

Project title: Broad Beans: Evaluation of Varieties

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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.

Mr. Salvador Potter
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GROWER SUMMARY

Headline

Growers will have information on previously untested varieties to enable choice of varieties with improved quality and yield. The quality criteria will include those for spring sown crops for the fresh market.

Background

There has been no independent evaluation of broad bean varieties for more than 10 years. During that time there have been a small number of new varieties made available by breeders but they have not been evaluated and compared with existing standard varieties. Prior to this work all trial work has been carried out in continental Europe under very different climatic conditions to those found in the UK.

The results of these trials will enable quality and agronomic characteristics to be analysed to enable varieties to be selected that suit UK conditions. Also some of the quality characteristics could be used to possibly develop new markets for in my case frozen broad beans.” Matthew Hayward Feb 2011.

The freezing market requires a white flowered bean with even seed size and colour. The fresh market requires a pod width and length of defined ranges of dimensions, a minimum number of beans per pod and a seed pod ratio of around 35%. The availability of information on new varieties which couple all these criteria with improved yield or quality will be advantageous. Additional information on disease resistance will also be of help to both organic and non-organic producers. A list of agronomic and quality characteristics of varieties has not been produced since 1998 and information on new varieties will be available at the end of the project.

Results

For full and comprehensive results please refer to the full trial report.

Table of varieties, source, approximate maturity and TSW - 2011

Variety	Source	Approx Maturity (days \pm Listra)	Approx TSW (g)
Monica	Elsoms	-4	1407
<u>Witkiem Manita</u>	<u>Elsoms</u>	<u>-4</u>	1436
Vendor	Holland Select	-3	977
Gold	Nickerson Zwaan	-2	710
Statissa	Pro Veg Seeds	-2	1272
Stereo	Holland Select	-2	686
<u>Listra</u>	<u>Nunhems</u>	<u>0</u>	822
Sirene	Bakker Brothers	-1	811
Suprifin	Holland Select	-1	1287
Finale	Nunhems	+4	655
Scorpio	Holland Select	+7	893
Greeny	Nunhems	+7	662

Trials Site details

PGRO trial ground, Thornhaugh Peterborough PE8 6HJ, on a sandy loam soil type. OS ref TF070017.

Production details

- Sown: 30 March 2011
- Fungicidal seed treatment: thiram
- Broad-leaved weeds were controlled pre-emergence
- Plots were protected with netting
- Pea and bean weevil and pea aphids were controlled with insecticide
- In the absence of any disease no fungicides were applied
- No irrigation was applied

The following varieties were of interest to the industry. Detailed information on all varieties can be found in the full trial report

Table of TSW, % yield, % TR, % beans to whole pods - 2011

Variety	TSW	Harvest1			Harvest 2			TR	% beans to whole pods
		Maturity	Yield	TR	% beans to whole pods	Maturity	Yield		
		(± days)	% of			(± days)	% of		
g	Listra	Listra		Listra	Listra				
Monica	1405	-5	109	147	29	-4	90	173	28
<u>Witkiem</u>									
<u>Manita (C)</u>	<u>1205</u>	<u>-4</u>	<u>92</u>	<u>133</u>	<u>27</u>	<u>-3</u>	<u>95</u>	<u>173</u>	<u>31</u>
Vendor	977	-2	93	125	33	-1	103	164	40
Gold	804	-2	76 ⁻	122	31	-2	84	144	34
Statissa	1272	-2	79 ⁻	118	37	-2	95	144	41
Stereo	686	-2	85	151	27	-2	81	167	29
<u>Listra</u>	<u>822</u>	<u>0</u>	<u>100</u>	<u>131</u>	<u>31</u>	<u>0</u>	<u>100</u>	<u>149</u>	<u>35</u>
		<u>(4/7)</u>	<u>(5.38t/ha)</u>		<u>(6/7)</u>	<u>(6.15t/ha)</u>			
Sirene	811	0	68 ⁻	135	23	0	59 ⁻	148	25
Suprifin (C)	1287	0	143 ⁺	125	45	-1	136 ⁺	167	48
Scorpio	893	+9	68 ⁻	131	37	+9	91	143	40
Finale	655	+7	76 ⁻	127	35	+7	101	142	47
Greeny	662	+9	90	132	30	+9	64 ⁻	143	33

KEY: (C) = Coloured flowered. TSW = Thousand Seed Weight

Yield: ⁻ significantly lower than Listra @ P = 0.05, ⁺ significantly greater than Listra @ P = 0.05.

As in 2010 the level of disease was very low or absent. In the exceptionally dry spring, plants were short and while yields were higher than in 2010 they were on the low side. It is probable that the number of pods per plant, length of pods and number of beans per pod were lower than normally seen.

Monika and Witkiem Manita are used mostly for the fresh market

Monica was the first variety to mature, five days before Listra and one day before W. Manita. Yields were a little higher than Listra at harvest stage 1 (H1) and a little lower at harvest stage 2 (H2). Yields were similar to W.Manita at H2 and % of beans to pods was similar to W.Manita, but lower than Listra. Pods were quite long and there were few beans per pod. Pods were presented in a horizontal-hanging down position, the same as W.Manita. It was the shortest variety in the trial.

