

Project title: Late Carrots - Independent assessment of varieties

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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

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

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FV 343

Late Carrots - Independent assessment of varieties

Headline

- 28 carrot varieties from 7 breeding companies were tested in independent trials
- Their performance was assessed in September and 20 weeks later in February
- During this period the mean yield increased by 35%
- The percentage of marketable roots only dropped by 4%
- 16 of the 28 varieties were slightly more brittle
- The Brix reading for all varieties dropped
- **Nairobi** performed well other varieties to perform well in September were: **Nervi, Newark, Nigel, Trevor, Zafiro, Miami, UK-07-03 and RX 04472269**
- All the above varieties apart from Miami also performed well in February as did: **Elegance, Ulyses, Artemis, Harvey, Nipomo, Eskimo, CA 1564 and Torro.**

Background and expected deliverables

Correct choice of variety is important in nearly every vegetable crop. Independent variety trials compare varieties from different seed companies to help growers with variety choice. Nairobi has dominated carrot growing for many years and still performs well over a wide range of maincrop conditions. However BCGA demonstration plots feature more than 40 varieties each year and there is a need to see whether any of these can match or out perform Nairobi. This trial was designed to compare the yield and quality of a large range of varieties over the winter period.

Expected deliverables:

- growers to choose and manage the best varieties for profitable production.
- breeders to promote those varieties that offer advantages over their competitors.
- the packing and retail trade to identify the best varieties for quality and market suitability.
- the UK vegetable industry to provide value and quality to maintain and expand its market share.

Summary of the project and main conclusions

- The trial successfully produced high yields of high quality carrots in September enabling valid variety comparisons for this period.
- The data generated after another 20 weeks in the ground at the February harvest still produced good yield and quality comparisons so that other varieties could be recommended for this period. However it was disappointing that the trial could not be left longer and be exposed to more extreme winter conditions, as cavity spot symptoms were starting to appear in patches in the surrounding farm crop of Nairobi.

Financial benefits

For growers to choose and manage the best varieties for profitable production.

Action points for growers

Choose the best varieties for their market.

Science Section

Introduction

Up until 2000 NIAB carried out regular independent assessment of carrot varieties, since then variety trialling has been limited to project FV 200b “Quality Monitoring in Late Drilled Carrots” when 11 varieties were tested from serial harvests throughout the winter (10 of these were included in this trial). The purpose of this project was to establish a late trial of a larger range of pre-pack carrot varieties under commercial growing conditions with sampling before and after strawing.

Materials and Methods

a) Field

28 varieties were drilled in 3 replications on the 8th May. The mean target population was 150 m² with the other replicates 10% higher or lower. The trial was sited in a commercial carrot crop and treated in the same way as the surrounding crop. Plots were established with a Stanhay Singulaire drill modified to cope with small seed quantities.

Vigour and emergence were recorded in the field.

The crop was covered with straw during the last week of October.

b) Harvesting and Grading

The trial was harvested on two occasions in September and after strawing in February. It had been hoped to leave the second harvest until later but the grower needed to clear the field.

September harvest records: graded yields, length, strength, colour, skin smoothness, appearance, defects and disease.

Breakage, BRIX measurement

After strawing harvest records

Graded yield, % sound

% unmarketable divided into defect categories

Breakage, BRIX measurement

Results and Discussion

General

The trial established well but some varieties had low vigour and achieved low populations. The September harvest produced high yields of good quality roots with a mean of 93% of the roots marketable and a mean marketable yield of 70.4 tonnes/ha.

The plan was to leave the trial as long as possible under straw but in practice we had to lift on the 6th February as the host grower was clearing the rest of the field. During the 20 weeks between harvests the marketable yield increased by 35% to a mean of 94.4 tonnes/ha, the percentage marketable only dropped by 4% to 89%, mean strength in the artificial drop test did not change overall but most individual varieties were slightly more brittle. The Brix scores for all varieties dropped with the mean decreasing from 9.1 to 7.9.

