

Spring 2016

# The Pulse magazine

Official Journal of the PGRO







# PGRO – the UK's centre of

## TRAINING COURSES

Pulse Agronomy and other related courses are held regularly. Bespoke courses can be tailor-made. Contact us to discuss your specific requirements

### An example of a recent crop protection course

A one day course for specialists involved in crop protection. An update for agronomists, consultants, growers and crop managers. The course covers major pests, diseases, disorders and weed control strategies for combining and vining peas, winter and spring field beans.



## Contract Trials & Services

PGRO is accredited to GEP and GLP standards and carries out a large number of field trials annually. Our contract trials services and reports can be applied to all areas of crop evaluation:

- Variety trials
- Evaluation of new crop protection products and their development, in association with manufacturers
- Fertiliser & nutrients trials
- General agronomy
- New species evaluation
- The study of seed vigour, health and protection
- Crop husbandry requirements
- The control and commercial significance of pests, diseases and disorders
- Machinery evaluation
- Crop management and timing

Please contact us to discuss ways in which PGRO's contract services can meet your research requirements.



## Conferences, Meetings and Training Seminars

The PGRO Conference Centre is an ideal setting for conferences, meetings and training seminars. It is available for hire throughout the year and offers flexible seating arrangements for up to 100 delegates. There is ample parking at the site and space for an outside marquee. There is also wheelchair access. Full catering is available from buffet sandwiches to hot meals, salads and BBQs.

### Conference Centre

- Theatre style for up to 100 delegates
- Classroom style for up to 40 delegates
- Seats up to 20 people boardroom style
- Fixed Screen with overhead projector and audio equipment
- Free wi-fi connection
- Electronic voting system for up to 70 delegates

### Meeting Room

- Seats up to 12 people boardroom style
- Screen and projector available on request

## Seed Testing

The PGRO laboratory runs a seed testing facility offering a range of seed testing services for quality, vigour and seed health. Seed analysts carry out a range of tests for crop research and private seed testing contracts.

In particular, growers considering the option of farm-saved seed should seriously consider a full seed health check to ensure the seed they intend to use is suitable and the best choice for new crop.

- Germination and vigour testing
- Seed-borne diseases
- Fungal, Bacterial and Viral diseases
- Pests
- Stem and Bulb nematodes
- Seed count and moisture content
- Thousand seed weight evaluation
- Waste and stain evaluation





## Three cheers for the UN – who'd of thought they'd find it here?

**So the International Year of Pulses has arrived and by the time this edition reaches the reader it will be well under way.**



The declaration by the UN of its sponsorship of an interest each year is eagerly anticipated by those applying for it, seeing the very promotion of awareness of the named year ahead as good publicity for their cause, from which they hope to gain lasting momentum.

If there are growers and their immediate associates in the UK who do not know of the 2016 declaration, then I would not be surprised. Despite the best efforts of many in the industry, it is not possible to reach all of the people all of the time. It can only be hoped that with the regular information and press coverage of events, by the time the year is ending all of those in UK agriculture will have been alerted.

Of course, for those entwined in the industry's comings and goings on a daily basis there is a danger that familiarity breeds the proverbial contempt and that the continuous banging on becomes just humdrum noise.

It is important then that we should all try to remember the point and to understand what it actually means for UK growers and the UK industry.

Pulses include a vast range of legume grains - many of which we cannot currently and perhaps never will be able to produce effectively in the UK. Many of these, however, provide the world's population with extremely valuable, healthy, nutritious, affordable and delicious sources of protein and energy. With the focus on agricultural resilience, issues of sustainability, the environment, water resource pressures, energy consumption and reduction of inputs and costs in production pulses have a highly significant part to play. It is for these reasons that they are

being heralded as 'superfoods' and the food of the future.

The volumes are colossal. In India alone it seems the population consumes an estimated 66,000 tonnes of pulse every day and, whilst consumption in Europe is significantly smaller in comparison, pulse consumption in various forms is increasing in whole foods as food ingredients and snacks. In creating awareness of the benefits of pulses, the market as a whole is surely set to grow - and whilst we might not produce many of the world's pulses in the UK (though there is increasing interest in developing new cropping opportunities), the world market for those that we do produce is expanding and encouraging their consumption across the world can only be of benefit to the UK producer.

Bigger markets bring greater marketing opportunities and increased demand. Increased production opportunities bring rotational diversity and impel improved sustainability practices, strengthen enterprise resilience and long term profitability for UK growers, exporters and the UK economy.

