2017


PGRO

# Annual Report

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## AN INTRODUCTION TO PGRO

Since its formation in 1944, PGRO has provided research and technical services to growers and processors of legume crops in the UK. It is funded by (a) *voluntary* grower levy collected by the merchants and processors who purchase the produce, and (b) contracted trials work commissioned by both commercial companies and government agencies. As a registered charity and company limited by guarantee, it is managed by a Board of Trustees appointed from the National Farmers Union, relevant food processors, and other related industries. This Board meets three times a year and four Board members also form, with the CEO and Finance Manager, the Management and Finance Committee which meets to review operational issues 4 times annually. A management team of the four senior members of staff, led by the CEO, manage the day-to-day decisions.

2017 was the third year for the Strategy period 2015-2019 established in 2014.

The Vision of the Board of Trustees and Mission of the PGRO is encapsulated in the following statements.

### Vision

"Our vision is to be the independent partner for applied crop research. To be acknowledged as the primary reference point for all aspects of temperate pulse and vegetable-legume crop production, marketing and economics"

### Mission

To pursue the provision of current advice for growers, the realisation of improved crop yield, quality and economics. To facilitate open, accessible, reliable and relevant knowledge exchange. To develop progressive and innovative approaches towards crop research and development. To create and maintain extensive and close links with growers, processors, trade and fundamental researcher communities.

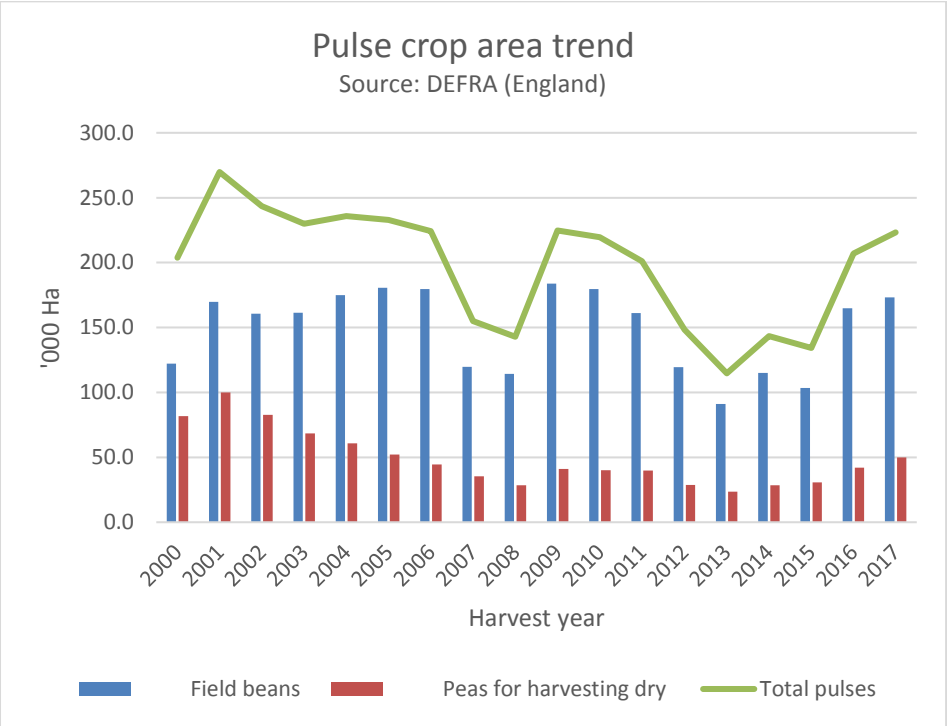
The core beliefs of the organisation are captured in the declared corporate values.

### Corporate values

The PGRO exists to support growers, and other supply chain stakeholders in improving the reliability and profitability of crops within its remit. The organisation aims to be as open and accessible as possible in order to ensure that members are able to quickly and easily glean the appropriate information and advice they require. Research will be carried out to a high standard and within appropriate quality criteria such as GEP* and GLP** as necessary and the organisation will do all it can to ensure and enhance a widely held reputation for reliability, independence and being the collaborative partner of first choice. Education in the form of knowledge exchange or knowledge transfer activities forms a core plank of the organisations purpose and is seen as being a critical value for future long term success.

**2017 LEGUME CROPS IN UK**

UK Pulse crop areas sown for 2017 harvest showed a 5% increase on the previous year (itself a six-year high), yet still slightly behind that of 2009 and over 43,000 Ha less than the highest area recorded by DEFRA since the year 2000 (269,000 Ha in 2001).




By the time February had arrived the trade was talking of a dearth of exportable human consumption grade beans. There were also growing fears of exposure to foreign currency and payment risk with significant changes in the value of Sterling and weakness in the export destination economies creating worries about the ability of buyers to pay. Demand from the domestic feed industry however remained high throughout the winter taking up any perceived or real drop in exports. With supply somewhat less than the trade had anticipated, by the end of the winter months the prices were held up by the need for short forward sellers to cover themselves and these higher values held out through the spring period, with a cry in the trade of “where are the beans”. The higher prices relative to alternative mid -range protein sources put beans at a disadvantage in feed compounder formulators programmes and saw feed beans take more of a back seat in early autumn / winter feed protein consumption.

The pea market continued to be quite uneventful through to the start of the new harvest season the blue and marrow fat pea markets were generally over supplied and the prices in the doldrums casting doubt upon grower enthusiasm for continued pea production. If there was a light on the horizon for peas it was in the yellow pea sector. Traditionally a small market in the UK and tightly supplied those with off contract yellow peas were able to enjoy some higher prices on the back of tighter availability in the export markets to India.

The winter period from the turn of the year was mild and dry with few problems winter beans having been establish with relative ease in relatively easy conditions in the late autumn. Except for a few later

arriving contract trial commitments, Spring sowing of trials took place about 2 weeks earlier than the previous year with the majority being completed in March. Seed was drilled into generally good seed beds and conditions of soil moisture.

Commercially the lack of rain began to cause concern for some of the later drilled crops with a little more difficulty created in seed bed preparation. This lead to some uneven emergence. For a prolonged period through March and April the weather was dominated by easterly winds and cool air temperatures. However there was significant sunlight levels and whilst air temperatures were low, soils warmed up rapidly. Before concerns for water availability became critical significant rain arrived in the late part of April and early May followed by a shift to SW air flows and rapidly warming air temperatures, most areas experiencing very high 20's $^{o}$C.in late May. Up to that point crops had been generally unhindered by significant pest or disease levels. All regions were at that time generally reporting pulse crops in excellent condition. With PGRO trials at both Stubton and Nocton sites looking spectacularly good.

The weather through June was warm, conducive to rapid growth and good pollination. However, as temperatures soared into the low 30 's C towards the end of the month concern began to emerge that the excess heat might be taking out maximum yield potential. The temperatures did not last and July was characterised by cool weather and relentless showers and some days of heavy rain. Pea trials that had looked ready for harvest in Mid-July (about 3 weeks early) were unable to be taken until mid-August and looked much the worse for wear – although yields were good at between 4.5 – 5.5 tones on average, quality suffered with considerable waste and stain in both peas and beans resulting. Throughout that period Vining pea harvest continued in less than ideal conditions.

