Project title:	Vining Peas: Extension of variety evaluation trials
Project number:	FV 340
Project leader:	Mr. S.J. Belcher, PGRO
Report:	Final report, February 2011
Previous report:	Annual report, February 2010 Annual report, February 2009
Key staff:	Mr. S.J. Belcher Dr. A.J. Biddle (pathology) Ms. S. Johnson
Location of project:	Commercial crops of vIning peas near Holbeach, S. Lincs PGRO, Great North Road, Thornhaugh, Peterborough
Industry representative:	Mr. T. Mudge PVGA, 133 Eastgate, Louth, LN11 9QG
Date project commenced:	March 2008
Date project completed (or expected completion date):	February 2011

The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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Grower summary

Headline

This project will provide vining pea growers with independent, relevant and accurate trials evaluations on vining pea varieties, so that a considered and informed variety choice can be made.

Background

Currently vining varieties are evaluated at just one site at PGRO, Thornhaugh with 'petits pois' varieties being evaluated on a silt soil type in South Lincolnshire (trials funded by seedsmen). The soil type at Thornhaugh is representative of only a proportion of the national pea growing production area and varieties can often perform differently in other soil types and areas. These trials on a fertile silt soil type in S. Lincolnshire will give additional data to enable growers to make an appropriate variety choice.

Results

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

Table of varieties, leaf type, source and approximate maturity - 2010

Variety Name	Leaf Type	Source	Maturity
Span	Conventional	Crites Seeds, USA	0
Avola	Conventional	Seminis Vegetable Seeds, France	0
DS 89289	Conventional	Maribo Seeds, Denmark	+ 1
DS 89326	Conventional	Maribo Seeds, Denmark	+ 1
DS 89324	Conventional	Maribo Seeds, Denmark	+ 2
CS 421 AF	Semi-leafless	Crites Seeds, USA	+ 2
Rumble (D85051)	Conventional	Syngeta Seeds, France	+ 3
Jaguar	Conventional	Limgagrain, UK	+ 4
Reliance (08240793)	Semi-leafless	Seminis Vegetable Seeds, France	+ 4
Savannah(CMG407AF)	Semi-leafless	Crites Seeds, USA	+ 4
Bikini	Semi-leaflesss/ semi-fasciated	Syngeta Seeds, France	+ 5
Amalfi (DS89264)	Conventional	Maribo Seeds, Denmark	+ 5
08240773	Semi-leafless	Seminis Vegetable Seeds, France	+ 5
Ruler (D 165182)	Semi-leafless	Syngeta Seeds, France	+ 6
Goutana (Nun 5218)	Semi-leafless	Nunhems Seeds, Netherlands	+ 6
Vixen (00S64813)	Semi-leafless	Limgagrain UK	+ 6
Samish	Conventional	Crites Seeds, USA	+ 6
Charlie (98S76314)	Semi-leafless	Limgagrain UK	+ 7
Ruthless (D 165188)	Semi-leafless	Syngeta Seeds, France	+ 7
CS 420 AF	Semi-leafless	Crites Seeds, USA	+ 8
Geneva	Conventional	Nunhems Seeds, Netherlands	+ 8
Oasis	Conventional	Limgagrain UK	+10
Snake	Semi-leafless	Crites Seeds, USA	+11
Ambassador	Conventional	Van Waveren, Germany	+11

Trial site details

Variety Trial Site: Fertile light silt soil in a commercial crop of Vining Peas, near Holbeach Hurn, South Lincolnshire. OS Ref: TF407280. Holbeach Marsh Co-op, Manor Farm, Holbeach Hurn, Spalding, PE12 8LR. Sown in commercial crop of vining peas and grown according best local and commercial practice.

Powdery Mildew Trial: Sandy Loam Soil. OS Ref: TF069019. PGRO, Thornhuagh, Peterborough, PE8 6HJ.

Downy Mildew Trials: 2008 and 2009 Silt soil. OS Ref TF461524. White House Farm, Friskney, Lincs
2010: Silt loam soil. OS Ref TF269482 Manor Farm, Langrick, Lincs

Table of % yield, % size grade, haul length and standing ability - 2010

Variety	@TR100					@TR120		
	Yield % of Bikini	% in size grades L	M	S	VS	Yield % of Bikini	Haulm length cm	Standing Ability 9=erect 1=lodged
Span	75-	38	44	16	2	86	52	4
Avola	58-	66	27	6	1	79-	72	4
DS 89289	65-	23	42	27	8	78-	58	5
DS 89326	75-	49	42	8	1	78-	73	3
DS 89324	64-	23	48	24	5	81	64	5
CS 421 AF	64-	41	38	15	6	79-	64	6
Rumble (D85051)	75-	19	45	30	6	102	68	4
Jaguar	69-	36	40	19	5	101	59	3
Reliance (08240793)	85	29	54	14	3	104	70	6
Savannah(CMG407AF)	83	50	33	15	2	90	63	5
Bikini	100 (12.8t/ha)	32	41	18	9	100 (12.8t/ha)	58	5
Amalfi (DS89264)	104	12	35	37	16	104	62	3
08240773	79-	25	47	23	5	94	65	6
Ruler (D 165182)	81	34	41	18	7	90	70	4
Goutana (Nun 5218)	103	19	44	28	9	106	79	4
Vixen (00S64813)	90	38	39	17	6	90	72	5
Samish	80-	40	43	14	3	84	64	3
Charlie (98S76314)	88	40	49	10	1	94	72	5
Ruthless (D 165188)	90	37	44	15	4	97	74	3
CS 420 AF	85	40	44	13	3	93	59	7
Geneva	86	24	50	20	6	90	58	3
Oasis	93	33	46	17	4	93	62	3
Snake	90	34	48	15	3	100	72	5
Ambassador	82	36	46	15	3	82	75	3

Full information on all varieties can be found in the Full Trial Report.

