



One-year
RESULTS for HDC

Project FV 98b

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Brussels Sprouts Taste Tests 1998/1999



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Project Leader	Mike Day, NIAB

NIAB BRUSSELS SPROUTS TASTE ASSESSMENTS 1998/99

Project No: 98b

Project co-ordinator: Keith Harwood

Project Leader: M J Day

Objective

To compare the taste of Brussels Sprouts varieties included in the 1998/99 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

Nine Brussels Sprout taste panels were carried out over the 1998/99 Autumn and Winter period. The produce was obtained from three sites: Biggleswade, Bedfordshire; Kirton, Lincolnshire; and Halsall in Lancashire (courtesy of Novartis Seeds).

Twenty three varieties of sprouts were tested. 17 of these varieties were in the 1998 NIAB performance trial and the remaining 6 varieties were controls from the demonstration trial. Varieties which had not been tasted before were: **BJ1750**, **BJ1751** and **Harley**. **Trafalgar** and **Bridge** had only been tested in preliminary plots. (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 20-55. It was not always possible to have the same 6 panel members for each tasting, however there were 6 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, in 1998/99 the tests showed that flavours were stronger than the over year average. Both sweetness and bitterness scores were more pronounced than the mean of 1990 to 1998 scores.

2. Site Comparisons

No large consistent differences between sites were observed but the scores for bitterness from the Halsall site were higher than the other two sites this time (2.6 cf 2.2 and 2.3 at the Biggleswade and Kirton sites).

3. Variety Comparisons

a) Consistency of Results (Table 1 compares 98 data with the mean of previous years)

The order of varieties in 1998/99 generally compare very well with the results from previous years for most varieties. For individual varieties the only deviations of more than 0.4 between the 1998 and 1990/98 mean scores were for **Topline** (less pleasant) and **Trafalgar*** (sweeter).

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

Bitterness scores ranged from a low of 1.5 (**Trafalgar***) to 4.3 (**Stephen**)

The highest scores for bitterness were **Stephen** (4.3) and **Revenge** (4.1). **Stephen** was also the most bitter variety in the 1997/98 trial.

The only other variety with a score for bitterness above 3.5 was **Veloce** (3.7)

There were nine varieties with scores for bitterness below 2.0: **Content** (1.9), **Adagia** (1.9), **Romulus** (1.9), **Helemus** (1.8), **Maximus** (1.6), **Harley*** (1.6), **Silverline** (1.6), **Bridge*** (1.6) and **Trafalgar*** (1.5)

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

In general these scores closely matched the bitterness scores.

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

The range in sweetness was between a low of 1.3 (**Stephen**) and 3.4 (**Romulus**)

Seven varieties had a sweetness score of 3.0 or above; **Trafalgar*** (3.0), **Oliver** (3.1), **Louis** (3.1), **Maximus** (3.2), **Content** (3.3), **Bridge*** (3.3) and **Romulus** (3.4) compared to five varieties in 1997/98

There were three varieties with overall sweetness scores below 2.0; **BJ1750*** (1.8), **Revenge** (1.6) and **Stephen** (1.3).

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

Pleasantness scores ranged from a low of 1.2 (**Stephen**) to 3.5 (**Silverline**). Eight varieties had pleasantness scores above 3.0 and four below 2.0. **Topline** slipped from 3.0 in 1997 to 1.6 in 1998.

Conclusions

1. In 1998/99 scores for Brussels Sprout flavour were generally stronger for bitterness and sweetness than the mean of previous seasons. There was however good consistency in varietal order between the results in 1998/99 and those from previous years. Very few varieties would be considered unpleasant and the work positively identified several varieties that were rated as pleasant.
2. The most bitter variety in 1998/99 was again: **Stephen** (4.3), followed by **Revenge** (4.1).
3. The sweetest varieties in 1998/99 were: **Romulus** (3.4), **Bridge*** (3.3), **Content** (3.3), **Maximus** (3.2), **Louis** (3.1), **Oliver** (3.1) and **Trafalgar*** (3.0)
4. The most pleasant varieties were: **Silverline** (3.5), **Bridge*** (3.4), **Maximus** (3.3), **Angus** (3.3), **Content** (3.3), **Louis** (3.2), **Romulus** (3.1) and **Helemus** (3.0).
5. *Summary for new varieties (in year one or preliminary trials)*

BJ1750: This very early variety did not score well in these taste assessments. It had a strong flavour (3.4), was rather bitter (3.0) and not sweet (1.8). Overall pleasantness score was only 1.7.

