

3

PROCESSORS & GROWERS RESEARCH ORGANISATION

1989
GREEN BEAN TRIALS

1989
NAVY BEAN TRIALS

1989
FIELD BEAN TRIALS

Registered Office:
The Research Station
Great North Road
Thornhaugh
Peterborough PE8 6HJ
Telephone: (0780) 782585
Facsimile: (0780) 783993

CONTENTS

	<u>Page</u>
The Season	1
Meteorological Data	1
GREEN BEANS	
Trials in 1989	2
Main Trial, Thornhaugh - 1989	2- 3
Preliminary Trial, Thornhaugh - 1989	3- 4
Screening Trial, Thornhaugh - 1989	4
Demonstration Area, Norfolk - 1989	4
Tables	5- 8
Appendix I	9
NAVY BEANS	
Trial, Thornhaugh - 1989	10
Table	11
FIELD BEANS (<i>Vicia faba</i>)	
Winter Field Bean Variety Trial - 1988/89	12
Spring Field Bean Varieties - Recommended List Trial - 1989 (NIAB/ADAS/PGRO)	12-13
White Flowered Beans for the Compounder - 1989	13
EC Joint Faba Bean Variety Trials - 1989	13-14
Tables	15-19
Appendix II: Key to Source of Varieties	20-22

The information contained in this publication must not be reproduced without permission. The data and observations reported herein do not constitute recommendations.

Information disseminated by the Processors & Growers Research Organisation is given after the exercise of all possible care in compilation, preparation and issue, but is provided without liability in its application or use.

THE SEASON

The most striking features of the 1989 season were the extremes in temperature and rainfall that occurred throughout the pea and bean growing areas. The winter was very mild, with temperature three or four degrees above the long term average. There were few frosts and consequently autumn ploughed soil remained unweathered. Additional cultivations were required in the Spring to produce adequate seedbeds. Rainfall at the end of February and beginning of March was average and emergence of field bean crops was generally good. April was the odd month out, temperatures were low for the time of year and rainfall was more than double the long term average (90 mm).

In May, drilling conditions for green beans were good. Temperatures rose and there appeared to be very little rain in comparison with April, until the third week, when one evening approximately 37 mm of rain and hail fell in less than two hours. There was waterlogging on some trials and hail caused minor temporary damage on some field bean trials.

June and July were exceptionally dry months with much lower rainfall than average. Daily temperatures throughout these months and into August were regularly between 21°C and 27°C. As the weather was dry and hot through much of the season, fungal diseases caused no major problems in field or green bean crops.

Harvesting was carried out very early, from the the end of July for field beans, under ideal dry conditions. The hot, dry weather advanced maturity of navy beans and the first were harvested on 5 September, a month earlier than in 1988. The harvest was completed by the end of September in contrast to 1988 when some late varieties matured in November and produce was affected by *Botrytis*.

METEOROLOGICAL DATA

Month	1989 Average Temperature		Long Term Average Temperature	
	Maximum °C	Minimum °C	Maximum °C	Minimum °C
May	20.4	5.8	15.7	6.5
June	21.3	7.6	19.1	9.5
July	24.7	11.6	20.6	11.1
August	23.9	10.6	20.4	11.4
September	21.0	10.1	18.1	9.7

Month	1989 Monthly Rainfall (mm)	Long Term Average Rainfall (mm)
May	28.2	46.2
June	29.4	49.7
July	33.7	52.5
August	34.9	63.5
September	52.0	46.2

Source = Marholm, Peterborough

GREEN BEANS

TRIALS IN 1989

Varieties entered for trial included a large number of "Nerina" types for freezing whole and 5 extra-fine podded varieties, but very few varieties suitable for cutting and slicing. A key to their source is in Appendix II. Standard varieties for the various groups were Gitana, short podded for processing whole, Nerina, slim intermediate length for freezing whole, Groffy of intermediate length with wide pods suitable for cutting or slicing. In all trials yield and maturity are relative to Groffy. Cascade, which has been superceded by varieties with improved quality, is no longer in trial.

An insecticidal/fungicidal seed treatment was applied to all seed to control bean seed fly and fungal diseases. The Screening trial was sown first on 8th May, and before beans emerged there was a storm with substantial rainfall on 24th May. The Preliminary trial was sown on 31st May, and the Main trial on 9th June. The weather during May, June, July and August was exceptionally dry, sunny and warm, but at Thornhaugh, crop drought stress was prevented by occasional rain storms. Weather conditions were ideal for *Phaseolus* beans. Plant emergence and growth was good and there was no pest or disease damage. Yields were generally very good, but maturity was uneven for some varieties where a few pods set early followed by a later flush of pods. Reliance should therefore not be placed on this seasons maturity data alone. Under the dry conditions, pod quality was variable and seeds sometimes developed prematurely.

The Main and Preliminary trial were harvested with a new plot harvester - a Ploeger transverse three row machine, this season. The trial area was increased in size to accomodate the new system, and an additional area for setting up and machine adjustment was also sown. Since damage is very dependent on reel setting and so are numbers of beans left on the plant, only the results for percentage of T stalks are likely to be a varietal characteristic and results are given in Appendix I.

MAIN TRIAL, THORNHAUGH - 1989

Arena an early maturing short podded variety suitable for processing whole, gave similar yields to Gitana. Plants were short under the dry conditions and some pods were close to the ground this year. Pods were not as straight as last year, and were wider and paler than Gitana.

Extra-fine beans, although popular in France are not yet grown in the UK. A size-grading system is needed to achieve a high quality product, and pods with width less than 6.5 mm would be worth a premium. Masai is the first variety of this type to be evaluated in Main trial. The plant habit was excellent and harvesting characteristics were good; with a low percentage of beans with T stalks, and percentage of broken and damaged beans was average. Yields were high for a variety of this pod type and the produce had a most attractive appearance.

