

**2016**



**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, the Management and Finance Committee which meets to review operational issues every two months. A management team of the four senior members of staff, chaired by the CEO, meets monthly to manage the day-to-day decisions.

2016 was the second 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.

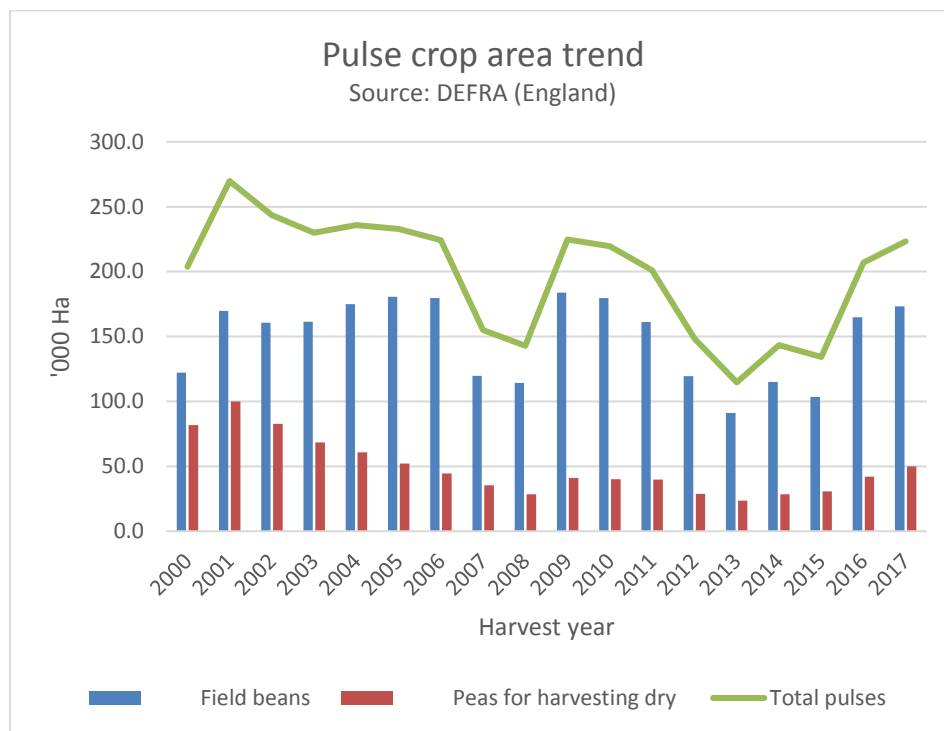
The core beliefs of the organisation are captured in the declared corporate values.

### **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.

## 2016 LEGUME CROPS IN UK

UK Pulse crop areas sown for 2016 harvest were the largest since 2009, though as the DEFRA data shows whilst pulse crop area has increase in recent years it is still significantly below that of the early 2000's



2015/2016 saw one of the mildest winters for many years cementing the year of 2015 as the warmest in the UK since records began. This continued through into the early part of 2016 but was accompanied by significant rainfall. Whilst the winter may have been mild spring was very slow to emerge and saturated ground combined with very low soil temperatures to make us fear for the timely sowing of spring crops.

As March approached however the soil dried sufficiently to allow drilling to take place in most parts though in some areas and on stronger soil types spring sown pulses were very late, with crops of peas and beans being delayed until mid or even late April. Despite the drier conditions in this period the soil still held significant moisture and the air and soil temperatures refused to rise, resulting in seeds sitting in cold wet soil for a prolonged period, which is never a good sign. Slow to emerge crops eventually struggled in low temperatures and light levels and just as flowering began the rain returned delivering cool very damp conditions right through mid- May and the whole of June. It is considered that this is the main reason for disappointing yields in many areas as pollination was adversely affected by the poor weather conditions during this critical period. One thing that was not an issue, even on light soils was drought, in fact the plant clinic at PGRO received significant numbers of enquiries from growers with leaf senescence in beans typical of water congestion. With many soils effectively at water capacity during this period there will also have been a negative impact upon the ability of rhizobia to fix nitrogen for the plants.

As the temperatures began to rise through the second half of June the humidity levels soared too and Cercospora and Chocolate Spot control became the critical agronomy focus to prevent bean leaf loss, particularly for winter beans. Despite the disease issues for beans, peas in general remained remarkably clean, however in the same period pea aphids began to appear in large numbers and a wide range of low level viruses were evident. Just as it looked as though these could be a major problem a mini heat wave arrived in early July combining with the very restricted chemical armoury to minimise their impact. With temperatures reaching almost 30 °C however, this spell terminated pea flowering a little early and resulted in significant contribution to lower overall average pea yields in 2016. As July progressed the rain returned and the temperatures fell away again having a further significant negative impact on early Vining pea crops approaching harvest.

Strong winds and rain battered a number of trials causing beans to 'brackel' low down and reports began to arrive of spring beans with low pod numbers (again thought to be the result of the poor environmental conditions during the pollination period and high plant numbers used in late sowings (late sown beans should be sown at lower populations even in a good year), a problem that winter beans in the main seemed to avoid.

Rust developed in the beans in warmer conditions of late July and this persisted through to mid-August giving many a relatively trouble free pea harvest and in some cases bringing forward bean maturity as diseases ripped the leaves from the plants.

PGRO combining pea trials were completed by 15<sup>th</sup> August and Faba bean harvesting started the same day.

As crops came to harvest it soon became clear that the late and wet start to spring had combined with the lack of sunlight, cool temperatures and prolonged wet atmosphere during the flowering to rob both pea and bean crops of significant yield potential. Variability became the watch word as crops around the country were declared significantly down on the previous harvest and somewhat below average. Initial estimates were a national reduction of 10-20% but the variation was enormous site to site, let alone region to region. The early July heat had also accelerated the crops towards maturity and taken a further percentage from the yield. The negative effect of the season was typical of that seen in the yields of almost all arable crops in 2016.

Pulse harvest itself was generally a trouble free period in terms of the weather, with August and September being generally warm and dry.

As far as quality was concerned peas were generally good and whilst some winter bean crops were ugly and the effect of Bruchid beetle also impacted human consumption quality produce, especially in the south.

After several months of quiet pessimism about the export market, (a lack of sellers and little buyer interest) and the prediction that selling would be tough the export market opened up and the first boats sailed at the start of September. Prices began to rise a little and feed companies continued to extend their commitment to the bean crop buying forward into the spring. Blue pea prices also began to rise with the knowledge that the predicted surplus from 2015 would not be realised and with

continued demand from processors and export markets for good quality produce. Bean trade exports were less robust than in 2015 hampered by a lack of quality and disquiet in the Egyptian market about the availability of currency for payment. Trade continued via containers but bulk boat shipments were much reduced. By Christmas it was apparent that bean exports would be down significantly on recent years (perhaps 50%). The demand for feed in the UK however took up the slack and committed to very significant forward requirements.

In September the Defra June survey was released confirming the year on year increase in pulse crop areas. Peas increasing 18.7% (from 42.1k ha to 49.9k ha) and beans rising a further 5.2% (from 164.8k ha to 173.3k ha). This seemed to be mostly at the expense of winter sown oilseed rape which fell to 542k ha, almost 90k ha down in 2 years.

