

Project title: Vining peas: Extension of variety evaluation trials

Project number: FV 340b

Project leader: Stephen Belcher, PGRO

Report: Annual report , 2016

Previous report: FV 340a final report

Key staff: S. Belcher, S. Johnson, J.Nash, Dr L. Wiesel

Location of project: Manor Farm
Holbeach Hurn
Spalding. PE12 8LR

Industry Representative: Mr. R. Fitzpatrick
Holbeach Marsh Co-op,
Manor Farm,
Holbeach Hurn,
Spalding, PE12 8LR.
Tel: 01406421098
Email:Richard.fitzpatrick@hmcpeas.co.uk

Date project commenced: 01/03/2015

Date project completed 28/02/2018
(or expected completion date):

DISCLAIMER

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

© Agriculture and Horticulture Development Board 2016 No part of this publication may be reproduced in any material form (including by photocopy or storage in any medium by electronic mean) or any copy or adaptation stored, published or distributed (by physical, electronic or other means) without prior permission in writing of the Agriculture and Horticulture Development Board, other than by reproduction in an unmodified form for the sole purpose of use as an information resource when the Agriculture and Horticulture Development Board or AHDB Horticulture is clearly acknowledged as the source, or in accordance with the provisions of the Copyright, Designs and Patents Act 1988. All rights reserved.

All other trademarks, logos and brand names contained in this publication are the trademarks of their respective holders. No rights are granted without the prior written permission of the relevant owners.

[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.

[Name]

[Position]

[Organisation]

Signature Date

[Name]

[Position]

[Organisation]

Signature Date

Report authorised by:

[Name]

[Position]

[Organisation]

Signature Date

[Name]

[Position]

[Organisation]

Signature Date

CONTENTS	3
GROWER SUMMARY	5
Headline.....	5
Background	5
Variety Trial Results	5
Financial Benefits.....	6
Trial site details	7
Standard Pea Main Trial, Holbeach 2015 – Tables 2 &3.....	8
Main Conclusions.....	8
FULL TRIAL REPORT	10
Introduction	10
Discussion	17
Conclusions	18
Technology transfer.....	19
Industry Representative Comments.....	19
APPENDIX 1	19

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

Through funding from Seed houses and PGRO vining pea levy, vining pea varieties are evaluated at one site. After year one (Preliminary Trial stage) varieties may progress to the Main Trial Stage, where after two further years of evaluation they may be added to the PGRO Descriptive List of Vining Pea Varieties. Currently these trials are located near Nocton, mid-Lincolnshire, but this represents only a proportion of the vining pea production area. Funding by AHDB Horticulture allows a duplicate Main Trial to be sown on a different soil type and location near Holbeach, S. Lincolnshire. After two years of evaluation varieties may be added to a Descriptive List of vining pea varieties for this area / soil type.

Variety Trial Results

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

Table 1. Varieties, Leaf type, Source and approximate Maturity – 2015

Variety Name	Leaf Type	Source	Maturity (\pm days cv. Avola)
Aloha	C	van Waveren, Germany	0
CS-430AF(Tomahawk)	SL	Crites Seed, USA	0
Sherwood	C	Seminis Vegetable Seeds, France	0
Avola	C	Seminis Vegetable Seeds, France	0
Beverly	C	van Waveren, Germany	+ 1
Kiss	C	van Waveren, Germany	+ 2
Cargo	C	van Waveren, Germany	+ 2
05S52738A	SL	Limagrain, UK	+ 4
CS- 437F	C	Crites Seed, USA	+ 5
D 85178	C	Syngenta Seeds, France	+ 7
SV0957QF	SL	Seminis Vegetable Seeds, France	+ 7
Payton	SL	Pure Line Seeds, USA	+ 7
CS-426AF	SL	Crites Seed, USA	+ 7
PFR 13-A21	C	Plant & Food Research Ltd, New Zealand	+ 8
05S52323A	SL	Limagrain, UK	+ 9
06S57317A	SL	Limagrain, UK	+ 9
Vivado(D85410)	C	Syngenta Seeds, France	+ 9
Oasis	C	Limagrain, UK	+ 9
D 175161	SL	Syngenta Seeds, France	+ 9
PFR 13-A37	SL	Plant & Food Research Ltd, New Zealand	+ 9
Standana	SL	Nunhems Seeds, Netherlands	+11
Maurice	SL	Seminis Vegetable Seeds, France	+11
CS-438AF	SL	Crites Seed, USA	+11
06S60830A	SL	Limagrain, UK	+11
04S51315A	SL	Limagrain, UK	+12
Ambassador	C	van Waveren, Germany	+12

C=Conventional-leaved; SL=Semi-leafless

Financial Benefits

New vining pea varieties in trial represent improvements in either yield, size-grade, colour, uniformity and disease vulnerability compared with varieties such as Avola, Bikini and Ambassador which have been grown for very many years.

