

Project Title: Vining Peas: Evaluation of new and established varieties sown at appropriate commercial timings

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'The results and conclusions in this report are based on an investigation conducted over one year. The conditions under which the experiment was carried out and the results obtained have been reported with detail and accuracy. However because of the biological nature of the work it must be borne in mind that different circumstance 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'.

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GROWER SUMMARY

FV 152b

Vining Peas: Evaluation of new and established varieties sown at appropriate commercial timings

Annual report 2005

GROWER SUMMARY

Headline

Variety choice is important for vining pea production and reliable and accurate information is key to this. PGRO is the only independent source of information for variety data.

Data obtained is added to the 'Advisory Leaflet on Vining Pea Varieties' and builds on data previously obtained.

This leaflet is available free of charge from PGRO or can be downloaded from the PGRO Website www.pgro.org.

Using this leaflet, growers can make informed decisions on varietal choice, but it should be noted that varietal performance can differ with site and seasons and small areas of a new variety should be evaluated before planning a large programme.

Background

Varietal selection is an important and key element of vining pea production to ensure a sequential programmed harvest period and to maintain high quality produce.

The PGRO evaluates a large number of varieties per annum including approximately 15 at National List Stage in Preliminary Trial and about 5 of the best ones are chosen for further evaluation in the Main Trial. Varieties are replicated three times and each plot has to be harvested at different stages of maturity to enable yield and size grade data to be presented for the practical freezing stage (TR 100) and practical canning stage (TR 120). This dictates that the trials are only sown on one date (usually early to mid-March for the Main Trial and mid-April for the Preliminary Trial), despite the fact that both trials contain early, mid-season and late varieties which commercially would be sown from late February to mid-May respectively.

Several promising varieties have been tested in recent years and more information on their performance and relative maturity within a maturity group is needed at the likely commercial sowing time. Early varieties would therefore be tested under cool establishment conditions with a long period from sowing to harvest while, in contrast, maincrop varieties would be tested under conditions of rapid establishment and growth. Further work is needed to gain experience in contrasting seasonal weather conditions.

Summary of results

Two early (Twinkle and Dakota), 7 early maincrop (Cabaret, Starlight, Gallant, Zelda, Urbana, Zodiac and Serge), 6 petits pois (Nalesa, Arnesa, Baghera, Corus, Caribou and PL 65) and 5 maincrop (Ranger, Kiros, Ibis, Akura and Geisha) varieties of vining peas were compared to Bikini for yield and maturity. Avola was included as a maturity check in the Early Trial, Waverex in the Petits Pois Trial and Ambassador in the Maincrop Trial.

Early and Second Early Varieties

Twinkle matured at the same time as Avola, 7 days before Bikini. Avola had medium length haulm and gave higher yields than Bikini. Peas were medium-large size grade and were a little uneven in colour. Twinkle had short haulm similar to Bikini. Yields were similar to Bikini and produce similar in size to Avola. Peas were not as dark as Avola, but were more evenly coloured.

Dakota matured 2 days later than Avola and gave very low yields, significantly lower than Bikini. Produce was medium size grade and had a good, even colour.

Early Maincrop Varieties

Website was withdrawn from trials by the breeder. Zodiac had poor establishment due to a poor germination and vigour, as result the variety was not harvested. Bikini gave only a small yield increase from TR100 to TR120. There were no statistically significant yield differences between the varieties in trial and the standard, but there were some significant differences between varieties.

Cabaret matured 2 days before Bikini. Yields were lower than Bikini at TR100, but similar at TR120. Produce was smaller than Bikini, however, medium size grade. Cabaret had similar length haulm to Bikini. Peas had a dark and even colour

Zelda matured at the same time as Bikini.

Semi-leafless Zelda had longer haulm than Bikini, but was erect at harvest. Yields were higher than Bikini and produce similar size, medium-large size grade. Peas had a dark and even colour.

Bikini was semi-leafless, semi-fasciated, short strawed and erect at harvest. Produce was medium-large size grade with a dark and even colour.

Serge, Urbana and Gallant were all semi-leafless and matured 3 days later than Bikini.

Serge had medium length haulm and was erect at harvest. Yields were the highest in this trial, but not significantly higher than Bikini. Produce was medium-large size grade, but with more peas in the large size grade than Bikini. Peas were paler than Bikini, but evenly coloured.

Urbana had long haulm, but stood well. Yields were a little higher than Bikini, and produce was smaller, medium-small size grade. Peas had a very dark and even colour.

Gallant had slightly longer haulm than Bikini and was erect at harvest. Yields were a little lower than Bikini at TR100 but a little higher at TR120. Produce was a little larger than Bikini, large-medium size grade with more peas in the large size grade than Bikini. Peas had a good, even colour.

Starlight was the latest variety to mature 3 days later than Bikini. Yields were low at TR100, but only a little lower than Bikini at TR120. Produce was a little larger than Bikini, medium-large size grade. Peas had a good, even colour.

Petits Pois Varieties

The trial was located in a major petits pois production area near Holbeach Hurn, South Lincolnshire. Growth in this trial was more vigorous than at the Thornhaugh site. Generally produce colour was not as even as the Thornhaugh site. Four additional varieties were included in the trial for 2005.

