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PROCESSORS DAYS

2ND & 3RD NOVEMBER 1993

1993 was a good season to show the level of improvement in crop performance from new pea and bean varieties. Compared to previous years, it was also almost a normal season in climatic terms, so data recorded from variety trials should be a useful guide to performance in future years.

Quick-freezers and Cannery Days have now been held continuously at PGRO since 1968 and there has been a gradual change of varieties over this period. It is therefore interesting to look at both commercial and "new" varieties at the commencement of Processors Days.

With vining peas, Sprite and Scout were becoming established as the major early and mid-season peas respectively, but the trial standards were Kelvedon Wonder and Dark Skinned Perfection. The major sources of new varieties were Asgrow, Western Valley Seed Company (now Crites Moscow Growers), Sharpes and Hursts (now Sharpes International), Clause and Brotherton.

With green beans, the standards were Harvester and Processor and improved pod quality through Bush Blue Lake types was topical.

The substantial plant breeding effort on peas and beans will ensure that further progress can be made, and good new varieties will continue to be highlighted through Quick-freezers and Cannery Days. We look forward to working with you at these events.

November 1993

G.P. Gent
Director

WEATHER FOR THE 1993 SEASON

Following a generally wet autumn, January 1993 received more than the long-term average rainfall. February and March, however, were particularly dry months receiving about one third of the average rainfall. April and May were again wet, with April receiving more than twice the average rainfall. June had average rainfall. The first week of July was dry, but the remainder of the month was wetter than average. August was drier than normal, and apart from one very wet day the last two weeks of August were dry.

Temperatures at the end of 1992 and the first week of 1993 were below zero. With the exception of a cold spell at the end of February, temperatures up to July were above or close to normal. From July temperatures were below or near to normal.

Fungal diseases caused some problems in peas, particularly *Botrytis*, downy mildew (*Peronospora viciae*) and *Mycosphaerella*. Broad beans also suffered from a severe early attack of downy mildew and later chocolate spot (*Botrytis fabae*). Green bean pods were infected with more *Botrytis* than in previous years.

The vining pea harvest started on the 22nd June, a little later than expected. In the somewhat cooler and wetter conditions at harvest, varieties were slow to mature and some had prolonged flowering. Combining peas were harvested in mostly dry conditions starting on the 27th July. Broad and green beans were slow to mature during cool conditions.

PROGRAMME

FREEZERS DAY

10.15 Coffee on Arrival
10.45 Introductory Talk by PGRO Staff
11.30 Inspection of Peas
1.00 Lunch
2.00 Inspection of Beans
3.15 Tea and Dispersal

CANNERS DAY

10.15 Coffee on Arrival
10.45 Introductory Talk by PGRO Staff
11.30 Inspection of Vining Peas, Broad & Green Beans
1.00 Lunch
2.00 Inspection of Processed Peas
3.15 Tea and Dispersal

STAFF

Director - G.P. Gent, NDA, MRAC

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VINING PEAS

Summary of Variety Trial Results 1993

Varieties were evaluated in Main, Preliminary and Screening Trials. Promising varieties from 1991 and 1992 Preliminary Trials were assessed in the Main Trial. Preliminary Trial varieties are at National List stage of testing in an EC member country, while breeders material at an early stage of development is evaluated in the Screening Trial. Additionally a trial sponsored by HDC was undertaken to evaluate established vining peas compared to newer varieties. This enables a direct comparison to be made between varieties when sown in the same season and location at a timing appropriate for the maturity. Peas were sown on three dates, one for early varieties, one for mid-season varieties and one for later maturing varieties.

Seed of all varieties was treated to control damping off, downy mildew and *Ascochyta* diseases. Breeders stock of standard varieties was used in all trials. In the Main, Preliminary and Screening trials, Sprite was the standard variety for maturity; Waverex the petits pois standard; Scout the yield standard; and Puget the late maturing standard.

Drilling conditions were good and the trials established well and evenly. Broad-leaved weeds were controlled pre-emergence with Opogard SC (terbutryn/terbuthylazine) and post-emergence with Fortrol + Triflex-Tra (cyanazine + MCPB/MCPA), except for the Screening trial where post-emergence Basagran (bentazone) was used.

Adequate moisture and warm conditions gave rise to vigorous growth and some varieties had a prolonged flowering period. Foliar diseases became apparent under these conditions particularly *Botrytis*. Aphid numbers built up rapidly in mid-June and were controlled with an insecticide spray.

The harvest began later than expected on the 22nd June and was completed by the 3rd August. Initially varieties were slow to mature and rate of maturity was erratic throughout the season

Samples from all trials were quick-frozen. Additional samples from the Main and Preliminary trials were canned as in previous years without colour additive.

Main Trial, Thornhaugh - Table 1

Varieties CO 400, Barle, Elorac and Sancho were in their third and final year of testing and a three year summary of results will be published in Variety Trials Manual No 1: Vining and Combining peas.

Haulm length of CO 400 was similar to Sprite and it was the first variety to mature one day before Sprite. Yields were significantly lower than Sprite and the evenly coloured produce was smaller (medium size grade) than Sprite.

Yields of Sprite were similar to Scout. Produce was larger than Scout, slightly pale and with blond peas in the frozen sample.

Maturing 5 days after Sprite, XPF 266 had medium length haulm with a good semi-leafless plant habit. Yields were lower than Scout at TR 100, but similar at TR 120. Produce was medium - small size grade with an even colour.

Waverex was significantly lower yielding than Scout at TR 120, however produce was very small with 82 % of the peas < 8.75 mm diameter. Peas were

uneven in colour, with blond peas in the frozen sample. Waverex had short haulm and matured one day before Scout.

Scout matured 7 days after Sprite and gave good yields of large - medium size grade peas. Produce was dark, but uneven in colour and with blond peas in the frozen sample.

Barle and Elorac matured at the same time as Scout.

Barle was semi-leafless, semi-fasciated, short strawed and remained erect. Yields were similar to Scout, but produce was a little larger. Peas had a good, dark and even colour.

Elorac was triple podded with heavy foliage which was longer than Scout. Produce was medium size grade with a dark, but uneven colour and with blond peas in the frozen sample.

Sancho matured 8 days after Sprite. Sancho had medium length haulm and a good, erect semi-leafless plant habit. Peas were medium - small size grade with a very dark and a very even colour.

Puget matured early, only one day later than Scout. Yields were low at TR 100, but similar to Scout at TR 120. Peas were medium size grade and the frozen produce contained several blond peas.

Preliminary Trial, Thornhaugh - Table 2

Twenty-three varieties including the standards were evaluated and several of these were early maturing. Scout, the yield standard, was a little lower yielding than in the Main trial. Two varieties NUN 0564 and NUN 0561 significantly outyielded Scout.

Modena was a round seeded starchy pea and matured very early, 7 days before Sprite. Yields were significantly lower than Sprite. Peas were small (75 % < 8.75 mm diameter) with a fairly even, but rather pale colour. Haulm was short and foliage fine.

CO 4554 had a good semi-leafless plant habit. Yields were significantly lower than Sprite and many of the upper pods failed to fill. Peas were smaller than Sprite, but rather pale and uneven in colour.

NUN 1034, NUN 1025 and Arise had medium length haulm and matured 3 days before Sprite. All three varieties were low yielding, NUN 1025 and Arise significantly so. Arise was semi-leafless with a good plant habit, but like CO 4554 failed to fill upper pods. Produce of NUN 1034 was of a similar size to Sprite, while produce from NUN 1025 and Arise was a little smaller at TR 100. Arise gave a good sample of evenly coloured peas. Frozen pea colour of NUN 1034 was a little darker and more even than NUN 1025.

Lunova matured 2 days before Sprite and gave similar yields. Produce was smaller than Sprite, but the peas were uneven in colour and there were many blond peas in the frozen sample.

Sprite gave slightly lower yields than Scout, but differences were not statistically significant. Produce as in the Main Trial was larger than Scout and evenly coloured.

Maturing at the same time as Sprite, NUN 1040 gave higher but not significantly higher yields than Scout. Produce at TR 100 was of a similar size to Sprite, but smaller at TR 120. Peas were dark, but uneven in colour with blond peas in the frozen sample.

Fresca and Award matured one day later than Sprite.

Frozen produce of Fresca was darker than in the raw state and there were a few blond peas in the frozen sample. Peas were as small as Waverex with 85 % < 8.75 mm diameter. Yields as in a previous trial were significantly lower than Waverex.

Award had leafy foliage and gave higher, but not significantly higher yields than Scout. Produce was medium size grade, but with many blond peas in the frozen sample. Award matured 3 days after Sprite.

Triple podded WAV 023 had fine, short foliage and lodged early. Produce was smaller and more even in size than Waverex, but pea colour was uneven.

WAV 035 had dark, fine leaved foliage and matured 4 days after Sprite. Produce was a little larger than Waverex, and pea colour darker. Yields were significantly lower than Waverex.

Scout matured 5 days after Sprite and had long haulm. Produce was medium - large size grade and dark coloured, but with several blond peas in the frozen sample.

Waverex matured at the same time as Scout. Yields were good, similar to Scout at TR 120. Produce was very small (82 % < 8.75 mm diameter), but with blond peas in the frozen sample.

Maturing at the same time as Waverex, Seranado had fine foliage and gave peas of a similar size to Waverex, but yields were poor. Frozen produce was darker than in the raw state and contained several blond peas.

NUN 0687, NUN 0564 and Delgado matured 7 days after Sprite.

NUN 0687 had a good semi-leafless plant habit and was fairly erect at harvest. Produce was a little larger than Waverex, (77% < 8.75 mm diameter) but more even in size, with a very even colour and no blond peas. Yields were significantly higher than Waverex at TR 100.

NUN 0564 had similar foliage to Scout, but haulm was not as long. Yields were significantly higher than Scout and produce smaller, mostly medium size grade. Peas had a dark colour, but there were a few blond peas in the frozen sample.

Delgado had fine, dark coloured foliage. Produce was small - medium size grade with a very dark colour, but with a few blond peas in the frozen sample. Yields were significantly lower than Scout.

BL 639 and NUN 0561 matured 8 days after Sprite.

Yields of BL 639 were similar to Waverex at TR 100, but the peas were larger, small - medium size grade. The colour of frozen produce was poor, and contained many blond peas.

NUN 0561 was the highest yielding variety in the trial, significantly higher than Scout. Haulm length and foliage were similar to those of Scout. In spite of this, pea colour was dark and even with no blond peas

in the frozen sample. Produce was smaller than Scout (medium size grade) and a little larger than NUN 0564.

Puget matured 4 days after Scout in this trial and gave similar yields. Produce was medium size grade and peas had a dark and even colour.

PSM 1.166 and 89/126 matured 10 and 13 days respectively after Sprite. Both were heavy foliaged and long strawed. PSM 1.166 gave small - medium size grade produce, with many blond peas in the frozen sample. 89/126 gave produce of medium size grade, that was uneven in colour and with blond peas in the frozen sample.

The following varieties performed well:-

Petits pois NUN 0687 gave yields similar to Waverex. NUN 0564 and NUN 0561 significantly outyielded Scout. NUN 1034 and NUN 1040 were early maturing, but gave large peas. NUN 1040 was high yielding. Award gave good yields, but the produce contained many blond peas.

Screening Trial, Thornhaugh - Table 3

Twenty two varieties including the standards were evaluated. Some varieties were higher yielding than Scout, but only FR 697 was significantly higher yielding.

Conf A matured 2 days before Sprite and gave similar yields. Produce was smaller than Sprite, medium size grade. Pea colour was darker than Sprite, but there were blond peas in the frozen sample.

Produce from Sprite was evenly coloured and smaller than Scout, medium - large size grade. Haulm was short and yields were a little lower than Scout.

FR 510, SIS 1352, WAV 102 and SIS 1469-1 matured one day later than Sprite.

FR 510 gave similar yields to Sprite and despite having long haulm remained fairly erect. Produce was smaller than Sprite and the peas had a slightly uneven colour.

Plots of SIS 1352 contained several rogue plants. Yields were good and produce was smaller than Sprite, medium - small size grade and evenly coloured.

WAV 102 gave an attractive sample of small peas. Produce was smaller than Waverex, with 93 % of the peas < 8.75 mm diameter. Haulm was short and yields were significantly lower than Scout.

SIS 1469-1 gave a good sample of medium size grade, dark, evenly coloured peas. Yields were good at TR 100.