Improvements in colour avoid deductions in payment which can be up to 5%. Growers, processors, retailers and consumers are likely to benefit from these improvements.

The data will provide additional data for the Descriptive List of Vining Peas – Holbeach, which will be published annually in the PGRO publication The Vining Pea Growers Guide. Data from the Nocton trials will be published in separate table. This booklet will also be available for distribution to all AHDB Horticulture pea levy payers. This work will benefit all vining pea growers interested in adopting new improved varieties.

Trial site details

Variety Trial Site: Fertile light silt soil in a commercial crop of Vining Peas, near Holbeach Hurn, South Lincolnshire. OS Ref: TF402269. Manor Farm, Holbeach Hurn, Spalding, PE12 8LR.

Downy Mildew Trials:

Colne Fen Farm near Chatteris, Cambs OS Ref: TL 369832

Holbeach St Marks, Lincs OS Grid Ref TF365343

Table 2. Yield (% of cv. Oasis), Size grade (% of cv. Oasis), Haulm length and Standing ability – Manor Farm 2015

Variety	@TR100					@TR120		Standing Ability 9=erect 1=lodged
	Yield % of Oasis	L	M	S	VS	Yield % of Oasis	Haulm length cm	
<u>Oasis</u>	<u>100</u> (8.48t/ha)	<u>40</u>	<u>46</u>	<u>12</u>	<u>2</u>	<u>100</u> (11.49t/ha)	<u>68</u>	<u>2</u>
Aloha						81 ⁻	62	3
CS-430AF(Tomahawk)						96	64	2
Sherwood						82 ⁻	59	3
<u>Avola</u>						<u>73⁻</u>	<u>66</u>	<u>2</u>
Beverly						86	61	2
Kiss	102	25	55	18	2	76 ⁻	66	2
Cargo	93	19	78	2	1	84 ⁻	62	2
05S52738A	76 ⁻	17	48	28	7	58 ⁻	62	6
CS- 437F	70 ⁻	32	45	19	4	59 ⁻	66	2
D 85178	81	25	60	14	1	60 ⁻	66	2
SV0957QF	118	42	49	8	1	90	69	6
Payton	81	19	57	21	3	60 ⁻	59	4
CS-426AF	108	32	57	10	1	80 ⁻	72	4
PFR 13-A21	98	30	51	17	2	76	64	2
05S52323A	108	26	53	18	3	95	72	4
06S57317A	108	47	46	6	1	82 ⁻	76	6
Vivado(D85410)	107	35	51	13	1	79 ⁻	72	2
D 175161	46 ⁻	3	20	43	34	51 ⁻	72	7
PFR 13-A37	91	29	53	16	2	91	96	8
Standana	86	21	59	18	2	86	92	6
Maurice	116	30	47	19	4	86	72	4
CS-438AF	93	24	55	18	3	92	82	5
06S60830A	99	27	52	18	3	77 ⁻	68	2
04S51315A	86	51	34	12	3	92	72	4
Ambassador	80	37	40	19	4	64 ⁻	82	3

KEY: Yield: ⁻ Significantly less than Oasis @ 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

Varieties (cv.) given in order of maturity (see Table 1).

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.

Standard Pea Main Trial, Holbeach 2015 – Tables 2 & 3

A very hot period and a clash in vining in late June / early July meant that three early varieties together with Avola were not harvested at TR100 stage, but harvested at TR120 stage only.

Tomahawk gave the highest yield of the early maturing varieties when compared to Oasis.

Oasis (the yield standard) gave a 3t/ha yield increase from TR100 to TR120. Several varieties that gave higher yields than Oasis at TR100 did not yield as well at TR120 when compared to Oasis.

