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Grower-friendly calabrese
prediction model

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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.

C D Paterson
.....

(Signature)

C D Paterson

Date *1/3/93*

Report authorised by:

M B Wood
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(on behalf of Dr M R Shipway, Head of Horticultural Development Division, Horticulture Research International)

Date *1/3/93*

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CONTENTS

	Page No.
Summary	1
Introduction	2
Materials and methods	2
Treatments	2
Plant raising and culture	3
Recording	3
Results	4
Appendix 1 Trial crop diary	9

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Summary

As part of the project to produce a "grower-friendly calabrese prediction model" four currently popular varieties were grown to provide information on maturity for the model. Shogun, Caravelle, Greenbelt and Marathon were grown to compare them with standard varieties Skiff and Cruiser. From three plantings; 16 June, 8 July and 5 August, harvesting was carried out from 10 August, 15 September and 12 November respectively. Data was provided to Dr Wurr at HRI-Wellesbourne for processing as agreed.

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Introduction

As part of the project to produce a "grower-friendly calabrese prediction model" four currently popular varieties were grown to provide information on maturity for the model. The four varieties were Shogun, Caravelle, Greenbelt and Marathon; Skiff and Cruiser were grown as controls. The trials were designed to provide specific information for the model and were not suitable for any standard assessments of yield or size of heads produced.

Materials and methods

Treatments

Six varieties of calabrese were grown at one, two or three plant spacings according to their potential head size produced. The treatments are shown below:

Variety	Spacing		
	61 cm x 56 cm	61 cm x 56 cm	61 cm x 16 cm
Cruiser	✓	✓	✓
Skiff	✓	✓	✓
Shogun	✓	✓	-
Caravelle	-	✓	✓
Greenbelt	✓	-	-
Marathon	✓	-	-

The trial was grown from mid-June, early July and early August plantings.

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Plant raising and culture

Seeds of each variety were sown on 6 May, 27 May and 24 June in 308 cellular trays using Bulrush modular compost. The seeds were chitted at 21°C for 24 hours before being placed in an unheated Venlo glasshouse. The plants were given liquid feeds of 100:200 mg/l N:K₂O as necessary. Fosetyl-aluminium (as 5 g/m² Aliette) against downy mildew (*Peronospora parasitica*) and damping-off (*Pythium* spp) and tolclofos-methyl (as 2.25 g/m² Basilex) against damping-off were applied. The plants were treated with a pre-planting drench of chlorpyrifos (as Dursban 4).

The trials were planted by hand on 15 June, 8 July and 5 August respectively. The plant spacing was according to treatment but always using 61 cm between the rows. All plots were 7.28 m long and to get the required number of plants (161-185 plants) the number of rows was varied. The crop was grown to a good commercial standard, cultural details are given in Appendix 1. Each trial was laid out as a randomised block design with two replicates.

Recording

A sample of ten guarded plants was taken at approximately 3, 4 and 5 weeks after planting to determine the date of initiation. State and diameter of the apex, and number of leaves was determined by examination with a binocular microscope. One sample per plot was required to be well over 0.6 mm mean diameter, if this had not been reached the sampling was repeated at intervals until it had.

The trials were inspected regularly as they approached maturity. The aim was to sample each plot when approximately 20%, 50% and 90% of heads had reached their potential maximum marketable diameter. Once harvesting had begun each plot was inspected three times a week. Twenty heads per plot were cut, each was measured (head diameter in two directions), weighed and classified as immature, marketable, loose, rotten, flowering, bracted, or discoloured.

The data was supplied on LOTUS-123 spreadsheets to Dr D C E Wurr, HRI-Wellesbourne.

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Results

The results have been tabulated giving date of the three cuts and percentage marketable at each cut (Tables 1-3). The second planting, maturing in late September was severely affected by spear rot and the expected levels of marketable heads was not reached. The varieties Skiff, Shogun, Greenbelt and Marathon were most affected but both Caravelle and Cruiser had already finished cutting when this occurred between 29 September and 5 October.

The third planting (5 August) did not begin to mature until mid-November. The cutting was spread over seven weeks and the quality was very poor due to frost damage in December. The later maturing varieties Shogun and Marathon were more badly affected than other varieties.

The dissection data has also been tabulated (Tables 4-6). Initiation had occurred after four, six and seven weeks from planting for the three plantings.

