A COMPARISON OF YIELD AND QUALITY BETWEEN FLOWERED AND NON-FLOWERING CANE

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Abstract

Samples of flowered and non-flowering NCo 376 were taken at fortnightly intervals for seven months after flowers emerged in June. The samples were subdivided into 6-8, 9-11 and 12-14 internode sections and the remainder. Detailed measurements and analyses on these samples gave the following results:

Sucrose % cane was much higher in the upper stalk of flowered cane than non-flowering cane at all times; it was also higher in the remainder until November. The moisture content of flowered cane was lower, but sucrose % dry matter was higher in flowered cane for three months after flowering. Flowering resulted in substantially increased fibre content; juice purities were also higher in flowered cane. The estimated recoverable sugar % cane was higher in flowered cane until November. Invert sugars were lower in flowered cane, especially in the upper part of the stalk.

The weights of flowered cane were substantially higher than those of non-flowering cane; the differences increased with time for the upper stalk and decreased for the remainder of the stalk. These effects could be largely accounted for by length and diameter measurements. The weight of recoverable sugar per 100 stalks was always higher in flowered cane but the difference diminished steadily with time. Pithiness occurred down to internode no. 13, and the majority of side shoots occurred on nodes 6-8.

Introduction

Flowering, with accompanying losses in cane yield and increases in fibre content and pith, is a major problem in cane cultivation in many cane growing areas, especially in the tropics. Flowering is only occasionally prolific in the Rhodesian Lowveld, but as 1972 was a heavy flowering year, the opportunity was taken to compare flowered and non-flowering canes sampled from the same field. Few comparisons of this nature are to be found in the literature, but Lalitha *et al.*[4] found that flowered cane had higher cane weights, sucrose % cane, purity, fibre % cane and lower reducing sugars than non-flowering cane up to 90 days after flowering. Thereafter, cane quality was better in the non-flowering cane. Davies[2] also noted the superior quality of flowered cane.

In these studies, as well as our own, the question must be asked: Did the flowering stimulus cause the differences observed, or were the flowered stalks those which were more robust initially and thus would have been heavier and of better quality even had flowering not occurred?

In view of the very large differences observed in this study, it is probable that both suppositions are true. Whatever the cause, it is hoped that the results will be of value to cane growers and millers in attempting to assess the effects of flowering on cane quality.

Floral initiation in the Rhodesian Lowveld is believed to occur between March 1-20, when the photoperiod is approximately 12½ hours. Flowers begin to appear in May and the majority of flowering occurs in June and July. The flowers start to die back in August.

Experimental methods

Commencing in July, 1972, fortnightly samples were taken of 100 stalks each of flowered and non-flowering cane from a field of 5th ratoon NCo 376, previously harvested in October, 1971, in which about 50% of the stalks had flowered. The sampling was continued until 2nd November, 1972, by which time the cane was severely lodged, and sampling was continued in another field of 6th ratoon NCo 376 previously harvested in November, 1971. This field was cut shortly after 14th December, 1972, and further sampling was carried out in the original field at extended intervals until 22nd January, 1973. Both fields were irrigated at approx. 1,0 × Class 'A' Pan evaporation and no signs of moisture stress were apparent. Changing the sampling sites did not appear to affect the cane quality, as can be seen by an examination of the graphs, but the yield levels were different in the two fields.

The samples were brought to the laboratory and each cane stalk was severed at node no. 6 as follows: With non-flowering cane, the top leaf which was more than half unrolled was designated no. 1, while with flowered cane the uppermost flag leaf was no. 1. Initially the stalks were cut into separate internodes 6, 7, 8, 9, 10, 11, 12, 13, 14 and remainder; the lengths and diameters of each internode of 20 stalks being measured. The diameters were measured with calipers at the centre of each internode or, in the case of the remainder, at the centre of the internode nearest the centre of gravity of the stalk.

For convenience of presentation, all measurements and analyses were meaned into groups of three: 6-8, 9-11 and 12-14 internodes. From 16th November onwards the samples were cut into these categories, not into individual internodes, thus reducing the number of samples analysed.

The samples were analysed by the direct method using a Jeffco cutter grinder and cold extractors.[1] The following were determined: sucrose % cane,

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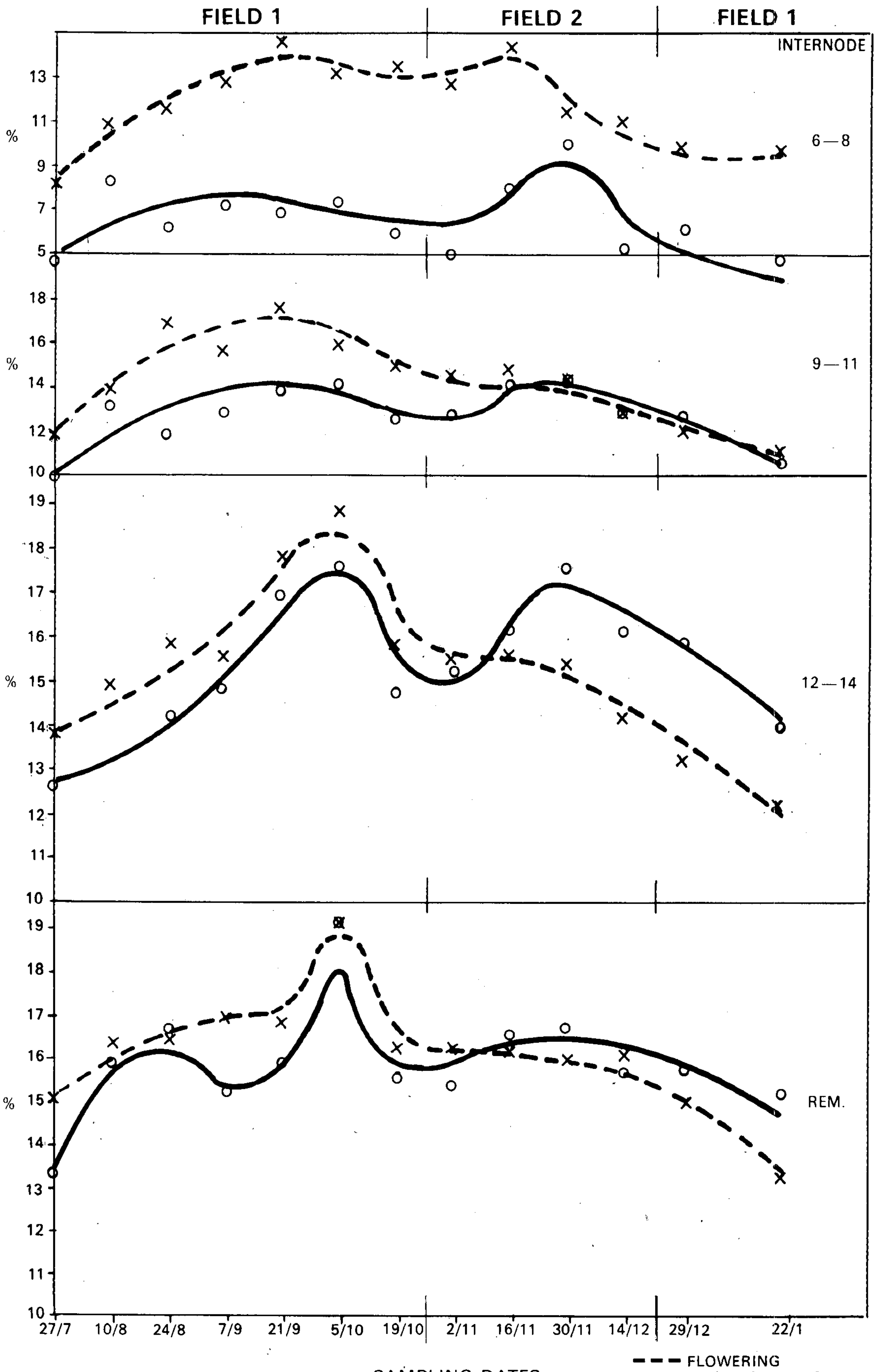

FIGURE 1: Sucrose % cane.

refractometer brix % cane, moisture % cane, and fibre (=100 — Brix — Moisture). Invert sugars % cane were also determined using the Lane-Eynon method (Meade[5]). The following data were also calculated: purity, sucrose % dry matter, sucrose/fibre ratio, e.r.s. % cane, weight of e.r.s./100 stalks, invert ratio.

Flowered cane is characterised by the development of side shoots. In July and August the number of side shoots was very small and they were removed before analysis. From 7th September onwards the number and length of all side shoots were determined. The shoots were not removed but were severed and analysed with the main stalk exactly as would occur in the field. From 21st September onwards a pith assessment was made on 10 additional stalks which were cut longitudinally, and pith was visually scored for each internode using a grading 0 = no pith to 9 = internode completely filled with pith.

Results

Sucrose % Cane (Figure 1)

Figure 1 shows the comparison of flowered and non-flowering canes for each section of stalks for a period of more than six months after the peak flush of flowering. In the 6-8 internode section, flowered cane had a very much higher sucrose concentration throughout, particularly from September to November when it averaged 6% higher. The difference became smaller towards the end of the season. In the 9-11 internode section there was a marked but much smaller (2-4%) difference in favour of flowered cane until the end of November after which the difference disappeared. In the 12-14 internode section and in the remainder of the stalk, flowered cane was about 1% higher than non-flowering cane until the beginning of November when the non-flowering cane became higher in sucrose.

Moisture % cane (Figure 2)

The moisture content of the non-flowering cane was consistently much higher than that of the flowered cane for both the 6-8 and 9-11 internode sections. The difference was generally around 3% for the 9-11 internodes but as high as 10% at times for the 6-8 internodes. The differences in moisture content between flowered and non-flowering cane in the 12-14 internode section and remainder were much less than in the upper part of the stalk; non-flowering cane was generally around 1% higher in moisture content.