Several varieties gave higher yields than Oasis at TR100 including Kiss, SV0957QF, CS426AF, 05S52323A, 06S57317A, Vivado, and Maurice. None however, gave statistically significantly higher yields than Oasis.

06S57317A gave peas with the darkest colour, both in the raw state and after freezing.

Semi-leafless PFR 13-A37 had the best standing ability and the longest haulm in the trial.

Although levels of downy mildew infection were relatively low in 2015, there were some varietal differences. CS 448AF was susceptible, while Maurice and Vivado showed good field resistance

Main Conclusions

Varieties were evaluated in standard Vining Pea Main Trials at Holbeach in 2014 and 2015.

Eight varieties Tomahawk, Aloha, Kiss, Payton, CS-426AF, Vivado, Standana and Maurice completed two years of evaluation in 2015.

Oasis (the yield standard) gave very high yields in 2014. In 2014 the yield difference from TR100 to TR120 was 0.37t/ha, but in 2105 it was 3t/ha. Only one variety, Maurice gave higher yields than Oasis over this 2 year series. Maturities for Oasis ranged from +15 (2014) to +9 (2015).

Aloha (Wav 834) (van Waveren) matured at the same time as Avola. Yields were 3% higher than Avola at TR100 and produce a little smaller, medium-large size grade.

Tomahawk (CS-430AF) (Crites Seed) was semi-leafless and matured at the same time as Avola. Yields were statistically significantly lower than Oasis at TR100, but only 4% lower at TR120. A similar yield pattern was seen in 2014. Produce was medium-large size grade, smaller than Avola.

Kiss (Wav 895) (van Waveren) also matured at the same time as Avola. Yields were 5% higher than Avola at TR120. Produce was a little smaller than Avola, medium-large size grade.

Payton (PLS 167) (Pure Line Seeds) was semi-leafless and matured 4 days before Oasis. Yields of medium size grade peas were 19% lower than Oasis at TR100. At TR120 yields were statistically significantly lower than Oasis.

CS-426AF (Crites Seed) was semi-leafless and matured 3 days before Oasis. Yields were 8 and 9% lower than Oasis at TR100 and TR120 respectively. Produce was medium-large size grade, smaller than Oasis.

Vivado (D 85410) (Syngenta) matured one day before Oasis. Yields were 13% lower than Oasis at TR100 and statistically significantly lower at TR120. Produce was a little smaller than Oasis.

Standana (Nunhems) was semi-leafless and matured one day later than Oasis. Yields were 13% lower than Oasis at TR100. Produce was much smaller than Oasis, medium size grade. Haulm was long, similar to Ambassador, but standing ability was amongst the best in these trials.

Maurice (Seminis Vegetable Seeds) was semi-leafless and matured 2 days later than Oasis. Overall yields were the highest in trial at TR100, 6% higher than Oasis. At TR120 yields were 7% lower than Oasis. This was a similar yield pattern to 2014. Produce was smaller than Oasis, medium-large size grade. Standing ability was amongst the best in these trials.

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 34,000 ha per annum, with a value of £ 47M (Source BGA 2014).

The Legume Industry Panel have identified varietal selection as an important and key element of crop production and require as accurate a guide to the performance of varieties in areas typical of pea production 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.

Through funding from Seed houses and PGRO vining pea levy, vining pea varieties are evaluated at one site. After year one (Preliminary Trial stage) varieties may progress to the Main Trial Stage, where after two further years of evaluation they may be added to the PGRO Descriptive List of Vining Pea Varieties. Currently these trials are located near Nocton, mid-Lincolnshire, but this represents only a proportion of the vining pea production area. Funding by AHDB Horticulture allows a duplicate Main Trial to be sown on a different soil type and location near Holbeach, S. Lincolnshire. After two years of evaluation varieties may be added to a Descriptive List of Vining Pea Varieties for this area / soil type

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 34,000 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
- maturity
- ease of integration in the harvest programme

A range of promising varieties have been tested in recent years and more information on their performance and relative maturity of varieties on a different soil type was needed. Trials data is required over at least three years to gain information on the performance of varieties in contrasting seasonal weather conditions.