Detailed results are attached in tables as follows:

Table 1 September results

Table 2 February results

Table 3 Comparison of September and February performance.

Comments on Varieties (in alphabetical order)

Variety	Source	Comments
55-67 RZ	RZA	Low population with some oversized and fanged roots. Uniform tapering roots with good colour. Poor early vigour. Similar performance at both harvests
Artemis	CLA	Average yield with some oversized and fanged roots. Smooth broad strong roots with good colour and high Brix reading. Good early vigour. Similar performance at both harvests.
Bullion	AGR	Low population with some oversized roots. Good colour. Good Brix reading. Relatively higher yield at second harvest but some harvest cracks.
CA 1564	AGR	Slow to bulk at first harvest but above average by February. Some fangs at both harvests and 6% oversized at second lift. Strong with good colour. Brix above average in February.
CA 4031	AGR	Below average yield at both harvests. Some oversized, split and harvest cracks recorded in February. Long tapering roots, Strong roots with above average Brix readings.
Elegance	NUN	Late to bulk but in the top five by February. High percentage marketable at both harvests with no serious defects. Slender but strong roots

Variety	Source	Comments
Eskimo	NIZ	Broad tapering roots. Strong roots with high Brix reading. Good early vigour. Did not bulk up much between the two harvests but good quality scores.
Grace	CLA	Average yields in September but of long slender tapering roots. Smooth with good colour. Performed relatively less well in February with some rots and more brittle than average.
Harvey	NUN	Good yield in September with high percentage marketable at both harvests. Tapered roots with good colour.
Miami	BJO	Produced primarily for organic growers. Low population giving several oversized roots by September. Over mature in February when susceptible to harvest cracks. Usually shorter and stronger than Starship.
Nairobi	BJO	<i>Control.</i> Very high yield in September. Percentage marketable and yield still high in February. Moderate uniformity and smoothness. Good colour.
Nepal	BJO	Slow to bulk in September. Disappointing yield in February due to oversized and fanged roots. Long, strong roots.
Nerac	BJO	<i>Control.</i> Long strong uniform roots. Poor early vigour which affected population and yield.
Nervi	BJO	Very high yield and percentage marketable in September. Yield still high in February but some oversized and broken roots. Slender, smooth roots with good colour. 9% broken in both drop tests. Low Brix reading in February.
Newark	BJO	Very high yields of short roots with good colour in September. 5% broken in drop test. Good early vigour. Continued to bulk well and produced the highest yield in February despite some oversized roots. Low Brix reading in February.
Nigel	BJO	High population and yield with 96% marketable at September harvest. Yield still high in February despite some oversized roots. Smooth with above average Brix readings at both harvests.
Nipomo	BJO	Late maturing. High percentage marketable and average yields in September but more defects in February. Uniform and strong. Poor early vigour. Good Brix reading in February.
NUN 3017	NUN	Low population and yield in September. Yield improved to average in February. Long smooth roots. Poor early vigour.
RX 04472211	SEM	Late bulking tapered roots. Several fangs. Smooth with good colour. Good Brix reading. Good early vigour. Similar performance at both harvests.

Variety	Source	Comments
RX 04472269	SEM	Good yield of slender tapering roots in September but bulked up well to produce high yields in February with a high percentage marketable. Low Brix reading in February.
Sirena	CLA	Early maturing variety with smooth stumped roots mainly intended for bunching. Some external discolouration. Good yield of short roots which were brittle in the drop test. Low Brix reading in February.
Starship	BJO	Produced primarily for organic growers. Fairly long, slightly tapering roots with some oversized roots in September. Low percentage marketable in February due to oversized and fanged roots. 7% broken in drop test in September. Above average Brix readings.
Torro	SEM	Short, smooth slightly tapering roots. No serious defects, yields below average in September but bulked up well by February.
Trevor	CLA	Early maturity. Cylindrical well stumped roots. High yield and percentage marketable at both harvests. Smooth with good colour. More brittle than average in drop tests.
UK-07-3	NIZ	High yield despite some fanged roots at both harvests. Very strong roots.
Ulyses	CLA	High percentage marketable in September with average marketable yield at both harvests. Smooth roots.
Volcano	NIZ	High percentage marketable but slow to bulk so low marketable yield in September but improved to average in February. Uniform long slender tapered roots with good colour and high Brix readings.
Zafiro	NIZ	High yield of tapered roots with no serious defects in September. Very high yield in February despite 16% oversized roots. Strong roots. Good Brix reading in September.

