



National Institute of Agricultural Botany

Summary of results for HDC

Brussels Sprout Taste Testing 1997/98

HDC Project No.:	FV 98a
Project Leaders:	M.Day.
Project Co-ordinators:	A. Whitlock.

BRUSSELS SPROUTS TASTE ASSESSMENTS 1997/98

Project No: 98a

Project co-ordinator: A J Whitlock

Project Leader: M J Day

Objective

To compare the taste of Brussels Sprouts varieties included in the 1997 NIAB Trials, from a selected range of soil types.

To make this information available to growers and consumers and encourage increased consumption of sprouts.

Introduction

Eleven Brussels Sprout taste panels were carried out over the 1997/98 autumn and winter period. The produce was obtained from three sites: Biggleswade, Bedfordshire; Kirton, Lincolnshire; and Halsall in Lancashire (courtesy of Novartis Seeds).

Twenty nine varieties of sprouts were tested. 24 of these varieties were in the 1997 NIAB performance trial and the remaining 7 varieties were controls from the demonstration trial. Varieties which had not been tasted before were: **Exodus, NIZ 93-213, NIZ 95-416, TZ 9680 and TZ 9681**. (all these varieties are marked * in the text)

Method

Sprouts were hand picked and transported to NIAB HQ. They were refrigerated overnight before being prepared for the taste test the following day.

The sprouts were trimmed in the usual domestic manner, put in separate but identical saucepans with just enough water to cover and boiled until cooked but still firm.

Eight varieties were tested on all occasions. The panel members sampled varieties in different orders to eliminate any bias due to "taste bud fatigue". Tap water and cream crackers were provided to cleanse the palate between varieties.

The panel members were taken from a pool of 11, which included both men and women, ranging in age from 20-52. It was not always possible to have the same 6 panel members for each tasting, however there were ` core members who were present on most of the panels.

The sprouts were scored on a 1-5 scale for sweetness, bitterness, flavour and pleasantness. Texture was also scored.

Results

1. General

Overall, 1997/98 was a good year for Brussels Sprout flavour. 58% of varieties that had been tasted before received higher scores for pleasantness compared to the over year average while only 21% received lower scores. Very few varieties would be classified as unpleasant.

2. Site Comparisons

No large consistent differences between sites were observed but the scores for sweetness from the Halsall site were lower than the other two sites this time (2.4 cf 2.7 at the other two sites).

3. Variety Comparisons

a) Consistency of Results (Table 1 compares 97 data with previous years)

The 1997/98 results generally compare very well with the results from previous years for most varieties. The only deviations of more than 0.4 between the 1997 and 1990/97 mean scores were for **Romulus** (bitterness), **Cyrus** and **Icarus** (strength of flavour), **Icarus** and **Ottoline** (sweetness) and **Amoroso and Angus** (overall pleasantness).

b) Bitterness (Table 2 lists varieties in order of bitterness)

Bitterness scores ranged from 1.3 (**TZ 9681**)* to 4.3 (**Stephen**).

The highest score for bitterness was **Stephen** (4.3) with a significant gap to the next variety at 3.8. This was also the most bitter variety in the 1996/97 trial.

There were five other varieties with scores for bitterness above 3.0: **Revenge** (3.8), **Odette** (3.5), **Veloce** (3.3), **Cyrus** (3.2), and **Diablo** (3.1). In these varieties some bitterness could be detected but they were not generally thought to be too unpleasant.

There were eleven varieties with scores for bitterness below 2.0: **Content** (1.8), **Ottoline** (1.8), **Silverline** (1.8), **NIZ 92-213*** (1.8), **Helemus** (1.7), **Amoroso** (1.7), **Prelent** (1.7), **Romulus** (1.6), **TZ 9680** (1.5), **Braveheart** (1.3), **Maximus** (1.3) and **TZ 9681*** (1.3).

c) Strength of Flavour (Table 3 lists varieties in order of strength of flavour)

Overall mean scores for strength of flavour ranged from 2.0 (**TZ 9680**) to 4.3 (**Cyrus**).