Table 1. Varieties (and numbered selections), Leaf type, Source and approximate Maturity - 2015

Variety Name	Leaf Type	Source	Maturity (\pm days cv. Avola)
Aloha	C	van Waveren, Germany	0
CS-430AF(Tomahawk)	SL	Crites Seed, USA	0
Sherwood	C	Seminis Vegetable Seeds, France	0
Avola	C	Seminis Vegetable Seeds, France	0
Beverly	C	van Waveren, Germany	+ 1
Kiss	C	van Waveren, Germany	+ 2
Cargo	C	van Waveren, Germany	+ 2
05S52738A	SL	Limagrain, UK	+ 4
CS- 437F	C	Crites Seed, USA	+ 5
D 85178	C	Syngenta Seeds, France	+ 7
SV0957QF	SL	Seminis Vegetable Seeds, France	+ 7
Payton	SL	Pure Line Seeds, USA	+ 7
CS-426AF	SL	Crites Seed, USA	+ 7
PFR 13-A21	C	Plant & Food Research Ltd, New Zealand	+ 8
05S52323A	SL	Limagrain, UK	+ 9
06S57317A	SL	Limagrain, UK	+ 9
Vivado(D85410)	C	Syngenta Seeds, France	+ 9
Oasis	C	Limagrain, UK	+ 9
D 175161	SL	Syngenta Seeds, France	+ 9
PFR 13-A37	SL	Plant & Food Research Ltd, New Zealand	+ 9
Standana	SL	Nunhems Seeds, Netherlands	+11
Maurice	SL	Seminis Vegetable Seeds, France	+11
CS-438AF	SL	Crites Seed, USA	+11
06S60830A	SL	Limagrain, UK	+11
04S51315A	SL	Limagrain, UK	+12
Ambassador	C	van Waveren, Germany	+12

C=Conventional-leaved; SL=Semi-leafless

Trial site details

Variety Trial Site: Fertile light silt soil in a commercial crop of Vining Peas, near Holbeach Hurn, South Lincolnshire. OS Ref: TF402269. Manor Farm, Holbeach Hurn, Spalding, PE12 8LR.

Production details

Fungicide seed treatment: Wakil XL

Sown with a Wintersteiger/Hege plot drill to achieve a target population of 90 plants/m².

Broad-leaved weeds were controlled pre-emergence and post-emergence herbicide.

Aphid and pea moth (*Cydia nigricana*) were controlled (monitored by pea moth traps).

Fungicide sprays were applied to control Botrytis and Mycosphaerella.

Variety Trial Design

Trial layout: Randomised block, 2 replications.

Plot size: 1.83 m x 14 m.

Sub-plots: 1.83 m x 3.5 m. Plots harvested at @TR value 100 (range 95-105), @TR 120 Range 115-130) and a third harvest if needed.

Sampling areas for TR assessment: 1.83 m x 1.25 m

Statistical analysis of yield and haulm length data in each year using ANOVA.

Statistical analysis of rolling 2 year average for varieties completing 2 years evaluation.

Trial records and data collected

Haulm lengths measured and standing ability assessed just before harvest.

Maturity assessed from the sampling areas to achieve correct harvest dates for quick-freezing and canning for vined peas using a pea tenderometer.

Sub-plots harvested when appropriate by hand, vined in a plot pea viner and washed.

Peas size-graded with a Mather & Platt grader and weighed and total yield measured.

Maturity assessed with a pea tenderometer.

Samples frozen at @TR100 for quality appraisal.

Downy Mildew Trials

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*).

Trial Sites:

Colne Fen Farm near Chatteris OS Ref: TL 369832

Sowing date: 7 May 2015

Assessment dates: 1. 1 June 2015, 2. 14 July 2015

Holbeach St Marks OS Grid Ref TF365343

Sowing date: 9 April 2015

Assessment dates: 1. 7 May 2015, 2. 21 May 2015, 3. 2 July 2015

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 randomized in 2 replications.

On at least 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.