BJ1751: Another early variety BJ 1751 was much sweeter (2.8) and less bitter (2.1) than BJ 1750 but had rather a weak strength of flavour (2.5).. Overall pleasantness was in the middle of the range at 2.9.

Harley: This was one of the least bitter varieties in the tests (1.6). All other scores including overall pleasantness were close to the means for the trial.

Bridge This variety was one of the sweetest and least bitter varieties in the tests. It scored very highly in overall pleasantness.

Trafalgar This was the least bitter variety in trial and although it scored well for sweetness the strength of flavour was judged weak so overall pleasantness was only average.

* = varieties in year one or preliminary trials in 1998/99

Table 1: TASTE TEST SUMMARY (in alphabetical order)

COMPARISON OF 1998 DATA WITH COMBINED 1990-1998 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1998	1990-1998	1998	1990-1998	1998	1990-1998	1998	1990-1998
ADAGIA	1.9	2.1	2.7	3.0	2.9	2.7	2.9	3.0
ANGUS	2.0	2.3	3.1	3.2	2.8	2.6	3.3	3.1
ARISTON	2.8	2.7	3.3	3.1	2.3	2.2	2.6	2.6
BJ1750	3.0	(3.0)	3.4	(3.4)	1.8	(1.8)	1.7	(1.7)
BJ1751	2.1	(2.1)	2.5	(2.5)	2.8	(2.8)	2.9	(2.9)
BRAVEHEART	2.3	1.9	2.9	2.8	2.6	2.7	2.9	3.1
BRIDGE	1.6	1.8	2.6	2.8	3.3	3.0	3.4	3.0
CONTENT	1.9	1.9	3.0	3.0	3.3	3.2	3.3	3.4
DIABLO	3.1	2.9	3.5	3.5	2.3	2.4	2.6	2.6
EXODUS	2.7	2.5	2.8	3.0	2.2	2.4	2.6	2.8
HARLEY	1.6	(1.6)	3.0	(3.0)	2.5	(2.5)	2.8	(2.8)
HELEMUS	1.8	1.8	2.9	2.8	2.8	2.9	3.0	3.0
LOUIS	2.2	2.2	3.2	3.1	3.1	2.8	3.2	3.1
MAXIMUS	1.6	1.6	2.7	2.8	3.2	3.2	3.3	3.4
OLIVER	2.0	2.2	2.9	3.0	3.1	2.9	2.9	3.0
OTTOLINE	2.2	2.1	3.1	3.0	2.7	2.7	2.8	2.8
REVENGE	4.1	3.8	4.2	3.9	1.6	1.6	1.7	1.8
ROMULUS	1.9	2.0	2.8	3.0	3.4	3.2	3.1	3.1
SILVERLINE	1.6	1.7	2.9	2.8	2.8	2.8	3.5	3.4
STEPHEN	4.3	4.2	4.3	4.2	1.3	1.4	1.2	1.3
TOPLINE	3.2	2.8	3.8	3.4	2.2	2.4	1.6	2.3
TRAFALGAR	1.5	1.5	2.4	2.2	3.0	2.5	2.9	2.6
VELOCE	3.7	3.5	3.7	3.7	2.2	2.0	2.2	2.1
means	2.4	2.1	3.1	2.7	2.6	2.2	2.7	2.4

