

Project title: Vining Peas: Extension of Variety Evaluation Trials

Project number: FV 462

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Report:

Previous report:

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Location of project:

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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. In the past a duplicate Main trial (funded by AHDB) has been located on a light-silt soil near Holbeach. For future trialling the Legume Industry Panel requested input into variety selection for this trial, which may include both new and commercially grown varieties. Standard Varieties would include Avola (maturity) and Oasis (yield).

Trial site details

Variety Trial Site: Gedney Drove End, South Lincolnshire.

Lat 52.828842, Long 0.128745.

Worth Farms Ltd,
Fleet Estate office,
Manor Farm,
Holbeach Hurn, Spalding,
Lincs. PE12 8LR

Downy Mildew Trials:

Grange Farm, Grange Lane, Nocton Lincs LN4 2AQ

Lat: 53.157731, Lon: -0.466427

Gedney Drove End, South Lincolnshire.

Lat 52.828842, Long 0.128745.

Table 1. Varieties, leaf type, source and approximate maturity – 2020

Variety Name	Leaf Type	Source	Maturity (± days Avola)
Aloha	C	van Waveren	-1
Tomahawk	SL	Crites Seed	-1
Avola	C	Seminis Vegetable Seeds	0
Sherwood	C	Seminis Vegetable Seeds	+ 1
Boston	C	Storm Seeds	+ 2
Anubis	C	Limagrain UK	+ 2
Ebba	SL	Findus	+ 2
Artemia	C	Limagrain UK	+ 3
Selune	C	Storm Seeds	+ 5
Idalgo	SL	Syngenta	+ 9
Ashton	C	Seminis Vegetable Seeds	+14
Boogie	SL	van Waveren	+14
Ida	SL	Findus	+14
Songo	SL	Syngenta	+14
Lyric	C	van Waveren	+14
Dancer	SL	van Waveren	+16
Oasis	C	Limagrain UK	+16
Kimberley	SL	Storm Seeds	+19

C=Conventional-leaved; SL=Semi-leafless

Results of the Variety Trials

Table 2. Percentage yield, Percentage size grade, haulm length and standing ability –2020

Variety	@TR105					@TR125		Haulm length cm	Standing Ability 9=erect 1=lodged
	Yield % of Oasis	% in size grades				Yield % of Oasis			
		L	M	S	VS				
Aloha	35	42	43	12	3		50	5.0	
Tomahawk	44	36	43	17	4		51	7.0	
Avola	33	68	25	6	1		50	5.0	
Anubis	36	34	37	20	9	37	51	7.0	
Ebba	26	29	40	23	8	23	51	8.0	
Artemia	6	2	8	54	36	8	52	6.0	
Selune	14	0	5	32	63	18	53	5.0	
Idalgo	44	38	38	18	6	42	51	8.0	
Ashton	77	30	50	16	4	66	56	7.0	
Boogie	79	67	26	6	1	82	56	8.0	
Ida	98	42	45	11	2	91	56	8.0	
Songo	56	40	40	16	4	68	55	8.0	
Lyric	77	30	56	11	3	66	54	7.0	
Dancer	79	14	49	30	7	68	56	8.0	
Oasis	100	46	37	14	3	100	55	2.0	
	(9.05t/ha)					(10.55t/ha)			
Kimberley	80	30	60	9	1	85	56	8.0	

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

Main Conclusions

Despite the conditions, the yield standard Oasis yielded well, 9.05t/ha at TR105, with a moderate increase to 10.55t/ha at TR125. Oasis, a vigorous leafy variety often performs well in these conditions and less well in fertile wetter conditions. In the wetter 2019 season some varieties out-performed Oasis, but in the difficult 2020 season many varieties were lower yielding by comparison.

Yields and maturity for Avola are based on a single harvest at around TR105. Consequently no maturity comparisons can be made against Avola at TR125.

Cooler and wetter conditions part way through the harvest gave rise to extended maturity for the later maturing varieties, with Oasis maturing 16 days later than Avola.

Early maturing varieties Aloha and Tomahawk matured one day earlier than Avola.

As in 2019 Dancer and Kimberly were the latest to mature, maturing 16 and 19 days later than Avola respectively.

Top yielding variety was Oasis. Ida (98 and 91%) was a little lower yielding than Oasis.