Baghera matured 3 days before Bikini. Baghera had longer haulm than Waverex and had fine foliage, but was lodged at harvest. Yields were higher than Waverex at TR100, but lower at TR120. Produce was in similar size to Waverex with 82% of the peas <8.75mm diameter. Pea colour was a little uneven.

Corus and Caribou matured 2 days later than Bikini.

Corus had fine-leaved foliage, and was semi-erect at harvest. Yields were low, significantly lower than Bikini at TR120. Produce was of a similar size to Waverex, with 83% of the peas <8.75mm diameter. Peas were a little uneven in colour.

Caribou was fine-leaved and was semi-erect at harvest. Yields were very high, significantly higher than Bikini or Waverex. Produce was larger than Waverex, small-medium size grade with 69% of the peas <8.75mm diameter. Peas had even colour.

Nalesa and PL 65 matured 3 days later than Bikini.

Nalesa was semi-leafless and was nearly erect at harvest. Yields were higher, but not significantly higher than Waverex at TR100. Produce was medium-small size grade with 73% of the peas <8.75mm diameter. Peas had a dark and even colour.

PL 65 had thicker foliage than most varieties and was lodged at harvest. Yields were higher, but not significantly higher than Waverex at TR100. Produce was small size grade with 83% of the peas <8.75mm diameter. Peas had a dark and even colour.

Arnesa was semi-leafless, erect at harvest and matured 5 days later than Bikini. Yields were higher, but not significantly higher than Waverex at TR100. Produce was small-very small size grade with 87% of the peas <8.75mm diameter. Peas had a dark and even colour

Maincrop Varieties

Yields of Bikini were lower than other trials at Thornhaugh and there was no yield increase from TR100 to TR120. Statistically there were no significant yield differences at TR100.

Bikini was the first to mature, 5 days before Ambassador. Bikini was semi-leafless and semi-fasciated and had very short haulm. Produce was smaller than in other trials, medium size grade. Peas had a very dark and even colour.

Ibis was semi-leafless and gave the highest yields in this trial, significantly higher than Bikini at TR120. Produce was smaller than Bikini, medium-small size grade. Ibis had longer haulm than Bikini, similar in length to Ambassador. Peas had a dark and even colour.

Semi-leafless Akura matured 2 days later than Bikini and had longer haulm than Bikini. Yields were lower, but not significantly lower than Bikini. Produce was smaller than Bikini, medium-small size grade with a good and very even colour.

Geisha was semi leafless and matured 3 days later than Bikini. Yields of medium-small size grade peas were a little lower than Bikini. Peas had a dark and even colour.

Kiros matured 4 days later than Bikini and had similar length haulm. Yields were high, but not significantly higher than Bikini. Produce was medium size grade, dark and evenly coloured.

Ranger matured at the same time as Ambassador, 5 days later than Bikini.

Ranger had short haulm, similar to Bikini and gave similar yields to Bikini. Produce was larger than Bikini, medium-large size grade and had a dark and even colour.

Ambassador was a little higher yielding than Bikini. Produce was larger than Bikini, medium-large size grade and evenly coloured.

Varietal susceptibility of vining peas to downy mildew (*Peronospora viciae*)

Varieties of vining peas were sown in disease observation trials at two sites (seed of Dakota and Gallant came pre-treated with Wakil XL and so were not included in the 2005 trials). Each trial was situated in a field with a history of pea growing.

Plants were scored for infection on two or three 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 on a 1-9 scale of increasing field resistance.

1	3	5	7	8	9
Very Susceptible	Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
Caribou	Akura	Arnesa		Corus	Ibis
Geisha	Cabaret	Baghera		Starlight	Nalesa
Twinkle	Kiros	Serge		Zelda	
	Ranger	Urbana			
		Zodiac			

Varieties varied in their susceptibility to downy mildew. The good field resistance of Nalesa was confirmed, while Cabaret, Twinkle, Geisha and Caribou appeared a little more susceptible than in previous years.

Varietal susceptibility of vining peas to powdery mildew (*Erysiphe pisi*)

Susceptibility of many of the varieties was determined in 2004. Nalesa and Arnesa were re-tested to confirm results of 2004 and the 3 of the 4 additional petits pois varieties were included. Peas were sown in a disease observation trial at one site at Thornhaugh.

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

Resistant	
Susceptible	Arnesa, Nalesa, Caribou, Corus, Baghera

The susceptibility of Nalesa and Arnesa to powdery mildew was confirmed. The results of these tests and those of previous years will be incorporated in the PGRO Advisory Leaflet of Vining Pea Varieties.

Potential benefits

New vining pea varieties in trial represent improvements in yield, size-grade and uniformity compared with older varieties which have been grown for very many years.

Reliable and accurate information on maturity to enable a sequential and uninterrupted harvest schedule to be followed is of great value to growers.

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

Varieties with good field resistance to downy mildew may not need an expensive seed treatment to control the disease.

The data will provide additional information for the growers leaflet 'Vining pea varieties: a descriptive list'. This, together with yearly trials results can be obtained by contacting PGRO or downloaded from the PGRO website www.pgro.org.