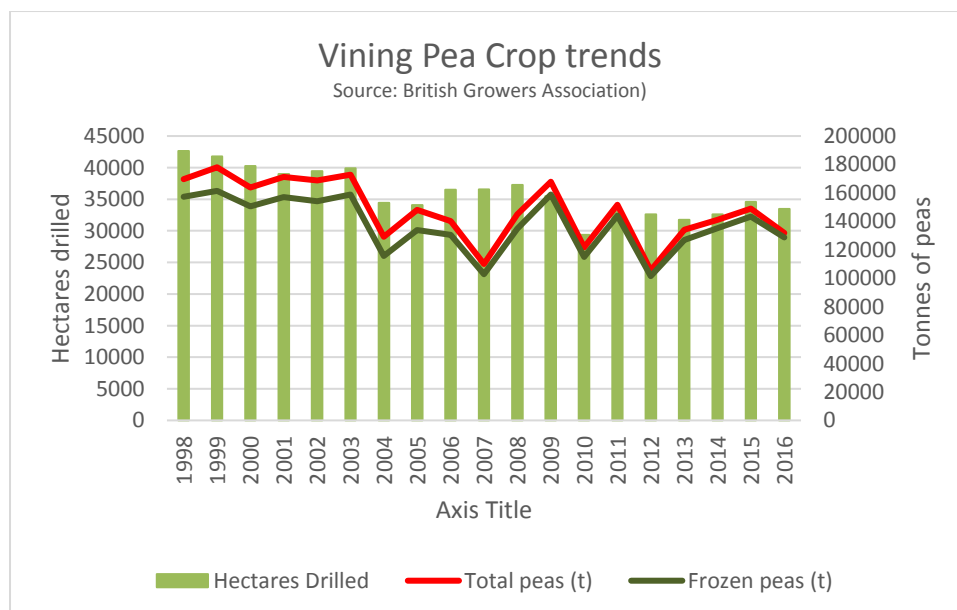
The autumn period was generally dry and quite open in the early part and for PGRO winter bean establishments went ahead without hindrance. Many commercial growers were tempted into sowing up early as access to land was easy and most intended winter establishment activities were achieved.

As the calendar turned the early winter period had been exceptionally open and dry.

### Vining Peas

By the time October arrived and the end of the season it was confirmed by the British Growers Association that the area drilled had fallen season on season by over 1600 Ha to 33,466 hectares. Despite early fears of a much worse problem at harvest, bypass crops were restricted on average to 7% of the drilled area, with the total national crop yielding circa 131,800 tonnes.

The long term area trend can be seen in the data below, with relative stability in recent years.



The early crops got off to a good start as did trials though the main crop establishments were delayed as wet, cool conditions prevailed through April. By the end of the month between just 30- 50% of the crops were sown and low night temperatures saw crops developing very slowly. Generally there were few significant problems in terms of pests and disease though some reported issues with Thrips, pea

moth and weed control. If anything and rather unusually, the more northern areas and Scotland saw the kinder early spring conditions. Earliest harvesting in the main crop areas of Lincolnshire and Yorkshire would not start until late June meaning that the gap between the end of sowing and the onset of harvest was extremely short.

In early June the weather brought some storms and flash flooding and record rainfalls were broken. Problems that caused more significant damage on the near continent significantly delaying green bean sowings and negatively impact vining peas with crop losses and harvest potential by up to 40% and some flash flooding to some areas in the UK.

Early UK crop was variable in yield but of good quality as the weather turned rapidly from wet to a short heat wave in early July before returning to cooler but wet summer conditions and some began to experience foot rot issues. The variability continued throughout the harvest period not only regionally but in terms of yield, quality and weather week on week, posing testing challenges for all groups.

As the season in central parts and southern parts drew to a close through August it was clear that the season was very average and negatively dominated by the weather. It would eventually end with Scotland unusually having had the easier season overall

## **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.

During the year a review strategy / schedule for company policies was initiated to help ensure risk is minimised and best value is returned in relation to the objectives of the charity.

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 2016 the strategy of not spending or committing to expenditure before funds are realised continues, however the situation now affords the possibility of further expanding the charitable objectives of funding both education and relevant research.

To this end the funding of 3 new PhD's have been committed to starting in 2017. These will focus on Stem nematodes (with Harper Adams University), Foot Rot in peas (with Warwick University) and Elite Rhizobia (with Stirling University and the James Hutton Institute). These compliment the already established PhD Studies into Aphanomyces in Peas (with Nottingham University) and Bruchid Beetle ecology (with the University of Newcastle upon Tyne).

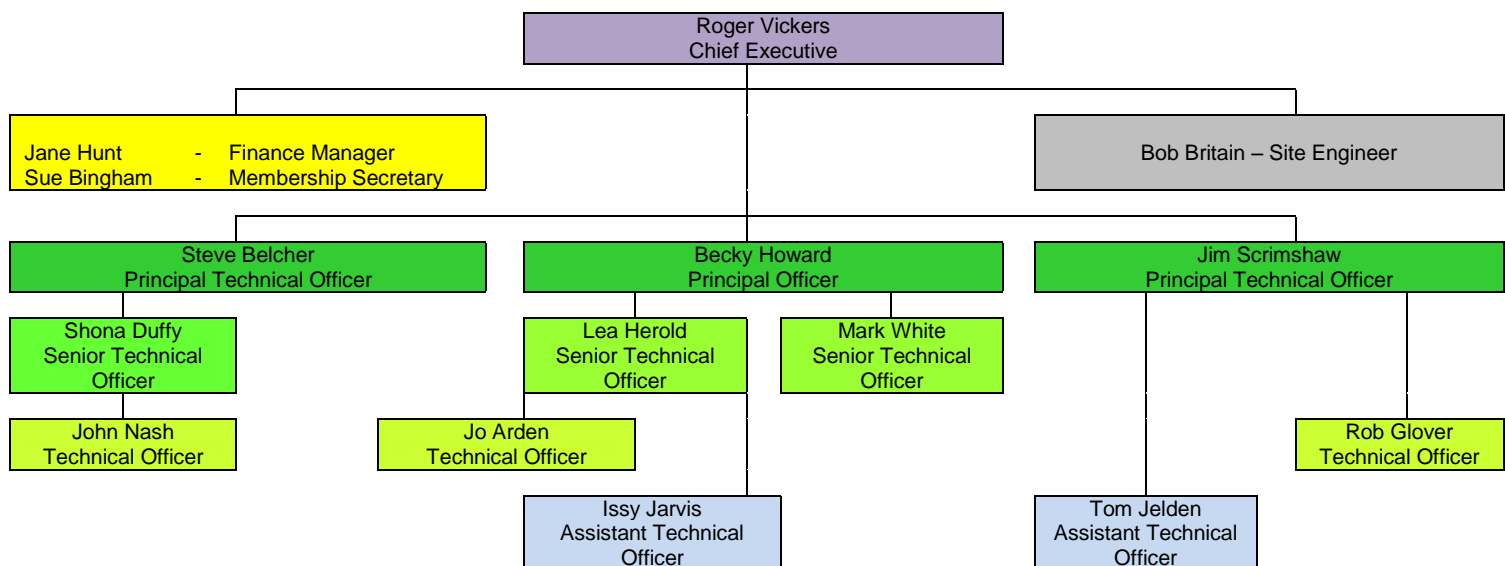
Significant investment in facilities and team at PGRO continued.

