

**Project title:** Vining Peas: Evaluation of new varieties sown at appropriate commercial timings

**Project number:** FV 154c

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**Report:** Annual report, February 2012

**Previous report:** Annual report, February 2011  
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**Date project commenced:** 1 March 2010

**Date project completed (or expected completion date):** 28 February 2013

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# AUTHENTICATION

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

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# CONTENTS

<b>GROWER SUMMARY</b> .....	<b>Error! Bookmark not defined.</b>
Headline.....	1
Background.....	1
Results.....	1
Main conclusions .....	8
<b>FULL TRIAL REPORT</b> .....	<b>9</b>
Introduction .....	9
Trial site details.....	10
Production details .....	11
Trial design .....	12
Trial records and data collected.....	13
Discussion .....	21
Conclusions .....	25
Technology transfer .....	25
Appendices .....	<b>Error! Bookmark not defined.</b>

# **GROWER SUMMARY**

## **Headline**

This work will enable growers to have further information on relative yields and maturities of vining pea varieties within a maturity group.

## **Background**

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.

PGRO evaluates around 15 varieties annually at National List stage funded by PGRO Levy and the most promising are evaluated in trials for a further two years. Trials are usually sown early and to improve and refine the evaluation process, additional information is needed to supplement data from established trials. Growers indicate that up to 35% of sowings occur in May, but PGRO trials are sown in March – April. Data are therefore required from varieties sown at a timing appropriate for their maturity.

## **Results**

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

Variety Name	Leaf Type	Source	Maturity
Pizarro	Semi-leafless	Seminis Vegetable Seeds, France	-1
Avola	Conventional	Seminis Vegetable Seeds, France	0
Salinero	Conventional	Seminis Vegetable Seeds, France	0
Sherwood	Conventional	Seminis Vegetable Seeds, France	+1
Anubis	Conventional	Limagrain, UK	+1
Hesbana	Semi-leafless	Nunhems Seeds, Netherlands	+1
Cosima	Conventional	van Waveren, Germany	+3
Romance	Semi-leafless	Seminis Vegetable Seeds, France	+3
Superana	Conventional	Nunhems Seeds, Netherlands	+4
Premio	Semi-leafless	Maribo Seeds, Denmark	+5
Chinook	Semi-leafless	Limagrain UK	+6
Bingo	Semi-leafless	Syngenta Seeds, France	+7
Bikini	Semi-leafless / semi-fasciated	Syngenta Seeds, France	+8
Biktop	Semi-leafless / semi-fasciated	Syngenta Seeds, France	+8
Ashton	Conventional	Seminis Vegetable Seeds, France	+9
Tommy	Semi-leafless	Limagrain UK	+9
Spandimo	Semi-leafless	Seminis Vegetable Seeds, France	+9
Boogie	Semi-leafless	Nunhems Seeds, Netherlands	+9
Zephyr	Semi-leafless	Limagrain UK	+11
Butana	Semi-leafless	Nunhems Seeds, Netherlands	+11
Ambassador	Conventional	van Waveren, Germany	+12
Hippee	Semi-leafless	Maribo Seeds, Denmark	+12
Naches	Semi-leafless	Crites Seeds, USA	+13
Kenobi	Semi-leafless	Maribo Seeds, Denmark	+13

### ***Trial site details***

Variety Trials and powdery mildew trial: PGRO, The Research Station, Great North Road, Thornhaugh, Peterborough PE8 6HJ. OS Grid Ref: TF070017.

Downy Mildew Trials: 2011 Silt loam soil. OS Grid Ref TF414515. Fold Hill, Old Leake, Lincs & silt loam soil. OS Ref TF212487 Chestnut House Farm, Amber Hill, Lincs.