Two varieties with intermediate length slim pods were compared with the standard Nerina which performed well in this trial:-

Mutin (Sentry) had a good plant habit and yields were the highest in trial. Processed samples had an excellent appearance and pods although paler than Nerina, were straighter.

Swing is sensitive to bentazone (Basagran) herbicide and suffered damage under the warm conditions at application. Plants were slightly stunted, maturity was delayed and yield may have been reduced. Pods were slimmer and straighter than Nerina. Both Swing and Mutin had fewer T stalks in the harvested sample than Nerina.

Groffy the widely grown intermediate podded variety suitable for cutting and slicing was the yield standard for the trial. It had good harvesting characteristics with a low percentage of T stalks in harvested samples. There were no other varieties in this class for comparison.

Optimus (WAV 499) was the only long podded variety in trial. Plant habit was rather lax, and this season plants set a few additional later maturing pods above the leaf canopy. Yields were very good, significantly higher than Groffy at canning stage. Pods were long, very straight, of good colour and not as wide as Groffy.

PRELIMINARY TRIAL, THORNHAUGH - 1989

Varieties in Preliminary trial are on, or entered for National List in an EEC member country. Eighteen varieties were evaluated including standards.

Thialf was the only short podded variety entered in this trial. It yielded significantly better than Gitana, and had an erect plant habit with good harvesting characteristics. Pods were a medium/dark colour, straight and slim. Thialf was early maturing.

Tavera an extra-fine podded variety gave acceptable yields of intermediate length, extra-fine (< 6.5 mm diameter) pods of medium colour. Tavera suffered from split flowering.

The following were slim intermediate podded varieties, of Nerina type and were suitable for freezing whole:-

Dulcima lower yielding and with slimmer pods than Nerina. Pods were not very straight and suffered more harvesting damage than other varieties of this type.

Malaga low yielding and early maturing. Pods were straighter, with similar colour to Nerina. However pods were wider than Nerina, suffered wind-scar problems and large seeds developed early. Plants were short and several pods touched the soil.

Pebe yielded similarly to Nerina. Pods were straight and a similar width to Nerina, but were paler and seeds developed quickly. Plants had an erect habit but were short, and there was a high proportion of pods with T stalks in the harvested sample.

Allaure yielded well and had an erect plant habit. Pods were fine, much slimmer than Nerina but not as straight and were blemished by wind-scars.

Verona gave low yields and pods were of similar width to Nerina but were curly and some suffered wind-scar problems. This variety was easily harvested and percentage of pods with T stalks was low.

Rovita yields were poor. Pods were a dark colour and longer than Nerina but very curved and their maturity was uneven.

4/1989

R034 yielded well and pods were medium colour and straight. Pods were well distributed on the plant and easy to harvest but plant habit was lax.

86RS 1500 (Xera), this late maturing variety was the highest yielding in the trial. Pods were longer and finer than Nerina, with a dark colour but seeds developed rapidly.

Linera yields were similar to Nerina and pods were finer, but suffered wind-scar damage and maturity was uneven. It was not easy to harvest.

XPB 221 (Brio) also gave similar yields to Nerina but pods were paler and curved. Harvesting characteristics were good, however.

Nerina the standard in this group gave lower yields than in other trials possibly because it was harvested at a slightly earlier stage of maturity. Produce had an attractive appearance and good colour. Pods were clustered in the centre of the plant, a feature which resulted in a higher percentage of pods with T stalks in the sample than for some varieties.

Only one new intermediate podded variety Novores was evaluated and compared with Groffy. Yields were similar, pods were narrower than Groffy and harvesting characteristics were very good. Although Novores performed no better than Groffy, its late maturity could be useful, and pods are of darker colour.

There were two long podded varieties (> 13 cm) in trial, but only one, 86RS1364, was suitable for slicing. 86RS1364 gave low yields but pods had a good even colour when processed. It was a very early maturing variety but plants were short and many pods trailed on the ground. The other, Presenta, was unusual in having a narrow pod of less than 9.5 mm. Presenta had a good plant habit, and was high yielding. However, pods were not very straight and were of medium but uneven colour and seed developed quickly.

Variety selection based on results for a hot, dry atypical season was difficult, but the most promising varieties were Thialf, Novores and R034.

SCREENING TRIAL, THORNHAUGH - 1989

There were no varieties for comparison with Gitana, or Nerina which gave high yields.

Of the three extra-fine podded types, WAV 717 was the highest yielding and matured early but it had a lax plant habit; WAV 715 had dark straight attractive pods but yields were lower; Halco had a lax plant habit with pods set low on the plant, it suffered from a split flowering period and pods were not very straight.

V973 and Argentic yielded similarly to Groffy. V973 matured very early. Pods of V973 were pale and straight, similar to Groffy, but were not as wide and less even in size. Argentic had a tall but rather lax plant habit and pods trailed on the ground. Pods were medium colour, and shorter and narrower than Groffy but the large seeds developed rapidly.

DEMONSTRATION AREA, NORFOLK - 1989

Varieties from Main trial and a range of new ones from several seed companies were sown near Aylsham, Norfolk and demonstrated on 22nd August.

GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Main Variety Trial 1989

Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 9th June 1989
 Results are means of three replicates. Target population 45 plants/m². Row width 30 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		Plant habit	No. pods touching soil	External colour	Shape	Pod Characteristics						
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy					Average length cm	Section	Pod width mm				
<u>Short</u>																	
Arena	Nun	5470	- 2	74-	- 2	87-	5	3	M/P	4.5	10.2	10.5	4.0	8.6	8.7		
<u>Gitana</u>	<u>RS</u>	<u>5032</u>	+ 3	<u>74-</u>	+ 3	<u>82-</u>	<u>5</u>	<u>4</u>	<u>M</u>	<u>4.6</u>	<u>10.1</u>	<u>10.2</u>	<u>3.8</u>	<u>8.4</u>	<u>8.4</u>		
<u>Intermediate (extra-fine)</u>																	
Masai	S&G	5970	0	89	- 1	105	5	5	M/D	4.6	10.2	10.6	3.4	6.8	7.6		
<u>Intermediate (whole)</u>																	
<u>Nerina</u>	<u>RS</u>	<u>4040</u>	<u>0</u>	<u>106</u>	<u>0</u>	<u>111+</u>	<u>5</u>	<u>2</u>	<u>M</u>	<u>4.5</u>	<u>12.7</u>	<u>13.2</u>	<u>3.9</u>	<u>8.8</u>	<u>9.1</u>		
Mutin	As	4994	+ 3	113	+ 2	123+	5	5	P/M	4.8	11.8	13.1	3.9	8.7	9.2		
Swing	PV	6650	(+ 4)	(70)	(+ 4)	76-	5	4	M	4.9	10.2	10.7	3.8	8.4	8.6		
<u>Intermediate</u>																	
Groffy	Nun	3570	0	100	0	100	5	4	P	4.8	13.5	13.8	4.9	10.8	12.1		
			(14/8)	(11.1 t/ha)	(16/8)	(11.4t/ha)											
<u>Long</u>																	
Optimus	vW	3930	+ 4	104	+ 4	120+	3	5	M	4.9	15.0	15.5	4.6	10.5	10.7		
Significance @ P = 0.05				SD		SD				SD	SD	SD	SD	SD	SD		
LSD @ P = 0.05				14.8		8.4				0.47	0.58	0.48	1.08				
CV %				9.3		4.8				2.3	2.7	3.1	6.6				

+ Significantly greater than Groffy @ P = 0.05; - Significantly less than Groffy @ P = 0.05

Short pods (10 cm or less) suitable for freezing or canning whole; freezing stage SL (seed length) 80; canning SL 90
 Intermediate extra-fine pods (10 - 13 cm length; 6.5 - 8 mm width). Maturity judged by pod width, NOT by seed length
 Intermediate pods (10 - 13 cm length; < 9.5 mm width) for freezing whole or cutting; freezing stage SL 90; canning SL 110
 Intermediate pods (10 - 13 cm length) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110
 Long pods (> 13 cm length) suitable for cutting or slicing; freezing stage SL 100; canning SL 120

GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Preliminary Variety Trial 1989

Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 31st May
 Results are means of two replicates. Target population 40 plants/m². Row width 30 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		Plant habit 1=lax 5=erect	No. pods touching soil 1=most 5=none	External colour P=pale M=medium D=dark	Pod Characteristics					
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy				External Shape 1=very curved 5=straight	Average length cm	Section 1=flat 5=round	Pod width mm		
<u>Short</u>															
Gitana	RS	5440	+ 1	61-	+ 1	62-	5	4	M/D	4.7	9.7	10.0	3.7	8.4	8.5
Thialf	PV	6360	- 3	82-	- 3	78-	5	5	M/D	4.8	9.6	9.9	4.3	7.8	7.8
<u>Intermediate (extra-fine)</u>															
Tavera	RS	6610	0	70-	0	86	5	4	M	4.4	11.2	11.4	3.7	6.3	6.8
<u>Intermediate (whole)</u>															
Malaga	RS	3920	- 3	57-	- 3	66-	5	3	M/D	4.8	10.0	10.2	4.5	9.2	8.9
Pebe	Agri	5528	- 2	76-	- 2	73-	5	5	M	4.6	10.0	10.3	3.9	8.4	9.2
Dulcima	RS	5440	+ 1	64-	+ 1	71-	5	4	M/D	4.5	10.2	10.8	3.7	8.0	8.1
Nerina	RS	4040	0	77-	- 1	87	5	5	M/D	4.6	11.2	11.6	3.9	8.6	8.7
Allaure	PV	5270	- 1	100	- 1	99	5	5	M	4.4	10.4	10.9	3.3	7.4	7.8
Verona	RS	6790	- 1	54-	- 1	52-	5	4	D/M	4.2	11.0	11.1	4.2	8.8	8.9
Rovita	RS	3330	0	69-	0	68-	5	4	M/D	4.0	12.2	12.2	3.8	8.7	8.7
RO34	S&G	3930	0	93	0	100	4	3	M	4.4	12.3	12.3	4.1	8.5	9.2
85RS 1500 (Xera)	RS	4610	+ 3	116+	+ 3	123+	5	4	D/M	4.5	12.6	12.7	3.9	8.0	8.3
Linera	PV	6390	0	75-	0	85	5	4	M/D	4.6	11.2	10.4	3.5	7.4	7.8
XPB 221 (Brio)	As	4240	- 1	85-	- 1	85	5	4	M	4.1	11.6	12.2	4.3	8.4	8.6

Continued/.....

GREEN BEAN VARIETY STUDIES (continued). Summary of agronomic data - Preliminary Variety Trial 1989

Varieties placed in order of maturity within each group. Standard varieties underlined All varieties sown on 31st May
Results are means of two replicates. Target population 40 plants/m². Row width 30 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		Plant habit	No. pods touching soil	External colour	Shape	Pod Characteristics				
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy					Average length cm	Section	Pod width mm		
<u>Intermediate</u>															
Groffy	Nun	3570	0 (10/8)	100 (8.44 t/ha)	0 (12/8)	100 (9.05 t/ha)	5	5	P/M	4.5	12.7	13.2	4.5	10.5	10.9
			+ 4	97	+ 4	91	5	4	M/D	4.5	11.9	12.7	4.0	9.4	10.0
<u>Long</u>															
86RS	1364 RS	3320	- 3	78-	- 3	70-	5	3	M	4.5	13.8	13.2	4.6	11.0	10.8
Presenta	RS	6204	+ 1	113+	+ 1	117	5	4	M	4.3	15.2	15.4	4.0	8.8	9.2
Significance @ P = 0.05															
LSD @ P = 0.05															
CV %															
SD															
0.78															
3.2															
2.7															
SD															
0.44															
2.5															
2.2															

