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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 soil type 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.

Variety Trial Results

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

Table 1. Varieties, leaf type, source and approximate maturity – 2017

Variety Name	**Leaf Type**	**Source**	**Maturity (± days Avola)**
Avola	C	Seminis Vegetable Seeds, France	0
Sherwood	C	Seminis Vegetable Seeds, France	0
D85460	C	Syngenta Seeds, France	0
D165621(Saltingo)	SL	Syngenta Seeds, France	+ 6
D165618	SL	Syngenta Seeds, France	+ 6
SV8112QF	SL	Seminis Vegetable Seeds, France	+ 8
D165613(Fantastigo)	SL	Syngenta Seeds, France	+ 8
SV0957QF	SL	Seminis Vegetable Seeds, France	+10
D165315	C	Syngenta Seeds, France	+10
CS-441AF	SL	Crites Seed, USA	+11
PFR 15-A10	C	Plant & Food Research, New Zealand	+11
Oasis	C	Limagrain, UK	+12
PFR 15-PA42	SL	Plant & Food Research, New Zealand	+12
D85607	C	Syngenta Seeds, France	+12
04S51315N	C	Limagrain, UK	+12
DGL0042	C	Syngenta Seeds, France	+12
LG Midnight(06S55519A)	SL	Limagrain, UK	+13
08S05676A	SL	Limagrain, UK	+13
Vidor(Wav4361)	C	van Waveren, Germany	+13
08S01030A	SL	Limagrain, UK	+13
Ambassador	C	van Waveren, Germany	+14
Reflection (PLS 196)	SL	Pure Line Seeds, USA	+14
CS-445AF	SL	Crites Seed, USA	+15
08S04137A	SL	Limagrain, UK	+19
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 all likely to benefit from these improvements.

The trials provide additional data for the Descriptive List of Vining Peas – Holbeach, which is published annually in the PGRO publication 'The Vining Pea Variety Guide'. Data from the Nocton trials is published in separate table within the guide. The guide is available on the AHDB Horticulture website. 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 Grid Ref: TF397278. The Grove, Holbeach Hurn, Spalding, PE12 8EX.

Downy Mildew Trials:
Grange Farm, near Nocton, Lincs, LN4 2AH, OS Grid Ref: TF025633
Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref SK894476

Standard Pea Main Trial, Holbeach 2017 – Table 2

Yields from the yield standard Oasis, were about 1 t/ha higher than in 2016 at TR100, but there was no yield increase from TR100 to TR120, yielding 9.49 t/ha. Consequently many varieties appear higher yielding at TR120 when compared to Oasis than at TR100.

Table 2. Percentage yield, Percentage size grade, haulm length and standing ability – 2017

Variety	@TR100					@TR120		
	Yield % of Oasis	% in size grades L	M	S	VS	Yield % of Oasis	Haulm length cm	Standing Ability 9=erect 1=lodged
Avola		63	37	0	0	95	70	2
Sherwood	64-	21	58	20	1	98	66	2
D85460		39	53	8	0	87	89	2
D165621(Saltingo)	58-	39	45	14	2	66-	66	5
D165618	68-	41	45	12	2	75-	62	6
SV8112QF	70-	17	55	24	4	70-	66	8
D165613(Fantastigo)	87	21	52	23	4	110	74	6
SV0957QF	83	27	49	20	4	97	74	8
D165315	77-	15	50	27	8	81	84	3
CS-441AF	88	42	48	9	1	102	68	6
PFR 15-A10	76-	19	37	36	8	86	68	2
Oasis	100 (9.49t/ha)	36	49	13	2	100 (9.49t/ha)	65	2
PFR 15-PA42	78	12	47	36	5	98	72	8
D85607	89	23	45	25	7	100	72	6
04S51315N	86	37	47	14	2	95	70	2
DGL0042	60-	22	57	18	3	69-	79	2
LG Midnight(06S55519A)	93	30	60	9	1	102	82	7
08S05676A	101	42	47	10	1	112	74	7
Vidor(Wav4361)	103	47	44	8	1	103	72	2
08S01030A	92	24	50	21	5	134+	70	5
Ambassador	107	35	47	15	3	133+	83	2
Reflection (PLS 196)	105	51	41	7	1	123	66	6
CS-445AF	117	64	30	5	1	147+	58	7
08S04137A	109	32	51	15	2	109	66	8

KEY: Yield: +Significantly less 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

Early varieties Avola and Sherwood gave similar yields at TR120. D85460 was lower yielding, but not significantly so. 08S04137A had very late maturity, maturing 7 days later than Oasis.