SCIENCE SECTION

Introduction

Varietal selection is an important and key element of crop production to ensure a programmed harvest period and to maintain high quality produce. To this end PGRO evaluate a large number of varieties per annum including 15 at National List Stage in Preliminary Trial and about 5 of the best ones are chosen for Main Trial. The variety treatment is replicated three times and each plot has to be harvested at different stages of maturity to enable yield and size grade data to be presented for the freezing stage Tenderometer Reading (TR) 100 and TR 120. This dictates that the trials are only sown on one date (usually mid-March for the Main Trial and mid-April for the Preliminary Trial), despite the fact that both trials contain early, mid-season and late varieties which commercially would be sown from late February to mid-May respectively.

Several promising new vining pea varieties with improved yield, and with more uniform size-grade and colour have been evaluated in PGRO Main and Preliminary Trials since the 1999 - 2000 project FV 154a. Both Main and Preliminary trials are sown on one date despite the fact that both trials contain early, mid-season and late varieties which commercially would be sown from late February to mid-May respectively. A further factor of vining pea variety evaluation is that because of the specialised equipment needed during harvesting and processing, the independent systematic evaluation of varieties is restricted to the PGRO, Thornhaugh site and one site for petits pois varieties in a commercial crop. This forms the basis for the selection and development of varieties for the 35,000 ha of commercial crops. In practice, commercial programmes are based on the use of a minimum of 4 varieties and it is more likely that 6 or 7 will be used to give a spread of maturity and to allow production for special markets. On the latter point, these can either be premium 'petits pois' or '150 minute' peas or, economy/value packs.

Varietal characteristics affect:

- yield
- quality (colour, flavour, size and texture)
- ease of harvesting
- disease vulnerability
- timeliness
- ease of integration in the harvest programme

and new ones are being actively sought by growers so that they can meet processors specifications for quality with the most productive, reliable and cost effective varieties.

Several promising varieties have been tested in recent years and more information on their performance and relative maturity of varieties within a maturity group is needed at the likely commercial sowing time. Early varieties would therefore be tested under cool establishment conditions with a long period from sowing to harvest while, in contrast, maincrop varieties would be tested under conditions of rapid establishment and growth. Work is needed over three years to gain experience in contrasting weather conditions.

Methods

Vining peas grown according to commercial practice.

Yield standard Bikini

Standards for each group underlined.

Sown:	15 March	8 April	20 March	25 April
Group/trial:	early/second early	early maincrop	petits pois	maincrop
	<u>Avola</u>	<u>Bikini</u>	<u>Waverex</u>	<u>Ambassador</u>
	<u>Bikini</u>	Cabaret	<u>Bikini</u>	<u>Bikini</u>
	Twinkle	Starlight	Nalesa	Ranger
	Dakota	Gallant	Arnesa	Kiros
		Zelda		Ibis
		Urbana		Akura
		Zodiac		Geisha
		Serge		

Sites: sandy loam soil at Thornhaugh, Cambs in a vining pea growing area; petits pois on a light silt soil in a commercial crop of petits pois in South Lincolnshire

Trial layout: Randomised complete block, 3 replications for trials at Thornhaugh. Randomised block, 2 replications (petits pois).

Plot size: 1.83 m x 19 m

Sub-plots: 1.83 m x 5 m for each of three harvest taken 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 2 m

Fungicide seed treatment: Wakil XL

Sown with an Øyjord plot drill to achieve a population of 90 plants m⁻²

Broad-leaved weeds were controlled pre-emergence and post-emergence if necessary.

Aphids were controlled if thresholds reached. Pea moth (*Cydia nigricana*) was controlled if necessary (monitored by pea moth traps).

Fungicide sprays were applied to control *Botrytis* and *Mycosphaerella* depending on weather conditions.

No irrigation was applied.

Haulm lengths measured and standing ability assessed just before harvest.

Maturity assessed from the sampling areas to achieve correct harvest dates for quick-freezing for vined peas using a Martin Pea Tenderometer.

Sub-plots were harvested when appropriate by hand, vined in a plot pea viner and washed. Peas were size-graded with a Mather & Platt size-grader, and weighed and total yield measured.

Samples were quick-frozen for quality appraisal and inspection by processors and growers.

Statistical analysis of yield for each maturity group in each year using ANOVA.

Combined analysis for three years data at the end of year 3.

Disease observation trials

i). Downy mildew

Varieties that came with untreated seed were planted in a double row plot with two replications at two sites in commercial crops of vining peas with a long history of pea growing where natural infection from soil borne oospores was likely to occur. The choice of site increased the likelihood of infection and could include a wider range of pathotypes. Infection scores were made on two occasions during the season and these scores converted to a scale of relative field resistance.

ii) Powdery mildew

Resistance to powdery mildew is controlled by a single gene and varieties are either fully resistant or fully susceptible to the disease. Varieties were planted at Thornhaugh in early June. Natural infection of powdery mildew occurred after flowering in late sown peas and varieties were scored as susceptible or resistant.