The following varieties matured 7 days after Sprite.

Conf B had an erect, semi-leafless plant habit with short haulm. Produce was medium size grade, and peas had a dark, even colour. Yields were similar to Scout.

CMG 293 F was triple podded with shorter haulm than Scout. Yields were similar to Scout at TR 100, but lower at TR 120. Produce was smaller than Scout and dark coloured, but with blond peas in the frozen sample.

FR 517 had shorter haulm than Scout and gave lower yields. Produce was smaller than Scout, medium - small size grade, with blond peas in the frozen sample.

Waverex was lower yielding than Scout, significantly so at TR 120. Produce was very small with 85 % of the peas < 8.75 mm diameter. Peas were uneven in size and colour with blond peas in the frozen sample.

FR 516 had short haulm and gave high yields. Produce was large, like Scout and there were blond peas in the frozen sample.

SIS 1355-2, Scout and PBINV 16-3 matured 8 days after Sprite.

SIS 1355-2 was significantly lower yielding than Scout at TR 120. Produce was medium size grade, with a lot of blond peas in the frozen sample.

Produce of Scout was large size grade and contained several blond peas.

Short strawed PBINV 16-3 as in 1992 gave significantly lower yields than Scout at TR 100. Produce was medium - small size grade and evenly coloured with no blond peas.

FR 697 and SIS 1413 matured 9 days after Sprite.

FR 697 had long haulm and was the highest yielding variety in the trial, significantly higher than Scout at TR 100. Produce was uneven in colour, with several blond peas in the frozen sample.

SIS 1413 had long haulm, a little shorter than Scout. Yields were a little higher than Scout at TR 100, but low at TR 120. Produce was medium size grade and dark coloured, but with blond peas in the frozen sample.

Puget matured 10 days after Sprite and gave similar yields to Scout at TR 100. Produce had an even colour with a few blond peas in the frozen sample.

SIS 1409-2 and SIS 1409-3 matured at the same time as Puget. Both had similar dark foliage and were triple podded. Their produce was similar in size, mostly medium size grade. Pea colour was dark, but there were several blond peas in the frozen samples of both varieties. Although SIS 1409-2 yielded slightly better, differences between these two varieties was not significant and yields were similar to Scout.

FR 798 matured one day later than Puget. It had short haulm and gave significantly low yields at TR 120. Produce was medium size grade, smaller than Puget with several blond peas in the frozen sample.

SIS 1416 and Quad matured 2 days after Puget. Both varieties yielded similarly to Puget and gave produce of medium size grade. Semi-leafless SIS 1416 gave peas of uneven size and colour. Quad had leafy foliage and set 3 - 4 pods per node. There were several blond peas in the frozen sample.

The following varieties performed well:-

Sprite and Conf B gave good samples of produce. 1352 was early and yielded well. FR 510 gave similar yields to Sprite. PBINV 16-3 gave a good sample of peas, but was low yielding. WAV 102 a good sample of petits pois peas, but yields were poor.

New and Established Variety Trial, Thornhaugh

The varieties tested have all been evaluated in previous trials, but not necessarily in the same years. This trial compares yields and relative maturity for commercially grown early, early maincrop and maincrop varieties when sown at the appropriate time for the maturity group. Scout was the yield and maturity standard common to the three sowings.

Early Varieties - Table 4

Avola matured first, 7 days before Scout and was significantly lower yielding than Scout at TR 100. Produce was large - medium size grade and the peas had an uneven colour.

Span and Misty matured one day later than Avola. Misty was significantly higher yielding than Avola at TR 100. Peas were evenly coloured and similar in size to Avola. There were no statistically significant yield differences between Span and Misty at quick-freezing stage or canning stage. Produce colour of Span was not as even as Misty and peas were a little smaller than Misty. Span, Misty and Sprite had short haulm and Span and Misty had a similar plant habit.

Sprite matured 2 days later than Avola and gave similar yields to Scout. Peas were very large (larger than Scout) with a few blond peas in the frozen sample.

Cobalt had fine, dark coloured foliage and matured at the same time as Sprite. Cobalt was the lowest yielding variety in this group, significantly lower than Scout. However, the produce was much smaller, with 62% of the peas < 8.75 mm diameter. Peas had a dark colour, but there were blond peas in the frozen sample.

Galaxie had long haulm and matured 2 days before Scout. Yields were similar to Scout at TR 120. Produce was a little smaller than Scout, with a few blond peas in the frozen sample.

Scout was the latest variety to mature and had long haulm. Produce was large - medium size grade, with a lot of blond peas in the frozen sample.

Early Maincrop Varieties - Table 5

Waverex, Darfon and Bastion were small seeded.

Waverex matured 2 days before Scout and gave good yields. Produce was very small, with 87% of the peas < 8.75 mm diameter, but with blond peas in the frozen sample.

Darfon had fine foliage and matured one day later than Waverex. Many of the upper pods failed to fill and yields were significantly lower than Waverex. Produce was a little larger than Waverex, with an uneven colour. Peas were very tight in the pods and difficult to vine.

Bastion also had fine foliage and matured 3 days later than Waverex. Yields were good, significantly higher than Scout at TR 120. Produce was a little larger than Waverex, but more even in size, with an even colour and no blond peas.

Bikini and Novella II matured at the same time. They were both semi-leafless, semi-fasciated, short strawed and erect at harvest. Both varieties gave similar yields and were significantly higher than Scout at TR 120. Their produce was smaller than Scout, dark and evenly coloured.

Scout had very long haulm. Produce was large and contained blond peas.

Barle was semi-leafless and semi-fasciated, with slightly longer haulm than Bikini. Standing ability was not as good as Bikini, but yields were very high, significantly higher than Scout. Produce was larger than Scout, but had a dark, even colour.

Semi-leafless Sancho had medium - long haulm and an erect plant habit. Yields of medium - small size grade peas were significantly higher than Scout. Pea colour was very even and very dark.

Tristar was the latest variety to mature in this group, 4 days later than Scout. Yields were significantly higher than Scout at TR 120 and produce smaller, but with an uneven colour.

Maincrop Varieties - Table 6

Scout matured first in this trial. Produce was large size grade with blond peas in the frozen sample.

Puget matured 2 days later than Scout and gave similar yields at TR 100. Produce was smaller than Scout, with a few blond peas in the frozen sample.

Ambassador, Polo and Rampart matured 4 days later than Scout.

Ambassador had long haulm and was the only variety not to suffer powdery mildew infection. Yields were higher than Scout, but differences were not statistically significant. Produce was large, and peas more evenly coloured than Scout.

Long strawed Polo had finer foliage than Scout and gave similar yields. Produce was medium - small size grade, with a few blond peas in the frozen sample.

Semi-leafless Rampart had medium length haulm and was erect at harvest. Rampart was significantly lower yielding than Scout at TR 100, but gave an attractive sample of evenly coloured, small size grade peas.

Markana was the latest variety to mature, 8 days after Scout. Markana was semi-leafless and long strawed and was fairly erect at harvest. Yields were similar to Scout at TR 100 and produce smaller, with an even pea colour.

TABLE 1 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Main Variety Trial, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 24th February
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage					At Practical Canning Stage					Raw pea colour 1=pale 5=dark
			Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout @ TR 100	% in size grades L M S VS	Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout @ TR 120	% in size grades L M S VS	Haulm length as cm	Pea wt. as % of total weight			
CO 400	JS	5860	-1	76	25 39 25 11	0	84	29 44 21 6	69	16	4.5		
Sprite	As	5835	0(26/6)	101	54 36 9 1	0(28/6)	105	66 27 6 1	68	17	4.0		
XPF 266	As (SL)	5903	+5	87	14 39 39 8	+5	105	21 52 24 3	75	18	4.0		
Waverex	vW	8713	+6	87	2 16 49 33	+6	86	2 22 55 21	67	17	4.0		
Barle	CM (SL/SF)	4646	+7	99	49 41 9 1	+6	107	57 36 6 1	62	19	5.0		
Scout	CM	4786	+7	100	41 41 15 3	+7	100	45 43 10 2	88	19	4.5		
				(8.02t/ha)			(8.65t/ha)						
Elorac (CMG 264 F)	CM	6026	+7	87	17 47 29 7	+8	88	25 54 18 3	101	17	5.0		
Sancho (SL)	Sh	6671	+8	105	5 33 49 13	+8	100	7 40 45 8	74	19	5.0		
Puget	Bro	4863	+8	88	24 46 24 6	+8	96	33 49 16 2	88	17	4.0		
				SD			SD						
				18.1			13.3						
				11.3			7.9						

KEY: YIELD: Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 (SL) = Semi-leafless; (SF) = Semi-fasciated
 Source of varieties see Appendix 1

TABLE 2 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Preliminary Variety Trial, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 18th March
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage					At Practical Canning Stage					Raw pea colour 1=pale 5=dark
			Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout	% in size grades L M S VS	Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout	% in size grades L M S VS	Haulm length cm	Pea wt. total weight			
Modena	N1	8409	- 7	61	2 23 38 37	- 6	58	4 26 41 29	66	12	3.5		
CO 4554	(SL) JS	4600	- 4	72	31 39 26 4	- 3	77	43 43 12 2	81	12	3.5		
NUN 1034	Nun	3948	- 3	88	46 35 16 3	- 3	85	56 34 9 1	83	16	4.5		
NUN 1025	Nun	5190	- 3	78	39 38 21 2	- 2	76	56 34 9 1	86	14	4.5		
Arise	(SL) As	4666	- 3	76	37 38 21 4	- 2	77	52 36 10 2	87	14	4.5		
Lunova	AGIS	4780	- 2	94	27 38 29 6	- 2	95	34 46 17 3	70	15	4.0		
Sprite	As	5835	0(2/7)	95	48 38 12 2	0(4/7)	88	56 34 9 1	72	15	4.0		
NUN 1040	Nun	3879	0	106	41 39 15 5	0	110	43 43 10 4	84	19	4.5		
Fresca	N1	6036	+ 1	71	1 14 48 37	+ 1	64	1 20 53 26	80	12	3.5		
Award (XPF 236)	As	6685	+ 1	113	22 50 23 5	+ 2	102	27 54 16 3	87	21	4.0		
WAV 023	vW	8261	+ 3	62	1 5 40 54	+ 4	59	1 9 51 39	69	10	4.0		
WAV 035	vW	6126	+ 4	79	3 25 46 26	+ 4	83	4 30 53 13	83	12	4.5		
Scout	CM	4786	+ 5	100	34 43 19 4	+ 5	100	41 45 12 2	98	14	5.0		
				(6.269t/ha)			(7.82t/ha)						
Waverex	vW	8713	+ 5	91	2 16 44 38	+ 5	100	2 20 57 21	74	14	4.0		
Seranado	BS	10645	+ 5	60	1 12 52 35	+ 5	53	1 9 60 30	80	10	3.5		
NUN 0687	(SL) Nun	9274	+ 7	108	2 21 61 16	+ 7	101	2 26 65 7	88	15	4.0		
NUN 0564	Nun	6739	+ 7	122	12 44 38 6	+ 7	118	17 56 24 3	85	16	4.5		
Delgado	BS	10521	+ 7	81	6 34 46 14	+ 8	75	11 49 36 4	78	15	4.5		
BL 639	Bl	7613	+ 8	90	5 29 50 16	+ 8	83	6 33 50 11	86	12	4.0		
NUN 0561	Nun	4704	+ 8	125	27 51 19 3	+ 9	119	32 56 11 1	95	15	4.0		
Puget	Bro	4863	+ 9	105	27 47 22 4	+ 9	99	41 47 10 2	83	13	4.0		
PSM 1.166	SM	9004	+10	59	5 31 47 17	+11	57	8 36 45 11	100	9	3.5		
89/126	SM	6802	+13	80	20 45 27 8	+13	74	20 47 26 7	107	9	4.0		

Significance @ P = 0.05 SD
 LSD @ P = 0.05 15.3
 CV % 10.5

KEY: YIELD: + Significantly greater than Scout @ P = 0.05; - Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 (SL) = Semi-leafless
 Source of varieties see Appendix 1