None of the varieties were found to be unsuitable for UK production

Span matured at the same time as Avola.

Span had shorter haulm than Avola, and lodged similarly. Yields were a little lower than Bikini, significantly so at TR120. Produce was smaller than Avola, medium-large size grade.

Avola gave significantly lower yields than Bikini. Produce was very large size grade. Haulm was long and the variety was lodged at harvest.

DS 89289 and DS 89326 matured one day later than Avola.

DS 89289 had medium length haulm and was semi-erect at harvest. Yields were significantly lower than Bikini. Produce was medium size grade at TR100.

DS 89326 had long haulm and was lodged at harvest. Yields of large-medium size grade peas were significantly lower than Bikini.

DS 894324 and CS 421 AF matured 2 days later than Avola.

DS 894324 had medium length haulm and was semi-erect at harvest. Yields were significantly lower than Bikini. Produce was medium size grade.

CS 421 AF was semi-leafless, had medium length haulm and stood reasonably well. Yields of large-medium size grade peas were significantly lower than Bikini.

Rumble was semi-leafless and matured 3 days later than Avola. Yields were significantly lower than Bikini at TR100, but similar at TR120. Haulm was similar in length to Avola and the variety lodged similar to Avola. Produce was medium-small size grade

Jaguar, Reliance and CMG 407 AF matured 4 days later than Avola

Jaguar had medium length haulm and was lodged at harvest. Yields were significantly lower than Bikini at TR100, but similar at TR120. Produce was medium-large size grade.

Reliance was semi-leafless, had long haulm and stood reasonably well at harvest. Yields were lower than Bikini at TR100, but similar at TR120. Produce was medium-large size grade.

CMG 407 AF was semi-leafless had similar medium-long haulm and was semi-erect at harvest. Yields of large-medium size grade peas were lower than Bikini.

Maturing 5 days later than Avola, **Bikini** was semi-leafless and semi-fasciated and was semi-erect at harvest. Yields were good, but there was little increase from TR100 to TR120. Produce was medium-large size grade.

Amalfi and 08240773 matured at the same time as Bikini.

Amalfi (DS 89264) had medium length haulm and was lodged at harvest. Yields were good, a little higher than Bikini. Produce was much smaller than Bikini, small-medium size grade.

08240773 was semi-leafless, had medium length haulm and stood reasonably well at harvest. Yields of medium size grade peas were lower than Bikini, significantly so at TR100.

Ruler, Goutana, Vixen and Samish matured one day later than Bikini.

Ruler was semi-leafless, had long haulm and did not stand quite as well as Bikini. Yields of medium-large size grade peas were lower than Bikini.

Goutana was semi-leafless, had long haulm and did not stand quite as well as Bikini. Yields of medium-small size grade peas were a little higher than Bikini.

Vixen was semi-leafless, had long haulm and stood as well as Bikini. Yields of medium-large size grade peas were lower, but not significantly lower than Bikini.

Samish had medium length haulm and was lodged at harvest. Yields were lower than Bikini, significantly so at TR100.

Charlie and Ruthless matured 2 days later than Bikini.

Charlie was semi-leafless, had long haulm and stood similar to Bikini. Yields were lower than Bikini, but not significantly lower. Produce was medium-large size grade.

Ruthless was semi-leafless, had long haulm and was lodged at harvest. Yields of medium-large size grade peas were a little lower than Bikini at TR120.

CS 420 AF and Geneva matured 3 days later than Bikini.

CS 420 AF was semi-leafless, had medium length haulm and as at the Thornhaugh site stood well at harvest. Yields were lower than Bikini, but not significantly lower. Produce was medium-large size grade.

Geneva had medium length haulm and was lodged at harvest. Yields were lower than Bikini, but not significantly lower. Produce was medium size grade.

Maturing 5 days later than Bikini, **Oasis** had medium length haulm and was lodged at harvest. Yields were lower, but not significantly lower than Bikini. Produce was medium-large size grade.

Snake and Ambassador were the latest varieties to mature, 6 days later than Bikini.

Snake was semi-leafless, had long haulm and stood similar to Bikini. Yields were similar to Bikini at TR120. Produce was medium-large size grade.

Ambassador had long haulm and was lodged at harvest. Yields were lower than Bikini. Produce was medium-large size grade.

Main conclusions

Variety trials continue to be valued by pea groups. The managers, and fieldsmen, of the groups find the information produced through this work extremely valuable for their varietal selection. This report adds to their knowledge base and helps them with their planning for the season.

Conclusions are drawn from a 2 year summary of varieties evaluated in either 2008/9 or 2009/2010.

Early variety Salinero yielded better than the early standard Avola. Second Early Savannah yielded as well as Bikini, but produce was very large size grade.

In the mid-season group, varieties Amalfi, Vixen Charlie, Biktop and Boogie gave higher yields than Bikini, but differences were not statistically significant. Biktop, a semi-leafless and semi-fasciated type like Bikini gave the highest yields in this trial series and was closely followed by Boogie and Charlie (both semi-leafless).

Yoda gave statistically significantly lower yields than Bikini.

Several mid to late season varieties, Charlie, Boogie, Yoda and standard Ambassador showed resistance to powdery mildew, a trait that can be beneficial for late sown crops.

Rumble showed good tolerance to downy mildew, while Charlie, Yoda and standard Oasis were slightly susceptible.

Full trial report

Introduction

Vining peas are a major vegetable crop grown for processing and for the fresh market and peas for freezing and canning occupy 29-36,000 ha per annum, with a value of £ 50M.

The PGRO Processed Legume Panel have identified Varietal selection is an important and key element of crop production to ensure a programmed harvest period and to maintain high quality produce and require as accurate a guide to the performance of varieties in areas typical of pea production areas as possible

Varietal selection is an important and key element of vining pea crop production to ensure a programmed harvest period and to maintain high quality produce. To this end PGRO evaluates around 15 varieties annually at National List stage funded by Seedsmen and PGRO Levy and the most promising are evaluated in trials for a further two years in the Main Trial. There are no other independent facilities for vining pea evaluation in the UK.