In both years, Artemia and Selune were the lowest yielding varieties, giving very low yields.

Overall Boogie (100/103%), Ida (100/102%) and Dancer (102/97%) were the higher yielding varieties over the 2 years.

Late maturing Kimberly, yielded (80 and 85%) better in 2020, when compared to Oasis.

Many other varieties showed similar yield rankings in 2020 to 2019 when compared to Oasis.

As in 2019 Artemia and Selune gave a very low pea:vine ratio (8% and 10% respectively) compared to Oasis (23%).

Avola and Boogie gave produce with very large size grade peas. Artemia and Selune gave much smaller produce, Artemia small-very small size grade and Selune very small-small size grade.

Many varieties showed no blond peas in the defrosted samples. Oasis showed the most.

Brix levels were generally higher than in 2019. As in 2019 Artemia gave the highest Brix score (16.2%).

The only variety to have lodged significantly was Oasis with a rating of 2.

Dancer, Ebba and Idalgo had the better downy mildew resistance, showing Moderate field resistance.

Conclusions

Establishment difficulties has led to some missing data for some varieties. There are number of consistencies in the 2019 and 2020 data, but it would of benefit to repeat the trial again 2021.

FULL TRIAL REPORT

Introduction

The Legume Industry Panel has identified varietal selection as an important and key element of crop production and requires an accurate guide to the performance of varieties in areas typical of pea production. Priorities also include the development of novel products to help mitigate the effects of continued loss of active substances to manage key pests and diseases.

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.

Priorities described in the AHDB-Horticulture strategy for legumes are:

1. Realising Genetic Potential (variety trials and resistance breeding),
2. Building Sustainable Plant Health (crop protection work, IPM, resistance management),
3. Managing Resources Sustainably (water, nutrients, energy),
4. Driving Precision Technology into Practice (automation, precision, smart technology),
5. Facilitating Wholesome & Trusted Food in the Supply Chain (improving quality, food safety),
6. Honing Business & Technical Skills (building research & industry capability, LEAN, CPD schemes).

This proposal addresses priorities 1, 2, 3 and 5. Variety trialling and harvest scheduling to maximise quality, reduce losses and improve factory efficiency firmly aligns with all priorities; Evaluation of novel products for improved management of diseases and improved quality and crop performance.

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 only one area of the total UK vining pea production area. Funding by AHDB-Horticulture has in the past allowed 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 were added to a Descriptive List of Vining Pea Varieties for this area / soil type. For future trialling the Legume Industry Panel requested input into variety selection which may include both new and commercially grown varieties. Standard Varieties would include Avola (maturity) and Oasis (yield).

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, evenness of colour number of blond peas and size)
- 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 the 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.

FV 340c: In each year new varieties including standards were evaluated and the Descriptive List and Vining Pea Variety Guide produced. In 2015, 2016, 2017 and 2018 trials were successfully delivered to harvest and an annual report produced. For 2018 trials the final report will be complete by the project end. In each year a rolling 2 year summary of varieties completing trials has been published.

Table 1. Varieties, leaf type, source and approximate maturity – 2020

Variety Name	Leaf Type	Source	Maturity (± days Avola)
Aloha	C	van Waveren	-1
Tomahawk	SL	Crites Seed	-1
Avola	C	Seminis Vegetable Seeds	0
Sherwood	C	Seminis Vegetable Seeds	+ 1
Boston	C	Storm Seeds	+ 2
Anubis	C	Limagrain UK	+ 2
Ebba	SL	Findus	+ 2
Artemia	C	Limagrain UK	+ 3
Selune	C	Storm Seeds	+ 5
Idalgo	SL	Syngenta	+ 9
Ashton	C	Seminis Vegetable Seeds	+14
Boogie	SL	van Waveren	+14
Ida	SL	Findus	+14
Songo	SL	Syngenta	+14
Lyric	C	van Waveren	+14
Dancer	SL	van Waveren	+16
Oasis	C	Limagrain UK	+16
Kimberley	SL	Storm Seeds	+19
C=Conventional-leaved; SL=Semi-leafless			

Variety Trial Site: Gedney Drove End, South Lincolnshire.

Lat 52.828842, Long 0.128745.