TABLE 3 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Screening Variety Trial, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 14th April
 Results are means of two replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage					At Practical Canning Stage					Raw pea colour 1=pale 5=dark
			Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout @ TR 100	% in size grades L M S VS	Maturity relative to Sprite (± days)	Yield of shelled peas as % Scout @ TR 120	% in size grades L M S VS	Haulm length cm	Pea wt. total weight			
Conf A	As	5032	- 2	92	12 42 41 5	- 2	96	14 53 30 3	73	18	4.5		
<u>Sprite</u>	As	5835	0(8/7)	98	34 47 17 2	0(10/7)	91	47 45 7 1	65	14	4.0		
FR 510	PLS	5921	+ 1	94	13 44 36 7	+ 1	86	22 55 20 3	85	13	4.0		
SIS 1352	Sh	6100	+ 1	115	9 41 40 10	+ 2	111	15 54 28 3	74	18	4.0		
WAV 102	vW	7372	+ 1	68 ⁻	1 6 42 51	+ 2	58 ⁻	1 11 57 31	66	11	4.0		
SIS 1469-1	Sh	5031	+ 1	109	23 52 22 3	+ 2	100	34 56 9 1	75	15	5.0		
Conf B	As	5675	+ 7	103	33 44 18 5	+ 6	107	36 46 14 4	69	16	4.5		
CMG 293 F	CM	4637	+ 7	103	38 41 14 7	+ 7	92	45 36 12 7	83	13	4.5		
FR 517	PLS	8235	+ 7	92	8 43 36 13	+ 8	88	11 48 32 9	84	14	4.5		
<u>Maverex</u>	vW	8713	+ 7	89	1 14 49 36	+ 8	71 ⁻	1 14 53 32	69	12	4.0		
FR 516	PLS	5734	+ 7	122	54 35 9 2	+ 8	109	59 32 7 2	62	18	4.0		
SIS 1355-2	Sh	6325	+ 8	79	27 43 21 9	+ 8	80 ⁻	29 45 18 8	86	11	4.0		
<u>Scout</u>	CM	4786	+ 8	100	50 32 14 4	+ 8	100	53 30 13 4	88	14	4.5		
				(6.57t/ha)			(8.17t/ha)						
PBINV 16-3	PBI	6937	+ 8	75 ⁻	19 43 30 8	+ 8	87	22 46 27 5	61	12	4.0		
FR 697	Bro	7923	+ 9	128 ⁺	41 36 18 5	+ 9	110	45 38 14 3	84	14	4.0		
SIS 1413	Sh	5871	+ 9	106	20 41 27 12	+10	86	30 42 20 8	82	13	4.5		
SIS 1409-2	Sh	6108	+10	109	20 36 29 15	+10	93	26 44 23 7	82	14	4.5		
SIS 1409-3	Sh	5729	+10	98	23 35 29 13	+10	79	26 45 22 7	84	14	4.0		
<u>Puget</u>	Bro	4863	+10	102	41 40 14 5	+10	94	45 41 11 3	69	14	4.0		
FR 798	Bro	7767	+11	86	24 39 26 11	+11	75 ⁻	31 46 19 4	60	13	4.0		
SIS 1416	Sh	5806	+12	102	22 38 29 11	+12	91	27 47 21 5	76	14	4.0		
Quad	CM	6802	+12	101	23 45 25 7	+12	85	27 52 18 3	83	14	4.0		
				SD			SD						
				23.4			19.6						
				11.3			10.3						

Significance @ P = 0.05
 LSD @ P = 0.05
 CV %

KEY: YIELD: + Significantly greater than Scout @ P = 0.05; - Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 (SL) = Semi-leafless
 Source of varieties see Appendix 1

TABLE 4 - VINING PEA VARIETY STUDIES. Summary of agronomic data - New and Established Variety Trial - Early Varieties, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 23rd February
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage				At Practical Canning Stage				Haulm length as % of total weight	Pea wt. as % of colour 1=pale 5=dark
			Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 100	% in size grades L M S VS	Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 120	% in size grades L M S VS				
Avola	AS	4624	-9	71	43 41 14 2	-7	89	68 26 5 1	77	16	4.0	
Misty	PLS	4358	-8	87	43 39 15 3	-7	100	64 30 5 1	58	16	4.0	
Span	CM	5270	-8	82	33 38 23 6	-6	98	55 33 10 2	56	16	4.0	
Sprite	AS	5659	-7	101	53 37 9 1	-6	111	59 33 7 1	63	17	4.0	
Cobalt	C1	7897	-7	60	6 32 41 21	-5	65	6 35 42 17	74	12	4.5	
Galaxie	BS	5280	-3	88	35 42 20 3	-2	97	42 45 11 2	80	15	4.5	
Scout	CM	4786	0(2/7)	100	42 42 13 3	0(4/7)	100	44 43 11 2	82	18	4.5	
				(8.08t/ha)			(8.30t/ha)					

KEY: YIELD: Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 Source of varieties see Appendix 1

13 Significance @ P = 0.05
 LSD @ P = 0.05
 CV %

SD
 17.8
 10.6

SD
 15.2
 10.2

TABLE 5 - VINING PEA VARIETY STUDIES. Summary of agronomic data - New and Established Variety Trial - Early Maincrop Varieties, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 31st March
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage					At Practical Canning Stage					Haulm length as % of total weight	Pea wt. as % of total weight	Raw pea colour 1=pale 5=dark
			Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 100	% in size grades L M S VS	Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 120	% in size grades L M S VS	Haulm length cm	Pea wt. as % of total weight					
Waverex	vW	8713	-2	90	1 12 45 42	-2	97	1 18 56 25	70	12	4.0				
Darfon	RS	10833	-1	66 ⁻	1 10 63 26	-1	70 ⁻	1 15 60 24	81	10	4.0				
Bikini	(SL/SF) BS	4698	0	116	36 54 9 1	0	127 ⁺	41 51 7 1	57	16	4.5				
Novella II	(SL/SF) BS	5315	0	119 ⁺	31 56 12 1	0	118 ⁺	42 49 8 1	50	15	4.5				
<u>Scout</u>	<u>CM</u>	<u>4786</u>	0(12/7)	100	<u>45 37 15 3</u>	0(14/7)	100	<u>50 37 11 2</u>	<u>117</u>	<u>13</u>	<u>4.5</u>				
				(5.54t/ha)			(6.05t/ha)								
Barle	(SL/SF) CM	4646	+1	155 ⁺	40 50 9 1	0	147 ⁺	60 36 3 1	63	16	5.0				
Bastion	Nun	8934	+1	98	1 17 58 24	+1	121 ⁺	3 26 59 12	75	12	4.0				
Sancho	(SL) Sh	6671	+1	130 ⁺	6 40 45 9	+1	135 ⁺	9 51 35 5	91	14	5.0				
Tristar	As	4666	+4	105	32 43 18 7	+2	120 ⁺	40 41 13 6	77	13	4.5				
				SD			SD								
				17.7			12.2								
				9.4			6.1								

KEY: YIELD: ⁺ Significantly greater than Scout @ P = 0.05; ⁻ Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 (SL) = Semi-leafless; (SF) = Semi-fasciated
 Source of varieties see Appendix 1

TABLE 6 - VINING PEA VARIETY STUDIES. Summary of agronomic data - New and Established Variety Trial - Maincrop Varieties, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 28th April
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	Seeds /kg	At Practical Freezing Stage				At Practical Canning Stage				Haulm length cm	Pea wt. as % of total weight	Raw pea colour 1=pale 5=dark
			Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 100	% in size grades	L M S VS	Maturity relative to Scout (± days)	Yield of shelled peas as % Scout @ TR 120	% in size grades	L M S VS			
<u>Scout</u>	<u>CM</u>	<u>4786</u>	0(23/7)	100 (6.24t/ha)	42 41 15 2	0(27/7)	100 (7.15t/ha)	45 42 11 2	73	17	4.5		
Puget	Bro	4863	+2	104	28 48 20 4	+2	93	31 51 15 3	60	17	4.0		
Ambassador	vW	4984	+4	119	44 41 12 3	+3	116	50 37 11 2	88	17	4.0		
Polo	Sh	6488	+4	106	9 40 40 11	+4	105	11 48 33 8	84	18	4.5		
Rampart	(SL) As	7582	+4	76	4 28 45 23	+4	83	5 33 46 16	66	11	4.5		
Markana	(SL) Sp	4340	+8	102	31 47 18 4	+8	94	34 50 14 2	77	16	4.5		
				SD			NSD						
				22.1			17.4						
				12.0			9.7						

KEY: YIELD: Significantly less than Scout @ P = 0.05
 Size grades: L = large > 10.3 mm; M = medium 8.75 - 10.3 mm; S = small 7.5 - 8.75 mm; VS = very small < 7.5 mm
 (SL) = Semi-leafless
 Source of varieties see Appendix 1

Significance @ P = 0.05
 LSD @ P = 0.05
 CV %

COMBINING PEAS

Summary Of Variety Trial Results 1993

Four replicated variety trials were conducted in 1993. A high proportion of the varieties were semi-leafless and several new marrowfat varieties were evaluated in the Screening trial. Yields were compared with the mean of Solara, Orb and Baroness for the RL and Screening trials and Solara and Baroness for the Preliminary trial. Maturities were related to Solara. The human consumption quality standards were marrowfat Maro and small blue Conquest.

The Screening, Preliminary and one of the Recommended List (RL) Trials were carried out at Thornhaugh on a sandy clay loam soil. A second RL trial was conducted at Chatteris, Cambs. on an organic sandy clay loam soil. The RL trials form part of the PGRO/NIAB co-ordinated series of trials, from which the Recommended List is produced. Varieties in these trials are either fully or provisionally recommended or are candidates for the Recommended List jointly selected from the most promising registered varieties. Five varieties were in the RLO category, where extra data is sought before deciding on full Recommended List evaluation. Varieties in the Preliminary trial are at National List stage of testing in an EC member country. Breeders material at an earlier stage of development is evaluated in the Screening trial.

Seed for the trials was treated with fungicide to control damping off, *Ascochyta* and downy mildew diseases. All trials were drilled relatively early during a spell of fine weather at the end of February and early March. The peas emerged quickly with few losses. Broad-leaved weeds were controlled pre-emergence with Opogard SC (terbutryn/terbuthylazine) and post-emergence with Pulsar + Fortrol (bentazone/MCPB + cyanazine). Grass weeds were controlled pre-sowing with Roundup (glyphosate) and post-emergence with Laser (cycloxdim) + Actipron oil. Growth was vigorous for all trials with high levels of lodging. Aphid (*Acyrtosiphon pisum*) numbers built up rapidly and were controlled with Aphox (pirimicarb). Pea moth (*Cydia nigricana*) were few in number.

At Chatteris seedbed conditions were excellent and the peas established well. Broad-leaved weeds were controlled post-emergence with Pulsar + Fortrol. Growth was vigorous and haulm very long, but lodging of some varieties was not as severe as at the Thornhaugh site. Aphid and pea moth were controlled and fungicides were applied. Manganese sulphate was sprayed to prevent manganese deficiency.

Varieties were combined during the period 27th July to 8th August, later than in the last few years.

Produce quality suffered because of lodging and wet conditions. Levels of staining and numbers of "chalky" peas (caused by *Botrytis*) were relatively high. Levels of staining were recorded for the varieties that were canned for human consumption. Small blue and marrowfat varieties from the Preliminary, Screening and Chatteris Recommended List trials were canned to assess quality for human consumption. These samples will be evaluated by a panel from the British Edible Pulse Association. Dry produce and canned samples are available for evaluation by the canning industry.

Blue seeded varieties can all be used for micronising for the pet food market, but the larger blue seeded marrowfats are generally preferred. Here quality is less important.

Recommended List Trial, Thornhaugh - Table 7

Five new varieties to the RL trial system (RLO stage) were Carrera, Chorale, Eiffel, Samba and Tenna (all semi-leafless white seeded). Candidate varieties for provisional recommendation (RLI Stage) in 1993 were Alfetta, Axe, Baccara, Juno (semi-leafless white seeded) and Olivin (conventional-leaved large blue seeded).

Tare-leaved Mascot yielded better than conventional-leaved Conquest, but both were significantly lower yielding than the mean of the control varieties. Mascot matured 3 days before Solara, while Conquest was later to mature at the same time as Solara. Conquest lodged earlier than Mascot, but both had lodged severely by harvest and levels of staining were similar. Orb yielded similarly to the control and was the first variety to mature 4 days before Solara. Standing ability was poor this year.

Yields of large blue seeded varieties Arena and Olivin were similar to the mean of the control varieties, and significantly better than Solara. Solara had short straw. Arena and Olivin (conventional-leaved) had longer, medium length straw. None of the large blues showed good standing ability. Olivin and Arena matured one day after Solara.