Sucrose % dry matter (Figure 3)

In the 6-8 internode section, the flowered cane had a consistently higher sucrose % dry matter, with differences as large as 20% on occasions. In the 9-11 internode section, sucrose % d.m. was higher in the flowering cane until November, after which it was lower than in non-flowering cane. In the 12-14 internode section, the flowered cane had a slightly higher sucrose % d.m. until October, after which it was markedly lower than the non-flowering cane. In the remainder, the flowered cane had a slightly higher sucrose % d.m. until October after which the non-flowering cane had a slightly higher sucrose % d.m.

It is clear that a substantial portion of the apparent increase in the sucrose content of the flowered cane was due to its lower moisture content. However, even when expressed on a dry matter basis the sucrose concentration was substantially higher in the top part of the stalk in flowered cane, and was also slightly higher in the lower parts of the stalk for most of the first three months of the investigation.

TABLE 1

Comparison of non-flowering and flowered cane: Data summarised into means of six sampling dates each for 1st half and 2nd half of period 27 July - 29 Dec 1972

First Half Mean (27 July — 5 October)		Second Half Mean (19 October — 29 December)	
Non-Flowering	Flowered	Non-Flowering	Flowered
Sucrose % cane			
6,77	11,76	6,87	12,12
12,64	15,29	13,16	13,90
15,17	16,12	15,98	14,90
16,07	16,78	15,94	15,99
Moisture % cane			
81,50	73,88	80,37	73,17
72,68	69,97	72,08	70,22
70,05	68,43	69,17	69,43
68,35	67,40	67,67	67,33
Sucrose % dry matter			
36,38	45,37	34,77	45,15
46,17	50,97	47,30	46,62
50,58	50,57	51,93	48,72
50,80	51,42	49,32	48,93
Fibre % cane			
8,00	9,96	8,12	11,23
10,84	11,46	9,67	12,33
11,02	11,78	10,62	12,03
12,62	12,98	13,18	13,52
Sucrose-fibre ratio			
0,97	1,44	0,98	1,11
1,17	1,53	1,41	1,14
1,40	1,23	1,55	1,26
1,33	1,28	1,21	1,19
Brix % cane			
10,6	17,1	11,5	15,6
16,4	19,3	18,3	17,5
18,9	19,9	20,2	18,3
19,4	19,6	19,2	19,2
% Purity			
62,00	69,43	58,13	77,53
77,13	79,02	73,27	79,73
80,15	81,25	79,55	81,60
82,73	85,72	83,45	83,72

Order downwards: internodes 6-8, 9-11, 12-14, remainder

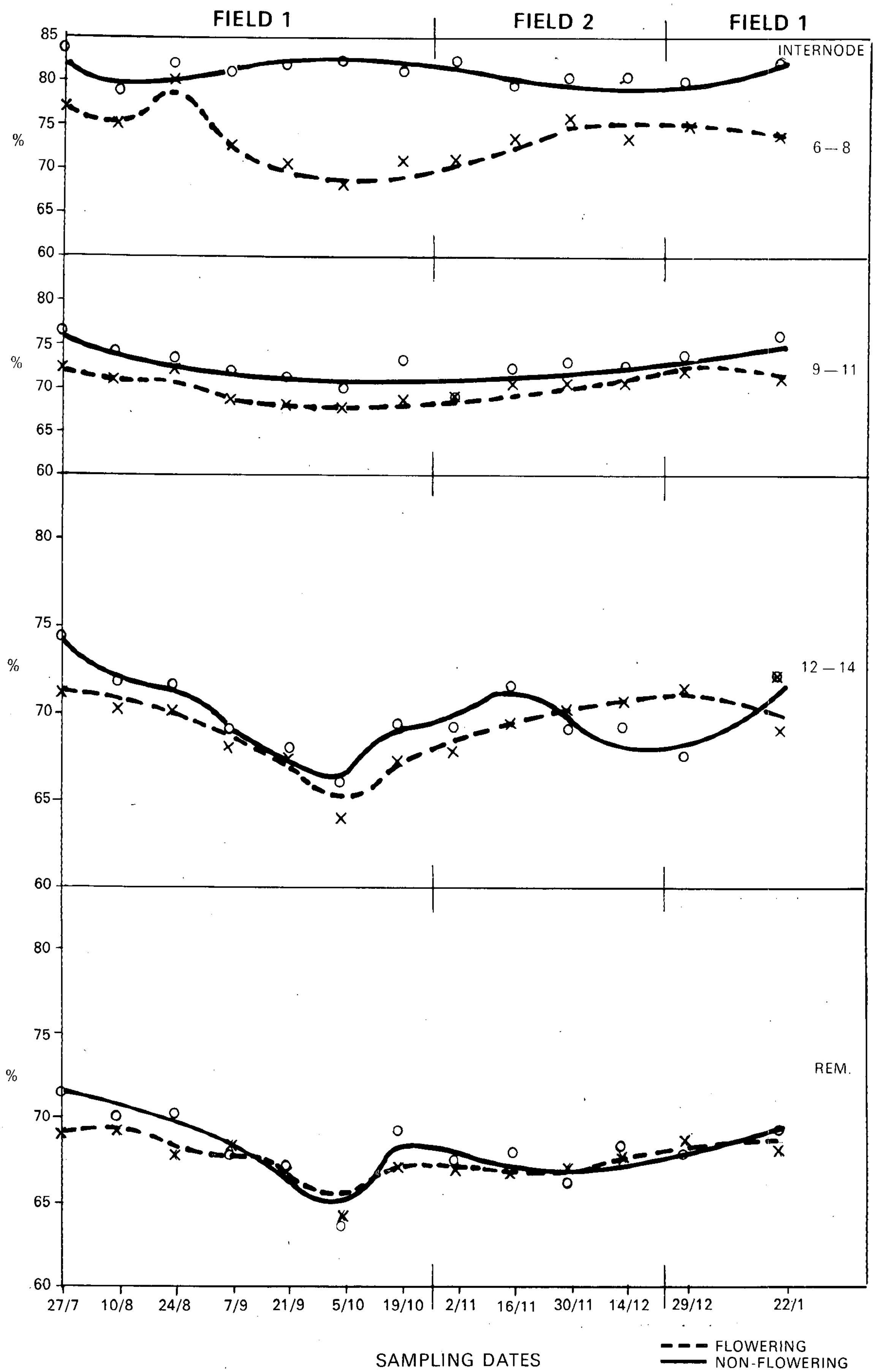

FIGURE 2: Mositure % cane.

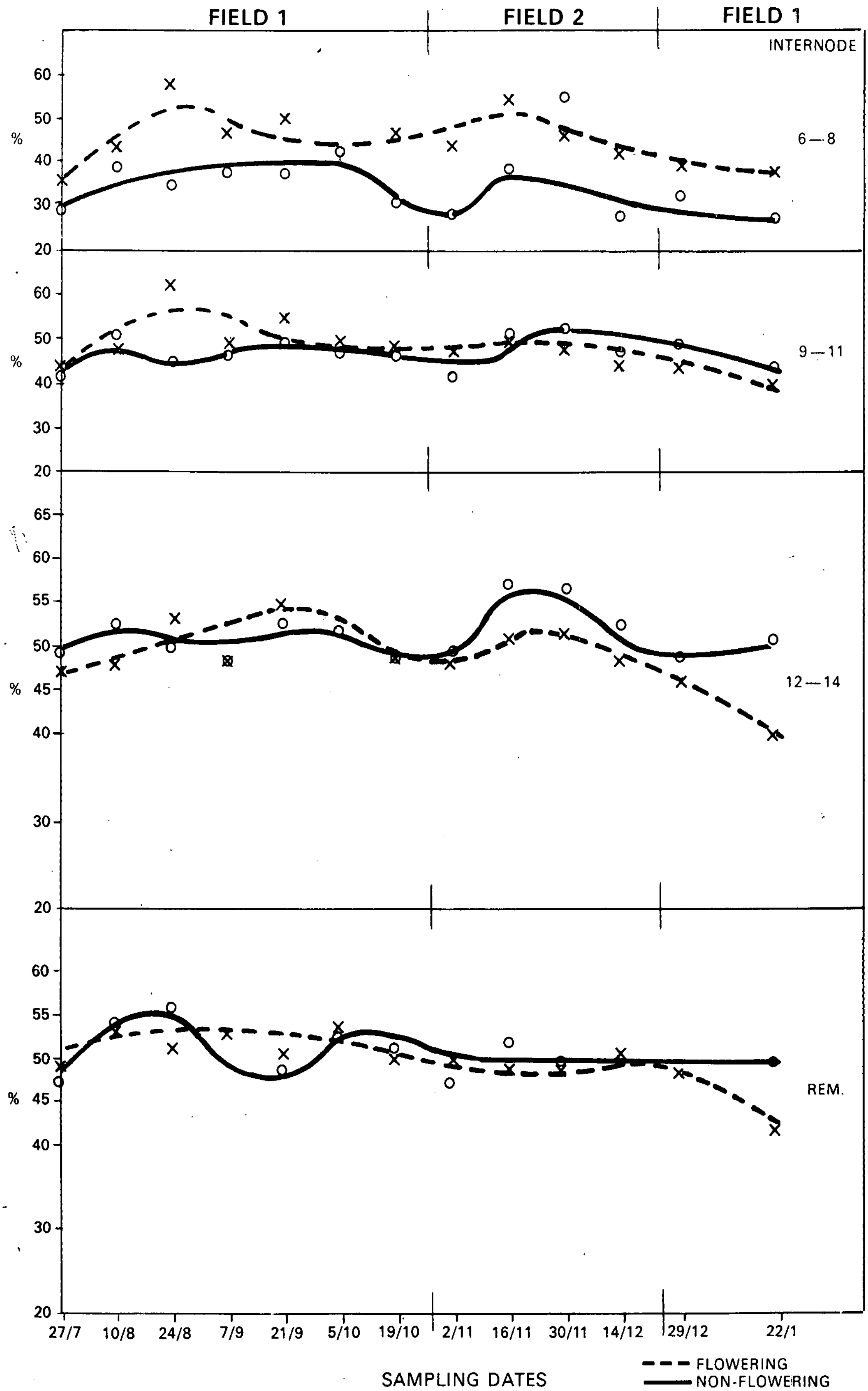

FIGURE 3: Sucrose % dry matter.

