

Summary

1984 proved to be a good year for sugar-beet yields, in spite of the cold dry start. Slow early growth was compensated for by a rapid increase in late August. Root yields rose in September, were static during October but rose in early November. Sugar content rose until late November and then remained at a high level until the last lift on 20 December.

Object

To monitor the progress of the beet crop through the harvest campaign period.

Treatments

Samples of washed roots and sugar content were taken fortnightly, beginning on 13 September and ending on 20 December.

Method

The crop of Monoire was drilled on 13 April with a row spacing of 50 cm and a seed spacing of 16 cm. Weekly estimates of ground cover were taken from early April to mid-September for soil moisture deficit determination by Norsk Hydro Fertilisers. The crop was drilled into a moist seedbed, but drilling was followed by mild dry and sunny weather. Cold dry easterly breezes then persisted for most of May and this dry period finished with heavy rain on 20 May. Heavy rain during the first half of August was followed by dry sunny and very warm weather. The soil moisture deficit rose from 40.5 mm on 13 August to 77.4 mm on 3 September. Very wet and dull weather was recorded in September. Rainfall kept pace with the demands of the crop and the soil moisture deficit had fallen slightly on the last date it was assessed, 17 September. October and November were very mild and October and December were both sunnier than normal.

Four 20 m² plots were hand harvested at fortnightly intervals and sub-samples were washed, weighed and sugar content determined from brei samples.

Results and Conclusions

The plant population averaged 91,370/ha and ranged from 84,600/ha to 96,100/ha, well above the target of 75,000/ha and well above the mediocre average level achieved in the crop as a whole at Morley. These differences were not statistically significant.

Sugar content was low (15.5%) in the dull wet September but subsequently rose to a maximum of 18.6% on 22 November.

*NOT FOR PUBLICATION WITHOUT THE DIRECTOR'S CONSENT.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.

The root yield increased during September, became static in October and then reached a maximum on 8 November. It then stayed at this level until the final harvest.

Sugar yield reached a maximum of 12.7 t/ha on 22 November and was still at 12.2 t/ha at the final harvest: a very satisfactory yield considering the slow start. The warm conditions in August and the mild October and November all helped to produce a good crop that still yielded well late in the season.

Yield Data Periodic Harvest 1984

Harvest date	Root yield t/ha	Sugar content %	Sugar yield t/ha
SE (7 d.f.)	<u>+1.91</u>	<u>+0.104</u>	<u>+0.334</u>
13 September	53.7	15.86	8.52
27 September	61.4	15.54	9.54
11 October	61.4	16.86	10.35
25 October	62.8	17.53	11.01
8 November	70.0	17.38	12.16
22 November	68.3	18.59	12.69
6 December	67.3	17.76	11.96
20 December	69.8	17.53	12.22
SE as % G.M.	<u>+3.82 or 5.9%</u>	<u>+0.207 or 1.2%</u>	<u>+0.668 or 6.0%</u>

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APPENDIX

Periodic harvest of sugar beet

NAS 512 ML 84

FIELD DATA

Soil type: sandy loam (Ashley series)

Previous cropping: 1982 spring barley
1983 winter barley

Cultivations: Ploughed 29 November 1983
Worked down 13 April

Fertilizers: 1550 Magnatrox containing 7% P₂O₅, 29% K₂O, 9.5% Na,
5% Mg + 0.37% B giving 0:109:450 kg/ha
7 bags 33.5% N giving 120 kg/ha N split between
drilling and post-emergence.

Drilled: 13 April

Herbicides: Pyramin FL pre-emergence 3.5 l/ha on 16 April
Nortron + Betanal E 2.5 l + 3.5 l/ha on 14 May
Fusilade + Agral 3 1/ha on 31 May

1984 Weather (16 year mean in brackets)

Month	Rainfall mm		Sunshine hrs		Mean temp °C	
January	93.6	(57.7)	80.9	(51.2)	3.1	(3.5)
February	39.1	(43.3)	69.8	(66.8)	3.3	(3.2)
March	41.4	(46.0)	42.5	(100.6)	4.6	(5.3)
April	11.4	(41.4)	223.7	(154.2)	7.2	(7.3)
May	57.0	(49.0)	129.3	(193.5)	9.0	(10.9)
June	90.3	(48.5)	192.7	(202.6)	13.6	(14.0)
July	46.1	(47.1)	190.5	(193.9)	15.9	(16.0)
August	51.9	(45.8)	220.5	(186.7)	17.0	(16.2)
September	88.6	(49.4)	98.8	(149.8)	13.7	(13.9)
October	46.3	(51.1)	112.2	(109.1)	11.2	(10.4)
November	66.1	(68.2)	54.8	(67.6)	8.3	(6.5)
December	46.2	(54.2)	68.8	(50.5)	4.9	(4.2)
Total	678.0	(601.7)	1484.8	(1526.5)		

RESULTS

Good emergence resulted despite the dry weather. Growth was initially slow but improved in June and July and it increased dramatically in August as a consequence of the warm sunny weather.

The maximum sugar content (18.6%) was recorded on 22 November, when the plots lifted happened to contain very high plant populations. The sugar-yield per plant on this date was not significantly different to those on the adjacent harvest dates, but the yield of washed beet per plant was significantly lower than the previous lift on 8 November. Sugar content remained at a high level throughout the rest of the season.

During the period up to 22 November the mean increase in sugar yield was 60 kg/ha/day, which compares with the figure for 1982. The period of greatest sugar accumulation was between 25 October and 8 November (82 kg/ha/day) whilst the overall figure for the season was 38 kg/ha/day.

Harvest Data

Harvest date	Plant population '000s/ha	Yield of washed beet/plant g	Yield of sugar per plant g	Daily sugar yield increase kg/ha
S.E. (7 d.f.)	± 4.69	± 40.9	± 7.07	-
13 September	93.2	581	92	-
27 September	91.0	678	105	73
11 October	90.7	677	114	58
25 October	92.9	685	120	47
8 November	84.6	837	145	82
22 November	96.1	713	132	38
6 December	89.6	761	135	-52
20 December	92.9	756	132	19
				60 to 22 Nov. 38 overall
SE as % G.M.	± 9.37 or 10.3%	± 81.8 or 11.5%	± 14.1 or 11.5%	