Best Performances

September

Nairobi, Nervi, Newark, Nigel, Trevor, Zafiro, Miami, UK-07-03 and RX 04472269

February

All the above apart from **Miami**, plus **Elegance, Ulyses, Artemis, Harvey, Nipomo, Eskimo, CA 1564 and Torro**.

Previous experience

In project FV 200b **Nipomo, Harvey and Eskimo** all performed well.

Technology Transfer

BCGA open day 4th October 2007

HDC News

Display at the Carrot Conference

Article in the Farmers Guardian

FV 343 - LATE CARROTS- INDEPENDENT ASSESSMENT OF VARIETIES - September Results

Table 1

Site: Everton, Bawtry,
Nottinghamshire

Drilled: 8th May 2007

in order of marketable
yield

Harvested: 18th September 2007

Variety	Population m/2	Marketable yield (t/Ha)	% RECORDED AS (by wt)						Root Quality										FIELD	
			% marketable	Under- sized	oversized	Growth split	Fanged	other defects	Shape uniformity (1-9) 1=poor	Skin texture (1-9) 1= rough	Mean root length (cm)	Mean root breadth (cm)	% Artificial breakage	flesh colour 1-9 1=pale	core colour 1-9 1=pale	% int greening	BRIX	vigour (1-9) 1=poor	emergence (1-9) 1=poor	
Nairobi	137	89.1	94	3	1	0	2	0	7.0	7.0	16.8	3.2	4.0	8.0	8.0	1.0	9.0	7.3	8.0	
Nervi	131	82.8	95	2	0	0	2	0	7.7	7.8	16.6	3.1	8.7	8.0	8.0	0.0	8.0	7.7	7.7	
Newark	113	82.6	93	0	3	0	4	0	7.2	7.8	14.2	3.3	5.3	8.0	8.0	1.0	9.0	8.3	8.0	
Nigel	161	81.5	96	2	0	0	2	0	7.8	8.0	14.4	3.1	3.3	7.0	8.0	0.0	10.0	7.3	7.3	
Trevor	128	80.8	95	1	0	0	3	0	7.7	8.0	14.1	3.4	7.3	8.0	8.0	2.0	9.0	7.0	8.0	
Zafiro	126	79.6	93	0	2	0	4	0	7.5	7.5	15.4	3.3	2.0	7.0	8.0	1.0	9.5	7.7	8.3	
Miami	93	78.4	88	0	8	0	4	0	7.7	7.7	16.4	3.6	2.7	7.0	8.0	1.0	8.0	6.7	6.0	
UK-07-03	148	78.0	90	1	1	0	8	0	7.5	7.5	15.1	3.3	0.0	7.5	8.0	2.0	9.0	7.7	8.0	
RX 04472269	156	76.1	93	2	2	0	3	0	7.8	7.5	15.1	2.8	3.3	7.0	8.0	2.0	9.0	7.3	7.7	
Harvey	147	74.5	95	1	1	1	2	0	7.7	7.8	15.7	3.3	5.3	8.0	8.0	1.0	8.5	7.3	7.7	
Eskimo	121	72.5	92	1	4	0	3	0	7.5	7.0	15.1	3.7	0.7	7.0	7.0	1.0	10.0	9.0	8.0	
Grace	168	70.2	93	3	1	0	2	1	7.5	8.0	16.9	3.0	4.0	8.0	8.0	5.0	9.0	7.0	7.0	
Sirena	120	69.8	93	1	0	1	3	3	7.7	7.8	14.6	3.2	25.3	7.5	8.0	2.0	8.5	7.0	7.0	
Artemis	132	69.4	87	1	7	0	5	0	7.5	8.0	15.7	3.5	1.3	8.0	8.0	1.0	10.0	8.0	8.0	
Ulyses	113	68.7	96	1	0	0	3	0	7.5	8.0	14.9	3.3	2.7	7.5	8.0	2.0	9.0	6.7	7.0	
Nipomo	140	68.2	95	2	1	0	2	1	8.0	7.7	16.5	3.2	0.7	7.5	8.0	0.0	9.0	6.3	6.7	
Starship	138	68.1	87	1	8	1	2	2	7.0	8.0	16.4	3.3	7.3	7.0	8.0	1.0	9.5	7.0	6.0	