Worth Farms Ltd,

Fleet Estate office,

Manor Farm,
Holbeach Hurn, Spalding,
Lincs. PE12 8LR

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 100 plants/m².

Broad-leaved weeds were controlled with pre-emergence. Aphid and pea moth (*Cydia nigricana*) were controlled (monitored by pea moth traps).

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

The following crop protection products were applied

29/04/2020	Nirvana	3.0 l/ha
22/05/2020	OptE Man	2.968 l/ha
15/06/2020	Cleancrop Granada	0.96 l/ha
15/06/2020	Cleancrop Corsair	0.075 l/ha
15/06/2020	Clayton Pirimicarb	0.14 Kg/ha

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 105 (range 95-105), @TR 125 Range 120-130) 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: 27 April 2020

Harvest dates: 3 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 @TR105 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 @TR105 and TR125 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:

Variety Trial Sites:

Gedney Drove End, South Lincolnshire.

Lat 52.828842, Long 0.128745.

Grange Farm, Grange Lane, Nocton Lincs LN4 2AQ

Lat: 53.157731, Lon: -0.466427

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 1. Varietal Susceptibility of Vining Peas to Downy Mildew (*Peronospora viciae*) - 2020

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.

Data for the mean of two sites is presented below

Susceptible 1/2	Moderately Susceptible 3/4	Slightly Susceptible 5/6	Moderate Field Resistance 7/8	Good Field Resistance 9
	Avola	Tomahawk	Dancer	
	Lyric	Boston	Ebba	
	Ashton	Anubis	Idalgo	
		Boogie		
		Ida		
		Songo		

These data after 2 years evaluation will be incorporated in the PGRO Descriptive Lists of Vining Pea Varieties, published in the PGRO Vining Pea Variety Guide.

TABLE 2 - VINING PEA VARIETY EVALUATIONS. Summary of agronomic data Standard Vining Pea AHDB Funded Variety Trial, Holbeach (Gedney Drove End) - 2020
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 27 April.
 Results are means of three replicates. Target population 100 plants per m² sown in ten 15 cm rows.

Variety	Source	1000 Seed Weight g	Maturity (± days) Avola	@ TR 105					@ TR 125					Haulm length cm	Standing Ability 9=erect 1=lodged	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark	
				Yield % of Oasis	% in size grades	Yield % of Oasis	% in size grades	L	M	S	VS	L	M					S
Aloha	vW	218	- 1	35	42	43	12	3						50	5.0	14	5.0	
Tomahawk	SL	CS	173	- 1	44	36	43	17	4		41	43	13	3	51	7.0	16	4.5
<u>Avola</u>	<u>SVS</u>	<u>182</u>	<u>0</u>	<u>33</u>	<u>68</u>	<u>25</u>	<u>6</u>	<u>1</u>						<u>50</u>	<u>5.0</u>	<u>14</u>	<u>4.5</u>	
Anubis	LUK	211	+ 2	36	34	37	20	9	37	49	29	16	6	51	7.0	17	4.3	
Ebba	SL	Fin	190	+ 2	26	29	40	23	8	23	43	37	17	3	51	8.0	12	4.8
Artemia	LUK	85	+ 3	6	2	8	54	36	8	1	17	51	31	52	6.0	8	4.0	
Selune	SS	92	+ 5	14	0	5	32	63	18	0	4	41	55	53	5.0	10	4.8	
Idalgo	SL	Syn	165	+ 9	44	38	38	18	6	42	45	36	14	5	51	8.0	16	4.8
Ashton	SVS	172	+14	77	30	50	16	4	66	38	46	13	3	56	7.0	22	4.8	
Boogie	SL	vW	208	+14	79	67	26	6	1	82	83	15	2	0	56	8.0	24	4.5
Ida	SL	Fin	182	+14	98	42	45	11	2	91	62	32	5	1	56	8.0	26	5.0
Songo	SL	Syn	176	+14	56	40	40	16	4	68	51	36	11	2	55	8.0	22	5.0
Lyric	vW	156	+14	77	30	56	11	3	66	45	45	7	3	54	7.0	25	4.8	
Dancer	SL	vW	145	+16	79	14	49	30	7	68	34	54	11	1	56	8.0	20	5.0
<u>Oasis</u>	<u>LUK</u>	<u>206</u>	<u>+16</u>	<u>100</u>	<u>46</u>	<u>37</u>	<u>14</u>	<u>3</u>	<u>100</u>	<u>68</u>	<u>26</u>	<u>5</u>	<u>1</u>	<u>55</u>	<u>2.0</u>	<u>23</u>	<u>5.0</u>	
					(9.05t/ha)					(10.55t/ha)								
Kimberley	SL	SS	160	+19	80	30	60	9	1	85	35	58	6	1	56	8.0	19	5.0