Currently varieties are evaluated at just one site at Thornhaugh with 'petits pois' varieties being evaluated on a silt soil type in South Lincolnshire. The soil type at Thornhaugh is representative of only a proportion of the national pea growing production area and varieties can often perform differently in other soil types and areas. An extension of the PGRO trials system to include an evaluation of the candidate commercial varieties at both Thornhaugh and in South Lincolnshire sites will add to refine the evaluation process, with additional information to supplement data from established trials. The variety treatment is replicated three times and each plot has to be harvested at different stages of maturity to enable yield and size grade data to be presented for the freezing stage Tenderometer Reading (TR) 100 and TR 120.

Several promising new vining pea varieties with improved yield and with more uniform size-grade and colour have been evaluated in PGRO Main and Preliminary Trials. A further factor of vining pea variety evaluation is the use of specialised equipment needed during harvesting and processing. The independent systematic evaluation of varieties is restricted to the PGRO, Thornhaugh site and one site for 'petits pois' varieties in a commercial crop. This forms the basis for the selection and development of varieties for the 36,000 ha of commercial crops. In practice, commercial programmes are based on the use of a minimum of 4 varieties and it is more likely that 6 or 7 will be used to give a spread of maturity and to allow production for special markets. On the latter point, these can either be premium 'petits pois' or '150 minute' peas or, so called, economy/value packs.

Varietal characteristics affect:

- yield
- quality (colour, flavour, size and texture)
- ease of harvesting
- disease susceptibility
- timeliness
- ease of integration in the harvest programme

New ones are being actively sought by growers so that they can meet processors specifications for quality with the most productive, reliable and cost effective varieties.

Several promising varieties have been tested in recent years and more information on their performance and relative maturity of varieties on a different soil type is needed. Work is

needed over at least three years to gain experience in contrasting seasonal weather conditions

Varieties and numbered selections included

Variety Name	Leaf Type	Source	Maturity
Span	Conventional	Crites Seeds, USA	0
Avola	Conventional	Seminis Vegetable Seeds, France	0
DS 89289	Conventional	Maribo Seeds, Denmark	+ 1
DS 89326	Conventional	Maribo Seeds, Denmark	+ 1
DS 89324	Conventional	Maribo Seeds, Denmark	+ 2
CS 421 AF	Semi-leafless	Crites Seeds, USA	+ 2
Rumble (D85051)	Conventional	Syngeta Seeds, France	+ 3
Jaguar	Conventional	Limgagrain, UK	+ 4
Reliance (08240793)	Semi-leafless	Seminis Vegetable Seeds, France	+ 4
Savannah(CMG407AF)	Semi-leafless	Crites Seeds, USA	+ 4
Bikini	Semi-leaflesss/ semi-fasciated	Syngeta Seeds, France	+ 5
Amalfi (DS89264)	Conventional	Maribo Seeds, Denmark	+ 5
08240773	Semi-leafless	Seminis Vegetable Seeds, France	+ 5
Ruler (D 165182)	Semi-leafless	Syngeta Seeds, France	+ 6
Goutana (Nun 5218)	Semi-leafless	Nunhems Seeds, Netherlands	+ 6
Vixen (00S64813)	Semi-leafless	Limgagrain UK	+ 6
Samish	Conventional	Crites Seeds, USA	+ 6
Charlie (98S76314)	Semi-leafless	Limgagrain UK	+ 7
Ruthless (D 165188)	Semi-leafless	Syngeta Seeds, France	+ 7
CS 420 AF	Semi-leafless	Crites Seeds, USA	+ 8
Geneva	Conventional	Nunhems Seeds, Netherlands	+ 8
Oasis	Conventional	Limgagrain UK	+10
Snake	Semi-leafless	Crites Seeds, USA	+11
Ambassador	Conventional	Van Waveren, Germany	+11

Trial site details

Variety Trial Site: Fertile light silt soil in a commercial crop of Vining Peas, near Holbeach Hurn, South Lincolnshire. OS Ref: TF407280. Holbeach Marsh Co-op, Manor Farm, Holbeach Hurn, Spalding, PE12 8LR.

Powdery Mildew Trial: Sandy Loam Soil. OS Ref: TF069019. PGRO, Thornhuagh, Peterborough, PE8 6HJ

Downy Mildew Trials: 2008 and 2009 Silt soil. OS Ref TF461524. White House Farm, Friskney, Lincs
2010: Silt loam soil. OS Ref TF269482 Manor Farm, Langrick, Lincs

Production details

Sown: 15 April 2010 in commercial crop of vining peas and grown according best local and commercial practice.

Fungicide seed treatment: Wakil XL
Broad-leaved weeds were controlled pre-emergence and (post-emergence where required).
Aphid and pea moth (Cydia nigricana) were controlled (monitored by pea moth traps).
Fungicide sprays were applied to control *Botrytis* and *Mycosphaerella* (where required).
No irrigation was applied.
Haulm lengths and standing ability were measured post flowering.
Maturity was assessed from the sampling areas to achieve correct harvest dates for quick-freezing and TR120 harvest stage for vined peas using a Martin Pea Tenderometer.
Sub-plots were harvested when appropriate by hand, vined in a static plot pea viner, sieved and washed. Peas were size-graded with a Mather & Platt size-grader, weighed and total yield measured.
Samples were blanched, sorted and quick-frozen at @TR100 for quality appraisal and inspection by processors and growers.
Quality aspects of the defrosted and cooked frozen samples were assessed for colour, eveness of colour, brightness of colour, numbers of blond peas, sweetness and strength of flavour.
Measure of sweetness assessed by Brix measurement.