The highest yielding variety was CS-445AF, which yielded 117 and 147% of Oasis at TR100 and TR120 respectively. Several other varieties out yielded Oasis at TR100 including 08S05676A, Vidor, Ambassador, Reflection (PLS 196) and 08S04137A.

Varieties with very good standing ability (8) were SV8112QF, SV0957QF, PFR 15-PA42 and 08S04137A.
Several varieties showed good field tolerance to downy mildew infection in 2017 including Cargo CS-455AF, D165618, D85460, D85607, Fantastigo, Saltingo.
Hot weather and a clash at harvest meant the early varieties Avola and D85460 were not harvested at the correct time for TR100 and no yield data was presented.

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.

Main Conclusions

Varieties were evaluated in standard Vining Pea Main Trials in 2016 and 2017.

After the withdrawal of 07S51368A and Valido and the placement of D95389 in the petits pois trials, nine varieties Saltingo, D165618, Fantastigo, SV0957QF, D85607, LG Midnight, Reflection (PLS 196), Vidor and CS-445AF completed three years of evaluation in 2017.

In 2016 Oasis gave a 2 t/ha yield increase from TR100 to TR120. In 2017 yields did not increase from TR100 to TR120. Oasis matured 9 and 12 days later than Avola in 2016 and 2017 respectively.

Sherwood, an early maturing replacement for Avola matured at the same time as Avola and gave a significant yield increase over Avola at TR100. Saltingo (D165621) (Syngenta) was semi-leafless and matured on average 5 days later than Avola. Yields were significantly lower than Oasis, but significantly higher than Avola at TR100. Produce was medium-large size grade, a little smaller than Avola at TR100. Haulm was similar in length to Avola and the variety had better standing ability (5).

D165618 (Syngenta) was semi-leafless and matured on average 5 days later than Avola. Yields were lower than Oasis, but significantly higher than Avola at TR100. Produce was medium-large size grade, a little smaller than Avola at TR100. Standing ability was a little above average (6).

Fantastigo (D165613) (Syngenta) was semi-leafless and matured 7 days later than Avola. Yields were significantly higher than Avola (84/89%). Yields were higher in 2017, than 2016. Produce was medium-large size grade, smaller than Avola. Standing was ability a little above average (6).

SV0957QF (Seminis Vegetable Seed) was semi-leafless and matured 3 days before Oasis. Yields were lower, but not significantly lower than Oasis (87/96). Produce was medium-large size grade. Standing ability was a little above average (6).

D85607 (Syngenta) matured 3 days before Oasis. Yields at TR100 were significantly lower than Oasis. Yields were better in 2017 than 2016. Produce was smaller than Oasis, medium-small size grade. Standing ability was average (5).

LG Midnight (06S55519A) (Limagrain UK) was semi-leafless and matured at the same time as Oasis. Overall yields were lower but not significantly lower than Oasis (84/83%). Yields were a little higher in 2017 than 2016. Produce was larger than Oasis, medium-large size grade. Haulm was longer than Oasis and the variety had the best standing ability (7).

Vidor (Wav 4361) (van Waveren) matured at the same time as Oasis. Overall, yields were similar to Oasis (98/100%). Produce was similar in size to Oasis, medium-large size grade. Standing ability was poor, similar to Oasis.

Reflection (PLS 196) (Pure Line Seeds) was semi-leafless and matured one day later than Oasis. Overall yields were higher than Oasis (102/118%) and were the highest in the trial at TR120. Produce was a little larger than Oasis, large-medium size grade. Standing ability was average (5).

CS-445AF (Crites Seed) was semi-leafless and matured one day later than Oasis. Yields were much higher in 2017 than 2016. Yields were the highest in trial at TR100

(109/114%). Produce was large size grade, larger than Oasis. Haulm was short and standing ability was a little above average (6).

SCIENCE SECTION

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 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 soil type 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.

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/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 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

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 three years to gain information on the performance of varieties in contrasting seasonal weather conditions.

