Project title:	Vining Peas: Evaluation of new varieties sown at appropriate commercial timings
Project number:	FV 154c
Project leader:	Mr. S.J. Belcher, PGRO
Report:	Annual report, February 2013
Previous report:	Annual report, February 2011, Annual report 2012
Key staff:	Mr. S.J. Belcher Dr. A.J. Biddle (pathology) Ms. S. Johnson
Location of project:	PGRO, Great North Road, Thornhaugh, Peterborough
Industry representative:	Mr. R Fitzpatrick, Holbeach Marsh Co-op, Manor Farm, Holbeach Hurn, Spalding, PE12 8LR
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.

Roger Vickers
Chief Executive Officer
Processors and Growers Research Organisation

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GROWER SUMMARY

Headline

This work will enable growers to have further information on relative yields and maturities of vining pea varieties at commercial harvesting times.

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.

Summary of results and main conclusions

Because of delayed sowing by wet weather and bird damage the mid-season and Late-season trials were not taken through to harvest in 2012. These trials will be repeated in 2013. However data for the downy and powdery mildew disease trials were obtained.

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

Variety Name	Leaf Type	Source	Maturity
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: 2012 Silt loam soil. OS Grid Ref TF436310. Red House Farm, Holbeach St Matthew, Lincs & silt loam soil. OS Ref TL500927, Manea, Cambs.

Tables of % yield, % size grade, haulm length and standing ability - 2012

Early-season Trial

	@TR100					@TR120		
Variety	Yield % of Bikini	% in size grades L	M	S	VS	Yield % of Bikini	Haulm length cm	Standing Ability 9=erect 1=lodged
Avola	94	24	41	29	6	87	53	2
Pizarro	81	14	44	34	8	90	54	4
Salinero	109	15	41	34	10	112	46	2
Sherwood	101	13	40	37	10	119	54	2
Hesbana	66-	6	40	43	11	76-	62	3
Anubis	87	15	36	37	12	94	57	3
Romance	151+	15	44	33	8	162+	54	4
Cosima	103	18	45	30	7	107	54	3
Premio	67-	16	44	29	11	77-	60	4
Bikini	100 (4.8t/ha)	20	51	25	4	100 (5.5t/ha)	41	5

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

Standard Pea Early Season Trial, Thornhaugh

Bikini the yield standard gave average yields considering the seasonal weather.

Avola matured first 10 days before Bikini and was lodged at harvest. Yields were lower than Bikini, but not significantly so. Produce was medium-large size grade.

Semi-leafless **Pizarro** matured at the same time as Avola. Haulm was similar in length to Avola and the variety stood a little better. Yields were similar to Avola at TR120. Produce was medium-small size grade at TR100 and medium-large size grade at TR120.

Maturing one day later than Avola, **Salinero** was a little shorter in haulm length than Avola and had and was lodged at harvest. Yields were good, higher than Bikini, but not significantly so. Produce was medium-small size grade at TR100 and medium-large size grade at TR120.

Sherwood matured 2 days later than Avola. Haulm was similar in length to Avola and the variety was lodged at harvest. Yields were similar to Bikini at TR100 and higher, but not significantly higher than Bikini at TR120. Produce was medium-small size grade at TR100 and medium size grade at TR120.

Semi-leafless **Hesbana** matured 3 days later than Avola. Haulm was longer than Avola and the variety was lodged at harvest. Yields of medium-small size grade peas were lower than Avola and significantly lower than Bikini.

Romance and Cosima matured 6 days later than Bikini.

Romance was semi-leafless and had lower than average standing ability. Yields were very high, significantly higher than Bikini and the highest in this trial. Produce was medium-small size grade at TR100 and medium size grade at TR120.

Cosima had similar length haulm to Avola and was lodged at harvest. Yields of medium-small size grade peas were higher than Avola and similar to Bikini.

Premio was later maturing this year, maturing at the same time as Bikini. Haulm was a little longer than Avola and the variety had lower than average standing ability. Yields were low, significantly lower than Bikini. Produce was medium-small size grade at TR100 and medium size grade at TR120.

Bikini matured 10 days later than Avola. Bikini was semi-leafless and semi-fasciated and gave average yields. Haulm was short and the variety had average standing ability. Produce was medium-large size grade

Main Conclusions

The varieties have been trialed in three very contrasting years.

In comparison to Bikini, many of the early varieties gave better yields in 2012. The exception was Premio, which gave lower yields in 2012. In 2010 and 2011 Premio gave higher yields.

Varietal differences in maturity is key in planning sowing and harvesting programmes and it is reassuring to find that there were no major variances from previous data. Pizarro, Salinero, Sherwood and Anubis matured at the same time as in previous trials. Hesbana, Cosima, Romance and Premio all matured one day later on average than seen in previous trials.