The white seeded peas were semi-leafless with the exception of conventional-leaved Rex. Several varieties in this group were significantly higher yielding than the control, including, Eiffel, Baccara, Grafila, Chorale and Baroness. Varieties yielding a little higher than the control were Montana, Rex, Alfetta, Samba and Carrera. Juno and Axe were lower yielding than the control and Tenna was significantly lower yielding.

All the white seeded peas matured earlier than Baroness. Eiffel, Montana, Juno, Baccara, Rex and Alfetta matured one day before Solara, While Tenna, Axe, Grafila, Chorale and Samba matured one day later. Carrera matured one day before Baroness.

Juno was short strawed and together with Baccara and Alfetta were severely lodged at harvest. Baroness had the longest haulm in this group. Tenna, Axe, Grafila, Chorale and Samba were also long strawed. All varieties lodged, but Eiffel, Grafila and Chorale showed the best standing ability.

All the Marrowfat varieties were significantly lower yielding than the control. Princess and Maro were the highest yielding and Bunting the lowest. Maro yielded better than Bunting and Progreta. Maturing 5 days later than Solara, Princess was the earliest of the marrowfat varieties to mature. Guido was the latest, 7 days later than Solara. All the marrowfat varieties showed similar, poor standing ability this year, but Princess was a little easier to harvest.

Recommended List Trial, Chatteris - Table 8

Growth at this site was vigorous, but lodging for some varieties was less severe than at the Thornhaugh site. Mean yields of the controls were high at this site (7.1 t/ha) and some varieties outyielded this figure. Maturity differences were greater than at the Thornhaugh site.

Three small blue seeded peas were evaluated. Orb was the highest yielding and Conquest the lowest, but all three were significantly lower yielding than the mean of the control varieties. Conquest (conventional-leaved) lodged earlier than Mascot (tare-leaved), and a higher percentage of peas were stained, but both varieties were severely lodged at harvest. Semi-leafless Orb also had poor standing ability.

Mascot and Conquest could be used for canning for human consumption. Canned produce of Conquest was a little larger than Mascot. Conquest gave a slightly better canned sample than Mascot, with very little breakdown of the peas. The canned sample of Orb was poor showing excessive amounts of breakdown.

At this site Olivin matured one day earlier than Solara and Arena one day later. Conventional-leaved Olivin and semi-leafless Arena were longer strawed than Solara. Solara had the best standing ability of the blue seeded varieties. Yields from Solara were better at this site, similar to Arena. In contrast to the Thornhaugh site Olivin was significantly lower yielding than the mean of the controls.

As at the Thornhaugh site Baroness was the latest of the white seeded peas to mature. Juno, Axe, Alfetta and Montana were the earliest to mature, one day before Solara. Baccara was later to mature in this trial 2 days after Solara.

Several varieties were significantly higher yielding than the mean of the controls including, Juno, Montana, Eiffel, Baccara and Baroness. Varieties which were also higher yielding than the control were Alfetta, Samba, Carrera, and Chorale. Axe, Tenna, Rex and Grafila were lower yielding than the mean of the controls.

Baroness was again very long strawed and Juno short strawed. At this site Grafila was as long as Baroness. Eiffel had excellent standing ability and was easy to harvest. The other white seeded varieties had similar standing ability, with Carrera, Grafila, Chorale and Baroness slightly better than the rest.

Maro and Guido were the latest varieties to mature 8 days after Solara. Bunting matured earlier at this site 4 days before Maro. Princess and Progreta matured one day before Maro. Yields from Princess were a little higher than the mean of the control varieties at this site and those from Progreta a little lower. Maro, Guido and Bunting were significantly low yielding. Guido performed better at this site. Princess had the best standing ability of the marrowfat varieties. Guido gave the largest and best canned sample of produce. Breakdown of the peas was slightly worse for Maro than other varieties, but acceptable. Produce from Princess and Progreta was a little larger than normal, only slightly smaller than Maro.

Preliminary Trial, Thornhaugh - Table 9

Varieties in this trial are at National List stage of testing in an EC member country. 11 varieties including the standards were evaluated. The Preliminary trial is not an official National List site, but it contains some of the varieties entered into official trials and provides a useful shop window for these varieties. Marrowfat varieties were assessed for their suitability for canning for human consumption.

Varieties S-1343, Amadeus, and Solara were large blue seeded and semi-leafless. Amadeus and Solara were short strawed and had poor standing ability. S-1343 was longer strawed and lodged severely. S-1343 yielded well, significantly higher than the control, while Solara and Amadeus were significantly lower yielding.

With the exception of Kiri, the following white seeded varieties were semi-leafless. Baroness was the latest variety to mature 5 days later than Solara. Kiri, Jet and CPB P8 matured 3 days after Solara. Jet and Baroness were significantly higher yielding than the mean of the control varieties. Kiri, PBINC 54-1 and CPB P8 gave similar yields to the control. Baroness had the longest straw in this group. No variety had good standing ability, but standing ability of CPB P8 was slightly better than the rest.

Spectrum was coloured flowered, large seeded and semi-leafless. Straw was medium in length and standing ability was similar to Solara. Spectrum gave significantly low yields and matured at the same time as Solara.

Maturing 7 days after Solara, Maro gave low yields and had poor standing ability. Tare-leaved Eagle matured 4 days earlier than Maro. Eagle had shorter straw than Maro and lodged severely. The canned sample of Eagle was good showing no breakdown of the peas or gel formation, but as in previous trials the canned produce of Eagle was smaller than Maro.

Screening Trial, Thornhaugh - Table 10

Thirty-four varieties including the standards were evaluated. As in 1992 a significant number of marrowfat varieties were entered, many of which were semi-leafless. Two varieties, Froidure and CA 1033, were also winter sown in the winter combining pea variety trial.

Giving yields similar to the control, Orb matured 4 days before Solara and as in other trials this year lodged severely. Conventional-leaved Froidure matured 3 days later than Solara and gave low yields (Yields were lower than when autumn sown). Produce of Froidure was very small, but of a similar size to Conquest when canned, but there was excessive breakdown of the peas and gel formation and the variety is unsuitable for this purpose.

The following varieties were large blue seeded and semi-leafless. Solara had the shortest straw and as in other trials at Thornhaugh gave low yields. Other varieties had medium length straw and P86P247L9 and P86P164A3 had slightly better standing ability. P86P247L9, P86P164A3, P86P233A1 and P89P049A3 gave similar yields to the control. P86P254A2 gave yields similar to Solara.

Most of the white seeded peas were semi-leafless. Conventional-leaved varieties were Conf 892, Conf 899, Conf 882, Conf 897, Conf 894 and CA 1033.

CA 1033 matured 2 days later than Baroness (Solara +4). The other white seeded peas were earlier to mature, the earliest being P85P156A1 2 days before Solara.

The longest strawed variety was Baroness. Other long strawed varieties included Conf 880, Conf 885, Conf 887, Conf 882, PBINC 55-1 and Conf 897. P85P156A1 was short strawed like Solara. P87P093A1, Conf 840 and Conf 892 were a little longer than Solara. Standing ability for most varieties was similar and poor, but Conf 880, Conf 887 and Conf 885 had better standing ability. P85P156A1, Conf 892 and Conf 899 lodged severely.

PBINC 55-1 was the only variety in the trial to significantly outyield the mean yield of the control varieties. Conf 887 also yielded well. Conf 840, Conf 892, Conf 882 and Conf 894 were low yielding. CA 1033, which was very small seeded, gave significantly lower yields than the mean of the control varieties and performed better when winter sown.

Several marrowfat varieties were entered into trial this year.

Maro, Conf 1 and Conf 2 were conventional-leaved and were the latest varieties to mature 7 days later than Solara. The other marrowfat varieties were semi-leafless. The earliest maturing of the marrowfat varieties were Conf 3 and Conf 4, 7 days before Maro.

Conf 7 was very long strawed, longer than Baroness. Other varieties with long straw were Conf 6, Conf 5, XAF 09 CB and XAG 09 AE. Conf 4, Conf 5 and Conf 7 showed the best standing ability of the marrowfat varieties.

Conf 3 and XAG 09 AE were the highest yielding varieties in this group, but yields were not statistically greater than the control. Conf 6, Conf 7, and Conf 8 gave similar yields to Maro. Conf 4, Conf 5, XAF 09 CB and Conf 2 were lower yielding than Maro. Conf 1 gave significantly low yields.

Levels of staining was low for Maro, other varieties had similar percentages of stained peas, except for Conf 3 and Conf 8 which were the highest.

The canned sample of Maro was large seeded and showed a little breakdown of the peas. Conf 1 was similar to Maro. Conf 2 gave the largest and best canned sample. Varieties that also canned well were Conf 8, Conf 4, Conf 3, Conf 6 and XAF 09 CB, but the produce of Conf 4, and Conf 6 was smaller than Maro and perhaps too small. Produce of Conf 8 was larger than Maro and Conf 3 and XAF 09 CB similar to Maro.

There were some promising semi-leafless marrowfat varieties suitable for canning for human consumption. White seeded peas PBINC 55-1 and Conf 887 performed well.

TABLE 7 - COMBINING PEA VARIETY STUDIES. Summary of Agronomic Data - Recommended List Variety Trial, Thornhaugh - 1993
 Standard varieties underlined. Control varieties for yield; Solara, Orb and Baroness
 All varieties sown on 22nd February. Results are means of three replicates

Variety	Source	Seed 1000 grain weight (g)	Maturity days (±) Solara	Yield % of Control @ 15% MC	Straw length (cm)	Standing ability 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	1000 grain weight (g)	Stained peas %
SMALL BLUES: Target population 95 plants/m²									
<u>Orb</u>	(SL) Sh	245	-4	98	71	1	1	205	7
Mascot	(TL) PBI	180	-3	77	67	1	1	180	8
Conquest	Sh	211	0	65	91	1	1	190	8
LARGE BLUES: Target population 70 plants/m²									
<u>Solara</u>	(SL) D	294	0 (31/7)	91	64	2	4	289	
Olivilin	Sem	210	+1	100	91	2	4	262	
Arena	(SL) Ni	251	+1	100	86	2	4	219	
WHITES: Target population 70 plants/m²									
Eiffiel (4-9076)	(SL) Mar	287	-1	108 ⁺	80	4	6	297	
Montana	(SL) SIL	297	-1	102	79	2	3	281	
Juno	(SL) Twy	297	-1	97	58	1	3	296	
Baccara	(SL) El	301	-1	110 ⁺	73	1	1	294	
Rex	Ni	240	-1	101	84	2	4	243	
Alfetta	(SL) SIL	291	-1	106	70	1	3	280	
Tenna (PJ 312608)	(SL) Ni	227	+1	86	76	2	4	235	
Axe	(SL) Ni	266	+1	98	90	2	4	261	
Grafila	(SL) Sh	305	+1	112 ⁺	98	4	6	288	
Chorale (KZ 1/1/3)	(SL) Sh	274	+1	114 ⁺	92	4	6	237	
Samba (LB 1/1/1/1)	(SL) Sh	266	+1	105	93	2	4	246	
Carrera (CEB 1426)	(SL) SIL	274	+2	101	75	2	4	264	
<u>Baroness</u>	(SL) Sh	298	+3	111 ⁺	104	3	5	309	
MARROWFATS: Target population 65 plants/m²									
Princess	(SL) Sh	343	+5	91	84	2	4	344	5
Progreta	(TL) Prog	292	+6	82	81	2	3	315	6
Bunting	Bat	332	+6	80	77	2	3	346	6
Maro	GA	364	+6	90	90	2	3	350	8
Guido	SIL	417	+7	85	89	2	3	403	6
Mean yield of control varieties t/ha									
Significance @ P = 0.05									
LSD @ P = 0.05									
CV %									

KEY: Yield: ⁺ Significantly greater than control @ P = 0.05; ⁻ Significantly less than control @ P = 0.05
 (SL) = Semi-leafless; (TL) = Tare-leaved
 Source of varieties see Appendix 1

TABLE 8 - COMBINING PEA VARIETY STUDIES. Summary of Agronomic Data - Recommended List Variety Trial, Chatteris - 1993
 Standard varieties underlined. Control varieties for yield; Solara, Orb and Baroness
 All varieties sown on 10th March. Results are means of three replicates

