

**Project title:** Vining Peas: Extension of Variety Evaluation Trials

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**Project leader:** Stephen Belcher, PGRO

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**(or expected completion date):**

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

# AUTHENTICATION

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

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# GROWER SUMMARY

## Headline

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

## Background

Through funding from seed companies 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 standard size 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.

## Trial site details

Variety Trial Site: Moulton Seas End, South Lincolnshire. OS Grid Ref: TF312368.  
Jack Buck (Farms) Ltd.  
Green Lane  
Moulton Seas End  
SPALDING  
Lincolnshire  
PE12 6LT

Downy Mildew Trials:

Rutland farm Farm, near Manea, Cambs, PE15 0GD, OS Ref: TL471913  
Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref SK881494

Table 1. Varieties, leaf type, source and approximate maturity – 2018

Variety Name	Leaf Type	Source	Maturity (± days Avola)
Eldorado	C	Syngenta Seeds, France	- 1
Avola	C	Seminis Vegetable Seeds, France	0
Sherwood	C	Seminis Vegetable Seeds, France	0
CS-455AF	SL	Crites Seed, USA	+ 3
DGL0027	SL	Syngenta Seeds, France	+ 4
SV8112QH	SL	Seminis Vegetable Seeds, France	+ 5
D165641	SL	Syngenta Seeds, France	+ 8
LG Valiant	SL	Limagrain, UK	+ 8
Kengo(D165315)	SL	Syngenta Seeds, France	+ 9
PFR 15-A10	C	Plant & Food Research, New Zealand	+ 9
PFR 15-PA42	SL	Plant & Food Research, New Zealand	+ 9
Oasis	C	Limagrain, UK	+ 9
LG Stingray	C	Limagrain, UK	+10
LG Compass	SL	Limagrain, UK	+10
CS-441AF	SL	Crites Seed, USA	+10

SV0823QG	SL	Seminis Vegetable Seeds, France	+10
Ambassador	C	van Waveren, Germany	+10
PFR 1601	C	Plant & Food Research, New Zealand	+10
LG Infinity	SL	Limagrain, UK	+16
LG Dolphin	SL	Limagrain, UK	+16
C=Conventional-leaved; SL=Semi-leafless			

## Results of the Variety Trials

Table 2. Percentage yield, Percentage size grade, haulm length and standing ability –2018

Variety	@TR100					@TR120		Standing Ability 9=erect 1=lodged
	Yield % of Oasis	% in size grades L M S VS				Yield % of Oasis	Haulm length cm	
Eldorado	56-	40	49	10	1	56-	84	3
Sherwood	69-	30	51	17	2	71-	61	3
Avola	71-	52	42	6	0	71-	78	3
CS-455AF	72-	43	50	6	1	72-	60	6
DGL0027	54-	33	57	9	1	54-	70	8
SV8112QH	43-	24	53	20	3	43-	64	7
LG Valiant	77-	24	56	19	1	80-	74	5
D165641	59-	42	47	10	1	84	58	4
PFR 15-A10	79-	21	47	29	3	80-	73	6
Oasis	100 (11.32t/ha)	60	37	3	0	100 (11.32t/ha)	66	2
LG Compass	98	45	46	8	1	108	82	3
CS-441AF	98	47	48	5	0	111	78	5
PFR 15-PA42	94	11	45	40	4	108	73	8
SV0823QG	88	23	63	13	1	92	81	8
Kengo(D165315)	90	34	46	17	3	100	70	7
PFR 1601	93	27	56	15	2	96	74	6
LG Stingray	77-	44	48	7	1	92	65	2
Ambassador	78-	63	35	2	0	78-	96	4
LG Dolphin	83-	31	53	15	1	80-	54	6

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

## Main Conclusions

Yields from the yield standard Oasis (11.32 t/ha), were 1.83 t/ha higher than in 2018 at TR100. Oasis did not give a yield increase from TR100 to TR120.

Eldorado was the first to mature one day before Avola while LG Infinity and LG Dolphin matured late, 14 days later than Avola.

Early varieties Avola, Sherwood and CS-455AF gave similar yields at TR120. Eldorado was lower yielding, but not significantly so.

Oasis was the highest yielding variety at TR100 and several varieties gave significantly lower yields, including D85460 (56%), Sherwood (69%), Avola (71%),

CS-455AF(72%), DGL0027(54%), SV8112QH(43%), LG Valiant(77%), D165641(59%), PFR 15-A10(79%), LG Stingray(77%), Ambassador(78%) and LG Dolphin(83%).