Results

With the exception of June, the months of January to July received less than average rainfall and there were few periods of prolonged rainfall during that time. June had average rainfall, but this fell on only a few occasions throughout the month. There were occasional frosts throughout January and February, with the lowest temperature of -3.4°C being recorded on 27 February. Frost was also recorded on 8, 16 and 21 April. January was a very mild month. The first half of February was very mild, but then turned colder with mean temperatures below average. Despite a cold start, March again was a very mild month. April was also warmer than average. The first two weeks of May were a little cooler than average, but then higher than average for the rest of the month. Temperatures during much of June and July were well above average, but a little cooler towards the end of July.

Drilling began in early March and the peas emerged well and evenly, with few field losses despite dry conditions at emergence.

Broad-leaved weeds were controlled pre-emergence with Reflex T (fomesafen/terbutryn) or Opogard (terbutryn/terbuthylazine) and post-emergence in the HDC Early Trial, HDC Early Maincrop Trial and the HDC Late Maincrop Trial with an application of Pulsar+Fortrol (bentazone/MCPB + cyanazine).

Weevil (*Sitona lineatus*) and field thrips (*Thrips angusticeps*) were controlled with an application of Hallmark (lambda-cyhalothrin). Aphids (*Acyrtosiphon pisum*) were controlled with Aphox (pirimicarb).

The vining pea harvest started early on 24 June (this was about 2 days late because of a mechanical breakdown with the viner) and was completed on 25 July. The peas matured rapidly at the start of the season. Wetter and cooler conditions during early July delayed maturity slightly.

Pea colour for most varieties was excellent this year and unless otherwise stated the uniformity of colour was also good. More vigorous growth at the petits pois site gave rise to some unevenness in pea colour for some varieties.

Early and Second Early Varieties - Tables 1 & 2

Twinkle matured at the same time as Avola, 7 days before Bikini. Avola had medium length haulm and gave higher yields than Bikini. Peas were medium-large size grade and were a little uneven in colour. Twinkle had short haulm similar to Bikini. Yields were similar to Bikini and produce similar in size to Avola. Peas were not as dark as Avola, but were more evenly coloured.

Dakota matured 2 days later than Avola and gave very low yields, significantly lower than Bikini. Produce was medium size grade and had a good, even colour.

Early Maincrop Varieties - Tables 3 & 4

Website was withdrawn from trials by the breeder. Zodiac had poor establishment due to a poor germination and vigour, as result the variety was harvested. Bikini gave only a small yield increase from TR100 to TR120. There were no statistically significant yield differences between

the varieties in trial and the standard, but there were some significant differences between varieties.

Cabaret matured 2 days before Bikini. Yields were lower than Bikini at TR100, but similar at TR120. Produce was smaller than Bikini, however, medium size grade. Cabaret had similar length haulm to Bikini. Peas had a dark and even colour

Zelda matured at the same time as Bikini.

Semi-leafless Zelda had longer haulm than Bikini, but was erect at harvest. Yields were higher than Bikini and produce similar size, medium-large size grade. Peas had a dark and even colour.

Bikini was semi-leafless, semi-fasciated, short and erect at harvest. Produce was medium-large size grade with a dark and even colour.

Serge, Urbana and Gallant were all semi-leafless and matured 3 days later than Bikini.

Serge had medium length haulm and was erect at harvest. Yields were the highest in this trial, but not significantly higher than Bikini. Produce was medium-large size grade, but with more peas in the large size grade than Bikini. Peas were paler than Bikini, but evenly coloured.

Urbana had long haulm, but stood well. Yields were a little higher than Bikini, and produce was smaller, medium-small size grade. Peas had a very dark and even colour.

Gallant had slightly longer haulm than Bikini and was erect at harvest. Yields were a little lower than Bikini at TR100 but a little higher at TR120. Produce was a little larger than Bikini, large-medium size grade with more peas in the large size grade than Bikini. Peas had a good, even colour.

Starlight was the latest variety to mature 3 days later than Bikini. Yields were low at TR100, but only a little lower than Bikini at TR120. Produce was a little larger than Bikini, medium-large size grade. Peas had a good, even colour.

Petits Pois Varieties – Tables 5 & 6

The trial was located in a major petits pois production area near Holbeach Hurn, South Lincolnshire. Growth in this trial was more vigorous than at the Thornhaugh site. Generally produce colour was not as even as the Thornhaugh site. Four additional varieties were included in the trial.

Baghera matured 3 days before Bikini. Baghera had longer haulm than Waverex and had fine foliage, but was lodged at harvest. Yields were higher than Waverex at TR100, but lower at TR120. Produce was in similar size to Waverex with 82% of the peas <8.75mm diameter. Pea colour was a little uneven.

Corus and Caribou matured 2 days later than Bikini.

Corus had fine-leaved foliage, and was semi-erect at harvest. Yields were low, significantly lower than Bikini at TR120. Produce was of a similar size to Waverex, with 83% of the peas <8.75mm diameter. Peas were a little uneven in colour.

Caribou was fine-leaved and was semi-erect at harvest. Yields were very high, significantly higher than Bikini or Waverex. Produce was larger than Waverex, small-medium size grade with 69% of the peas <8.75mm diameter. Peas had even colour.