Varieties and numbered selections included in the variety trial

Table 1. Varieties, leaf type, source and approximate maturity – 2017

Variety Name	Leaf* Type	Source	Maturity (± days Avola)
Avola	C	Seminis Vegetable Seeds, France	0
Sherwood	C	Seminis Vegetable Seeds, France	0
D85460	C	Syngenta Seeds, France	0
D165621(Saltingo)	SL	Syngenta Seeds, France	+ 6
D165618	SL	Syngenta Seeds, France	+ 6
SV8112QF	SL	Seminis Vegetable Seeds, France	+ 8
D165613(Fantastigo)	SL	Syngenta Seeds, France	+ 8
SV0957QF	SL	Seminis Vegetable Seeds, France	+10
D165315	C	Syngenta Seeds, France	+10
CS-441AF	SL	Crites Seed, USA	+11
PFR 15-A10	C	Plant & Food Research, New Zealand	+11
Oasis	C	Limagrain, UK	+12
PFR 15-PA42	SL	Plant & Food Research, New Zealand	+12
D85607	C	Syngenta Seeds, France	+12
04S51315N	C	Limagrain, UK	+12
DGL0042	C	Syngenta Seeds, France	+12
LG Midnight(06S55519A)	SL	Limagrain, UK	+13
08S05676A	SL	Limagrain, UK	+13
Vidor(Wav4361)	C	van Waveren, Germany	+13
08S01030A	SL	Limagrain, UK	+13
Ambassador	C	van Waveren, Germany	+14
Reflection (PLS 196)	SL	Pure Line Seeds, USA	+14
CS-445AF	SL	Crites Seed, USA	+15
08S04137A	SL	Limagrain, UK	+19

*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 Grid Ref: TF397278. The Grove, Holbeach Hurn, Spalding, PE12 8EX.

Production details

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/m².
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*.

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 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

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:
Grange Farm, near Nocton, Lincs, LN4 2AH, OS Grid Ref: TF025633
Sowing date: 10 March 2017
Assessment dates: 1. 9 May 2017, 2. 24 May 2017

Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref: SK894476
Sowing date: 17 April 2017
Assessment dates: 1. 2 May 2017, 2. 22 May 2017

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 STUDIES. Summary of agronomic data Standard Vining Pea Main Variety Trial, Holbeach Hurn - 2017
Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 11 April.
Results are means of two 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 Oasis	% in size grades L	M	S	VS		Maturity (± days) Avola	Yield % of Oasis	% in size grades L	M	S	VS	Haulm length cm	Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
Avola		SVS	206	0(25/6)		63	37	0	0		0(27/6)	95	61	37	2	0	70	2	21	5.3
Sherwood		SVS	184	0	64-	21	58	20	1		0	98	26	59	14	1	66	2	22	5.4
D85460		Syn	221	0		39	53	8	0		0	87	37	57	6	0	89	2	20	5.5
D165621(Saltingo)	(SL)	Syn	204	+ 6	58-	39	45	14	2		+ 6	66-	44	47	8	1	66	5	13	5.4
D165618	(SL)	Syn	201	+ 6	68-	41	45	12	2		+ 7	75-	59	37	4	0	62	6	15	5.1
SV8112QF	(SL)	SVS	170	+ 8	70-	17	55	24	4		+ 8	70-	31	53	13	3	66	8	14	5.3
D165613(Fantastigo)	(SL)	Syn	195	+ 8	87	21	52	23	4		+ 8	110	33	58	9	0	74	6	19	5.1
SV0957QF	(SL)	SVS	156	+10	83	27	49	20	4		+10	97	41	49	9	1	74	8	18	5.3
D165315		Syn	180	+10	77-	15	50	27	8		+10	81	19	57	20	4	84	3	17	5.0
CS-441AF	(SL)	CS	213	+11	88	42	48	9	1		+10	102	42	50	7	1	68	6	19	4.8
PFR 15-A10		PFR	176	+11	76-	19	37	36	8		+12	86	22	52	23	3	68	2	17	5.0
Oasis		LUK	206	+12	100 (9.49t/ha)	36	49	13	2		+12	100 (9.49t/ha)	41	48	9	2	65	2	19	5.3
PFR 15-PA42	(SL)	PFR	190	+12	78	12	47	36	5		+12	98	22	61	15	2	72	8	16	5.0
D85607		Syn	198	+12	89	23	45	25	7		+13	100	32	51	14	3	72	6	16	5.1
04S51315N		LUK	228	+12	86	37	47	14	2		+13	95	60	36	4	0	70	2	16	5.0
DGL0042		Syn	215	+12	60-	22	57	18	3		+13	69-	45	46	8	1	79	2	12	4.9
LG Midnight(06S55519A)	(SL)	LUK	204	+13	93	30	60	9	1		+12	102	39	54	6	1	82	7	21	5.3
08S05676A	(SL)	LUK	241	+13	101	42	47	10	1		+12	112	58	36	5	1	74	7	20	5.4
Vidor(Wav4361)		vW	200	+13	103	47	44	8	1		+13	103	57	37	5	1	72	2	18	5.0
08S01030A	(SL)	LUK	180	+13	92	24	50	21	5		+14	134+	47	41	10	2	70	5	20	5.0
Ambassador		vW	184	+14	107	35	47	15	3		+14	133+	49	44	6	1	83	2	19	5.0
Reflection (PLS 196)	(SL)	PLS	202	+14	105	51	41	7	1		+14	123	67	28	4	1	66	6	20	5.0
CS-445AF	(SL)	CS	243	+15	117	64	30	5	1		+15	147+	75	23	2	0	58	7	22	5.0
08S04137A	(SL)	LUK	178	+19	109	32	51	15	2		+19	109	48	52	0	0	66	8	18	5.0
Significance @ P=0.05					SD							SD								
LSD @ P=0.05					22.4							23.4								
CV %					14.3							13.1								