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Bullion	108	67.1	88	1	8	0	3	0	7.7	7.5	16.1	3.4	2.0	8.0	8.0	1.0	9.5	6.7	6.3	
Elegance	143	66.7	94	3	0	0	3	0	7.5	7.5	14.5	2.8	0.7	8.0	8.0	0.0	8.5	7.0	7.0	
Nerac	126	66.7	93	1	1	1	3	0	8.0	7.5	17.3	3.2	1.3	7.5	7.5	4.0	9.0	6.3	5.7	
55-67 RZ	90	65.4	91	0	4	0	4	0	8.0	7.5	16.4	3.5	2.7	8.0	8.0	0.0	8.5	5.7	5.7	
Torro	139	64.1	94	2	1	0	3	0	7.0	7.8	14.7	3.0	4.0	7.5	7.5	1.0	8.5	7.3	8.0	
RX 04472211	135	61.3	89	2	2	1	6	0	7.5	8.0	15.7	3.1	5.0	8.0	8.0	2.0	9.5	8.0	7.0	
Nepal	122	61.1	94	2	0	0	4	0	7.7	7.5	17.3	3.2	3.3	7.0	8.0	0.0	9.5	6.0	5.7	
CA4031	130	59.7	93	2	2	0	2	1	7.0	7.7	17.3	3.2	0.7	7.0	8.0	2.0	10.0	7.0	7.0	
CA1564	121	56.8	92	1	2	0	5	0	7.8	7.5	16.6	3.4	0.7	8.0	8.0	0.0	9.0	6.7	7.0	
NUN 3017	83	56.5	93	1	1	0	4	1	7.0	8.0	18.0	3.2	2.7	7.0	7.0	3.0	9.0	6.3	6.0	
Volcano	143	54.3	95	3	1	0	1	0	8.0	7.3	17.8	3.0	2.7	8.0	8.0	0.0	10.0	7.3	7.3	
Mean	129	70.1	92.2	1.4	2.2	0.2	3.7	0.3	7.5	7.7	15.7	3.2	4.0	7.6	7.9	1.3	9.1	7.1	7.1	



TRIAL DIARY

Crop	<u>Late Carrots</u>
Site	<u>H. W. Smith & Sons, Everton, Bawtry, Nottinghamshire.</u>
Soil type	Sandy loam
Sowing date	8 th May 2007
Harvest dates	18 th September 2007 6 th February 2008
Drill & Spacing	Stanhay Singulaire 4 triple rows on 1.84 m bed
Fertilizer	0 N, 35 P, 145 K (kg/ha), salt 145 (kg/ha) Mn x 6, Bo x 4, Sulpha N x 6, Cu, Zn, Epsotop, Nutriphite Excel x 2.
Herbicides	Stomp + Linuron, Fusilade, Linuron + Dosaflo, Folicur x 3, Corbel x 2
Pesticides	Aphox x 3, Decis x 2, Hallmark x 4.
Fungicides	SL 567A, Compass, Signum.
Irrigation	80 mm / 4