TABLE 1 (continued)

Comparison of non-flowering and flowered cane: Data summarised into means of six sampling dates each for 1st half and 2nd half of period 27 July - 29 Dec. 1972

First Half Mean (27 July — 5 October)		Second Half Mean (19 October — 29 December)	
Non-Flowering	Flowered	Non-Flowering	Flowered
Estimated recoverable sugar % cane			
4,42	8,67	4,18	9,69
10,07	12,64	10,12	11,34
12,63	13,50	13,24	12,44
13,64	14,50	13,48	13,52
Order downwards: internodes 6-8, 9-11, 12-14, Remainder			
Invert % cane			
6,50	3,76	7,06	1,90
3,78	2,30	2,82	1,87
2,05	1,70	1,22	1,03
0,69	0,79	0,73	0,89
Invert ratio			
82,60	31,96	122,62	16,04
30,44	15,12	21,86	8,60
13,52	10,64	7,84	7,06
4,18	4,70	4,56	5,78
Cane weight per 100 *stalks*			
7,59	8,98	5,70	10,07
11,96	12,53	6,56	12,10
16,36	17,95	8,34	16,92
47,69	81,08	50,03	58,22
Internode length (*cm*)			
20,55	25,65	18,60	27,83
33,75	36,75	18,60	35,95
46,73	46,35	27,05	43,88
146,83	160,38	151,62	127,15
Stalk diameter (*mm*)			
20,45	21,95	19,63	20 75
19,88	21,15	20,67	21,12
19,28	22,05	20,15	21,63
21,50	24,50	19,00	23,92
Estimated Recoverable Sugar Weight per 100 *Stalks*			
0,353	0,788	0,239	0,965
1,192	1,563	0,823	1,376
2,046	2,382	1,104	2,112
6,599	11,769	6,735	7,811
Cumulative Estimated Recoverable Sugar Weight per 100 *Stalks*			
10,189	16,501	8,734	12,263
9,836	15,713	8,495	11,299
8,645	13,983	7,769	9,923
6,599	11,769	6,735	7,811

Order downwards: internodes 6-8, 9-11, 12-14, Remainder

Fibre % Cane (Figure 4)

Flowering is well known to cause an increase in the fibre content of cane, and this was amply confirmed in these studies. In the 6-8 internode section, fibre was frequently 4% higher in the flowered cane than in non-flowering cane. The differences diminished farther down the stalk, but in nearly all cases fibre was higher in the flowered cane than in the non-flowering cane.

Factory throughput is normally determined by the tons of fibre rather than tons cane being crushed. When heavily-flowered cane is delivered, crushing rate expressed as tons cane/hour usually drops, although when expressed as tons fibre/hr it remains constant. The sucrose: fibre ratio is therefore of interest and it was calculated and plotted graphically. However, the data was very similar to the sucrose % d.m., so only the summary is given in Table 1, in which summaries of other relevant data are also given.

Purity (Figure 5)

The absolute juice purity of flowered cane in the 6-8 internode section was substantially higher (by as much as 20%) than that of the non-flowering cane. The flowered cane also had higher purities in the 9-11 and 12-14 internode sections until December, but the differences were much smaller (2-5%). In the remainder of the stalk, flowered cane again had an advantage until November after which the non-flowering cane had a higher purity.

Estimated Recoverable Sugar % Cane (Figure 6)

(ERS = S − 0,451(B-S) − 0,077F where S = Sucrose, B = Brix and F = Fibre by direct analysis)

Flowered cane had a very much higher e.r.s. % cane in the 6-8 internode section throughout the season. Until October, the e.r.s. of flowered cane was also higher in the 9-11, 12-14 internode sections and remainder, but by the end of the season the non-flowering cane was giving higher values in the 12-14 internode section and remainder of stalk.

Invert sugars % cane (Figure 7)

Flowering resulted in a remarkable reduction in the invert sugars of the upper part of the stalk, particularly in the 6-8 and 9-11 internode sections. There was relatively little difference between flowered and non-flowering cane in the remainder of the stalk. Invert ratios (Invert sugars % cane ÷ sucrose % cane × 100) are given in Tables 1 and 2 and show an even more remarkable reduction with flowered cane since the sucrose % cane was higher than with non-flowering cane.

Table 2 gives analytical details by individual internodes for a typical date of sampling.

Cane Weight per 100 *stalks* (Figure 8)

Figure 8 shows that the weight per stalk was almost always much higher in flowered than in non-flowering cane, frequently by a factor of two or more. In the upper stalk (6-14 internodes) there was very little difference in cane weight between flowered and non-flowering cane in July, but thereafter there was a steadily increasing gap and by December-January, the upper stalk of flowered cane weighed 3-4 times

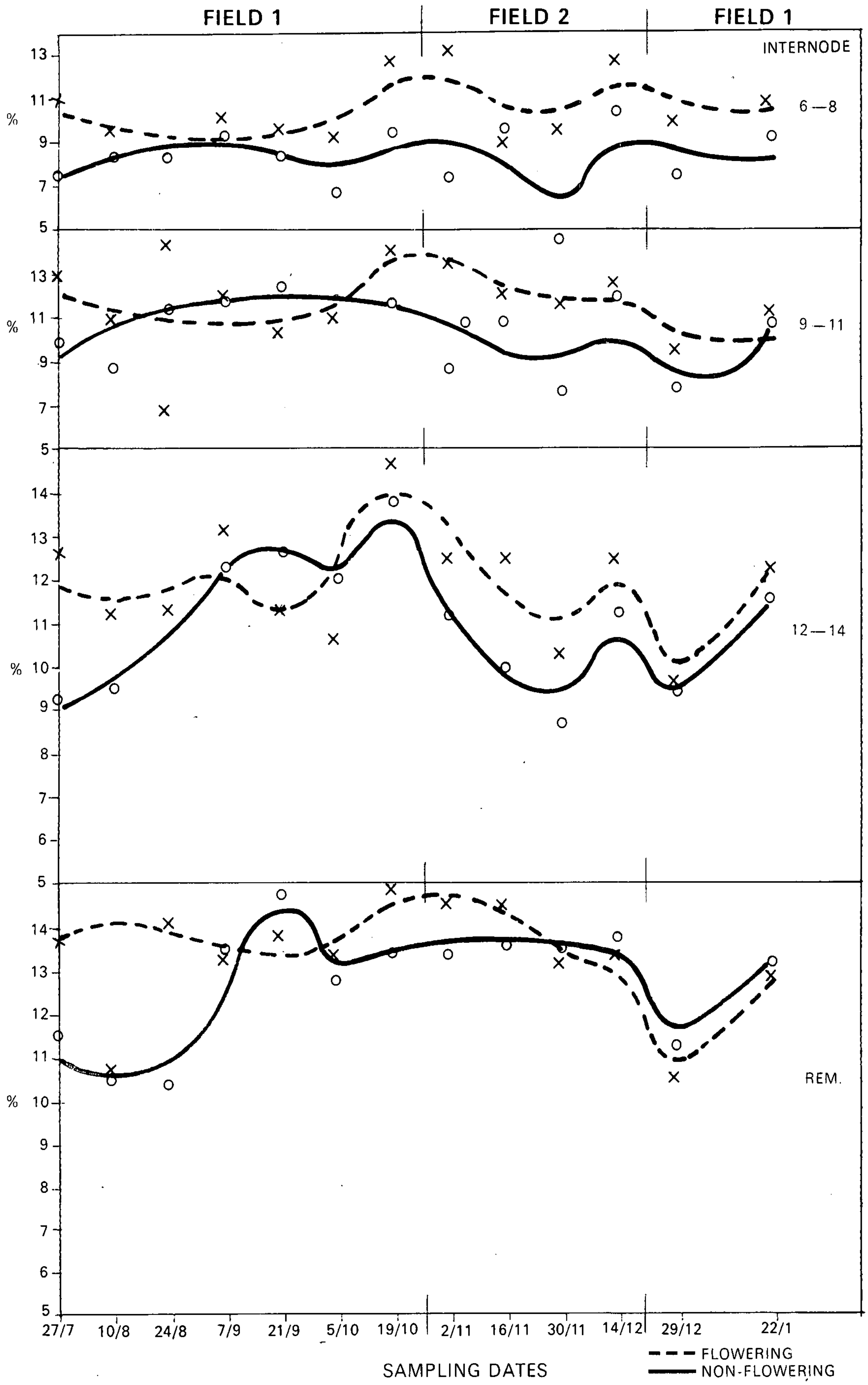

FIGURE 4: Fibre % cane.