Witkiem Manita was coloured flowered and matured 4 days before Listra. Yields were a little lower than Listra. Pods were the longest in the trial there were more beans per pod than Monica. Haulm

was similar in length to Listra and a little taller than Monica. Pods were presented in a horizontal-hanging down position and the pods had a snag attachment of 1-2cm, shorter than Monica.

Vendor, Gold, Statissa and Stereo matured 2 days before Listra at H1.

Vendor had similar length haulm to Listra. Yields were a little lower than Listra at H1 and a little higher at H2. The % of beans to pods was quite high, 33% (H1) and 40% (H2). Pods were a little shorter than Listra and there were fewer beans per pod. Pods were presented in a horizontal position.

Gold was a small seeded variety and had shorter haulm than Listra. Yields were lower than Listra, significantly so at H1. Pods were shorter than Listra, but the number of beans per pod was similar. The % of beans to pods was 31% (H1) and 34% (H2). Gold gave a large increase in the number of pods from H1 to H2. Pods were presented in a horizontal position.

Statissa was a large seeded variety and was a little taller than Listra. Yields were significantly lower than Listra at H1, but only a little lower at H2. Pod length and number of beans per pod were similar to Listra at H2. The % of beans to pods was high, 37% (H1) and 41% (H2). Pods were presented in a horizontal position.

Stereo gave lower, but not significantly lower yields than Listra, but yields were better than 2010. Plants were a little taller than Listra. Pods were a little shorter than Listra, but there were more of them. The number of beans per pod was similar to Listra. The % of beans to pods was 27% (H1) and 29% (H2). Pods were presented in a vertical position.

Listra gave higher yields than 2010 by 2.81 t/ha at H1. Haulm length was shorter than 2010. The % of beans to pods was 31% (H1) and 35% (H2), a little lower than in 2010. On average pods were 12.3cm long, 9 pods per plant and 4.4 beans per pod. Pods were presented in near vertical position.

Sirene and Sprifin matured at the same time as Listra.

Sirene as in 2010 gave significantly lower yields than Listra. The % of beans to pods was the lowest in the trial, 23% (H1) and 25% (H2). Haulm length was a little shorter than Listra. Pods were not as long as Listra, but the number of pods per plant and beans per pod were similar to Listra. Pods were presented in a vertical position.

Suprifin was coloured flowered and as in 2010 was the highest yielding variety in the trial. Yields were very high and significantly higher than Listra. The % of beans to pods was the highest in the trial, 45% (H1) and 48% (H2). Pods were long and presented in a downward orientation. The number of pods per plant was higher than W,Manita and a little lower than Listra. The number of beans per pod was higher than W. Manita and similar to Listra. Plants were a similar height to Listra.

Finale, Scorio and Greeny were late maturing varieties. Finale matured 7 days later than Listra while Scorpio and Greeny matured 9 days later than Listra.

Scorpio gave significantly low yields at H1. Yields were much better at H2, a little below Listra. The % of beans to pods was high, 37% (H1) and 40% (H2). Plants were a little taller than Listra. Pods were quite short and the number of pods per plant and beans per pod were lower than Listra. Pods were presented in a vertical position.

Finale matured late in 2011 whereas in 2010 it matured at the same time as Listra. Yields were poor at H1, significantly lower than Listra. Yields were better at H2, similar to Listra. Pods were presented in a near vertical position. The number of pods per plant and beans per pod were similar to Listra. The % of beans to pods was high, 35% (H1) and 47% (H2). Finale was tall, being 11cm taller than Listra.

Greeny was a little lower yielding than Listra at H1, but yields were significantly low at H2. The % of beans to pods was 30% (H1) and 33% (H2). Pods were presented in a vertical position and were the shortest in the trial. The number of pods per plant was similar to Listra, but there were fewer beans in the pods than Listra. At 61cm, Listra was the tallest variety in the trial. Produce from Greeny has a distinctive, bright green colour.

Main conclusions

Varietal selection is an important and key element of broad bean crop production to ensure a programmed harvest period and to maintain high quality produce. New varieties are chosen by either the processors or by growers in consultation with the processor, or retailer. This will give greater reliability to the results and allow broad beans to be correctly integrated into drilling and harvesting programmes.

Conclusions are drawn from a 2 year summary of varieties evaluated in 2010 - 2011.

Monica and Witliem Manita were the earliest varieties to mature, 4 to 5 days earlier than Listra. Late maturing (Listra +7) varieties were Greeny and Scorpio and could offer advantages in extending the maturity range.

Suprifin (coloured flowered) was a large seeded bean and was the highest yielding variety. Yields were significantly higher than all other varieties in the trial series.

Sirene gave significantly lower yields than Listra.

The % of beans to whole pods was generally high. The varieties giving the highest percentage were Suprifin, Scorpio and Finale (H2 only) with values over 40%.

While plant growth was generally short, Finale and Greeny were the tallest varieties. Gold, Monica and Scorpio were the shortest varieties.

Pod length was generally short. Varieties producing the longest pods were Suprifin, Monica, Witkiem, Manita and Vendor. All gave pods longer than Listra and greater 12cm length.