2016 saw capital investments in the set up and establishment of PCR molecular testing facilities at PGRO. Facilities that are being used to develop improved and more rapid disease and pest diagnostic services for growers and applications in crop research programmes.

An industrial dehumidification unit was acquired to substantially increase the throughput and efficiency of grain drying at harvest, a critical limiting factor at a busy period of the year. A replacement van was purchased for much needed reliability in the servicing trials team needs.

## STAFF STRUCTURE & PERSONNEL

- **PGRO - Organisation Chart as at 31<sup>st</sup> December 2016**



Total 15 employees  
(includes 5 part time)

- Keith Poulson resigned during the year and was replaced by Issy Jarvis
- Tom Jeldens accepted a full time position at ATO grade
- A 3 month Student placement was filled by Emily Butterwick form Lincoln University
- Jill Sardeson ( administrative staff) requested and was granted voluntary redundancy during the year
- Paul Armitage retired in November. His role as Lab manager was filled by the promotion of Jo Arden
- 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.

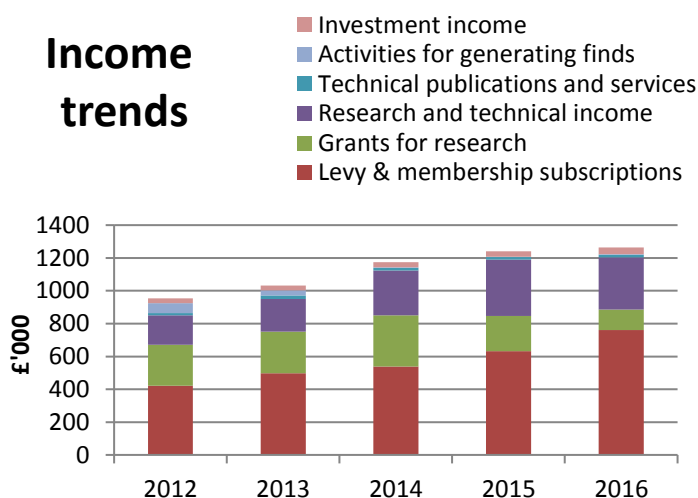
The year ended with total income increasing from £1,244k to £1,281k

The crop area increase in 2016 harvest was a surprise to the trade with peas increasing 18.7% and beans a further 5.2% according to Defra Statistics. A total crop area increase for dried peas and beans of 7.9%. The negative environmental conditions however significantly reduced yields overall and with depressed trading in the export market for human consumption beans levy returns-for the 3<sup>rd</sup> and 4<sup>th</sup> quarter of the year were - though good - relatively disappointing in comparison year on year.

Levy receipts of £731k for 2016 were buoyed by unprecedented returns from the 2015 pulse crop levy receipts in quarters 1 and 2 together with significant income (£317k) from the activities of PGRO Research Limited. This afforded the opportunity to put make additional financial investments either side of the EU referendum. Invested funds at the yearend were valued at £990k, an increase of £285k. Total funds at the yearend were valued at £2,075k, an increase of £313k and the year ended with a strong cash balance. Whereas in the previous 12 months investments had fallen in value 2016 saw a significant increase with gains of £84k.

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.

### Income trends



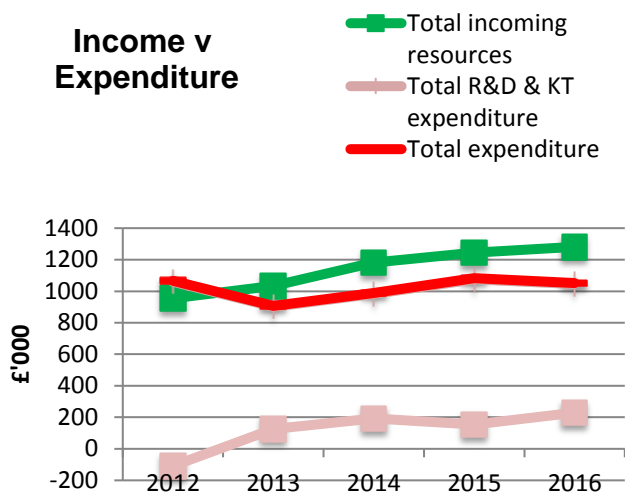
Whilst PGRO continues to apply for grant funding to support research, the economic and political climate makes accessing funds of this nature ever more difficult. During the year income from grants fell further, from £215k to £123k emphasising the precarious nature of public funding for applied research. Funding of this nature along with other income streams is used to leverage the value of levy. It is exceedingly rare if not impossible to receive 100% grant support. That said the year ended on a good note with notification from a number of sources - including the EU - that consortium applications for projects to start in 2017 were successful, meaning that grant incomes are projected to increase again significantly in the short term.

Levy rates continued through the year at £0.97 per tonne and a decision was made to postpone a pre-planned increase from 2017 crop.

With careful attention to operational costs in all areas total expenditure fell £31k to £1,052k

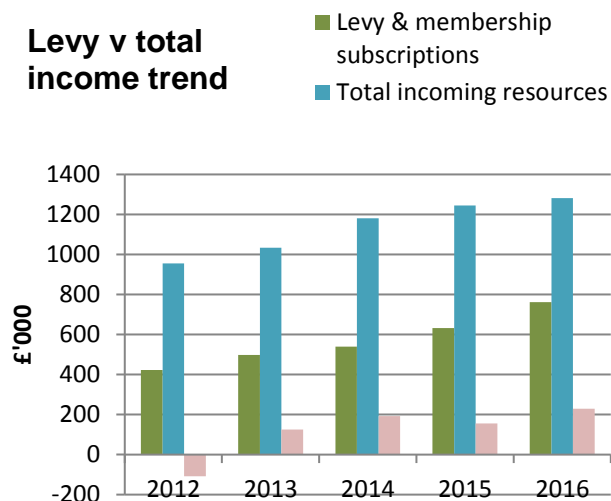
Expenditure can be categorised as 70.7% Research and Development with 29.3% Knowledge Transfer activities. (In comparison to 2015 at 76% and 24% respectively.) R&D expenditure ebbs and flows as existing projects come to a conclusion and new ones begin. Knowledge transfer remains a key stone in PGRO activities.

### Income v Expenditure



The ratio of the levy to the total spent on R&D continues to illustrate the added value PGRO generates. With the exceptional returns received in 2016, levy contributed 57% of income (up 9% on the year) however levy receipts continue to be closely matched by funding from alternative sources and looked at over a 5 year period for every £1 in levy received £2.12 has been spent on R&D and Knowledge Transfer.