The three varieties with the highest scores for flavour (i.e. strongest) were; **Cyrus** (4.3), **Stephen** (4.2) and **Revenge** (3.8). All of these varieties were in the top six for bitterness.

Maximus (2.6), **TZ 9681** (2.6)*, **NIZ 93-213*** (2.5), **Braveheart** (2.2) and **TZ 9680*** (2.0) had the weakest flavour (below 2.7).

d) Sweetness (Table 4 lists varieties in order of sweetness)

The range in sweetness was between 1.4 (**Stephen**) to 3.8 (**TZ 9681**)

Five varieties had a sweetness score of 3.0 or above; **NIZ 95-416*** (3.1), **Ottoline** (3.2), **Romulus** (3.3), **Content** (3.4) and **TZ 9681*** (3.8) compared to Seven varieties in 1996/97.

There were six varieties with overall sweetness scores below 2.0; **TZ 9680*** (1.9), **Veloce** (1.8), **Cyrus** (1.8), **Odette** (1.7), **Revenge** (1.5) and **Stephen** (1.4).

e) Overall Pleasantness (Table 5 lists varieties in order of pleasantness)

The range in pleasantness was between 1.5 (**Stephen**) to 3.8 (**TZ 9681**) and closely matches the ranking for sweetness

Nearly 50% of the varieties had pleasantness scores of 3.0 or above.

Conclusions

1. 1997/98 was a good year for Brussels Sprout flavour
2. There was generally good consistency in varietal order between the results in 1997/98 and those from previous years.
3. The most bitter variety in 1997/98 was again: **Stephen** (4.3).
4. The sweetest varieties in 1997/98 were: **TZ 9681*** (3.8), **Content** (3.4) and **Romulus** (3.3).
5. *Summary for new varieties (first time in these tests)*
TZ 9681 Awarded the highest scores for sweetness and pleasantness and the lowest bitterness scores.

NIZ 93-416 High sweetness and bitterness scores with medium strength of flavour.

Exodus Average scores for all taste characteristics

NIZ 93-213 Weak flavour, below average sweetness but not bitter.

TZ 9680 Weakest flavour in trial. Low sweetness and bitterness.

* = varieties tested in 1997/98 only

Table 1: TASTE TEST SUMMARY (in alphabetical order)
COMPARISON OF 1997 DATA WITH COMBINED 1990-1997 DATA