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Table 1 Planting 1 – Cut date and percentage marketable at each cut (means of two replicates)

VARIETY	SPACING (cm)	CUT DATE			% MARKETABLE		
		CUT 1	CUT 2	CUT 3	CUT 1	CUT 2	CUT 3
CRUISER	61 X 56	10/8	12/8	16/8	90.0	92.5	90.0
	61 X 28	10/8	12/8	14/8	95.0	87.5	82.5
	61 X 16	10/8	12/8	14/8	60.0	80.0	65.0
SKIFF	61 X 56	18/8	21/8	24/8	85.0	95.0	57.5
	61 X 28	12/8	16/8	19/8	70.0	92.5	85.0
	61 X 16	19/8	23/8	26/8	70.0	42.5	60.0
SHOGUN	61 X 56	23/8	26/8	30/8	80.0	47.5	42.5
	61 X 28	23/8	26/8	30/8	71.4	55.0	22.5
CARAVELLE	61 X 28	10/8	14/8	17/8	60.0	80.0	85.0
	61 X 16	13/8	17/8	19/8	70.0	67.5	57.5
GREENBELT	61 X 56	12/8	16/8	21/8	85.0	87.5	67.5
MARATHON	61 X 56	17/8	21/8	24/8	85.0	90.0	70.0

Table 2 Planting 2 – Cut date and percentage marketable at each cut (means of two replicates)

VARIETY	SPACING (cm)	CUT DATE			% MARKETABLE		
		CUT 1	CUT 2	CUT 3	CUT 1	CUT 2	CUT 3
CRUISER	61 X 56	19/9	26/9	29/9	84.2	52.5	50.0
	61 X 28	17/9	20/9	24/9	77.8	83.3	88.6
	61 X 16	15/9	22/9	25/9	58.3	52.8	66.7
SKIFF	61 X 56	22/9	25/9	29/9	75.0	82.1	0.0
	61 X 28	22/9	27/9	1/10	72.2	47.2	0.0
	61 X 16	26/9	29/9	2/10	33.3	38.9	5.9
SHOGUN	61 X 56	29/9	2/10	5/10	25.0	7.5	0.0
	61 X 28	22/9	29/9	2/10	97.2	50.0	8.6
CARAVELLE	61 X 28	18/9	22/9	25/9	75.0	80.6	83.3
	61 X 16	18/9	22/9	25/9	66.7	61.1	69.4
GREENBELT	61 X 56	22/9	30/9	3/10	85.0	51.3	10.8
MARATHON	61 X 56	20/9	26/9	29/9	92.5	71.8	43.8

Table 3 Planting 3 – Cut date and percentage marketable at each cut (means of two replicates)

VARIETY	SPACING (cm)	CUT DATE			% MARKETABLE		
		CUT 1	CUT 2	CUT 3	CUT 1	CUT 2	CUT 3
CRUISER	61 X 56	13/11	25/11	7/12	71.1	82.5	69.2
	61 X 28	13/11	25/11	2/12	90.0	77.5	32.5
	61 X 16	13/11	23/11	7/12	65.0	82.1	38.5
SKIFF	61 X 56	20/11	11/12	21/12	60.0	16.2	0.0
	61 X 28	20/11	11/12	18/12	41.0	20.0	8.1
	61 X 16	13/11	30/11	14/12	41.0	35.0	12.8
SHOGUN	61 X 56	14/12	17/12	21/12	28.6	0.0	0.0
	61 X 28	13/11	11/12	18/12	43.6	32.5	0.0
CARAVELLE	61 X 28	13/11	27/11	7/12	80.0	60.0	17.5
	61 X 16	13/11	25/11	7/12	80.0	72.5	20.0
GREENBELT	61 X 56	13/11	2/12	11/12	70.0	37.8	12.8
MARATHON	61 X 56	6/12	16/12	21/12	33.3	5.3	0.0

Table 4 Planting 1 – Leaf number, apex diameter and percentage plants initiated at each sample date; 2, 3 and 4 weeks after planting (means of two replicates) Key : I = Initiated

VARIETY	SPACING (cm)	2 WEEKS			3 WEEKS			4 WEEKS		
		LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I
CRUISER	61 X 56	12.2	0.15	0	17.7	1.18	0	25.1	0.91	85
	61 X 28	12.6	0.17	0	17.6	0.29	0	25.0	0.91	85
	61 X 16	12.2	0.17	0	17.6	0.29	0	25.6	0.93	95
SKIFF	61 X 56	12.8	0.17	0	18.3	0.32	0	25.9	0.85	90
	61 X 28	12.4	0.17	0	18.6	0.31	0	25.5	0.81	85
	61 X 16	13.0	0.18	0	18.9	0.29	0	25.5	0.80	75
SHOGUN	61 X 56	11.6	0.13	0	17.9	0.31	0	24.5	0.69	60
	61 X 28	11.6	0.13	0	16.7	1.06	0	24.8	0.76	60
CARAVELLE	61 X 28	12.1	0.17	0	18.4	0.29	0	25.5	0.71	80
	61 X 16	11.9	0.18	0	18.6	0.32	0	24.8	0.80	80
GREENBELT	61 X 56	12.6	0.15	0	17.8	0.31	0	25.3	0.93	85
MARATHON	61 X 56	13.5	0.16	0	20.3	0.32	0	26.9	0.95	95