TABLE 2 - VINING PEA VARIETY TRIALS: Summary of agronomic data Standard Vining Pea Main Variety Trial, Holbeach Hurn, OS Ref: TF402269 - 2015
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 8 April 2015.
 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						@ 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 Oasis	% in size grades L M S VS				Maturity (± days) Avola	Yield % of Oasis	% in size grades L M S VS							Haulm length cm
<u>Avola</u>	<u>SVS</u>	<u>218</u>	<u>0(6 July)</u>						<u>0(8 July)</u>	<u>73⁻</u>	<u>30</u>	<u>59</u>	<u>7</u>	<u>4</u>	<u>66</u>	<u>2</u>	<u>21</u>	<u>5.6</u>
Aloha	vW	218	0						0	81 ⁻	30	57	12	1	62	3	22	5.6
CS-430AF(Tomahawk)	SL CS	219	0						0	96	35	58	6	1	64	2	22	5.5
Sherwood	SVS	215	0						0	82 ⁻	28	60	11	1	59	3	19	5.4
Beverly	vW	182	+1						+1	86	37	55	7	1	61	2	22	5.5
Kiss	vW	174	+2	102	25	55	18	2	+2	76 ⁻	35	57	7	1	66	2	18	5.4
Cargo	vW	202	+2	93	19	78	2	1	+3	84 ⁻	20	71	8	1	62	2	20	5.4
05S52738A	SL LUK	194	+4	76 ⁻	17	48	28	7	+5	58 ⁻	21	53	22	4	62	6	14	5.5
CS- 437F	CS	175	+5	70 ⁻	32	45	19	4	+6	59 ⁻	41	47	10	2	66	2	13	5.1
D 85178	Syn	188	+7	81	25	60	14	1	+7	60 ⁻	25	61	13	1	66	2	14	5.5
SV0957QF	SL SVS	188	+7	118	42	49	8	1	+8	90	48	47	5	0	69	6	20	5.5
Payton	SL PLS	146	+7	81	19	57	21	3	+8	60 ⁻	20	60	18	2	59	4	16	5.6
CS-426AF	SL CS	192	+7	108	32	57	10	1	+8	80 ⁻	39	53	7	1	72	4	18	5.5
PFR 13-A21	PFR	227	+8	98	30	51	17	2	+9	76	41	51	7	1	64	2	18	5.6
05S52323A	SL LUK	143	+9	108	26	53	18	3	+9	95	36	54	9	1	72	4	19	5.3
06S57317A	SL LUK	200	+9	108	47	46	6	1	+9	82 ⁻	47	46	6	1	76	6	17	5.9
Vivado(D85410)	Syn	155	+9	107	35	51	13	1	+10	79 ⁻	40	53	6	1	72	2	17	5.5
<u>Oasis</u>	<u>LUK</u>	<u>205</u>	<u>+9</u>	<u>100</u>	<u>40</u>	<u>46</u>	<u>12</u>	<u>2</u>	<u>+10</u>	<u>100</u>	<u>48</u>	<u>44</u>	<u>7</u>	<u>1</u>	<u>68</u>	<u>2</u>	<u>19</u>	<u>5.3</u>
				(8.48t/ha)						(11.49t/ha)								
D 175161	SL Syn	89	+9	46 ⁻	3	20	43	34	+10	51 ⁻	4	28	57	11	72	7	11	5.1
PFR 13-A37	SL PFR	223	+9	91	29	53	16	2	+10	91	45	52	3	0	96	8	14	5.5
Standana	SL Nun	156	+11	86	21	59	18	2	+11	86	21	63	15	1	92	6	18	5.3
Maurice	SL SVS	127	+11	116	30	47	19	4	+11	86	39	45	13	3	72	4	19	5.3
CS-438AF	SL CS	185	+11	93	24	55	18	3	+12	92	25	57	16	2	82	5	17	5.1
06S60830A	SL LUK	196	+11	99	27	52	18	3	+12	77 ⁻	31	54	13	2	68	2	18	5.4
04S51315A	SL LUK	207	+12	86	51	34	12	3	+12	92	68	26	5	1	72	4	16	4.9
<u>Ambassador</u>	<u>vW</u>	<u>175</u>	<u>+12</u>	<u>80</u>	<u>37</u>	<u>40</u>	<u>19</u>	<u>4</u>	<u>+13</u>	<u>64⁻</u>	<u>51</u>	<u>45</u>	<u>4</u>	<u>0</u>	<u>82</u>	<u>3</u>	<u>17</u>	<u>4.8</u>
Significance @ P=0.05				SD						SD								
LSD @ P=0.05				22.6						15.3								
CV %				12.3						10.0								

KEY: Yield: + Significantly greater than Oasis @ P = 0.05; - Significantly less than Oasis @ 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; Source of varieties see Appendix