Variety	Source	Seed 1000 grain weight(g)	Maturity days (±)Solara	Yield % of Control @ 15% MC	Straw length (cm)	Standing ability 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	1000 grain weight (g)	Water uptake	Stained peas
SMALL BLUES: Target population 95 plants/m²										
Orb	(SL) Sh	245	-5	92 ⁻	71	2	3	230	96	2
Mascot	(TL) PBI	180	-5	82 ⁻	66	1	2	187	104	5
Conquest	Sh	211	-2	71 ⁻	83	1	2	206	112	13
LARGE BLUES: Target population 70 plants/m²										
Olivin	Sem	210	-1	93 ⁻	91	2	4	313		
Solara	(SL) D	294	0(5/8)	99	73	4	6	341		
Arena	(SL) Ni	251	+2	101	94	3	5	255		
WHITES: Target population 70 plants/m²										
Junco	(SL) Twy	297	-1	112 ⁺	68	3	5	348		
Axe	(SL) Ni	266	-1	94	83	3	4	278		
Alfetta	(SL) SIL	291	-1	106	78	3	5	322		
Montana	(SL) SIL	297	-1	107 ⁺	73	3	5	331		
Tenna (PJ 312608)	(SL) Ni	227	0	97	82	2	4	280		
Eiffiel (4-9076)	(SL) Mar	287	0	109 ⁺	87	7	8	331		
Rex	Ni	240	+1	97	87	2	4	297		
Samba (LB 1/1/1/1)	(SL) Sh	266	+1	106	99	2	4	274		
Baccara	(SL) El	301	+2	113 ⁺	79	2	4	330		
Carrera (CEB 1426)	(SL) SIL	274	+2	104	79	4	6	305		
Grafila	(SL) Sh	305	+3	98	108	4	6	310		
Chorale (KZ 1/1/3)	(SL) Sh	274	+3	105	89	4	6	254		
Baroness	(SL) Sh	298	+4	110 ⁺	107	4	6	326		
MARROWFATS: Target population 65 plants/m²										
Bunting	Bat	332	+4	84 ⁻	75	2	3	396	104	5
Princess	(SL) Sh	343	+7	104	101	4	6	386	107	6
Prograta	(TL) Prog	292	+7	95	86	2	3	358	92	3
Maro	GA	364	+8	86 ⁻	86	2	3	389	104	5
Guido	SIL	417	+8	91 ⁻	90	2	3	429	103	4

Mean yield of control varieties t/ha
 Significance @ P = 0.05
 LSD @ P = 0.05
 CV %

KEY: Yield: ⁺ Significantly greater than control @ P = 0.05; ⁻ Significantly less than control @ P = 0.05
 (SL) = Semi-leafless; (TL) = Tare-leaved
 Source of varieties see Appendix 1

TABLE 9 - COMBINING PEA VARIETY STUDIES. Summary of Agronomic Data - Preliminary Variety Trial, Thornhaugh - 1993
 Standard varieties underlined. Control varieties for yield; Solara and Baroness
 All varieties sown on 3rd March. Results are means of three replicates

Variety	Source	Seed 1000 grain weight(g)	Maturity days (±)Solara	Yield % of Control @ 15% MC	Straw length (cm)	Standing ability 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	1000 grain weight (g)	Water uptake %	Stained peas %
LARGE BLUES: Target population 70 plants/m²										
S-1343	(SL) Twy	312	-1	111 ⁺	79	1	3	308		
Solara	(SL) D	<u>294</u>	0(4/8)	92 ⁻	<u>69</u>	<u>2</u>	<u>4</u>	299		
Amadeus (CPB 10)	(SL) CPB	254	+1	90 ⁻	<u>66</u>	2	4	305		
WHITES: Target population 70 plants/m²										
PBING 54-1	(SL) PBI	247	0	101	83	3	5	248		
Kiri	CPB	223	+3	98	76	2	3	258		
Jet (XAF 10 AA)	(SL) JS	264	+3	111 ⁺	87	3	4	322		
CPB P8	(SL) CPB	231	+3	97	84	4	5	258		
Baroness	(SL) Sh	<u>298</u>	+5	<u>108⁺</u>	<u>101</u>	<u>2</u>	<u>5</u>	308		
COLOURED FLOWERED: Target population 65 plants/m²										
Spectrum (TWY 87/45)	(SL) Twy	328	0	91 ⁻	79	2	4	349		
MARROWFATS: Target population 65 plants/m²										
Eagle (PBICC 34-1)	(TL) PBI	323	+3	99	78	1	3	323	97	9
Maro	GA	364	+7	93	84	2	3	345	105	7
Mean yield of control varieties t/ha										
Significance @ P = 0.05										
LSD @ P = 0.05										
CV %										

KEY: Yield: ⁺ Significantly greater than control @ P = 0.05; ⁻ Significantly less than control @ P = 0.05
 (SL) = Semi-leafless; (TL) = Tare-leaved
 Source of varieties see Appendix 1

TABLE 10 - COMBINING PEA VARIETY STUDIES. Summary of Agronomic Data - Screening Variety Trial, Thornhaugh - 1993
 Standard varieties underlined. Control varieties for yield; Solara, Orb and Baroness
 All varieties sown on 8th March. Results are means of two replicates

Variety	Source	Seed 1000 grain weight(g)	Maturity days (±)Solara	Yield % of Control @ 15% MC	Straw length (cm)	Standing ability 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	1000 grain weight (g)	Water uptake %	Stained peas %
SMALL BLUES: Target population 95 plants/m²										
Orb	(SL) Sh	245	-4	101	75	1	3	205		6
Froidure	HAM	152	+3	85	97	2	3	162	99	4
LARGE BLUES: Target population 70 plants/m²										
P86P254A2	(SL) PH	220	-1	94	87	2	4	220		
Solara	(SL) D	294	0(5/8)	92	69	2	4	296		
P86P247L9	(SL) PH	315	0	102	86	4	6	330		
P86P164A3	(SL) PH	230	+1	97	85	4	6	296		
P86P233A1	(SL) PH	260	+3	101	94	3	5	263		
P89P049A3	(SL) PH	250	+3	100	80	2	4	266		
WHITES: Target population 70 plants/m²										
P85P156A1	(SL) PH	280	-2	90	69	1	3	281		
P87P093A1	(SL) PH	305	-1	87	79	2	4	311		
Conf 840	(SL) Conf	289	-1	79	76	2	4	314		
Conf 892	Conf	265	0	79	73	1	2	264		
Conf 899	Conf	215	+1	106	81	1	2	260		
Conf 880	(SL) Conf	266	+2	112	90	4	6	337		
Conf 885	(SL) Conf	255	+2	113	98	5	7	335		
P86P387A1	(SL) PH	260	+2	107	88	3	5	268		
Conf 887	(SL) Conf	254	+3	119	94	4	6	316		
Conf 882	Conf	224	+3	94	92	2	3	292		
PBINC 55-1	(SL) PBI	247	+3	122 ⁺	93	2	4	246		
Conf 897	Conf	245	+3	99	90	2	3	296		
Conf 894	Conf	234	+3	94	78	2	4	267		
Baroness	(SL) Sh	298	+4	108	104	2	4	306		
CA 1033	HAM	210	+6	71	86	2	3	192		

continued/....

TABLE 10 (continued) - COMBINING PEA VARIETY STUDIES. Summary of Agronomic Data - Screening Variety Trial, Thornhaugh - 1993
 Standard varieties underlined. Control varieties for yield; Solara, Orb and Baroness
 All varieties sown on 8th March. Results are means of two replicates

Variety	Source	Seed 1000 grain weight(g)	Maturity days (±)Solara	Yield % of Control @ 15% MC	Straw length (cm)	Standing ability 9=erect 1=lodged	Ease of harvest 9=easy 1=difficult	1000 grain weight (g)	Water uptake %	Stained peas %
MARROWFATS: Target population 65 plants/m²										
Conf 3	(SL) Conf	339	0	102	85	3	5	325	115	15
Conf 4	(SL) Conf	350	0	86	86	4	6	329	103	7
Conf 6	(SL) Conf	354	+1	99	94	3	5	321	106	4
Conf 5	(SL) Conf	349	+2	86	101	5	7	324	100	6
Conf 7	(SL) Conf	366	+3	98	124	4	6	340	100	3
XAF 09 CB	(SL) JS	296	+6	91	101	2	4	344	95	7
XAG 09 AE	(SL) JS	229	+6	108	101	3	5	265	99	6
Conf 8	(SL) Conf	373	+6	97	81	2	3	334	102	13
Conf 1	Conf	368	+7	73	86	2	3	339	122	7
Maro	GA	364	+7	96	82	2	3	360	100	5
Conf 2	Conf	401	+7	92	85	2	3	410	106	10

Mean yield of control varieties t/ha 4.84
 Significance @ P = 0.05 SD
 LSD @ P = 0.05 21.89
 CV % 11.10

KEY: Yield: + Significantly greater than control @ P = 0.05; - Significantly less than control @ P = 0.05
 (SL) = Semi-leafless
 Source of varieties see Appendix 1

GREEN BEANS

Summary of Variety Trial Results 1993

Main Trial varieties included a high yielding flat podded bean and three new very fine/extra fine beans. Varieties entered for Preliminary Trial this year were predominantly beans for cutting and in Screening Trial nine new very fine/extra fine beans were evaluated.

All seed was treated with an insecticidal/fungicidal seed treatment to control bean seed fly (*Delia platura*) and fungal "damping-off" disease.

The Screening Variety Trial was sown on 15th May, Preliminary Trial on 24th May and Main Trial on 1st June into fine seedbeds.

Weeds were controlled with trifluralin (Treflan) pre-sowing and incorporated, monolinuron (Arresin) pre-emergence and, for the Screening Trial bentazone (Basagran) post-emergence was also applied.

Although temperatures were higher than the long term average after sowing, the weather during most of June and July was cooler than average and bean growth was initially slow. Higher than average rainfall from the end of May and in June and July resulted in very vigorous leafy crops, and some varieties lodged.

Many varieties suffered from secondary flowering under these weather conditions. There was also a tendency for a first pod to become mature well in advance of the rest and thus maturity was uneven, particularly for some varieties.

There was wind scarring on pods of earlier harvested varieties and in the wet humid conditions *Botrytis* on pods was more prevalent than in recent years.

Harvesting for the trials began on 11th August, a fortnight later than in 1992 and finished on 27th August. The Main and Preliminary Trial are machine harvested and data for a percentage of "T" stalks in the sample are presented in Table ????. This factor is characteristic of variety, but in general levels were very high this year.

Main Trial green beans and some interesting new material from several seed companies, in total 36 varieties, were demonstrated at a site near Aylsham, Norfolk on 7th September.

Main Trial, Thornhaugh - Table 11

Milagrow (HS 537), Laguna (PV 496), Larissa and Narbonne are in their final year of evaluation.

Roma II, the standard flat podded bean has a lax plant habit and suffered from early lodging and *Botrytis*. Pods were pale and yields were much lower than in previous years.

Atlanta, a new flat bean was the highest yielding variety in trial. Pods are a darker colour than Roma II and longer. It is a very early maturing variety and it is essential for a flat podded bean to be harvested before seeds become prominent. There was a higher percentage of "T" stalks in the harvested sample than in the 1992 trial.

Lasso, the standard fine short podded bean for quick-freezing whole, gave very high yields for a bean of this type, out yielding Groffy this year. Pods grew larger under the wet conditions than in previous years and were paler. The frozen sample was less attractive than the very fine beans.

Three varieties were compared with Masai:-

Masai, the standard very fine/extra fine bean was harvested when most pods were 7 mm wide at quick-freezing stage and yielded well. Pods were very uniform, about 10 cm long, and straight. Pod colour was medium/dark. Plant habit and harvesting characteristics were very good. This variety performs consistently well in the UK in different weather conditions.

Larissa a very fine/extra fine bean, yielded very well. Pods are longer than Masai 11 - 12 cms, but were not quite as straight or uniform. Pod colour was medium/dark. Machine harvesting was good, and similar to Masai. Larissa matured later than Masai.

Safari a very fine/extra fine bean also yielded well. Pods are about 7 mm width and a little longer than Masai. Pods are also uniform in size, very straight and a medium/dark colour. It is late maturing. Plant habit is not as vigorous as Masai and some pods touched the soil but machine harvestability was good.

Arcadia a very fine/extra fine bean, longer and slightly wider podded than Masai. Pods were very straight and a very uneven size. The raw pods were rather pale but after processing the frozen sample was a medium/dark colour. Arcadia was the highest yielding variety in this group but harvesting characteristics were not as good.