VARIETY		Bitterness		Flavour		Sweetness		Pleasantness	
		1997	1990-97	1997	1990-97	1997	1990-97	1997	1990-97
ADAGIA	S & G	2.3	2.2	3.1	3.3	2.5	2.5	3.1	3.2
AMOROSO	Royal Sluis	1.7	1.8	2.7	2.8	2.2	2.6	3.0	3.5
ANGLUS	S & G	2.7	2.5	3.5	3.4	2.4	2.4	2.3	2.9
ARISTON	S & G	2.6	2.5	2.8	2.8	2.1	2.1	2.6	2.5
BRAVEHEART	Nickerson	1.3	1.6	2.2	2.6	2.8	2.8	3.2	3.4
CASCADE	Elsoms/HRI	2.0	2.0	2.7	2.7	2.5	2.5	3.2	3.0
CONTENT	Nickerson	1.8	1.8	3.1	2.9	3.4	3.2	3.5	3.5
CYRUS	S & G	3.2	3.0	4.3	3.8	1.8	2.1	1.8	2.2
DIABLO	Elsoms/Bejo	3.1	2.8	3.6	3.4	2.5	2.6	2.6	2.7
EXODUS	S & G	2.3	(2.3)	3.1	(3.1)	2.6	(2.6)	3.1	(3.1)
HELEMUS	S & G	1.7	1.9	2.7	2.7	2.9	2.9	2.9	3.0
ICARUS	S & G	2.5	2.3	3.3	2.8	2.7	2.2	2.8	2.4
LOUIS	S & G	2.2	2.3	3.3	3.0	2.8	2.6	3.2	3.1
MAXIMUS	S & G	1.3	1.6	2.6	2.9	2.9	3.1	3.3	3.5
NIZ 93-210	Nickerson	2.2	2.0	3.1	2.9	2.6	2.8	2.5	2.7
NIZ 93-213	Nickerson	1.8	(1.7)	2.5	(2.5)	2.3	(2.3)	3.1	(3.1)
NIZ 95-416	Nickerson	2.1	(2.1)	3.1	(3.1)	3.1	(3.1)	3.2	(3.2)
ODETTE	Peto	3.5	3.2	3.5	3.4	1.7	1.8	2.3	2.5
OLIVER	S & G	2.1	2.3	2.9	3.0	2.5	2.6	2.9	3.0
OTTOLINE	Howe/Huizer	1.8	2.1	3.0	2.9	3.2	2.7	2.7	2.7
PRELENT	Nickerson	1.7	1.9	3.2	2.9	2.8	2.7	2.8	3.1
REVENGE	Elsoms/Bejo	3.8	3.5	3.8	3.7	1.5	1.7	1.8	1.9
ROMULUS	S & G	1.6	2.1	2.9	3.3	3.3	3.0	3.5	3.1
SILVERLINE	Howe/Huizer	1.8	1.9	2.9	2.8	2.7	2.9	3.0	3.3
STEPHEN	S & G	4.3	4.2	4.2	4.0	1.4	1.6	1.5	1.5
TOPLINE	Howe/Huizer	2.2	2.3	3.1	3.1	2.9	2.6	3.0	3.0
TZ 9680	Tozer	1.5	(1.5)	2.0	(2.0)	1.9	(1.9)	2.3	(2.3)
TZ 9681	Tozer	1.3	(1.3)	2.6	(2.6)	3.8	(3.8)	3.8	(3.8)
VELOCE	Royal Sluis	3.3	3.4	3.6	3.8	1.8	1.8	2.0	2.0

() = varieties tested in 1997 only

Taste Test Scale:	Bitterness	Flavour	Sweetness	Pleasantness
	1 = not bitter	1 = weak	1 = not sweet	1 = not pleasant
	3 = sl. bitter	3 = medium	3 = sl. sweet	
	5 = v. bitter	5 = strong	5 = v. sweet	5 = v. pleasant

Table 2: TASTE TEST SUMMARY (in order of bitterness)
 COMPARISON OF 1997 DATA WITH COMBINED 1990-1997 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1997	1990-97	1997	1990-97	1997	1990-97	1997	1990-97
STEPHEN	4.3	4.2	4.2	4.0	1.4	1.6	1.5	1.5
REVENGE	3.8	3.5	3.8	3.7	1.5	1.7	1.8	1.9
ODETTE	3.5	3.2	3.5	3.4	1.7	1.8	2.3	2.5
VELOCE	3.3	3.4	3.6	3.8	1.8	1.8	2.0	2.0
CYRUS	3.2	3.0	4.3	3.8	1.8	2.1	1.8	2.2
DIABLO	3.1	2.8	3.6	3.4	2.5	2.6	2.6	2.7
ANGUS	2.7	2.5	3.5	3.4	2.4	2.4	2.3	2.9
ARISTON	2.6	2.5	2.8	2.8	2.1	2.1	2.6	2.5
ICARUS	2.5	2.3	3.3	2.8	2.7	2.2	2.8	2.4
EXODUS	2.3	(2.3)	3.1	(3.1)	2.6	(2.6)	3.1	(3.1)
ADAGIA	2.3	2.2	3.1	3.3	2.5	2.5	3.1	3.2
TOPLINE	2.2	2.3	3.1	3.1	2.9	2.6	3.0	3.0
LOUIS	2.2	2.3	3.3	3.0	2.8	2.6	3.2	3.1
NIZ 93-210	2.2	2.0	3.1	2.9	2.6	2.8	2.5	2.7
OLIVER	2.1	2.3	2.9	3.0	2.5	2.6	2.9	3.0
NIZ 95-416	2.1	(2.1)	3.1	(3.1)	3.1	(3.1)	3.2	(3.2)
CASCADE	2.0	2.0	2.7	2.7	2.5	2.5	3.2	3.0
CONTENT	1.8	1.8	3.1	2.9	3.4	3.2	3.5	3.5
OTTOLINE	1.8	2.1	3.0	2.9	3.2	2.7	2.7	2.7
SILVERLINE	1.8	1.9	2.9	2.8	2.7	2.9	3.0	3.3
NIZ 93-213	1.8	(1.7)	2.5	(2.5)	2.3	(2.3)	3.1	(3.1)
HELEMUS	1.7	1.9	2.7	2.7	2.9	2.9	2.9	3.0
AMOROSO	1.7	1.8	2.7	2.8	2.2	2.6	3.0	3.5
PRELENT	1.7	1.9	3.2	2.9	2.8	2.7	2.8	3.1
ROMULUS	1.6	2.1	2.9	3.3	3.3	3.0	3.5	3.1
TZ 9680	1.5	(1.5)	2.0	(2.0)	1.9	(1.9)	2.3	(2.3)
BRAVEHEART	1.3	1.6	2.2	2.6	2.8	2.8	3.2	3.4
MAXIMUS	1.3	1.6	2.6	2.9	2.9	3.1	3.3	3.5
TZ 9681	1.3	(1.3)	2.6	(2.6)	3.8	(3.8)	3.8	(3.8)

