



**HORTICULTURE RESEARCH INTERNATIONAL**

KIRTON

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**HDC CONTRACT FV96**

**BORECOLE (CURLY KALE) CONTINUITY**

**OF PRODUCTION 1991/92**

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AUTHENTICATION

I declare that this work was done under my supervision according to the procedures described herein and that this report represents a true and accurate record of the results obtained.

.....*M J Leatherland*.....  
(Signature)

M J Leatherland

Date ..*8*.. *May*.. *1992*

Report authorised by ..*M B Wood*.....  
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## Summary

To arrive at a production schedule for borecole (curly kale) five varieties were planted each on three dates from mid June to the end of July 1991. Records were made of yield at harvest as well as features such as curliness, colour and texture after cooking. Although some varieties were recorded in two harvests lower and crown leaves figures were bulked together for comparison with single harvest types. The most promising result was with a short variety, 'Kobolt' which gave consistently high yields from single harvests. 'Bornick', a taller variety, did give higher yields particularly later in the season but this was from two cuts which would probably not be normal commercial practice.

Observations made indicated that the holding ability of curly kale was very good and that better continuity might be achieved using fewer sowings with longer holding intervals. Further support for this argument was given by the fact that earlier plantings gave consistently higher yields with all varieties.

## Introduction

Whilst continuity programmes are widely available for many brassica crops, the sequential production of borecole or curly kale is less clearly defined. The development of experimentally proven combinations of varieties and sowing dates into a reliable programme for winter production would be useful to the industry. Although statistics are not kept separately for this crop there is increasing demand from supermarkets for a product which can be packed and marketed efficiently. This means looking for a product with a low volume to weight ratio. Harvesting is also important and shorter growing cultivars which can be single harvested are of particular interest. Finally, consumer appeal must be considered. Colour is important as is the cooking quality of the product. In a preliminary trial at HRI Kirton, started in summer 1991, these aspects were investigated with a range of sowing dates and varieties.

## Materials and Methods

### Treatments

#### Varieties:

- A. Bornick F1 (Nickersons)
- B. Dwarf Green Curled (Tozers)
- D. Fribor F1 (Several)
- F. Showbor F1 (Bejo/Elsoms)
- G. Kobolt F1 (Breeders Seeds)

#### Sowing dates:

1. 26 April (planted 10 June)
2. 27 May (planted 10 July)
3. 14 June (planted 31 July)

### Cultural details

- Soil type: mixed silt/clay loams
- Previous cropping: 1989/90 Narcissus followed by short term grass
- Soil analysis: pH 7.5, P-2, K-4
- Fertilisers applied: Base dressing: 150 kg/ha triple superphosphate and 400 kg/ha sulphate of potash on 29/4/91
- Top dressing: Each planting received 62.5 kg/ha N as Nitram approximately 4 weeks after planting and a further 62.5 kg/ha after the first cut if appropriate.
- Cultivations: Ploughed 30/11/90. Cultivated with 'Lely Roterra' immediately before each planting.

Herbicides: Each planting was sprayed with Propachlor at 9 l/ha and chlorthal dimethyl as 6 kg/ha Dacthal soon after planting.

Insecticides: Demeton-S-methyl as 560 ml/ha Metasystox + cypermethrin as 250 ml/ha Ambush C in 600 l/ha water on 23.7, 1.8, 21.8. Metasystox alone on 23/10

Fungicides: Chlorothalonil as 3 l/ha Bombardier + mancozeb and metalaxyl as 1.5 kg/ha Fubol on 7/8/91, triadimenol as 500 ml/ha Bayfidan + Iprodione as 2 l/ha Rovral applied against powdery mildew on 19/9/91.

Spacing: 51 cm rows, 39 cm in row

#### Experimental design and layout

The trial was set out in a randomised block design with three replicates. Plot size was two rows of 17 plants and the 15 inner plants were recorded giving a total of 30 recorded plants per plot. For ease of cultivation plantings were not fully randomised but planted as blocks. Two degrees of freedom were removed from the analysis to allow for this giving no statistical comparison between planting means. Differences were however, large enough to be clear without the need for statistics.