KEY:

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 EVALUATIONS. Summary of quality data - Standard Vining Pea AHDB Funded Variety Trial, Holbeach (Gedney Drove End Bridge) - 2020

Variety	Tenderometer Reading	Appearance				Brix %
		Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Aloha	108.0	6.0	2.0	4.8	1.0	12.1
Tomahawk	103.0	6.2	2.0	4.8	1.0	12.5
Avola	102.5	6.0	2.0	4.8	1.0	12.3
Anubis	95.0	5.8	2.0	4.5	1.0	13.3
Ebba	99.0	6.2	2.0	5.0	1.0	13.7
Artemia	98.0	5.8	2.0	5.0	1.0	16.2
Selune	105.0	5.3	2.0	4.8	1.0	12.5
Idalgo	104.0	6.0	2.0	4.8	1.0	12.6
Ashton	100.0	6.0	2.0	4.8	1.0	12.5
Boogie	102.5	6.0	2.0	4.8	1.0	11.7
Ida	103.5	6.0	2.0	4.7	1.3	12.7
Lytic	98.5	5.3	2.0	4.8	1.3	13.3
Songo	100.0	6.5	2.0	4.0	1.0	12.1
Dancer	97.5	6.2	2.0	5.0	1.0	13.7
Oasis	97.5	5.8	2.0	4.0	1.7	12.6
Kimberley	106.5	6.5	2.0	5.0	1.0	12.9

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. Vining Pea AHDB Funded Variety Trial, 2019 - 2020
 Varieties placed in order of maturity. Standard varieties underlined. Target population 100 plants per m² sown in ten 15 cm rows.

Variety	Source	1000 Seed Weight g	@ TR 100						@ TR 120						Haulm length cm	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							
Aloha	vW	206	-1	62-	43	43	11	3	0	65-	58	38	3	1	56	4	16	4.9
Tomahawk	CS	173	-1	62-	36	48	13	3	0	71-	47	42	9	2	51	4	19	4.5
<u>Avola</u>	<u>SL</u>	<u>SVS</u>	<u>0</u>	<u>56-</u>	<u>67</u>	<u>27</u>	<u>5</u>	<u>1</u>	<u>0</u>	<u>67-</u>	<u>85</u>	<u>13</u>	<u>2</u>	<u>0</u>	<u>60</u>	<u>4</u>	<u>16</u>	<u>4.6</u>
Sherwood		SVS	+1	64-	37	47	14	2	+1	63-	53	40	6	1	58	7	17	4.6
Boston	SL	SS	+2	58-	20	53	22	5	+2	48-	24	57	16	3	55	4	19	4.8
Anubis		LUK	+2	65-	39	38	17	6	+3	69-	52	32	12	4	58	5	18	4.4
Ebba		Fin	+3	53-	33	39	21	7	+3	51-	47	36	14	3	63	5	13	4.8
Artemia	SL	LUK	+4	18-	2	13	53	32	+5	20-	2	21	53	24	49	6	8	4.3
Selune		SS	+5	25-	0	6	37	57	+5	25-	1	7	48	44	61	4	9	4.5
Idalgo		Syn	+8	57-	41	40	15	4	+6	53-	57	33	7	3	61	5	13	4.8
Ashton	SL	SVS	+12	89	30	49	17	4	+10	90	37	49	11	3	68	5	21	4.8
Boogie		vW	+12	101	59	33	7	1	+10	103	72	24	3	1	60	5	24	4.6
Songo	SL	Syn	+13	73-	42	41	14	3	+11	82	52	37	9	2	58	5	20	4.9
Ida	SL	Fin	+13	100	36	50	12	2	+11	101	54	40	5	1	60	5	23	4.9
Lyric	SL	vW	+12	90	35	51	11	3	+11	94	46	46	6	2	61	5	22	4.8
<u>Oasis</u>	<u>SL</u>	<u>LUK</u>	<u>+14</u>	<u>100</u>	<u>41</u>	<u>41</u>	<u>15</u>	<u>3</u>	<u>+11</u>	<u>100</u>	<u>55</u>	<u>35</u>	<u>8</u>	<u>2</u>	<u>67</u>	<u>2</u>	<u>23</u>	<u>4.9</u>
				(9.60t/ha)						(10.71t/ha)								
Dancer	vW	160	+14	102	18	53	24	5	+12	97	31	62	6	1	66	9	20	4.9
Kimberley	SS	172	+16	74-	26	57	15	2	+13	78	33	59	7	1	70	5	17	4.9
Significance @ P=0.05				SD						SD								
LSD @ P=0.05				20.8						19.4								
CV %				16.8						16.6								