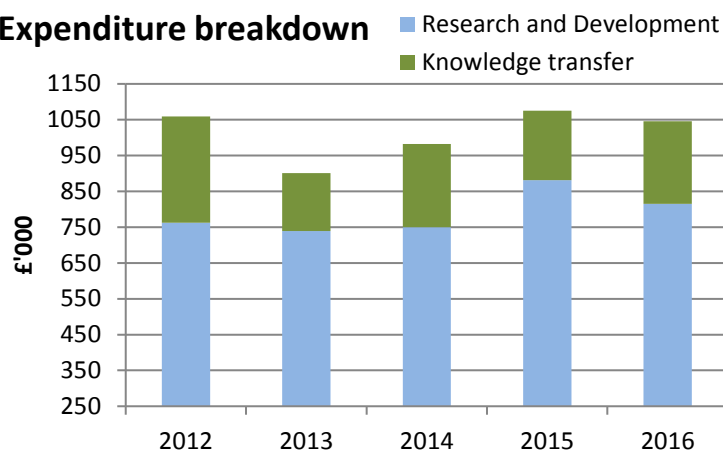
### Levy v total income trend



## 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.

## Expenditure breakdown



Research and Development is for nothing if not accompanied by an effective programme of Knowledge Transfer activities. Expenditure on Knowledge Transfer increased by £37k to £231k in 2016, both a real and percentage increase.

### The following KT activities can be listed for 2016

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](http://www.pgro.org)
2. Marketing reports were collated in conjunction with BEPA and distributed monthly throughout the year
3. Nine Crop Updates were issued throughout the season, delivering critical agronomy advice.
4. PGRO & BEPA presented at the Cereals 2016 event with displays and plots of pulses and focussed on the market opportunities presented by International Year of Pulses 2016
5. PGRO exhibited at the 2 day national CropTec 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 on line service hosted on the PGRO web site
8. Social media was further embraced with significant increase in use and 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, with record attendances
12. The online Optibean Agronomy decision support tool was developed and improved
13. The Bruchid Cast online decision support tool was actively promoted into its second year
14. Technical staff contributed to a number of 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](http://www.pgro.org) appearing as an "e-book" for the first time.
17. The Vegetable magazine was again produced for the vining pea and vegetable legume industry, directly mailed to growers and grower groups and also published on line via [www.pgro.org](http://www.pgro.org)

18. The PGRO Pulse Agronomy Guide was expanded further to include key weed identification tools. Released in January 2016 in hard copy it is also available as a download from [www.pgro.org](http://www.pgro.org)
19. The PGRO Recommended Lists of peas and beans were announced in November and launched to the press at the CropTec 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](http://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 UN declared “International Year of Pulses” promotional activity was lead in the UK by BEPA (British Edible Pulse Association). Throughout the year PGRO teamed up with BEPA to help create promotional awareness of the designated year supporting BEPA in PGRO Publications and at various events, including Cereals and regional agricultural and educational shows. At the request of BEPA, PGRO co-sponsored the Bean Art Project delivered by Victoria Brown to great effect (Artist in residence at 3 community schools in Derbyshire.)

### **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 2016.

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 2016

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

In 2013 the Pulse Panel (appendix 2) agreed that it would collate a general plan for PGRO research priorities and would in future meet twice per year (spring and autumn). This started in 2014.

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

Since 2012 PGRO in conjunction with HDC, guide the Processed Legume Industry Panel (appendix 2) in formulating 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 2016 PGRO LEVY SPONSORED PROJECTS

#### 1. VARIETY EVALUATION

A mild and wet winter period was followed by an unremarkable spring with temperatures and rainfall close to average. The summer months were generally cool with average amounts of rainfall, but with some localised heavy storms. The hot weekend of 18-20 July curtailed flowering in many pea crops and sunshine levels were lower than normal.

##### a. Peas

Overall 2016 trial yields (3.79t/ha) were well down on the 5 year (4.81t/ha) average.

Five trials went through to harvest. Yields were generally lower than in 2015, but the trial near Harwich bucked the trend and gave the highest yields at 5.16t/ha. Trials varied greatly in the degree of lodging that occurred and was greatly influenced by bursts of heavy rainfall.

Karpate a new white-seeded pea from Senova joins the RL with a P1 recommendation as the top yielding variety with a yield of 105% of controls. Kareni, top yielder in 2015 moves to 2nd year of provisional recommendation. Salamanca, Mascara and Gregor remain fully recommended. The aptly named large blue Bluetooth (LS Plant Breeding) joins Prophet, Daytona, Crackerjack and Campus as fully recommended varieties in that category. Two varieties LG Stallion (Limagrain UK) and Vertex (Senova) join the list with a 1st year provisional recommendation. LG Stallion tops the large blue yield rankings at 102% with Vertex 2% lower. Kingfisher moves to 2nd year of provisional recommendation.

The small blue category makes a re-appearance on the RL with the addition of Greenwood (IAR Agrii) with a P1 recommendation. Yields are 6% lower than Prophet, but while seed is smaller it is on the large side for a small blue. Standing ability rates at only 4, similar to Crackerjack. Coloured flowered maple peas Mantara and Rose remain as fully recommended varieties. In the marrowfat category, Sakura and Genki remain fully recommended and top yielder in this category, Aikido moves to 2nd year provisional recommendation.

**b. Winter Beans**

In the mild winter and where winter beans were planted early, vigorous growth gave rise to high levels of brackling, lodging and chocolate spot. Five of the nine trials went into the 2016 matrix. 2016 yields (5.73t/ha) were 17% higher than the 5 year average (4.89t/ha), with sites at Thorney and Hereford yielding close to 6.5t/ha.

Several candidate varieties were withdrawn from RL consideration by the breeders, so there were no new additions to the RL. Clipper was also withdrawn. In the pale hilum category, Tundra, Wizard and Honey remain as fully recommended varieties. Bumble moves from P1 to P2 recommendation and joins Tundra as the top yielding pale hilum types at 104% of controls. In the black hilum (feed) category Arthur was moved to the becoming outclassed category.

**c. Spring Beans**

All ten spring bean trials were used in the 2016 matrix. 2016 yields (5.67t/ha) were marginally up on the 5 year mean (5.44t/ha). The highest yielding site was in Kent (6.52t/ha), but several others yielded over 6t/ha.

Pale hilum types Vertigo, Fanfare, Fury, Fuego and Boxer all remain as fully recommended varieties. New to the RL with a P1 recommendation is LG Cartouche (Limagrain UK). Yields were just 1% lower than the best, but it only has a 4 (same as Fuego) rating for downy mildew resistance. Lynx moves from P1 to P2 recommendation and joins Vertigo as the top yielding varieties. As in 2015 it has maintained a 7 rating for downy mildew resistance, the best amongst the pale hilum types. Pyramid and Babylon were removed from the RL. Black hilum, tic bean Maris Bead remains with a full recommendation.

## **2. SCOTTISH PULSES (with SRUC)**

### Spring Beans

A row width / population look-see trial was conducted at SRUC to complement one conducted by PGRO at Stubton.

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. Seven varieties of potentially early spring beans from Limagrain UK and LS Plant breeding were solicited and compared to 4 Recommended List varieties in terms of

Earliness and yield. Sites were SRUC and a Frontier site near Haywold, N. Yorkshire. From this LS Plant Breeding has entered one of these into National List year 1 trials.