TABLE 3 - VINING PEA VARIETY TRIALS. Summary of quality data - Standard Vining Pea Main Variety Trial, Holbeach - 2015

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Avola	136.0	5.8	1.0	4.3	1.0	10.0
Aloha	117.0	5.5	1.0	3.8	1.0	10.0
CS-430AF(Tomahawk)	126.0	6.0	1.0	4.5	1.0	9.9
Sherwood	117.0	5.3	1.0	3.3	1.0	11.4
Beverly	114.0	5.5	1.0	3.8	1.0	10.7
Kiss	108.0	5.5	1.0	4.0	1.0	10.8
Cargo	108.0	5.3	1.0	3.3	1.5	10.5
05S52738A	99.5	5.8	1.0	4.0	1.0	12.5
CS- 437F	104.0	5.0	1.0	3.5	1.0	9.4
D 85178	101.5	5.5	1.0	2.8	1.5	10.6
SV0957QF	100.5	6.8	1.0	4.5	1.0	10.5
Payton	103.0	5.8	1.0	4.5	1.0	11.5
CS-426AF	108.5	6.0	1.0	4.5	1.0	11.8
PFR 13-A21	98.0	5.8	1.0	3.5	1.0	12.9
05S52323A	106.0	5.8	1.0	4.3	1.0	9.5
06S57317A	102.5	7.0	1.0	4.3	1.0	11.2
Vivado(D85410)	98.5	6.3	1.0	3.8	2.0	11.0
Oasis	97.0	6.3	1.0	4.0	1.5	10.4
D 175161	102.0	6.3	1.0	4.5	1.0	11.6
PFR 13-A37	100.0	6.5	1.0	4.5	1.0	12.2
Standana	101.0	6.3	1.0	4.5	1.0	11.2
Maurice	102.5	6.5	1.0	4.3	1.0	10.8
CS-438AF	99.5	6.8	1.0	5.0	1.0	11.8
06S60830A	98.0	6.5	1.0	4.3	1.0	12.1
04S51315A	100.5	6.0	1.0	3.5	1.0	12.3
Ambassador	99.0	6.0	1.0	3.8	1.0	10.1

KEY: Uniformity; Uniformity; No. of blonds: (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 4 - VINING PEA VARIETY TRIALS. Summary of Standard Vining Peas – Holbeach, Evaluated 2014 - 2015
 Varieties placed in order of maturity. Standard varieties underlined

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 Oasis	% in size grades L M S VS				Maturity (± days) Avola	Yield % of Oasis	% in size grades L M S VS				Haulm length cm				
<u>Avola</u>	<u>SVS</u>	<u>221</u>	<u>0</u>	<u>52</u>	<u>57</u>	<u>28</u>	<u>12</u>	<u>3</u>	<u>0</u>	<u>74</u>	<u>48</u>	<u>42</u>	<u>7</u>	<u>3</u>	<u>63</u>	<u>3</u>	<u>20</u>	<u>5.6</u>	
Aloha (Wav 834)	vW	216	0	62	41	42	13	4	0	77	41	46	11	2	60	3	20	5.6	
CS-430AF(Tomahawk)	SL CS	212	0	73	27	52	19	2	0	96	42	50	7	1	59	3	22	5.4	
Kiss (Wav 895)	vW	189	+2	84	30	48	19	3	+2	79	40	48	10	2	65	3	19	5.4	
Payton (PLS 1670)	SL PLS	139	+8	81	19	54	23	4	+9	74	21	57	19	3	64	4	18	5.6	
CS-426AF	SL CS	194	+9	92	29	51	17	3	+9	91	35	55	9	1	71	4	18	5.4	
Vivado(D85410)	Syn	155	+11	87	30	51	17	2	+12	85	39	53	7	1	74	3	20	5.6	
<u>Oasis</u>	<u>LUK</u>	<u>200</u>	<u>+12</u>	<u>100</u>	<u>38</u>	<u>46</u>	<u>14</u>	<u>2</u>	<u>+12</u>	<u>100</u>	<u>47</u>	<u>44</u>	<u>8</u>	<u>1</u>	<u>72</u>	<u>3</u>	<u>20</u>	<u>5.4</u>	
				(11.78t/ha)						(13.47t/ha)									
Standana	SL Nun	163	+13	87	19	57	22	2	+13	86	22	67	10	1	84	6	18	5.1	
<u>Ambassador</u>	<u>vW</u>	<u>192</u>	<u>+14</u>	<u>85</u>	<u>38</u>	<u>43</u>	<u>16</u>	<u>3</u>	<u>+15</u>	<u>76</u>	<u>48</u>	<u>45</u>	<u>6</u>	<u>1</u>	<u>86</u>	<u>4</u>	<u>20</u>	<u>5.1</u>	
Maurice	SL SVS	128	+14	106	28	47	20	5	+14	93	37	47	13	3	76	6	20	5.4	
Significance @ P=0.05				SD						SD									
LSD @ P=0.05				23.7						13.6									
CV %				12.7						8.0									