Tables of % yield, % size grade, haulm length and standing ability - 2011

#### Early-season Trial

Variety	@TR100				@TR120		Standing Ability 9=erect 1=lodged	
	Yield % of Bikini	% in size grades L M S VS				Yield % of Bikini		Haulm length cm
Pizarro	55	48	43	8	1	62	44	7
Avola	40	57	35	7	1	39	49	4
Salinero	55	31	52	14	3	67	45	5
Sherwood	59	30	50	16	4	78	44	4
Anubis	80	35	49	14	2	98	41	4
Hesbana	55	14	55	27	4	59	46	7
Cosima	85	30	52	16	2	89	38	4
Romance	84	19	59	20	2	84	41	6
Premio	91	15	55	28	2	104	53	6
Bikini	100	35	56	8	1	100	39	8
	(7.42t/ha)					(7.74t/ha)		

Mid-season Trial

Variety	@TR100					@TR120		Standing Ability 9=erect 1=lodged
	Yield	% in size grades				Yield	Haulm	
	% of Bikini	L	M	S	VS	% of Bikini	length cm	
Chinook	85	19	56	23	2	94	45	9
Biktop	99	28	66	6	0	96	37	9
Bikini	100	34	59	7	0	100	40	7
	(7.30t/ha)					(8.06t/ha)		
Ashton	114 <sup>+</sup>	30	64	5	1	116	48	2
Boogie	88	59	39	2	0	86	46	9
Spandimo	118 <sup>+</sup>	38	59	3	0	110	39	9
Tommy	95	22	66	11	1	91	53	9
Chinook	85	19	56	23	2	94	45	9

Late-season Trial

Variety	@TR100					@TR120		Standing Ability 9=erect 1=lodged
	Yield	% in size grades				Yield	Haulm	
	% of Bikini	L	M	S	VS	% of Bikini	length cm	
Bikini	100	33	52	13	2	100	41	8
	(4.79t/ha)					(6.35t/ha)		
Zephyr	125 <sup>+</sup>	29	57	12	2	99	43	7
Kenobi	135 <sup>+</sup>	39	49	11	1	105	55	8
Butana	160 <sup>+</sup>	32	57	10	1	133 <sup>+</sup>	60	8
Hippee	134 <sup>+</sup>	37	52	10	1	101	49	7
Ambassador	140 <sup>+</sup>	73	23	4	0	133 <sup>+</sup>	60	4
Naches	136 <sup>+</sup>	46	45	8	1	110	46	8



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

### ***Standard Pea Early Season Trial, Thornhaugh***

Bikini the yield standard gave good yields considering the seasonal weather. Many of the early varieties did not yield well compared to Bikini. These varieties suffered more than most in the very dry conditions.

Semi-leafless Pizarro was the first variety to mature one day before Avola. Haulm was shorter than Avola and the variety stood well. Yields of large size grade peas were higher than Avola, but significantly lower than Bikini.

**Avola** had less than average standing ability. Yields of very large size grade peas were significantly lower than Bikini

Maturing at the same time as Avola, **Salinero** had similar length haulm to Avola and had average standing ability. Yields of very medium-large size grade peas were significantly lower than Bikini.

**Sherwood** and **Anubis** matured one day later than Avola and both varieties lodged similar to Avola.

Both varieties gave peas of medium size grade. Yields were higher than Avola, but significantly lower than Bikini.

Semi-leafless **Hesbana** matured 3 days later than Avola and the variety stood well at harvest. Yields of medium-small size grade peas were higher than Avola, but significantly lower than Bikini.

Cosima and Romance matured 6 days later than Avola.

**Cosima** had short Haulm and lodged similar to Avola. Yields of medium-large size grade peas were higher than Avola, but lower than Bikini.

**Romance** was semi-leafless and had better than average standing ability. Yields of medium size grade peas were higher than Avola, but lower than Bikini.

**Premio** matured 7 days later than Avola. Haulm was a little longer than Avola and the variety had better than average standing ability. Yields were good, similar to Bikini at TR120.

**Bikini** matured 10 days later than Avola and stood very well at harvest. Yields of medium-large size grade peas were high.

### ***Standard Pea Mid-season Trial, Thornhaugh***

Three varieties Meridian (Limagrain UK), Recital (Syngenta) and Yoda (Maribo Seed) were withdrawn from the trials at the request of the breeders. Seed supplied for the variety Bingo (Syngenta) was found to be incorrect and judging by maturity was probably the variety Prelado.

Yields of Bikini were similar to the early sown trial.

Semi-leafless **Chinook** was the first variety to mature 2 days before Bikini. Haulm was a little longer than Bikini and had excellent standing ability. Yields of medium size grade peas better at TR120, a little lower than Bikini.

Biktop matured at the same time as Bikini.