The following varieties gave higher, but not significantly higher yields than Oasis at TR120 including, Kengo(100%), PFR-15-PA42(108%), LG Compass(108%) and CS-441AF(108%).

Varieties with very good standing ability (8) were DGL0027, PFR 15-PA42 and SV0823QG.

## SCIENCE SECTION

### Introduction

The Legume Industry Panel has 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.

The vining pea industry in the UK has a farm gate value of c.£52M per annum, with estimated retail value of £500M per annum. If improvements are made in yield and quality of just 5%, the value would be £2.6 million at the farm gate. An additional improvement in factory process efficiency of 1% represents around £1.3 million (Calculations based on industry evidence, 2017). Total value could be up to £3.9m per year to growers and processors. Internationally, vining peas are often grown to a lower grade standard than in the UK, giving UK producers competitive advantage in the domestic market and presenting export opportunity. The UK is estimated to produce approximately 30-40% of the vining peas in the EU, most of which are consumed in the domestic market.

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. Vining peas are grown commercially in strict schedules from drilling to harvest and selection of variety is critically important to allow growers and processors to manage programs effectively. This enables a high degree of harvest and processing planning and the spread of workload both agronomically and in the processing factories. Any disruption to factory process leads to large additional costs or losses. The period of harvesting and processing is from mid-June to the end of August in the UK, and varies depending on regional differences in environmental conditions.

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. Trials are currently located near Nocton, mid-Lincolnshire, but this represents a small proportion of the total UK vining pea production area. Funding by AHDB-Horticulture allows a duplicate standard size Main Trial to be sown on a different soil type and location near Holbeach, in South Lincolnshire. After two years of evaluation,



varieties may be added to a Descriptive List of Vining Pea Varieties for this area / soil type.

Vining pea variety evaluation requires the use of specialised equipment during harvesting and processing and as such, independent systematic evaluation of varieties in the UK is limited to the PGRO, Thornhaugh/ Nocton 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. These include premium ‘petits pois’ or ‘150 minute’ peas or, so called economy and 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

Varieties have been tested in recent years and more information on their performance and relative maturity of varieties on a different soil type is needed. Trials data is needed over at least one year and preferably over at least 2 years to gain information about the performance of varieties in contrasting seasonal weather conditions.

### **Varieties and numbered selections included**

Table 1. Varieties, leaf type, source and approximate maturity – 2018

<b>Variety Name</b>	<b>Leaf Type</b>	<b>Source</b>	<b>Maturity (± days Avola)</b>
Eldorado	C	Syngenta Seeds, France	- 1
Avola	C	Seminis Vegetable Seeds, France	0
Sherwood	C	Seminis Vegetable Seeds, France	0
CS-455AF	SL	Crites Seed, USA	+ 3
DGL0027	SL	Syngenta Seeds, France	+ 4
SV8112QH	SL	Seminis Vegetable Seeds, France	+ 5
D165641	SL	Syngenta Seeds, France	+ 8
LG Valiant	SL	Limagrain, UK	+ 8
Kengo(D165315)	SL	Syngenta Seeds, France	+ 9
PFR 15-A10	C	Plant & Food Research, New Zealand	+ 9
PFR 15-PA42	SL	Plant & Food Research, New Zealand	+ 9
Oasis	C	Limagrain, UK	+ 9

LG Stingray	C	Limagrain, UK	+10
LG Compass	SL	Limagrain, UK	+10
CS-441AF	SL	Crites Seed, USA	+10
SV0823QG	SL	Seminis Vegetable Seeds, France	+10
Ambassador	C	van Waveren, Germany	+10
PFR 1601	C	Plant & Food Research, New Zealand	+10
LG Infinity	SL	Limagrain, UK	+16
LG Dolphin	SL	Limagrain, UK	+16
C=Conventional-leaved; SL=Semi-leafless			

## Trial site details

Variety Trial Site: Moulton Seas End, South Lincolnshire. OS Grid Ref: TF312368.  
 Jack Buck (Farms) Ltd.  
 Green Lane  
 Moulton Seas End  
 Spalding  
 Lincolnshire  
 PE12 6LT

## Production details

Fertile light silt soil in a commercial crop of Vining Peas

Fungicide seed treatment: Wakil XL

Sown in 15cm rows, with a Wintersteiger/Hege single disc plot drill to achieve a target population of 90 plants/m<sup>2</sup>.