+ Significantly greater than Groffy @ P = 0.05; - Significantly less than Groffy @ P = 0.05

Short pods (10 cm or less) suitable for freezing or canning whole; freezing stage SL (seed length) 80; canning SL 90
Intermediate extra-fine pods (10 - 13 cm length; 6.5 - 8 mm width). Maturity judged by pod width, NOT by seed length
Intermediate pods (10 - 13 cm length; < 9.5 mm width) for freezing whole or cutting; freezing stage SL90; canning SL 110
Intermediate pods (10 - 13 cm length) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110
Long pods (> 13 cm length) suitable for cutting or slicing; freezing stage SL 100; canning SL 120

GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Screening Variety Trial 1989

Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 8th May
Results are means of two replicates. Target population 45 plants/m². Row width 30 cm

Variety	At Practical Freezing Stage		At Practical Canning Stage		Plant habit 1=lax 5=erect	No. pods touching soil 1=most 5=none	External colour P=pale M=medium D=dark	External Shape 1=very curved 5=straight	Pod Characteristics					
	Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy					Average length cm	Section 1=flat 5=round	Pod width mm			
<u>Short</u>														
<u>Gitana</u>	<u>RS</u>	<u>3039</u>	<u>+ 1</u>	<u>86</u>	<u>0</u>	<u>4</u>	<u>M/D</u>	<u>4.8</u>	<u>10.4</u>	<u>3.9</u>	<u>8.6</u>	<u>8.7</u>		
<u>Intermediate (extra-fine)</u>														
WAV 717	vW	6240	- 2	103	- 2	4	M	4.3	13.0	4.1	7.6	7.6		
WAV 715	vW	5270	0	76-	0	5	M/D	4.6	13.6	3.6	7.7	7.8		
Halco	Ni/Zw	4620	+ 1	67-	+ 1	3	D/M	4.1	12.8	4.3	7.8	8.2		
<u>Intermediate (whole)</u>														
<u>Nerina</u>	<u>RS</u>	<u>4040</u>	<u>0</u>	<u>127</u>	<u>- 1</u>	<u>5</u>	<u>M/D</u>	<u>4.4</u>	<u>14.0</u>	<u>4.1</u>	<u>9.6</u>	<u>9.8</u>		
<u>Intermediate</u>														
Argentia	Ni/Zw	3170	- 1	100	- 1	3	M	5.0	14.0	4.3	10.0	11.2		
V973	V11	3680	- 4	96	- 4	4	P/M	4.6	15.8	4.3	10.5	10.4		
<u>Groffy</u>	<u>Nun</u>	<u>3570</u>	<u>0</u>	<u>100</u>	<u>0</u>	<u>4</u>	<u>P/M</u>	<u>4.6</u>	<u>14.6</u>	<u>4.7</u>	<u>12.0</u>	<u>12.2</u>		
			<u>(27/7)</u>	<u>(13.8 t/ha)</u>	<u>(31/7)</u>									
Significance @ P = 0.05				SD					SD		SD	SD		
LSD @ P = 0.05				23.5					0.63		0.36	0.49		
CV %				10.5					2.0		1.6	2.2		

+ Significantly greater than Groffy @ P = 0.05; - Significantly less than Groffy @ P = 0.05

Short pods (10 cm or less) suitable for freezing or canning; freezing stage SL (seed length) 80; canning SL 90

Intermediate extra-fine pods (10 - 13 cm length; 6.5 - 8 mm width). Maturity judged by pod width, NOT by seed length

Intermediate pods (10 - 13 cm length; < 9.5 mm width) for freezing whole or cutting; freezing stage SL 90; canning SL 110

Intermediate pods (10 - 13 cm length) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110

APPENDIX I
GREEN BEAN VARIETY STUDIES. Summary of machine harvesting data 1989

Percentage by weight of beans with "T" stalks

Variety	F	% T Stalks	C	Variety	F	% T Stalks	C
MAIN TRIAL							
<u>Short</u>				PRELIMINARY TRIAL			
Arena	16		16	Short			
Gitana	<u>17</u>		<u>14</u>	Gitana	<u>14</u>		<u>24</u>
				Thialf	18		17
<u>Intermediate (extra-fine)</u>				<u>Intermediate (extra-fine)</u>			
Masai	13		12	Tavera	16		12
<u>Intermediate (whole)</u>				<u>Intermediate (whole)</u>			
Nerina	21		22	Dulcima	16		15
Mutin (Sentry)	17		16	Pebe	26		26
Swing	14		14	Malaga	16		21
<u>Intermediate</u>				<u>Nerina</u>	<u>21</u>		<u>20</u>
<u>Groffy</u>	<u>14</u>		<u>9</u>	Allaure	16		12
				Verona	11		10
<u>Long</u>				Rovita	15		17
Optimus (WAV 499)	20		27	R034	14		16
				85RS 1500	18		14
				Linera	18		16
				XPB 221 (Brio)	14		12
				<u>Intermediate</u>			
				<u>Groffy</u>	<u>12</u>		<u>10</u>
				Novores	6		4
				<u>Long</u>			
				86RS 1364	21		23
				Presenta	22		18
Significance @ P = 0.05	SD		SD		SD		SD
LSD @ P = 0.05	5.82		4.34		6.4		8.1
C V %	20.0		15.3		18.6		23.8

The percentage of broken and damaged beans was also assessed but is not shown here, since this is very dependent on harvester reel setting. Percentage T stalks appear to be a characteristic of variety and sometimes maturity.

NAVY BEANS

Evaluation of varieties continued for a second year at Thornhaugh and those bred in the UK for earliness and cold tolerance were compared with Seafarer (Purley King) the old standard, and with some lines from the USA.

TRIAL, THORNHAUGH - 1989

Seed of all varieties was treated with fungicide/insecticide to control damping off diseases and bean seed fly. The trial was sown into good seedbed conditions and the beans emerged well. A root disease reduced populations of some varieties, particularly RB coded varieties. All varieties suffered a slight infection of bean yellow mosaic virus.