Trial design

Trial layout: Randomised block, 2 replications.
Plot size: 1.83 m x 19 m
Sub-plots: 1.83 m x 4 m for upto three harvests taken at @TR 100 (range 95-105), @TR 120 Range 115-130) and a third harvest if required.
Sampling areas for TR assessment: 1.83 m x 1.5 m
Sown with an Øyjord plot drill to achieve a population of 90 plants/m²
Yields were corrected to TR100 and TR120 and statistically analysed using ANOVA.
For varieties that had completed 2 Years trialling in either 2008/2009 or 2009/2010 Yields were corrected to TR100 and TR120 and statistically analysed using fitted constant REML analysis.

Sites will differ in their location each year and will be chosen where there has been a long history of pea cultivation and the potential for a high population of downy mildew (Peronospora viciae) is high. Sowing is carried out at a time which is favourable to natural infection taking place. Two replicates of 200 seeds of each variety without any fungicidal seed treatment will be drilled in a double row 5m long. The varieties will be randomised. At two occasions, disease assessments will be made, the first at about the 4 node stage when the percentage of primary infected seedlings will be estimated and the second assessment is an estimate of the percentage plants showing downy mildew infection and an estimate of the percentage leaf area infected. The scores of these assessments will be amalgamated and an overall infection level calculated. Based on the level of infection, a resistance score will be allocated using a 9-1 scale where 9 is indicates good field resistance and 1 indicates very susceptible.

Varieties will also be evaluated for resistance to Powdery mildew (*Erysiphe pisi*). In each year, two 1.5m x 1.5m plots of each variety will be drilled in early June on the PGRO trial ground at Thornhaugh. Natural infection of powdery mildew is very likely to occur once the pods have formed. When natural infection has taken place, the whole plot is assigned as resistant (no infection) or susceptible.

Powdery Mildew Trial

Varieties were planted in a double row plot with two replications at Thornhaugh in late early June. Natural infection of powdery mildew was assessed after flowering and varieties were scored as susceptible or resistant.

Downy Mildew Trials

Fields differed in their location each year and were chosen where there has been a long history of pea cultivation and the potential for a high population of downy mildew (*Peronospora viciae*) was high. Sowing was carried out at a time which was favourable to natural infection taking place. Two replicates of 200 seeds of each variety without any fungicidal seed treatment were drilled in a double row 5m long. The varieties were randomised. At two occasions, disease assessments were made, the first at about the 4 node stage when the percentage of primary infected seedlings was estimated and the second assessment was an estimate of the percentage plants showing downy mildew infection and an estimate of the percentage leaf area infected. The scores of these assessments were amalgamated and an overall infection level calculated. Based on the level of infection, a resistance score was allocated using a 1-9 scale where 1 is very susceptible and 9 indicates good field resistance

Trial records and data collected

2010, after a cold and wet February March was also cold. Rainfall was less than half the normal, with most falling in the last 10 days. April was mostly fine and dry, with some high daytime temperatures, but occasional frosts. Rainfall was less than half the average, with bulk falling on the last day of the month. May had a cool start, but temperatures rose to above normal in the 3rd week. There were occasional showers, but rainfall was less than one third of average for the month. June was very warm with daily maximum temperatures 2.5°C higher than normal. Rainfall was less than half the normal with bulk falling on the 8/9 June. Temperatures in July were above average. Rainfall was 55% of average, mostly falling in the middle 2 weeks.

TABLE 1 - VINING PEA VARIETY STUDIES. Summary of agronomic data Standard Vining Pea Main Variety Trial, Holbeach - 2010
Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 15 April
Results are means of two replicates. Target population 90 plants per m² sown in ten 15 cm rows.

Variety		Source	1000 Seed Weight g	@ TR 100 Maturity (± days) Avola	@ TR 100 Yield % of Bikini	@ TR 100 % in size grades L	M	S	VS	@ TR 120 Maturity (± days) Avola	@ TR 120 Yield % of Bikini	@ TR 120 % in size grades L	M	S	VS	Haulm length cm	Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
Span		CS	186	0	75-	38	44	16	2	0	86	51	40	8	1	52	4	29	5.5
Avola		SVS	204	0(5/7)	58-	66	27	6	1	0(7/7)	79-	71	26	3	0	72	4	22	5.1
DS 89289		Mar	157	+ 1	65-	23	42	27	8	+ 1	78-	29	48	20	3	58	5	18	5.5
DS 89326		Mar	187	+ 1	75-	49	42	8	1	+ 1	78-	55	38	6	1	73	3	23	4.6
DS 89324		Mar	162	+ 2	64-	23	48	24	5	+ 2	81	25	60	14	1	64	5	20	5.1
CS 421 AF	SL	CS	213	+ 2	64-	41	38	15	6	+ 2	79-	34	50	15	1	64	6	19	5.8
Rumble (D85051)		Syn	170	+ 3	75-	19	45	30	6	+ 3	102	24	59	17	0	68	4	19	5.1
Jaguar		LUK	187	+ 4	69-	36	40	19	5	+ 4	101	37	36	16	11	59	3	24	5.0
Reliance (08240793)	SL	SVS	174	+ 4	85	29	54	14	3	+ 4	104	43	35	12	10	70	6	24	5.4
Savannah(CMG407AF)	SL	CS	195	+ 4	83	50	33	15	2	+ 5	90	61	30	8	1	63	5	22	5.0
Bikini	SLSF	Syn	222	+ 5	100 (12.8t/ha)	32	41	18	9	+ 5	100 (12.8t/ha)	36	44	16	4	58	5	23	5.5
Amalfi (DS89264)		Mar	134	+ 5	104	12	35	37	16	+ 5	104	10	43	39	8	62	3	27	4.9
08240773	SL	SVS	171	+ 5	79-	25	47	23	5	+ 5	94	33	48	16	3	65	6	22	5.6
Ruler (D 165182)	SL	Syn	222	+ 6	81	34	41	18	7	+ 6	90	51	37	10	2	70	4	19	5.3
Goutana (Nun 5218)	SL	Nun	166	+ 6	103	19	44	28	9	+ 6	106	24	61	15	0	79	4	24	5.6
Vixen (00S64813)	SL	LUK	190	+ 6	90	38	39	17	6	+ 6	90	50	44	6	0	72	5	20	5.5
Samish		CS	192	+ 6	80-	40	43	14	3	+ 7	84	46	42	9	3	64	3	22	5.4
Charlie (98S76314)	SL	LUK	184	+ 7	88	40	49	10	1	+ 7	94	39	51	8	2	72	5	23	5.8
Ruthless (D 165188)	SL	Syn	153	+ 7	90	37	44	15	4	+ 7	97	46	46	8	0	74	3	20	5.6
CS 420 AF	SL	CS	154	+ 8	85	40	44	13	3	+ 8	93	45	44	9	2	59	7	20	5.4
Geneva		Nun	174	+ 8	86	24	50	20	6	+ 8	90	27	55	16	2	58	3	22	5.1
Oasis		LUK	220	+10	93	33	46	17	4	+10	93	32	50	15	3	62	3	26	5.3
Snake		CS	169	+11	90	34	48	15	3	+11	100	42	45	11	2	72	5	23	5.4
Ambassador		vW	232	+11	82	36	46	15	3	+11	82	35	51	12	2	75	3	21	5.0
Significance @ P=0.05					SD						SD								
LSD @ P=0.05					19.3						19.0								
CV %					11.4						10.1								