#### Assessments

The following parameters were recorded:

1. Yield by weight.
2. Colour.
3. Degree of curliness.
4. Stringiness after cooking.

## RESULTS

### Harvest dates and procedures

Harvesting techniques evolved as the trial progressed. The harvesting diary was as follows:-

- 21 August All varieties of planting one were harvested leaving the crown leaves.
- 17 September Crown leaves of planting one were cut.
- 10 October Varieties Showbor and Kobolt were cut completely and the lower leaves only taken from Bornick, Dwarf Green curled and Fribor; all from planting 2.
- 25 November Crown leaves taken from Bornick, Dwarf Green curled and Fribor from planting 2.
- 18 December Varieties Showbor and Kobolt cut completely and the lower leaves only taken from Bornick, Dwarf Green Curled and Fribor; all from planting 3.
- 31 December Crown leaves taken from Bornick, Dwarf Green curled and Fribor from planting 3.

### Yields

Where harvests were split the treatments have been bulked for ease of comparison. It is likely that in practice split harvests would not normally be used. The results are given in Table 1 and expressed graphically in Appendix 1.

The highest early yield was given by the short variety Kobolt from the earliest planting. Yield remained comparable to other varieties at later harvests from later plantings. A taller variety, Bornick was slightly lower in potential from the early planting but showed yields higher than other varieties from later plantings. The maximum yield potential was therefore

from Kobolt at the early planting date. Allowing for the fact that subsequent plantings of this variety were single harvested and still gave yields comparable to or better than the other varieties, it seems to have promise.

Table 1

Yields in tonnes/hectare

Variety	Planting			Mean
	10 June	10 July	31 July	
Bornick	49.31	47.73	42.77	46.61
Dwarf Green Curled	52.68	42.62	34.39	43.23
Fribor	50.92	39.19	33.89	41.33
Showbor	52.30	39.05	31.67	41.01
Kobolt	57.91	42.62	37.50	46.01
Mean	52.62	42.24	36.05	
LSD variety means (5%) 4.61				
LSD variety means within any planting (5%) 7.98				

Assessment of stringiness

A sample was taken of each variety from each harvest. Leaf tissue was separated from main leaf veins and simmered in boiling water for 10 minutes. An assessment was then made by a panel of testers two of whom were present on all occasions. Results were variable reflecting the subjective nature of this kind of work. It was also thought that the cooking time might be reduced in subsequent work as no samples were particularly difficult to chew. Taking the means of all results as a guide the variety Fribor was the most tender and Kobolt slightly tougher than average but no varieties were by any means inedible. Full results all given in Table 2.



Table 2

Assessment of toughness scored after 10 minutes cooking

1 = tough, 9= tender

Variety	Sample date						Mean
	21/8	17/9	10/10	25/11	18/12	31/12	
Bornick	5	7.5	7	7	5	8	6.6
Dwarf Green Curled	7	7	4	7	6	7	6.3
Fribor	9	8	6	8	8	6	7.5
Showbor	3	7	8	-	6	-	6.0
Kobolt	4	5	5	-	9	-	5.8

Assessment of colour and curliness

Colour and curliness were scored on two occasions. The variety Kobolt had a very tight curled head giving good density for packing purposes. Dwarf Green Curled was the least curly variety on both occasions. Kobolt also had a good strong green colour without being too dark. The variety Showbor had a very dark, blue green leaf which would perhaps be less attractive to the consumer. Full details can be found in Table 3.

Table 3

Assessments of curliness and colour

Variety	Curliness		Colour	
	21/8	10/10	21/8	10/10
Bornick	7	5	4	3
Dwarf Green Curled	4	4	4	6
Fribor	5	5	7	5
Showbor	7	5	7	8
Kobolt	9	8	6	6

Curliness, 9 = very curly -> 1 = flat or unserrated

Colour, 9 = very dark, blue green -> 1 = flat or unserrated

Other comments

A casual observation on 18 September suggested that the variety Dwarf Green Curled was particularly susceptible to powdery mildew although traces of this disease were found on other cultivars. The trial was subsequently sprayed with Bayfidan (see diary) and no further problems were found.

All sowings and varieties where guards were left uncut began to run to seed in early March. This included an August sowing which was too late to make a plant large enough to yield.

**Conclusions**

As might have been predicted, early sowings with more time to develop produced heavier yields and matured earlier. The June planting, however, produced its yield in August when market demand is unlikely to be high. An early August sowing planted in mid September did not produce a viable crop and was abandoned. The period during which crops could be planted was therefore established as being between mid June and possibly mid August. The two tall varieties performed well as did one of the dwarf varieties (Bornick,

Dwarf Green Curled and Kobolt respectively). Guards left in the plots indicated that standing ability was generally very good and many of the treatments could have been cut later than they were. Given that earlier plantings produced higher yields, the length of standing might be a more profitable way of achieving continuity and this will be put to the test in the second year of this project.

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APPENDIX 1

# HDC curly kale 1991/92

Yield in t/ha