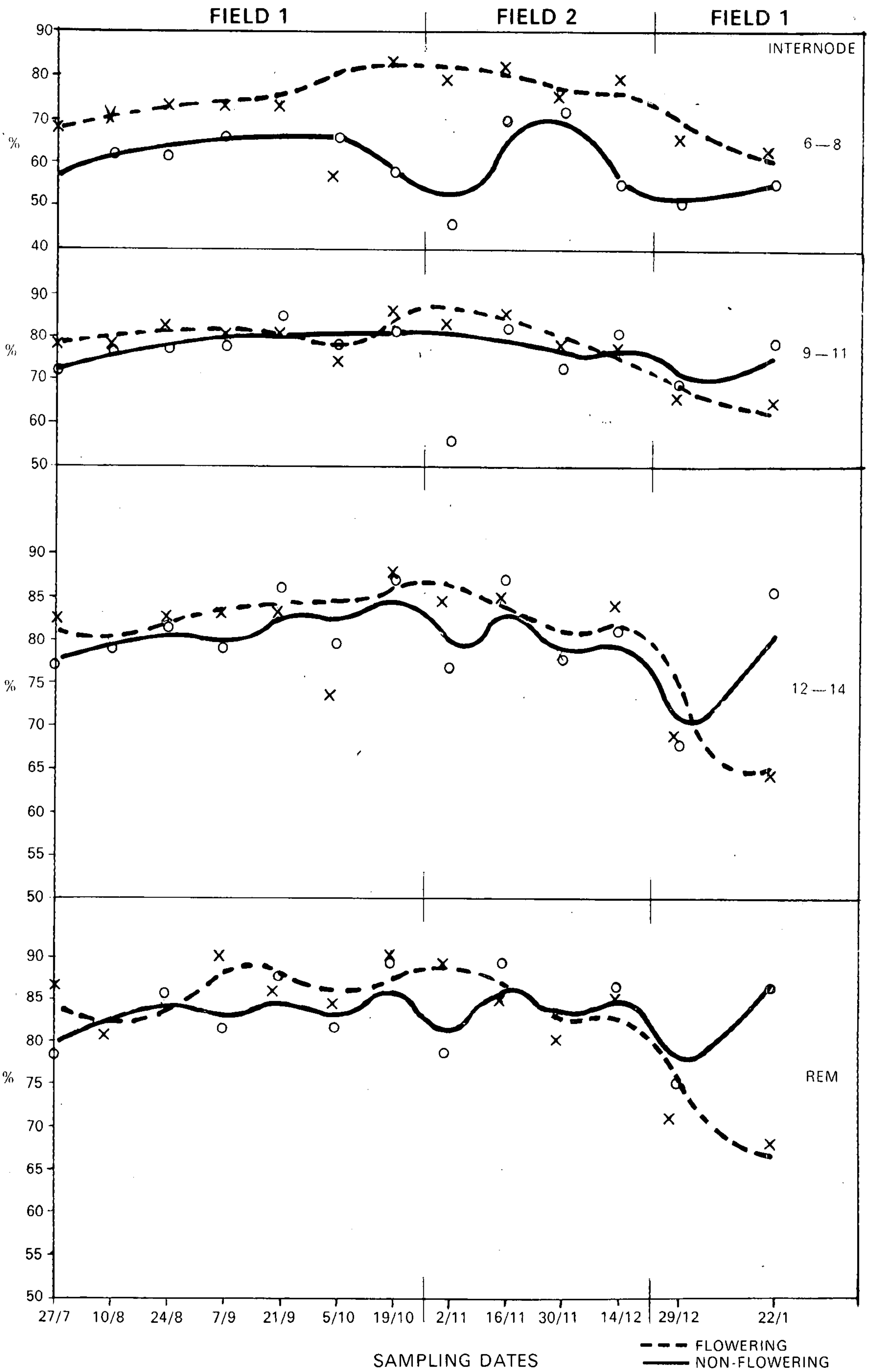

FIGURE 5: Purity.

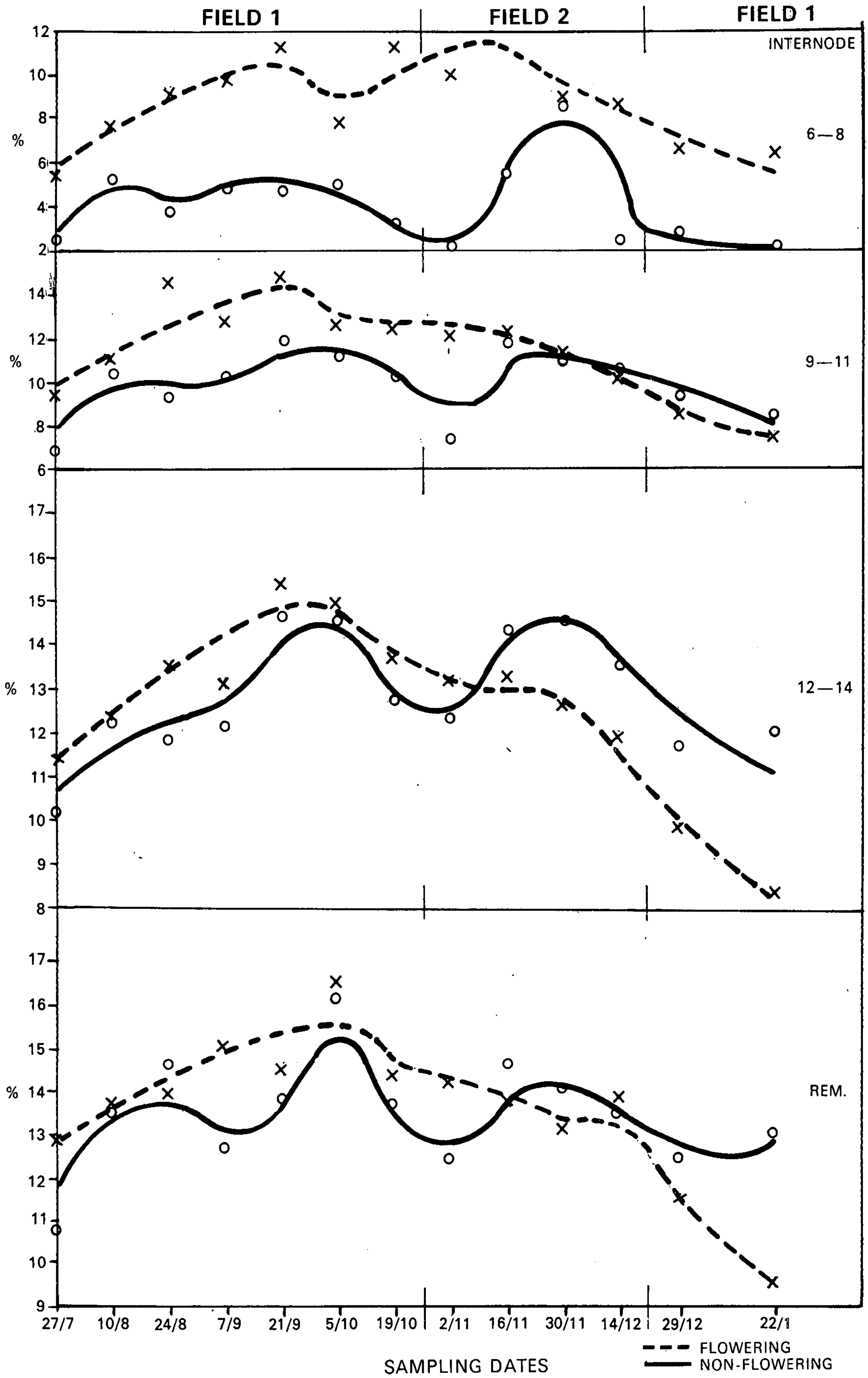

FIGURE 6: ERS % cane.

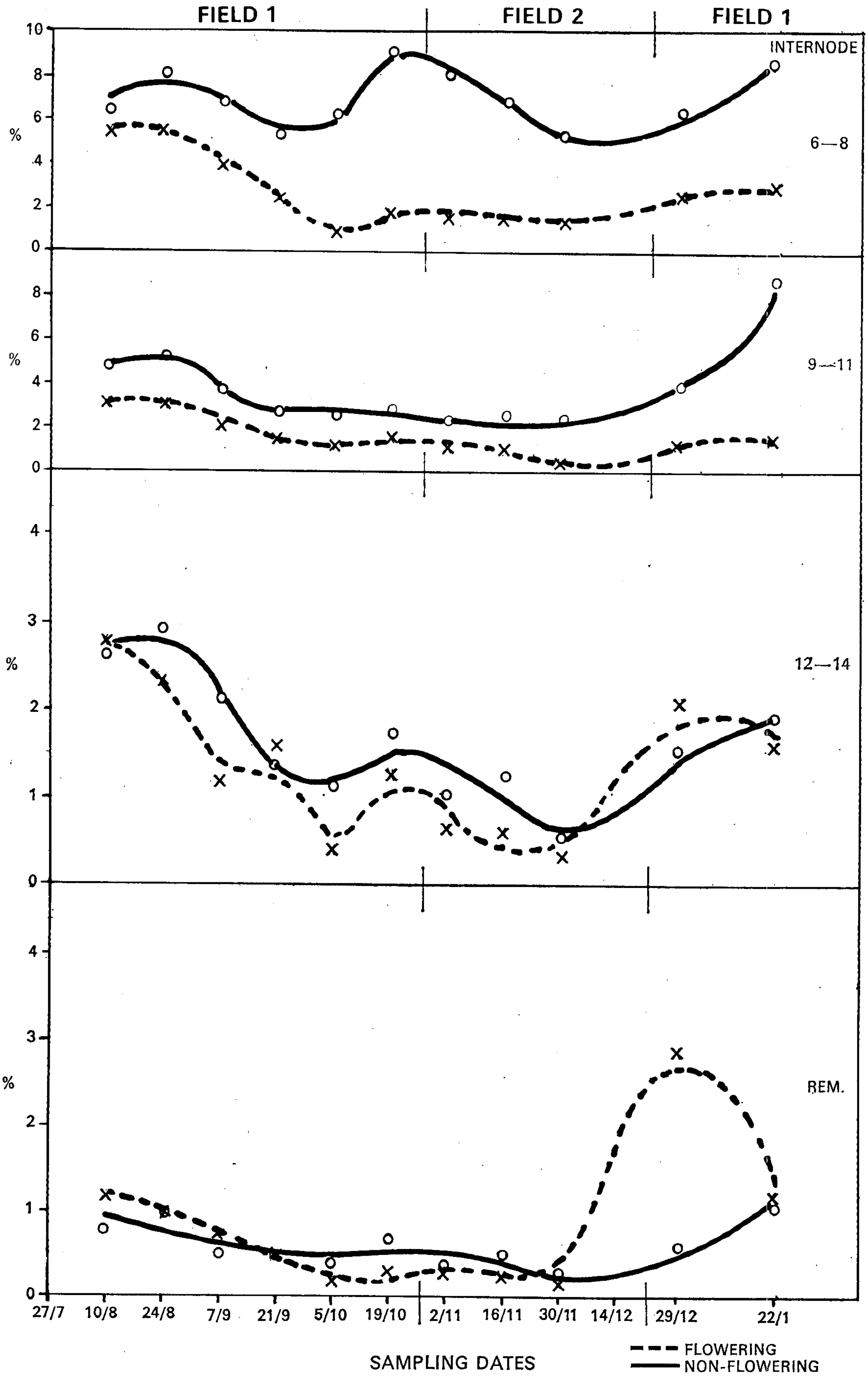

FIGURE 7: Invert % cane.