The number of beans per pod did not vary greatly, but Suprifin gave slightly the highest number 4.5 and 5.2 beans per pod at H1 and H2 respectively.

The number of pods per plant was more varied and ranged at H1 from 3.7 (Monica) to 9.1 (Greeny and Scorpio) and 8.8 (Statissa).

There were some differences between the length of the snag attachment between varieties. This is an important attribute for the fresh industry as it has to be snipped off prior to being sold. Varieties showing a shorter snag attachment were Monica, Witkiem Manita, Statissa, Gold, Suprifin, Finale and Greeny. The colour of Greeny was very distinctive, being bright green.

FULL TRIAL REPORT

Introduction

Growers will have access to information on previously untested varieties of broad beans. The varieties may have improved quality, yield and disease resistance enabling the possibility of reducing pesticide inputs. There has been no independent evaluation of broad bean varieties for more than 10 years. During that time there have been a small number of new varieties made available by breeders but they have not been evaluated and compared with existing standard varieties. The freezing market requires a white flowered bean with even seed size and colour. The fresh market requires a pod width and length of defined ranges of dimensions, a minimum number of beans per pod and a seed pod ratio of around 35%. The availability of information on new varieties which couple all these criteria with improved yield or quality will be advantageous. Additional information on disease resistance will also be of help to both organic and non-organic producers. A list of agronomic and quality characteristics of varieties has not been produced since 1998 and information on new varieties will be available at the end of the project.

The objectives are:-

Yield relative to a standard at two harvest timings

Maturity relative to a standard at two harvest timings

Percentage of beans to pods

Haulm length

Number of pods per plant

Number of beans per pod

Pod length

Pod orientation on the plant

Snag attachment

Quality appraisal of harvested produce

Disease susceptibility to downy mildew, chocolate spot, and rust if present.

Table 1. Table of varieties, source, approximate maturity and TSW - 2011

Variety	Source	Approx Maturity	Approx TSW (g)
Monica	Elsoms	-4	1407
<u>Witkiem Manita</u>	<u>Elsoms</u>	<u>-4</u>	1436
Vendor	Holland Select	-3	977
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Statissa	Pro Veg Seeds	-2	1272
Stereo	Holland Select	-2	686
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Greeny	Nunhems	+7	662

Trial site details

PGRO trial ground, Thornhaugh Peterborough PE8 6HJ, on a sandy loam soil type. OS ref TF070017.

Production details

Sown: 30 March 2011.

Fungicidal seed treatment: thiram.

Broad-leaved weeds were controlled pre-emergence.

Plots were protected with netting.

Pea and bean weevil and pea aphids were controlled with insecticide.

In the absence of any disease no fungicides were applied.

No irrigation was applied.

Trial design

Trial layout: Randomised block, 3 replications.

Plot size: 1.83 m x 14 m.

Sub-plots: of 2.5 m² i.e. one row (0.25 m) x 10 m for up to three harvests taken. Harvest 1, TR range 110-140 (140g sample), Harvest 2, TR range 130-150 (140g sample) and a third harvest if required.

Sampling areas for TR assessment: 1.5 m x 2.0 m

Plots were sown with an Øyjord plot drill or by hand (Monica, Witkiem Manita, Statisa and Suprifin) because of the large seed size, in 6 rows, 25cm row width to achieve a target population of 18 plants/m².

Yields were statistically analysed using ANOVA.

On completion of the project yields were statistically analysed using fitted constant REML analysis.

Trial records and data collected

2011 temperatures during March, April and May were above average for the time of year. April was 3.7 °C above average, making it the equal-warmest spring. Rainfall at Thornhaugh during March and April was very low, receiving only 2.0mm and 1.0 mm respectively. The first 3 weeks of May were also very dry. Temperatures during June, July and August were below average for the time of year, making it the coolest summer since 1993. Rainfall during this period was very variable across the UK. At Thornhaugh rainfall was sporadic with the months June to August receiving 48.6%, 56.2% and 68.2% of average rainfall respectively.

Haulm lengths were measured, and number of tillers per plant were counted post-flowering.

Maturity was assessed from the sampling areas to achieve correct harvest dates for Harvest 1 and Harvest 2 stages using a Martin Tenderometer.

At each harvest stage the following were recorded from 5 randomly chosen plants:

Pod orientation (1=vertical, 3=horizontal, 5=hanging down)

Snag attachment after stripping pods (<1cm, 1-2cm, >2cm)

Number and weight of pods per plant

Number and weight of beans per pod

The % of shelled beans to whole pods was calculated from the weight of whole pods and shelled beans.

Sub-plots were harvested when appropriate by hand, pods were stripped from the plants, threshed in a static plot podder, sieved and washed. The beans were weighed and total yield measured.

After maturity assessment by Martin Tenderometer, samples were blanched, sorted and quick-frozen for future quality appraisal and inspection by processors and growers.

Quality aspects of the defrosted frozen samples were assessed for colour, evenness of colour and brightness of colour.