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

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

Fungicide sprays were applied to control *Botrytis* and *Mycosphaerella*.

## 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 required.

Sampling areas for TR assessment: 1.83 m x 1.25 m

Adjustment of yields to TR100 and TR120 using Berry's Model

Statistical analysis of yield data (in t/ha and as % of the control, Oasis) in each year using ANOVA.

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

## Trial records and data collected

Sowing date: 3 May 2018

Harvest dates: 7 July – 21 July

Flowering scores and dates of cessation of flowering recorded to aid maturity and harvest assessment.

Haulm lengths measured and standing ability assessed after cessation of flowering and prior to harvest.

Maturity assessed from the sampling areas to achieve correct harvest dates for @TR100 and @TR120 harvest stages using a pea tenderometer.

Sub-plots separated and harvested when appropriate by hand.

Whole plots weighed.

Plants vined in a static plot pea viner, sieved and washed in a floatation washer to remove extraneous debris.

Peas size-graded into grades very small (<7.5mm), small (7.5-8.75mm), medium (8.75-10.2mm) and large (>10.2mm) with a Mather & Platt grader.

Each size grade weighed.

Total yield measured.

Fresh pea colour assessed against colour chart

Maturity assessed with a pea tenderometer

Samples frozen (200g) at @TR100 for quality appraisal.

Quality appraisal after defrosting for colour, colour uniformity, colour brightness, number of blond peas and Brix determination.

Calculation of pea weight as a % of the total weight.

Calculation of the % of peas in size grades very small, small medium and large.

Estimation of maturity in days at @TR100 and TR120 compared to the standard (Avola=0 days).

## **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:

Rutland farm Farm, near Manea, Cambs, PE15 0GD, OS Ref: TL471913

Assessment dates: 1. 22/05/2018 2. 20/06/2018

Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref SK881494

Assessments dates: 1. 08/05/2018 2. 14/06/2018

These data and those from previous years were incorporated in the PGRO

Descriptive Lists of Vining Pea Varieties, published in the PGRO Vining Pea Variety Guide.

Sowing was carried out at a time which was favorable to natural infection taking place. Two replicates of 50 seeds of each variety without any fungicidal seed treatment were planted in 1.0m rows, spaced 0.25-0.30m apart. Peas were planted to a depth of 3.5cm to 5.0cm and evenly spaced along the 1.0m row. Plots were rolled with a Cambridge roll to consolidate the seed bed and preserve moisture.

Inputs were managed the same as the adjacent vining pea trials or the same as the surrounding field crop.

On at least two occasions, disease assessments were made. The first at about the 4 node stage (GS 13-16) when the percentage of primary infected seedlings was estimated. The second assessment was an estimate of the percentage plants showing downy mildew infection and an estimate of the percentage leaf area infected (GS 51).