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05
Size grades: L = large > 10.2mm; M = medium 8.75 - 10.2mm; S = small 7.5 - 8.75mm; VS = very small < 7.5mm
SL = Semi-leafless; SF = Semi-fasciated
Source of varieties see Appendix 1

TABLE 2 - VINING PEA VARIETY STUDIES. Summary of quality data - Standard Vining Pea Main Variety Trial, Holbeach - 2010

Variety	Tenderometer Reading	Appearance				Taste		
		Colour	Brightness	Uniformity	No. of blonds	Flavour	Texture	Brix
		(3-8)	(1-2)	(1-5)	(1-5)	(1-5)	(1-5)	%
Span	106.5	5.50	1.33	4.00	1.33	2.3	3.33	9.9
Avola	106.5	5.33	1.33	3.33	1.67	2.7	3.00	9.2
DS 89289	96.0	5.17	1.00	3.67	1.33	3.0	1.67	10.3
DS 89326	105.0	5.33	1.33	4.33	1.33	3.7	2.00	8.7
DS 89324	99.0	5.17	1.00	4.33	1.00	3.3	3.33	9.7
CS 421 AF	99.5	5.33	1.00	4.00	1.00	3.3	2.33	9.4
Rumble (D85051)	95.5	5.00	1.00	3.00	2.33	3.7	2.33	10.1
Jaguar	96.5	5.67	1.33	4.00	1.00	2.3	2.67	9.9
Reliance(08240793)	99.5	6.00	1.00	4.67	1.00	3.7	2.67	9.8
Savannah(CMG407AF)	100.0	5.33	1.00	4.67	1.00	2.7	2.67	8.1
Bikini	97.5	5.67	1.00	4.33	1.33	3.3	2.67	9.0
Amalfi (DS89264)	97.0	5.00	1.00	3.00	2.67	3.3	2.67	9.0
08240773	96.0	5.33	1.00	4.33	1.00	3.0	2.67	9.2
Goutana (Nun 5218)	109.0	5.33	1.00	4.33	1.00	3.0	3.00	8.4
Ruler (D 165182)	105.5	5.67	1.00	4.33	1.00	3.0	2.00	9.2
Vixen (00S64813)	101.5	5.50	1.00	4.33	1.00	3.0	3.00	7.4
Samish	105.0	5.50	1.00	3.67	1.67	2.3	3.00	8.3
Charlie (98S76314)	99.5	6.33	1.33	4.67	1.00	1.3	4.33	8.3
Ruthless (D 165188)	100.0	5.67	1.00	4.00	1.00	3.0	2.67	10.1
CS 420 AF	98.5	5.33	1.00	3.33	1.67	2.3	2.33	9.1
Geneva	97.0	5.33	1.00	3.00	2.33	3.3	2.67	9.1
Oasis	109.5	5.50	1.00	3.00	3.33	2.3	4.00	8.5
Snake	98.5	5.83	1.00	4.00	1.00	2.7	3.67	9.6
Ambassador	105.5	5.00	1.00	3.00	3.33	2.0	4.00	8.0

KEY: Uniformity; Uniformity; No. of blonds; Flavour; Texture: (1-5) - a high figure indicates that the variety shows the character to a high degree
Colour: a high figure indicates a darker green; Brightness: 1 = bright, 2 = dull; Brix - measured using Atago pocket refractometer PAL-1 and gives an indication of sugar content

TABLE 3 - VINING PEA VARIETY STUDIES. Summary of Standard Vining Peas - Holbeach Tested 2008 - 2009 or 2009 - 2010
Varieties placed in order of maturity. Standard varieties underlined