KEY:

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 EVALUATIONS. Summary of quality data – AHDB Funded Variety Trial, 2019 - 2020

Variety	Year	Tenderometer Reading	Appearance				Brix %
			Colour (3-8)	Brightness (1-2)	Uniformity (1-5)	No. of blonds (1-5)	
Aloha	19	100.5	7.0	1.0	5.0	1.0	12.2
	20	108.0	6.0	2.0	4.8	1.0	12.1
Tomahawk	19	103.5	7.0	1.0	4.5	1.0	12.4
	20	103.0	6.2	2.0	4.8	1.0	12.5
Avola	19	99.5	7.0	1.0	5.0	1.0	12.1
	20	102.5	6.0	2.0	4.8	1.0	12.3
Sherwood	19	103.0	6.0	1.0	4.5	1.0	12.3
	20						
Boston	19	103.5	5.0	1.0	5.0	1.0	12.0
	20	134.5	6.0	2.0	4.8	1.0	12.1
Anubis	19	101.0	6.0	1.0	4.5	1.0	12.0
	20	95.0	5.8	2.0	4.5	1.0	13.3
Ebba	19	101.5	6.5	1.0	5.0	1.0	12.5
	20	99.0	6.2	2.0	5.0	1.0	13.7
Artemia	19	102.0	5.0	1.0	5.0	1.0	13.3
	20	98.0	5.8	2.0	5.0	1.0	16.2
Selune	19	101.0	5.5	1.0	4.5	1.0	11.9
	20	105.0	5.3	2.0	4.8	1.0	12.5
Idalgo	19	98.0	7.0	1.0	5.0	1.0	12.5
	20	104.0	6.0	2.0	4.8	1.0	12.6
Ashton	19	99.5	5.2	1.0	3.0	2.7	11.0
	20	100.0	6.0	2.0	4.8	1.0	12.5
Boogie	19	96.5	6.0	1.0	4.0	1.3	11.3
	20	102.5	6.0	2.0	4.8	1.0	11.7
Songo	19	105.0	6.5	1.0	4.7	1.0	11.1
	20	100.0	6.5	2.0	4.0	1.0	12.1
Ida	19	105.5	5.8	1.0	4.2	1.0	11.0
	20	103.5	6.0	2.0	4.7	1.3	12.7
Lyric	19	97.0	5.5	1.0	3.0	3.3	11.2
	20	98.5	5.3	2.0	4.8	1.3	13.3
Oasis	19	102.0	5.3	1.0	2.3	3.7	11.1
	20	97.5	5.8	2.0	4.0	1.7	12.6
Dancer	19	97.5	6.2	1.0	3.8	1.0	12.8
	20	97.5	6.2	2.0	5.0	1.0	13.7
Kimberley	19	97.5	5.8	1.0	3.7	2.3	12.8
	20	106.5	6.5	2.0	5.0	1.0	12.9

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

Discussion

The variety Sherwood did not establish well (also at other trial sites) and the variety was removed from the trial.

The trial was sown into very dry and cloddy conditions on 27 April. Subsequent emergence was erratic and patchy, with some plots showing good emergence and other not. Plots were visually inspected at regular intervals and only those with adequate emergence and subsequent growth were taken for yield. For some varieties no replication was available so statistical analysis of yield was not possible.

Despite the conditions, the yield standard Oasis yielded well, 9.05t/ha at TR105, with a moderate increase to 10.55t/ha at TR125. Oasis, a vigorous leafy variety often performs well in these conditions and less well in fertile wetter conditions. In the wetter 2019 season some varieties out-performed Oasis, but in the difficult 2020 season many varieties were lower yielding by comparison.