Three cheers for the UN in recognising such an important basic crop and food group and for giving the industry that is behind it the opportunity to raise the awareness of the rest of the population.

Look out for International Year of Pulses events throughout the year both at home and abroad (see the special IYP feature on pages 8-9 of this issue.)

Let's hope for all of us that the impact is positive and endures.

**Roger Vickers**, Chief Executive



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See Pages 8-9  
for International  
Year of Pulses  
special feature.

## Cathy Knott

It is with heavy hearts that former colleagues learned of the passing of Cathy Knott at the end of November 2015. Cathy worked tirelessly at PGRO from 1974-2000 and is fondly remembered for her commitment, enthusiasm and significant contribution to weed research. Her passing will bring a note of sadness to many in an appreciative industry.



## DIARY DATES FOR 2016

Cereals 2016	Duxford, Cambridgeshire	15 & 16 June
Vining Pea Field Day	Nocton, near Lincoln	June
Pulse Crop Field Day	Stubton, near Newark	July

Please check the PGRO web site for dates and details of this year's Field Days [www.pgro.org](http://www.pgro.org)

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FRANEK SMITH

## Demand increases for beans with forecasts for planting likely to be the same for 2016.

Franek Smith, Vice President of BEPA (British Edible Pulse Association)



Since the return to work from Christmas, we have seen increased demand for beans

for both human consumption and feed. The human consumption market is mainly being supplied into Egypt, where other origins are currently not suitable due to quality (France) or are too expensive (Australia). The demand is mainly for containerised beans as the Egyptians continue to have a lack of hard currency (USD) – this means that the banks physically do not have enough of the correct currency to pay for the goods, hence small shipments of containers are easier to manage than large bulk vessels. Demand is likely to stay strong for short to medium term..

This increase in demand has also pushed the feed price up as they are somewhat linked. Supply and Demand forecasts state that although the area of beans sown significantly increased for 2015, there is demand for the entire crop, allowing a smooth transition into new crop with no significant stock levels to be overyeared.

Planting of beans are likely to start in coming weeks, with forecasts of the trade around a similar level - some thinking minus 10% - while others of an increase up to 15%. It is very difficult to accurately forecast plantings until the crop is actually in the ground, as there is a level of farm saving of seed that is much higher than for other spring crops.

Pea demand for large blues remains relatively static - the area increased last year significantly



"we have started to see manufacturers look at marrowfat peas as a snack product in the UK ... they are a much healthier option than other snacks - such as nuts - but with none of the allergenic properties."

due in part to the EFA/Green legislation and good yields on farm. As this crop is a relatively small market when compared to major UK crops, it has led to high stocks and lower prices. Some stock will carry to crop 2016 and like beans, plantings are estimated to be similar to 2015, so pricing is forecast to be consistent until the new crop is harvested and yield results are assessed.

Marrowfat peas are still considered a lucrative deal for farmers in comparison to other spring crop options. However, the seed is all sold for 2016 – so watch this space for 2017! Demand for marrowfats remains strong as it is for other pulses. Marrowfat peas are only grown in three countries in the world: Canada, New Zealand

and the UK. Customers are often asked to change origin when they have started using one, and the general consensus is that the UK's quality is the best. We have also started to see manufacturers look at marrowfat peas as a snack product in the UK. This is in its infancy, but is a potentially large market in the future as they are a much healthier option than other snacks - such as nuts - but with none of the allergenic properties.



See Pages 8-9  
for International Year of  
Pulses special feature.



STEVE BELCHER

## The *Optibean* Bean Agronomy Tool

One of the prime drivers of the PGRO is to help and support growers in their decision making for growing successful pulse crops and to optimise their economic output, writes Stephen Belcher.



A major output of the recently ended 4-year Optibean project was the development of a

spreadsheet based decision support agronomy tool. Becky Ward hinted at this in the last edition of the Pulse Magazine and the Bean Agronomy Tool was finally launched on the PGRO website ([www.pgro.org](http://www.pgro.org)) in January 2016.

The tool requires Windows Excel v7 or later and is compatible with Apple Mac systems and download instructions are available via the following link.