Overall yields for most varieties at TR100 were similar to those seen in previous trials. Salinero and Romance gave high yields in 2012 and overall yields were higher at TR100 and TR120 than previously seen. Premio gave a smaller yield increase on previous results. Pizarro and Sherwood gave yield increases on previous results at TR120. Anubis gave slightly lower yields than previously seen.

Overall size grade profiles and haulm lengths for the varieties have remained similar to previous data.

Downy mildew is an important disease of peas. Romance and Premio gave very good field resistance to the disease, closely followed by Salinero, which showed moderate field resistance. Cosima gave a susceptible rating followed by Sherwood and Anubis having a moderately susceptible rating. No data has been obtained for Hesbana as only treated seed was supplied. Powdery mildew is of little importance in early peas, but Hesbana and Anubis were resistant.

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.

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

Variety Name	Leaf Type	Source	Maturity
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 TF436310. Red House Farm, Holbeach St Matthew, Lincs & silt loam soil. OS Ref TL500927, Manea, Cambs.

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 16 March 2012

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, eveness 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

The trial had:

Bikini as the yield standard and Avola as the early standard

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/m²
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

2012 was an upside down spring with April being cooler than March. Mean temperatures were 2.5 °C above average during March, 0.6 °C below during April and 0.5 °C above during May. It was the third warmest March in the UK temperature series from 1910 and the warmest since 1957. April was the coldest since 1989. The cool theme continued until the last 10 days of May, which were notably warm. Whilst the overall UK rainfall was very close to average, there was a pronounced gradient between the drier north-west and the wetter east and south. Rainfall over the UK was well below average during March (38%), making it provisionally the driest March since 1953 and the fifth driest since 1910. In marked contrast, April was the wettest on record, with 182% of normal. It was particularly wet across eastern and southern England. In May the rainfall pattern was variable, but totals in many areas were near average. Mean temperatures were 0.7 °C below average during June, 1.0 °C below during July and 0.4 °C above during August. It was the coolest June since 1991 and the coolest July since 2000. It was in an exceptionally wet summer especially during June and much of July. It was the wettest June across the UK in the England and Wales series from 1766. August was also a wetter than average month.

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Table 1 - Vining Pea Variety Studies. Summary of agronomic data Standard Vining Pea HDC Funded Early Variety Trial, Thornhaugh - 2012
Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 16 March
Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows.

				@ TR 100							@ TR 120								
Variety		Source	1000 Seed Weight g	Maturity (± days) Avola	Yield % of Bikini	% in size grades L	M	S	VS		Maturity (± days) Avola	Yield % of Bikini	% 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		As	214	0(29/6)	94	24	41	29	6		0(2/7)	87	35	47	15	3	53	2	19	5.5
Pizarro	SL	SVS	223	0	81	14	44	34	8		0	90	32	56	11	1	54	4	22	5.5
Salinero		SVS	212	+ 1	109	15	41	34	10		+ 1	112	26	50	20	4	46	2	21	5.5
Sherwood		SVS	192	+ 2	101	13	40	37	10		+ 2	119	21	51	24	4	54	2	19	5.7
Hesbana	SL	Nun	207	+ 3	66^{-}	6	40	43	11		+ 4	76^{-}	12	50	33	5	62	3	15	5.5
Anubis		LUK	209	+ 4	87	15	36	37	12		+ 4	94	21	43	28	8	57	3	14	5.3
Romance	SL	SVS	184	+ 6	151^{+}	15	44	33	8		+ 6	162^{+}	21	52	22	5	54	4	21	5.4
Cosima		vW	162	+ 6	103	18	45	30	7		+ 6	107	21	47	26	6	54	3	22	5.7
Premio		Mar	182	+10	67^{-}	16	44	29	11		+10	77^{-}	25	49	22	4	60	4	12	5.4
Bikini	SLSF	S&G	204	+10	100 (4.8t/ha)	20	51	25	4		+10	100 (5.5t/ha)	21	63	15	1	41	5	14	5.9
Significance @ P=0.05					SD							SD								
LSD @ P=0.05					19.1							21.5								
CV %					11.1							12.2								

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 – 2012

Variety	Tenderometer Reading	Appearance				
		Colour	Brightness	Uniformity	No. of blonds	Brix
		(3-8)	(1-2)	(1-5)	(1-5)	%
Avola	96.0	4.8	1.0	3.7	1.3	8.9
Pizarro	97.0	5.5	1.0	4.2	1.3	9.2
Salinero	104.0	5.5	1.0	4.2	1.0	8.3
Sherwood	95.0	5.7	1.0	4.2	1.3	9.1
Hesbana	95.0	4.8	1.3	3.5	1.3	9.0
Anubis	101.0	5.2	1.3	3.7	1.3	7.4
Cosima	105.0	5.7	1.0	4.3	1.3	7.3
Romance	100.0	5.7	1.0	4.2	1.0	7.9
Premio	96.5	5.2	1.0	4.0	1.3	8.2
Bikini	100.0	5.3	1.0	4.7	1.0	7.7