Table 2. Summary of Broad Bean Variety Trial, Thornhaugh - 2011

Varieties placed in order of maturity. Standard varieties underlined. All varieties were sown on 30 March. Results are means of three replicates. Target population 18 plants per m².

Variety	Source	Harvest 1					Harvest 2					Plant Height cm	No. pods /plant		Pod length cm		No. beans /pod		Snag attachment	Pod attachment
		1000 Seed Weight g	Maturity (± days) Listra	Yield % of Listra	TR	% beans to whole pods	Maturity (± days) Listra	Yield % of Listra	TR	% beans to whole pods	H1		H2	H1	H2	H1	H2			
Monica	EL	1405	-5	109	147	29	-4	90	173	28	40	3.6	3.6	13.4	12.5	4.0	4.2	>2	4.0	
<u>Witkiem Manita (C)</u>	<u>EL</u>	<u>1205</u>	<u>-4</u>	<u>92</u>	<u>133</u>	<u>27</u>	<u>-3</u>	<u>95</u>	<u>173</u>	<u>31</u>	<u>45</u>	<u>4.8</u>	<u>6.6</u>	<u>14.2</u>	<u>15.2</u>	<u>4.0</u>	<u>4.8</u>	<u>1-2</u>	<u>4.0</u>	
Vendor	HS	977	-2	93	125	33	-1	103	164	40	45	8.0	7.2	11.6	12.0	3.8	4.0	>2	3.5	
Gold	NiZw	804	-2	76 ⁻	122	31	-2	84	144	34	42	5.6	13.0	10.6	11.3	4.6	4.2	1-2	3.0	
Statissa	PVS	1272	-2	79 ⁻	118	37	-2	95	144	41	48	8.8	11.4	10.4	11.8	3.4	4.0	1-2	3.0	
Stereo	HS	686	-2	85	151	27	-2	81	167	29	48	11.0	10.4	11.4	11.2	4.3	4.4	>2	1.5	
<u>Listra</u>	<u>Nun</u>	<u>822</u>	<u>0</u>	<u>100</u>	<u>131</u>	<u>31</u>	<u>0</u>	<u>100</u>	<u>149</u>	<u>35</u>	<u>46</u>	<u>8.6</u>	<u>9.4</u>	<u>12.7</u>	<u>11.8</u>	<u>4.6</u>	<u>4.2</u>	<u>≥2</u>	<u>2.0</u>	
			<u>(4/7)</u>	<u>(5.38t/ha)</u>			<u>(6/7)</u>	<u>(6.15t/ha)</u>												
Sirene	BB	811	0	68 ⁻	135	23	0	59 ⁻	148	25	44	8.4	9.6	10.6	10.8	4.0	4.2	>2	1.5	
Suprifin (C)	HS	1287	0	143 ⁺	125	45	-1	136 ⁺	167	48	46	7.4	7.0	13.4	14.0	4.6	5.0	>2	4.0	
Scorpio	HS	893	+9	68 ⁻	131	37	+9	91	143	40	49	9.6	6.7	10.5	10.2	3.8	3.8	>2	2.0	
Finale	Nun	655	+7	76 ⁻	127	35	+7	101	142	47	57	8.0	8.0	11.4	11.3	4.4	4.2	1-2	2.0	
Greeny	Nun	662	+9	90	132	30	+9	64 ⁻	143	33	61	9.0	7.8	9.6	9.7	3.4	3.8	>2	1.5	
Significance @ P=0.05				SD				SD												
LSD @ P=0.05 (Pair wise)				21.0				23.1												
CV %				13.8				14.9												

KEY: Pod angle (orientation): 1 = vertical, 3 = horizontal, 5 = hanging down. Snag attachment: <1cm, >1 & <2cm, >2cm long.
(C): = Coloured flowered.

Yield: ⁻ significantly lower than Listra @ P = 0.05, ⁺ significantly greater than Listra @ P = 0.05.

Harvest 1: TR 110 -140 for a 140g sample; Harvest 2: TR 130 -150 for a 140g sample.

Table 3. Summary of quality data, Thornhaugh - 2011

Variety	Appearance		
	Defrosted colour	Brightness (1-2)	Uniformity (1-5)
Monica	white/grey	2	4.7
<u>Witkiem Manita (C)</u>	white/grey	2	4.7
Vendor	white/green	2	3.0
Gold	white/green	2	3.3
Statissa	white/grey	2	4.3
Stereo	white/green	2	3.0
<u>Listra</u>	white/green	2	3.3
Sirene	white/green	2	4.0
Suprifin (C)	white/grey	2	4.7
Finale	white/green	2	3.0
Scorpio	white/green	2	3.2
Greeny	green	1	4.0

KEY: Uniformity; (1-5) - a high figure indicates that the variety shows the character to a high degree
Colour: Brightness: 1 = bright, 2 = dull

Table 4. Summary of Broad Bean Trial, Thornhaugh Tested 2010 - 2011
Varieties placed in order of maturity. Standard varieties underlined