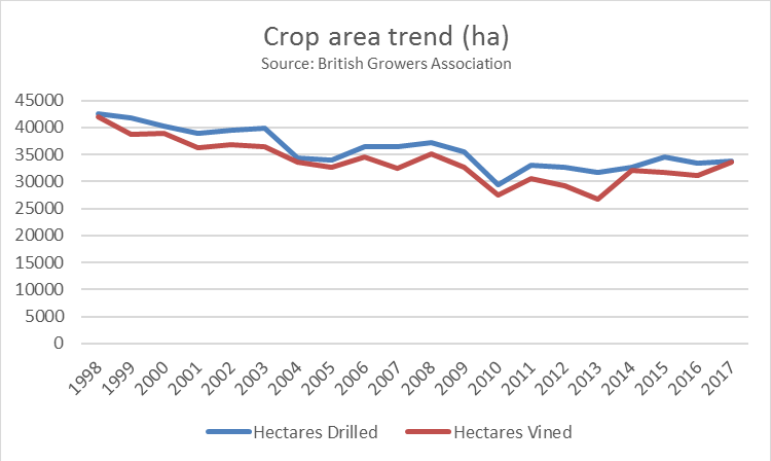
Growers around the country were finding that they were unable to harvest their wheat but reports of winter beans being harvested in the very early days of August were received with promising yields.

PGRO RL winter bean trials at Stubton were all taken on 7th August with a mean yield of 4.4t /Ha. If the priority had not been on rescuing the peas due to the persistently intermittent weather they could have been harvested 10 days previously.

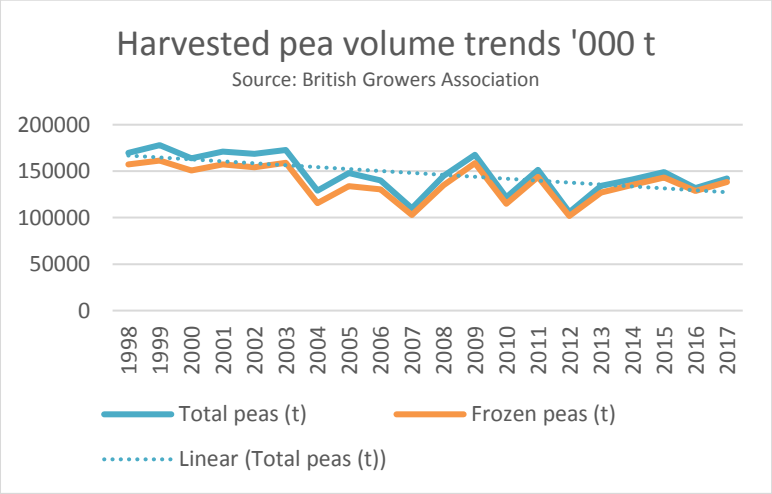
Further north the harvest was prolonged and "painful" the wet conditions took significant toll of the bean crops and had a heavily negative impact on quality. The availability of cosmetically pleasing samples for Human consumption export trade was seriously impacted resulting in a dramatic reduction in exports to Egypt before the turn of the year. Southern crops experienced very high levels of Bruchid damage in the spring heat and northern crops significant staining form repeated wet dry cycles at maturity before harvest.

**Vining Peas**

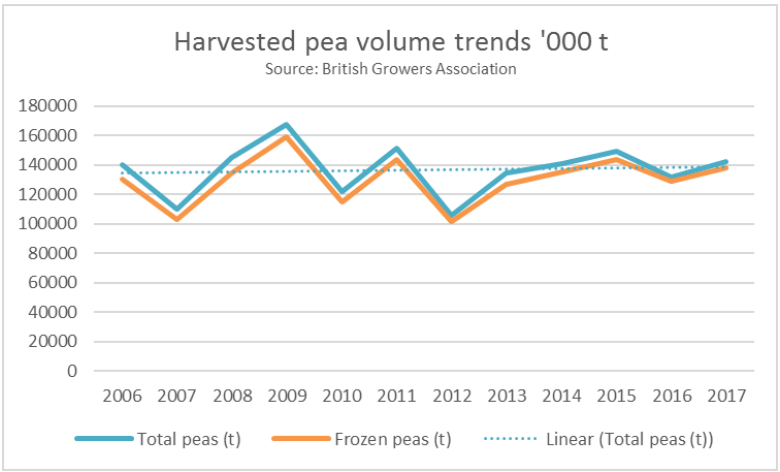
Data confirmed by the British Growers Association suggests that vining pea crop area drilled rose by approximately 2,500 ha in 2017. Despite the tougher wet harvest conditions, little was by passed and yields were generally stable year on year with regional variations.




The national quantity of peas frozen rose by approximately 10,000 tonnes to over 138,000t.




The long-term trend since 1998 has been downward but viewed over the last 10 years the trend is more stable suggesting perhaps decline has been arrested.



In May the BGA were forecasting an increase in crop area to just over 36,000 Ha but with drilling in full swing it was only an estimate.

With the Industry getting used to the new regime for Wakil and the inability to use the new MAPP number before the 1st April it was becoming increasingly apparent that the changes would have a significant impact on the ability to produce early peas as economically and would potentially have an impact on factory efficiencies too. An issue that will not be fully understood until the season of 2018 harvest.

In the South the dry winter and spring meant that early sowings went relatively smoothly but by mid-season seed beds were becoming harder to create and sowings began to get deeper chasing the moisture, which later reflected in variable emergence which would have an impact on yield and maturity consistency. Further north this was less of a problem.

Through Mid-May it was apparent that Vining peas would be maturing about 2-3 weeks earlier than in 2016 and a good season looked likely.

Harvest started around 12th June just as an influx of aphid threatened to take hold however a sudden burst of heat and then heavy rain generally saw them off before they could do significant harm. Unfortunately, the high temperatures took away significant yield potential from the early and mid-season crops-terminating flowering and preventing filling of the top pods.

The return of cool weather accompanied, persistently showery- even wet - conditions right through harvest and with too little heat and reduced light levels, yields were significantly down for many groups. Maturity was irregular and quality problems presented themselves in the factories reducing throughput and outturn. In some cases, the latest maturing crops were hardly worth taking at all, such was the poor pod set.

By early August the first groups were reporting that harvest was over- some three weeks earlier than the previous season.

**STRATEGIC PROGRESS**

The path outlined in the PGRO “Strategic Review 2015-2019” continued with the focus upon levy funded applied research supported by supplementary income from research contracts and research grants. PGRO remains one of the few UK sources of sound, independent technical advice, at a time when food production, quality and provenance have never been more scrutinised, both locally and globally.
The Trustees of the PGRO remain committed to ensuring that the organisation is equipped, organised and orientated to achieve and maintain its position of excellence in applied pulse crop and vegetable legume research.
Value for the Levy payers remains core to the PGRO existence and the proportion of funds spent on research and Knowledge transfer compared to levy income, remains high. (See pages 8/9)