Maturing at the same time as Bikini, **Biktop** was also semi-leafless and semi-fasciated. Haulm was short like Bikini and had excellent standing ability. Yields of medium-large size grade peas were similar to Bikini.

**Bikini** was semi-leafless and semi-fasciated, stood well at harvest and gave high yields. Produce was medium-large size grade.

**Ashton** matured one day later than Bikini. Haulm was similar in length to Bikini but was lodged at harvest. Yields were very high, significantly higher than Bikini at TR100.

Boogie, Spandimo and Tommy were all semi-leafless, had excellent standing ability and matured 3 days later than Bikini.

**Boogie** gave lower yields than Bikini of large size grade peas.

**Spandimo** gave produce of medium-large size grade peas. Yields were the highest in this trial at TR100, significantly higher than Bikini.

**Tommy** gave produce with a high percentage of peas in the medium size grade. Yields were a little lower than Bikini at TR100.

### ***Standard Pea late-season Trial, Thornhaugh***

One variety, Elvas (Maribo Seeds) was withdrawn from the trials at the request of the breeder.

Bikini the yield standard gave lower yields than the mid-season trial. Standing ability at harvest for most varieties in this trial was good.

**Bikini** was the first Variety to mature and had very good standing ability. Peas were medium-large size grade.

Semi-leafless **Zephyr** matured 3 days later than Bikini. Haulm was similar in length to Bikini and the variety stood well at harvest. Yields of medium-large size grade peas were significantly higher than Bikini at TR100.

Kenobi and Butana matured 4 days later than Bikini. Both varieties were semi-leafless, had longer haulm than Bikini and had very good standing ability.

**Kenobi** gave significantly higher yields than Bikini at TR100 of medium-large size grade peas.

**Butana** gave produce of medium-large size grade. Yields were the highest in this trial at TR100, significantly higher than Bikini.

Hippee matured at the same time as Ambassador, 5 days later than Bikini.

**Hippee** was semi-leafless and stood well at harvest. Yields of medium-large size grade peas were significantly higher than Bikini at TR100 and similar to Bikini at TR120.

**Ambassador** had long haulm and was lodged at harvest. Yields of very large size grade peas were significantly higher than Bikini at both TR100 and TR120.

**Naches** was semi-leafless and matured 6 days later than Bikini. Haulm was a little longer than Bikini and the variety stood very well at harvest. Yields of large size grade peas were significantly higher than Bikini at TR100, similar to Ambassador.

## **Main conclusions**

This vining pea variety work is a very valuable addition to previous variety trials in that it is matching maturity groups to drilling periods of the season appropriate to the commercial vining pea business. The data produced from this work is an extremely valuable addition to the knowledge base of group managers and fieldsmen when planning variety choice and sowing programme.

Many of the early and second early varieties did not yield well compared to Bikini. These varieties suffered more than most in the exceptionally dry conditions. The exception as in 2010 was second early, Premio which gave yields similar to Bikini. Annubis also yielded well at TR120. Avola gave particularly large produce. Several varieties gave including Hesbana, Romance and Premio gave much smaller produce.

Varieties In the mid-season group benefited from rain in June and yields were higher than the early sown trial. Ashton and Spandimo gave the highest yields, statistically significantly higher than Bikini. Chinook and Tommy gave produce that was smaller than other varieties. Most varieties had good – excellent standing ability, with the exception of Ashton which was lodged at harvest. Ashton is the only conventional-leaved variety in this trial.

In the late-season trial, Bikini the yield standard gave lower yields than the mid-season trial. Standing ability at harvest for most varieties in this trial was good. Ambassador (Conventional-leaved lodged more than most). In 2010 maturities were a little later than expected, but in 2011 maturity were similar to previous results. All Varieties significantly out-yielded Bikini at TR100. The highest yielding was Butana followed by Ambassador and both of these varieties significantly out-yielded Bikini at TR120 also. Produce from most varieties was medium-large size grade, but Ambassador gave particularly large peas.

# FULL TRIAL REPORT

## Introduction

Vining peas are a major vegetable crop grown for processing and for the fresh market.

Peas for canning and freezing occupy 36,000 ha per annum, with a farmgate value of £42M.