### **3. PULSE CROP GENETIC IMPROVEMENT NETWORK (PCGIN) (With JIC and NIAB)**

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 therefore assist with the more sustainable development of the arable sector. The network has created stakeholder groups to interact within the network and to provide links with the EU research community. PCGIN is managed by JIC, PGRO, NIAB and Defra with input by the commercial sector.

The objectives are to identify key phenotypic and performance characteristics within peas and beans, to develop genetic maps in pulse crops to provide novel germplasm and marker traits for commercial development of varieties.

A Field trial of 19 recombinant inbred lines and Prophet the yield standard were evaluated in 2016, at 2 sites Stubton and NIAB, Cambs.

A Stakeholder meeting was held at NIAB in December 2016

### **4. WEB BASED FORECASTING SCHEME FOR DOWNY MILDEW IN SPRING BEANS**

(With FERA, York)

The automated system at FERA was available for forecasting downy mildew monitoring from 15 sites from May until late June. Updates about the infection risk at each monitoring site were posted weekly on the Spring Beans page on the CropMonitor website ([www.cropmonitor.co.uk](http://www.cropmonitor.co.uk)).

### **5. MANAGEMENT OF DOWNY MILDEW IN SPRING BEANS**

Levels of DM were low in 2016 and aggressive rust development quickly defoliated the beans making further DM assessments impossible. All treatments offered some DM control at the top of the crop except Zynergy + NA13. SL 567A and Amistar gave significantly better control than Conf1 (coded). There were no statistical differences in DM control between Previcur, Infinito, SL 567A and Amistar and all were equally effective. Rust control from Amistar resulted in a significant increase in yield compared to the untreated control and the other treatments, between which there were no significant differences.

### **6. OPTIBEAN (TSB supported project with NIAB TAG, Wherry and industrial partners)**

Whilst the Optibeans project concluded in November 2015. Updates to the agronomy tool continue to be made.

An update in January 2017 saw the addition of winter bean population / sowing date data, updates to the Bruchid distribution maps and updates from the Nix pocket book.

Updates to the aesthetics of the Excel workbook were also made.

At the time of writing May 2017, 165 downloads of the version 2 of the tool has been made.

The Optibean tool is scalable to enabling data from future projects to be incorporated.

#### **7. PROTEIN CONTENT VS.YIELD IN LEGUMES: RELEASING THE CONSTRAINT** (*SAF-IP with Wherry and Son, JIC and other industry partners*)

The project investigated the relationship between protein content and yield in pulses. It produced novel genetic stocks with improved traits, breeding tools and associated marker systems, together with knowledge of screening and characterising mutants. The project provided advanced understanding and know-how for breeding high-value legume protein crops and ended in January 2016.

#### **8. LURE- AND-KILL TECHNOLOGY TO MANAGE BEETLE PESTS** (*Sitona lineatus and Bruchus rufimanus*) OF FIELD BEANS AND PEAS (*AgriTech project sponsored by Innovate UK, PGRO, BASF, Rothamsted, OECOS & Exoset*)

Our innovative AgriTech project, led by the PGRO, is developing a “lure-and-kill” approach to manage beetle pests of peas and beans. Currently blanket sprays of insecticide are used against these damaging pests. The pea and bean weevil (*Sitona lineatus*) attacks the nitrogen fixing root nodules and the Bruchid beetle (*Bruchus rufimanus*) severely reduces saleable quality of beans by burrowing holes in them. Instead of controlling these pests with sprays in a crop which is hard to penetrate, our vision is to make the pests come to us by formulating a killing agent together with a pheromone or plant volatile attractant. This will improve targeting of control measures and provide a much needed new solution following the occurrence of pyrethroid resistance in the pea and bean weevil.

We are collaborating with BASF and Exoset who have a natural enemy of beetle pests (an insect fungal disease) and electrostatically charged powder formulations that stick to the body of the insect. Rothamsted Research has identified an aggregation pheromone specific for the pea and bean weevil which attracts both sexes and floral attractants for the Bruchid beetle. These will be formulated with the insect fungal disease and put into inoculation stations in the field that we will develop with another project partner, Oecoc. The project started in Oct 2014.

#### **9. BEANS 4 FEEDS** (*Innovate UK sponsored project with, BIOMAR, SRUC, EWOS, Universities of Stirling Aberdeen and St Andrews, Limagrain, Harbro, Marine Harvest, James Hutton Institute, PGRO*)

Beans4feeds represented a £2.6m research investment through an 11 partner industry led and co-funded research project with the UK's Innovate UK. Research started on 1 January 2012 and ran for four years. The project aimed to develop air-classification technology for Faba beans to improve the economic and environmental sustainability of UK food production and food security. PGRO's



involvement was in the process of knowledge transfer during the final two years of the project dissemination continued in 2016.

#### **10. VINING PEAS: THE EFFECT OF PHOSPHORUS FERTILISERS ON RHIZOBIAL POPULATIONS AND PEA YIELDS – EXTENSION OF PROJECT FV428**

Field trials were established by Stephen Francis. An experimental licence was received from the Environment Agency to allow the use of N starter in peas at specific sites. At each site three rates of Primary P (with N) and three rates of a phosphate fertiliser were tested. These were applied at drilling. Each plot was about 2ha in size. Soil samples were taken to determine mineral status and rhizobia levels. An extension was granted to continue trials in 2016.

#### **11. PEA DOWNY MILDEW RACE DIVERSITY IN THE UK AHDB FV436**

The project aims to determine races and distribution of pea downy mildew in the UK, to inform breeding programs and growers and help decisions regarding varietal tolerance to the disease. Downy mildew isolates were collected from a range of varieties from trials and commercial sites. A culture collection was created for inoculation onto differential JIC pea lines. The project has established successful means of storing downy mildew by drying plant material. In addition, much work has been carried out to establish a robust method of inoculating peas. Work has begun to test the JIC differential lines for susceptibility to the culture collection. Trials were established across the UK at 6 locations to test up to 40 lines for downy mildew susceptibility, including 4 differential JIC host lines that are known to have resistance to the disease.

#### **12. FERTILISER MANUAL (RB209), PLANET AND MANNER-NPK UPDATES PEAS AND BEANS**

AHDB are leading and co-ordinating a UK strategic partnership between UK government departments (including Defra) and the agricultural industry. The next scheduled RB209 update is 2017 and priorities for review and further research are in place, as per steering group meetings.

#### **13. CHEMICAL BLACK GRASS CONTROL USING AVADDEX (TRI-ALLATE) IN FIELD BEANS**

Following re-registration of Avadex, it will no longer be approved in spring beans and combining peas after 31 December 2016. PGRO is not able to apply for Extension of Authorisation for field beans as they are classed as a major crop. More residue data may be required for peas, although an EAMU application is likely to be submitted by Gowan. No additional trials were undertaken in 2016.

#### **14. COMBINING PEA OPTIMUM POPULATIONS**

An investigation of optimum populations for combining peas was carried out in 2016. A marrowfat variety, Sakura, was included in 2016 trials. Optimum (economic) population for Crackerjack in 2016 was 97 plants/ m<sup>2</sup> and for Sakura 65 plants/ m<sup>2</sup>.