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 STUDIES. Summary of quality data - Standard Vining Pea Main Variety Trial, Holbeach Hurn - 2017

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Avola	122.0	5.0	2.0	4.5	1.0	9.0
Sherwood	116.0	5.0	2.0	4.5	1.0	11.2
D85460	121.0	5.0	2.0	4.5	1.0	12.1
D165621(Saltingo)	99.5	5.0	2.0	4.5	1.0	12.0
D165618	95.5	5.0	2.0	4.5	1.0	12.1
SV8112QH	101.5	6.0	2.0	5.0	1.0	13.0
D165613(Fantastigo)	103.0	4.5	2.0	4.0	2.0	11.0
SV0957QF	103.5	5.0	2.0	4.5	1.0	11.6
D165315	101.0	4.5	2.0	4.5	1.0	11.0
CS-441AF	103.0	4.5	1.0	3.5	2.0	10.5
PFR 15-A10	98.5	5.0	2.0	4.0	1.0	12.7
Oasis	99.0	5.0	1.0	4.0	2.0	10.4
PFR 15-PA42	95.5	5.0	2.0	5.0	1.0	11.6
04S51315N	95.0	4.5	2.0	3.5	2.0	12.5
DGL0042	101.0	5.0	2.0	3.5	2.0	11.3
D85607	99.5	5.5	2.0	4.5	1.0	12.2
LG Midnight(06S55519A)	103.0	5.5	1.0	4.5	2.0	10.6
08S05676A	99.5	5.0	1.0	4.5	1.0	12.2
Vidor(Wav4361)	100.5	5.0	2.0	4.0	2.0	11.4
08S01030A	97.0	6.0	2.0	4.5	2.0	11.9
Reflection (PLS 196)	97.0	6.0	1.0	4.5	1.0	12.4
Ambassador	94.5	5.0	1.0	4.0	2.0	11.8
CS-445AF	98.5	5.0	2.0	4.0	2.0	10.5
08S04137A	101.0	5.5	2.0	4.0	2.0	11.6

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 STUDIES. Summary of Standard Vining Peas - Holbeach 2016 - 2017
Varieties placed in order of maturity. Standard varieties underlined

Variety		Source	1000 Seed Weight g	@ TR 100 Maturity (± days) Avola	@ TR 100 Yield % of Oasis	@ TR 100 % in size grades L	M	S	VS	@ TR 120 Maturity (± days) Avola	@ TR 120 Yield % of Oasis	@ TR 120 % in size grades L	M	S	VS	Haulm length cm	Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
Avola		SVS	212	0	40-	56	35	7	2	0	60-	57	36	6	1	66	2	18	5.1
Sherwood		SVS	197	0	67-	27	47	23	3	+ 1	86	34	53	12	1	62	2	22	5.4
D165621(Saltingo)	(SL)	Syn	204	+ 5	63-	38	46	14	2	+ 5	61-	44	46	9	1	63	5	16	5.4
D165618	(SL)	Syn	201	+ 5	80	41	46	11	2	+ 6	76	52	43	5	0	61	6	18	5.4
D165613(Fantastigo)	(SL)	Syn	198	+ 7	84	27	48	21	4	+ 7	89	37	53	9	1	66	6	18	5.0
SV0957QF	(SL)	SVS	176	+ 8	87	30	51	16	3	+ 8	96	40	51	8	1	67	6	21	5.3
D85607		Syn	180	+ 8	72-	18	51	25	6	+ 8	83	24	58	15	3	74	5	18	5.0
LG Midnight(06S55519A)	(SL)	LUK	202	+11	84	32	57	10	1	+10	83	42	51	6	1	74	7	22	5.4
Oasis		LUK	189	+11	100 (8.98t/ha)	38	49	11	2	+11	100 (9.99t/ha)	45	46	7	2	64	2	19	5.1
Vidor(Wav4361)		vW	181	+11	98	42	45	11	2	+11	100	56	38	5	1	67	2	18	4.9
Reflection (PLS 196)	(SL)	PLS	210	+12	102	46	43	9	2	+12	118	67	28	4	1	68	5	20	5.1
CS-445AF	(SL)	CS	221	+12	109	58	33	7	2	+12	114	71	25	3	1	56	6	22	5.0
Ambassador		vW	188	+13	96	39	43	15	3	+13	99	51	41	7	1	83	4	18	5.0
Significance @ P=0.05					SD						SD								
LSD @ P=0.05					21.7						37.1								
CV %					12.6						21.1								