The peas market is worth £216M in value and has been in growth by 11% year on year. (TNS Worldpanel,52W 14 June 2009)

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.

PGRO evaluates around 15 varieties annually at National List stage funded by PGRO Levy and the most promising are evaluated in trials for a further two years. Trials are usually sown early and to improve and refine the evaluation process, additional information is needed to supplement data from established trials. Growers indicate that up to 35% of sowings occur in May, but PGRO trials are sown in March – April. Data are therefore required from varieties sown at a timing appropriate for their maturity.

<b>Variety Name</b>	<b>Leaf Type</b>	<b>Source</b>	<b>Maturity</b>
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Salinero	Conventional	Seminis Vegetable Seeds, France	0
Sherwood	Conventional	Seminis Vegetable Seeds, France	+1
Anubis	Conventional	Limagrain, UK	+1
Hesbana	Semi-leafless	Nunhems Seeds, Netherlands	+1
Cosima	Conventional	van Waveren, Germany	+3
Romance	Semi-leafless	Seminis Vegetable Seeds, France	+3
Superana	Conventional	Nunhems Seeds, Netherlands	+4
Premio	Semi-leafless	Maribo Seeds, Denmark	+5
Chinook	Semi-leafless	Limagrain UK	+6
Bingo	Semi-leafless	Syngenta Seeds, France	+7
Bikini	Semi-leafless / semi-fasciated	Syngenta Seeds, France	+8
Biktop	Semi-leafless / semi-fasciated	Syngenta Seeds, France	+8
Ashton	Conventional	Seminis Vegetable Seeds, France	+9
Tommy	Semi-leafless	Limagrain UK	+9
Spandimo	Semi-leafless	Seminis Vegetable Seeds, France	+9
Boogie	Semi-leafless	Nunhems Seeds, Netherlands	+9
Zephyr	Semi-leafless	Limagrain UK	+11
Butana	Semi-leafless	Nunhems Seeds, Netherlands	+11
Ambassador	Conventional	van Waveren, Germany	+12
Hippee	Semi-leafless	Maribo Seeds, Denmark	+12
Naches	Semi-leafless	Crites Seeds, USA	+13
Kenobi	Semi-leafless	Maribo Seeds, Denmark	+13

### ***Trial site details***

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### ***Production details***

Several promising varieties have been tested in recent years and more information on their performance and relative maturity of varieties within a maturity group is needed at the likely commercial sowing time. Early varieties would therefore be tested under cool establishment conditions with a long period from sowing to harvest while, in contrast, maincrop varieties would be tested under conditions of rapid establishment and growth. Work is needed over three years to gain experience in contrasting weather conditions.

Sown:            Early Trial 15 March 2011  
                  Mid-season Trial 15 April 2011  
                  Late-season Trial 28 April 2011

Grown under 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, evenness of colour, brightness of colour and numbers of blond peas

Measure of sweetness was assessed by Brix measurement.

## ***Specific Objectives***

1. Yield relative to a standard at TR100 and TR120
2. Maturity relative to a standard at TR100 and TR120
3. Size-grade specification
4. Haulm length
5. Standing ability
6. Standing ability at harvest
7. Disease susceptibility to downy mildew (*Peronospora viciae*)
8. Disease susceptibility powdery mildew (*Erysiphe pisi*) where no previous data exist.
9. Provision of Processed samples for evaluation
10. Basic sensory appraisal of processed samples

## ***Trial design***

Each trial early, mid-season, late-season had:

Bikini as the yield standard, common across all 3 trials

The trials additionally had the standards below.

Early-season trials Avola

Mid-season trials Bikini

Late-season trials Ambassador

Trial layout: Randomised block, 3 replications.

Plot size: 1.83 m x 19 m

Sub-plots: 1.83 m x 5 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 2.0 m

Sown with an Øyjord plot drill to achieve a population of 90 plants/m<sup>2</sup>

Yields were corrected to TR100 and TR120 and statistically analysed using ANOVA.

On completion of the project yields will be corrected to TR100 and TR120 and statistically analysed using fitted constant REML analysis.



## **Powdery Mildew Trial**

Varieties that had not been previously screened for powdery mildew resistance 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**

Varieties that came with untreated seed were planted in a double row plot with two replications at two sites in commercial crops of vining peas with a long history of pea growing where natural infection from soil borne oospores was likely to occur. Infection scores were made on two occasions during the season and these scores converted to a scale of relative field resistance.