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 EVALUATIONS.** Summary of agronomic data Standard Vining Pea Main Variety Trial, Holbeach (Moulton Seas End) - 2018  
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 3 May.  
 Results are means of two 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 Oasis	% in size grades L M S VS				Maturity (± days) Avola	Yield % of Oasis	% in size grades L M S VS				Haulm length cm				
Elorado (D85460)	Syn	249	- 1	56-	40	49	10	1	- 1	56-	59	38	2	1	84	3	14	5.6	
Sherwood	SVS	174	0	69-	30	51	17	2	- 1	71-	38	54	7	1	61	3	20	5.6	
<u>Avola</u>	<u>SVS</u>	<u>220</u>	<u>0(08/7)</u>	<u>71-</u>	<u>52</u>	<u>42</u>	<u>6</u>	<u>0</u>	<u>0(10/7)</u>	<u>71-</u>	<u>73</u>	<u>27</u>	<u>0</u>	<u>0</u>	<u>78</u>	<u>3</u>	<u>19</u>	<u>5.4</u>	
CS-455AF	(SL) CS	215	+ 1	72-	43	50	6	1	+ 1	72-	63	36	1	0	60	6	19	5.4	
DGL0027	(SL) Syn	176	+ 1	54-	33	57	9	1	+ 1	54-	43	51	5	1	70	8	14	5.8	
SV8112QH	(SL) SVS	164	+ 4	43-	24	53	20	3	+ 3	43-	30	54	14	2	64	7	12	5.6	
LG Valiant	(SL) LUK	195	+ 5	77-	24	56	19	1	+ 5	80-	31	65	4	0	74	5	20	5.8	
D165641	(SL) Syn	208	+ 6	59-	42	47	10	1	+ 6	84	52	44	4	0	58	4	19	5.8	
PFR 15-A10	PFR	214	+ 7	79-	21	47	29	3	+ 7	80-	23	57	18	2	73	6	23	5.0	
<u>Oasis</u>	<u>LUK</u>	<u>182</u>	<u>+ 8</u>	100	<u>60</u>	<u>37</u>	<u>3</u>	<u>0</u>	<u>+ 8</u>	100	<u>65</u>	<u>33</u>	<u>2</u>	<u>0</u>	<u>66</u>	<u>2</u>	<u>28</u>	<u>5.3</u>	
				(11.32t/ha)						(11.32t/ha)									
LG Compass	(SL) LUK	203	+ 8	98	45	46	8	1	+ 8	108	57	39	4	0	82	3	25	5.3	
CS-441AF	(SL) CS	206	+ 8	98	47	48	5	0	+ 8	111	58	39	3	0	78	5	25	5.1	
PFR 15-PA42	(SL) PFR	172	+ 8	94	11	45	40	4	+ 8	108	20	77	3	0	73	8	23	5.0	
SV0823QG	(SL) SVS	202	+ 9	88	23	63	13	1	+ 8	92	31	62	7	0	81	8	24	5.6	
Kengo(D165315)	(SL) Syn	176	+ 9	90	34	46	17	3	+ 9	100	44	47	8	1	70	7	22	5.6	
PFR 1601	PFR	212	+ 9	93	27	56	15	2	+ 9	96	33	61	5	1	74	6	24	5.1	
LG Stingray	LUK	185	+ 9	77-	44	48	7	1	+ 9	92	53	43	4	0	65	2	22	5.3	
<u>Ambassador</u>	<u>vW</u>	<u>199</u>	<u>+11</u>	<u>78-</u>	<u>63</u>	<u>35</u>	<u>2</u>	<u>0</u>	<u>+10</u>	<u>78-</u>	<u>68</u>	<u>31</u>	<u>1</u>	<u>0</u>	<u>96</u>	<u>4</u>	<u>20</u>	<u>5.0</u>	
LG Dolphin	(SL) LUK	150	+14	83-	31	53	15	1	+14	80-	37	57	6	0	54	6	21	5.0	
LG Infinity	(SL) LUK	151	+14	87	36	50	12	2	+14	81-	46	49	5	0	56	4	22	5.0	
Significance @ P=0.05				SD					SD										
LSD @ P=0.05				16.1					17.4										
CV %				12.0					12.4										

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; SF = Semi-fasciated

Source of varieties see Appendix

**TABLE 3 - VINING PEA VARIETY EVALUATIONS.** Summary of quality data - Standard Vining Pea Main Variety Trial, Holbeach (Moulton Seas End) - 2018

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Eldorado (D85460)	100.0	6.0	2.0	4.3	2.0	13.4
Sherwood	98.5	6.0	2.0	3.8	2.0	13.1
Avola	95.0	5.5	2.0	4.3	2.0	13.8
CS-455AF	98.5	5.8	2.0	4.3	2.0	13.0
DGL0027	99.0	6.5	1.0	4.5	2.0	13.3
SV8112QH	101.0	6.8	2.0	4.8	2.0	14.5
LG Valiant	102.5	6.0	1.5	4.5	2.0	14.2
D165641	97.5	5.3	2.0	4.5	2.0	12.2
PFR 15-A10	109.0	5.5	1.5	3.3	1.0	13.2
Oasis	100.0	5.3	2.0	4.0	2.0	13.2
LG Compass	101.0	5.8	2.0	4.0	2.0	12.9
CS-441AF	99.5	5.0	1.5	3.8	2.0	11.7
PFR 15-PA42	100.0	5.0	2.0	4.5	2.0	12.8
SV0823QG	100.0	5.8	2.0	4.5	2.0	12.5
Kengo(D165315)	100.0	5.8	1.0	3.8	1.0	13.6
PFR 1601	98.0	4.8	2.0	2.3	1.0	12.3
LG Stingray	99.0	5.3	2.0	3.8	1.0	13.8
Ambassador	103.0	5.8	2.0	4.3	2.0	12.8
LG Dolphin	101.5	5.8	1.0	3.5	2.0	14.1
LG Infinity	95.0	5.0	1.5	2.5	1.0	12.7