[www.pgro.org/index.php/agronomy-guides-publications/optibean-project](http://www.pgro.org/index.php/agronomy-guides-publications/optibean-project)

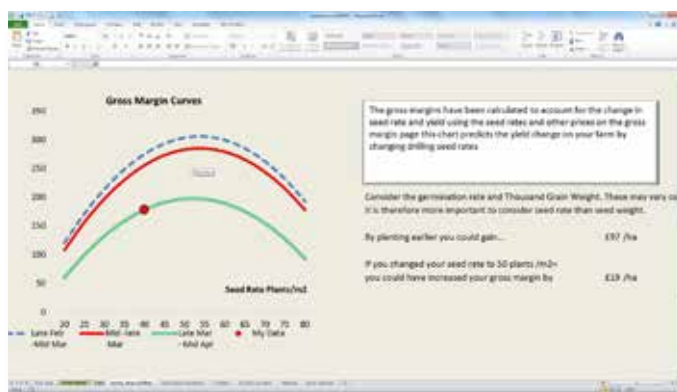
Prior to downloading we ask that people register an email address. It is via this address that we aim to keep users informed of future updates as the tool is developed further.

The Bean Agronomy tool uses data from the Optibean project, but allows growers to either use standard data or preferably data from their own farm to make cost benefit calculations for the comparison of on farm operations.

- Calculations for plant populations of Spring beans for either maximum yield, or economic optimum yield.
- Seed rate calculations
- Fertilizer recommendations
- Winter bean fungicide timing/yield loss/ cost benefit recommendations
- Bruchid Beetle distribution in the UK
- Weight loss in drying calculator

Updates to the tool will be forthcoming - and in the near future winter bean sowing date/plant populations will be added.

Refinements to the amounts of N available for the following crop could be made after the publication of a report from ADAS and PGRO, and the aim is to incorporate the findings of future projects to further enhance the scope of the tool over time.



Optibean - improving the availability of UK sourced protein feed through new faba bean varieties, production and utilisation systems - was funded by the industry partners: Wherry and Sons Ltd., NIAB TAG, PGRO, Aquascot, Moy Park, Lincs. Turkeys Ltd., Stonegate, Gressingham Foods, Dalehead Foods and Garfords and co-funded by the Sustainable Agri-Food Innovation Platform and Innovate UK, with support from IBERS.



# Jim Scrimshaw gives an update on the latest position for pulses and blackgrass control

We are well aware that chemistry which used to give effective blackgrass control is failing as resistant populations increase. We hear the terms stacking and sequencing of products when it comes to attempting to control blackgrass in cereals, but herbicides need to be used in conjunction with cultural techniques i.e. rotational ploughing, delayed drilling, increased seed rates, incorporating spring crops into the rotation etc. and there is no one solution that fits all. Each situation has to be very much considered on an individual basis.

Long term experiments would suggest that including spring cropping in the rotation offers the most reliable means of reducing blackgrass, and recent CAP reform encourages spring cropping. However, the level of control which can be achieved is very much dependent on the 'starting' point of the population. If significant numbers remain in the spring crop, there will more than likely be limitations in the effective chemistry available - meaning we have little impact overall. This is potentially an issue if contemplating spring peas or beans, and these crops are attracting increased interest because of the three crop rule within the CAP reform, and also because they also contribute to EFA (environmental focus area) requirements within the reform.

Early in their development neither peas nor beans are very competitive and are unlikely to suppress blackgrass emergence in the spring. We have pre-emergence products with some limited claimed activity on blackgrass and some

graminicides. However, none of the residual pre-emergence herbicide sprays 'stacked' together offer acceptable control even in combination with the presently approved graminicides - all of which are increasingly failing.

Work in 2015, however, has highlighted that when there is a potential for high numbers of blackgrass to emerge in the spring, in beans, there appear to be effective tactics we can consider.

Tri-alleate (Avadex) has been around for many years and is approved for use in many crops including peas and beans. It is effective at controlling wild oats but can contribute significantly to the control of blackgrass. It is a material which tends to perform best when lightly incorporated at drilling into moist soil. It is an added cost, and when there were products available which gave good chemical control, a material for which there was a more limited requirement. However, times have changed and demand for the product has increased significantly as growers incorporate it into their blackgrass control strategy.

Last season, PGRO carried out some collaborative work examining the contribution Avadex could make to controlling blackgrass when followed by various pre-emergence herbicides and mixes.

The population of blackgrass which emerged and developed on untreated plots was very high. (Figure 1). Initial counts indicated a population of over 160 pl/m<sup>2</sup>.