Variety		Source	1000 Seed Weight g	@ TR 100 Maturity (± days) Avola	@ TR 100 Yield % of Bikini	@ TR 100 % in size grades L	M	S	VS	@ TR 120 Maturity (± days) Avola	@ TR 120 Yield % of Bikini	@ TR 120 % in size grades L	M	S	VS	Haulm length cm	Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
Avola		SVS	213	0	70- a	52	35	11	2	0	78- a	63	31	5	1	75	4	20	5.4
Span		CS	185	0	87 b	38	43	17	2	0	95 b	49	39	10	2	57	3	26	5.6
Salinero (08520702)		SVS	208	+ 1	98 b	34	45	18	3	0	92 b	43	42	13	2	71	4	21	5.6
Rumble (D85051)		Syn	165	+ 3	79 b	18	41	33	8	+ 3	91 b	23	54	22	1	80	4	17	5.2
Savannah(CMG407AF)	SL	CS	210	+ 5	102 b	52	34	12	2	+ 5	101 b	62	30	7	1	73	5	22	5.3
Recital (D84171)		Syn	153	+ 6	80 b	14	45	35	6	+ 5	78 b	19	58	20	3	88	7	16	5.4
Bikini	SLSF	Syn	212	+ 7	100 (10.0t/ha)	31	48	16	5	+ 6	100 (10.9t/ha)	42	47	9	2	58	5	19	5.7
Amalfi (DS89264)		Mar	133	+ 7	118 b	8	33	45	14	+ 6	111 b	8	41	44	7	74	3	23	5.1
Vixen (00S64813)	SL	LUK	197	+ 7	101 b	31	48	17	4	+ 7	104 b	43	49	7	1	80	7	20	5.4
Charlie (98S76314)	SL	LUK	203	+ 8	111 b	37	53	9	1	+ 8	107 b	38	53	7	2	84	5	21	5.9
Biktop	SFSF	Syn	204	+ 8	117 b	33	51	14	2	+ 8	121 b	42	50	7	1	58	5	19	5.8
Yoda (DS 89201)	SL	Mar	175	+ 9	71- b	36	45	15	4	+ 9	74- b	55	35	8	2	74	5	13	5.4
Boogie	SL	vW	206	+ 9	113 b	50	42	7	1	+ 9	113 b	60	34	5	1	64	5	20	5.5
Oasis		LUK	202	+11	103 a	31	49	16	4	+11	106 a	39	48	11	2	82	4	21	5.5
Ambassador		vW	236	+12	90 a	32	46	18	4	+12	86 a	42	48	9	1	95	4	17	5.2
Significance @ P=0.05					SD						SD								
LSD @ P=0.05 (Pair wise)					33.7 general						32.6 general								
LSD @ P=0.05 v Bikini (2 years data)					21.9 a						21.2 a								
LSD @ P=0.05 v Bikini (3 years data					24.7 b						23.9 b								
CV %					14.5						13.5								

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05
Size grades: L = large > 10.2mm; M = medium 8.75 - 10.2mm; S = small 7.5 - 8.75mm; VS = very small < 7.5mm
SL = Semi-leafless; SF = Semi-fasciated
Source of varieties see Appendix 1

TABLE 4 - VINING PEA VARIETY STUDIES. Summary of quality data – Standard pea varieties - Holbeach 2008 - 2009 or 2009 - 2010

Variety	Year	Tenderometer Reading	Appearance				Taste		
			Colour	Brightness	Uniformity	No. of blonds	Flavour	Texture	Brix
			(3-8)	(1-2)	(1-5)	(1-5)	(1-5)	(1-5)	%
Avola	08	100.0	5.50	1.00	4.00	1.50	4.00	-	8.40
	09	101.0	6.00	1.25	3.50	1.75	3.00	3.50	9.20
	10	106.5	5.33	1.33	3.33	1.67	2.67	3.00	9.20
Span	09	115.0	6.00	1.75	3.75	1.75	2.00	4.00	8.50
	10	106.5	5.50	1.33	4.00	1.33	2.33	3.33	9.85
Salinero	08	97.0	5.50	1.00	4.00	1.00	4.00	-	9.30
	09	100.5	5.25	1.00	2.75	3.00	3.75	2.75	9.40
Rumble	09	97.0	5.13	1.50	2.75	3.50	3.50	2.25	9.60
	10	95.5	5.00	1.00	3.00	2.33	3.67	2.33	10.10
Savannah(CMG407AF)	09	101.0	5.88	1.25	4.50	1.00	1.75	4.25	8.90
	10	100.0	5.33	1.00	4.67	1.00	2.67	2.67	8.05
Recital	08	99.0	5.00	1.00	3.00	3.00	4.50	-	9.60
	09	110.0	5.50	1.25	3.00	2.25	2.50	3.25	7.90
Bikini	08	97.0	4.50	1.00	3.00	3.00	5.00	-	8.40
	09	99.5	6.25	1.50	4.75	1.00	2.75	3.50	9.40
	10	97.5	5.67	1.00	4.33	1.33	3.33	2.67	9.00
Amalfi (DS89264)	09	95.0	4.63	1.50	3.50	1.25	3.25	2.25	9.00
	10	97.0	5.00	1.00	3.00	2.67	3.33	2.67	9.00
Vixen	09	101.5	5.63	2.00	3.25	1.50	2.75	3.75	9.20
	10	101.5	5.50	1.00	4.33	1.00	3.00	3.00	7.40
Charlie	09	103.5	6.50	1.50	3.75	1.75	2.25	3.50	8.80
	10	99.5	6.33	1.33	4.67	1.00	1.33	4.33	8.30
Biktop	08	97.0	5.00	1.00	4.00	1.50	3.00	-	9.40
	09	100.0	5.25	1.25	4.00	1.25	3.25	3.50	8.90
Yoda	08	99.0	4.50	1.00	3.00	3.00	3.00	-	9.30
	09	104.5	5.25	1.50	3.75	1.50	3.25	3.75	10.20
Boogie	08	98.0	5.00	1.00	2.50	2.00	4.50	-	8.30
	09	106.5	5.75	1.50	4.50	1.00	1.50	3.50	9.20
Oasis	08	105.0	4.50	2.00	2.00	3.50	5.00	-	8.30
	09	101.5	6.00	1.00	3.75	1.25	3.50	2.75	9.90
	10	109.5	5.50	1.00	3.00	3.33	2.33	4.00	8.50
Ambassador	08	100.0	5.00	1.00	3.00	3.00	3.00	-	8.80
	09	103.0	5.50	1.50	3.00	4.00	2.50	3.00	9.80
	10	105.5	5.00	1.00	3.00	3.33	2.00	4.00	8.00