Yields and maturity for Avola are based on a single harvest at around TR105. Consequently no maturity comparisons can be made against Avola at TR125.

Cooler and wetter conditions part way through the harvest gave rise to extended maturity for the later maturing varieties, with Oasis maturing 16 days later than Avola.

Early maturing varieties Aloha and Tomahawk matured one day earlier than Avola.

As in 2019 Dancer and Kimberly were the latest to mature, maturing 16 and 19 days later than Avola respectively.

Top yielding variety was Oasis. Ida (98 and 91%) was a little lower yielding than Oasis.

In both years, Artemia and Selune were the lowest yielding varieties, giving very low yields.

Overall Boogie (100/103%), Ida (100/102%) and Dancer (102/97%) were the higher yielding varieties over the 2 years.

Late maturing Kimberly, yielded (80 and 85%) better in 2020, when compared to Oasis.

Many other varieties showed similar yield rankings in 2020 to 2019 when compared to Oasis.

As in 2019 Artemia and Selune gave a very low pea:vine ratio (8% and 10% respectively) compared to Oasis (23%).

Avola and Boogie gave produce with very large size grade peas. Artemia and Selune gave much smaller produce, Artemia small-very small size grade and Selune very small-small size grade.

Many varieties showed no blond peas in the defrosted samples. Oasis showed the most.

Brix levels were generally higher than in 2019. As in 2019 Artemia gave the highest Brix score (16.2%).

The only variety to have lodged significantly was Oasis with a rating of 2

Dancer, Ebba and Idalgo had the better downy mildew resistance, showing Moderate field resistance.

Conclusions

Establishment difficulties has led to some missing data for some varieties. There are number of consistencies in the 2019 and 2020 data, but it would of benefit to repeat the trial again 2021.

Comment from the Industry representative

Technology transfer

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 2017/18/19 data was presented in the PGRO Vegetable Magazine winter editions, the PGRO websites and PGRO app.

Appendices

KEY TO SOURCE OF VARIETIES

CS	Crites Seed Inc., USA
Fin	Findus, Sweden
LUK	Limagrain UK Ltd, UK
SVS	Seminis Vegetable Seeds, UK
SS	Storm Seeds, Belgium
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-20	1.2	9.1	0	01-May-20	6.7	13.7	0
02-Apr-20	3.9	13.3	0	02-May-20	5.9	16.1	0
03-Apr-20	3.3	11.6	0	03-May-20	5.9	14	0
04-Apr-20	2.7	15.9	0	04-May-20	6.8	12.7	0
05-Apr-20	5.9	20.1	0	05-May-20	5.7	11.5	0
06-Apr-20	7.7	16.5	0	06-May-20	3	12.5	0
07-Apr-20	3.7	18.1	0	07-May-20	4.9	20.4	0
08-Apr-20	5.9	19.1	0	08-May-20	9.7	21.4	0
09-Apr-20	6.9	13.5	0	09-May-20	9.5	21.8	0
10-Apr-20	6.7	21.9	0	10-May-20	6.1	14.3	0
11-Apr-20	7.1	23.6	0	11-May-20	2.3	9.6	0
12-Apr-20	8.3	19.6	0	12-May-20	0.7	11.6	0
13-Apr-20	5.7	8.5	0.2	13-May-20	3.1	9.7	0
14-Apr-20	2.9	11.9	0	14-May-20	0.8	11.3	0
15-Apr-20	3.2	17.7	0	15-May-20	3.4	16.7	0
16-Apr-20	4.1	14.2	0	16-May-20	5.8	15.8	0
17-Apr-20	7.2	10.2	0	17-May-20	8.6	19.3	0
18-Apr-20	7	9.9	0.6	18-May-20	11.4	20.7	0
19-Apr-20	4.4	11.7	0	19-May-20	13	23.1	0
20-Apr-20	7.8	11.5	0	20-May-20	12.3	26.7	0
21-Apr-20	8.9	12.2	0	21-May-20	13.3	24.1	0
22-Apr-20	7.3	12.9	0	22-May-20	12.3	20.3	0
23-Apr-20	7.1	16.4	0	23-May-20	10.6	18.2	0
24-Apr-20	3.9	13.9	0	24-May-20	11.4	18.7	0
25-Apr-20	6.9	13.8	0	25-May-20	8.1	23.8	0
26-Apr-20	4.5	20.7	0	26-May-20	11.3	21.9	0
27-Apr-20	8.5	12.7	0.4	27-May-20	10.7	22	0
28-Apr-20	7.2	9.2	13	28-May-20	8.3	19.9	0
29-Apr-20	6.8	11.8	1	29-May-20	8.9	18.2	0
30-Apr-20	6.8	11.5	6.2	30-May-20	9.1	19.5	0
				31-May-20	10.3	21.1	0