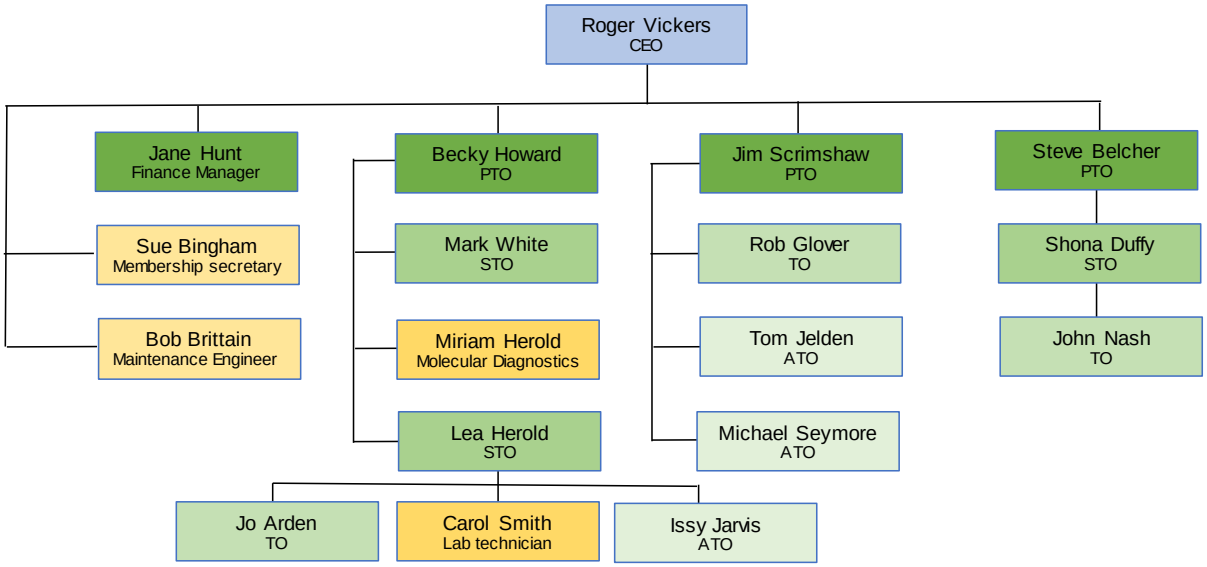
With income moving ahead of expenditure in the situation now affords the possibility of further expanding the charitable objectives of funding both education and relevant research – in line with the strategy.

3 new PhD's started in 2017, bringing the total currently funded 5.

Further investment in the PCR molecular testing facilities at PGRO established in 2016 saw the first real commercialisation of more rapid disease and pest diagnostic services for growers and applications in crop research programmes began to come to fruition.

## STAFF STRUCTURE & PERSONNEL

**PGRO - Organisation Chart as at 31st December 2017**




- 3-month Student placement was filled by Kathy Fenn from Riseholme College
- 4 Students were employed during the summer harvest period

**FINANCES**

PGRO has no borrowings and continues to operate a relatively strong financial position without debt.

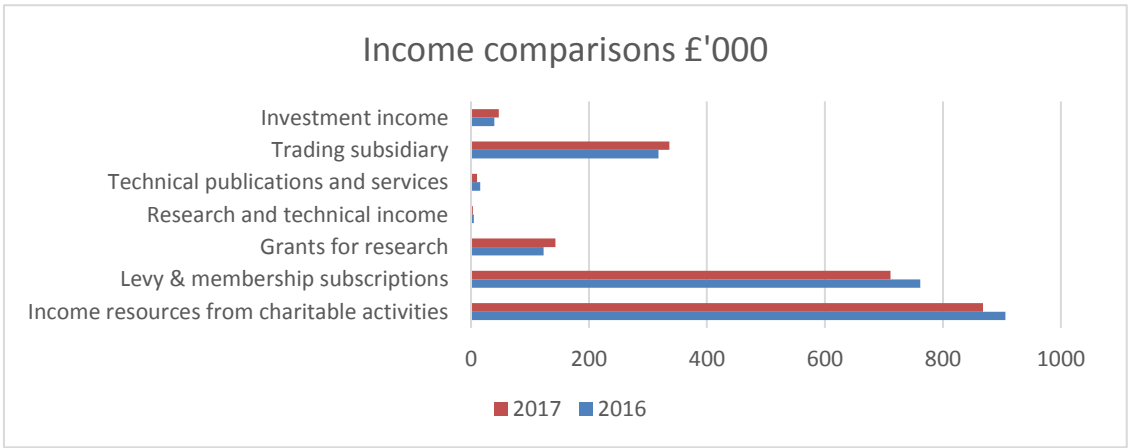
The year ended with total income nearly static decreasing from £1,281k to £1,256k

The continued bean crop area increase in 2017 harvest was a surprise to the trade rising 8.9 % to 188,700 ha. Peas however fell significantly following the previous year's disappointing harvest and continued poor market values. Dry pea area dropped 21.6% to 39,200ha according to Defra's June survey statistics.

Despite the pea area fall total dried pulse crop area increased by 4,800ha, a 3.8% rise year on year. Although yield potential was curtailed a little by high temperatures in early July generally yields were better than in 2016. The quality suffered in the wet harvest conditions depressing trading in the export market for human consumption beans. Feed bean consumption both domestic and export were however buoyant and returns-for the 3rd and 4th quarter of the year were improved, exceeding the previous year by £16k.

The low returns from the 2016 pulse crop harvest in the first 2 quarters of the year, saw levy receipts fall by £57k overall to £674k of which £116k was drawn from the vegetable legume sector.

PGRO Research Limited contributed income of £336k up £18k year on the year and by the year end Total funds at the year end were valued at £2,236k, an increase of £160k, the year again ended with a strong cash balance and investments valued at £1,255k.




Both the reserves and investment policies were subject to detailed review during the year, considering factors such as current activities and expenditure commitments, variability of income streams, fixed expenditure and long-term liability commitments, fixed asset replacement requirements, economic climate and business risks, grant funding and contingencies.

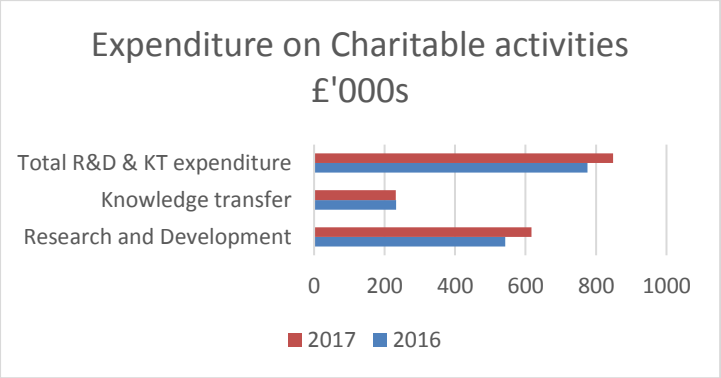
Whilst the grant funding landscape continues to worsen in the face of extended political uncertainty, PGRO were fortunate to increase grant income receipts during the year. The award of two EU H2020 projects in which PGRO are partners secured advanced payments to facilitate the projects and total

grant income increased by £20k to £143k for the year, still £72k behind that received in 2015. Competitively tendered grants as a source of income for research however continue to look precarious.

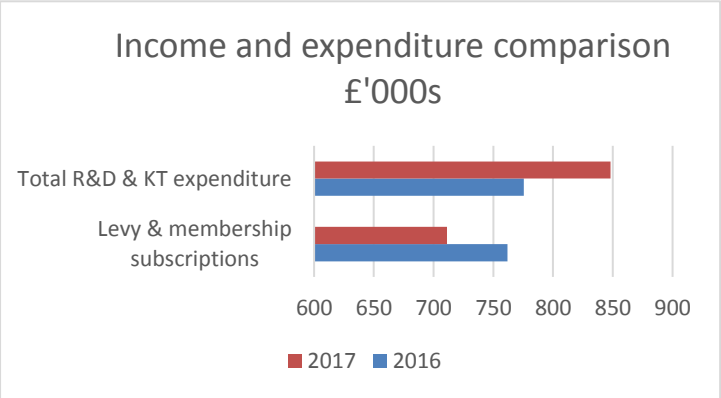
Levy rates continued through the year at £0.97 per tonne a decision to postpone the increase from crop 2017 having been postponed by the Trustees.

With careful attention to operational costs in all areas total support costs fell again, reducing by a further £9k to £297k.

Expenditure on charitable activities can be categorised as 72.6% Research and Development with 27.4% Knowledge Transfer activities. R&D expenditure ebbs and flows as existing projects conclude and new ones begin. Knowledge transfer remains a key stone in PGRO activities.