() = varieties tested in 1997 only

Taste Test Scale:	Bitterness	Flavour	Sweetness	Pleasantness
	1 = not bitter	1 = weak	1 = not sweet	1 = not pleasant
	3 = sl. bitter	3 = medium	3 = sl. sweet	
	5 = v. bitter	5 = strong	5 = v. sweet	5 = v. pleasant

Table 3: TASTE TEST SUMMARY (in order of flavour)
 COMPARISON OF 1997 DATA WITH COMBINED 1990-1997 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1997	1990-97	1997	1990-97	1997	1990-97	1997	1990-97
CYRUS	3.2	3.0	4.3	3.8	1.8	2.1	1.8	2.2
STEPHEN	4.3	4.2	4.2	4.0	1.4	1.6	1.5	1.5
REVENGE	3.8	3.5	3.8	3.7	1.5	1.7	1.8	1.9
DIABLO	3.1	2.8	3.6	3.4	2.5	2.6	2.6	2.7
VELOCE	3.3	3.4	3.6	3.8	1.8	1.8	2.0	2.0
ANGUS	2.7	2.5	3.5	3.4	2.4	2.4	2.3	2.9
ODETTE	3.5	3.2	3.5	3.4	1.7	1.8	2.3	2.5
LOUIS	2.2	2.3	3.3	3.0	2.8	2.6	3.2	3.1
ICARUS	2.5	2.3	3.3	2.8	2.7	2.2	2.8	2.4
PRELENT	1.7	1.9	3.2	2.9	2.8	2.7	2.8	3.1
EXODUS	2.3	(2.3)	3.1	(3.1)	2.6	(2.6)	3.1	(3.1)
NIZ 93-210	2.2	2.0	3.1	2.9	2.6	2.8	2.5	2.7
ADAGIA	2.3	2.2	3.1	3.3	2.5	2.5	3.1	3.2
TOPLINE	2.2	2.3	3.1	3.1	2.9	2.6	3.0	3.0
CONTENT	1.8	1.8	3.1	2.9	3.4	3.2	3.5	3.5
NIZ 95-416	2.1	(2.1)	3.1	(3.1)	3.1	(3.1)	3.2	(3.2)
OTTOLINE	1.8	2.1	3.0	2.9	3.2	2.7	2.7	2.7
ROMULUS	1.6	2.1	2.9	3.3	3.3	3.0	3.5	3.1
SILVERLINE	1.8	1.9	2.9	2.8	2.7	2.9	3.0	3.3
OLIVER	2.1	2.3	2.9	3.0	2.5	2.6	2.9	3.0
ARISTON	2.6	2.5	2.8	2.8	2.1	2.1	2.6	2.5
HELEMUS	1.7	1.9	2.7	2.7	2.9	2.9	2.9	3.0
CASCADE	2.0	2.0	2.7	2.7	2.5	2.5	3.2	3.0
AMOROSO	1.7	1.8	2.7	2.8	2.2	2.6	3.0	3.5
MAXIMUS	1.3	1.6	2.6	2.9	2.9	3.1	3.3	3.5
TZ 9681	1.3	(1.3)	2.6	(2.6)	3.8	(3.8)	3.8	(3.8)
NIZ 93-213	1.8	(1.7)	2.5	(2.5)	2.3	(2.3)	3.1	(3.1)
BRAVEHEART	1.3	1.6	2.2	2.6	2.8	2.8	3.2	3.4
TZ 9680	1.5	(1.5)	2.0	(2.0)	1.9	(1.9)	2.3	(2.3)