Date	Air Min °C	Air Max °C	Rainfall mm	Date	Air Min °C	Air Max °C	Rainfall mm
01-Jun-20	9.5	18.4	0	01-Jul-20	14.7	19.8	0
02-Jun-20	8.2	20	0	02-Jul-20	11.5	16.7	0
03-Jun-20	10.7	15.2	0.4	03-Jul-20	12	18.9	0
04-Jun-20	9.5	13.5	0.4	04-Jul-20	15.5	20.3	0
05-Jun-20	7.8	13.1	4.4	05-Jul-20	13.7	19.9	0
06-Jun-20	7	15.3	1	06-Jul-20	10	18.6	0
07-Jun-20	6.9	13.3	3.6	07-Jul-20	8.8	17.7	6.4
08-Jun-20	7.3	13	0	08-Jul-20	12.5	15	10.6
09-Jun-20	4.3	15.5	0	09-Jul-20	12.6	16	5.2
10-Jun-20	10.4	14.1	5	10-Jul-20	11.2	18	2
11-Jun-20	10.9	15.4	6.6	11-Jul-20	9.3	18.8	0
12-Jun-20	12.9	15.7	1.2	12-Jul-20	7.8	21.5	0
13-Jun-20	13.4	21.6	0	13-Jul-20	11.8	21.7	0

14-Jun-20	13.2	17.7	0	14-Jul-20	10.6	18.1	0
15-Jun-20	12.4	19.6	0	15-Jul-20	8.9	17.2	0
16-Jun-20	13.2	20.4	0	16-Jul-20	14.8	21.6	0
17-Jun-20	12.1	21	0.8	17-Jul-20	15	25.2	0
18-Jun-20	13.2	19	27.8	18-Jul-20	15.8	20.9	0
19-Jun-20	11.1	17.4	0	19-Jul-20	11.9	18.9	17.6
20-Jun-20	10.4	21.6	0	20-Jul-20	9.4	18.4	0
21-Jun-20	11.5	20.6	3.4	21-Jul-20	8.9	18.5	0
22-Jun-20	9.4	22.7	0	22-Jul-20	12.1	22.9	0
23-Jun-20	13.3	26.3	0	23-Jul-20	12.6	22.9	0
24-Jun-20	13.6	28.8	0	24-Jul-20	14	23.6	0
25-Jun-20	16.5	26.9	0	25-Jul-20	13.3	23.4	2.4
26-Jun-20	15.8	29.6	0	26-Jul-20	12	22	0
27-Jun-20	13.5	21.3	9.2	27-Jul-20	11.8	21.3	3.8
28-Jun-20	11.5	19.3	0	28-Jul-20	10.8	18.8	0
29-Jun-20	12	16.2	0	29-Jul-20	10.2	21.1	0
30-Jun-20	13.3	20.2	0	30-Jul-20	13.3	27.5	0
				31-Jul-20	13.7	33.9	0
24-Jun-19	13.5	23.6	6.8	24-Jul-19	18.2	30.5	3
25-Jun-19	13.8	16.7	5	25-Jul-19	18.1	37.2	0
26-Jun-19	11.8	15.7	0	26-Jul-19	18.3	25.7	0
27-Jun-19	9.8	16	0	27-Jul-19	15.1	18.6	13.4
28-Jun-19	12.1	18.1	0	28-Jul-19	14.1	17.8	9
29-Jun-19	9.8	30.5	0	29-Jul-19	14.2	24.9	0
30-Jun-19	13.6	23.1	0	30-Jul-19	15.5	24.1	1
				31-Jul-19	15.3	19	6.4