The ratio of the levy to the total spend on R&D illustrates the added value PGRO generates. Levy receipts continue to be closely matched by funding from alternative sources. And expenditure on Research and development and Knowledge transfer considerably exceeds levy contributions received.

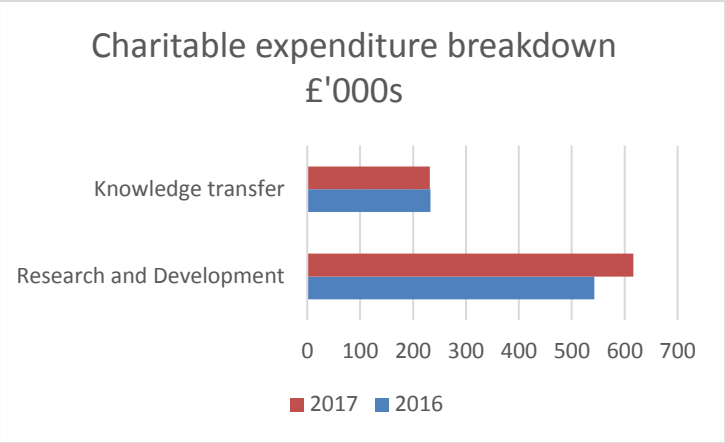



The nature of longer term R&D projects is such that the expenditure is sometimes a commitment far ahead of the necessary funds being received emphasising the importance of strong supporting assets.

**COMMUNICATIONS AND KNOWLEDGE TRANSFER (KT)**

Considerable effort continues to be made to reach out to levy payers and a significant proportion of total expenditure is allocated to Knowledge transfer annually. The retention of a PR agency, shared with BEPA, continues to raise the profile of PGRO with the press and to ensure journalist attention to all our events with subsequent excellent press coverage. KT activities are notoriously hard to quantify in terms of time spent by staff interacting with growers, advisors, trade and fellow researchers. This means that the proportion of cost spent on KT is always likely to be significantly understated.

Knowledge Transfer is a fundamentally essential part of an effective Research and Development. Expenditure on Knowledge Transfer remained unchanged at £231k in 2017.




**The following KT activities can be listed for 2017**

1. Advice and literature was produced throughout the year with much of the technical information made available through the PGRO web site www.pgro.org
2. Nine Marketing reports were collated in conjunction with BEPA and distributed monthly throughout the year
3. Five Crop Updates were issued throughout the season, delivering critical agronomy advice.
4. PGRO & BEPA presented at the Cereals 2017 event with displays and plots of pulses and focussed on the market opportunities.
5. PGRO exhibited at the 2-day national Crop Tec event which was attended by staff
6. 43 Technical updates were produced for the use of growers and agronomists
7. Pea moth bulletins continued with an online service hosted on the PGRO web site.
8. Engagement via social media increased with interaction via the Twitter account @pgroresearch for the dissemination of technical messages and topical activity updates
9. Telephone support fielding and responding to requests for advice was considerable
10. PGRO staff continued to support a number of AHDB declared monitor farms in discussion meetings and field guidance surrounding pulse cropping issues
11. Pulse road-shows were held at 5 locations in January and February in conjunction with Syngenta.
12. The online Optibean Agronomy decision support tool was maintained and developed.
13. The Bruchid Cast online decision support tool was actively promoted into its third year
14. Technical staff contributed to several grower/merchant and Ag-chem company meetings
15. Three issues of PGRO Pulse Magazine were distributed via CPM magazine with a circulation of around 13,000. CPM is thought to be the leading technical agronomy magazine in UK agriculture. The Pulse magazines are a significant vehicle for knowledge transfer to growers
16. The Pulse magazine was also published on line via www.pgro.org as an “e-book”.
17. The Vegetable magazine was again produced for the vining pea and vegetable legume industry, directly mailed to growers and grower groups and published on line via www.pgro.org
18. The PGRO Pulse Agronomy Guide was expanded further to include key weed identification tools and pests and disease recognition images. Released in January 2017 in hard copy it was also made available as a download from www.pgro.org
19. The PGRO Recommended Lists of peas and beans were announced in November and launched to the press at the Crop Tec event

20. The PGRO Vining Pea Growers Guide including the vining pea descriptive list was also updated and modernised - produced and published in November. It is also available as a download from www.pgro.org
21. Conventional press/media were used extensively to ensure pulse and vegetable legumes continued to receive good coverage in a market expressing strong interest in spring cropping
22. A PGRO demonstration /open day /trials event was held at the Nocton site for vining peas
23. A PGRO Field Day- an open event for pulses – was held at the Stubton site
24. PGRO supported NIAB at various regional open days to talk pulses
25. Student visitor groups from Universities and Colleges were hosted at PGRO
26. Presentations were given at several meetings in Europe as part of participation in collaborative project events and information exchange forums/ missions
27. PGRO supported AICC at their annual conference
28. The PGRO Launched an APP for mobile communication devices at the end of the year. This new agronomy tool is available free as a download from Google Play and Apple I-Tunes stores.

**Pest monitoring activities / services**

For a number of years PGRO has conducted or participated in wider national pest monitoring activities. The following can be listed, continuing in 2017.

1. **Pea Moth:** A long term PGRO initiative accessed via the PGRO web site providing warnings and guidance.
2. **Bean Downy Mildew Forecast:** A Crop Monitor service with funding from PGRO accessed via http://www.cropmonitor.co.uk/sbeans/livemonitoring/monitoring/bean-monitor.cfm
3. **Aphid alert**
4. **Bruchid Beetle:** A network of monitor farms managed by PGRO to monitor the presence and distribution of Bruchid Beetle. The Bruchidcast spray forecast model is provided by Syngenta.
5. **Silver Y Moth**: A monitoring and advisory programme managed and funded by PGRO.

# RESEARCH & DEVELOPMENT PROJECTS 2017

The two crop sector panels met during the year to discuss and prioritise research needs for processing legumes and pulses.

## RESEARCH STRATEGY FOR COMBINABLE PULSE CROPS

The Pulse Panel (appendix 2) collates a general plan for PGRO research priorities and meets twice per year (spring and autumn).
David Robinson Chairman of the Panel succeeded to the position from Stephen Francis.
The Pulse Panel has drawn up a working document - current at the turn of the year, reproduced in appendix 3.

## RESEARCH STRATEGY FOR VINING PEAS AND VEGETABLE LEGUMES

Chaired by David Robinson the Processed Legume Industry Panel (appendix 2) formulates a Research and Development Strategy for Vining Peas, Green Beans and Broad Beans. The document being used for the direction of Levy sponsored projects at the PGRO for the period 2015- 2018 and is reproduced in appendix 4, (Legume Industry Priorities 2015-2018).

## SUMMARY OF 2017 PGRO LEVY SPONSORED PROJECTS

The over-winter period was again relatively mild and relatively dry. The lack of a frost mould on some soils caused difficulties in producing adequate seed beds and caused establishment problems. The spring and early summer months were warmer than normal and the season for many crops was about 2 weeks earlier than 2016. The latter summer months were unsettled, being wetter and cooler than normal.

### 1. VARIETY EVALUATION

Peas

2017 trial yields (4.42t/ha) were a little down on the 5-year (4.77t/ha) average, though much better than in 2016. Powdery mildew (normally a late season disease) was evident in several trials, especially severe in the trial in N.Yorks.

Five trials went through to harvest and the highest yields came from the most Southerly site in Hampshire. Three other trials yielded over 4t/ha.