Masai, Safari, Arcadia and Larissa all gave very attractive frozen samples.

Two varieties were compared with Nerina:-

Nerina, the standard intermediate length, fine (< 9 mm) podded variety yielded less than Groffy and suffered from uneven maturity. There was a high proportion of "T" stalks in the harvested produce.

Milagrow, had slimmer, straighter pods than Nerina and yields were similar. Pod colour was dark. Pod maturity was not uniform, and pod colour and width of the quick-frozen sample was very uneven. It had a tall, very leafy plant habit with pods at several levels on the plant. Harvesting characteristics were excellent.

Narbonne pod size was similar to Nerina, but beans were straighter and darker. Frozen produce was a darker green than Nerina. Plant habit and harvesting characteristics were much better.

The cut beans had a better appearance than the whole beans for these three varieties.

Three varieties were compared with Groffy:-

Groffy the intermediate podded standard for cutting and slicing yielded well. The pale, straight pods had very good machine harvestability.

Laguna (PV 496) gave significantly better yields than Groffy this year. Pods were a very uniform size - shorter and slimmer than Groffy. Pod colour was dark green and it gave an excellent sample of quick-frozen cut beans. Plant habit was good but there was a high percentage of "T" stalks in the harvested sample, similar to Nerina. Laguna is late maturing.

Highway (PV 532), yields were a little higher than Groffy but differences were not statistically significant. Pods were slightly longer, medium dark colour and not quite as wide or straight as Groffy. Pod size was not

uniform and maturity was uneven. Under the wet conditions plant habit was lax and the % of "T" stalks in the harvested sample was higher this year, similar to Nerina.

Optimus had long, very straight pods. Pod width was over 10 mm and very uneven. Raw pod colour was rather pale, but was darker than Groffy after processing. Yields were similar to Groffy. Plants lodged and there was a high percentage of "T" stalks in the sample.

Preliminary Trial, Thornhaugh - Table 12

Varieties entered for Preliminary Trial are on, or entered for, National List in an EEC member country.

Two varieties were compared with Lasso:-

Lasso the short podded standard for quick-freezing whole gave excellent yields, significantly higher than Groffy.

PV 563 gave high yields of fine (9 mm width), uniform, very straight pods, which were longer and wider than Lasso. Plant habit was good but the percentage of "T" stalks in the machine harvested sample was high.

Nun 9271 (Glory) yielded less than Lasso. Pods were longer, wider (9 mm) and not as straight as Lasso. Pod colour was dark. In this trial Nun 9271 was not late maturing. The beans seemed over mature, with large seeds when processed and were unsuitable for freezing whole.

Three new very fine/extra fine beans were compared with Masai:-

Masai the standard very fine bean, yielded significantly less than Groffy. Pods were straight, even in size and with good harvestability.

Nickel, harvested when most pods were 7 mm width yielded similarly to Masai. Pods were a little longer than Masai but could be processed whole, and were a dark colour. Machine harvestability was poor: several plants were uprooted and there was a high percentage of "T" stalks in the sample.

CO 8833 (Stripease), pods were not as fine or as straight as Masai. The processed sample was uneven colour and paler. Several pods touched the soil, but machine harvestability was excellent.

Primera, an early maturing variety, outyielded Masai. Pods were straight, dark and uniform with pod width about 7 mm. The quick-frozen samples of chopped and whole beans were most attractive. Plants were short and several pods touched the soil and harvesting characteristics were not as good as Masai. Pods were unsightly and unsuitable for processing when overmature.

The other varieties in trial were all most suitable for cutting and were very difficult to categorise. Although some of the finer beans were processed whole like Nerina by today's standards these were too large for an attractive product. Some of the wider podded "Groffy" types were also suitable for slicing.

Three new varieties were compared with Nerina, the fine podded intermediate length standard which was lower yielding than Groffy in this trial.

Nomad was late maturing. Pods width was less than Nerina and the beans were straighter but rather large seeded. Yields were similar to Nerina. There were a few flat podded beans in the sample. Raw pod colour was medium/dark but pods were paler after processing. Plant habit was very tall and vigorous and harvestability was good.

Nun 1097 was early maturing and gave the highest yield of beans in the trial at quick-freezing stage. The straight pods were shorter and wider than Nerina and their cross section was not very round. Pod colour was medium/dark and seeds were rather large. Several pods touched the soil, otherwise harvesting characteristics were good with few "T" stalks in the sample.

Magnum was a very late maturing variety. Yields were excellent and pods were uniform and finer than Nerina. Raw pod colour was darker than the processed sample. Although plant habit was very good with pods well spread at the top of the plant, there was a very high percentage of "T" stalks in the harvested produce.

Four varieties of intermediate (< 13 cm) length were compared with Groffy which yielded and harvested well.

Nun 0820 had shorter, slimmer pods than Groffy, but maturity was uneven. Plants were tall, but pods were low on the plant and some touched the soil. However percentage of "T" stalks was low. The sample of quick-frozen produce was a poor colour.

HS 607 gave similar yields to Groffy. Pods were straight and very similar to Groffy but a good medium/dark green. However large seeds developed quickly. Plants were tall but several pods trailed on the ground. There was a low percentage of "T" stalks in the sample.

HS 422 yielded significantly less than Groffy and pods were slimmer. Raw and quick-frozen pod colour were both dark. Seeds were large and development rapid. Although plant habit was excellent there was a higher percentage of "T" stalks in the sample than HS 607.

PVN 1.58-91 was also lower yielding than Groffy. Pods were shorter than Groffy, and medium colour, but cross section was not very round. The variety appears to be sensitive to monolinuron herbicide. Plants were short and there was a high percentage of "T" stalks on beans harvested at canning stage.

There were four long (> 13 cm) podded varieties:-

Scuba yielded similarly to Groffy. Pods were straight about 10 mm wide, less than Groffy and medium/dark colour. Plants were tall with large leaves and the percentage of "T" stalks was very high.

Nun 1314 yielded better than Groffy. Raw pod colour was medium/pale although the quick-frozen beans were darker. Seeds were large but did not become prominent. Pods were long, but slimmer than Nerina and more suitable for cutting than slicing. The cut sample was attractive. Harvesting characteristics were average.

HS 1489 was long podded and fine, about 8.5 mm, and suitable for cutting. Yields were significantly lower than Groffy. Pod colour was medium dark. The produce was very uneven in colour and size, and seeds were large and prominent. Plant were very leafy and with a lax habit, some of the pods trailed on the ground. There was secondary flowering and maturity was uneven.

WAV 9001 had very long pods which were straight. They were 10 mm wide and seeds were large. It outyielded Groffy. There was secondary flowering and maturity was uneven for a bean of this type. Plant habit was lax and harvesting characteristics very poor.

The most promising varieties in this trial included Magnum, PV 563 and Primera.

Screening Trial, Thornhaugh - Table 13

An even greater number of new lines were entered for Screening Trial this year. High rainfall after drilling, 33 mm on 26th May, affected emergence particularly from seed lots with low vigour and yield data is not presented for these varieties. Cool weather before harvest may also have resulted in uneven maturity.

Lasso the standard fine whole bean yielded very well.

Score also a fine whole bean, gave low yields. Pods were longer than Lasso and were rather curly and too pale.

Nine very fine/extra fine podded varieties all yielding significantly lower than Groffy (or Nerina) were compared with Masai:-

Masai the very fine/extra fine standard yielded well, but produce was less even in size and maturity than from other trials.

Xera gave the highest yields (as in the Preliminary Trial in 1992). It had very fine (8 mm), long pods, suitable for cutting. Pods were rather curly and touched the soil. Pod colour was medium/dark.

BL 4-90 an extra fine bean had slimmer pods than Masai. Pods were also longer and rather curly. The quick-frozen sample had dark green colour. Plant habit was very good.

MIV 102 an extra fine (6.5 mm), whole bean gave one of the best quick-frozen samples, which had medium dark green colour. Pods were not quite as straight as Masai, and a few touched the ground but plant habit was good. Yields were good considering the pod size.

CO 6745 (Romerai) was a very fine/extra fine bean, similar size to Masai. Pods were rather pale and not as straight as Masai. Plant habit was poor.

CO 6256 (Filease) was low yielding, although pods were wider than Masai and maturity was uneven.

CO 8816 (Osorno) had attractive, glossy, extra-fine, 13 cms long pods which may be suitable for fresh market. Maturity was uneven and the produce had uneven colour.

Pablo an early maturing variety had very fine (< 8 mm), straight pods of medium green colour. Pods were rather tangled on the plant. Yields were not as good as Masai.

Afrío a very fine/extra fine straight bean with dark colour gave a very attractive quick-frozen sample. Plant habit was not as good as Masai and most pods touched the soil.

RS 1243 had very fine pods, less than 8 mm, of medium dark colour and may be suitable for fresh market. In this test the frozen sample was poor. Plant habit was good with beans well spaced on the plant and held well off the ground.

Two varieties were compared with Nerina, which yielded well but maturity was very uneven.

Saranda matured early and yielded less than Nerina. Pod colour was not as dark and rather uneven.

Talion was very late maturing and yields were also lower than Nerina. Pods were rather curly and cross section was not very round. Several pods touched the soil. The cut processed sample looked attractive however.

Quick-frozen cut samples of Nerina, Saranda and Talion had a better appearance than those processed whole.

The following varieties were compared with Groffy the standard bean for cutting or slicing whole:-

Coupon was early maturing. Pods were similar size to Groffy, but were a better colour, medium/dark green. Maturity was uneven and seed development was rapid.

Matador had long pods, slimmer than Groffy and a dark green colour. the frozen sample was uniform and attractive. Plants were vigorous and large leaved. Yields were lower than Groffy.

Tenderlake yielded less than Groffy at freezing stage, similarly at canning stage. Trueblue was a similar type with slightly smaller beans. Both were long podded and beans were very fleshy with small seeds which were slow to develop, ideal for slicing (a Bush Blue Lake type). Plant habit was poor and several pods touched the soil.

Espada had long, dark coloured pods and the processed sample was good. Plants were tall and leafy but several pods touched the soil. This variety was late maturing. Yields were less than Groffy.

Cool, wet weather this season tested suitability of varieties for the UK climate. The most promising were MIV 102, Pablo, Matador, Xera and possibly RS 1243 which seemed to perform well at Aylsham.

TABLE 11 - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Main Variety Trial 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 1st June
 Results are means of three replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#Plant habit	No. pods touching soil	External colour raw	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				
											l=v.curved	5=round					
<u>Flat</u>																	
Atlanta	HS	2432	- 6	126 ⁺	111 ⁺	3	3	M	4.8	4.7	14.7	15.0	flat	flat	18.8	19.6	
<u>Roma II</u>	<u>BS</u>	<u>2188</u>	+ 2	<u>97</u>	<u>91</u>	2	2	<u>P</u>	<u>4.5</u>	<u>4.1</u>	<u>14.1</u>	<u>14.5</u>	<u>flat</u>	<u>flat</u>	<u>15.9</u>	<u>16.7</u>	
<u>Fine short</u>																	
<u>Lasso</u>	<u>PV</u>	<u>5882</u>	- 2	<u>110⁺</u>	<u>96</u>	4.5	4	<u>M/P</u>	<u>5.0</u>	<u>5.0</u>	<u>9.8</u>	<u>10.1</u>	<u>4.8</u>	<u>5.0</u>	<u>8.4</u>	<u>8.7</u>	
<u>Very fine/extra fine</u>																	
<u>Masai</u>	<u>BS</u>	<u>4913</u>	- 2	<u>83⁻</u>	<u>78⁻</u>	5	5	<u>M/D</u>	<u>5.0</u>	<u>5.0</u>	<u>10.1</u>	<u>10.1</u>	<u>3.9</u>	<u>4.0</u>	<u>7.0</u>	<u>7.2</u>	
Larissa	PV	4964	+ 3	90 ⁻	78 ⁻	5	4.5	M/D	4.5	4.5	11.5	11.9	3.8	3.9	7.1	7.4	
Safari	HS	6992	+ 4	81 ⁻	70 ⁻	4.5	4	M/D	5.0	5.0	10.8	11.0	4.0	4.0	7.0	7.3	
Arcadia	Ni/Zw	5891	- 3	96	88 ⁻	5	5	M/P	4.9	4.8	12.0	12.2	3.9	4.1	7.2	7.4	
<u>Intermediate whole/cut</u>																	
<u>Nerina</u>	<u>RS</u>	<u>5140</u>	0	<u>93</u>	<u>83⁻</u>	4	5	<u>M/D</u>	<u>4.6</u>	<u>4.5</u>	<u>12.6</u>	<u>12.8</u>	<u>4.0</u>	<u>4.0</u>	<u>8.7</u>	<u>9.0</u>	
Milagrow	HS	4358	+ 2	91 ⁻	83 ⁻	5	5	D	4.8	4.8	11.5	12.5	3.8	4.4	8.0	8.7	
Narbonne	RS	3975	+ 2	97	83 ⁻	5	5	D	4.8	4.8	12.4	13.1	3.8	4.3	8.8	9.0	
<u>Intermediate cut/slice</u>																	
<u>Groffy</u>	<u>Nun</u>	<u>3602</u>	0	<u>100</u>	<u>100</u>	5	5	<u>P</u>	<u>5.0</u>	<u>5.0</u>	<u>12.4</u>	<u>12.9</u>	<u>4.8</u>	<u>5.0</u>	<u>10.2</u>	<u>10.7</u>	
<u>Laguna</u>																	
(PV 496) Highway	PV	4492	+ 3	110 ⁺	99	5	5	D	5.0	4.9	12.0	12.3	4.6	5.0	8.8	9.6	
(PV 532) Highway	PV	3297	- 1	105	95	4	5	M/D	4.6	4.5	13.0	13.2	4.4	4.3	9.5	9.9	

Continued/.....