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 Early Variety Trial, Thornhaugh – 2010 - 2012
Varieties placed in order of maturity. Standard varieties underlined

			@ TR 100						@ TR 120									
Variety	Source	1000 Seed Weight g	Maturity (± days) Avola	Yield % of Bikini	% in size grades L	M	S	VS	Maturity (± days) Avola	Yield % of Bikini	% 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
Pizarro	SVS	215	-1	60^{-}	37	44	16	3	0	68^{-}	57	36	6	1	45	6	22	5.8
Avola	SVS	211	0	58^{-}	50	34	13	3	0	58^{-}	62	29	7	2	48	3	20	5.6
Salinero	SVS	199	0	67^{-}	31	46	18	5	0	73	46	41	11	2	42	4	21	5.6
Sherwood	SVS	183	+1	64^{-}	23	48	23	6	+1	80	36	49	13	2	44	4	21	5.6
Anubis	LUK	231	+2	75	30	43	21	6	+2	82	45	38	13	3	42	5	21	5.3
Hesbana	Nun	206	+3	56^{-}	12	50	32	6	+3	60^{-}	25	61	12	2	49	6	18	5.4
Cosima	vW	162	+5	82	30	46	20	4	+5	86	36	46	15	3	42	4	25	5.4
Romance	SVS	179	+6	99	19	49	27	5	+5	105	28	58	12	2	44	6	23	5.5
Premio	Mar	185	+8	87	16	50	29	5	+8	94	22	60	17	1	53	6	23	5.5
Bikini	Syn	212	+9	100	26	55	17	2	+8	100	31	57	11	1	37	6	24	5.7
Significance @ P=0.05				SD						SD								
LSD @ P=0.05				28.5						22.0								
CV %				22.2						30.4								

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 - Early Variety Trial, Thornhaugh – 2010 - 2012

Variety	Year	Tenderometer Reading	Appearance				
			Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	Brix %
Avola	10	104.5	5.2	1.3	4.8	1.0	9.3
	11	101.5	5.9	1.0	4.5	1.0	8.9
	12	96.0	4.8	1.0	3.7	1.3	8.9
Pizarro	10	97.0	5.8	1.0	4.3	1.3	10.8
	11	99.5	6.0	1.0	4.5	1.0	10.0
	12	97.0	5.5	1.0	4.2	1.3	9.2
Salinero	10	104.0	5.8	1.0	4.7	1.0	8.6
	11	99.5	5.5	1.0	4.5	1.0	8.9
	12	97.0	5.5	1.0	4.2	1.3	9.2
Sherwood	10	99.5	5.2	1.0	4.0	1.3	10.8
	11	104.0	5.8	1.0	4.3	1.0	10.7
	12	104.0	5.5	1.0	4.2	1.0	8.3
Hesbana	10	95.0	4.2	1.7	2.7	1.3	10.9
	11	99.5	4.8	1.0	3.0	1.3	10.0
	12	95.0	5.7	1.0	4.2	1.3	9.1
Anubis	10	99.5	5.3	1.0	4.3	1.0	10.0
	11	98.0	5.5	1.0	4.3	1.0	10.3
	12	101.0	5.2	1.3	3.7	1.3	7.4
Cosima	10	102.0	5.5	1.0	4.7	1.0	8.7
	11	97.5	5.5	1.0	4.5	1.0	9.7
	12	105.0	5.7	1.0	4.3	1.3	7.3
Romance	10	99.0	6.2	1.0	5.0	1.0	9.6
	11	105.0	5.8	1.0	4.5	1.0	10.1
	12	100.0	5.7	1.0	4.2	1.0	7.9
Premio	10	96.5	5.3	1.0	4.7	1.0	8.5
	11	97.0	5.3	1.0	4.0	1.0	8.8
	12	96.5	5.2	1.0	4.0	1.3	8.2
Bikini	10	102.0	5.8	1.0	4.8	1.0	9.1
	11	99.5	6.0	1.0	5.0	1.0	9.4
	12	100.0	5.3	1.0	4.7	1.0	7.7

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 Downy Mildew (Peronospora viciae) - 2012

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.

Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
Cosima Chinook	Spandimo	Hippee Sherwood Boogie Tommy Naches Kenobi Pizzaro	Salinero Biktop Bingo Butana	Premio

Varietal Susceptibility of Vining Peas to Powdery Mildew (Erysiphe pisi) - 2012

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

Vining Peas

Resistant	Ashton, Bingo, Boogie, Butana, Hesbana, Hippee, Kenobi, Naches,
Susceptible	Anubis, Bikini, Biktop, Chinook, Cosima, Pizarro, Premio, Romance, Salinero, Sherwood, Spandimo, Tommy, Zephyr

Discussion

Because of delayed sowing by wet weather and bird damage the mid-season and Late-season trials were not taken through to harvest in 2012. These trials will be repeated in 2013. However data from the downy and powdery mildew disease trials was obtained.

Standard Pea Early Season Trial, Thornhaugh 2012 – Tables 1 & 2

Bikini the yield standard gave average yields considering the seasonal weather.

Avola matured first 10 days before Bikini and was lodged at harvest. Yields were lower than Bikini, but not significantly so. Produce was medium-large size grade.

Semi-leafless **Pizarro** matured at the same time as Avola. Haulm was similar in length to Avola and the variety stood a little better. Yields were similar to Avola at TR120. Produce was medium-small size grade at TR100 and medium-large size grade at TR120.

Maturing one day later than Avola, **Salinero** was a little shorter in haulm length than Avola and had and was lodged at harvest. Yields were good, higher than Bikini, but not significantly so. Produce was medium-small size grade at TR100 and medium-large size

grade at TR120.

Sherwood matured 2 days later than Avola. Haulm was similar in length to Avola and the variety was lodged at harvest. Yields were similar to Bikini at TR100 and higher, but not significantly higher than Bikini at TR120. Produce was medium-small size grade at TR100 and medium size grade at TR120.
Semi-leafless **Hesbana** matured 3 days later than Avola. Haulm was longer than Avola and the variety was lodged at harvest. Yields of medium-small size grade peas were lower than Avola and significantly lower than Bikini.

Romance and Cosima matured 6 days later than Bikini.

Romance was semi-leafless and had lower than average standing ability. Yields were very high, significantly higher than Bikini and the highest in this trial. Produce was medium-small size grade at TR100 and medium size grade at TR120.
Cosima had similar length haulm to Avola and was lodged at harvest. Yields of medium-small size grade peas were higher than Avola and similar to Bikini.

Premio was later maturing this year, maturing at the same time as Bikini. Haulm was a little longer than Avola and the variety had lower than average standing ability. Yields were low, significantly lower than Bikini. Produce was medium-small size grade at TR100 and medium size grade at TR120.

Bikini matured 10 days later than Avola. Bikini was semi-leafless and semi-fasciated and gave average yields. Haulm was short and the variety had average standing ability. Produce was medium-large size grade.

Conclusions

The varieties have been trialed in three very contrasting years.

In comparison to Bikini, many of the early varieties gave better yields in 2012. The exception was Premio, which gave lower yields in 2012. In 2010 and 2011 Premio gave higher yields.

Varietal differences in maturity is key in planning sowing and harvesting programmes and it is reassuring to find that there were no major variances from previous data. Pizarro, Salinero, Sherwood and Anubis matured at the same time as in previous trials. Hesbana,

Cosima, Romance and Premio all matured one day later on average than seen in previous trials.

Overall yields for most varieties at TR100 were similar to those seen in previous trials. Salinero and Romance gave high yields in 2012 and overall yields were higher at TR100 and TR120 than previously seen. Premio gave a smaller yield increase on previous results. Pizarro and Sherwood gave yield increases on previous results at TR120. Anubis gave slightly lower yields than previously seen.

Overall size grade profiles and haulm lengths for the varieties have remained similar to previous data.

Downy mildew is an important disease of peas. Romance and Premio gave very good field resistance to the disease, closely followed by Salinero, which showed moderate field resistance. Cosima gave a susceptible rating followed by Sherwood and Anubis having a moderately susceptible rating. No data has been obtained for Hesbana as only treated seed was supplied. Powdery mildew is of little importance in early peas, but Hesbana and Anubis were resistant.

Industry representative comments

Vining peas are at their optimum - in terms of quality of taste and yield -for as little as 24 hours of their life cycle. In order to harvest peas in this 'quality' window there needs to be a succession of plantings throughout the Spring. Normally the drilling season for vining peas stretches from late February to mid/late May. Therefore I consider this to be an essential project in order to evaluate main crop varieties sown at times that are more realistic to the commercial situation.

Technology transfer

Trials were demonstrated at the PGRO Vining Pea Trials day on 12 June 2012. Trials were visited by seedsmen at intervals throughout the harvest period.

The PGRO publication ‘Vining Pea Growers Guide 2013’ was produced and distributed in November 2012. Data from these trials were included in this publication. Data from other PGRO trials are also presented. This Publication is available free of charge and via the PGRO website.

Results will be presented at future meeting of the Vegetable Agronomists Association meeting.

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