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 EVALUATIONS.** Summary of Standard Vining Peas - Holbeach 2017 - 2018

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				
Eldorado (D85460)	Syn	235	- 1	57-	40	50	9	1	- 1	70-	48	47	4	1	87	2	17	5.6	
<u>Avola</u>	<u>SVS</u>	<u>213</u>	<u>0</u>	<u>74-</u>	<u>57</u>	<u>40</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>82-</u>	<u>67</u>	<u>32</u>	<u>1</u>	<u>0</u>	<u>74</u>	<u>3</u>	<u>20</u>	<u>5.3</u>	
Sherwood	SVS	179	0	67-	26	53	19	2	- 1	83-	32	56	11	1	64	3	21	5.5	
SV8112QH	(SL) SVS	167	+ 6	56-	21	53	22	4	+ 6	56-	31	52	14	3	65	8	13	5.4	
PFR 15-A10	PFR	195	+ 9	78-	20	41	33	6	+10	83-	23	53	21	3	71	4	20	5.0	
CS-441AF	(SL) CS	210	+10	93	45	47	7	1	+ 9	107	49	45	5	1	73	6	22	4.9	
PFR 15-PA42	(SL) PFR	181	+10	86	12	45	38	5	+10	104	21	69	9	1	73	8	20	5.0	
<u>Oasis</u>	<u>LUK</u>	<u>194</u>	<u>+10</u>	<u>100</u>	<u>48</u>	<u>43</u>	<u>8</u>	<u>1</u>	<u>+10</u>	<u>100</u>	<u>52</u>	<u>41</u>	<u>6</u>	<u>1</u>	<u>66</u>	<u>2</u>	<u>24</u>	<u>5.3</u>	
				(10.41t/ha)						(10.41t/ha)									
LG Compass	(SL) LUK	222	+11	99	44	46	9	1	+10	110	56	38	5	1	78	5	23	5.3	
LG Stingray	LUK	207	+11	81	41	46	11	2	+11	93	56	40	4	0	68	2	19	5.1	
Kengo(D165315)	(SL) Syn	187	+11	89	29	45	21	5	+11	100	38	49	11	2	71	5	19	5.4	
<u>Ambassador</u>	<u>vW</u>	<u>192</u>	<u>+13</u>	<u>91</u>	<u>48</u>	<u>41</u>	<u>9</u>	<u>2</u>	<u>+12</u>	<u>103</u>	<u>57</u>	<u>38</u>	<u>4</u>	<u>1</u>	<u>90</u>	<u>3</u>	<u>20</u>	<u>5.0</u>	
LG Dolphin	(SL) LUK	165	+14	87	28	51	18	3	+14	105	42	49	8	1	62	6	21	5.0	
LG Infinity	(SL) LUK	165	+17	97	34	50	14	2	+17	93	47	50	3	0	61	6	20	5.0	
Significance @ P=0.05				SD						SD									
LSD @ P=0.05				21.7						29.4									
CV %				12.4						16.3									

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; SF = Semi-fasciated

Source of varieties see Appendix

**TABLE 5 - VINING PEA VARIETY EVALUATIONS.** Summary of quality data – Standard pea varieties – Holbeach 2017 – 2018

Variety	Year	Tenderometer Reading	Appearance				Brix %
			Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Eldorado (D85460)	17	121.0	5.0	2.0	4.5	1.0	12.1
	18	100.0	6.0	2.0	4.3	2.0	13.4
Avola	17	122.0	5.0	2.0	4.5	1.0	9.0
	18	95.0	5.5	2.0	4.3	2.0	13.8
Sherwood	17	116.0	5.0	2.0	4.5	1.0	11.2
	18	98.5	6.0	2.0	3.8	2.0	13.1
SV8112QH	17	101.5	6.0	2.0	5.0	1.0	13.0
	18	101.0	6.8	2.0	4.8	2.0	14.5
PFR 15-A10	17	98.5	5.0	2.0	4.0	1.0	12.7
	18	109.0	5.5	1.5	3.3	1.0	13.2
CS-441AF	17	103.0	4.5	1.0	3.5	2.0	10.5
	18	99.5	5.0	1.5	3.8	2.0	11.7
PFR 15-PA42	17	95.5	5.0	2.0	5.0	1.0	11.6
	18	100.0	5.0	2.0	4.5	2.0	12.8
Oasis	17	99.0	5.0	1.0	4.0	2.0	10.4
	18	100.0	5.3	2.0	4.0	2.0	13.2
LG Compass	17	99.5	5.0	1.0	4.5	1.0	12.2
	18	101.0	5.8	2.0	4.0	2.0	12.9
LG Stingray	17	95.0	4.5	2.0	3.5	2.0	12.5
	18	99.0	5.3	2.0	3.8	1.0	13.8
Kengo	17	101.0	4.5	2.0	4.5	1.0	11.0
	18	100.0	5.8	1.0	3.8	1.0	13.6
Ambassador	17	94.5	5.0	1.0	4.0	2.0	11.8
	18	103.0	5.8	2.0	4.3	2.0	12.8
LG Dolphin	17	97.0	6.0	2.0	4.5	2.0	11.9
	18	101.5	5.8	1.0	3.5	2.0	14.1
LG Infinity	17	101.0	5.5	2.0	4.0	2.0	11.6
	18	95.0	5.0	1.5	2.5	1.0	12.7