Manager, a new white-seeded pea from KWS joins the RL with a P1 recommendation as the top yielding variety with a yield of 108% of controls. Karpate, top yielder in 2016 moves to 2nd year of provisional recommendation. Kareni gains a full recommendation with a yield of 101%. Mascara remains with a full recommendation, while Salamanca and Gregor move to the outclassed category. Three new large blues join the RL with a P1 recommendation, Karioka (Senova), Bluetime (LSPB) and Blueman (LSPB) with yields of 107%, 106% and 102% respectively. Blueman has an excellent

rating for downy mildew resistance, with a top rating of 9. Vertix and LG Stallion both progress to P2 recommendation. Kingfisher gains a full recommendation for 2017. Prophet, which shows consistent performance, Bluetooth and Daytona remain as fully recommended varieties. Crackerjack, on the list since 2008 and Campus are moved to the becoming outclassed category. Small blue Greenwood progresses to P2 recommendation. Coloured flowered varieties Mantara and Rose remain fully recommended. Marrowfat Aikido gains a full recommendation for 2017 as the top yielding variety in the category. Sakura, just behind on yield remains fully recommended, while Genki is moved to the becoming outclassed category.

Winter Beans

Beans established well in the mild autumn conditions and disease pressure in the spring and summer was lower than in 2016. 2017 yields (4.65t/ha) were a little lower than the 5-year average of 5.16t/ha. Seven trials were harvested, and the top yielding site was in Lincolnshire at 6.2t/ha. The trial near Hereford suffered through a lack of rainfall and gave lower yields in 2017 than normally seen from this site.

New variety Vespa (pale hilum) from Senova joins the RL with a P1 recommendation. Yields at 102% are only 3% lower than the best. Bumble gains a full recommendation for 2017, with yields just 2% below the best. Top yielding variety Tundra, Wizard and Honey remain with a full recommendation. Yields from Honey are now below the best, but a combination of short straw and early maturity means it find favour in later maturing areas. With the removal of Arthur from the outclassed category, all winter beans now pale hilum types.

Spring Beans

Despite some very high yields, over 7t/ha from the two Yorkshire trials 2017 yields (4.45t/ha) were well below the 5 year mean of 5.39t/ha. These northerly trials were late to be harvested.

New to the RL with a P1 recommendation is Mallory from LS Plant Breeding. Yields are just 2 % below the best and has a good rating (7) for downy mildew resistance. LG Cartouche progresses from P1 to P2 recommendation and ups its downy mildew rating from 4 to 5. Lynx gains a full recommendation for 2017 and tops the yield rankings at 104% of controls, whilst maintaining a good (7) rating for downy mildew resistance. Fanfare, Vertigo, Fugo and Tic bean Maris Bead all remain with a full recommendation. Boxer and Fury were moved to becoming outclassed category.

## 2. SCOTTISH PULSES (with SRUC and JHI)

Spring Beans

A winter bean equivalent RL trial was conducted by SRUC to assess maturity and yield of winter beans.

JHI conducted a spring bean row width / population trials to complement the one being undertaken at PGRO

Lateness of the harvest of spring beans crops in Scotland Northern UK is a concern for some growers, particularly in terms of establishing a following winter wheat crop. Early maturing varieties may help to alleviate this. After a look see trial in 2016, LS Plant Breeding entered an early maturing bean into the National List. The variety showed promise and continued into year 2 trials for 2018. The variety also shows good tolerance to Downy mildew.

***VARIETIES, SOILS AND AGRONOMY***

### 3. VARIETY EVALUATION OF COMBINING PEAS AND FIELD BEANS

Full Recommended List tables for 2018 were available at http://www.pgro.org/recommended-lists-2017/. This was published at Crop Tec on November 29th, 2017. Sponsored by PGRO levy.

### 4. VARIETAL SUSCEPTIBILITY OF COMBINING PEAS TO DOWNY MILDEW

As part of the series of trials to assess the relative susceptibility of combining peas to downy mildew, two disease observation trials are carried out by PGRO in conjunction with those carried out by NIAB. Ratings are reported in the RL. Sponsored by PGRO levy.

### 5. PULSE CROP GENETIC IMRPOVEMENT NETWORK – COMBINING PEAS, FIELD BEANS AND LUPINS

The network, formed in 2005, is based on collaboration between a strong research base and the UK plant breeding industry to promote development of peas, beans and lupins and assist with more sustainable development of the arable sector. PCGIN continued for a further year in 2017 though involved no field work. Further discussion took place to plan for a project extension for up to 5 years. Please go to the website for further details www.pcgin.org. Sponsored by DEFRA.

### 6. PEAGEN – GENETIC IMPROVEMENT OF PEA TO REPLACE SOYABEAN IN THE DIETS OF POULTRY AND MONOGASTRIC LIVESTOCK

In this LINK project, new genetic approaches to enhance the nutritional value (protein and water-soluble carbohydrate) of the pea (Pisum sativum L.) seed will be developed and applied. The aim is to increase the use of peas as a high-quality feed in animal diets, reducing the UK protein deficit from the import of soya products and delivering environmental benefits to livestock production systems. The project started in October 2017 and its duration is 5 years. PGRO will carry out trials to evaluate the agronomic character of the peas and will help to disseminate findings. Sponsored by BBSRC and industry partners.

### 7. LEGUMES FOR THE AGRICULTURE OF TOMORROW (LEGATO) – FIELD BEANS COMBINING PEAS AND LUPINS

The overall aim was to contribute to the sustainable reintroduction of grain legumes in European cropping systems. Working on pea, faba bean and with specific objectives for white lupin and grass

pea, the project focused on identification of and testing novel legume breeding lines possessing characteristics such as pest and disease resistance, tolerance to abiotic stresses and quality for human consumption. This project ended in December 2017. Sponsored by EUFP7 and Industry partners.

## 8. FERTILISER MANUAL (RB209), PLANET AND MANNER-NPK UPDATES

RB209 was updated in May 2017 and priorities for review and further research are in place, as per steering group meetings. There are currently no changes for legumes.

## 9. COMBINING PEA OPTIMUM POPULATION

An investigation of optimum populations for combining peas was carried out in 2017. The varieties Sakura and Crackerjack were included in 2017 trials. Sponsored by PGRO levy.

## 10. YIELD ENHANCEMENT NETWORK FOR PEAS

Pea fields were monitored throughout the season, including crop growth stages, images, root samples, grab samples for yield and quality samples. All work was carried out by Keith Costello to maintain consistency between crops. A stakeholder meeting was held on 12 December 2017 to review outputs. Sponsored by PGRO levy.

## 11. IMPROVEMENT OF SOIL HEALTH USING COVER CROPS IN PEAS

Cover crops were established in August 2016 and August 2017. The objectives are to establish how cover crops improve soil structure, organic matter content, nutrient retention and management of soil moisture. Soil-borne pathogen levels are being monitored using standard plate tests, with the aim of using molecular tests once developed, to indicate the influence of improved soil structure on pathogens over several years. Grant funding is in place until January 2020. An additional evaluation of the influence of vetch in the cover for disease impact will be carried out. First results indicated that cover crops improved soil structure. Sponsored by the Rural Payments Agency via EIP-Agri European funding with the Green Pea Company and PGRO levy.

## 12. BIOSTIMULANTS, FERTILISERS AND SEED TREATMENTS IN PEAS AND BEANS

Ten products were tested for effects on yield in field beans and combining peas in 2017. Yield was improved by 7 of the 10 treatments in beans and by 9 of the products in combining peas (not statistically significant). Sponsored by PGRO levy.