TABLE 11 (continued) - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Main Variety Trial 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 1st June
 Results are means of three replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#plant habit	No. pods touching soil	External colour	External Shape	Pod Characteristics		Pod width mm			
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy					Average length cm	Section				
Optimus	vW	3758	+ 1	102	+ 2	98	3	5	M/P	4.8	4.8	15.1	4.7	5.0	10.2	10.7
												SD			SD	SD
												0.40	0.22		0.22	0.30
												1.9	1.0		1.3	1.8

Long
 #plant habit 5 = vigorous/erect/good pod distribution; 1 = short/lax/pods tangled/above leaf canopy
 P = Pale; M = Medium; D = Dark. + Significantly greater than Groffy @ P = 0.05; - Significantly less than Groffy @ P = 0.05
 Flat pods freezing and canning stage; before seeds become prominent
 Fine short pods (10 cm length or less) suitable for freezing or canning whole; freezing stage SL (seed length) 80; canning SL 90
 Very fine/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; > 9.5 mm width) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110
 Long pods (> 13 cm length; < 9.5 mm width) suitable for cutting; freezing stage SL 90; canning SL 110
 Long pods (> 13 cm length; > 9.5 mm width) suitable for cutting or slicing; freezing stage SL 100; canning SL 120

TABLE 12 - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Preliminary Variety Trial - 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 24th May
 Results are means of two replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#Plant habit	No. pods touching soil 1=most 5=none	Pod Characteristics								
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy			External colour raw	Shape	Average length cm	Section	Pod width mm				
									l=v.curved 5=straight	F C F C	F C F C	F C F C					
<u>Fine short</u>																	
PV 563		7012	+ 1	99	0	92	5	4.8	M/D	5.0	5.0	10.2	11.0	4.9	5.0	9.0	9.1
<u>Lasso</u>		<u>5882</u>	- 2	<u>112</u> ⁺	- 3	<u>101</u>	4	4	<u>M/P</u>	<u>5.0</u>	<u>5.0</u>	<u>10.0</u>	<u>10.2</u>	<u>4.6</u>	<u>4.8</u>	<u>8.2</u>	<u>8.3</u>
Nun 9271 (Glory)	Nun	5312	+ 1	81	- 1	80	5	4.5	D	4.2	4.2	10.5	11.1	4.6	4.8	8.8	8.8
<u>Very fine/extra fine</u>																	
Nickel	Ni/Zw	5611	0	71	- 2	61	4	4.9	M	4.6	4.4	11.0	11.2	3.8	4.0	7.1	7.4
Masai	BS	<u>4913</u>	0	<u>68</u>	- 2	<u>72</u>	5	<u>4.9</u>	<u>M/D</u>	<u>4.9</u>	<u>5.0</u>	<u>10.6</u>	<u>10.5</u>	<u>3.9</u>	<u>4.0</u>	<u>7.1</u>	<u>7.3</u>
CO 8833 (Stripease)	JS	5118	- 2	57	- 4	51	4	3.5	<u>M/P</u>	4.2	4.6	11.0	11.5	3.6	3.9	7.6	7.8
Primera	PV	6510	- 3	87	- 4	77	4	3	D	4.8	4.7	10.8	11.1	4.0	4.0	7.0	7.2
<u>Intermediate (whole/cut)</u>																	
Nerina	RS	5140	0	86	0	88	4	4	<u>M/D</u>	4.3	4.1	12.2	12.8	4.0	4.4	8.8	9.3
Nomad	PV	4796	+ 3	82	+ 2	79	5	4.5	<u>M/D</u>	4.4	4.4	12.7	13.0	3.8	4.1	8.7	9.0
Nun 1097	Nun	6865	- 3	117	- 3	99	4	2.5	<u>M/D</u>	4.8	4.6	11.4	11.8	3.4	3.6	9.0	9.4
Magnum	PV	5277	+ 5	121	+ 5	108	5	5	M	4.9	5.0	11.8	12.0	4.4	4.6	8.8	9.0
<u>Intermediate (cut/slice)</u>																	
<u>Groffy</u>	<u>Nun</u>	<u>3602</u>	0	100	0	100	4.5	4	<u>P</u>	5.0	5.0	12.7	12.9	4.8	5.0	10.4	10.6
Nun 0820	Nun	4468	+ 1	93	0	86	4	3	M	4.8	4.6	12.2	12.4	4.0	4.8	9.3	10.1
HS 607 (Newton)	HS	3518	- 2	98	- 3	90	4.5	3	<u>M/D</u>	4.8	4.9	12.6	12.9	4.8	4.9	10.2	10.3
HS 422	HS	4087	- 1	81	- 2	84	5	5	D	4.8	4.4	12.6	13.2	3.7	3.8	9.7	10.0
PVN 1.58-91	PV	7184	+ 2	91	0	80	4.8	4	M	4.8	4.8	11.2	11.4	3.6	3.8	9.2	9.8

continued/.....

TABLE 12 (continued) - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Preliminary Variety Trial - 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 24th May
 Results are means of two replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#Plant habit	No. pods touching soil 1=most 5=none	External Shape		Average length		Section		Pod width mm	
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy			1=v.curved	5=round	cm	cm	1=flat	5=round		
			to Groffy	to Groffy	F	C			F	C	F	C	F	C		
Scuba	PV	4002	0	104	0	101	4	4	M/D	4.8	13.2	13.4	4.8	5.0	9.7	10.2
Nun 1314	Nun	4791	+ 1	107 ⁺	+ 1	101	5	5	M/P	3.7	13.0	13.2	3.9	4.0	8.8	8.9
HS 8149	HS	4087	- 1	71 ⁻	- 2	76 ⁻	4	3	M/D	4.7	13.6	13.8	4.0	4.5	8.4	8.6
WAV 9001	vW	4258	+ 1	110 ⁺	- 1	102	4	4.5	M	4.0	14.3	14.8	5.0	5.0	10.0	10.4
Significance @ P = 0.05				SD		SD					SD	SD			SD	SD
LSD @ P = 0.05				6.7		5.8					0.37	0.36			0.22	0.29
CV %				3.5		3.2					1.5	1.4			1.2	1.5

Plant habit 5 = vigorous/erect/good pod distribution; 1 = short/lax/pods tangled/above leaf canopy
 P = Pale; M = Medium; D = Dark. + Significantly greater than Groffy @ P = 0.05; - Significantly less than Groffy @ P = 0.05
 Fine short pods (10 cm length or less) suitable for freezing or canning whole; freezing stage SL (seed length) 80; canning SL 90
 Very fine/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; > 9.5 mm width) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110
 Long pods (> 13 cm length; < 9.5 mm width) suitable for cutting; freezing stage SL 90; canning SL 110
 Long pods (> 13 cm length; > 9.5 mm width) suitable for cutting or slicing; freezing stage SL 100; canning SL 120

TABLE 13 - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Screening Variety Trial - 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 15th May
 Results are means of two replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#Plant habit	No. pods touching soil 1=most 5=none	Pod Characteristics													
			Maturity (± days) relative to Groffy	Yield % of Groffy	Maturity (± days) relative to Groffy	Yield % of Groffy			External colour raw	External Shape	Average length cm	Section	Pod width mm									
									1=v.curved 5=straight	F C	F C	F C	F C									
<u>Fine short</u>																						
<u>Lasso</u>	PV	5882	- 2	96	- 4	92	5	4	4.9	4.9	9.7	9.9	4.4	5.0	8.4	8.4						
Score	Sh	4652	+ 1	60	- 1	59	4	4.5	4.0	4.0	9.9	10.6	4.8	4.9	8.2	8.4						
<u>Very fine/extra fine</u>																						
<u>Masai</u>	BS	4913	- 1	85	- 3	87	5	5	4.9	4.9	10.2	10.2	4.0	4.1	6.8	6.9						
Xera	RS	5490	0	86	- 2	89	5	3.5	3.8	3.7	13.0	13.1	3.9	3.9	7.9	7.9						
BL 4-90	Sh	7443	+ 1	-	- 1	-	5	5	3.6	3.7	11.8	11.7	3.6	3.8	6.7	7.0						
MIV 102	CI	9688	0	68	- 2	63	5	4	3.9	3.7	11.6	11.6	3.4	3.6	6.4	6.4						
CO 6745	JS	9004	0	67	- 3	79	4.5	3	4.0	3.8	10.9	10.9	3.8	4.0	7.0	7.0						
(Romerol)	JS	7919	- 1	40	- 3	41	4.5	4	3.6	3.8	12.1	12.2	3.8	3.7	7.4	7.4						
CO 6256	JS	7919	- 1	40	- 3	41	4.5	4	3.6	3.8	12.1	12.2	3.8	3.7	7.4	7.4						
(Filease)	JS	5439	0	-	- 2	-	4.5	3.5	4.1	3.9	13.2	13.3	3.6	4.0	7.0	7.1						
CO 8816	JS	8820	- 4	68	- 6	78	5	4	4.6	4.6	11.5	11.5	3.6	3.7	7.7	7.8						
(Osorno)	As	8382	- 1	48	- 3	48	4	2	4.0	4.0	12.1	12.4	4.0	4.0	6.9	7.0						
Pablo	JS	5675	- 2	67	- 4	75	5	4.5	4.1	4.3	11.8	11.9	3.9	3.9	7.5	7.6						
Afrío	RS	5140	- 1	100	- 1	97	4	3	3.9	3.8	12.2	12.4	4.3	4.5	8.8	8.9						
RS 1243	RS	3818	- 3	83	- 5	92	5	4.5	3.9	4.0	12.1	12.3	3.9	4.6	8.8	8.9						
Intermediate (whole/cut)	JS	5220	+ 7	71	+ 7	85	3	3	3.7	3.6	12.1	12.3	3.7	3.8	8.6	9.0						
Nerina	RS	3602	0	100	0	100	5	4	5.0	5.0	12.8	12.8	4.8	4.9	10.6	11.0						
Saranda	RS	3602	- 3	83	- 5	92	5	4.5	3.9	4.0	12.1	12.3	3.9	4.6	8.8	8.9						
Talion	JS	5220	+ 7	71	+ 7	85	3	3	3.7	3.6	12.1	12.3	3.7	3.8	8.6	9.0						
Intermediate (cut/slice)	JS	3805	- 3	-	- 4	-	4	3	4.4	4.2	12.2	12.3	4.6	4.8	10.6	10.8						
Groffy	Nun	3602	0	100	0	100	5	4	5.0	5.0	12.8	12.8	4.8	4.9	10.6	11.0						
Coupon	JS	3805	- 3	(13/8)	(14.6t/ha)	(17/8)	(15.8t/ha)	4	M/D	4.4	4.2	12.2	12.3	4.6	4.8	10.6	10.8					

Continued/....