The warm weather conditions were ideal for navy beans and harvesting which was carried out much earlier than usual, began on 5th September. However, there was very little rainfall in May, June, July and August so plants were shorter than usual and pods of Nos. 5, 6 and 11 were very close to the soil.

The earliest varieties to mature were Albion and No. 5. Marcus and Adrian matured later than Seafarer this year and 84071 was very much later than in the 1988 trial.

The highest yield, harvestable with a plot combine was for Albion, although it was not significantly higher yielding than Edmund, Marcus, 84071 and No. 15. Combine losses were very high for 5, 6 and 11 and harvestable yield was poor. New lines, RB1 to 6 matured later than Seafarer, since final population was low. These plots were not harvested.

Quality was excellent; few seeds were blemished with *Botrytis* and colour was good. Most varieties were similar in seed size to Seafarer while No. 15 and Marcus had larger seeds. All varieties gave acceptable processed samples with little breakdown of the produce.

Albion seems the best variety for the UK in terms of earliness, yield, harvestability and quality. A commercial area (20 ha) of Albion at North Maldon in Essex was grown successfully but harvest losses were high.

NAVY BEAN VARIETY STUDIES. Summary of agronomic data - Screening Trial 1989

Varieties placed in order of maturity. Standard variety underlined. All varieties sown on 15th May
 Results are means of three replicates. Target population 40 plants/m² sown in five 30 cm rows

Variety	Source	Seeds /kg	Maturity (± days) relative to Albion	Yield % of controls @ 16% MC	Straw length (cm)	Standing ability 5=erect 1=lax	Mean pod height above (cm)	Pods touching soil at harvest 5=none 1=most	Ease of harvest 9=easy 1=difficult	Thousand seed weight (g)
Albion	PBI	4110	0(5/9)	2.12	24	5	10	5	4	210
Edmund	PBI	4800	+14	1.69	24	5	11	4	3	232
Marcus	IHR	4260	+14	1.50	23	5	9	4	3	250
Adrian	IHR	5120	+20	1.32	24	5	9	4	3	215
<u>Seafarer</u>	<u>MSU</u>	<u>4490</u>	+ 7	<u>1.62</u>	<u>24</u>	<u>5</u>	<u>10</u>	<u>4</u>	<u>4</u>	<u>237</u>
5	IHR	4890	0	0.96-	15	5	3	1	1	214
6	IHR	4580	+ 2	0.81-	21	5	6	2	1	225
11	IHR	5140	+ 2	0.86-	19	5	6	2	1	218
15	IHR	4360	+ 2	1.44	22	5	7	3	2	261
84071	Rog	6020	+20	1.56	27	5	9	4	4	216

Significance @ P = 0.05

LSD @ P = 0.05

CV %

SD

0.710

29.4

- Significantly less than Seafarer @ P = 0.05

5, 6, 11; Combine losses very high, hand harvested sample 5 yield 1.44 t/ha
 RB1, 2, 3, 4, 5, 6 not harvested

FIELD BEANS (*Vicia faba*)

The number of field bean variety trials undertaken by PGRO at Thornhaugh has increased and now includes a Recommended List spring field bean trial as part of the National NIAB/ADAS/PGRO trial system. The field bean trial of white flowered tannin-free varieties for the compounder continues. Winter field bean varieties were also tested since there is little information on performance on a light soil type. Since winter field beans were less affected by drought, they outyielded spring varieties grown on adjacent trials. A trial was also carried out jointly with other centres within the EC to assess spring beans with specific nutritional qualities. New breeders material was also screened.

WINTER FIELD BEAN VARIETY TRIAL - 1988/89

The winter was mild and few plants were killed by frost, but there was some pheasant damage and final populations were around the target. Initial growth was vigorous, but dry conditions later resulted in short plants (in 1988 plant height of Banner was 194 cm) and consequently no variety lodged, although 10% of plants of Banner were leaning. Punch had the shortest straw. Banner and Punch were the earliest varieties to flower, in early May; Bulldog and Boxer the latest. All varieties had finished flowering by 26th June.

In contrast with the previous trial harvested in 1988, there was very little chocolate spot (*Botrytis fabae*) or downy mildew (*Peronospora viciae*) disease, but there was a late infection of bean rust.

The earliest varieties to mature were Banner and Bourdon, and the latest were Bulldog and 1332.

The produce from the white flowered variety IB38 is more acceptable to the compounder than coloured flowered varieties, but yields were significantly lower than the mean of the controls - too low to be compensated for by a price differential of £12/tonne (if offered).

Punch was the highest yielding variety in trial, significantly higher than Bulldog. Boxer yielded better than Bulldog but not significantly so.

SPRING FIELD BEAN VARIETIES - RECOMMENDED LIST TRIAL -1989 (NIAB/ADAS/PGRO)

Varieties of spring sown field beans at Recommended List stage of testing were evaluated at Thornhaugh on a fine sandy loam soil as part of the National RL series. Control varieties were Troy, Alfred, Corton and Victor.

Bean emergence was good and target populations of 40 plants/m² were achieved. In the wet months of March and April growth was vigorous.

Albatross was the first variety to flower, the rest began flowering on 27/28th May. The flowering period was short 3 - 4 weeks. During this time the weather was very dry and continued so, with temperatures a little higher than normal during May, June, July and August. Straw lengths were consequently shorter than usual with Victor, Barker and Troy very short; and corton, Frinebo and Gobo the longest strawed varieties. No variety lodged at any time in this seasons trial and all were easy to harvest.

Slight infections of chocolate spot and downy mildew were controlled with fungicide applied as an aerial spray. A late infection of bean rust was not sprayed. There was also an attack by bean midge larvae (*Risseliella*) and stems of some bean plants were infected with *Fusarium*. Both Gobo and Corton suffered from some *Ascochyta* infection.