Fields 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***

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

was sporadic with the months June to August receiving 48.6%, 56.2% and 68.2% of average rainfall respectively.

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**TABLE 1 - VINING PEA VARIETY STUDIES.** Summary of agronomic data Standard Vining Pea HDC Funded Early Variety Trial, Thornhaugh - 2011

Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 15 March

Results are means of three replicates. Target population 90 plants per m<sup>2</sup> sown in ten 15 cm rows.

Variety	Source	1000 Seed Weight g	@ TR 100							@ TR 120							Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
			Maturity (± days) Avola	Yield % of Bikini	% in size grades				Maturity (± days) Avola	Yield % of Bikini	% in size grades				Haulm length cm				
					L	M	S	VS			L	M	S	VS					
Pizarro	SL	SVS	228	- 1	55 <sup>-</sup>	48	43	8	1	- 1	62 <sup>-</sup>	64	31	4	1	44	7	21	6.0
<u>Avola</u>		<u>SVS</u>	<u>214</u>	<u>0(10/6)</u>	<u>40<sup>-</sup></u>	<u>57</u>	<u>35</u>	<u>7</u>	<u>1</u>	<u>0(13/6)</u>	<u>39<sup>-</sup></u>	<u>70</u>	<u>24</u>	<u>5</u>	<u>1</u>	<u>49</u>	<u>4</u>	<u>16</u>	<u>5.5</u>
Salinero		SVS	183	0	55 <sup>-</sup>	31	52	14	3	0	67 <sup>-</sup>	48	44	7	1	45	5	20	5.5
Sherwood		SVS	192	+ 1	59 <sup>-</sup>	30	50	16	4	0	78 <sup>-</sup>	43	50	6	1	44	4	22	5.7
Anubis		LUK	262	+ 1	80	35	49	14	2	+ 1	98	55	40	5	0	41	4	26	5.5
Hesbana	SL	Nun	205	+ 3	55 <sup>-</sup>	14	55	27	4	+ 3	59 <sup>-</sup>	27	72	1	0	46	7	19	5.4
Cosima		vW	162	+ 6	85	30	52	16	2	+ 6	89	34	56	9	1	38	4	26	5.3
Romance	SL	SVS	184	+ 6	84	19	59	20	2	+ 6	84	28	64	7	1	41	6	22	5.6
Premio		Mar	191	+ 7	91	15	55	28	2	+ 7	104	23	65	12	0	53	6	24	5.1
<u>Bikini</u>	<u>SLSF</u>	<u>Syn</u>	<u>211</u>	<u>+10</u>	<u>100</u>	<u>35</u>	<u>56</u>	<u>8</u>	<u>1</u>	<u>+9</u>	<u>100</u>	<u>45</u>	<u>49</u>	<u>5</u>	<u>1</u>	<u>39</u>	<u>8</u>	<u>25</u>	<u>5.4</u>
						<u>(7.42t/ha)</u>						<u>(7.74t/ha)</u>							
Significance @ P=0.05						SD						SD							
LSD @ P=0.05						20.9						21.0							
CV %						15.1						14.0							

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 - Early Variety Trial, Thornhaugh – 2011

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Pizarro	99.5	6.00	1.00	4.50	1.0	10.0
Salinero	99.5	5.50	1.00	4.50	1.0	8.9
Sherwood	104.0	5.75	1.00	4.25	1.0	10.7
Anubis	98.0	5.50	1.00	4.25	1.0	10.3
Hesbana	99.5	4.75	1.00	3.00	1.3	10.0
Cosima	97.5	5.50	1.00	4.50	1.0	9.7
Romance	105.0	5.75	1.00	4.50	1.0	10.1
Premio	97.0	5.25	1.00	4.00	1.0	8.8

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 agronomic data Standard Vining Pea HDC Funded Mid-Season Variety Trial, Thornhaugh - 2011

Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 15 April

Results are means of three replicates. Target population 90 plants per m<sup>2</sup> sown in ten 15 cm rows.