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 STUDIES. Summary of quality data – Standard pea varieties – Holbeach 2016 – 2017

Variety	Year	Tenderometer Reading	Appearance				Brix %
			Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Avola	16	91.5	5.5	1.0	3.8	1.0	10.8
	17	122.0	5.0	2.0	4.5	1.0	9.0
Sherwood	16	102.5	5.8	1.0	2.5	2.0	12.0
	17	116.0	5.0	2.0	4.5	1.0	11.2
Saltingo	16	99.5	6.5	1.5	4.5	1.0	10.5
	17	99.5	5.0	2.0	4.5	1.0	12.0
D165618	16	103.5	6.3	1.0	4.8	1.0	10.7
	17	95.5	5.0	2.0	4.5	1.0	12.1
Fantastigo	16	97.0	5.5	1.0	4.3	1.0	10.6
	17	103.0	4.5	2.0	4.0	2.0	11.0
SV0957QF	16	106.0	5.8	1.0	4.5	1.0	11.1
	17	103.5	5.0	2.0	4.5	1.0	11.6
D85607	16	104.0	5.3	1.0	3.0	2.0	11.8
	17	99.5	5.5	2.0	4.5	1.0	12.2
LG Midnight(06S55519A)	16	101.5	6.3	2.0	4.5	1.0	11.5
	17	103.0	5.5	1.0	4.5	2.0	10.6
Oasis	16	99.5	5.5	1.0	2.5	2.0	10.3
	17	99.0	5.0	1.0	4.0	2.0	10.4
Vidor	16	98.5	5.3	1.0	3.5	1.0	10.8
	17	100.5	5.0	2.0	4.0	2.0	11.4
Reflection (PLS 196)	16	100.5	6.0	1.0	4.0	1.0	11.7
	17	97.0	6.0	1.0	4.5	1.0	12.4
CS-445AF	16	99.0	5.3	1.0	4.5	1.0	9.9
	17	98.5	5.0	2.0	4.0	2.0	10.5
Ambassador	16	103.0	5.8	1.5	3.0	2.0	11.1
	17	94.5	5.0	1.0	4.0	2.0	11.8

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)* - 2017

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) – 2017

Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
	Avola	Oasis	04S51315N	Cargo
		PFR15-A10	LG Midnight(06S55519A)	CS-455AF
			08S01030A	D165618
			08S04137A	D85460
			08S05676	D85607
			CS-441AF	Fantastigo(D165613)
			LG Element	Saltingo(D165621)
			LG Galileo	
			LG Guardian	
			PFR15-PA42	
			Reflection (PLS 196)	
			Vidor(Wav 4361)	

Downy Mildew Trial Sites:
Grange Farm, near Nocton, Lincs, LN4 2AH, OS Ref: TF025633
Lodge farm, near Stubton, Lincs, NG32 2AX, OS Grid Ref SK894476

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

Hot weather and a clash at harvest meant the early varieties, Avola and D85460, were not harvested the correct time for TR100 and no yield data was presented.

Yields from the yield standard Oasis, were about 1 t/ha higher than in 2016 at TR100, but there was no yield increase from TR100 to TR120, yielding 9.49 t/ha. Consequently many varieties appear higher yielding at TR120 when compared to Oasis than at TR100.

Early varieties Avola and Sherwood gave similar yields at TR120. D85460 was lower yielding, but not significantly so. 08S04137A had very late maturity, maturing 7 days later than Oasis.

The highest yielding variety was CS-445AF, which yielded 117 and 147% of Oasis at TR100 and TR120 respectively. Several other varieties out yielded Oasis at TR100 including 08S05676A, Vidor, Ambassador, Reflection (PLS 196) and 08S04137A.