() = varieties tested in 1998 only

Taste Test Scale Bitterness

1 = not bitter
3 = sl. bitter
5 = v. bitter

Flavour

1 = weak
3 = medium
5 = strong

Sweetness

1 = not sweet
3 = sl. sweet
5 = v. sweet

Pleasantness

1 = not pleasant
5 = v. pleasant

Table 2: TASTE TEST SUMMARY (in order of bitterness)

COMPARISON OF 1998 DATA WITH COMBINED 1990-1998 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1998	1990-1998	1998	1990-1998	1998	1990-1998	1998	1990-1998
STEPHEN	4.3	4.2	4.3	4.2	1.3	1.4	1.2	1.3
REVENGE	4.1	3.8	4.2	3.9	1.6	1.6	1.7	1.8
VELOCE	3.7	3.5	3.7	3.7	2.2	2.0	2.2	2.1
TOPLINE	3.2	2.8	3.8	3.4	2.2	2.4	1.6	2.3
DIABLO	3.1	2.9	3.5	3.5	2.3	2.4	2.6	2.6
BJ1750	3.0	(3.0)	3.4	(3.4)	1.8	(1.8)	1.7	(1.7)
ARISTON	2.8	2.7	3.3	3.1	2.3	2.2	2.6	2.6
EXODUS	2.7	2.5	2.8	3.0	2.2	2.4	2.6	2.8
BRAVEHEART	2.3	1.9	2.9	2.8	2.6	2.7	2.9	3.1
LOUIS	2.2	2.2	3.2	3.1	3.1	2.8	3.2	3.1
OTTOLINE	2.2	2.1	3.1	3.0	2.7	2.7	2.8	2.8
BJ1751	2.1	(2.1)	2.5	(2.5)	2.8	(2.8)	2.9	(2.9)
ANGUS	2.0	2.3	3.1	3.2	2.8	2.6	3.3	3.1
OLIVER	2.0	2.2	2.9	3.0	3.1	2.9	2.9	3.0
CONTENT	1.9	1.9	3.0	3.0	3.3	3.2	3.3	3.4
ADAGIA	1.9	2.1	2.7	3.0	2.9	2.7	2.9	3.0
ROMULUS	1.9	2.0	2.8	3.0	3.4	3.2	3.1	3.1
HELEMUS	1.8	1.8	2.9	2.8	2.8	2.9	3.0	3.0
MAXIMUS	1.6	1.6	2.7	2.8	3.2	3.2	3.3	3.4
HARLEY	1.6	(1.6)	3.0	(3.0)	2.5	(2.5)	2.8	(2.8)
SILVERLINE	1.6	1.7	2.9	2.8	2.8	2.8	3.5	3.4
BRIDGE	1.6	1.8	2.6	2.8	3.3	3.0	3.4	3.0
TRAFALGAR	1.5	1.5	2.4	2.2	3.0	2.5	2.9	2.6

() = varieties tested in 1998 only

Taste Test Scale Bitterness

- 1 = not bitter
- 3 = sl. bitter
- 5 = v. bitter

Flavour

- 1 = weak
- 3 = medium
- 5 = strong

Sweetness

- 1 = not sweet
- 3 = sl. sweet
- 5 = v. sweet

Pleasantness

- 1 = not pleasant
- 5 = v. pleasant

Table 3: TASTE TEST SUMMARY (in order of flavour)