JIM SCRIMSHAW

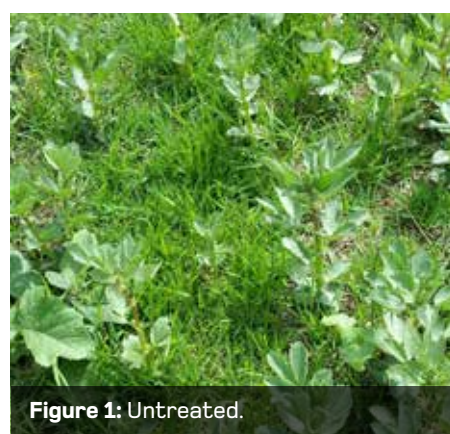


Figure 1: Untreated.



Figure 2: Nirvana no Avadex



Figure 3: Avadex fb Nirvana





**Figure 4:** Avadex fb Stomp + Defy.



**Figure 5:** Avadex fb Stomp Dual Gold

Early assessment showed that Avadex 15kg significantly reduced blackgrass numbers, and when followed by a pre-emergence herbicide application of Nirvana 4.5 l/ha, Stomp 2.0l/ha + Dual Gold 1.0 l/ha or Stomp 2.0 l/ha + Defy 4.0 l/ha, numbers were generally further reduced but not by a statistically significant amount. The early count indicated that none of the pre-emergence applications alone were effective. Later Stomp 2.0 l/ha + Dual Gold 1.0 l/ha seemed to significantly reduce the amount of blackgrass ground cover to a comparable level to that seen with Avadex. Later, however, there was little evidence this suppression was offering an advantage.

Figures 1-5 are examples of blackgrass control which could be achieved from the various treatments. There was some variation between replications with the Stomp + Dual Gold and Stomp + Defy following Avadex but generally both improved control compared to Avadex used alone at 15kg/ha. Nirvana following Avadex, however, offered the best level of control in this work - significantly better than 15kg of Avadex used alone and better than Avadex followed by Stomp 2.0 l/ha + Defy 4.0 l/ha or Stomp 2.0 l/ha + Dual Gold 1.0 l/ha. It must be noted, however, this one was only one year's work and conditions at the site after drilling and Avadex incorporation were dry - not the best conditions for Avadex. Had there been more moisture available results may have been more impressive from all. It does

though offer useful pointers.

Within this work we also had examined the usefulness of Laser (cycloxydim) and Aramo (tepraloxym) comparing their effectiveness against Centurion Max (clethodim). There have been increasing reports of Laser and Aramo delivering poor blackgrass control. Centurion Max, although occasionally causing crop effects in oilseed rape, has generally been much more effective. Our graminicide applications indicated similar findings (see figures 6-7).

There have been reports of less than satisfactory control with Centurion Max too, so there may well be some resistance out there already. Relying on blackgrass control using Centurion Max alone would be ill-advised. As part of a program where any remaining blackgrass has been sensitised by previous herbicide applications, control will be enhanced and effective product life hopefully prolonged.

Unfortunately, there are a couple of problems with the potential program outlined. Although there should be enough Avadex with old MAPP number for the 2016 product, re-registration has meant a new MAPP number has been issued and label approvals have been much reduced. There will be no use in peas and beans permitted under the new MAPP number. Efforts are being made to address this. Also, at the moment, Centurion Max has no approval for use in peas or beans either. We are however hopeful that EAMU's or on-label approvals will be forthcoming.



**Figure 6:** Increased chlorosis on Aramo (top) treated strips compared to untreated but little control.



**Figure 7:** Strip (foreground) sprayed with Centurion Max compared to Laser.



# UN INTERNATIONAL YEAR OF PULSES 2016

Chris Collings, President of BEPA, introduces our special feature on the UN International Year of Pulses in 2016. This was declared in December 2013 by the United Nations – such declarations are only occasionally edible crops with 2008 being potatoes and 2013 quinoa.



CHRIS COLLINGS



**The International Year of Pulses aims to heighten public awareness of the nutritional benefits of pulses as part of a sustainable food production aimed towards food security and nutrition. The year creates the unique opportunity to encourage connections throughout the food chain that would better utilise pulse based proteins, further global production and address the challenge in the trade of pulses.**



The word Pulses is limited to crops harvested for dry grain, so on a global scale this includes beans, peas, lentils and chickpeas. While the UK does not produce the latter two, we are a significant player in the human consumption bean market and produce some of the most superior human consumption peas in the world.