#### **15. THE USE OF GLYPHOSATE VERSUS DIQUAT AS A DESICCANT AND FOR WEED CONTROL IN FIELD BEANS**

An investigation of the active ingredients for weed control and desiccation in field beans.

The earlier the glyphosate application the greater the reduction in germination capacity. At a commercially acceptable timing of 8 days before harvest the better germination was seen but was still unacceptable (65%).

#### **16. APPLICATION OF SNP GENOTYPING AND RAPID SCREENING PROCEDURES TO ENABLE COMMERCIALISATION OF FABA BEAN VARIETIES WITH STEM NEMATODE RESISTANCE IUK 100878**

The project ended in 2015 with some promising lines that showed tolerance to stem nematode. A field trial was undertaken in 2016 to evaluate promising Faba bean lines for stem nematode resistance. Results were not conclusive.

#### **17. COMBATING INSECTICIDE RESISTANCE IN MAJOR UK PESTS**

The overall aim was to develop strategies to maintain effective chemical control of economically important pests of agriculture and horticulture including pea and beans pests and to compare the net benefit of different insecticide resistance management strategies for insect pests with contrasting life-histories and damage implications.

The project developed a method to assess insecticide resistance risk based on objective and measurable criteria.

#### **18. 'INVESTIGATING THE RELATIONSHIP BETWEEN APHANOMYCES EUTEICHES AND YIELD DECLINE IN PEAS' (PhD with Nottingham University)**

The PhD started in October 2015 and is being undertaken by student Brian O Loinsigh. A soil sampling strategy was developed for the 2016 season and work on molecular diagnostics for identification of *A. euteiches* started.

#### **19. 'THE BIOLOGY AND ECOLOGY OF *Bruchus rufimanus* (BEAN SEED BEETLE)' (PhD with University of Newcastle Upon Tyne)**

The PhD started in 2009 and is being undertaken by PGRO, Becky Howard, on a part time basis. The research was written up in 2017 with final amendments and assessment due to in March 2018.

## **20. ABSTRESS- IMPROVING THE RESISTANCE OF LEGUME CROPS TO COMINED ABIOTIC AND BIOTIC STRESS** ( With EU consortium partners and Funded with EU FP7 contribution)

An EU FP7 project with partners across Europe. It aimed to use different tools to study the effect of drought and *Fusarium* stress on the pea crop both at the genetic and field level. Breeding material with tolerance to both of these stresses was developed. Experimental conditions were established for the two stresses on plant material to enable the study of the plant metabolome. Experiments took place at PGRO in 2014 and 2015, but not in 2016. This involved evaluating varieties from member countries to assess *Fusarium* tolerance or resistance. There were three replica trials in Spain, England and the Czech Republic with comparison of the data across Europe. PGRO has been undertaking knowledge transfer at Roadshows, Cereals and open days. The project concluded in 2016 <https://secure.fera.defra.gov.uk/abstress/>

## **21. LEGATO – LEGUMES FOR THE AGRICULTURE OF TOMORROW** (With EU consortium partners and Funded with EU FP7 contribution).

The project was conceived to promote the culture of grain legumes in Europe by identifying priority issues currently limiting grain legume cultivation and devising solutions in term of novel varietal development, culture practices, and food uses. LEGATO is developing tools and resources to enable state of the art breeding methodology and to exploit fully the breadth of genetic resources available. The project is for 4 years concluding in December 2017 and a final international conference. It is divided into 8 work packages. PGRO is leading Work package 6 “Stakeholder interface for targets orientation and practical evaluation”, which will evaluate the potential impact of the new breeding material and cropping systems that are developed. One task in WP6 will embrace a stakeholder forum of plant breeders that identify priorities for trait selection and evaluate new data and material emerging from the project. A second major task will be trials by a Europe-wide network of plant breeders, both public and commercial, of genetic material and crop management regimes, and of marker-assisted selection protocols, all arising from the project.

The overall aim of LEGATO is to contribute to the increased sustainable reintroduction of grain legumes in European cropping systems. Working on the major European grain legumes, pea, Faba bean, and with specific objectives on white lupin and grass pea, the project will focus on the identification and testing of novel legume breeding lines possessing valuable characters such as disease and pest resistance and quality for human consumption. <http://www.legato-fp7.eu/>

## **22. YIELD ENHANCEMENT NETWORK PEAS**

2016 was a pilot year managed by ADAS and assisted by PGRO. Pea fields were monitored throughout the season, including crop growth stages, images, root samples, grab samples for yield and quality samples. There was a preliminary meeting on 11 Nov followed by another on 6 December to discuss outcomes.

## **23. WEEVIL CONTROL OF SLOT FIELD BEANS**

A number of active ingredients were evaluated for control of pea and bean weevil in field beans in 2016. There were some confidential treatments within the trial and also included were Karate Zeon (lambda-cyhalothrin), Biscaya (thiacloprid) and Decis Forte (deltamethrin). All insecticides reduced notching compared to the untreated plots. There were no significant differences in yield between any of the treatments and the untreated plots.

#### **24. VINING PEA DOWNY MILDEW SCREENING**

Screening of new and existing foliar active ingredients for downy mildew control in peas continued in 2016. Products tested were Previcur Energy (fosetyl-aluminium + propamocarb hydrochloride), Infinito (fluopicolide + propamocarb hydrochloride), one confidential treatment, one foliar feed, SL567A (metalaxyl-M) and Amistar (azoxystrobin). None of the treatments reduced foliar or pod infection.

#### **25. SEED TREATMENTS – PHOSPHITE ON PEAS**

The following seed treatments were included in trials in peas: Kick-Off P; Kick-Off ST; Multimax GPA; Take-Off ST; Radiate; Start-UP; Serenade; Pea rhizobial inoculant. There were no observed differences in vigour or disease levels in the peas but yield was improved by all treatments when compared to the untreated, although these were not statistically significant.

### **PROJECT SUBMISSIONS REQUESTING PARTIAL PUBLIC FUNDING**

Applications were submitted for collaborative funding:

- a. Innovate UK: Development of a diagnostic tool to assess risk levels of pea foot rot pathogens in soils
- b. Innovate UK: A decision support tool for legume growers utilising precision agriculture technologies
- c. BBSRC: Smarter rotations supporting nutriEnt Cycling for sUustainable and REsilient food (SECURE food)

The three projects above were submitted but failed to receive funding despite receiving very strong support and feedback.

The Pulse Panel agreed that project a (Development of a diagnostic tool to assess risk levels of pea foot rot pathogens in soils) should be funded by PGRO.

- d. BBSRC: Genetic improvement in peas
- e. EIP-Agri funded by the RPA with Birds Eye and the Green Pea Company – Cover crops to improve soil health in vining peas
- f. BBSRC: British soya production to increase the resilience of the UK's food system (BRITSOYA)
- g. Horizon 2020: Fostering sustainable legume-based farming systems and agri-feed and food chains in the EU (LEGVALUE)
- h. Horizon 2020: Transition paths to sustainable legume based systems in Europe (TRUE)

- i. Horizon 2020: Transitioning to legume-based farming and food systems
- j. Horizon 2020: Chinese-European Legume Improvement Alliance (C-ELIA)
- k. Innovate UK: Faba bean: a profitable source of ingredients for the enhancement of bread bakery mixes

PhD's proposed:

Subject to the availability of funds the PGRO's sponsorship of PhD's forms part of the organisations strategy for the furtherance of critical research, allowing direct focus on key issues for UK producers in line with the identified research priorities.