Variety	Source		@ TR 100							@ TR 120							Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
			1000	Maturity ± days) Bikini	Yield % of Bikini	% in size grades				Maturity ± days) Bikini	Yield % of Bikini	% in size grades				Haulm length cm			
			Seed Weight g			L	M	S	VS			L	M	S	VS				
Chinook	SL	LUK	204	- 2	85	19	56	23	2	- 2	94	28	57	13	2	45	9	24	5.9
Biktop	SLSF	Syn	170	0	99	28	66	6	0	0	96	41	54	5	0	37	9	25	5.5
<u>Bikini</u>	<u>SLSF</u>	<u>Syn</u>	<u>211</u>	<u>0(6/7)</u>	<u>100</u>	<u>34</u>	<u>59</u>	<u>7</u>	<u>0</u>	<u>0(8/7)</u>	<u>100</u>	<u>45</u>	<u>51</u>	<u>4</u>	<u>0</u>	<u>40</u>	<u>7</u>	<u>23</u>	<u>5.7</u>
					(7.30t/ha)						(8.06t/ha)								
Ashton		SVS	211	+ 1	114 <sup>+</sup>	30	64	5	1	+ 1	116	42	55	3	0	48	2	29	5.4
Boogie	SL	vW	216	+ 2	88	59	39	2	0	+ 2	86	66	32	2	0	46	9	22	6.0
Spandimo	SL	SVS	196	+ 2	118 <sup>+</sup>	38	59	3	0	+ 2	110	48	50	2	0	39	9	30	6.0
Tommy	SL	LUK	161	+ 2	95	22	66	11	1	+ 2	91	25	66	8	1	53	9	24	6.0
Significance @ P=0.05					SD						SD								
LSD @ P=0.05					13.7						19.4								
CV %					8.2						12.0								

KEY: Yield: <sup>+</sup> Significantly greater than Bikini @ P = 0.05; <sup>-</sup> 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 – Mid-season Variety Trial, Thornhaugh – 2011

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Chinook	101.0	6.33	1.00	4.00	1.0	10.1
Bikini	103.5	6.67	1.00	4.67	1.0	9.5
Biktop	103.5	6.67	1.00	4.17	1.0	10.4
Ashton	107.5	6.17	1.33	3.00	2.0	10.5
Boogie	101.0	6.33	1.00	4.17	1.0	10.1
Spandimo	101.0	6.67	1.00	4.67	1.0	9.7
Tommy	100.5	7.00	1.00	3.67	1.7	10.0

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 5- VINING PEA VARIETY STUDIES.** Summary of agronomic data Standard Vining Pea HDC Funded Late Season Variety Trial, Thornhaugh - 2011

Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 28 April

Results are means of three replicates. Target population 90 plants per m<sup>2</sup> sown in ten 15 cm rows.

Variety	Source		@ TR 100							@ TR 120							Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
			1000	Maturity ± days) Bikini	Yield % of Bikini	% in size grades				Maturity ± days) Bikini	Yield % of Bikini	% in size grades				Haulm length cm			
			Seed Weight g			L	M	S	VS			L	M	S	VS				
<u>Bikini</u>	<u>SLSF</u>	<u>Syn</u>	<u>211</u>	<u>0(17/7)</u>	<u>100</u>	<u>33</u>	<u>52</u>	<u>13</u>	<u>2</u>	<u>0(19/7)</u>	<u>100</u>	<u>41</u>	<u>49</u>	<u>9</u>	<u>1</u>	<u>41</u>	<u>8</u>	<u>23</u>	<u>5.7</u>
					(4.79t/ha)						(6.35t/ha)								
Zephyr	SL	LUK	218	+ 3	125 <sup>+</sup>	29	57	12	2	+ 3	99	30	59	10	1	43	7	23	5.3
Kenobi	SL	Mar	182	+ 4	135 <sup>+</sup>	39	49	11	1	+ 4	105	43	47	9	1	55	8	22	5.3
Butana	SL	Nun	178	+ 4	160 <sup>+</sup>	32	57	10	1	+ 4	133 <sup>+</sup>	42	49	8	1	60	8	23	5.3
Hippee	SL	Mar	185	+ 5	134 <sup>+</sup>	37	52	10	1	+ 5	101	49	46	5	0	49	7	23	5.1
Ambassador		vW	190	+ 5	140 <sup>+</sup>	73	23	4	0	+ 5	133 <sup>+</sup>	77	20	3	0	60	4	24	5.2
Naches	SL	CS	215	+ 6	136 <sup>+</sup>	46	45	8	1	+ 5	110	53	40	6	1	46	8	25	5.2
Significance @ P=0.05					SD						SD								
LSD @ P=0.05					17.2						18.3								
CV %					7.2						9.2								