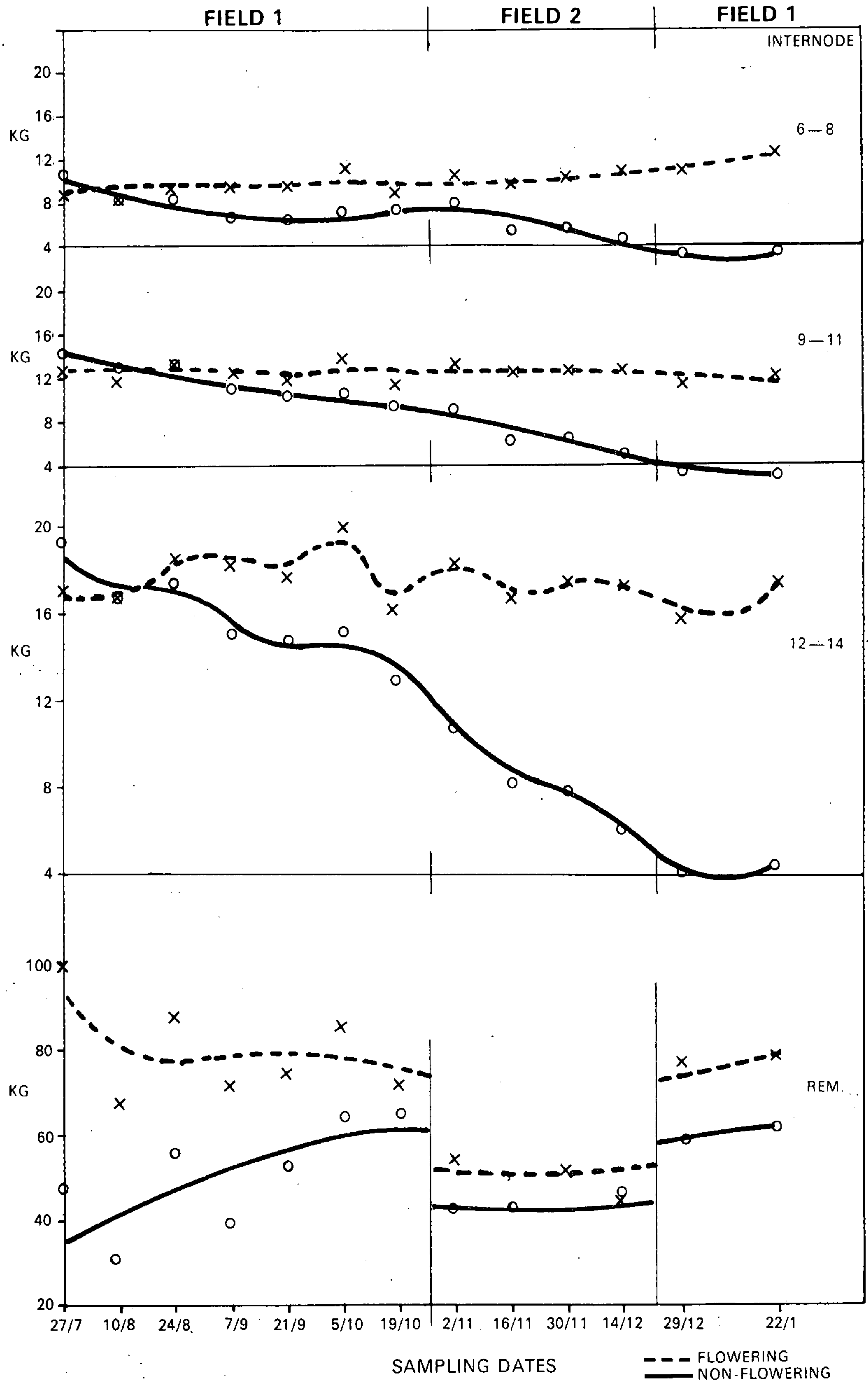

FIGURE 8: Cane weight (kg/100 stalks).

TABLE 2
Flowered vs. non-flowering NCo 376 sampled on 19-10-72 by individual internodes

Internode No.	N	F	N	F	N	F	N	F	N	F
	Sucrose % Cane		Fibre % cane		Purity		ERS % cane		Invert % cane	
6	3,74	13,28	7,9	12,7	43,1	82,8	0,89	11,08	9,89	1,51
7	5,52	13,42	10,0	12,6	60,4	82,2	3,14	11,15	9,60	1,97
8	8,17	13,88	10,2	13,3	69,3	85,3	5,75	11,76	7,79	2,17
9	10,64	15,05	11,0	13,3	76,8	85,9	8,32	12,92	4,26	1,82
10	13,02	15,09	11,2	14,4	81,0	87,4	10,77	12,94	2,24	1,38
11	13,82	14,62	12,7	14,9	83,8	87,2	11,63	12,49	2,19	1,61
12	14,44	15,59	13,5	14,5	86,6	88,0	12,38	13,52	1,84	1,41
13	14,89	15,58	13,8	14,8	86,9	87,6	12,83	13,44	1,76	1,45
14	14,96	16,33	13,7	14,9	87,3	88,3	12,94	14,20	1,70	1,10
Remainder	15,58	16,28	13,4	14,9	89,3	90,3	13,73	14,36	0,71	0,40
	Invert ratio		Cane yield (kg)		Internode length (cm)		Stalk diameter (mm)		E.R.S. yield (kg)	
6	264,4	11,4	2,19	2,30	6,9	7,8	20,4	21,7	0,019	0,255
7	173,9	14,7	2,70	2,76	7,4	8,1	22,7	23,1	0,085	0,308
8	95,4	15,6	2,92	3,39	7,2	9,0	21,5	22,1	0,168	0,399
9	40,0	12,1	2,92	3,54	7,4	10,7	22,2	22,0	0,243	0,457
10	16,2	9,2	3,18	3,70	7,9	10,2	21,1	21,0	0,342	0,479
11	15,8	11,0	3,30	4,03	9,4	12,7	21,1	21,0	0,384	0,503
12	12,7	9,0	3,78	4,45	11,7	13,9	19,3	22,3	0,468	0,602
13	11,8	9,9	4,29	5,30	12,2	15,5	19,4	22,4	0,550	0,712
14	11,4	6,7	4,91	6,33	14,9	16,0	18,5	22,5	0,635	0,899
Remainder	4,6	2,5	63,65	71,62	169,4	153,5	19,3	24,1	8,739	10,285

N = Non-flowering F = Flowered

as much as that of non-flowered cane. This is clearly because the upper stalk in the non-flowering cane was continually being replaced by newly formed internodes, whereas in the flowered cane, the last formed internodes continued to increase in size. This may also be seen in *internode length.*

As would be expected, the remainder of the stalk showed the opposite trend to the upper stalk. Due to the continual addition of new internodes, the weight of the remainder of the non-flowering stalks increased from 50% of that of the flowered stalks in July to 75% by November. The fresh weight of 100 flowered stalks remained nearly constant at around 80 kg from July to January (actually it appeared to drop slightly), while the weight of 100 non-flowering stalks increased from 40 to 60 kg during that period.

The period during which Field 2 was sampled (2/11 to 14/12) gave a different yield level, as shown in Figure 8, but the conclusions are similar.

Internode Length (Figure 9)

In the upper stalk (6-14 internodes) there was very little difference between flowered and non-flowering cane in August, but there was a steady decrease in length of the non-flowering cane internodes until in January the total length of the 6-14 internode section was 42 cm compared with 95 cm for the flowered cane. The length of the upper stalk of flowered cane was relatively constant throughout the period. The length of the remainder of the flowered stalks decreased steadily from July to December whilst the length of the remainder of non-flowering stalks increased during this period.

These stalk length measurements account for much of the variation in stalk weight previously mentioned.

Internode diameter (Figure 10)

The diameter of the upper stalk of flowered cane was generally greater than that of non-flowering cane with a few exceptions. The difference was more consistent in the case of the remainder, where flowered cane averaged 3-4 mm thicker than non-flowering cane. This was another factor causing the greater weights in the flowered cane.

Estimated Recoverable Sugar Weight per 100 *stalks* (Figure 11)

Flowered cane produced substantially more sugar than non-flowering cane in the upper part of the stalk (6-14 internodes). There was little difference in July but the difference widened steadily to November and remained essentially constant thereafter. The weight of sugar in the remainder was much higher in the flowered than non-flowered stalks in July and August, but the difference dropped steadily until December when the non-flowering canes produced more sugar in the remainder of the stalk than the flowered canes.

The total sugar produced per 100 stalks is also shown in Figure 11; it can be seen that the total weight of sugar per 100 stalks was always higher in the flowered stalks, but that the difference dropped steadily from about 8 kg in July to 2 kg from November onwards.