Variety	Source	1000 Seed Weight g	Harvest 1				Harvest 2				Plant Height cm	No. pods /plant		Pod length cm		No. beans /pod		Snag attachment	Pod attachment
			Maturity (± days) Listra	Yield % of Listra	TR	% beans to whole pods	Maturity (± days) Listra	Yield % of Listra	TR	% beans to whole pods		H1	H2	H1	H2	H1	H2		
Monica	EI	1407	-5	124	151	30	-4	99	173	28	47	3.7	3.8	12.7	12.6	3.8	4.6	1-2	3.8
<u>Witkiem Manita (C)</u>	<u>EI</u>	<u>1436</u>	<u>-4</u>	<u>106</u>	<u>139</u>	<u>32</u>	<u>-4</u>	<u>104</u>	<u>180</u>	<u>35</u>	<u>52</u>	<u>5.6</u>	<u>5.9</u>	<u>12.4</u>	<u>14.6</u>	<u>3.9</u>	<u>4.5</u>	<u>1-2</u>	<u>3.8</u>
Vendor	HS	977	-3	98	131	34	-3	98	174	39	49	6.9	7.8	12.9	10.9	4.0	4.0	>2	2.5
Statissa	PVS	1272	-2	83	139	35	-2	106	144	41	52	8.8	9.7	10.0	10.4	3.7	4.1	1-2	3.0
Gold	NiZw	710	-2	80	143	34	-2	83	144	34	45	6.3	9.9	9.8	10.3	4.3	4.1	1-2	2.8
Stereo	HS	686	-2	92	156	27	-2	76	167	29	49	8.9	9.6	10.0	10.0	4.0	4.1	>2	2.3
Sirene	BB	811	-1	68	146	25	0	66	154	34	49	8.0	7.9	9.6	9.9	3.6	4.1	>2	1.8
Suprifin (C)	HS	1287	-1	170 ⁺	143	47	-1	139 ⁺	167	48	50	6.8	6.7	12.6	12.8	4.5	5.2	1-2	4.3
<u>Listra</u>	<u>Nun</u>	<u>822</u>	<u>0</u>	<u>100</u>	<u>135</u>	<u>28</u>	<u>0</u>	<u>100</u>	<u>144</u>	<u>38</u>	<u>51</u>	<u>8.4</u>	<u>10.3</u>	<u>11.2</u>	<u>11.1</u>	<u>4.1</u>	<u>4.2</u>	<u>≥2</u>	<u>1.8</u>
				(3.97t/ha)				(4.52t/ha)											
Finale	Nun	655	+4	91	129	35	+4	104	139	43	59	7.8	8.1	10.8	11.6	4.2	4.5	1-2	1.8
Scorpio	HS	893	+7	75	116	45	+8	88	147	43	47	9.1	6.8	9.9	9.2	4.0	3.9	>2	2.8
Greeny	Nun	662	+7	90	125	26	+8	75	154	35	58	9.1	7.3	9.5	9.0	3.6	3.7	1-2	2.0
Significance @ P=0.05				SD				SD											
LSD @ P=0.05 (Pair wise)				28.4				30.0											
CV %				12.1				15.8											

KEY: Pod angle (orientation): 1 = vertical, 3 = horizontal, 5 = hanging down. Snag attachment: <1cm, >1 & <2cm, >2cm long.
(C): = Coloured flowered.

Yield: - significantly lower than Listra @ P = 0.05, + significantly greater than Listra @ P = 0.05.

Harvest 1: TR 110 -140 for a 140g sample; Harvest 2: TR 130 -150 for a 140g sample

Table 5. Summary of quality, Thornhaugh – 2010 & 2011

Variety	Appearance					
	Cooked colour 2010	Defrosted colour 2011	Brightness	Brightness	Uniformity	Uniformity
			2010 (1-2)	2011 (1-2)	2010 (1-5)	2011 (1-5)
Monica	Grey/brown	white/grey	1.4	2.0	4.1	4.7
<u>Witkiem Manita (C)</u>	Grey/brown	white/grey	2.0	2.0	4.1	4.7
Vendor	white	white/green	1.8	2.0	4.0	3.0
Statissa	Grey/brown	white/grey	1.6	2.0	3.7	4.3
Gold	Slightly green	white/green	2.0	2.0	4.0	3.3
Stereo	Slightly green	white/green	1.4	2.0	4.0	3.0
Sirene	White	white/green	1.8	2.0	4.2	4.0
Suprifin (C)	Grey/brown	white/grey	2.0	2.0	3.2	4.7
<u>Listra</u>	White	white/green	1.8	2.0	3.7	3.3
Finale	White	white/green	1.8	2.0	3.8	3.0
Scorpio	White	white/green	1.2	2.0	3.6	3.2
Greeny	Green	green	1.2	1.0	4.0	4.0

KEY: Uniformity; (1-5) - a high figure indicates that the variety shows the character to a high degree
 Colour: Brightness: 1 = bright, 2 = dull