## 13. DEVELOPMENT OF A SOIL MANAGEMENT INFORMATION SYSTEM (SMIS)

The project aims to improve the assessment and management of soil health, supporting the sustainability of horticultural soils for crop production and environmental protection. The SMIS will

hold, manipulate and represent selected and available sources of data. The project started in June 2015 and data collection was undertaken by PGRO and Cranfield University. Rob Simmons presented the most recent results of the study to the Legume Panel on 19 October 2017 and to the Vining Pea Conference on 21 November 2017. Sponsored by PGRO levy and AHDB-Horticulture.

***DISEASES***

## 14. PEA DOWNY MILDEW RACE STRUCTURE IDENTIFICATION – COMBINING PEAS AND VINING PEAS

The project started in April 2014 and ends in March 2018. The aim of the project was to identify the different races of pea downy mildew in the UK and their distribution. Results from the project will help breeders to improve varietal tolerance to downy mildew. Downy mildew trials continued in 2017 at 9 sites, including 32 vining pea and combining pea cultivars. Sponsored by PGRO levy and AHDB-Horticulture (FV436).

## 15. WEB-BASED FORECASTING SYSTEM FOR DOWNY MILDEW IN SPRING BEANS (CROPMONITOR)

The automated system at FERA Research Ltd is available for forecasting downy mildew monitoring from 15 sites from April until late June. Updates about the infection risk at each monitoring site are posted weekly on the Spring Beans page on the Crop Monitor website www.cropmonitor.co.uk. Sponsored by PGRO levy for spring beans.

## 16. FOLIAR APPLIED ACTIVE SUBSTANCES FOR CONTROL OF DOWNY MILDEW IN FIELD BEANS

Nine foliar products were evaluated for efficacy in a trial at Stubton in 2017. Some products are confidential, but we use this trial to pursue approvals for products for field beans. Sponsored by PGRO levy and chemical companies.

## 17. VINING PEA DOWNY MILDEW – SCREENING OF ACTIVE SUBSTANCES

Screening of new and existing foliar active ingredients for downy mildew control in peas continued in 2017. Sponsored by PGRO levy and chemical companies.

## 18. LEGUME DISEASE MANAGEMENT IN VINING PEAS. COMBINING PEAS AND FABA BEANS

This project received approval from the Rural Payments Agency at the end of 2017. New biological products may offer an opportunity to improve management of soil-borne diseases and the project aims to test a variety of biostimulants, biocontrol agents and nutritional products for control of Aphanomyces

euteiches (root rot) and Peronospora viciae (downy mildew) in peas and faba beans. Sponsored by the Rural Payments Agency via EIP-Agri European funding, and PGRO levy.

## 19. DEVELOPMENT OF MOLECULAR TECHNIQUES FOR THE IDENTIFICATION OF FUSARIUM, APHANOMYCES AND DIDYMELLA IN PEAS

This project received approval for funding from Innovate UK at the end of 2017. The project aims to develop molecular diagnostic (qPCR) techniques for the foot rot complex in peas. This will be provided as a service to growers should the project be successful. Sponsored by Innovate UK and PGRO levy, with academic support from Nottingham University and the University of Warwick.

## 20. BIO-REMEDIATION OF APHANOMYCES INFECTED SOILS (PEAS) USING A PLANT BAITING TECHNIQUE

This project received approval from the Legume Panel in 2017. Interruption of Aphanomyces disease life cycle will be evaluated using weak host plants. This may cause the Aphanomyces oospores to germinate and disrupt the life cycle before they can release new oospores. Glasshouse only. Sponsored by PGRO levy.

***PESTS***

## 21. LURE AND KILL TECHNOLOGY TO MANAGE BEETLE PESTS (SITONA LINEATUS AND BRUCHUS RUFIMANUS) OF FIELD BEANS AND PEAS

The project aims to develop a 'lure and kill' system for the control of pea and bean weevil and bruchid beetle using a biological control agent Beauveria bassiana (BB). The BB formulation is being compared to a similar system using alpha-cypermethrin. Results were mixed in 2017. Partners are Keele University (following the transfer of the project from Rothamsted Research and the appointment of Toby Bruce at Keele University), Exosect, PGRO, Oecos, BASF and Velcourt Ltd. (Sub-contractor). Sponsored by Innovate UK, PGRO levy and industry partners.

## 22. CONTROL OF PEA AND BEAN WEEVIL USING FOLIAR ACTIVE SUBSTANCES

Several active ingredients were evaluated for control of pea and bean weevils in field beans in 2017. Standard pyrethroid applications gave little control of weevils. Biscaya + Decis gave good control of weevil foliar feeding but there were no significant differences in yield. Sponsored by PGRO levy and chemical companies.

## 23. APHID ALERTS FOR PEAS AND BEANS

AHDB Aphid News is written using information produced using a network of suction and water traps and provides information about when aphids are migrating at key times of the year. Information in the newsletters should be used to rationalise the use of insecticides, time treatments better and reduce harm to beneficial insects. This will also lower the risk of selection for insecticide resistance by

reducing unnecessary or wrongly timed sprays. Aphid alerts are published on websites of participating organisations. Sponsored by PGRO, AHDB and industry partners.

### 24. CONTROL OF APHIDS IN FIELD BEANS USING FOLIAR ACTIVE SUBSTANCES

Several products were tested in 2017 and a short report is available on request. Sponsored by PGRO levy and chemical companies.

### 25. INVESTIGATING THE SURVIVAL OF STEM NEMATODES (DITYLENHCUS SPP.) IN FARMYARD MANURE

There is some evidence that stem nematodes can survive in straw and dung and may be transmitted to soils following application of manure. PGRO began the preliminary work to study the effect of feeding beans in rations and the viability of nematodes following digestion. Sponsored by PGRO levy.

***OTHER***

### 26. FOSTERING SUSTAINABLE LEGUME-BASED FARMING SYSTEMS AND AGRI-FEED AND FOOD CHAINS IN THE EU (LEGVALUE)

The goal of LEGVALUE is to develop routes to sustainable and competitive legume-based farming systems and agri-feed and food chains in the EU. The project will assess both the economic and environmental benefits for the EU agro industry to widely produce and use legumes in a sustainable manner. PGRO is a work package manager for dissemination of findings, as well as a partner to develop farm networks and supply chain case studies. Sponsored by EU Horizon 2020, PGRO levy and industry partners.

### 27. TRANSITION PATHS TO SUSTAINABLE LEGUME-BASED SYSTEMS IN EUROPE (TRUE)

The main aim of TRUE is to identify and enable pathways to successful legume-supported production systems and agri-feed and -food chains. PGRO is a partner for dissemination and stakeholder engagement. Sponsored by EU Horizon 2020 and industry partners.

## PROJECT SUBMISSIONS REQUESTING PARTIAL PUBLIC FUNDING

Applications were submitted for collaborative funding:

a. BBSRC: British soya production to increase the resilience of the UK's food system (BRITSOYA).

b. Innovate UK: Faba bean: a profitable source of ingredients for the enhancement of bread bakery mixes.

c. Ekhaga: An integrated pest management approach (IPM) to investigate the effects of companion cropping in faba beans (Vicia faba) on weeds, pests and diseases.

d. INTERREG Europe: Carbon Farming in the North Sea Region.

The a) – d) failed at application stage.

e. Innovate UK Knowledge Transfer Partnership: Vining Pea Crop Modelling – prediction of yield and maturity.
f. DEFRA: Pulse Crop Genetic Improvement Network continuation.

Applications were submitted to AHDB for funding of investigations into:

a. Bean Seed Fly (*Delia platura*): A review of control and management techniques in vegetable crops, including legumes.

