.44	84.26	83.87
Sucrose/refractometer brix purity	37.92	37.24	37.08	37.21	37.70
Final molasses @ 85 brix % cane	4.03	3.73	3.93	3.70	3.97
Average sugar polarisation	99.53	99.54	99.48	99.47	99.51
Sucrose lost % sucrose in cane					
Lost in bagasse	2.13	2.04	2.26	2.21	2.07
Lost in filter cake	0.17	0.18	0.18	0.15	0.19
Lost in final molasses	9.48	8.62	9.45	8.96	9.25
Undetermined losses	1.95	1.87	1.92	1.67	1.99
Lost in boiling house	11.61	10.67	11.55	10.79	11.43
Total losses	13.74	12.71	13.81	13.00	13.50
M3 massecuite per ton Bx in M.J.					
A - massecuite	0.95	0.90	1.06	1.07	1.07
B - massecuite	0.36	0.32	0.40	0.38	0.39
C - massecuite	0.22	0.20	0.26	0.26	0.27
Total	1.53	1.42	1.73	1.71	1.74
Exhaustion of massecuites					
A - massecuite	63.99	64.49	63.81	63.56	63.57
B - massecuite	57.76	60.09	58.75	59.90	59.16
C - massecuite	54.57	56.60	55.94	56.53	54.80
Brix of syrup	65.96	65.79	64.30	64.09	64.76

TABLE F

AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS FOR SOUTH AFRICAN MILLS

(SEASON 2003 - 2004)

End of month period		29 MAR 2003	3 MAY 2003	31 MAY 2003	28 JUN 2003	2 AUG 2003	30 AUG 2003	27 SEP 2003	1 NOV 2003	29 NOV 2003	27 DEC 2003
Tons of sugar m&e	Month	28838	158298	271148	290200	392617	313840	293925	365837	235287	74257
	To-date	28838	187136	458284	748484	1141101	1454941	1748866	2114703	2349990	2424247
Tons cane crushed	Month	266488	1434725	2351909	2461681	3215330	2509129	2391082	3045020	2051017	692553
	To-date	266488	1701213	4053122	6514803	9730133	12239262	14630344	17675364	19726381	20418934
Tons cane crushed per hour	Month	208.51	260.15	283.67	294.59	298.31	291.60	292.21	290.46	273.69	246.08
	To-date	208.51	250.43	268.70	277.93	284.35	285.81	286.84	287.45	285.96	284.40
Sucrose % cane	Month	13.16	13.00	13.30	13.44	13.86	14.29	14.09	13.87	13.47	13.31
	To-date	13.16	13.02	13.18	13.28	13.47	13.64	13.71	13.74	13.71	13.70
Fibre % cane	Month	14.90	13.96	14.30	14.28	14.27	14.55	15.18	15.50	15.98	15.89
	To-date	14.90	14.11	14.22	14.24	14.25	14.31	14.45	14.63	14.77	14.81
RV % cane	Month	11.92	11.68	12.03	12.27	12.70	13.10	12.85	12.60	12.14	11.99
	To-date	11.92	11.71	11.90	12.04	12.26	12.43	12.50	12.52	12.48	12.46
Tons cane per ton sugar	Month	9.24	9.06	8.67	8.48	8.19	7.99	8.14	8.32	8.72	9.33
	To-date	9.24	9.09	8.84	8.70	8.53	8.41	8.37	8.36	8.39	8.42
Extraction (sucrose based)	Month	96.74	97.69	97.84	97.96	97.94	98.03	97.94	97.83	97.81	97.58
	To-date	96.74	97.54	97.72	97.81	97.85	97.89	97.90	97.89	97.88	97.87
Imbibition % fibre	Month	339	371	376	383	385	382	374	365	370	354
	To-date	339	366	372	376	379	380	379	376	376	375
Pol % bagasse	Month	1.36	1.02	0.96	0.94	0.97	0.95	0.94	0.95	0.90	0.99
	To-date	1.36	1.08	1.01	0.98	0.98	0.97	0.97	0.96	0.96	0.96
Moisture % bagasse	Month	51.87	51.59	50.83	50.54	50.56	49.86	49.62	49.99	50.20	50.15
	To-date	51.87	51.64	51.17	50.94	50.81	50.62	50.45	50.36	50.35	50.34
Boiling house recovery	Month	84.68	86.44	88.15	89.13	89.55	88.89	88.64	88.10	86.59	82.42
(sucrose based)	To-date	84.68	86.16	87.33	88.02	88.54	88.61	88.62	88.53	88.33	88.14
Overall recovery	Month	81.92	84.44	86.25	87.31	87.70	87.13	86.82	86.19	84.69	80.43
(sucrose based)	To-date	81.92	84.04	85.34	86.09	86.64	86.75	86.76	86.66	86.46	86.26
Mixed juice(adj) sucrose purity	Month	85.74	84.29	85.65	86.61	87.38	87.42	86.84	86.35	85.35	84.83
	To-date	85.74	84.52	85.17	85.72	86.28	86.52	86.57	86.53	86.41	86.36
Pol/sucrose ratio in mixed juice	Month	0.9910	0.9869	0.9908	0.9914	0.9944	0.9944	0.9964	0.9954	0.9941	0.9932
	To-date	0.9910	0.9875	0.9894	0.9902	0.9916	0.9922	0.9929	0.9934	0.9934	0.9934
Sucrose/refractometer brix purity	Month	38.05	36.86	36.71	36.56	37.36	38.12	38.53	38.02	39.69	41.52
in final molasses	To-date	38.05	37.04	36.86	36.75	36.94	37.18	37.40	37.51	37.76	37.92
Sucrose lost in final molasses	Month	10.71	10.58	9.59	8.76	8.44	8.73	9.23	9.47	10.97	13.49
% sucrose in cane	To-date	10.71	10.60	10.01	9.53	9.16	9.07	9.09	9.16	9.34	9.48
Undetermined lost sucrose %	Month	3.79	2.47	1.80	1.71	1.65	2.01	1.72	2.00	1.97	3.43
sucrose in cane	To-date	3.79	2.68	2.17	1.99	1.87	1.90	1.87	1.90	1.90	1.95
Pol/sucrose ratio FM	Month	0.9285	0.9021	0.9137	0.9118	0.9452	0.9492	0.9539	0.9714	0.9485	0.9675
	To-date	0.9285	0.9063	0.9105	0.9109	0.9217	0.9274	0.9319	0.9390	0.9401	0.9414