KEY: Uniformity; Uniformity; No. of blonds; Flavour; Texture: (1-5) - a high figure indicates that the variety shows the character to a high degree
Colour: a high figure indicates a darker green; Brightness: 1 = bright, 2 = dull; Brix - measured using Atago pocket refractometer PAL-1 and gives an indication of sugar content

Varietal Susceptibility of Vining Peas to Powdery Mildew (Erysiphe pisi) - 2010

Plants were scored for natural infection at the full pod growth stage. The scores reflected resistance and susceptibility and are shown below

Resistant	*Ruler, Ruthless, Reliance, DS 89326, 08240773, CS 420 AF, Charlie*
Susceptible	*Goutana, Vixen, Rumble, DS 8926, DS 89289, DS 89324, CS 421 AF*

Varietal Susceptibility of Vining Peas to Downy Mildew (Peronospora viciae) - 2010

The trial was situated in a commercial crop of vining peas with a history of pea growing. The soil type was a silt loam and the trial was drilled on 20th April.

Plants were scored for infection on two occasions during the season, to include both primary systemically infected seedlings and secondary infection on the foliage and pods. The data were combined to give an indication of the relative susceptibility to downy mildew on a 1-9 scale of increasing field resistance.

1	3	7	8	9
Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
DS 89289	CS 421 AF	DS 89326	Jaguar	Reliance
Amalfi	Span		CS 420 AF	DS 89324
Vixen	Savannah		Charlie	08240773
	Samish			

Discussion

Standard Pea Main Trial, Holbeach 2010 - Tables 1 & 2

Growth was vigorous pea colour was not as even as at the Thornhaugh site and there were blond peas in some of the frozen samples. The yield standard, Bikini yielded very well, giving over 12t/ha at TR100, but there was little yield increase at TR120. Many varieties yielded better at TR120 when compared to Bikini.

Span matured at the same time as Avola.

Span had shorter haulm than Avola, and lodged similarly. Yields were a little lower than Bikini, significantly so at TR120. Produce was smaller than Avola, medium-large size grade.

Avola gave significantly lower yields than Bikini. Produce was very large size grade. Haulm was long and the variety was lodged at harvest.

DS 89289 and DS 89326 matured one day later than Avola.

DS 89289 had medium length haulm and was semi-erect at harvest. Yields were significantly lower than Bikini. Produce was medium size grade at TR100.

DS 89326 had long haulm and was lodged at harvest. Yields of large-medium size grade peas were significantly lower than Bikini.

DS 894324 and CS 421 AF matured 2 days later than Avola.

DS 894324 had medium length haulm and was semi-erect at harvest. Yields were significantly lower than Bikini. Produce was medium size grade.

CS 421 AF was semi-leafless, had medium length haulm and stood reasonably well. Yields of large-medium size grade peas were significantly lower than Bikini.

Rumble was semi-leafless and matured 3 days later than Avola. Yields were significantly lower than Bikini at TR100, but similar at TR120. Haulm was similar in length to Avola and the variety lodged similar to Avola. Produce was medium-small size grade

Jaguar, Reliance and CMG 407 AF matured 4 days later than Avola

Jaguar had medium length haulm and was lodged at harvest. Yields were significantly lower than Bikini at TR100, but similar at TR120. Produce was medium-large size grade.

Reliance was semi-leafless, had long haulm and stood reasonably well at harvest. Yields were lower than Bikini at TR100, but similar at TR120. Produce was medium-large size grade.

CMG 407 AF was semi-leafless had similar medium-long haulm and was semi-erect at harvest. Yields of large-medium size grade peas were lower than Bikini.

Maturing 5 days later than Avola, **Bikini** was semi-leafless and semi-fasciated and was semi-erect at harvest. Yields were good, but there was little increase from TR100 to TR120. Produce was medium-large size grade.

Amalfi and 08240773 matured at the same time as Bikini.

Amalfi (DS 89264) had medium length haulm and was lodged at harvest. Yields were good, a little higher than Bikini. Produce was much smaller than Bikini, small-medium size grade.

08240773 was semi-leafless, had medium length haulm and stood reasonably well at harvest. Yields of medium size grade peas were lower than Bikini, significantly so at TR100.

Ruler, Goutana, Vixen and Samish matured one day later than Bikini.

Ruler was semi-leafless, had long haulm and did not stand quite as well as Bikini. Yields of medium-large size grade peas were lower than Bikini.

Goutana was semi-leafless, had long haulm and did not stand quite as well as Bikini. Yields of medium-small size grade peas were a little higher than Bikini.

Vixen was semi-leafless, had long haulm and stood as well as Bikini. Yields of medium-large size grade peas were lower, but not significantly lower than Bikini.

Samish had medium length haulm and was lodged at harvest. Yields were lower than Bikini, significantly so at TR100.

Charlie and Ruthless matured 2 days later than Bikini.

Charlie was semi-leafless, had long haulm and stood similar to Bikini. Yields were lower than Bikini, but not significantly lower. Produce was medium-large size grade.

Ruthless was semi-leafless, had long haulm and was lodged at harvest. Yields of medium-large size grade peas were a little lower than Bikini at TR120.

CS 420 AF and Geneva matured 3 days later than Bikini.

CS 420 AF was semi-leafless, had medium length haulm and as at the Thornhaugh site stood well at harvest. Yields were lower than Bikini, but not significantly lower. Produce was medium-large size grade.

Geneva had medium length haulm and was lodged at harvest. Yields were lower than Bikini, but not significantly lower. Produce was medium size grade.