1. Understanding and mitigation of yield decline in pea – Warwick University (BBSRC iCase)
2. Management of *Ditylenchus* spp. in field beans (*Vicia faba* L) using biofumigant *Brassica* spp. and other allelopathic cover crops (Harper Adams University)
3. Genetic variation of the bacterial cytoskeletal network for polar growth and its role in the *Rhizobium*-legume symbiosis (University of East Anglia)

The first two of these are set to start in 2017.

The third did not receive essential support from the BBSRC for the UEA and was shelved.

Applications were submitted to AHDB for funding of investigations into:

- a. Survey of UK pea crops for the presence of viral pathogens
- b. Research Partnership for 'Management of Rotations, Soil Structure and Water'

**PGRO LABORATORY SERVICES**

Significant increases in the use of Laboratory diagnostic services were seen in 2016. The plant clinic received 115 plant samples which required laboratory work for identification or diagnostic purposes as part of the PGRO advisory service and increase of 36 on the year. Pea moth spray date predictions were made available through an online web service. Seed and soil testing continued as a fee paid service, maintaining the number of samples of seed for testing from overseas producers. 1960 seed samples were tested in the period July 2015 – June 2016. This was 292 samples up on the previous comparison period reflecting the continued importance put on testing farm saved seed in the domestic market and the value of the independent expert service offered to overseas customers. 132 soil samples were received for root rot analysis, an increase of 53. PGRO continued to operate the tenderometer standardisation service with 50 comparison tests during the season.

New services were introduced during 2016. Early in the year a new PCR molecular testing facility was installed and commissioned for use in project work and for the development of quantifiable diagnostic services for soil and plant tissue analysis. During the year a reliable quantifiable test for Club Root was perfected using an outline protocol developed in an AHDB funded project (CP099a) at Worcester University. **Clubroot** is a common disease with serious economic consequences for growers of plants belonging to the family Brassicaceae (Cruciferae) including Oilseed Rape. It is caused by *Plasmodiophora brassicae* a soil borne fungal pathogen. The rapid PCR test permits the quantification of pathogen levels in soil samples allowing growers to make a judgement about the risk of infection. 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 2016 was £317k compared to £341k the previous year. During 2016 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 7<sup>th</sup> 2016

Secretary – R.G.VICKERS \$

1.	P.E. BARRETT	Askew & Barrett (Pulses) Ltd.
2.	P.J. RIX	Dunns (Long Sutton) Ltd.
3.	A.G. BURY	Frontier Agriculture Ltd.
4.	C. STOWE	Princes Ltd.
5.	S.W. BUMSTEAD\$	Ouse Bank Farm, Great Barford
6.	S.J. FRANCIS \$	The Old Farmhouse, Church End, Old Leake, Boston
7.	J .FENTON \$ (Vice Chairman)	Springwell House, Elmswell, Driffield, E.Yorkshire
8.	M. HAYWARD\$	Swaythorpe Growers Ltd.
9.	M.R. LEGGOTT \$	The Limes, Holland Fen, Chapel Hill, Lincoln
10.	R.T. THOMAS	Whatoff Lodge, Quorn, Loughborough
11.	S.P. MARX\$	1, The Courtyard, Stamford, Lincs
12.	J.A. YOUNG	Birds Eye Ltd.
13.	PROF M. GOODING	IBERS
14.	P.J. SMITH	Wherry & Sons Ltd.
15.	W.A. van der HAVE \$ (Chairman)	Limagrain UK Ltd.

\$ denotes attendant at PGRO Management and Finance Committee.

#### Board composition following the AGM of June 7<sup>th</sup> 2016

At the AGM in June Bram van der Have was succeeded as Chairman by his Vice John Fenton and Steve Bumstead was unanimously voted to the position of Vice Chairman.

There were five Board resignations and five new appointments:

#### Resignations:

P.E. Barratt:  
P.J. Rix  
M.R. Leggott  
R.T.Thomas  
J.A.Young

#### New Appointments:

D.Sedgley      Grower  
C.Renner        Grower  
A.Dawson       Birds Eye  
C.Collings      Harlow Agricultural Merchants  
F.Smith         Dunns (Long Sutton)

## **Appendix 2**

### **INDUSTRY PANELS**

#### **PROCESSING LEGUMES INDUSTRY PANEL**

S. Ashton	Greenyard Frozen UK Ltd
W. Bradley	Green Pea Company Ltd
C. Brewster	Horticultural Development Council
M. Brown	A.P. (East Anglia) Ltd
R. Corfield	Aylsham Growers
M. Lilley	Princes Ltd
S. Dawson	National Farmers Union
R. Fitzpatrick	Holbeach Marsh Cooperative
S. Francis	Fen Peas Ltd
I. Grant	Bishop Farm Partners
J. Grant	J.W. Grant & Co
M. Hayward	Swaythorpe Growers Ltd
M. Heading	A. & E.G. Heading Ltd
R. Hirst	Anglian Pea Growers Ltd
E. Jadin	Ardo
P. Langley	Sandfields Farms Ltd
A. Leatham	Scottish Borders Produce Ltd
A. Lee	A.L. Lee & Sons
M. Leggott	West Fen Peas Ltd
A. Lenson	Wootton Marsh Farms Ltd
T. Mudge	BGA Ltd
N. Murray	W.P. Bruce
R. Pinder	Raymond Caudwell Produce
K. Taylor	K.H. Taylor Ltd
J. Thompson	Beeswax Farming (Rainbow) Ltd
I. Watson	Stemgold Peas
A. Whiting	Birds Eye Ltd

#### **PULSE PANEL**

David Robinson	(Chairman) Frontier Agriculture Ltd
Roger Vickers	PGRO
Becky Ward	PGRO
TBC	DEFRA – Vacant position
Matt Lilley	Princes Limited
Stuart Cree	Ebbage Seeds
Rodney Fletcher	Grower - Belmont Farms
Martin Stuffsins	Grower – Park Farm, Thorney
James Wallace	IAR-Agri
Mark Wells	Grower - Leicestershire
David Whyte	United Oilseeds Marketing Ltd
Stephen Francis	Fen Peas Ltd
Andrew Lensen	Grower - Velcourt Farms Ltd.
Peter Smith	Agricultural Consultant
Paul Drinkwater	Grower – Abbots Ripton Estate
Stuart Jackson	Syngenta- representing the CPA



## **Appendix 3**

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

The Processing Legume Industry Panel - Research and Development Strategy for Vining Peas, Green Beans and Broad Beans is a working and evolving document, the version in use for the majority of 2016 is incorporated in the embedded document below and is entitled “ **Legume Panel (LP) - Vining Peas, Green Peas & Beans and Broad Beans Research and Knowledge Exchange - Industry Priorities (2015 - 2018)**”



Legume Industry  
Priorities\_2015-2018

The document is formulated by the Industry Panel with guidance from the PGRO, AHDB and BGA. Funding for projects come from the PGRO, AHDB and where and when available from competitive tenders to funding providers such as Innovate UK and the EU.