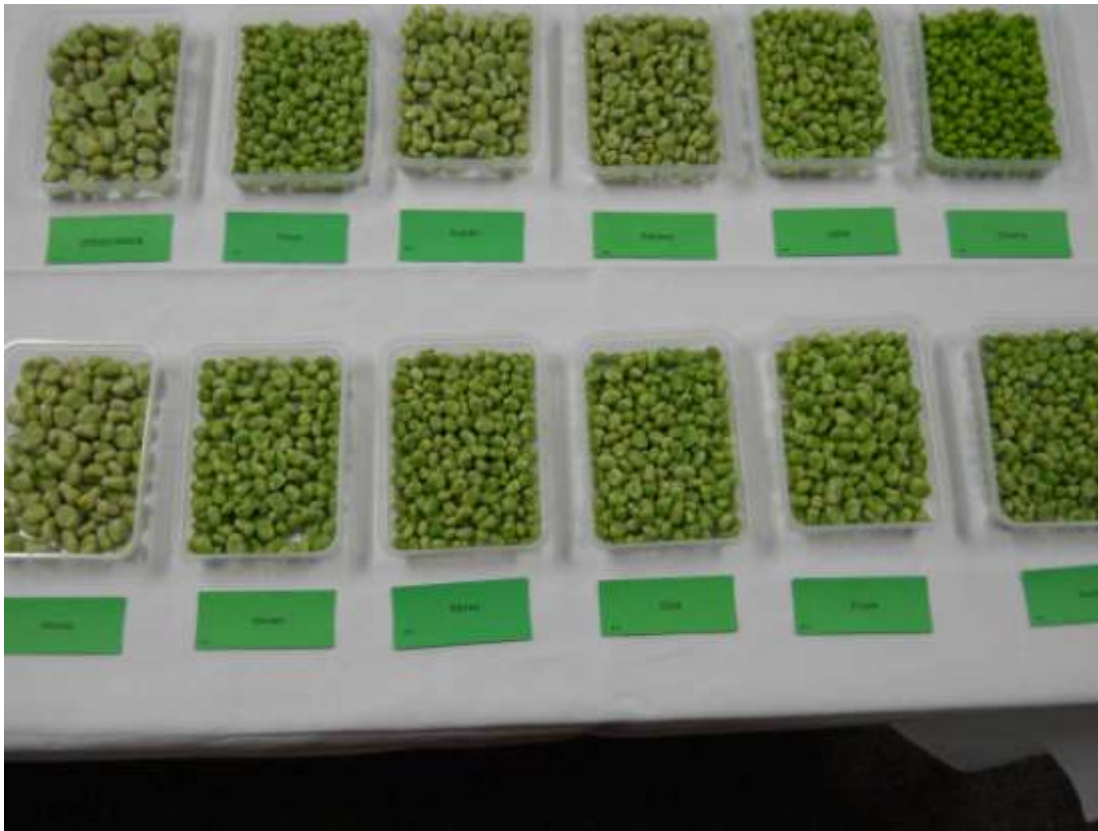


Figure 1. Produce displayed at the Varieties Day PGRO 9 November 2010



Figure 2. Colour variation after processing and defrosting: top left white/green (Finale), Bottom left (Listra), top right white/grey (Witkiem Manita), bottom right bright green (Greeny) -2011.



Figure 3. Whole pods, beans per pod, snag attachment and raw bean colour - 2011.

Discussion

2011 Trial – Tables 2 & 3

As in 2010 levels of disease was very low or absent. In the exceptionally dry spring, plants were short and while yield were higher than in 2010 they were on the low side. It is probable that the number of pods per plant, length of pods and number of beans per pod was lower than normally seen.

Monika and Witkiem Manita are used mostly for the fresh market

Monica was the first variety to mature, 5 days before Listra and one day before W. Manita. Yields were a little higher than Listra at harvest stage 1 (H1) and a little lower at harvest stage 2 (H2). Yields were similar to W.Manita at H2 and % of beans to pods was similar to W. Manita, but lower than Listra. Pods were quite long and there were few beans per pod. Pods were presented in a horizontal-hanging down position, the same as W.Manita. It was the shortest variety in the trial.

Witkiem Manita was coloured flowered and matured 4 days before Listra. Yields were a little lower than Listra. Pods were the longest in the trial there were more beans per pod than Monica. Haulm was similar in length to Listra and a little taller than Monica. Pods were presented in a horizontal-hanging down position and the pods had a snag attachment of 1-2cm, shorter than Monica.

Vendor, Gold, Statissa and Stereo matured 2 days before Listra at H1.

Vendor had similar length haulm to Listra. Yields were a little lower than Listra at H1 and a little higher at H2. The % of beans to pods was quite high, 33% (H1) and 40% (H2). Pods were a little shorter than Listra and there were fewer beans per pod. Pods were presented in a horizontal position.

Gold was a small seeded variety and had shorter haulm than Listra. Yields were lower than Listra, significantly so at H1. Pods were shorter than Listra, but the number of beans per pod was similar. The % of beans to pods was 31% (H1) and 34% (H2). Gold gave a large increase in the number of pods from H1 to H2. Pods were presented in a horizontal position.

Statissa was a large seeded variety and was a little taller than Listra. Yields were significantly lower than Listra at H1, but only a little lower at H2. Pod length and number of beans per pod were similar to Listra at H2. The % of beans to pods was high, 37% (H1) and 41% (H2). Pods were presented in a horizontal position.