Pith Development

When cutting through stalks longitudinally to determine the extent of pithiness, it was noticed that there was a marked borderline between pithy and normal internodes. For all but two sampling dates this border line was static at internode No. 13. On the two occasions when pith did encroach into the

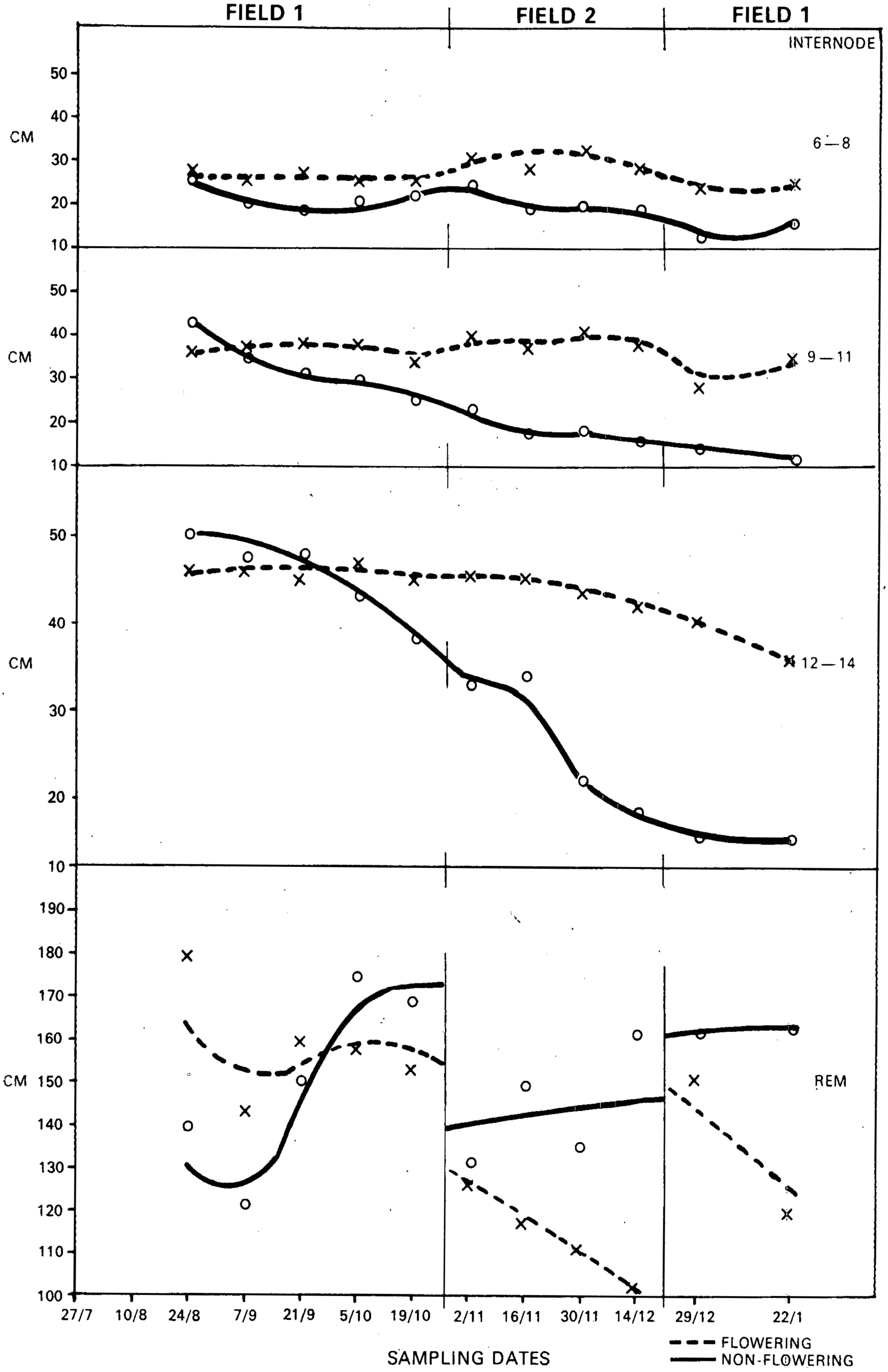

FIGURE 9: Internode length (cm).

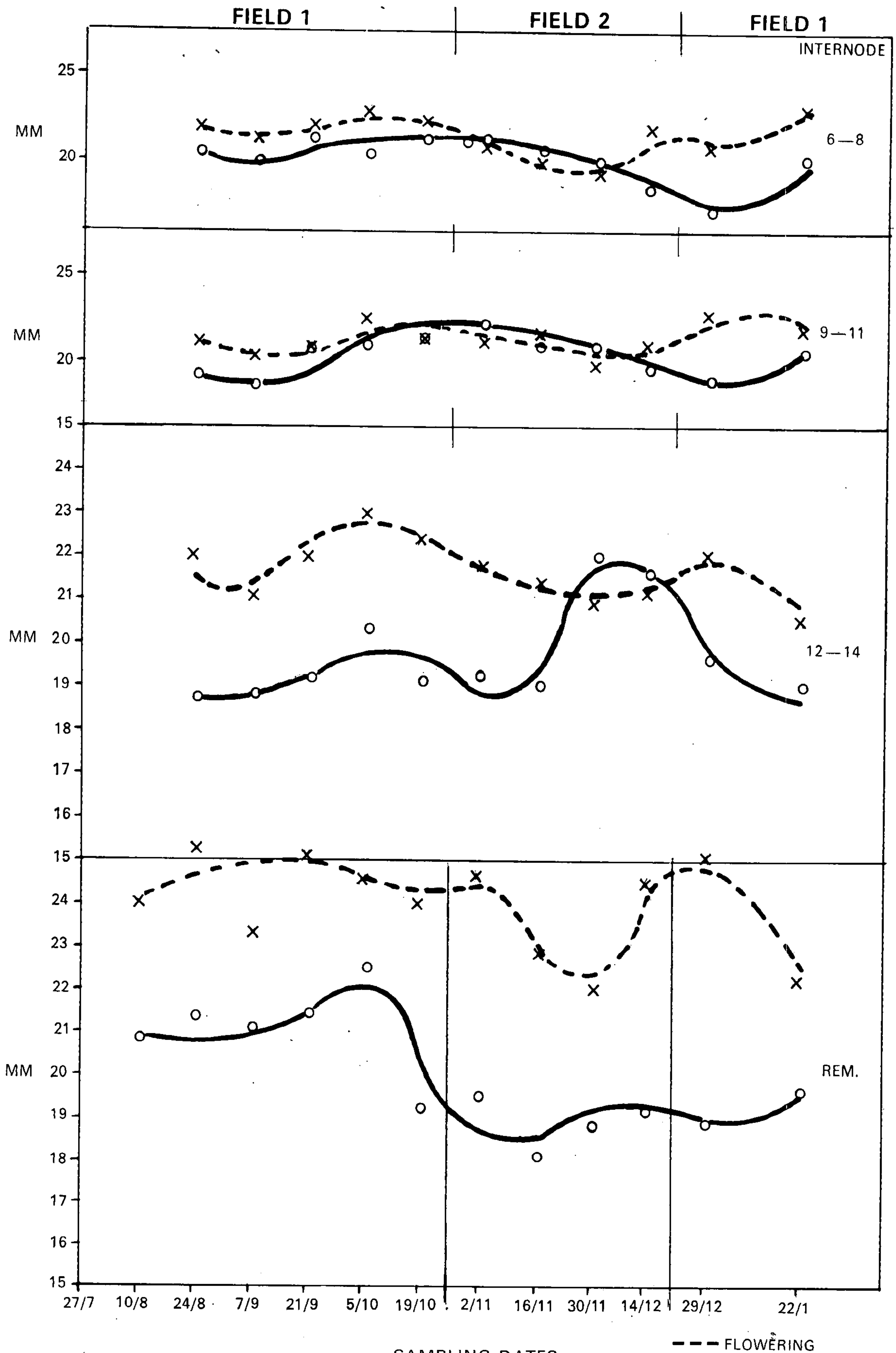

FIGURE 10: Stalk diameter (mm).