Varieties with very good standing ability (8) were SV8112QF, SV0957QF, PFR 15-PA42 and 08S04137A.

Several varieties showed good field tolerance to downy mildew infection in 2017 including Cargo, CS-455AF, D165618, D85460, D85607, Fantastigo, Saltingo.

Conclusions

Varieties were evaluated in standard Vining Pea Main Trials in 2016 and 2017.

After the withdrawal of 07S51368A and Valido and the placement of D95389 in the petits pois trials, nine varieties Saltingo, D165618, Fantastigo, SV0957QF, D85607, LG Midnight, Reflection (PLS 196), Vidor and CS-445AF completed three years of evaluation in 2017.

In 2016 Oasis gave a 2 t/ha yield increase from TR100 to TR120. In 2017 yields did not increase from TR100 to TR120. Oasis matured 9 and 12 days later than Avola in 2016 and 2017 respectively.

Sherwood, an early maturing replacement for Avola matured at the same time as Avola and gave a significant yield increase over Avola at TR100.

Saltingo (D165621) (Syngenta) was semi-leafless and matured on average 5 days later than Avola. Yields were significantly lower than Oasis, but significantly higher than Avola at TR100. Produce was medium-large size grade, a little smaller than Avola at TR100. Haulm was similar in length to Avola and the variety had better standing ability (5).

D165618 (Syngenta) was semi-leafless and matured on average 5 days later than Avola. Yields were lower than Oasis, but significantly higher than Avola at TR100. Produce was medium-large size grade, a little smaller than Avola at TR100. Standing ability was a little above average (6).

Fantastigo (D165613) (Syngenta) was semi-leafless and matured 7 days later than Avola. Yields were significantly higher than Avola (84/89%). Yields were higher in 2017, than 2016. Produce was medium-large size grade, smaller than Avola. Standing was ability a little above average (6).

SV0957QF (Seminis Vegetable Seed) was semi-leafless and matured 3 days before Oasis. Yields were lower, but not significantly lower than Oasis (87/96). Produce was medium-large size grade. Standing ability was a little above average (6).

D85607 (Syngenta) matured 3 days before Oasis. Yields at TR100 were significantly lower than Oasis. Yields were better in 2017 than 2016. Produce was smaller than Oasis, medium-small size grade. Standing ability was average (5).

LG Midnight (06S55519A) (Limagrain UK) was semi-leafless and matured at the same time as Oasis. Overall yields were lower but not significantly lower than Oasis (84/83%). Yields were a little higher in 2017 than 2016. Produce was larger than Oasis, medium-large size grade. Haulm was longer than Oasis and the variety had the best standing ability (7).

Vidor (Wav 4361) (van Waveren) matured at the same time as Oasis. Overall, yields were similar to Oasis (98/100%). Produce was similar in size to Oasis, medium-large size grade. Standing ability was poor, similar to Oasis.

Reflection (PLS 196) (Pure Line Seeds) was semi-leafless and matured one day later than Oasis. Overall yields were higher than Oasis (102/118%) and were the highest in the trial at TR120. Produce was a little larger than Oasis, large-medium size grade. Standing ability was average (5).

CS-445AF (Crites Seed) was semi-leafless and matured one day later than Oasis. Yields were much higher in 2017 than 2016. Yields were the highest in trial at TR100 (109/114%). Produce was large size grade, larger than Oasis. Haulm was short and standing ability was a little above average (6).

Technology transfer

No formal trials demonstration was held in 2017. However, an open invitation was sent out to view the trial at people's convenience.

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 and 2015/16 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). The guide is also available on the AHDB Horticulture website.

Industry Representative Comments

"This is an extremely worthwhile project as it allows growers to choose new varieties based on quality independent research. It demonstrates the strengths and weaknesses of new varieties in a climate of less reliance on pesticides and more emphasis on plant disease resistance and vigour. In times where we are experiencing more extreme weather events we also need to find varieties that are more able to withstand these extremes. The vining pea crop is an important part of the crop rotation, but it needs to remain financially viable, therefore it is vital that we have independent variety trial data. The standout varieties over the last 3 years have been Tomahawk, which is out-yielding the early standards, late maturing Maurice, which has out-yielded Oasis at TR100 and has good field resistance to downy mildew, also late maturing and out yielding Oasis were Reflection and CS-445AF".

Appendices

APPENDIX 1

KEY TO SOURCE OF VARIETIES

CS	Crites Seed Inc., USA
El	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			