The highest yielding variety was Gobo, followed by Alfred and Victor. Albatross the white flowered variety also performed very well, yielding similarly to Victor. The new very small seeded variety Barker (suitable for pigeon feed), Minden, Sapphire and Frinebo were significantly lower yielding than the mean of the control varieties. Whilst some late maturing varieties (Frinebo and Sapphire) appeared to be affected by inadequate moisture this year, Gobo was not.

WHITE FLOWERED BEANS FOR THE COMPOUNDER - 1989

The aim of this trial was to assess varieties of white flowered tannin-free field beans for yield, maturity, harvestability and other agronomic characters and also to provide the compounders with samples of produce from the trial so that quality of produce for animal feed could be determined by analysis and feeding studies.

White flowered spring sown field bean varieties, including breeders coded material, were evaluated at Thornhaugh on a light soil and comparisons were made with coloured flowered control varieties Troy, Alfred and Corton. The months of May, June, July and August were very dry and hotter than average. Straw lengths were shorter than usual and no variety lodged. The flowering period was brief, and the first variety to mature was 69005 on 28th July, which was exceptionally early.

With the exception of Toret which gave significantly lower yields than the mean of the controls (and did not perform as well as in previous trials) and 69103, all other white flowered varieties gave statistically similar yields to the coloured flowered controls. Of these 69005, Blandine, Conf 3 and Albatross were the highest yielding.

The largest seeded varieties were Blandine, Albatross and Dame Blanche, but tests by PGRO showed that such varieties can still be sown using conventional cereal drills.

Note: The EEC minimum price differential (September 1989) between peas, white flowered which do not contain tannin an anti-nutritional factor, and currently grown coloured flowered field beans (@ £150/t) is £12/tonne. An 8% lower yield for white compared with coloured flowered varieties for a 3 t/ha crop would be compensated for, if white flowered beans were worth the same as peas to the compounder. Most white flowered varieties achieved yields which were well within this limit compared with Alfred.

EC JOINT FABA BEAN VARIETY TRIALS - 1989

This trial is aimed at defining breeding objectives following close liaison between breeders and nutritionists. It is a long term project and is not "near-market research". Causes of poor nutritional quality are attributed to tannins, trypsin inhibitors, vicine/convicine, and low levels of methionine, cystine and haemagglutinin. High protein and starch levels are desirable.

The project investigates the agronomy, physiology and nutritional quality of genotypes over a wide range of environments within the EC. Novel genotypes include those with a terminal inflorescence (ti) and determinate growth habit; seed with low or high levels of trypsin inhibitor (TI); low and high levels of glucoside; contrasting levels of protein; with and without tannin; a variety with an independent vascular supply; one very early; one long podded; two synthetic; two inbred lines. Near isogenic pairs were chosen where possible but only SVPw & SVPc and SCl & SWl were available.

Nutritional evaluation and analysis for anti-nutritional factors in produce from the trial, and feeding studies with pigs and chicks will be carried out by other organisations.

The spring was wet, plant emergence was good and target populations were achieved. Some varieties were slightly sensitive to herbicide, HTl suffered severe damage and was temporarily stunted. Otherwise initial growth was vigorous.

The months of May, June, July and August were very sunny and warm and rainfall was much lower than average. Flowering began early, with Blandine, followed by Minica, LTl, HTl and Albatross. The flowering period was short (3 - 4 weeks) under hot conditions. Plants were very short strawed (about 50% less than in 1988 for Troy and Alfred) and lodging was negligible. LTl and HTl, the semi-determinate Mythos, and ti types Tina and Piccolo were the shortest while SCl was the longest strawed variety. Some varieties set pods close to the ground.

There was an unusual infection with stem *Fusarium* and (*Risseliella*) bean midge, and also a late infection of bean rust. Panther was infected with *Ascochyta* (90% of plants on 1 plot), and a little disease was found on LPSP, Tina and Piccolo.

The harvest was about 4 weeks earlier than usual and Troy was the earliest variety to mature followed by the determinate or short strawed varieties Piccolo, Mythos, HTl and LTl (1st August). Variety 106 was much later to mature than other varieties, stems were slow to senesce and at harvest 100% of stems were still green.

Many varieties yielded significantly lower than the control varieties. The most interesting varieties which yielded similarly to the controls were the tannin free 69013 and Albatross and (A x C) the F₁ hybrid variety with low trypsin inhibitor.

LTl and HTl were exceptionally small seeded, Minica was the largest seeded variety and SVPc + w and A x C and (A x D) x C were also large.

WINTER FIELD BEAN VARIETY STUDIES. Summary of agronomic data 1988/89

All varieties sown on 7th November 1988 at a final target population of 18/m². Results are means of 3 replicates
 Yields (@ 14% moisture content) are given as a % of control varieties Bourdon, Banner and Bulldog

Variety	Source	Plants/m ² emerged final	Seeds/ kg	Maturity (± days) relative to Banner	Yield % of controls @ 14% MC	Straw length (cm)	Lodging 9=erect 1=lodged	Ease of harvest 9=easy 1=diffi- cult	Thousand seed weight (g)	Disease score
Punch	PBI	21	1500	+ 5	109.4	148	9	7	662	R/MR
Bourdon	PBI	17	1340	+ 2	107.6	152	2	7	692	MR
Banner	PBI	20	1340	0(8/8)	102.3	152	8	7	697	MR
Boxer	PBI	24	1350	+ 8	98.5	160	9	7	799	MR
Bulldog	PBI	26	1356	+10	92.9	155	2	7	713	R/MR
1322	PBI	21	1252	+10	85.0-	155	9	8	721	MR
IB38#	PBI	23	1304	+ 4	82.7-	160	9	7	699	R

Mean yield of control varieties Bourdon, Banner & Bulldog t/ha 7.45

Significance @ P = 0.05

LSD @ P = 0.05

CV %

SD
11.58
6.6

- Significantly lower than the mean yield of the control varieties

Disease Score: R = resistant

MR = moderately resistant

White flowered

SPRING FIELD BEAN VARIETIES - RECOMMENDED LIST TRIAL. Summary of agronomic data 1989