Nalesa and PL 65 matured 3 days later than Bikini.

Nalesa was semi-leafless and was nearly erect at harvest. Yields were higher, but not significantly higher than Waverex at TR100. Produce was medium-small size grade with 73% of the peas <8.75mm diameter. Peas had a dark and even colour.

PL 65 had thicker foliage than most varieties and was lodged at harvest. Yields were higher, but not significantly higher than Waverex at TR100. Produce was small size grade with 83% of the peas <8.75mm diameter. Peas had a dark and even colour.

Arnesa was semi-leafless, erect at harvest and matured 5 days later than Bikini. Yields were higher, but not significantly higher than Waverex at TR100. Produce was small-very small size grade with 87% of the peas <8.75mm diameter. Peas had a dark and even colour

Maincrop Varieties – Tables 7 & 8

Yields of Bikini were lower than other trials at Thornhaugh and there was no yield increase from TR100 to TR120. Statistically there were no significant yield differences at TR100.

Bikini was the first to mature, 5 days before Ambassador. Bikini was semi-leafless and semi-fasciated and had very short haulm. Produce was smaller than in other trials, medium size grade. Peas had a very dark and even colour.

Ibis was semi-leafless and gave the highest yields in this trial, significantly higher than Bikini at TR120. Produce was smaller than Bikini, medium-small size grade. Ibis had longer haulm than Bikini, similar in length to Ambassador. Peas had a dark and even colour.

Semi-leafless Akura matured 2 days later than Bikini and had longer haulm than Bikini. Yields were lower, but not significantly lower than Bikini. Produce was smaller than Bikini, medium-small size grade with a good and very even colour.

Geisha was semi leafless and matured 3 days later than Bikini. Yields of medium-small size grade peas were a little lower than Bikini. Peas had a dark and even colour.

Kiros matured 4 days later than Bikini and had similar length haulm. Yields were high, but not significantly higher than Bikini. Produce was medium size grade, dark and evenly coloured.

Ranger matured at the same time as Ambassador, 5 days later than Bikini.

Ranger had short haulm, similar to Bikini and gave similar yields to Bikini. Produce was larger than Bikini, medium-large size grade and had a dark and even colour.

Ambassador was a little higher yielding than Bikini. Produce was larger than Bikini, medium-large size grade and evenly coloured.

Varietal susceptibility of vining peas to downy mildew (*Peronospora viciae*)

Varieties of vining peas were sown in disease observation trials at two sites (seed of Dakota and Gallant came pre treated with Wakil XL and so were not included in the 2005 trials). Each trial was situated in a field with a history of pea growing. Site 1. At Langrick, Boston and site 2 at Wainfleet, Lincs.

Plants were scored for infection on two or three 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 on a 1-9 scale of increasing field resistance.

1	3	5	7	8	9
Very Susceptible	Susceptible	Moderately Susceptible	Slightly Susceptible	Moderate Field Resistance	Good Field Resistance
Caribou Geisha Twinkle	Akura Cabaret Kiros Ranger	Arnesa Baghera Serge Urbana Zodiac		Corus Starlight Zelda	Ibis Nalesa

Varieties varied in their susceptibility to downy mildew. The good field resistance of Nalesa was confirmed, while Cabaret, Twinkle, Geisha and Caribou appeared a little more susceptible than in previous years.

Varietal susceptibility of vining peas to powdery mildew (*Erysiphe pisi*)

Susceptibility of many of the varieties was determined in 2004. Nalesa and Arnesa were re-tested to confirm results in 2004 and the 3 of the 4 additional petits pois varieties were included. Peas were sown in a disease observation trial at one site at Thornhaugh.

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

Resistant	
Susceptible	Arnesa, Nalesa, Caribou, Corus, Baghera

The susceptibility of Nalesa and Arnesa to powdery mildew were confirmed. The results of these tests and those of previous years will be incorporated in the PGRO Advisory Leaflet of Vining Pea Varieties.

CONCLUSIONS

New varieties are chosen either by the processor or by growers in consultation with their processor. They can provide additional yield and additional reliability. It is particularly important that maturity data will allow new peas to be correctly integrated into drilling and harvesting programmes.

Information from the trials has been incorporated into the data used to produce the PGRO advisory leaflet on vining pea varieties updated November 2005, a leaflet used extensively by growers, processors and merchants.

REFERENCES

PGRO Variety Trial Results: November 2005
 PGRO Vining Pea Varieties: advisory leaflet November 2005
 PGRO Information Sheet 142: The choice of herbicides for spring peas revised January 2006

TABLES OF RESULTS

TABLE 1 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Vining Pea HDC Early Maturing Trial, Thornhaugh - 2005
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 15 March
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows.