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



## Varietal Susceptibility of Vining Peas to Downy Mildew (*Peronospora viciae*) - 2018

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.

Table 6. Downy mildew susceptibility ratings (average of two sites) – 2018

Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
	Avola	CS-445AF	LG Dolphin	LG Stingray
	LG Midnight	PFR 15-A10	LG Infinity	Afivert
	Oasis	PFR 15-PA42	LG Compass	D165641
			CS-441AF	D85460
			PFR 1601	Kengo
				Norvet
				SV0823QG
				SV8112QH

### Downy Mildew Trial Sites:

Rutland farm Farm, near Manea, Cambs, PE15 0GD, OS Ref: TL471913

Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref SK881494

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

## Discussion

Yields from the yield standard Oasis (11.32 t/ha), were 1.83 t/ha higher than in 2018 at TR100. Oasis did not give a yield increase from TR100 to TR120.

Eldorado was the first to mature one day before Avola while LG Infinity and LG Dolphin matured late, 14 days later than Avola.

Early varieties Avola, Sherwood and CS-455AF gave similar yields at TR120. D85460 was lower yielding, but not significantly so.

Oasis was the highest yielding variety at TR100 and several varieties gave significantly lower yields, including D85460(56%), Sherwood(69%), Avola(71%), CS-455AF(72%), DGL0027 (54%), SV8112QH(43%), LG Valiant(77%), D165641(59%), PFR 15-A10(79%), LG Stingray(77%), Ambassador(78%) and LG Dolphin(83%).

The following varieties gave higher, but not significantly higher yields than Oasis at TR120 including, Kengo(100%), PFR-15-PA42(108%), LG Compass(108%) and CS-441AF(108%).

Varieties with very good standing ability (8) were DGL0027, PFR 15-PA42 and SV0823QG.

## Conclusions

Varieties were evaluated in standard Vining Pea Main Trials in 2017 and 2018.

This 2 year data set comprises data from only the Hlobeach site.

Ten varieties Eldorado (D85460), SV8112QH, Kengo (D165315), PFR15-A10, PFR 15-PA42, CS-441AF, LG Stingray (04S51315N), LG Compass (08S05676A), LG Dolphin (08S01030A) and LG Infinity (08S04137A) completed 2 years of evaluation in 2018.

Yields from the standard Oasis were the highest in 2018 (11.32 t/ha) and lowest in 2017 (9.49 t/ha). Maturity of Oasis when compared to Avola ranged from +8 in 2018 to +12 in 2017.

Sherwood a possible replacement for Avola, matured at a similar time to Avola and gave similar yields.

**Eldorado** (D85460) (Syngenta) matured one day before Avola. Yields were significantly lower than Oasis and 12-14% lower than Avola. Produce was medium-large size grade, but smaller than Avola. Standing ability (2) was relatively poor.

**SV8112QH** (Seminis Vegetable Seeds) was semi-leafless and matured 6 days later than Avola. Yields (56%) were significantly lower than Oasis. Yields were low in 2018. Produce was much smaller than either Avola or Oasis, medium size grade. Standing ability was good (8).

**PFR 15-A10** (Plant & Food Research) matured one day before Oasis. Yields (78 & 83%) were lower significantly lower than Oasis. Produce was smaller than Oasis, medium-small size grade. Standing ability was below average (4).