() = varieties tested in 1997 only

Taste Test Scale:	Bitterness	Flavour	Sweetness	Pleasantness
	1 = not bitter	1 = weak	1 = not sweet	1 = not pleasant
	3 = sl. bitter	3 = medium	3 = sl. sweet	
	5 = v. bitter	5 = strong	5 = v. sweet	5 = v. pleasant

Table 4: TASTE TEST SUMMARY (in order of sweetness)
 COMPARISON OF 1997 DATA WITH COMBINED 1990-1997 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1997	1990-97	1997	1990-97	1997	1990-97	1997	1990-97
TZ 9681	1.3	(1.3)	2.6	(2.6)	3.8	(3.8)	3.8	(3.8)
CONTENT	1.8	1.8	3.1	2.9	3.4	3.2	3.5	3.5
ROMULUS	1.6	2.1	2.9	3.3	3.3	3.0	3.5	3.1
OTTOLINE	1.8	2.1	3.0	2.9	3.2	2.7	2.7	2.7
NIZ 95-416	2.1	(2.1)	3.1	(3.1)	3.1	(3.1)	3.2	(3.2)
HELEMUS	1.7	1.9	2.7	2.7	2.9	2.9	2.9	3.0
MAXIMUS	1.3	1.6	2.6	2.9	2.9	3.1	3.3	3.5
TOPLINE	2.2	2.3	3.1	3.1	2.9	2.6	3.0	3.0
BRAVEHEART	1.3	1.6	2.2	2.6	2.8	2.8	3.2	3.4
PRELENT	1.7	1.9	3.2	2.9	2.8	2.7	2.8	3.1
LOUIS	2.2	2.3	3.3	3.0	2.8	2.6	3.2	3.1
SILVERLINE	1.8	1.9	2.9	2.8	2.7	2.9	3.0	3.3
ICARUS	2.5	2.3	3.3	2.8	2.7	2.2	2.8	2.4
NIZ 93-210	2.2	2.0	3.1	2.9	2.6	2.8	2.5	2.7
EXODUS	2.3	(2.3)	3.1	(3.1)	2.6	(2.6)	3.1	(3.1)
DIABLO	3.1	2.8	3.6	3.4	2.5	2.6	2.6	2.7
ADAGIA	2.3	2.2	3.1	3.3	2.5	2.5	3.1	3.2
CASCADE	2.0	2.0	2.7	2.7	2.5	2.5	3.2	3.0
OLIVER	2.1	2.3	2.9	3.0	2.5	2.6	2.9	3.0
ANGUS	2.7	2.5	3.5	3.4	2.4	2.4	2.3	2.9
NIZ 93-213	1.8	(1.7)	2.5	(2.5)	2.3	(2.3)	3.1	(3.1)
AMOROSO	1.7	1.8	2.7	2.8	2.2	2.6	3.0	3.5
ARISTON	2.6	2.5	2.8	2.8	2.1	2.1	2.6	2.5
TZ 9680	1.5	(1.5)	2.0	(2.0)	1.9	(1.9)	2.3	(2.3)
VELOCE	3.3	3.4	3.6	3.8	1.8	1.8	2.0	2.0
CYRUS	3.2	3.0	4.3	3.8	1.8	2.1	1.8	2.2
ODETTE	3.5	3.2	3.5	3.4	1.7	1.8	2.3	2.5
REVENGE	3.8	3.5	3.8	3.7	1.5	1.7	1.8	1.9
STEPHEN	4.3	4.2	4.2	4.0	1.4	1.6	1.5	1.5