COMPARISON OF 1998 DATA WITH COMBINED 1990-1998 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1998	1990-1998	1998	1990-1998	1998	1990-1998	1998	1990-1998
STEPHEN	4.3	4.2	4.3	4.2	1.3	1.4	1.2	1.3
REVENGE	4.1	3.8	4.2	3.9	1.6	1.6	1.7	1.8
TOPLINE	3.2	2.8	3.8	3.4	2.2	2.4	1.6	2.3
VELOCE	3.7	3.5	3.7	3.7	2.2	2.0	2.2	2.1
DIABLO	3.1	2.9	3.5	3.5	2.3	2.4	2.6	2.6
BJ1750	3.0	(3.0)	3.4	(3.4)	1.8	(1.8)	1.7	(1.7)
ARISTON	2.8	2.7	3.3	3.1	2.3	2.2	2.6	2.6
LOUIS	2.2	2.2	3.2	3.1	3.1	2.8	3.2	3.1
OTTOLINE	2.2	2.1	3.1	3.0	2.7	2.7	2.8	2.8
ANGUS	2.0	2.3	3.1	3.2	2.8	2.6	3.3	3.1
CONTENT	1.9	1.9	3.0	3.0	3.3	3.2	3.3	3.4
HARLEY	1.6	(1.6)	3.0	(3.0)	2.5	(2.5)	2.8	(2.8)
BRAVEHEART	2.3	1.9	2.9	2.8	2.6	2.7	2.9	3.1
OLIVER	2.0	2.2	2.9	3.0	3.1	2.9	2.9	3.0
SILVERLINE	1.6	1.7	2.9	2.8	2.8	2.8	3.5	3.4
HELEMUS	1.8	1.8	2.9	2.8	2.8	2.9	3.0	3.0
EXODUS	2.7	2.5	2.8	3.0	2.2	2.4	2.6	2.8
ROMULUS	1.9	2.0	2.8	3.0	3.4	3.2	3.1	3.1
ADAGIA	1.9	2.1	2.7	3.0	2.9	2.7	2.9	3.0
MAXIMUS	1.6	1.6	2.7	2.8	3.2	3.2	3.3	3.4
BRIDGE	1.6	1.8	2.6	2.8	3.3	3.0	3.4	3.0
BJ1751	2.1	(2.1)	2.5	(2.5)	2.8	(2.8)	2.9	(2.9)
TRAFALGAR	1.5	1.5	2.4	2.2	3.0	2.5	2.9	2.6

() = varieties tested in 1998 only

Taste Test Scale Bitterness

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Flavour

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Sweetness

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5 = v. sweet

Pleasantness

1 = not pleasant
5 = v. pleasant

Table 4: TASTE TEST SUMMARY (in order of sweetness)

COMPARISON OF 1998 DATA WITH COMBINED 1990-1998 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1998	1990-1998	1998	1990-1998	1998	1990-1998	1998	1990-1998
ROMULUS	1.9	2.0	2.8	3.0	3.4	3.2	3.1	3.1
BRIDGE	1.6	1.8	2.6	2.8	3.3	3.0	3.4	3.0
CONTENT	1.9	1.9	3.0	3.0	3.3	3.2	3.3	3.4
MAXIMUS	1.6	1.6	2.7	2.8	3.2	3.2	3.3	3.4
LOUIS	2.2	2.2	3.2	3.1	3.1	2.8	3.2	3.1
OLIVER	2.0	2.2	2.9	3.0	3.1	2.9	2.9	3.0
TRAFALGAR	1.5	1.5	2.4	2.2	3.0	2.5	2.9	2.6
ADAGIA	1.9	2.1	2.7	3.0	2.9	2.7	2.9	3.0
BJ1751	2.1	(2.1)	2.5	(2.5)	2.8	(2.8)	2.9	(2.9)
HELEMUS	1.8	1.8	2.9	2.8	2.8	2.9	3.0	3.0
ANGUS	2.0	2.3	3.1	3.2	2.8	2.6	3.3	3.1
SILVERLINE	1.6	1.7	2.9	2.8	2.8	2.8	3.5	3.4
OTTOLINE	2.2	2.1	3.1	3.0	2.7	2.7	2.8	2.8
BRAVEHEART	2.3	1.9	2.9	2.8	2.6	2.7	2.9	3.1
HARLEY	1.6	(1.6)	3.0	(3.0)	2.5	(2.5)	2.8	(2.8)
ARISTON	2.8	2.7	3.3	3.1	2.3	2.2	2.6	2.6
DIABLO	3.1	2.9	3.5	3.5	2.3	2.4	2.6	2.6
TOPLINE	3.2	2.8	3.8	3.4	2.2	2.4	1.6	2.3
VELOCE	3.7	3.5	3.7	3.7	2.2	2.0	2.2	2.1
EXODUS	2.7	2.5	2.8	3.0	2.2	2.4	2.6	2.8
BJ1750	3.0	(3.0)	3.4	(3.4)	1.8	(1.8)	1.7	(1.7)
REVENGE	4.1	3.8	4.2	3.9	1.6	1.6	1.7	1.8
STEPHEN	4.3	4.2	4.3	4.2	1.3	1.4	1.2	1.3

