

3.1 PERIODIC HARVEST OF SUGAR BEET, 1987
(Not funded by SBREC)

NAS 512 ML
12th year

Summary

After a late drilling, the 1987 crop eventually produced a good yield of sugar. Sugar content rose from a low of 15.5% in mid-September to a maximum of 19.0% in early December. Sugar yield reached a maximum of 11.6 t/ha on 3 December. Maleic hydrazide increased the sugar content, but decreased the root yield on 22 October. The 0.5 t/ha decrease just failed to reach statistical significance.

Object

To monitor the progress of the beet crop through the harvest campaign period, and to determine the effect of a late August application of maleic hydrazide on early lifted samples.

Materials and method

Four 18 m² plots were hand harvested at fortnightly intervals and samples were washed, weighed and sugar content determined from brei samples. The first lift was on 10 September and the final one on 17 December. In addition, samples were taken from plots which had been sprayed with maleic hydrazide on 28 August. These samples were taken between 10 September and 22 October.

Results and conclusions

The plant population averaged 87,870/ha (range 86,390 to 89,580/ha) - well above the target of 75,000/ha. The differences in plant populations at the different harvests were not statistically significant.

*NOT FOR PUBLICATION WITHOUT THE DIRECTOR'S CONSENT. This report deals primarily with only one year's work, so any conclusions given are only provisional.

Results and discussion

Yield data

	Root yield (t/ha)	Sugar content (%)	Sugar yield (t/ha)
(ESE)	(+1.19)	(+0.143)	(+0.18)
10 September	46.7	15.49	7.2
24 September	50.9	16.90	8.6
8 October	56.5	17.76	10.0
22 October	59.7	18.27	10.9
5 November	60.6	18.42	11.2
19 November	60.3	18.81	11.3
3 December	61.2	19.00	11.6
17 December	62.0	18.67	11.6
<u>Maleic hydrazide treated plots</u>			
<u>(28 August)</u>			
10 September	44.6	15.44	6.9
24 September	51.6	16.87	8.7
8 October	56.9	18.05	10.3
22 October	54.7	19.03	10.4
S.E. per plot (33 d.f.) or as % G.M.	+2.39 or 4.3%	+0.285 or 1.6%	+0.36 or 3.6%

Sugar content was low (15.49%) on 10 September and rose to a peak of 19.00% on 3 December. This was lower than the peak of 20.07% in 1986 and 19.30% in 1985. Levels remained high even at the last lift (18.67%).

Root yields were reasonable (46.7 t/ha) at the first harvest and rose steadily to 62.0 t/ha on the last harvest date (17 December). This was the lowest peak since 1983 (61.0 t/ha) and was considerably lower than the high levels of 1982 (70.3 t/ha) and 1984 (70.0 t/ha).

Sugar yields reached a maximum (11.6 t/ha) on 3 December and were still at this level on 17 December. Maximum sugar yield was higher in 1982, 1984 and 1986 but lower in 1983 and 1985. The daily gain in sugar yield from the first lift to the date of the highest yield (3 December) was 52 kg/ha/day. This was higher than those of 1983 and 1985 but lower than all the others from 1982.

Root yield was significantly reduced on the fourth lift (22 October) by the use of maleic hydrazide. However sugar content was increased significantly by maleic hydrazide at this date, but not sufficiently so to compensate fully, and a fall in sugar yield appeared to result. However, this did not quite reach statistical significance.

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APPENDIX - NAS 512 ML

Periodic harvest of sugar beet, 1987

Field data

Soil type: Sandy clay loam (Beccles series) East end of Wheate Close

Previous cropping: 1985 Winter Wheat
1986 Winter Wheat

Cultivations: Two passes of dutch harrow

Fertilisers: Magnatrox 160 kg/ha P₂O₅, 300 kg/ha K₂O,
171 kg/ha Na, 57 kg/ha Mg in autumn
21 April 42 kg N/ha
8 May 84 kg N/ha

Drilled: 18 April (50 cm rows, 16 cm seed spacing)