Table 5 Planting 2 – Leaf number, apex diameter and percentage plants initiated at each sample date; 2, 3, 4 and 6 weeks after planting (means of two replicates) Key : I = Initiated

VARIETY	SPACING (cm)	2 WEEKS			3 WEEKS			4 WEEKS			6 WEEKS		
		LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I
CRUISER	61 X 56	13.6	0.16	0	16.7	0.26	0	23.8	0.35	15	21.7	1.47	100
	61 X 28	13.6	0.20	0	17.7	0.24	0	23.7	0.33	20	25.2	2.27	100
	61 X 16	15.2	0.22	0	18.7	0.32	0	25.1	0.38	20	25.4	3.12	100
SKIFF	61 X 56	14.3	0.20	0	18.8	0.33	0	26.5	0.55	25	29.1	2.35	100
	61 X 28	13.3	0.20	0	16.9	0.27	0	25.4	0.33	0	29.3	1.96	100
	61 X 16	14.4	0.22	0	19.6	0.34	5	27.2	0.35	15	28.8	1.95	100
SHOGUN	61 X 56	12.8	0.18	0	16.8	0.25	0	25.2	0.30	6	28.5	1.39	100
	61 X 28	14.1	0.15	0	18.1	0.29	0	26.6	0.35	10	33.3	1.66	100
CARAVELLE	61 X 28	13.5	0.19	0	16.9	0.28	0	23.7	0.31	0	28.3	1.68	100
	61 X 16	14.0	0.17	0	17.6	0.31	0	26.0	0.33	0	29.9	1.40	100
GREENBELT	61 X 56	12.9	0.19	0	16.5	0.23	0	24.8	0.41	35	27.2	1.90	100
MARATHON	61 X 56	15.0	0.19	0	20.6	0.33	0	30.5	0.54	79	32.4	2.85	100

Table 6 Planting 3 – Leaf number, apex diameter and percentage plants initiated at each sample date; 3, 4 and 7 weeks after planting (means of two replicates) Key : I = Initiated

VARIETY	SPACING (cm)	3 WEEKS			4 WEEKS			7 WEEKS		
		LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I	LEAF No.	DIAM (mm)	% I
CRUISER	61 X 56	14.2	0.24	0	15.3	0.32	0	24.3	2.28	100
	61 X 28	13.7	0.22	0	17.7	0.33	0	23.8	4.08	100
	61 X 16	14.8	0.26	0	16.8	0.32	0	22.3	2.43	100
SKIFF	61 X 56	14.7	0.24	0	16.9	0.29	0	25.9	1.59	94
	61 X 28	14.0	0.23	0	16.6	0.31	0	25.7	1.36	95
	61 X 16	14.3	0.24	0	17.8	0.33	0	27.1	1.96	100
SHOGUN	61 X 56	13.2	0.22	0	15.5	0.26	0	25.2	1.51	94
	61 X 28	13.7	0.21	0	16.5	0.33	0	27.1	1.27	79
CARAVELLE	61 X 28	14.5	0.27	0	18.9	0.39	0	25.5	3.10	95
	61 X 16	14.5	0.25	0	18.4	0.31	0	26.9	3.18	100
GREENBELT	61 X 56	14.5	0.26	0	17.2	0.34	0	25.9	4.08	100
MARATHON	61 X 56	14.1	0.24	0	18.8	0.35	0	28.0	2.31	100

APPENDIX 1 Trial Crop Diary

Soil type: Fine silt

Previous cropping: Grass

Soil analysis: pH 7.2, P index 4, K index 2, Mg index 3

Cultivations: Ploughed January 1992
Worked with Lely before planting

Fertiliser: 150 kg/ha N, 80 kg/ha P₂O₅, 240 kg/ha K₂O base
100 kg/ha N top dressing

Herbicide: Propachlor as 9 l/ha Ramrod applied post establishment

Insecticide: Chlorpyrifos as Dursban 4 applied pre-planting

9 July Pirimicarb as 420 g/ha Phantom plus cypermethrin as
250 ml/ha Ambush C applied to planting 1

15 August Cypermethrin as above applied to plantings 1 + 2 + 3

16 September As per 9 July applied to planting 2 + 3

9 October As per 9 July applied to planting 3

Fungicide: Mancozeb plus metalaxyl as 1.5 kg/ha Fubol 58 WP applied to
planting 3

Irrigation: 10 mm applied 16 June post planting

Planting: 16 June (planting 1) sown 6 May
8 July (planting 2) sown 27 May
5 August (planting 3) sown 24 June

Harvesting: Planting 1 10 August - 1 September
Planting 2 15 September - 7 October
Planting 3 12 November - 21 December

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