KEY: Yield: <sup>+</sup> Significantly greater than Bikini @ P = 0.05; <sup>-</sup> 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 6- VINING PEA VARIETY STUDIES.** Summary of quality data – late season Variety Trial, Thornhaugh – 2011

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Bikini	103.0	6.50	1.33	4.17	1.0	8.3
Zephyr	103.0	6.00	1.33	4.50	1.0	7.8
Butana	100.5	5.83	1.33	3.67	1.0	8.4
Kenobi	97.0	6.17	1.00	4.00	1.0	8.8
Ambassador	108.5	6.00	1.33	3.50	1.0	7.6
Hippee	95.5	5.83	1.33	3.67	1.0	8.5
Naches	106.0	6.17	1.00	4.00	1.0	8.3

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*) - 2011**

Varieties that had not been screened for powdery mildew in previous evaluations were included in the powdery mildew evaluation

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

<b>Resistant</b>	Ashton, Boogie, Butana
<b>Susceptible</b>	Chinook, Tommy, Premio, Sherwood, Biktop, Salinero, Anubis, Romance

**Varietal Susceptibility of Vining Peas to Downy Mildew (*Peronospora viciae*) - 2011**

The trials were situated in commercial crops of vining peas with a history of pea growing.

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
Cosima	Anubis		Chinook	Biktop
Naches	Kenobi		Premio	Boogie
Zephyr				Hippee

## Discussion

### ***Standard Pea Early Season Trial, Thornhaugh – Tables 1 & 2***

Bikini the yield standard gave good yields considering the seasonal weather. Many of the early varieties did not yield well compared to Bikini. These varieties suffered more than most in the very dry conditions.

Semi-leafless Pizarro was the first variety to mature one day before Avola. Haulm was shorter than Avola and the variety stood well. Yields of large size grade peas were higher than Avola, but significantly lower than Bikini.

**Avola** had less than average standing ability. Yields of very large size grade peas were significantly lower than Bikini

Maturing at the same time as Avola, **Salinero** had similar length haulm to Avola and had average standing ability. Yields of very medium-large size grade peas were significantly lower than Bikini.

**Sherwood** and **Anubis** matured one day later than Avola and both varieties lodged similar to Avola.

Both varieties gave peas of medium size grade. Yields were higher than Avola, but significantly lower than Bikini.

Semi-leafless **Hesbana** matured 3 days later than Avola and the variety stood well at harvest. Yields of medium-small size grade peas were higher than Avola, but significantly lower than Bikini.

Cosima and Romance matured 6 days later than Avola.

**Cosima** had short Haulm and lodged similar to Avola. Yields of medium-large size grade peas were higher than Avola, but lower than Bikini.

**Romance** was semi-leafless and had better than average standing ability. Yields of medium size grade peas were higher than Avola, but lower than Bikini.

**Premio** matured 7 days later than Avola. Haulm was a little longer than Avola and the variety had better than average standing ability. Yields were good, similar to Bikini at TR120.

**Bikini** matured 10 days later than Avola and stood very well at harvest. Yields of medium-large size grade peas were high.

### ***Standard Pea Mid-season Trial, Thornhaugh – Tables 3 & 4***

Three varieties Meridian (Limagrain UK), Recital (Syngenta) and Yoda (Maribo Seed) were withdrawn from the trials at the request of the breeders. Seed supplied for the variety Bingo (Syngenta) was found to be incorrect and judging by maturity was probably the variety Prelado.

Yields of Bikini were similar to the early sown trial.

Semi-leafless **Chinook** was the first variety to mature 2 days before Bikini. Haulm was a little longer than Bikini and had excellent standing ability. Yields of medium size grade peas better at TR120, a little lower than Bikini.

Biktop matured at the same time as Bikini.