KEY: Yield: + Significantly greater than Oasis @ P = 0.05; - Significantly less than Oasis @ 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; Source of varieties see **Appendix**

TABLE 5 - VINING PEA VARIETY STUDIES. Summary of quality data – Standard pea varieties – Holbeach, 2014 & 2015

Variety	Year	Tenderometer Reading	Appearance				Brix %
			Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
AVOLA	14	98.5	4.67	1.00	3.50	1.67	8.4
	15	136.0	5.75	1.00	4.25	1.00	10.0
Aloha	14	98.5	5.50	1.00	4.50	1.00	9.1
	15	117.0	5.50	1.00	3.75	1.00	10.0
CS-430AF(Tomahawk)	14	99.0	5.33	1.00	4.67	1.00	8.5
	15	100.5	6.75	1.00	4.50	1.00	10.6
Kiss	14	101.0	5.33	1.00	4.67	1.00	9.4
	15	101.5	5.50	1.00	2.75	1.50	10.8
Payton	14	100.5	5.83	1.00	4.33	1.33	9.7
	15	97.0	6.25	1.00	4.00	1.50	11.4
CS-426AF	14	100.0	5.33	1.00	4.33	1.00	9.4
	15	108.5	6.00	1.00	4.50	1.00	11.8
Vivado	14	100.0	5.33	1.00	3.33	1.33	8.3
	15	98.5	6.25	1.00	3.75	2.00	11.0
Oasis	14	96.5	4.83	1.00	3.00	2.00	9.2
	15	102.5	6.50	1.00	4.25	1.00	10.4
Standana	14	99.0	5.33	1.00	4.17	1.00	8.5
	15	117.0	5.25	1.00	3.25	1.00	10.5
Ambassador	14	93.0	5.33	1.00	3.67	1.67	8.7
	15	99.0	6.00	1.00	3.75	1.00	10.1
Maurice	14	97.0	5.17	1.00	4.00	1.00	8.8
	15	108.0	5.50	1.00	4.00	1.00	10.8

KEY: Uniformity; No. of blonds; (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*) - 2015

Downy mildew levels were very low at both sites in 2015

Table 6. Downy mildew susceptibility ratings (average of two sites) - 2015

Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
CS-448AF	Ambassador	Cargo	Beverley Payton (PLS167)	Maurice Vivado (D85410)
	Tomahawk(CS430AF) D85178 D175161 CS-437F Avola	PFR 13-A37 CS 426 AF Kiss PFR 13-A21		

Downy Mildew Trial Sites:

Colne Fen Farm near Chatteris OS Ref: TL 369832

Holbeach St Marks OS Grid Ref TF365343

These data and those from previous years were incorporated in the PGRO Descriptive Lists of Vining Pea Varieties, published in the PGRO Vining Pea Growers Guide.

Discussion

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

Standard Pea Main Trial, Holbeach 2015 – Tables 2 & 3

A very hot period and a clash in vining in late June / early July meant that three early varieties together with Avola were not harvested at TR100 stage, but harvested at TR120 stage only.

Tomahawk gave the highest yield of the early maturing varieties when compared to Oasis.

Oasis, the yield standard gave a 3t/ha yield increase from TR100 to TR120. Several varieties that gave higher yields than Oasis at TR100 did not yield as well at TR120 when compared to Oasis.

Several varieties gave higher yields than Oasis yields at TR100 including, Kiss, SV0957QF, CS426AF, 05S52323A, 06S57317A, Vivado, and Maurice. None however, gave statistically significantly higher yields than Oasis.