Variety	Source	@ TR 100								@ TR 120							
		1000	Maturity (± days)	Yield % of	% in size grades				Maturity (± days)	Yield % of	% in size grades				Haulm length cm	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
		Seed Weigh t g			Avola	Bikini	L	M			S	VS	Avola	Bikini			
<u>Avola</u>	<u>As</u>	<u>199</u>	<u>0(21/6)</u>	<u>112</u>	<u>26</u>	<u>60</u>	<u>13</u>	<u>1</u>	<u>0(24/6)</u>	<u>103</u>	<u>36</u>	<u>53</u>	<u>10</u>	<u>1</u>	<u>53</u>	<u>20</u>	<u>5.5</u>
Twinkle	Sh	212	0	100	29	62	8	1	0	101	30	56	13	1	44	20	5.0
Dakota	S&G	193	+ 2	55 ⁻	20	58	20	2	+ 3	51 ⁻	29	56	14	1	50	16	5.3
<u>Bikini</u>	<u>SLSF S&G</u>	<u>159</u>	<u>+7</u>	<u>100</u>	<u>34</u>	<u>55</u>	<u>10</u>	<u>1</u>	<u>+6</u>	<u>100</u>	<u>52</u>	<u>45</u>	<u>2</u>	<u>1</u>	<u>43</u>	<u>17</u>	<u>5.5</u>
				(6.32t/ha)						(6.85t/ha)							
Significance @ P=0.05				SD						SD							
LSD @ P=0.05				23.6						22.5							
CV %				14.6						14.3							

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05
 Size grades: L = large > 10.2mm; M = medium 8.75 - 10.2mm; S = small 7.5 - 8.75mm; VS = very small < 7.5mm
 SL = Semi-leafless; SF = Semi-fasciated
 Source of varieties see Appendix 1

TABLE 2 - VINING PEA VARIETY STUDIES. Summary of quality data - Vining Pea HDC Early Maturing Trial, Thornhaugh - 2005

Variety	Tenderometer Reading	Appearance			Flavour		Texture		Flesh mealiness
		Colour r (3-6)	Brightness s (1-2)	Uniformity (1-5)	Sweetness ss (1-5)	Strength (1-5)	Skin firmness (1-5)	Flesh firmness (1-5)	
Avola	114.0	5.63	1.25	2.75	3.00	3.50	3.75	2.50	3.75
Twinkle	116.5	5.25	1.00	3.75	2.75	3.75	4.00	3.00	4.00
Dakota	103.0	5.88	1.00	4.50	2.63	3.50	3.50	2.75	2.75
Bikini	98.0	5.50	1.00	4.75	3.25	3.25	3.00	1.63	1.25

KEY: Uniformity; Sweetness; Strength; Skin & Flesh Firmness; Flesh mealiness: (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

TABLE 3 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Vining Pea HDC Early Maincrop Variety Trial, Thornhaugh - 2005
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 8 April
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows.

Variety	Source	@ TR 100								@ TR 120								Pea wt. Raw pea Haulm as % of length total colour 1=pale 6=dark	
		1000	Maturity	Yield	% in size grades				Maturity	Yield	% in size grades								
		Seed Weigh t g	(± days) Bikini	% of Bikini	L	M	S	VS	(± days) Bikini	% of Bikini	L	M	S	VS	cm	weight			
Cabaret	Sh	221	- 2	87	20	46	27	7	- 2	95	30	56	12	2	47	16	5.5		
Zelda	SL Dan	169	0	113	28	54	14	4	0	117	37	49	11	3	58	18	5.4		
<u>Bikini</u>	<u>SLSF S&G</u>	<u>159</u>	<u>0</u> (8/7)	<u>100</u> (4.8t/ha)	<u>25</u>	<u>53</u>	<u>18</u>	<u>4</u>	<u>0</u> (10/7)	<u>100</u> (4.9t/ha)	<u>33</u>	<u>50</u>	<u>14</u>	<u>3</u>	<u>44</u>	<u>19</u>	<u>5.5</u>		
Serge	SL PLS	184	+ 2	119	42	44	11	3	+ 2	120	45	44	9	2	52	20	4.8		
Urbana	SL Nun	153	+ 2	105	13	52	29	6	+ 2	109	16	59	21	4	67	19	5.5		
Gallant	SL S&G	170	+ 2	93	43	40	13	4	+ 2	110	34	50	13	3	50	17	5.6		
Starlight	Sh	177	+ 3	82	31	44	19	6	+ 2	94	48	44	7	1	49	16	5.2		
Significance @ P=0.05				NSD								NSD							
LSD @ P=0.05				26.1								26.4							
CV %				14.7								14.0							

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05
 Size grades: L = large > 10.2mm; M = medium 8.75 - 10.2mm; S = small 7.5 - 8.75mm; VS = very small < 7.5mm
 SL = Semi-leafless; SF = Semi-fasciated
 Source of varieties see Appendix 1

TABLE 4 - VINING PEA VARIETY STUDIES. Summary of quality data – HDC Early Maincrop Variety Trial, Thornhaugh - 2005

Variety	Tenderometer Reading	Appearance			Flavour		Texture		Flesh mealiness
		Colour r (3-6)	Brightness s (1-2)	Uniformity (1-5)	Sweetness ss (1-5)	Strength (1-5)	Skin firmness (1-5)	Flesh firmness (1-5)	
Cabaret	97.5	5.50	2.00	4.38	3.13	3.50	3.38	2.88	1.25
Zelda	100.0	5.50	1.75	4.50	3.00	2.50	2.63	2.25	2.25
Bikini	98.5	5.50	1.25	4.25	3.00	2.88	2.63	2.25	1.75
Serge	103.0	4.88	1.75	4.38	1.75	3.50	2.63	2.63	2.50
Urbana	105.0	5.75	2.00	4.50	2.25	3.50	2.88	3.00	1.50
Gallant	104.0	5.25	1.25	4.13	2.50	2.88	2.75	2.25	1.88
Starlight	97.5	5.50	1.50	4.25	2.88	3.38	3.63	2.75	1.50