() = varieties tested in 1998 only

Taste Test Scale Bitterness

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Flavour

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5 = strong

Sweetness

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5 = v. sweet

Pleasantness

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5 = v. pleasant

Table 5: TASTE TEST SUMMARY (in order of pleasantness)

COMPARISON OF 1998 DATA WITH COMBINED 1990-1998 DATA

VARIETY	Bitterness		Flavour		Sweetness		Pleasantness	
	1998	1990-1998	1998	1990-1998	1998	1990-1998	1998	1990-1998
SILVERLINE	1.6	1.7	2.9	2.8	2.8	2.8	3.5	3.4
BRIDGE	1.6	1.8	2.6	2.8	3.3	3.0	3.4	3.0
MAXIMUS	1.6	1.6	2.7	2.8	3.2	3.2	3.3	3.4
ANGUS	2.0	2.3	3.1	3.2	2.8	2.6	3.3	3.1
CONTENT	1.9	1.9	3.0	3.0	3.3	3.2	3.3	3.4
LOUIS	2.2	2.2	3.2	3.1	3.1	2.8	3.2	3.1
ROMULUS	1.9	2.0	2.8	3.0	3.4	3.2	3.1	3.1
HELEMUS	1.8	1.8	2.9	2.8	2.8	2.9	3.0	3.0
OLIVER	2.0	2.2	2.9	3.0	3.1	2.9	2.9	3.0
BJ1751	2.1	(2.1)	2.5	(2.5)	2.8	(2.8)	2.9	(2.9)
BRAVEHEART	2.3	1.9	2.9	2.8	2.6	2.7	2.9	3.1
ADAGIA	1.9	2.1	2.7	3.0	2.9	2.7	2.9	3.0
TRAFALGAR	1.5	1.5	2.4	2.2	3.0	2.5	2.9	2.6
OTTOLINE	2.2	2.1	3.1	3.0	2.7	2.7	2.8	2.8
HARLEY	1.6	(1.6)	3.0	(3.0)	2.5	(2.5)	2.8	(2.8)
ARISTON	2.8	2.7	3.3	3.1	2.3	2.2	2.6	2.6
EXODUS	2.7	2.5	2.8	3.0	2.2	2.4	2.6	2.8
DIABLO	3.1	2.9	3.5	3.5	2.3	2.4	2.6	2.6
VELOCE	3.7	3.5	3.7	3.7	2.2	2.0	2.2	2.1
REVENGE	4.1	3.8	4.2	3.9	1.6	1.6	1.7	1.8
BJ1750	3.0	(3.0)	3.4	(3.4)	1.8	(1.8)	1.7	(1.7)
TOPLINE	3.2	2.8	3.8	3.4	2.2	2.4	1.6	2.3
STEPHEN	4.3	4.2	4.3	4.2	1.3	1.4	1.2	1.3

() = varieties tested in 1998 only

Taste Test Scale Bitterness

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Flavour

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Sweetness

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Pleasantness

- 1 = not pleasant
- 5 = v. pleasant



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26th January 1999

Dear Fiona,

NIAB VEGETABLE VARIETY TRIAL RESULTS

Please find attached NIAB trial results as follows:

**Autumn Cabbage
Autumn Broccoli
Brussels Sprouts**

plus
Brussels sprouts Tatse Tests 1998/99

With best wishes

Mike Day