Maturing 5 days later than Bikini, **Oasis** had medium length haulm and was lodged at harvest. Yields were lower, but not significantly lower than Bikini. Produce was medium-large size grade.

Snake and Ambassador were the latest varieties to mature, 6 days later than Bikini.

Snake was semi-leafless, had long haulm and stood similar to Bikini. Yields were similar to Bikini at TR120. Produce was medium-large size grade.

Ambassador had long haulm and was lodged at harvest. Yields were lower than Bikini. Produce was medium-large size grade.

TWO YEAR SUMMARY – VARIETIES TESTED 2008-2009 or 2009-2010

Standard Size Varieties, Holbeach 2008-2009 or 2009-2010 - Tables 4 & 5

The yield standard, Bikini yielded well in all 3 years, but yields were the highest in 2010, giving over 12t/ha at TR100, but there was little yield increase at TR120. Many varieties yielded better at TR120 when compared to Bikini. Avola gave low yields, significantly lower than Bikini.

Span (Crites) was the first variety to mature, maturing at the same time as Avola. Yields were higher than Avola, but not significantly higher. Haulm was short, similar in length to Bikini, and the variety was lodged at harvest. Produce was smaller than Avola, medium-large size grade.

Salinero (Seminis) matured one day later than Avola. Haulm was similar in length to Avola and the variety had similar standing ability. Yields were good, only a little lower than Bikini. Produce was smaller than Avola, medium-large size grade.

Rumble (Syngenta) matured 3 days later than Avola. Haulm was longer than Avola and the variety had similar standing ability. Yields were better at TR120 and only a little lower than Bikini. Produce was much smaller than Avola, medium-small size grade.

Savannah (Crites) matured 2 days before Bikini. It was semi-leafless, determinate and haulm was longer than Bikini. Standing ability at harvest was average, similar to Bikini.

Yields were higher than Bikini in 2009 and lower in 2010 and overall were a little higher than Bikini. Produce was large-medium size grade, larger than Bikini.

Recital (Syngenta) matured one day before Bikini. Haulm was long, but the variety stood well at harvest. Yields were lower, but not significantly lower than Bikini. Produce was much smaller than Bikini, medium-small size grade.

Amalfi and Vixen matured at the same time as Bikini, 7 days later than Avola.

Amalfi (Maribo) had longer haulm than Bikini and was lodged at harvest. Overall yields were higher, but not significantly higher than Bikni. Produce was much smaller than Bikini, medium-small size grade.

Vixen (Limagrain) was semi-leafless, had long haulm and stood well at harvest. Overall yields were a little higher than Bikini. Produce was similar size grade to Bikini, medium-large size grade.

Charlie and Biktop matured one day later than Bikini.

Charlie (Limagrain) was semi-leafless, had long haulm and had average standing ability at harvest. Yields were very high in 2009 and overall were higher than Bikini, but not significantly higher. Produce was a little larger than Bikini, medium-large size grade.

Biktop (Syngenta) was semi-leafless and semi-faciated. Haulm was similar in length to Bikini and the variety had average standing ability, similar to Bikini. Yields were very high in 2008 and overall were higher than Bikini, but not significantly higher. Produce was similar size to Bikini, medium-large size grade.

Yoda and Boogie matured 2 days later than Bikini.

Yoda (Maribo) was semi-leafless, had longer haulm than Bikini and had similar standing ability at harvest. Overall yields were significantly lower than Bikini at both TR100 and TR120. Produce was a little larger than Bikini, medium-large size grade.

Boogie (van Waveren) was semi-leafless, had longer haulm than Bikini and had similar standing ability at harvest. Yields were very high in 2008 and overall yields were higher than Bikini, but not significantly higher. Produce was larger than Bikini, large-medium size grade.

Oasis and **Ambassador** matured 4 and 5 days respectively later than Bikini. Oasis gave similar yields to Bikini, while Amabssador gave lower yields.

Conclusions

Conclusions are drawn from a 2 year summary of varieties evaluated in either 2008/9 or 2009/2010.

Vining peas are a unique crop in terms of timely harvesting. Varietal selection is an important and key element of vining pea crop production to ensure a programmed harvest period and to maintain high quality.

Early variety Salinero yielded better than the early standard Avola. Second Early Savannah yielded as well as Bikini, but produce was very large size grade.

In the mid-season group varieties Amalfi, Vixen Charlie, Biktop and Boogie gave higher yields than Bikini, but differences were not statistically significant. Biktop, a semi-leafless and semi-fasciated type like Bikini gave the highest yields in this trial series and was closely followed by Boogie and Charlie (both semi-leafless).

Yoda gave statistically significantly lower yields than Bikini.

Several mid to late season varieties, Charlie, Boogie, Yoda and standard Ambassador showed resistance to powdery mildew, a trait that can be beneficial for late sown crops.

Rumble showed good tolerance to downy mildew, while Charlie, Yoda and standard Oasis were slightly susceptible.

Technology transfer

No formal trials demonstration was held in 2010 because of the earliness and intensity of the commercial harvest. However, an open invitation was sent out to view the trial at people's convenience.

Samples of harvested produce and a summary of 2010 and 2 years summary results were presented at the PGRO Varieties Day on 9 November 2010.

A new PGRO publication 'Vining Pea Growers Guide' was produced and distributed and contains 2 year summaries for varieties completing trials in 2008/9 or 2009/10. Data from other PGRO trials are also presented. This Publication is available free of charge and via the PGRO website.

APPENDIX 1

KEY TO SOURCE OF VARIETIES

CS	Crites Seed Inc., USA
LUK	Limagrain UK Ltd, UK
Mar	Maribo Seed A/S, Denmark
Nun	Nunhems Zaden BV., Holland
SVS	Seminis Vegetabke Seeds, France
Syn	Syngenta Seeds SAS, France
vW	van Waveren, Germany

APPENDIX 2

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 vining peas are given below:-

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