## **Appendix 5**

### **CHAIRMANS REPORT**

#### **YEAR ENDING 2016**

The past year has been one of considerable success for the PGRO seeing its profits for the year double that of the previous year, standing at £ 315 349. Though an element of caution is required in this figure as circa £ 89 000 was unrealised gains on Investments. The results of the past two years have enabled the organisation to consolidate its position financially and is in a far better shape to face the uncertainty surrounding the outcome of any future Brexit talks.

The year started with the introduction of EFA's and this has had a very positive impact on levels of pulse levy collected with the tonnage up by 152 000 tonnes on the previous year. Contrastingly the tonnage for vining peas was down 30 000 on the previous year. Forecasting the level of levy funding continues to be a vexed question, but I do feel the organisation is getting better at its forecasts. It is certainly not an exact science. With talk of the possibility of a restriction of the use of pesticides on EFA's emanating from Brussels, I fear that the area of pulses grown could be reduced considerably and the implications for the organisation could be enormous. The proposed levy increase of 2p per tonne will not take place in July of this year. Levy accounts for around 50% of the organisations income. I would urge all growers to lobby their MP's on this issue.

The PGRO's staff have to be congratulated on the outstanding results they have produced in the past year, exceeding their budgets in laboratory and evaluation work by circa £ 70 000. As an organisation we are extremely fortunate to employ such a dedicated team and I personally would like to thank them for the contribution they have made to the success of the organisation, particularly over the past year. Such achievements need to be recognised and I was extremely pleased that the M & F saw fit to reward all of the staff with a bonus this year.

Competition for Grant funded projects, another important source of income to the organisation, seems to intensify year on year as cuts to government funding bite harder. Whilst there were disappointments with some of the submissions, the picture going forward is far more positive than previously budgeted for at the start of 2017.

The charitable status of the organisation requires it to provide a degree of educational sponsorship and I am pleased to report that three PhD students are currently being sponsored, with a further one to be added next year.

The strength of the organisations balance sheet has required the organisation to re- evaluate its investment policy and seek a more diverse portfolio. With this in mind consideration has been given to the purchase of land suitable for trialling purposes. Whilst this has been on a wish list in the past, I believe it is right that the organisation should actively pursue a policy of land acquisition.

I would like to take this opportunity to congratulate Roger and his team on a truly fantastic set of financial result. One which I hope will consolidate the organisations position in the industry and in becoming 'the partner of choice' in the future. May I also take this opportunity to thank all those board members who have given so generously of their time to the organisation over the past year.

**John Fenton**

**13<sup>th</sup> 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 (Chichester) Ltd.
13. Henry Bell & Co. (Grantham) Ltd.
14. Andrew Bird (Seeds & Services)
15. Bodle Bros. Ltd.
16. Camgrain Stores Ltd.
17. Campbell & Penty Ltd.
18. Cefetra Ltd.
19. Cherwell Valley Silos Ltd.
20. Chilton Grain Ltd.
21. W.A. Church (Bures) Ltd.
22. Cofco International UK Ltd.
23. Cotswold Agricultural Merchants
24. A.L. Cox & Sons Ltd.
25. Criddle & Co. Ltd.
26. Crop Marketing (Groups) Ltd.
27. Dalmark Grain Ltd.
28. J.E. & V.M. Dalton Ltd
29. G. O. Davies (Westbury) Ltd.
30. Dengie Crops Ltd.
31. Dodson & Horrell Ltd.
32. Dunns (Long Sutton) Ltd.
33. John Ebbage Seeds Ltd.
34. Ellingham Grain Ltd.
35. Elsoms Seeds Ltd.
36. Fengrain Ltd.
37. Fengrain (Services) Ltd.
38. John Foad & Co.
39. FramFarmers Ltd.
40. Frontier Agriculture Ltd.
41. GFP (Agriculture) Ltd.
42. Glasson Grain Ltd.
43. Gleadall Agriculture Ltd.
44. Glencore Grain UK Ltd.
45. Peter Glossop Seeds
46. GrainCo Ltd
47. Grainlink Ltd.
48. Harlow Agricultural Merchants
49. Henson & Jackson Retail Ltd.
50. Hubbards Seeds

51. J.S. Hubbuck Ltd.
52. l'Anson Bros. Ltd.
53. Inglis & Son
54. Charles Jackson & Co. Ltd.
55. Robert Kerr Agriculture Ltd.
56. Mark Lawrence Grain
57. Limagrain UK Ltd.
58. W.N. Lindsay Ltd.
59. Maviga Europe Ltd.
60. James Mortimer Ltd.
61. Openfield Agriculture Ltd.
62. Organic Arable Marketing Co. Ltd.
63. Peters Commodities Ltd.
64. Premium Crops Ltd.
65. Saxon Agriculture Ltd.
66. Scotgrain Agriculture Ltd.
67. Senova Ltd.
68. Simpson Malt Ltd.
69. Soya UK Ltd.
70. David Trethewey Seeds
71. United Oilseeds Marketing Ltd.
72. R.W. Warnock Ltd.
73. Westland Horticulture Ltd.
74. Weston Mill Farming Co.
75. Wherry & Sons Ltd.
76. G. Williams & Co. (Grain) Ltd.
77. G. Williams & Co. (Seeds)
78. Witney Grain Ltd.
79. Charles Wright & Sons Ltd.

#### 2. VEGETABLE CROPS

1. Anglian Pea Growers Ltd.
2. Aylsham Growers Ltd.
3. Beeswax Farming (Rainbow) 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
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  
Adama Agricultural Solutions Ltd.  
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.  
British Society of Plant Breeders Ltd.  
Certis Europe  
Coles, K.S.  
Dodman Ltd.  
Doug Balderson Agriculture Ltd.  
Du Pont (UK) Ltd.  
Elsoms Seeds Ltd.  
Eurofins Agrosociences Ltd.  
Field Technique Ltd.  
Flamingo Produce Ltd.  
Freemantle, M.J.  
Frontier Agriculture Ltd.  
Harper Adams University College  
Headland Agrochemicals Ltd.  
H.L. Hutchinson Ltd.  
l'Anson Ltd.  
James Hutton Institute  
J.S. Frozen Foods Ltd.  
Limagrain UK Ltd.  
Lincoln, University of  
L.S. Plant Breeding Ltd.  
Monsanto UK Ltd.  
Norman & Spicer (Agrochemicals) Ltd.  
Nottingham, University of  
NuFarm Ltd.  
Pinguin Foods 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  
Trevan Cropcare Ltd.  
United Phosphorus Ltd.  
Verdesian Life Sciences Europe Ltd.  
Walford & North Shropshire College  
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  
Strube Espana SA, Spain  
Unigrow CVBA, Belgium  
Van Waveren-Saaten GmbH, Germany  
Vilmorin SA, France  
Charles R. Wynne Ltd., Eire

\* Joined during 2016

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