**CS-441AF** (Crites Seed) was semi-leafless and matured at the same time as Oasis. Yields (93 & 107%) were a little lower than Oasis at TR100 and a little higher than Oasis at TR120. Produce was similar size grade to Oasis. Standing ability was average (6).

**PFR 15-PA42** (Plant & Food Research) was semi-leafless and matured at the same time as Oasis. Yields (86 & 104%) were lower than Oasis at TR100 and a little higher at TR120. Produce was smaller than Oasis, medium-small size grade at TR100. Standing ability was good (8).

**LG Compass** (08S05676A) (Limagrain UK) was semi-leafless and matured one day later than Oasis. Yields (99 & 110%) good, similar to Oasis at TR100 and the highest in the trials at TR120. Yields were better in 2017. Produce was similar in size to Oasis. Standing ability was average (5).

**LG Stingray** (04S51315N) (Limagrain UK) matured one day later than Oasis. Yields (81 & 93%) were lower, but not significantly lower than Oasis. Produce was similar in size to Oasis. Standing ability was similar to Oasis (2).

**Kengo** (D165315) (Syngenta) was semi-leafless and matured one day later than Oasis. Yields (89 & 100%) lower than Oasis at TR100, but similar at TR120. Produce was a little smaller than Oasis, medium size grade. Standing ability was average (5).

**LG Dolphin** (08S01030A) (Limagrain UK) was semi-leafless and overall matured 4 days later than Oasis. Maturity however was quite variable over the 2 years. Yields (87 & 105%) were lower than Oasis at TR100, but a little higher at TR120. Produce was a little smaller than Oasis. Standing ability was average (6).

**LG Infinity** (08S04137A) (Limagrain UK) was semi-leafless and had late maturity, maturing 7 days later than Oasis. Yields (97 & 93%) were similar to Oasis at TR100 and a little lower at TR120. Yield were high in 2017. Produce was similar in size to Oasis. Standing ability was average (6).

### **Comment from the Industry representative**

As stated previously I think these variety trials, carried out in the areas of main commercial production are invaluable to the industry. As individual growers, pressurised by tight margins and time constraints, we cannot possibly produce such detailed results as these trials. What we can do is analyse the PGRO trial data and pick two or three that we can then take on the field scale trials. The best yielding varieties we are growing at the moment have been chosen through this process. Seed breeding – and the evaluation of new varieties – has to be the main area of development in terms of a sustainable pea vining industry.

### **Technology transfer**

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

20 June Visit BY DT Seeds

21 June 2018 Visit by HMC Peas grower group

6 July Visit by ZKI (Hungarian seed company)

The PGRO publication 'Vining Pea Variety 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, 2014/15, 2015/16 and 2016/17 from the light silt-land sites near Holbeach, S. Lincolnshire. Data from other PGRO trials are also presented. This publication is available free of charge via a hard copy, download from the PGRO website or by the PGRO app (Android and iOS). For varieties completing trials in 2017/18 data was presented in the PGRO Vegetable Magazine winter edition 2018/9, the PGRO websites and PGRO app.

## Appendices

### KEY TO SOURCE OF VARIETIES

CS	Crites Seed Inc., USA
LUK	Limagrain UK Ltd, UK
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

### Meteorological Data

Date	Air Min °C	Air Max °C	Rainfall mm	Date	Air Min °C	Air Max °C	Rainfall mm
01-Apr-18	2.9	6.7	0.4	01-May-18	0.3	14.7	0
02-Apr-18	2.8	10.8	13	02-May-18	5.2	13.6	4.8
03-Apr-18	5.8	14.8	0	03-May-18	3	15.8	0
04-Apr-18	4.2	12.8	0.2	04-May-18	6.7	17.9	0
05-Apr-18	2.4	11.3	0	05-May-18	7.4	22.4	0
06-Apr-18	3.6	13.2	0	06-May-18	6.2	22.7	0
07-Apr-18	4.6	17.2	0	07-May-18	9	24	0
08-Apr-18	6.3	9.4	2.4	08-May-18	9.7	25.9	0
09-Apr-18	6.1	8.6	5.2	09-May-18	7.6	20.4	0
10-Apr-18	5.5	10.3	7.2	10-May-18	7.5	18.5	1
11-Apr-18	4.9	7.2	0	11-May-18	6	18.4	0
12-Apr-18	5.2	6.4	0	12-May-18	8.6	17.6	13
13-Apr-18	5.8	11.3	2.4	13-May-18	7.8	18.2	0
14-Apr-18	7.7	15.2	0	14-May-18	5.9	19.4	0
15-Apr-18	7.8	14.9	1.8	15-May-18	7.1	22.2	0
16-Apr-18	7.4	14.5	0	16-May-18	5.6	13.8	0
17-Apr-18	8.8	18.7	0	17-May-18	2.5	15.5	0
18-Apr-18	11.1	23.5	0	18-May-18	2.3	16.8	0
19-Apr-18	8.6	27	0	19-May-18	4.2	19.2	0
20-Apr-18	9	21.7	0	20-May-18	6.8	22	0
21-Apr-18	8.3	22.5	0	21-May-18	7	21.1	0
22-Apr-18	9.3	22.4	0.6	22-May-18	7.1	20.7	0
23-Apr-18	7.5	15.1	0	23-May-18	9.2	15	0
24-Apr-18	9.2	13.2	9	24-May-18	8.9	19.3	0.6
25-Apr-18	6.5	13.2	1.4	25-May-18	11.1	16.7	16.2