Control varieties underlined. All varieties sown on 23rd February at a target population of 40 plants/m². Results are means of 4 replicates. Yields are given as % of control varieties Troy, Alfred, Corton and Victor

Variety	Source Breeder (UK Agent)	Seeds/kg	Maturity (+ days) relative to Troy	Yield % of controls @ 14% MC	Straw length (cm)	Lodging 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	Thousand seed weight (g)	Disease score
Gobo	VEB (Bk)	2079	+11	123+	121	9	8	494	S
<u>Alfred</u>	<u>Ceb (SI)</u>	<u>2427</u>	+ <u>6</u>	<u>103</u>	<u>103</u>	<u>9</u>	<u>8</u>	<u>528</u>	<u>S</u>
<u>Victor</u>	<u>Ceb (SI)</u>	<u>2033</u>	+ <u>6</u>	<u>100</u>	<u>93</u>	<u>9</u>	<u>8</u>	<u>613</u>	<u>S</u>
Albatross	Lem (Twy)	1701	+12	100	102	9	8	656	S
<u>Troy</u>	<u>Lem (Wh)</u>	<u>2128</u>	<u>0(31/77)</u>	<u>97</u>	<u>100</u>	<u>9</u>	<u>8</u>	<u>548</u>	<u>S</u>
<u>Corton</u>	<u>Sem (Sem)</u>	<u>1805</u>	+ <u>9</u>	<u>99</u>	<u>126</u>	<u>9</u>	<u>7</u>	<u>504</u>	<u>MS</u>
Maris Bead	PBI (PBI)	2611	+12	92	112	9	8	415	MS
Frinebo	VEB (Bk)	1923	+15	91-	121	9	8	544	MR
Sapphire	VEB (Bk)	2092	+15	91-	116	9	8	522	MR
Barker	Bar (Bk)	3906	+ 2	75-	99	9	7	388	MS
Minden	Pet (Ni)	2564	+ 8	71-	112	9	7	438	MR

Mean yield of control varieties Troy, Alfred, Corton & Victor t/ha 4.59

Significance @ P = 0.05 SD
LSD @ P = 0.05 11.08
CV % 7.9

+ Significantly higher than the mean yield of control varieties; - Significantly lower than the mean yield of control varieties
Disease Score: S = susceptible
MS = moderately susceptible
MR = moderately resistant

WHITE FLOWERED BEANS FOR COMPOUNDING - VARIETY STUDIES. Summary of agronomic data 1989

All varieties sown on 23rd February at a target population of 40 plants/m². Results are means of three replicates
Yields are given as a % of coloured flowered control varieties Troy, Alfred and Corton

Variety	Breeder (UK Agent)	Seeds/ kg	Maturity (± days) relative to Troy	Yield % of controls @ 14% MC	Straw length (cm)	Lodging 9=erect 1=lodged	Ease of harvest 9=easy 1=diffi- cult	Thousand seed weight (g)	Disease score
Troy	c	2000	0(29/77)	110.6	93	9	Z	558	S
Alfred	c	2360	+ 7	104.4	98	9	Z	536	S
Corton	c	1805	+11	88.5	115	9	Z	513	MR
69005	w	2050	- 1	106.7	85	9	7	591	MR
Blandine	w	1326	+ 6	101.7	100	9	8	672	MR
Conf. 3	w	1460	+ 1	101.2	80	9	7	533	MR
Albatross	w	1600	+10	99.0	95	9	7	631	S
Octopus	w	1660	+ 2	97.9	86	9	7	552	HR
Mont Blanc	w	1540	+ 6	96.5	95	9	8	600	S
88902	w	1440	+ 4	95.7	79	9	8	538	MR
Dame									
Blanche	w	1420	+13	94.6	97	9	8	643	S
69013	w	2251	+11	84.9-	100	9	7	369	MR
Toret	w	1640	+ 8	76.0-	68	9	7	592	HR

Mean yield of control varieties Troy, Alfred & Corton t/ha 3.67

Significance @ P = 0.05

LSD @ P = 0.05

CV %

SD

13.3

8.1

- Significantly lower than the mean yield of control varieties

c = coloured, w = white flowered

Disease Score: S = susceptible

MR = moderately resistant

HR = highly resistant

EC JOINT FABA BEAN VARIETY TRIALS. Summary of agronomic data 1989

Sown on 20th February 1989 at a target population of 40 plants/m², except for Tina, Piccolo and Mythos, 70 plants/m²
 10 rows per plot, 12 cm row width

Results are means of 3 replicates. Yields are given as a % of the mean of control varieties Alfred and Troy

Variety	Type	Breeder	Seeds /kg	Maturity (± days) relative to Troy	Yield % of controls @ 14% MC	Straw length (cm)	Lodging 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	Thousand seed weight (g)	Disease score
Alfred	lower protein	Ceb	1770	+ 4	107	120	9	8	508	MR
Minica	high TI	Ni/Zw	926	+ 7	101	102	9	8	898	HS
Troy	lower protein	Lem	1597	0(30/7)	93	111	9	8	524	S
Slaney	early	UCD	2110	+ 9	88	119	9	8	444	MR
Panther	long pod	PBI	2004	+ 4	84-	112	9	8	469	MR
Syn 0	synthetic	UH	1634	+11	102	119	9	8	540	MR
Syn 3	synthetic	UH	1636	+11	104	119	9	8	556	MR
A x C	F1 hybrid	INRA	1330	+ 5	96	120	9	8	845	MR
	low TI									
(A x D) x C	F1 hybrid	INRA	1461	+ 8	102	121	9	8	717	MR
LPSP	high protein	PBI	2531	+ 7	77-	121	9	8	350	MS
106	high protein	INRA	1880	+33	51-	118	9	8	508	R
SW1	w no tannin	PBI	2740	+ 9	73-	116	9	8	300	R
SC1	c high tannin	PBI	2347	+ 9	77-	127	9	8	316	R
SVPw	w no tannin	Wag	1290	+16	74-	100	9	8	710	S
SVPc	c high tannin	Wag	1136	+13	80-	104	9	8	758	S
69013	w no tannin	Mar	2222	+ 5	115	115	9	7	346	MR
WF2PBOZ	w no tannin	INRA	2460	+13	66-	103	9	8	392	S
Albatross	w no tannin	Lem	1600	+11	95	99	9	8	651	MR
Blandine	w no tannin	INRA	1430	+ 4	72-	103	9	8	610	MR
LT1	low TI	SCRI	3759	+ 2	47-	85	9	7	235	HS
HT1	low TI	SCRI	3546	+ 2	45-	85	9	7	267	HS

Continued/.....