Stereo gave lower, but not significantly lower yields than Listra, but yields were better than 2010. Plants were a little taller than Listra. Pods were a little shorter than Listra, but there were more of them. The number of beans per pod was similar to Listra. The % of beans to pods was 27% (H1) and 29% (H2). Pods were presented in a vertical position.

Listra gave higher yields than 2010 by 2.81 t/ha at H1. Haulm length was shorter than 2010. The % of beans to pods was 31% (H1) and 35% (H2), a little lower than in 2010. On average pods were 12.3cm long, 9 pods per plant and 4.4 beans per pod. Pods were presented in near vertical position.

Sirene and Suprifin matured at the same time as Listra.

Sirene as in 2010 gave significantly lower yields than Listra. The % of beans to pods was the lowest in the trial, 23% (H1) and 25% (H2). Haulm length was a little shorter than Listra. Pods were not as long as Listra, but the number of pods per plant and beans per pod were similar to Listra. Pods were presented in a vertical position.

Suprifin was coloured flowered and as in 2010 was the highest yielding variety in the trial. Yields were very high and significantly higher than Listra. The % of beans to pods was the highest in the trial, 45% (H1) and 48% (H2). Pods were long and presented in a downward orientation. The number of pods per plant was higher than W,Manita and a little lower than Listra. The number of beans per pod was higher than W. Manita and similar to Listra. Plants were a similar height to Listra.

Finale, Scorpio and Greeny were late maturing varieties. Finale matured 7 days later than Listra while Scorpio and Greeny matured 9 days later than Listra.

Scorpio gave significantly low yields at H1. Yields were much better at H2, a little below Listra. The % of beans to pods was high, 37% (H1) and 40% (H2). Plants were a little taller than Listra. Pods were quite short and the number of pods per plant and beans per pod were lower than Listra. Pods were presented in a vertical position.

Finale matured late in 2011 whereas in 2010 it matured at the same time as Listra. Yields were poor at H1, significantly lower than Listra. Yields were better at H2, similar to Listra. Pods were presented in a near vertical position. The number of pods per plant and beans per pod were similar to Listra. The % of beans to pods was high, 35% (H1) and 47% (H2). Finale was tall, being 11cm taller than Listra.

Greeny was a little lower yielding than Listra at H1, but yields were significantly low at H2. The % of beans to pods was 30% (H1) and 33% (H2). Pods were presented in a vertical position and were the shortest in the trial. The number of pods per plant was similar to Listra, but there were fewer beans in the pods than Listra. At 61cm, Listra was the tallest variety in the trial. Produce from Greeny has a distinctive, bright green colour.

TWO YEAR SUMMARY – VARIETIES TESTED 2010 - 2011 – Tables 4 & 5

In both years 2010 and 2011 the spring period was very dry and the whole season drier than average. The summer of 2010 was warmer than average, while the summer of 2011 was cooler than average. In both years there was little or no disease present and the disease resistance to either downy mildew, chocolate spot or rust could not be ascertained.

Overall Monica and Witkiem Manita were the earliest varieties to mature, maturing 5 and 4 days respectively before Listra.

Yields from **Monica** higher, but statistically not significantly higher than Listra at harvest stage 1 (H1). At harvest stage 2 (H2), yields were similar to Listra. The % of beans to pods was 30% (H1) and 28% (H2). Pods were quite long, but there were few beans per pod. Pods were presented in a horizontal to hanging down position, the same as W.Manita. It was one of the shortest varieties in the trial.

Witkiem Manita was coloured flowered. Yields at H1 were better in 2010, but overall yields were a little higher than Listra at both harvest stage. Pods at H2 were the longest in the trial and there were more pods than Monica. Haulm was similar in length to Listra and a little taller than Monica. Pods were presented in a horizontal to hanging down position and the pods had a snag attachment of 1-2cm, similar to Monica.

Vendor matured 3 days before Listra and had slightly shorter length haulm. Yields overall were a little lower than Listra. The % of beans to pods was quite high, 34% (H1) and 39% (H2). Pods

were a little longer than Listra at H1 and there were a similar number of beans per pod. Pods were presented in a horizontal position.

Statissa, Gold and Stereo matured 2 days before Listra.

Statissa was a large seeded variety and had similar haulm length to Listra. Yields in 2011 were low (but taken at low TR). In 2010 Yields were higher and overall Statissa appears to yield better at higher TR values. The % of beans to pods was high, 35% (H1) and 41% (H2). Pods were shorter than Listra, with fewer beans per pod. Pods were presented in a horizontal position.

Gold was a small seeded variety and had shorter haulm than Listra. Yields were consistently lower, but overall, not significantly lower than Listra. Pods were shorter than Listra, but the number of beans per pod was similar. The % of beans to pods was 34% (H1) and 34% (H2). Gold gave a good increase in the number of pods from H1 to H2. Pods were presented in a near horizontal position.

Stereo gave lower, but not significantly lower yields than Listra, but yields were better in 2011. Plants were a little shorter than Listra. Pods were shorter than Listra, but the number of beans per pod was similar. The % of beans to pods was 27% (H1) and 29% (H2). Pods were presented in a horizontal to near vertical position. Haulm was a little shorter than Listra.