TABLE 13 (continued) - GREEN BEAN VARIETY STUDIES. Summary of agronomic data - Screening Variety Trial - 1993
 Varieties placed in order of maturity within each group. Standard varieties underlined. All varieties sown on 15th May
 Results are means of two replicates. Target population 45 plants per m². Row width 25 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage		At Practical Canning Stage		#Plant habit	No. pods touching soil 1=most 5=none	External colour raw	Shape 1=v.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					
			to Groffy	to Groffy	F	C					F	C					
Long																	
Matador	As	4629	+ 3	75 ⁻	+ 2	75 ⁻	4	3	D	4.1	3.8	14.1	13.9	4.8	5.0	10.0	10.1
Tenderlake	Ni/Zw	2527	+ 2	90 ⁻	+ 2	97	3	2	M/D	3.8	3.7	14.9	15.0	5.0	5.0	11.6	12.2
Trueblue	Ni/Zw	3206	+ 3	-	+ 3	-	3	2	M/D	3.6	3.8	14.3	14.6	5.0	5.0	11.2	11.6
Espada	Cl	4596	+ 5	72 ⁻	+ 5	79 ⁻	3	2	D	3.8	3.6	14.1	14.2	4.8	5.0	10.1	10.6
Significance @ P = 0.05				SD		SD						SD	SD			SD	SD
LSD @ P = 0.05				9.1		7.8						0.48	0.51			0.20	0.25
CV %				5.7		4.6						1.9	2.0			1.2	3.1

#Plant habit 5 = vigorous/erect/good pod distribution; 1 = short/lax/pods tangled/above leaf canopy

P = Pale; M = Medium; D = Dark. - Significantly less than Groffy @ P = 0.05

Fine short pods (10 cm length or less) suitable for freezing or canning whole; freezing stage SL (seed length) 80; canning SL 90
 Very fine/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; > 9.5 mm width) suitable for cutting (or slicing); freezing stage SL 90; canning SL 110

Long pods (> 13 cm length; < 9.5 mm width) suitable for cutting; freezing stage SL 90; canning SL 120

Long pods (> 13 cm length; > 9.5 mm width) suitable for cutting or slicing; freezing stage SL 100; canning SL 120

TABLE 14 - GREEN BEAN VARIETY STUDIES. Summary of machine harvesting data - Main and Preliminary Trials 1993
 Percentage by weight of "T" stalks

Main Trial Variety	F	% T Stalks	C	Preliminary Trial Variety	F	% T Stalks	C
Atlanta	36 [†]		43 [†]	PV 563	33 [†]		38 [†]
Roma II	26 [†]		34 [†]	Lasso	28 [†]		24
Lasso	30 [†]		39 [†]	Nun 9271 (Glory)	13		13 ⁻
Masai	22		25	Nickel	25 [†]		40 [†]
Larissa	15		19	Masai	13		17
Safari	18		21	CO 8833 (Stripease)	15		18
Arcadia	27 [†]		31 [†]	Primera	20		24
Nerina	32 [†]		42 [†]	Nerina	26 [†]		27 [†]
Milagrow	14		17	Nomad	18		22
Narbonne	14		22	Nun 1097	12		16
Groffy	17		19	Magnum	38 [†]		40 [†]
Laguna (PV 496)	37 [†]		38 [†]	Groffy	12		19
Highway (PV 532)	28 [†]		32 [†]	Nun 0820	18		21
Optimus	30 [†]		36 [†]	HS 607	14		19
				HS 422	20		28 [†]
				PV N1.58-91	20		30 [†]
				Nun 1314	20 [†]		22
				Scuba	30 [†]		38 [†]
				HS 8149	24 [†]		25 [†]
				Wav 9001	34 [†]		38 [†]
Significance @ P = 0.05	SD		SD	Significance @ P = 0.05	SD		SD
LSD @ P = 0.05	5.6		7.0	LSD @ P = 0.05	7.4		6.1
CV %	13.5		13.9	CV %	16.7		11.4

[†] Significantly (@ P = 0.05) higher than Groffy
 - Significantly (@ P = 0.05) lower than Groffy

BROAD BEANS

Eight broad bean varieties with a range of seed sizes were evaluated in this trial. Yields were compared with Medes (standard seed size) and Talia was included for comparison with small seeded varieties.

Broad Bean Trial, Thornhaugh - Table 15

Seed of all varieties was treated with fungicide to control "damping off" diseases. The trial was sown on 30th March into an ideal seedbed. A pre-emergence herbicide Opogard SC (terbutryn/terbuthylazine) controlled most broad-leaved weeds except cleavers which were controlled with Basagran (bentazone). Talia is sensitive to Basagran and suffered slight damage. Grass weeds (couch) were controlled by Laser (cycloxdim) post-emergence.

Frequent and higher than average rainfall throughout the season resulted in vigorous growth and high yields. There was a severe, early infection with downy mildew (*Peronospora viciae*) and the most susceptible varieties were Medes and Nun 1038. Fungicide Folio (metalaxyl/chlorothalonil) was applied on 25th May which gave good control although a further outbreak occurred later, but after flowering. Some chocolate spot (*Botrytis fabae*) occurred on most varieties, and bean rust (*Uromyces fabae*) infections were too late to damage yield. HS 108 was the most severely infected with both diseases. There were no black bean aphid infestations.

Harvesting began on 20th July and finished on 2nd August. Yields were better than in the preceding drier years and bean size of the standards was also larger than in 1992.

HS 108 gave high yields at freezing stage. Beans were a little smaller than Medes and an even size. The variety had fine foliage and was late maturing.

1311 outyielded Medes, differences were statistically significant at canning stage. Bean size was large, much larger than Medes. Plants were also tall and very vigorous with large pods.

Nun 2511 gave very good yields for a small seeded variety. Beans were smaller than Talia.

Nun 1038 yielded similarly to Medes at quick-freezing stage. Beans were slightly smaller than Medes and a bright lime green colour. It is an early maturing variety (tested as Conf 6 in 1992).

Talia performed very well giving similar yields to Medes of small beans with uniform size. It is a short strawed variety.

Diamant another small sized bean, also yielded well, and better than in 1992 where it seemed to suffer from drought stress more than some varieties. It is an early maturing variety. Produce was an even size and good flavour.

Bailey (Sel 5) gave slightly lower yields than Medes (significantly lower at canning stage), and performed better in 1992. Beans are smaller than Medes and very uniform.

Nun 2514 yielded similarly to other small seeded varieties at quick-freezing stage. Beans were similar size to Diamant. This variety gave a most attractive quick-frozen sample of bright lime green beans and could be a novel product.

TABLE 15 - BROAD BEAN VARIETY STUDIES. Summary of agronomic data - Variety Trial, Thornhaugh - 1993
 Varieties placed in order of maturity. Standard variety underlined. All varieties sown on 30th March
 Results are means of three replicates. Target population 18 plants/m². Row width 30 cm

Variety	Source	Seeds /kg	At Practical Freezing Stage			At Practical Canning Stage			Plant height cm
			Maturity (\pm days) relative # to Medes #	Yield as % of Medes	Mean length 10 beans mm	Maturity (\pm days) relative # to Medes #	Yield as % of Medes	Mean length 10 beans mm	
<u>Medes</u>	<u>Ni/Zw</u>		<u>0</u>	<u>100</u>	<u>237</u>	<u>0</u>	<u>100</u>	<u>254</u>	<u>107</u>
			(22/77)	(8.7t/ha)		(28/77)	(10.9t/ha)		
HS 108	HS	1465	+ 7	110	217	+ 6	96	220	102
1311	PBI	755	+ 5	108	268	+ 4	109 ⁺	285	122
Nun 2511	Nun	1682	0	100	166	- 1	91 ⁻	171	105
Nun 1038	Nun	1203	- 2	99	215	- 3	87 ⁻	224	97
Talia	Nun	1687	+ 2	97	174	0	97	181	92
Diamant	Ni/Zw	1562	- 2	93	178	- 3	93	191	96
Bailey	BS	1378	0	91	187	- 1	80 ⁻	194	97
Nun 2514	Nun	1293	+ 5	90	179	+ 4	79 ⁻	214	106
				SD	SD		SD	SD	SD
				11.9	7.9		9.0	7.8	6.0
				6.9	2.3		5.8	2.1	3.4

g = bright lime green

Maturity of Medes is normally 1 day earlier than Threefold White
 + Significantly greater than Medes @ P = 0.05; - Significantly less than Medes @ P = 0.05
 Practical Freezing Stage - TR 110 - 140 for a 140 g sample
 Practical Canning Stage - TR 115 - 140 for a 56 g sample

PROCESSING DETAILS FOR CANNED SAMPLES

All samples were sorted to remove damaged or diseased produce and extraneous matter, washed and then blanched in water of 6° hardness. After cooling and further sorting the cans were filled, the brine added and then the cans were seamed and processed. After processing the cans were cooled in chlorinated water and air dried ready for storage.

The processing details for each group are given below:-

1. Vining Peas

Blanch:	1.5 min. @ 93°C
Wt/280 g can	194.5 g
*Brine: Sugar	15 g/l of water @ 93°C
*Salt	13 g/l of water @ 93°C
*Mint	0.11 ml/l of water @ 93°C
Process:	15 min. @ 121°C, 1.05 kg/m ² pressure

* Some samples were processed without salt and sugar and some were processed with mint flavouring.

2. Green Beans

Blanch:	6 min. @ 74°C
Wt/280 g can	142 g
Brine: Salt	15.6 g/l of water @ 93°C
Process:	15 min. @ 121°C, 1.05 kg/cm ² pressure

3. Combining Peas

Soak:	18-24 hours in water of 6°C hardness
Blanch:	2 min. @ 84°C
Wt/280 g can	125 g
Brine: Sugar	15 g/l of water @ 82.5°C
Salt	14.5 g/l of water @ 82.5°C
*Colour	0.18 g of U.R. 213/l of water @ 82.5°C
*Mint	0.11 ml/l of water @ 85.8°C
Process:	20 min. @ 121°C, 1.05 kg/cm ² pressure

* Some samples were processed without colour and some were processed with mint flavouring.

4. Broad Beans

Blanch:	4 min. @ 85°C
Wt/280 g can	194.5 g
Brine: Salt	18.83 g/l of water @ 93°C
Process:	14 min. @ 121°C, 1.05 kg/cm ² pressure

PROCESSING DETAILS FOR FROZEN SAMPLES

All samples were sorted to remove damaged or diseased produce and extraneous matter, washed and then blanched in water of 6° hardness. After cooling in tap water and further sorting the samples were packed for freezing.

The processing details for each crop are given below:-

1. Vining Peas

- | | |
|--------------|-----------------|
| 1. Blanch: | 1.5 min. @ 93°C |
| Blast frozen | @ -30°C |
| Stored | @ -18°C |

2. Green Beans

- | | |
|--|---------------------|
| Blanch: | 4 min. @ 85°C whole |
| Cut or packed whole according to process requirement | |
| Blast frozen | @ -30°C |
| Stored | @ -18°C |

3. Broad Beans

- | | |
|--------------|---------------|
| Blanch: | 4 min. @ 82°C |
| Blast frozen | @ -30°C |
| Stored | @ -18°C |

APPENDIX 1

KEY TO SOURCE OF VARIETIES

AGIS	AGIS, Germany
As	Asgrow Seed Company, USA
Bat	Brooke Bond Foods Limited, UK
B1	Maison André Blondeau, France
Bro	W. Brotherton Seed Company Inc., USA
BS	Breeders Seeds Limited, UK
Cl	Clause S.A., France
CM	Crites-Moscow Growers Inc., USA
Conf	Confidential
CPB	Cambridge Plant Breeders, UK
D	Dalgety Agriculture Limited, UK
E1	Elsoms Seeds Limited, UK
CA	General Availability
HAM	Harlow Agricultural Merchants Limited, UK
HS	Holland Select BV., Holland
JS	Johnsons Seeds Limited, UK
Mar	Maribo UK Limited, UK
Ni	Nickerson Seeds Limited, UK
Ni/Zw	Nickerson/Zwaan, UK
Nun	Nunhems Zaden BV., Holland
PH	Pioneer Hi-Bred (UK) Limited, UK
PBI	Plant Breeding International Cambridge, UK
PV	Pop Vriend BV., Holland
Prog	Progreta Limited, UK
PLS	Pure Line Seeds Inc., USA
RS	Royal Sluis Limited, UK
Sem	Semundo Limited, UK
Sh	Sharpes International Seeds Limited, UK
SIL	Seed Innovations Limited, UK
SM	Samen Mauser, Switzerland
Sp	Karl Sperling & Co. Limited, Germany
Twy	Twyfords Seeds Limited, UK
vW	van Waveren, Germany