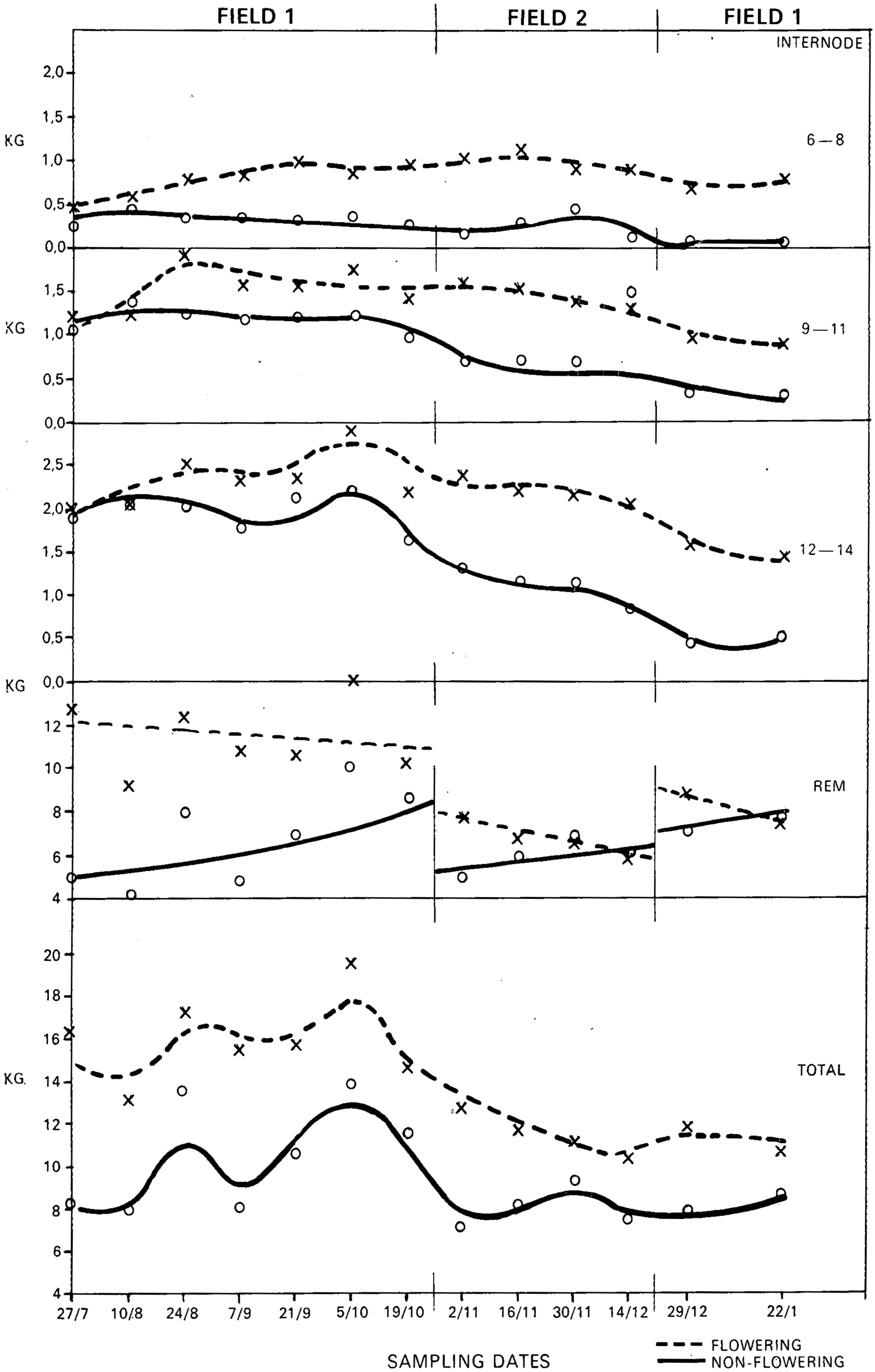

FIGURE 11: ERS weight (kg/100 stalks).

TABLE 3

Development of pith and sideshoots in flowered stalks

Date	Pith development in internode no.									REM	Side shoots	
	6	7	8	9	10	11	12	13	14		Total no. per 100 stalks	Mean length (cm)
7 Sept											24	10,1
21 Sept											48	29,6
5 Oct	4	4	5	6	8	8	7	5	1	0	60	40,3
19 Oct	9	9	9	9	8	8	6	4	1	1	95	66,7
2 Nov	4	3	3	5	5	5	5	5	3	0	46	81,7
16 Nov	5	5	6	6	6	6	4	3	1	0	47	114,2
30 Nov	9	9	9	8	8	8	5	4	2	1	56	114,0
14 Dec	9	9	9	8	7	6	5	1	1	0	63	131,0
29 Dec	8	8	8	8	8	7	6	4	3	0	115	133,1
22 Jan	8	7	7	6	6	5	5	4	4	0	128	154,7

Grading 0 = No pith
9 = Internode completely filled with pith.

Note: Samples from 2nd November to 14th December inclusive were taken from Field 2.

remainder it was negligible with a scoring of only 1 as shown in Table 3.

It was surprising to find consistently high values of sucrose in pithy internodes, and on two occasions a large amount of dry pith was separated from the remaining tissue and analysed separately, after blending with water in the cold extractor.

Mean values from the two determinations were:

Sucrose % pith : 15,13
Sucrose % remaining tissue : 15,62

Since this sucrose is located in dry pith and the juice % cane has declined, it is likely that the true recoverable sugar from the pith will be lower than that given in the e.r.s. formula. The diffusion process could be of advantage here, otherwise the imbibition water requirement would be higher than with non-flowering cane.

Development of side shoots

It was noted earlier that there was little development of side shoots prior to September. Table 3 shows the rapid development of side shoots, both in number and in length, after this date. The position of the side shoots was also noted, and it was found that there was a remarkable consistency in position of the side shoots. No side shoots whatever were found above node 6 or below node 12. The percentage of shoots on other nodes were as follows:

Node No.	6	53,0	93,6 % on 6-8
	7	29,6	
	8	11,0	
	9	3,6	
	10	1,7	
	11	0,8	
	12	0,3	

Comparison of these data with actual field and factory results for 1972

Flowering was much more severe in 1972 on Triangle than in any of the previous six years; on Hippo Valley the overall picture was similar to that obtaining in 1969 with somewhat more flowering in 1972. It is therefore of interest to compare the conclusions from these investigations with those of actual field and factory performances.

Cane yields were some 10-14 tons/ha lower than estimates, notably after September. This reduction has been variously attributed to flowering, frost and cold weather in July, and lower radiation conditions. Losses in yield caused by a severe frost in August were undoubtedly severe, especially on Triangle; in addition minimum temperatures for June, July and August were well below average (see Discussion). The total radiation received between January and October 1972 was 4 700 cal/cm^2 compared with 5 000 for the same period in 1971. Mean sunshine hours were 7,87 and 8,70 per day respectively. The overcast weather which characterised much of 1972 up to August thus appears to have played a part in reducing cane yields. No conclusions could thus be drawn regarding the effect of flowering on cane yields on a field scale.

Factory results for 1972 support the conclusions reached above. Figure 12 shows that instead of the usual sucrose peak in mid-September followed by a noticeable reduction, the mill data for 1972 show a comparatively slight reduction in sucrose from the October peak to December.

Figure 13 shows that fibre % cane climbed much more rapidly in 1972 than usual. This effect was also noticed in 1969 (another year with much flowering) and confirms that flowering resulted in a marked increase in mill fibre content.

The invert ratios have been lower and purities higher from August to December than in any previous year at Hippo Valley. This accords with results from this investigation. A comparison of invert ratios for 1971 and 1972 is shown in Figure 14.

Discussion

In many tropical areas, e.g., Guyana and Nigeria, flowering is widely accepted as being a major cause of crop loss which can amount to one-third of the sugar yield (Evans 1973). In view of this, it is surprising

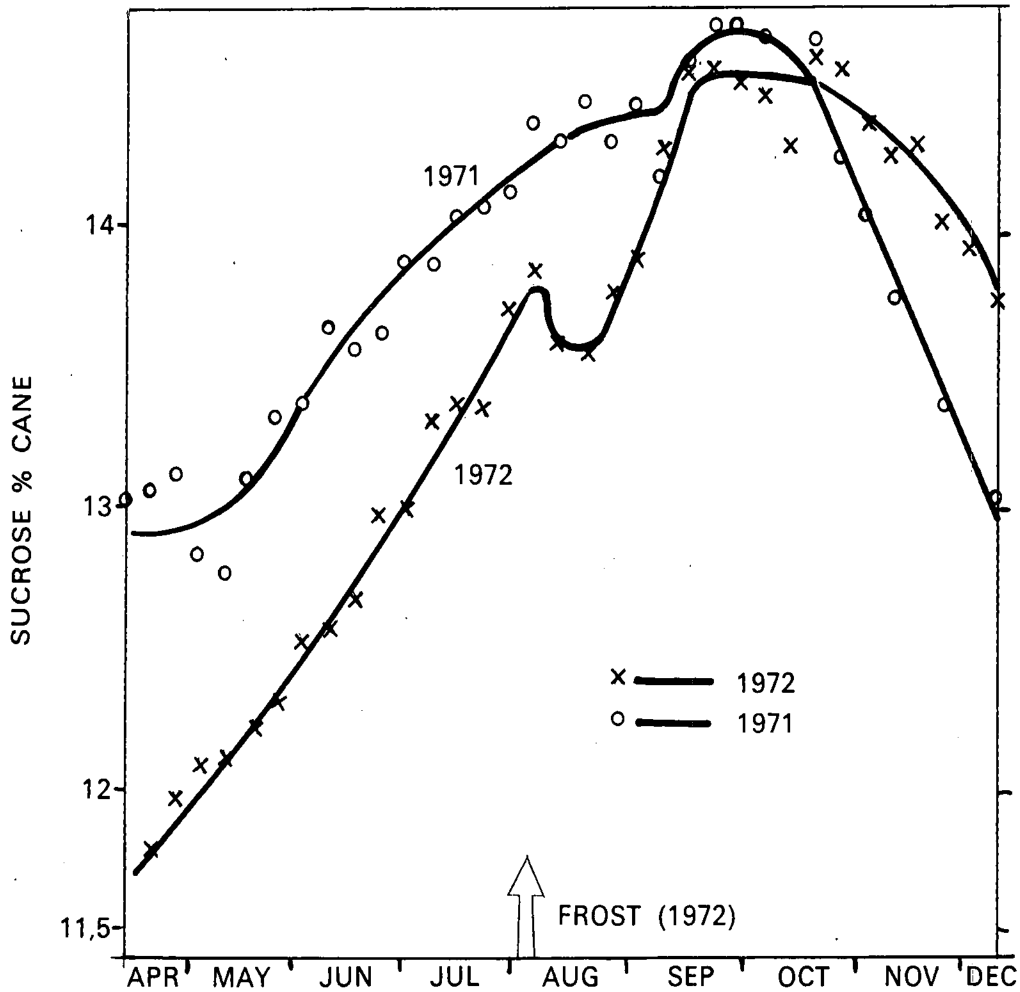

FIGURE 12: Sucrose % cane (mean Triangle and Hippo Valley).

that there is almost a complete lack of quantitative data of these losses under controlled conditions. The ideal method of obtaining such information would be to use artificial lighting in field plots to prevent floral initiation. Yields and cane quality could then be compared with adjacent flowering plots which have otherwise received identical treatment. The method used in the present investigation, viz., to obtain both flowered and non-flowering stalks from the same part of the same field, is open to the criticism that the flowered stalks may have been the more vigorous shoots at the period of floral initiation. In a ratoon crop of NCo 376 which produces 160 000 harvestable stalks per ha, the density of primaries in the ratoon regrowth will probably prevent almost all secondaries from reaching maturity. There are undoubtedly quite large differences in size amongst the primaries at an early stage, but it would appear unlikely that these account for the tremendous differences between flowered and non-flowered canes described above.