() = varieties tested in 1997 only

Taste Test Scale:	Bitterness	Flavour	Sweetness	Pleasantness
	1 = not bitter	1 = weak	1 = not sweet	1 = not pleasant
	3 = sl. bitter	3 = medium	3 = sl. sweet	
	5 = v. bitter	5 = strong	5 = v. sweet	5 = v. pleasant

Table 5: TASTE TEST SUMMARY (in order of pleasantness)
 COMPARISON OF 1997 DATA WITH COMBINED 1990-1997 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1997	1990-97	1997	1990-97	1997	1990-97	1997	1990-97
TZ 9681	1.3	(1.3)	2.6	(2.6)	3.8	(3.8)	3.8	(3.8)
CONTENT	1.8	1.8	3.1	2.9	3.4	3.2	3.5	3.5
ROMULUS	1.6	2.1	2.9	3.3	3.3	3.0	3.5	3.1
MAXIMUS	1.3	1.6	2.6	2.9	2.9	3.1	3.3	3.5
LOUIS	2.2	2.3	3.3	3.0	2.8	2.6	3.2	3.1
BRAVEHEART	1.3	1.6	2.2	2.6	2.8	2.8	3.2	3.4
NIZ 95-416	2.1	(2.1)	3.1	(3.1)	3.1	(3.1)	3.2	(3.2)
CASCADE	2.0	2.0	2.7	2.7	2.5	2.5	3.2	3.0
EXODUS	2.3	(2.3)	3.1	(3.1)	2.6	(2.6)	3.1	(3.1)
NIZ 93-213	1.8	(1.7)	2.5	(2.5)	2.3	(2.3)	3.1	(3.1)
ADAGIA	2.3	2.2	3.1	3.3	2.5	2.5	3.1	3.2
SILVERLINE	1.8	1.9	2.9	2.8	2.7	2.9	3.0	3.3
AMOROSO	1.7	1.8	2.7	2.8	2.2	2.6	3.0	3.5
TOPLINE	2.2	2.3	3.1	3.1	2.9	2.6	3.0	3.0
HELEMUS	1.7	1.9	2.7	2.7	2.9	2.9	2.9	3.0
OLIVER	2.1	2.3	2.9	3.0	2.5	2.6	2.9	3.0
PRELENT	1.7	1.9	3.2	2.9	2.8	2.7	2.8	3.1
ICARUS	2.5	2.3	3.3	2.8	2.7	2.2	2.8	2.4
OTTOLINE	1.8	2.1	3.0	2.9	3.2	2.7	2.7	2.7
DIABLO	3.1	2.8	3.6	3.4	2.5	2.6	2.6	2.7
ARISTON	2.6	2.5	2.8	2.8	2.1	2.1	2.6	2.5
NIZ 93-210	2.2	2.0	3.1	2.9	2.6	2.8	2.5	2.7
TZ 9680	1.5	(1.5)	2.0	(2.0)	1.9	(1.9)	2.3	(2.3)
ANGUS	2.7	2.5	3.5	3.4	2.4	2.4	2.3	2.9
ODETTE	3.5	3.2	3.5	3.4	1.7	1.8	2.3	2.5
VELOCE	3.3	3.4	3.6	3.8	1.8	1.8	2.0	2.0
REVENGE	3.8	3.5	3.8	3.7	1.5	1.7	1.8	1.9
CYRUS	3.2	3.0	4.3	3.8	1.8	2.1	1.8	2.2
STEPHEN	4.3	4.2	4.2	4.0	1.4	1.6	1.5	1.5

() = varieties tested in 1997 only

Taste Test Scale:	Bitterness	Flavour	Sweetness	Pleasantness
	1 = not bitter	1 = weak	1 = not sweet	1 = not pleasant
	3 = sl. bitter	3 = medium	3 = sl. sweet	
	5 = v. bitter	5 = strong	5 = v. sweet	5 = v. pleasant