EC JOINT FABA BEAN VARIETY TRIALS (Continued). Summary of agronomic data 1989

Sown on 20th February 1989 at a target population of 40 plants/m², except for Tina, Piccolo and Mythos, 70 plants/m² 10 rows per plot, 12 cm row width
 Results are mean of 3 replicates. Yields are given as a % of the mean of control varieties Alfred and Troy

Variety	Type	Breeder	Seed /kg	Maturity (± days) relative to Troy	Yield % of controls @ 14% MC	Straw length (cm)	Lodging 9=erect 1=lodged 1=diffi-	Ease of harvest 9=easy (g) cult	Thousand seed weight	Disease scores
Ascott	low glucoside	INRA	1910	+ 9	73-	119	9	7	461	R
Tina	ti	VEB	1872	+ 8	87	80	9	8	500	HS
Piccolo	ti	Lem	2381	+ 2	80-	91	9	8	369	S
Mythos	short	Lem	2165	+ 2	88	84	9	8	430	MR

Mean yield of control varieties Alfred & Troy t/ha 4.98

Significance @ P = 0.05

LSD @ P = 0.05

CV %

SD

15.6

11.5

+ significantly higher than the mean yield of control varieties; - significantly lower than the mean yield of control varieties
 ti = determinate; TI = trypsin inhibitor; w = white; c = coloured flowered

Disease Score: HS = highly susceptible

S = susceptible

MR = moderately resistant

R = resistant

APPENDIX II

KEY TO SOURCE OF VARIETIES

CODE	NAME & ADDRESS	COUNTRY
Agri	Agri Saaten GmbH Siemensstrabe 43 D-2084 Rellingen Postfach 1151	W. Germany
Bar	Barenbrug UK Limited P.O. Box 2 Bury St. Edmunds Suffolk	UK
Bk	Booker Seeds Limited Boston Road Sleaford Lincolnshire NG34 7HA	UK
Ceb	Cebeco Zaden BV 31 Blaak Postbus 182 3000 AD Rotterdam	Holland
Conf	Confidential	
D	Dalgety Agriculture Limited Dalgety House, Works Lane Setchey, Kings Lynn Norfolk	UK
GA	General Availability	
ICI	ICI Seeds UK Limited Marsh Lane Boston Lincolnshire PE21 7RR	UK
IHR	Institute of Horticultural Research Wellesbourne Warwickshire	UK
INRA	INRA BV. 1540 21034 Dijon Cedex	France
Joo	J. Joordens Zaadhandel BV Schijfweg Noord 5 Postbus 7823 5995 ZG Kessel (LB)	Holland
Lem	Hans-Georg Lembke KG Norddeutsche Pflanzenzucht D-2331 Hohenlieth Post Holtsee U Eckernforde	W. Germany

Mar	The Breeding Station "Maribo" P.O. Box 32 DK-4960 Holeby	Denmark
MSU	Michigan State University Dept. of Crop & Soil Science Plant & Soil Sciences Building East Lansing Michigan 48824-1325	USA
Ni	Nickerson Seeds Limited Rothwell Lincoln LN7 6DT	UK
Ni/Zw	Nickerson/Zwaan BV Rothwell Lincoln LN7 6DT	UK
Nun	Nunhems Zaden BV Postbus 4005 6080 AA Haelen	Holland
PBI	Plant Breeding International Cambridge Maris Lane Trumpington Cambridge CB2 2LQ	UK
Pet	F. von Lochow-Petkus GmbH Postfach 1311 D-3103 Bergen 1	W. Germany
PV	Pop Vriend BV P.O. Box 5 1619 ZG Andijk	Holland
Rog	Rogers Brothers Seed Co. International Group P.O. Box 4727 Boise ID 83711-0727	USA
RS	Royal Sluis Postbus 22 1600 AA Enkhuizen	Holland
SCRI	Scottish Crops Research Institute Invergowrie Dundee DD2 5DA	Scotland
Sem	Semundo Limited Unit 55 Clifton Road Cambridge CB1 4FR	UK
S&G	Sluis & Groot BV P.O. Box 13 Enkhuizen	Holland

SI	Seed Innovations Limited 1 Paradise Road Downham Market Norfolk PE38 9HS	UK
Twy	Twyford Seeds Limited Scotts Farm Kings Sutton Banbury Oxfordshire OX17 3QW	UK
UCD	University College Dublin Faculty of Agriculture Belfield Dublin 4	Eire
UH	University of Hohenheim Postfach 700562 7000 Stottgart 70	W. Germany
VEB	VEB Saat-Und Pflanzgut Noosdorfstrasse 7-9 1193 Berlin-Treptow	E. Germany
Vil	Vilmorin SA La Menitre 49250 Beaufort-en-Vallee	France
vW	van Waveren Pflanzenzucht GmbH D-3405 Rosdorf Uber Gottingen	W. Germany
Wag	Stiching Voor Plantenveredeling SVP Wageningen Droevendaalseestegeg 1 Postbus 117 6700 AC Wageningen	Holland
Wh	Wherry & Sons Limited South Street Bourne Lincolnshire PE10 9LU	UK