KEY: Uniformity; Sweetness; Strength; Skin & Flesh Firmness; Flesh mealiness: (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

TABLE 5 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Vining Pea HDC Petits Pois Trial, Holbeach Hurn, Lincs - 2005
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 20 April
 Results are means of two replicates. Target population 90 plants per m² sown in ten 15 cm rows

Variety	Source	@ TR 100									@ TR 120					Haulm length cm	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark	
		1000 Seed Weigh t g	Maturity (± days) Bikini	Yield % of Bikini	% in size grades					Maturity (± days) Bikini	Yield % of Bikini	% in size grades							
					L	M	S2	S1	VS			L	M	S2	S1				VS
Baghera	NiZw	91	- 3	108	2	16	15	32	35	- 3	89	2	21	20	46	11	56	20	4.9
<u>Bikini</u>	<u>SLSF</u> <u>S&G</u>	<u>159</u>	<u>0</u> (15/7)	<u>100</u> (4.8t/ha)	<u>28</u>	<u>50</u>	<u>11</u>	<u>8</u>	<u>3</u>	<u>0</u> (17/7)	<u>100</u> (5.8t/ha)	<u>33</u>	<u>51</u>	<u>9</u>	<u>5</u>	<u>2</u>	<u>44</u>	<u>22</u>	<u>5.6</u>
<u>Waverex</u>	<u>vW</u>	<u>120</u>	<u>+1</u>	<u>101</u>	<u>2</u>	<u>17</u>	<u>17</u>	<u>32</u>	<u>32</u>	<u>+1</u>	<u>88</u>	<u>2</u>	<u>23</u>	<u>22</u>	<u>32</u>	<u>21</u>	<u>48</u>	<u>20</u>	<u>5.0</u>
Corus	S&G	74	+ 2	68	1	15	16	38	30	+ 2	60 ⁻	1	19	20	36	24	52	17	4.8
Caribou	NiZw	125	+ 2	134 ⁺	3	28	22	31	16	+ 2	126 ⁺	3	27	29	28	13	48	24	5.3
Nalesa (Nun 6748)	SL Nun	102	+ 3	118	2	25	27	34	12	+ 3	102	2	26	27	34	11	68	20	5.5
PL 65	PLS	102	+ 3	116	1	16	21	38	24	+ 3	104	1	18	22	39	20	66	21	4.8
Arnesa (Nun 9000)	SL Nun	89	+ 5	116	1	12	18	41	28	+ 5	102	1	13	19	42	25	55	20	5.3
Significance @ P=0.05				SD							SD								
LSD @ P=0.05				31.8							23.0								
CV %				14.9							11.8								

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05

Size grades: L = large > 10.2mm; M = medium >8.75 - 10.2mm; S2 = small2 >8.2 - 8.75mm; S1 = small1 >7.5 - 8.2mm; VS = very small < 7.5mm

(SL) = Semi-leafless; (SF) = Semi-fasciated

Source of varieties see Appendix 1

TABLE 6 - VINING PEA VARIETY STUDIES. Summary of quality data - Vining Pea HDC Petits Pois Trial, Holbeach Hurn, Lincs - 2005

Variety	Tenderometer Reading	Appearance			Flavour		Texture		Flesh mealiness
		Colour r (3-6)	Brightness s (1-2)	Uniformity (1-5)	Sweetness ss (1-5)	Strength (1-5)	Skin firmness (1-5)	Flesh firmness (1-5)	
Baghera	95.0	5.13	1.50	3.63	2.50	3.13	2.88	2.38	1.50
Bikini	103.0	5.88	1.25	4.25	2.75	3.38	3.25	2.38	1.88
Waverex	99.5	5.50	1.00	4.00	3.00	3.13	2.50	1.75	1.00
Corus	104.0	5.00	1.75	3.38	1.38	3.88	3.38	3.00	3.50
Caribou	109.0	5.63	1.00	4.25	3.13	3.00	3.13	2.75	2.25
Nalesa (Nun 6748)	109.0	5.50	1.25	4.13	2.88	3.25	3.25	2.63	2.25
PL 65	104.0	5.13	1.50	3.00	2.00	3.50	3.50	2.88	2.50
Arnesa (Nun 9000)	104.0	5.50	1.50	4.75	2.75	3.13	3.00	2.88	2.63

KEY: Uniformity; Sweetness; Strength; Skin & Flesh Firmness; Flesh mealiness: (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

TABLE 7 - VINING PEA VARIETY STUDIES. Summary of agronomic data - Vining Pea HDC Maincrop Variety Trial, Thornhaugh - 2005
 Varieties placed in order of maturity. Standard varieties underlined. All varieties sown on 25 April
 Results are means of three replicates. Target population 90 plants per m² sown in ten 15 cm rows.