TABLE G

CANE VARIETIES AND RAINFALL
(SEASON 2003 - 2004)
PERCENTAGE BY WEIGHT

MILL	N 11	N 12	N 14	N 16	N 17	N 19	N 21	N 22	N 23	N 24	N 25	N 26	N 27	N 28	N 29	N 30	NCo 310	NCo 376	MIXED VARIETY	UNKNOWN AND OTHER	% BURNT	* RAINFALL mm
ML	-	-	19.2	-	0.4	45.0	-	3.3	1.5	5.0	21.1	-	-	0.1	-	1.2	-	-	1.0	2.2	99.6	193
KM	-	-	33.4	-	0.3	41.3	-	2.3	0.5	0.9	11.8	0.1	-	0.4	-	0.1	-	-	2.6	6.1	99.8	87
PG	-	-	18.8	-	0.4	15.6	-	1.9	5.1	0.7	30.0	3.7	-	0.7	-	0.5	-	-	5.4	17.2	72.6	390
UF	-	1.9	2.0	-	7.3	30.6	0.8	3.6	-	0.3	0.4	0.1	9.0	-	8.1	-	0.6	18.6	16.3	0.4	99.2	321
EN	-	36.6	-	18.0	0.2	-	0.1	0.1	-	-	-	-	0.9	-	2.2	-	-	4.3	-	37.7	99.3	269
FX	-	2.1	2.6	0.3	5.1	11.8	0.2	0.7	3.2	0.2	4.8	0.7	12.7	0.5	3.8	0.3	-	19.2	4.7	27.3	94.0	482
AK	-	16.1	0.5	1.1	3.3	6.2	1.5	-	-	-	0.7	0.1	4.1	-	2.4	-	-	11.0	7.6	45.3	95.5	272
DL	-	16.4	0.5	11.1	3.2	5.8	2.6	-	-	-	-	-	6.4	-	1.6	-	-	15.1	1.7	35.5	82.2	385
MS	-	19.9	0.4	15.1	2.6	2.2	0.9	-	-	-	0.2	-	1.7	-	1.5	-	-	27.4	13.5	14.5	74.7	335
GH	-	24.2	0.4	9.3	2.9	3.0	1.7	0.1	-	-	0.2	0.2	2.8	-	1.6	-	-	19.6	5.7	28.2	82.1	425
NB	0.7	66.0	-	22.2	0.1	0.3	1.4	-	0.1	-	0.3	0.4	0.3	-	1.1	0.1	-	-	0.3	6.6	93.5	594
UC	0.6	58.2	-	32.4	0.1	0.8	1.3	0.2	0.5	-	0.3	1.5	0.2	-	0.8	-	-	0.1	-	3.2	100.0	458
ES	-	59.0	-	10.3	0.1	-	0.4	0.1	0.1	-	-	0.1	0.1	0.1	0.6	0.3	-	0.1	0.2	28.6	98.7	367
SZ	-	32.7	0.3	4.7	0.1	-	0.2	-	-	-	-	-	0.4	-	1.0	-	0.1	5.4	6.8	48.4	70.9	729
UK	-	32.4	0.7	2.8	-	-	1.3	-	-	-	-	-	1.1	-	1.4	-	-	8.6	1.0	50.7	88.9	706
Average SA Mills	0.1	21.7	7.1	6.8	1.7	13.2	0.7	0.9	0.9	0.6	5.8	0.5	2.7	0.2	1.6	0.2	0.1	8.3	4.6	22.4	87.8	-
MH	-	-	6.3	-	-	33.9	-	0.1	6.4	-	3.5	-	-	0.1	-	0.2	-	49.2	0.4	-	-	202
UB	-	3.4	0.1	-	-	11.4	-	-	22.3	1.0	10.8	0.4	-	0.1	-	0.3	-	43.5	6.4	0.3	-	139
SM	-	-	5.1	-	0.2	6.9	-	-	16.6	-	7.0	-	-	0.1	-	0.2	-	60.3	3.7	-	-	241
NH	-	-	49.9	-	-	1.3	-	0.1	4.3	-	14.7	-	-	0.4	0.9	0.3	-	-	12.8	15.3	-	57
DW	-	-	10.1	-	0.1	28.8	-	-	-	-	7.1	0.3	-	-	-	-	-	27.9	3.5	22.2	-	35
HV	-	-	24.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.5	0.2	32.1	-	310
TR	-	-	42.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45.2	-	12.1	-	255