**PGRO LABORATORY SERVICES**

The plant clinic received 77 samples (v115 in 2016) requiring identification or diagnostics as part of the PGRO advisory service.

Seed and soil testing continued as a fee paid service.1399 samples for testing were received from seed producers in the calendar year. 151 soils arrived for foot rot evaluation (v132 in 2016).

PGRO continued to operate the tenderometer industry standardisation service with 62 (v 50 in 2016) comparison tests during the season.

Late in 2016 a rapid reliable quantifiable test for Club Root had been perfected. Clubroot a fungal pathogen (Plasmodiophora brassicae) is a common disease with serious economic consequences for growers of plants belonging to the family Brassicaceae (Cruciferae) including Oilseed Rape. A chargeable service that was enthusiastically taken up in the late autumn months of the year. The PGRO PCR test facility is primarily being used to develop diagnostic tools for legume pests, pathogens and symbionts for the benefit of UK pulse and vegetable legume producers.

**CONTRACT TRIALS**

As well as running the levy and grant/ award funded programmes of research and development, PGRO carry out a number of privately funded trials and projects which include variety evaluation and agrochemical screening in the field, glasshouse and laboratory. PGRO is GEP accredited and officially recognised by CRD to carry out efficacy trials with pesticides for agricultural and horticultural crops. Whilst this work continues each year, the volume fluctuates and "Research and Technical Income" from these activities can vary from year to year. Income from contracts and services through PGRO Research Limited in 2017 was £336k compared to £317k the previous year. During 2017 PGRO retained its GLP accreditation enabling wider opportunities for contract research to be accepted.

**ACKNOWLEDGEMENTS**

The Organisation remains grateful to the many seedsmen and agrochemical and nutrient manufacturers for the provision of considerable quantities of seed, agrochemicals and plant nutrients throughout the trialling season.

The assistance and co-operation of Bees Wax Farming who own the arable land at Stubton and Nocton where the PGRO home based trial grounds are sited and the owner, Sir. James Dyson is gratefully acknowledged. The cooperation of Mr Michael Sly of Park Farm, Thorney is also acknowledged in allowing part of his land to be used for PGRO pulse trials.

The help of the numerous growers in the provision of additional field trial sites and the many commercial concerns and individuals too numerous to mention by name, is also gratefully acknowledged with sincere thanks.

## Appendix 1

### PGRO BOARD OF TRUSTEES

Board composition until the AGM of June 13th, 2017

Secretary – R.G.VICKERS $

| | | |
|---|---|---|
| 1. | A.G. BURY | Frontier Agriculture Ltd |
| 2. | C. STOWE | Princes Ltd |
| 3. | S.W. BUMSTEAD$ (Vice Chairman) | Farmer / Grower |
| 4. | S.J. FRANCIS $ | Fen Peas Ltd |
| 5. | J. FENTON $ (Chairman) | Farmer / Grower |
| 6. | M. HAYWARD$ | Swaythorpe Growers Ltd. |
| 7. | S.P. MARX$ | Frozen Foods Consultant |
| 8. | PROF M. GOODING | IBERS |
| 9. | W.A. van der HAVE $ | Limagrain UK Ltd. |
| 10. | D. SEDGELY | Farmer / Grower |
| 11. | C. RENNER | Farmer / Grower |
| 12. | A. DAWSON | Birds Eye Ltd |
| 13. | C. COLLINGS | Harlow Agricultural Merchants |
| 14. | F. SMITH | Dunns ( Long Sutton ) Ltd |

$ denotes attendant at PGRO Management and Finance Committee.

Board composition following the AGM of June 13th, 2017

There were two Board resignations and two new appointments:

| Resignations: | New Appointments: | |
|---|---|---|
| M. HAYWARD | J. WARD | British Growers Association |
| | S. PORTAS | Agrii |

## Appendix 2

# INDUSTRY PANELS

### PROCESSING LEGUMES INDUSTRY PANEL

| | |
|---|---|
| S. Ashton | Greenyard Frozen UK Ltd |
| A. Beach | Anglian Pea Growers Ltd |
| S. Belcher | PGRO |
| M. Brown | A.P. (East Anglia) Ltd |
| R. Byass | Scottish Borders Produce Ltd |
| R. Corfield | Aylsham Growers |
| G. Ellerington | Green Pea Company Ltd |
| R. Fitzpatrick | Holbeach Marsh Cooperative Ltd |
| S. Francis | Fen Peas Ltd |
| J. Grant | J.W. Grant & Co |
| R. Hartley | Raymond Caudwell Produce |
| J. Hayes | Beeswax Dyson Farming Ltd |
| M. Hayward | Swaythorpe Growers Ltd |
| M. Heading | A. & E.G. Heading Ltd |
| L. Herold | PGRO |
| R. Hirst | Anglian Pea Growers Ltd |
| B.Howard | PGRO |
| E. Jadin | Ardo |
| P. Langley | Sandfields Farms Ltd |
| A. Lee | A.L. Lee & Sons |
| M. Lilley | Princes Ltd |
| N. Murray | W.P. Bruce Ltd |
| F. Richardson | East Coast Viners Ltd |
| C. Russel | BGA Ltd |
| J. Scrimshaw | PGRO |
| K. Taylor | K.H. Taylor Ltd |
| D. Teverson | Horticultural Development Council |
| J. Thompson | Beeswax Dyson Farming Ltd |
| R. Vickers | PGRO |
| P. Waldock | Growing Earth Consultancy Ltd |
| I. Watson | Stemgold Peas Ltd |
| A. Whitehead | Velcourt Ltd |
| A. Whiting | Birds Eye Ltd |
| H. Wilder | Barfoots |

### PULSE PANEL

| | |
|---|---|
| D.Robinson (Chairman) | Frontier Agriculture Ltd |
| B. Howard (Secretary) | PGRO |
| S. Belcher | PGRO |
| S. Cree | John Ebbage Seeds Ltd |
| P. Drinkwater | Grower - Cambridgeshire |
| R. Fletcher | Grower – Cambridgeshire |
| S. Francis | Fen Peas Ltd. |
| L. Herold | PGRO |
| S. Jackson | Syngenta UK (CPA) |
| A. Lensen | AgreServes Ltd. |
| M. Lilley | Princes Ltd |
| J. Scrimshaw | PGRO |
| P. Smith | BSPB (Independent) |
| L. Spadavecchia | DEFRA |
| M. Stuffins | Grower - Cambridgeshire |
| R. Vickers | PGRO |
| J. Wallace | IAR-Agri |
| M. Wells | Grower – Leicestershire |
| D. Whyte | United Oilseeds |

## Appendix 3

**Pulse Panel - R & D Strategy Pulses 2016-2019** is a working and evolving document, the version in use for the majority of 2017 is incorporated in the embedded document below.

The working strategy document of the PULSE PANEL.

The Pulse Panel is made up of Growers, trade and industry representatives. Meeting twice each year its' purpose is to give guidance and priority to the PGRO for the expenditure of Pulse Levy in the pursuit of grower led objectives concerning the production of combinable pulse crops.

By partnering with growers, other science and research organisations and by collaborating with commercial industry, PGRO works to leverage additional resources and access EU and UK funds to compliment the levy contributions to deliver maximum effect.

The 5 key priorities identified by the Pulse Panel are as follows.
1: Deliver YIELD STABILITY by understanding and quantifying the influencing factors and providing recommendations to ensure its realisation.

2: SOIL HEALTH and plant and soil biological interactions greatly influence pulse crops. Provide recommendations for remedial actions and the delivery of soil health improvement.