Maturing at the same time as Bikini, **Biktop** was also semi-leafless and semi-fasciated. Haulm was short like Bikini and had excellent standing ability. Yields of medium-large size grade peas were similar to Bikini.

**Bikini** was semi-leafless and semi-fasciated, stood well at harvest and gave high yields. Produce was medium-large size grade.

**Ashton** matured one day later than Bikini. Haulm was similar in length to Bikini but was lodged at harvest. Yields were very high, significantly higher than Bikini at TR100.

Boogie, Spandimo and Tommy were all semi-leafless, had excellent standing ability and matured 3 days later than Bikini.

**Boogie** gave lower yields than Bikini of large size grade peas.

**Spandimo** gave produce of medium-large size grade peas. Yields were the highest in this trial at TR100, significantly higher than Bikini.

**Tommy** gave produce with a high percentage of peas in the medium size grade. Yields were a little lower than Bikini at TR100.

### ***Standard Pea late-season Trial, Thornhaugh – Tables 5 & 6***

One variety, Elvas (Maribo Seeds) was withdrawn from the trials at the request of the breeder.

Bikini the yield standard gave lower yields than the mid-season trial. Standing ability at harvest for most varieties in this trial was good.

**Bikini** was the first Variety to mature and had very good standing ability. Peas were medium-large size grade.

Semi-leafless **Zephyr** matured 3 days later than Bikini. Haulm was similar in length to Bikini and the variety stood well at harvest. Yields of medium-large size grade peas were significantly higher than Bikini at TR100.

Kenobi and Butana matured 4 days later than Bikini. Both varieties were semi-leafless, had longer haulm than Bikini and had very good standing ability.

**Kenobi** gave significantly higher yields than Bikini at TR100 of medium-large size grade peas.

**Butana** gave produce of medium-large size grade. Yields were the highest in this trial at TR100, significantly higher than Bikini.

Hippee matured at the same time as Ambassador, 5 days later than Bikini.

**Hippee** was semi-leafless and stood well at harvest. Yields of medium-large size grade peas were significantly higher than Bikini at TR100 and similar to Bikini at TR120.

**Ambassador** had long haulm and was lodged at harvest. Yields of very large size grade

peas were significantly higher than Bikini at both TR100 and TR120.

**Naches** was semi-leafless and matured 6 days later than Bikini. Haulm was a little longer than Bikini and the variety stood very well at harvest. Yields of large size grade peas were significantly higher than Bikini at TR100, similar to Ambassador.

## **Conclusions**

Many of the early and second early varieties did not yield well compared to Bikini. These varieties suffered more than most in the exceptionally dry conditions. The exception as in 2010 was second early, Premio which gave yields similar to Bikini. Annubis also yielded well at TR120. Avola gave particularly large produce. Several varieties gave including Hesbana, Romance and Premio gave much smaller produce.

Varieties In the mid-season group benefited from rain in June and yields were higher than the early sown trial. Ashton and Spandimo gave the highest yields, statistically significantly higher than Bikini. Chinook and Tommy gave produce that was smaller than other varieties. Most varieties had good – excellent standing ability, with the exception of Ashton which was lodged at harvest. Ashton is the only conventional-leaved variety in this trial.

In the late-season trial, Bikini the yield standard gave lower yields than the mid-season trial. Standing ability at harvest for most varieties in this trial was good. Ambassador (Conventional-leaved lodged more than most). In 2010 maturities were a little later than expected, but in 2011 maturity were similar to previous results. All Varieties significantly out-yielded Bikini at TR100. The highest yielding was Butana followed by Ambassador and both of these varieties significantly out-yielded Bikini at TR120 also. Produce from most varieties was medium-large size grade, but Ambassador gave particularly large peas.

## **Technology transfer**

Trials were demonstrated at the PGRO Vining Pea Trials day on 8 June 2011. Trials were visited by seedsmen at intervals throughout the harvest period.

A summary of 2010 results were presented at the PGRO Varieties Day on 15 November 2011.

The PGRO publication 'Vining Pea Growers Guide' was produced and distributed on 15 November 2011. Data from these trials will be included in this publication. Data from other PGRO trials are also presented. This Publication is available free of charge and via the PGRO website.

The same data is also available in a leaflet format.

## **APPENDICES**

### **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 Vegetable 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