* Rainfall during the crushing season

TABLE H

TRANSPORT SUMMARY SOUTH AFRICAN MILLS

(SEASON 2003 - 2004)

PERCENT OF CANE 'TRANSPORTED

FACTORIES	ML	KM	PG	UF	EN	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	AVERAGE
SOUTH AFRICAN RAILWAYS	-	-	-	-	-	22.9	-	-	-	-	-	-	-	-	-	2.1
TRAMS	-	-	-	70.3	-	-	-	-	-	-	-	-	-	-	-	3.7
UNKNOWN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARTICULATED TRUCK DRIVEN VEHICLES																
- Interlink	-	1.3	8.1	29.4	44.4	56.1	58.4	37.4	87.5	77.7	31.2	10.7	62.3	87.1	88.5	44.4
- Tri-Axle	-	-	-	-	-	-	9.0	12.7	-	6.1	1.0	-	10.1	-	-	2.3
- Hilo	39.8	0.6	34.5	0.3	-	0.2	0.2	0.4	-	10.7	3.3	0.7	8.8	10.9	0.6	8.7
RIGID CHASSIS VEHICLES																
- Truck	55.4	72.5	3.4	-	-	-	-	-	-	-	18.4	40.5	-	2.0	5.5	16.3
- Lorry	-	1.9	-	-	10.9	-	-	0.4	-	-	2.8	16.5	-	0.1	0.7	1.3
TRACTOR DRIVEN VEHICLES																
- Hilo	-		11.9	-	-	-	10.5	31.0	1.1	0.6	31.2	8.2	17.4	-	-	7.1
- Rig	-	0.2	0.1	-	44.7	20.7	13.9	14.7	1.3	3.6	11.7	4.8	0.7	-	0.5	5.8
- Interlink	4.9	23.6	42.0	-	-	0.1	8.0	3.4	10.0	1.2	0.5	18.7	0.7	-	4.3	8.3