Sirene and Suprifin matured one day before Listra.

Sirene gave low yields in both years. Overall yields were significantly lower than Listra. Haulm was a little shorter than Listra. The % of beans to pods was one of the lowest in the trials, 25% (H1) and 34% (H2). Pods were not as long as Listra, but the number of pods per plant and beans per pod were similar to Listra. Pods were presented in a vertical position.

Suprifin was coloured flowered and was the highest yielding variety in both years. Overall it was statistically significantly higher yielding than Listra at both harvests stages. The % of beans to pods was the highest in the trials, 47% (H1) and 48% (H2). Pods were long and presented in a downward orientation. The number of pods per plant was higher than W,Manita and a little lower than Listra. The number of beans per pod was higher than W. Manita and similar to Listra. Plants were a similar height to Listra.

Listra gave higher yields in 2011 by 2.81 t/ha at H1. Haulm length was shorter than 2010. The % of beans to pods was 28% (H1) and 38% (H2). On average pods were 11.2cm long, 9.4 pods per plant and 4.2 beans per pod. Pods were presented in near vertical position.

Finale matured late in 2011 (+7) whereas in 2010 it matured at the same time as Listra (0). Overall maturity averaged Listra +4, which agrees with breeder information and data obtained in the previous trial series (1995-1998). Yields were very variable over the two years, but overall yields were similar to Listra at H2 and a little lower at H1. Pods were presented in a near vertical position. Pod length was a little shorter than Listra and there were fewer pods per plant. The number of beans per pod was similar to Listra. The % of beans to pods was high, 35% (H1) and 43% (H2). Finale was one of the taller varieties 8cm longer than Listra.

Scorpio matured 7 days later than Listra and was consistently lower yielding than Listra. Overall yields were lower than Listra, but not significantly lower. Despite the lower yields, the % of beans to pods was very high, 45% (H1) and 43% (H2). Plants were a little taller than Listra. Pods were quite short and the number of pods per plant and beans per pod were lower than Listra. Pods were presented in a vertical position. Pods were presented in a near horizontal position.

Greeny matured 7 days later than Listra. Yields were variable over the two years, but overall yields were lower than Listra, particularly at H2. The % of beans to pods was 26% (H1) and 35% (H2). Pods were presented in a near vertical position and were amongst the shortest in the trials. The number of pods per plant was similar to Listra, but there were fewer beans in the pods than Listra. Greeny was one of the taller varieties 7cm longer than Listra. Produce of Greeny has a distinctive, bright green colour.

Conclusions

Conclusions are drawn from a 2 year summary of varieties evaluated in 2010 - 2011.

Varietal selection is an important and key element of broad bean crop production to ensure a programmed harvest period and to maintain high quality produce. New varieties are chosen by either the processors or by growers in consultation with the processor, or retailer. The results will provide additional data to be added to the PGRO Variety Information Leaflet. This will give greater reliability to the results and allow broad beans to be correctly integrated into drilling and harvesting programmes.

Monica and Witkiem Manita were the earliest varieties to Mature, 4 to 5 days earlier than Listra. Late maturing (Listra +7) varieties were Green and Scorpio and could offer advantages in extending the maturity range.

Suprifin (coloured flowered) was a large seeded bean and was the highest yielding variety. Yields were statistically significantly higher than all other varieties in the trial series.

Sirene gave statistically significantly lower yields than Listra.

The % of beans to whole pods was generally high. The varieties giving the highest percentage were Suprifin, Scorpio and Finale (H2) only with a value of over 40%.

While plant growth was generally short, Finale and Greeny were the tallest varieties. Gold, Monica and Scorpio were the shortest varieties.

Pod length was generally short. Varieties producing the longest pods were Suprifin, Monica, Witkiem Manita and Vendor. All gave pods longer than Listra and greater 12cm length.

The number of beans per pod did not vary greatly, but Suprifin gave slightly the highest number 4.5 and 5.2 beans per pod at H1 and H2 respectively.

The number of pods per plant was more varied and ranged at H1 from 3.7 (Monica) to 9.1 (Greeny and Scorpio) and 8.8 (Statissa).

There were some differences between the length of the snag attachment between varieties. This is an important attribute for the fresh industry as it has to be snipped off prior to being sold. Varieties showing a shorter snag attachment were Monica, Witkiem Manita, Statissa, Gold, Suprifin, Finale and Greeny.

The colour of Greeny produce was very distinctive, being bright green.

Any further evaluation work should be considered as new varieties become available. More immediate work could involve disease assessment work on varieties tested in this series.

Technology transfer

Open invitations were sent out to all interested parties, seed companies, growers and processors to view the trial over the harvesting period and attendance was very good.

There was also a further opportunity to view blanched and frozen material at the Processors day in November 2010 while the trial results, from 2010 was presented to the Vegetable Agronomists Association in January 2011.

It is hoped to update the PGRO Broad Bean Variety Advisory leaflet with the new information (last updated in September 1998) in early 2012.

Appendices

Appendix 1 – Broad bean blanching temperature and time:

	Blanching time	Blanching temp
Broad Beans	4mins	82°C