Variety	Source		@ TR 100							@ TR 120							Haulm length cm	Pea wt. as % of total weight	Raw pea colour 1=pale 6=dark
			1000 Seed Weigh t	Maturity (± days)	Yield % of Bikini	% in size grades				Maturity (± days)	Yield % of Bikini	% in size grades							
			g	Bikini	Bikini	L	M	S	VS	Bikini	Bikini	L	M	S	VS				
<u>Bikini</u>	<u>SLSF</u>	<u>S&G</u>	<u>159</u>	<u>0</u> (15/7)	<u>100</u> (3.7t/ha)	<u>22</u>	<u>46</u>	<u>27</u>	<u>5</u>	<u>0</u> (17/7)	<u>100</u> (3.7t/ha)	<u>26</u>	<u>47</u>	<u>23</u>	<u>4</u>	<u>43</u>	<u>20</u>	<u>5.3</u>	
Ibis	SL	Dan	161	+ 1	124	17	46	30	7	+ 1	134 ⁺	19	49	27	5	53	22	5.5	
Akura	SL	As	168	+ 2	92	14	45	33	8	+ 2	89	13	52	31	4	53	18	5.3	
Geisha	SL	Sh	201	+ 3	98	16	56	24	4	+ 3	93	20	56	21	3	54	19	5.3	
Kiros		vWB	176	+ 4	121	20	57	19	4	+ 4	122	24	59	14	3	47	22	4.9	
Ranger		Sh	187	+ 5	101	33	49	15	3	+ 5	100	36	51	11	2	49	19	5.6	
Ambassador		vW	186	+ 5	107	26	59	13	2	+ 5	102	32	56	10	2	56	18	5.5	
Significance @ P=0.05			NSD							SD									
LSD @ P=0.05			30.6							26.0									
CV %			16.2							13.8									

KEY: Yield: + Significantly greater than Bikini @ P = 0.05; - Significantly less than Bikini @ P = 0.05

Size grades: L = large > 10.2mm; M = medium 8.75 - 10.2mm; S = small 7.5 - 8.75mm; VS = very small < 7.5mm

SL = Semi-leafless; SF = Semi-fasciated

Source of varieties see Appendix 1

TABLE 8 - VINING PEA VARIETY STUDIES. Summary of quality data – HDC Maincrop Variety Trial, Thornhaugh - 2005

Variety	Tenderometer Reading	Appearance			Flavour		Texture		Flesh mealiness
		Colour r (3-6)	Brightness s (1-2)	Uniformity (1-5)	Sweetness ss (1-5)	Strength (1-5)	Skin firmness (1-5)	Flesh firmness (1-5)	
Bikini	98.5	5.75	2.00	4.63	2.63	3.13	3.13	2.13	1.38
Ibis	115.0	5.50	1.50	4.38	1.88	3.38	4.00	2.25	3.25
Akura	104.0	5.63	1.75	4.75	2.50	2.75	3.25	2.88	1.88
Geisha	101.0	5.75	2.00	4.50	1.75	3.50	3.13	2.63	4.00
Kiros	99.0	5.38	1.75	4.63	2.00	3.25	3.75	2.25	2.75
Ranger	97.0	5.50	1.75	4.50	2.25	3.63	4.00	3.00	3.00
Ambassador	100.0	5.75	1.75	4.88	2.25	3.13	3.63	3.25	2.88

KEY: Uniformity; Sweetness; Strength; Skin & Flesh Firmness; Flesh mealiness: (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

APPENDIX 1

KEY TO SOURCE OF VARIETIES

<u>CODE</u>	<u>NAME & ADDRESS</u>	<u>COUNTRY</u>
As	Asgrow Research Center PO Box 1235 Twin Falls Idaho. 83303-1235.	USA
vWB	W. Brotherton Seed Co. Inc. P.O. Box 1136 Moses Lake Washington 98837	USA
CM	Crites-Moscow Growers Inc. Box 8912 Moscow Idaho 83843	USA
Dan	Danisco Seed A/S Højbygårdvej 31 DK-4960 Holeby	Denmark
Nun	Nunhem Zaden BV Postbus 4005 6080 AA Haelen	Holland
PLS	Pure Line Seeds Inc. P.O. Box 8866 Moscow Idaho 83843	USA
S&G	Syngenta Seeds SAS. Route de Pouillé B.P. 39 49135 Les Ponts de Cé Cedex	France
Sh	Sharpes, Advanta Seeds UK Ltd. Boston Road Sleaford Lincolnshire NG34 7HA	UK
vW	WAV Industriesaaten GmbH Bordeler Berg 4 D-37127 Dransfield	Germany

APPENDIX 2

PROCESSING DETAILS FOR FROZEN SAMPLES

All samples were sorted to remove damaged or diseased produce and extraneous matter, washed and then blanched in water of 6° hardness. After cooling in tap water and further sorting the samples were packed for freezing.

The processing details for vining peas are given below:-

Blanch:	1.5 min. @ 93°C
Blast frozen	@ -30°C
Stored	@ -18°C