It is therefore probable that the physiological processes involved in flowering have been at least partially responsible for the very different and generally better performance in all aspects, which was shown by the flowered cane for several months after the onset of flowering.

These results are applicable to conditions pertaining in the Rhodesian Lowveld during 1972 and would require to be verified in other years, and in other areas. It is very likely that the unusually cold weather in June to August, 1972, retarded the deterioration of flowered cane.

The mean temperatures for 1972 compared with the average mean temperatures for 1967-70 are given below:

	1967/70	1972
June	16,8	15,2
July	16,7	15,9
August	19,1	17,8
September	21,7	21,8
October	24,5	24,1
November	25,4	24,3
December	26,0	28,0

Although the June, July and August temperatures were appreciably below normal, from September onwards, they were approximately normal. Experience in many parts of the world indicates that there is a very rapid fall-off in the quality of flowered cane with the onset of the hot weather. This was not the case in this study.

It is therefore reasonable to conclude that under Rhodesian Lowveld conditions, flowered cane produces higher sucrose, purity, e.r.s., cane weight and

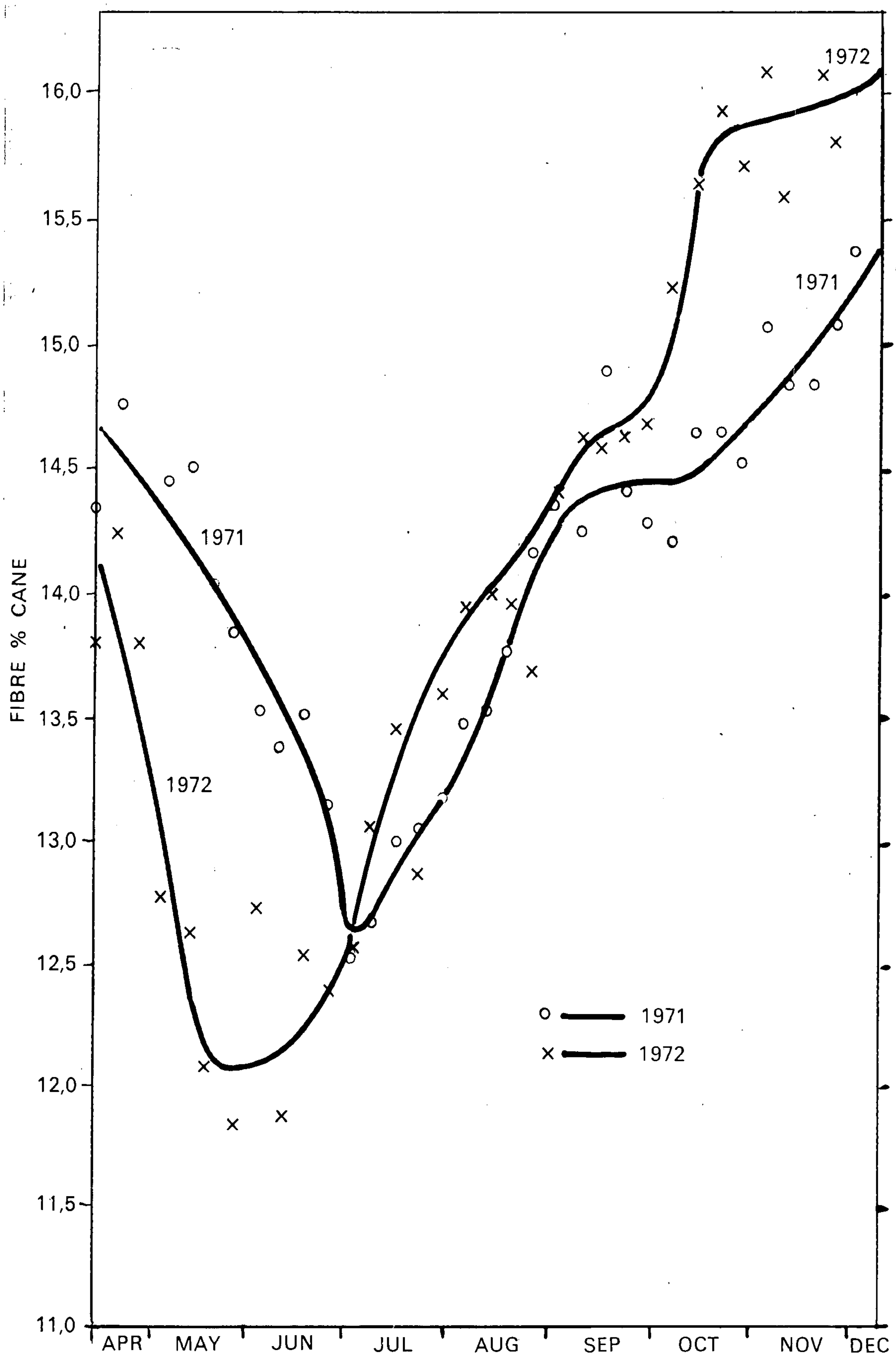

FIGURE 13: Fibre % cane, Triangle 1971 and 1972.

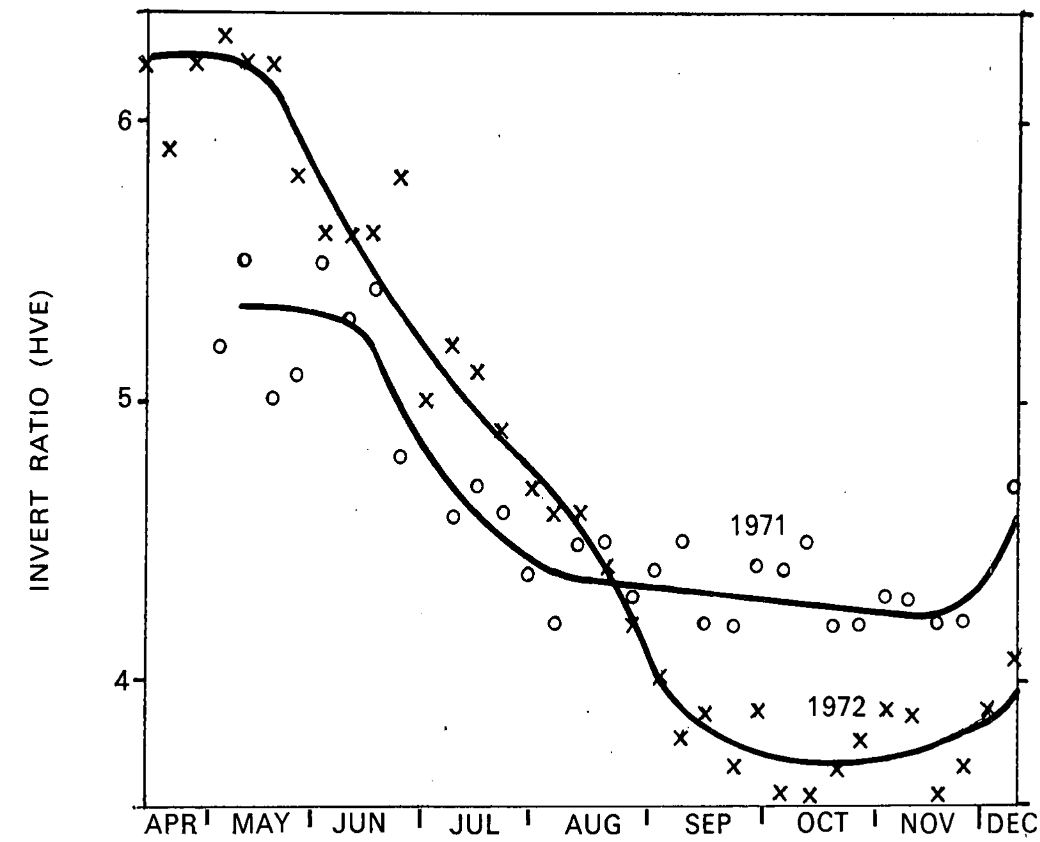

FIGURE 14: Invert ratio (HVE).

e.r.s. weight and lower invert sugars, but higher fibre and pith than non-flowering cane up to around November following the appearance of flowers in May-July.

It is noteworthy that irrigation was not reduced in spite of the reduction in canopy caused by the dying back of the upper foliage. Field observation suggests that rapid deterioration of flowered cane follows the imposition of a drying off régime on flowered cane and it would be interesting to compare the effects of drying off on flowered and non-flowering cane.

When heavy flowering develops, there is usually a tendency to top the cane lower in order to reduce the amount of fibre and pith being milled. These results show that this practice causes considerable loss of sugar, and a study of Tables 1 and 2 leads to the conclusion that topping should be higher in flowered than in non-flowering cane. However, more information is required on the true recoverability of the sucrose in a highly fibrous, pithy stalk.

Wherever sucrose % cane has been quoted in this paper, it should strictly be termed pol % cane. In order to ascertain whether the sucrose % cane of flowered cane was artificially inflated by a high dextrose/laevulose ratio in the invert sugars, Clerget or true sucrose determinations (Meade[5]) were carried out on two batches of flowered and non-flowering cane, in addition to normal pol determinations. The values obtained were close to each other, the mean results on the extractor liquor of one batch being:

	POL % gm.	CLERGET SUCROSE % gm.
Flowered	4,76	4,54
Non-Flowering	4,35	4,01

It is therefore clear that the pol readings can be reliably accepted as equivalent to true sucrose figures.

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