3: Deliver CROP NUTRITION plans for modern production techniques providing recommendations for optimum performance.

4: ENVIRONMENTAL CHANGE will influence future cropping techniques. Deliver recommendations for growing in a changing environment.

5: LEGISLATION UPDATES: To provide relevant information which can be used to impact and promote production and consumption.


R and D strategy Pulses 2016-2019.pd

## Appendix 4

Processed Legumes Research and Development Priorities 2017-2020 (for vining peas, picking peas, edible podded peas, broad beans and green beans)

**Top Processed Legume priority issues (in consultation with the industry Legume Panel)**:

Downy mildew, pre- and post-emergent herbicides, variety assessment, seed treatment, soil-borne diseases, pigeons, bean seed fly management.

The Processing Legume Industry Panel meets twice a year to provide guidance about the priorities of the industry.


Processed_legumes
_R_and_D_priorities

Funding for projects come from the PGRO, where and when available from competitive tenders to funding providers such as Innovate UK and the EU and AHDB.

## Appendix 5

# CHAIRMANS REPORT

### YEAR ENDING 2017


Adobe Acrobat Document

**John Fenton**

**26th June 2017**

## Appendix 6

# LEVY COLLECTORS

### 1. ***PULSE CROPS***

1. 2 Agriculture Ltd
2. Acorn Arable Ltd
3. Adams & Howling Ltd
4. ADM Direct
5. Agrii
6. S.C. Andrews & Son
7. Robin Appel Ltd
8. Argrain Ltd
9. Armstrong, Richardson & Co. Ltd
10. Askew & Barrett (Pulses) Ltd
11. H. Banham Ltd
12. Bartholomews Agri Food Ltd
13. Henry Bell & Co. (Grantham) Ltd
14. Bodle Bros. Ltd
15. Camgrain Stores Ltd
16. Campbell & Penty Ltd
17. Cefetra Ltd
18. Cherwell Valley Silos Ltd
19. Chilton Grain Ltd
20. W.A. Church (Bures) Ltd
21. Cofco International UK Ltd
22. Cotswold Agricultural Merchants
23. A.L. Cox & Sons Ltd
24. Criddle & Co. Ltd
25. Crop Marketing (Groups) Ltd
26. J.E. & V.M. Dalton Ltd
27. G. O. Davies (Westbury) Ltd
28. Dengie Crops Ltd
29. Dodson & Horrell Ltd
30. Dunns (Long Sutton) Ltd
31. John Ebbage Seeds Ltd
32. Ellingham Grain Ltd
33. Elsoms Seeds Ltd
34. Fengrain Ltd
35. Fengrain (Services) Ltd
36. John Foad & Co
37. FramFarmers Ltd
38. Frontier Agriculture Ltd
39. GFP (Agriculture) Ltd
40. Glasson Grain Ltd
41. Gleadall Agriculture Ltd
42. Glencore Grain UK Ltd
43. GrainCo Ltd
44. Grainlink Ltd
45. Harlow Agricultural Merchants
46. Henson & Jackson Retail Ltd
47. Highfield Seeds Ltd
48. Hodmedod Ltd
49. J.S. Hubbuck Ltd
50. I'Anson Bros. Ltd
51. Inglis & Son
52. Charles Jackson & Co. Ltd
53. Robert Kerr Agriculture Ltd
54. Mark Lawrence Grain
55. Limagrain UK Ltd
56. W.N. Lindsay Ltd
57. Maviga Europe Ltd
58. James Mortimer Ltd
59. Openfield Agriculture Ltd
60. Organic Arable Marketing Co. Ltd
61. Peters Commodities Ltd
62. Premium Crops Ltd
63. Saxon Agriculture Ltd
64. Scotgrain Agriculture Ltd
65. Senova Ltd
66. Simpson Malt Ltd
67. Soya UK Ltd
68. United Oilseeds Marketing Ltd
69. R.W. Warnock Ltd
70. Westland Horticulture Ltd
71. Weston Mill Farming Co
72. Wherry & Sons Ltd
73. G. Williams & Co. (Grain) Ltd
74. G. Williams & Co. (Seeds)
75. Witney Grain Ltd
76. Charles Wright & Sons Ltd

### *2. VEGETABLE CROPS*

1. Anglian Pea Growers Ltd
2. Aylsham Growers Ltd
3. Beeswax Dyson Farming Ltd
4. Birds Eye Ltd. and their growers
5. Bishop Farm Partners
6. W.P. Bruce Ltd
7. R. Caudwell (Produce) Ltd
8. Fen Peas Ltd
9. J.W. Grant & Co.
10. The Green Pea Co. Ltd
11. A & E G Heading Ltd
12. Holbeach Marsh Co-Operative Ltd
13. Scottish Borders Produce Ltd
14. Stemgold Peas Ltd.
15. Swaythorpe Growers
16. K.H. Taylor Ltd
17. Wootton Marsh Farms

## Appendix 7

# ASSOCIATE MEMBERS

The following were Associate Members of the Organisation at 31st December 2016.

***UNITED KINGDOM***

Acorn Seeds
Agrichem (International) Ltd
Agrii
Agrovista UK Ltd
Allen Agriculture Ltd
A.P. (East Anglia) Ltd
Bartholomews Agri Food Ltd
BASF Plc
Bayer CropScience Ltd
BCS Agriculture Ltd
Belchim Crop Protection Ltd
Birds Eye Ltd
Bishop Burton College *
British Society of Plant Breeders Ltd
Certis UK
Coles, K.S.
Dodman Ltd
Doug Balderson Agriculture Ltd
Elsoms Seeds Ltd
Flamingo Produce Ltd
Freemantle, M.J.
Frontier Agriculture Ltd
Greenyard Frozen UK Ltd
Harper Adams University College
Headland Agrochemicals Ltd
H.L. Hutchinson Ltd
l'Anson Bros Ltd
James Hutton Institute
Limagrain UK Ltd
Lincoln, University of
L.S. Plant Breeding Ltd
Monsanto UK Ltd
Norman & Spicer (Agrochemicals) Ltd
Nottingham, University of
NuFarm UK Ltd
PMC Harvesters Ltd
Prime Agriculture LLP
Princes Ltd
Procam UK Ltd
Pro-Veg Seeds Ltd
REA Agronomy
Royal Agricultural University
Sandfields Farms Ltd
Scottish Borders Produce Ltd
SRUC
Syngenta UK Ltd
A.L. Tozer Ltd
David Trethewey Seeds
UPL Europe Ltd
Verdesian Life Sciences Europe Ltd
Debbie Wedge Ltd
G. Williams & Co. (Seeds)
Zantra Ltd

***OVERSEAS***

Agis, Germany
Agro Seed Services bvba, Belgium
Barba Stathis SA, Greece
W. Brotherton Seed Co. Inc., USA
Canterbury Seed Co. Ltd., New Zealand
Columbia Seed, Canada
Crites Seed Inc., USA
Findus Sveridge, Sweden
Hans-Georg Lembke KG, Germany
Horticulture New Zealand
Massey University, New Zealand
Midland Seed Ltd., New Zealand
Nunhems, Netherlands BV, Holland
PGG Wrightson Seeds Ltd., New Zealand
Plant & Food Research, New Zealand
Ploeger Machines BV, Holland
Pop Vriend Seeds BV, Holland
Seneca Foods Corporation, USA
Shem Drowne, Eire *
Strube Espana SA, Spain
Unigrow CVBA, Belgium
Van Waveren-Saaten GmbH, Germany
Vilmorin SA, France
Charles R. Wynne Ltd., Eire

* Joined during 2017