Variety: Hilma + 5 kg/ha Temik

Herbicides: 1 May 1.7 kg/ha Goltix WG + 1.7 l/ha Actipron
25 May 2.5 l/ha Betanal E + 1.5 kg/ha Goltix WG

Weather

1987 Weather (19 year mean in brackets)

Month	Rainfall (mm)		Sunshine (hours)		Mean temp (°C)	
January	31.8	(56.9)	36.9	(51.7)	0.1	(3.1)
February	25.4	(38.7)	72.2	(70.5)	3.3	(2.9)
March	42.6	(46.4)	94.9	(102.1)	3.3	(5.2)
April	45.9	(43.5)	150.6	(152.6)	9.9	(7.4)
May	46.1	(49.0)	197.3	(191.6)	9.8	(10.8)
June	89.1	(55.1)	120.6	(198.5)	13.0	(13.9)
July	81.8	(49.5)	167.4	(193.9)	15.6	(16.0)
August	117.8	(51.6)	146.5	(182.7)	15.5	(16.1)
September	32.4	(45.3)	159.6	(150.8)	14.1	(13.8)
October	126.5	(53.8)	125.6	(111.9)	10.3	(10.4)
November	50.8	(65.7)	47.6	(67.9)	6.6	(6.4)
December	26.6	(55.7)	35.2	(49.4)	5.9	(4.4)
Total	716.8	(611.2)	1354.6	(1523.6)		

The crop was drilled late because of the cool wet conditions in early April, but the month was the mildest since 1949. May was much cooler than normal, but rainfall and sunshine were near to the average. June and July were very wet and dull with below normal temperatures. June was particularly cool. August was extremely wet with 246% of the normal rainfall. Sunshine was well below the average and the mean temperature was below normal. September was slightly warmer and sunnier than usual, and the rainfall was 70% of the normal. October was very wet (254% of normal) with slightly below normal temperatures. Sunshine however was higher than average. November was dull but drier than the average with normal temperatures.

December had 46% of the usual rainfall but was much cloudier than normal. The mean temperature was 1.5°C above the 18 year mean.

Soil moisture

Soil moisture deficit

Date	Crop cover%	Soil moisture deficit (mm)	Date	Crop cover %	Soil moisture deficit (mm)
13 April	0	0.0	6 July	45	19.7
20 April	0	5.0	13 July	70	39.3
27 April	0	8.3	20 July	90	26.5
4 May	1	8.9	27 July	100	17.3
11 May	2	13.5	3 August	100	6.4
18 May	2	3.0	10 August	100	19.1
25 May	3	6.6	17 August	100	32.1
1 June	4	11.1	24 August	100	32.9
8 June	8	4.6	31 August	100	0.0
15 June	10	0.3	7 September	100	2.1
22 June	18	0.0			
29 June	30	0.3			

Weekly estimates of ground cover were taken from early April to early September for soil moisture deficit determinations by Norsk Hydro Fertilisers.

The soil moisture deficit remained at a low level throughout April, May and June and even returned to nil on 22 June. The deficit rose until mid July and then gradually fell to 6.4 mm in early August. A further steady rise to a deficit of 32.9 mm on 24 August was followed by a rapid fall to nil on 31 August as a result of very heavy rain. 42.6 mm rain was lost to drainage during the week ending 31 August. The deficit of 2.1 mm on 7 September was sufficiently low for further calculation of soil moisture deficit to be considered unnecessary.

Crop growth

The crop emerged well in the warm weather of April but growth was slow in the cool weather of May. The slow but steady growth in June was followed by more substantial growth in July and early August. The dull wet weather in late August slowed down the growth of the crop.

Beet population

Date	'000s/ha
(ESE)	(\pm 1.66)
10 September	86.7
24 September	86.5
8 October	87.6
22 October	89.6
5 November	89.0
19 November	86.4
3 December	87.4
17 December	88.9
<u>Maleic hydrazide treated plots</u>	
<u>(28 August)</u>	
10 September	86.8
24 September	87.9
8 October	88.8
22 October	88.9
S.E per plot (33 d.f.)	\pm 3.32
or as % G.M.	or 3.8%