26-Apr-18	5	14.2	0	26-May-18	10.5	16.6	0
27-Apr-18	5.1	8.3	5.8	27-May-18	11.5	21.9	0
28-Apr-18	5.9	8.3	2.8	28-May-18	11.9	21.7	0
29-Apr-18	5.6	7.6	0	29-May-18	10.8	15.4	0
30-Apr-18	4.2	8.6	0	30-May-18	11.9	15.4	4.4
				31-May-18	12.8	18	0

Date	Air Min °C	Air Max °C	Rainfall mm	Date	Air Min °C	Air Max °C	Rainfall mm
01-Jun-18	12.3	22.7	0	01-Jul-18	10.5	23.8	0
02-Jun-18	13.5	21.9	1	02-Jul-18	10.7	22.5	0
03-Jun-18	12.9	22.7	0	03-Jul-18	9.5	18.7	0
04-Jun-18	11.4	15	0	04-Jul-18	8.5	20.6	0
05-Jun-18	7.7	16.5	0	05-Jul-18	13	27.5	0
06-Jun-18	5.8	18.1	0	06-Jul-18	14.7	24.9	0
07-Jun-18	11.9	17.6	0	07-Jul-18	14.2	26.8	0
08-Jun-18	11.8	16.6	0	08-Jul-18	12.3	26.6	0
09-Jun-18	11.6	15.6	0	09-Jul-18	13.7	25.1	0
10-Jun-18	8.6	17.4	0	10-Jul-18	11.7	19.9	0
11-Jun-18	7.4	21.6	0	11-Jul-18	13.5	18.1	0
12-Jun-18	10.5	17.4	0	12-Jul-18	11	20	0
13-Jun-18	10	21.8	0	13-Jul-18	9.4	21.2	0
14-Jun-18	11.8	21.1	0	14-Jul-18	11.9	27.8	0
15-Jun-18	8.9	21.3	0	15-Jul-18	12.8	28.7	0
16-Jun-18	11.9	20.8	2.4	16-Jul-18	12.7	28.8	0
17-Jun-18	10.4	18.9	0	17-Jul-18	13.5	23.4	0
18-Jun-18	14.7	23.7	0	18-Jul-18	10.7	23	0
19-Jun-18	15.8	23.9	0	19-Jul-18	14.7	26.6	0
20-Jun-18	12.4	24.6	0	20-Jul-18	11.7	27.8	1.4
21-Jun-18	9.2	18.1	0	21-Jul-18	14.1	25.8	0
22-Jun-18	7.7	19.7	0	22-Jul-18	14.2	25.4	0
23-Jun-18	6.8	21.3	0	23-Jul-18	16.1	31.8	0
24-Jun-18	7.1	24	0	24-Jul-18	16.6	29.1	0
25-Jun-18	10.2	24.6	0	25-Jul-18	14.7	27	0
26-Jun-18	8.2	22.6	0	26-Jul-18	16.4	33.1	0
27-Jun-18	12.4	18.6	0	27-Jul-18	18.5	30.7	18.2
28-Jun-18	10.8	20.6	0	28-Jul-18	12.8	21.2	2.8
29-Jun-18	10.2	21.7	0	29-Jul-18	13.6	20.4	0.6
30-Jun-18	13	21.7	0	30-Jul-18	13.7	23.5	0
				31-Jul-18	14.1	23.8	1.8