TABLE J
COMPARATIVE DATA OF REPORTING S.A. MILLS FROM 1925 ONWARDS

PERIOD (SEASON)	Percent Cane		Cane / sugar Ratio		Extraction	Pol % fibre in Bagasse	Percent Bagasse		Imbibition Percent		Mixed Juice		Final Molasses Suc/brix Purity	Boiling House Recovery	Overall Recovery
	Pol	Fibre	Tel Quel	96 Pol Sugar	Pol based		Pol	Moisture	Cane	Fibre	Purity Pol based	Reducing Sugar/ Pol ratio	Chem.suc.	Pol based	Pol based
Average 1925 - 1934	**13.19**	**15.78**	**9.86**	**9.64**	**89.83**	**8.86**	**3.88**	**50.57**	**27.6**	**175**	**85.09**	**3.65**	**45.3**	**83.67**	**75.12**
Average 1935 - 1944	**13.53**	**15.30**	**8.96**	**8.73**	**92.05**	**7.05**	**3.11**	**51.60**	**32.6**	**213**	**86.01**	**3.22**	**43.3**	**88.36**	**81.34**
Average 1945 - 1954	**13.79**	**16.06**	**8.60**	**8.36**	**93.04**	**5.95**	**2.69**	**51.32**	**33.8**	**210**	**85.95**	**3.29**	**40.7**	**89.46**	**83.23**
Average 1955 - 1964	**13.53**	**15.49**	**8.75**	**8.49**	**93.43**	**5.73**	**2.51**	**52.78**	**36.3**	**235**	**85.24**	**3.67**	**39.6**	**89.58**	**83.69**
Average 1965 - 1974	**13.16**	**15.22**	**8.95**	**8.68**	**95.00**	**4.35**	**1.91**	**53.15**	**41.7**	**274**	**84.80**	**4.15**	**39.3**	**88.49**	**84.06**
Average 1975 - 1980	**12.80**	**15.61**	**9.09**	**8.77**	**96.20**	**3.26**	**1.45**	**52.50**	**46.28**	**309**	**84.85**	**5.37**	**38.4**	**88.92**	**85.54**
From 1981 onwards data are sucrose based	***Sucrose***				***Sucrose based***						***Sucrose based***	***(GL+FR)/ suc.ratio***	***Sucrose based***	***Sucrose based***	***Sucrose based***
Average 1981 - 1984	**12.44**	**15.88**	**9.44**	**9.12**	**97.12**	**2.36**	**1.09**	**51.74**	**52.60**	**347**	**85.17**	**5.88**	**37.2**	**87.25**	**84.74**
1985	13.13	15.38	8.88	8.57	97.47	2.25	1.04	51.64	52.9	358	84.55	6.28	36.3	87.51	85.30
1986	12.80	15.24	9.08	8.76	97.66	2.03	0.95	51.27	54.3	368	85.44	5.44	36.7	87.70	85.65
1987	12.00	15.23	9.67	9.33	97.63	1.94	0.91	51.24	52.6	357	85.25	5.76	36.8	87.84	85.76
1988	12.61	15.44	9.16	8.83	97.60	2.04	0.96	50.92	53.0	355	85.70	5.43	36.8	88.33	86.21
1989	13.17	15.07	8.72	8.41	97.67	2.11	0.98	51.61	53.5	366	86.40	4.94	36.7	88.74	86.67
1990	12.91	15.14	8.92	8.60	97.75	1.98	0.92	51.62	54.1	368	86.23	5.00	37.0	88.50	86.51
1991	13.04	14.93	8.77	8.42	97.95	1.85	0.87	47.07	54.4	375	86.39	4.80	37.1	88.88	87.06
1992	13.82	15.40	8.57	8.23	97.81	1.79	0.93	51.92	58.1	387	83.61	6.49	37.4	85.92	84.05
1993	12.53	16.23	9.56	9.22	97.75	1.78	0.83	51.52	60.1	380	83.14	5.55	38.2	85.05	83.14
1994	12.54	15.49	9.37	8.99	97.87	1.77	0.83	51.27	55.1	366	83.66	6.14	36.9	86.50	84.66
Average 1985 - 1994	**12.86**	**15.36**	**9.07**	**8.74**	**97.72**	**1.95**	**0.92**	**51.01**	**54.8**	**368**	**85.04**	**5.58**	**37.0**	**87.50**	**85.50**
1995	11.73	15.84	9.99	9.64	97.69	1.78	0.83	51.70	54.9	356	83.60	6.09	37.3	85.93	83.94
1996	12.60	15.36	9.20	8.88	97.72	1.92	0.90	51.40	50.4	337	85.38	5.23	37.3	87.82	85.82
1997	12.62	15.38	9.15	8.83	97.74	1.91	0.90	51.12	49.9	334	86.15	4.72	37.5	88.09	86.10
1998	13.36	14.66	8.65	8.35	97.73	2.11	1.00	51.00	49.1	343	86.17	5.31	37.2	88.08	86.09
1999	13.77	14.76	8.36	8.06	97.93	1.97	0.94	50.81	52.3	362	86.51	4.73	37.7	88.33	86.50
2000	13.08	14.98	8.74	8.44	97.79	1.97	0.95	49.95	51.25	348	86.46	4.82	37.2	88.97	86.99
2001	13.11	14.97	8.81	8.5	97.74	2.02	0.95	50.81	54.32	369	85.92	4.94	37.1	88.18	86.19
2002	13.71	14.80	8.32	8.02	97.96	1.93	0.92	50.08	53.26	366	87.31	4.16	37.2	89.11	87.29
2003	13.70	14.81	8.42	8.12	97.87	2.01	0.96	50.34	54.5	375	86.36	4.59	37.9	88.14	86.26
Average 1995 - 2003	**13.08**	**15.06**	**8.85**	**8.54**	**97.80**	**1.96**	**0.93**	**50.80**	**52.2**	**354**	**85.98**	**4.95**	**37.4**	**88.07**	**86.13**