06S57317A gave peas with the darkest colour, both in the raw state and after freezing.

Semi-leafless PFR 13-A37 had the best standing ability and the longest haulm in the trial.

Although levels of downy mildew infection were relatively low in 2015, there were some varietal differences. CS448AF was susceptible, while Maurice and Vivado showed good field resistance.

Conclusions

Varieties were evaluated in standard Vining Pea Main Trials at Holbeach in 2014 and 2015.

Eight varieties Tomahawk, Aloha, Kiss, Payton, CS-426AF, Vivado, Standana and Maurice completed two years of evaluation in 2015.

Oasis (the yield standard) gave very high yields in 2014. In 2014 the yield difference from TR100 to TR120 was 0.37t/ha, but in 2105 it was 3t/ha. Only one variety, Maurice gave higher yields than Oasis over this 2 year series. Maturities for Oasis ranged from +15 (2014) to +9 (2015).

Aloha (Wav 834) (van Waveren) matured at the same time as Avola. Yields were 3% higher than Avola at TR100 and produce a little smaller, medium-large size grade.

Tomahawk (CS-430AF) (Crites Seed) was semi-leafless and matured at the same time as Avola. Yields were statistically significantly lower than Oasis at TR100, but only 4% lower at TR120. A similar yield pattern was seen in 2014. Produce was medium-large size grade, smaller than Avola.

Kiss (Wav 895) (van Waveren) also matured at the same time as Avola. Yields were 5% higher than Avola at TR120. Produce was a little smaller than Avola, medium-large size grade.

Payton (PLS 167) (Pure Line Seeds) was semi-leafless and matured 4 days before Oasis. Yields of medium size grade peas were 19% lower than Oasis at TR100. At TR120 yields were statistically significantly lower than Oasis.

CS-426AF (Crites Seed) was semi-leafless and matured 3 days before Oasis. Yields were 8 and 9% lower than Oasis at TR100 and TR120 respectively. Produce was medium-large size grade, smaller than Oasis

Vivado (D 85410) (Syngenta) matured one day before Oasis. Yields were 13% lower than Oasis at TR100 and statistically significantly lower at TR120. Produce was a little smaller than Oasis.

Standana (Nunhems) was semi-leafless and matured one day later than Oasis. Yields were 13% lower than Oasis at TR100. Produce was much smaller than Oasis, medium size grade. Haulm was long, similar to Ambassador, but standing ability was amongst the best in these trials.

Maurice (Seminis Vegetable Seeds) was semi-leafless and matured 2 days later than Oasis. Overall yields were the highest in trial at TR100, 6% higher than Oasis. At TR120 yields were 7% lower than Oasis. This was a similar yield pattern to 2014. Produce was smaller than Oasis, medium-large size grade. Standing ability was amongst the best in these trials.

Technology transfer

No formal trials demonstration was held. However, an open invitation was sent out to view the trial at people's convenience.

The PGRO publication 'Vining Pea Growers Guide' was produced and distributed and contains two year summaries for varieties completing trials in 2008/9 or 2009/10, 2010/11, 2011 & 2013, 2013/14 and 2014/15 from the silt-land sites near Holbeach, S. Lincolnshire. Data from other PGRO trials are also presented. This publication is available free of charge via the PGRO website.

Industry Representative Comments

'I see this as an extremely important project and absolutely crucial to the future of the UK vining pea industry. It continues to provide the UK vining pea growers with a very professional and independent assessment of new vining pea varieties. We need these new varieties that show – amongst other things – better levels of disease resistance, yield potential and produce quality in order to make our UK industry more efficient and compete with imported produce. The fact that these trials are carried out in the same soil types and actual field sites where the main commercial crops are grown makes them all the more valuable.'

APPENDIX 1

KEY TO SOURCE OF VARIETIES

CS	Crites Seed Inc., USA
EI	Elsoms Seeds Ltd, UK
GA	General Availability
LUK	Limagrain UK Ltd, UK
Nun	Nunhems Zaden BV., Holland
PFR	The New Zealand Institute for Plant and Food Research Ltd
PLS	Pure Line Seeds Inc., USA
SVS	Seminis Vegetable Seeds, UK
Syn	Syngenta Seeds, UK
vW	van Waveren, Germany