Pulses are a vital source of plant base proteins and amino acids for people around the globe. Their consumption can help address obesity, as well as help with managing diabetes and coronary conditions, along with help in preventing cancer. Studies of the world's longest living people - in the so called 'blue zones' - find that beans are the one specific food they all eat in common.

The UK pulse industry is doing all it can to support IYP 2016. Members of BEPA (British Edible Pulse Association) have contributed towards a fighting fund to help promote, educate and raise awareness in the UK of pulses during the course of the year.



For example, on the 1st May in Borough Market, London there is the London Falafel festival, a competition cook off between different chefs to produce the best Falafel, as judged by the crowd.

We will be attending a number of food and farming school day events across the country in the course of the year to engage with, and educate, some 15,000 children about pulses, how they are grown, and the ways in which they can be consumed.

Sponsorship of community art based projects, aimed at engaging with school children through art will also take place, while BEPA will have a strong presence at Cereals this year, demonstrating the new and emerging snack food market with pulses.

On the 6th January 'The Pulse Epiphany', the UK launch event in The Gate restaurant in London was one of 141 such events that took place as part of a rolling round-the-world launch of IYP 2016, with some 21 million people connected by social media.



While public perception will take time to change, raising awareness of pulses - the future of food by highlighting the healthy, nutritious, affordable and sustainable benefits remain at the centre of the UK IYP activities.

Pulse consumption in the future will also consist of demand for the fractions of pulses, protein, starch and fibre, along with the flours. This will happen as food manufacturers aim to create products to meet consumer demands for taste, nutrition and sustainability.

Since 1980 global pulse production has nearly doubled to 70 million tonnes. By 2050, with adequate investment and raising of consumer awareness, production and consumption could double again, providing an important source of healthy and sustainable protein for the world's population.

The International Year of Pulses is truly an opportunity for the world to recognise pulses for their important contribution to global nutrition today and into the future.

Check PGRO and BEPA web sites for full details and other dates!  
[www.pgro.org](http://www.pgro.org)  
[www.bepa.org](http://www.bepa.org)



## The Bean Project

To celebrate United Nations 2016 Year of Pulses Victoria Brown, an Artist based in Derbyshire, will be running an arts project titled 'Bean'. During the project she will be observing a bean crop closely from seed to harvest. Victoria will create a new series of paintings titled 'The Bean Scrolls' celebrating the land, plant growth and the production of nutritious food to feed an ever growing world population.

Thanks to sponsorship from PGRO and BEPA, Victoria will be working with children and teachers delivering 'Bean' Art Workshops at two Schools and a Nursery in and around the city of Derby. The project will give the children and staff opportunities to experience the wonders of planting and growing beans, responding creatively.

Victoria will share her creative processes

encouraging the children to draw, paint, sculpt, photograph their close observations and experiences of beans during the project.

An exhibition of the Bean project art work will then be exhibited at RHS Tatton Park 20th to 24th July 2016. Alongside the exhibition, the public will be able to see Victoria painting the bean scrolls and have opportunity to create their own bean art.

Please follow the Bean project on Twitter @victoriasart  
 facebook VictoriaBrownartist  
[www.victoriabrownartist.com](http://www.victoriabrownartist.com)



Victoria Brown

## INTERNATIONAL YEAR OF PULSES EVENTS

The series of events that will take place during the year will promote the message of what pulses are, what they look like, why they are healthy, good environmentally, how they are grown, what they produce - ending with what food products/snacks they produce and giving the opportunity to experience what they taste like.

<b>London Falafel Festival</b>	Borough Market, Borough High Street, London SE1 9AH	1 May
An afternoon of falafel competition between Egyptian, Israeli, Lebanese and English street food vendors to see who the best falafel maker in London is! The attraction will be promoted by food critic and social media star Daniel Young of YoungandFoodish.com. It will be an exciting event in the Borough Market of London, and a one-of-a-kind outdoor food celebration for IYP.		
<b>Suffolk Schools Farm and Country Fair</b>	Suffolk Showground, Ipswich	21 April
<b>Open Farm Sunday Event</b>	MHS Farms Ltd, Thorney, Peterborough	5 June
<b>Essex Schools Food &amp; Farming Day</b>	Writtle College, near Chelmsford	8 June
<b>Cereals 2016</b>	Duxford, Cambridgeshire	15 & 16 June
Join over 25,000 farmers, agronomists and industry professionals at the prime technical event for the arable industry where PGRO and BEPA will be presenting the pulse story on their joint stand 1108.		
<b>Food and Farming Day</b>	East of England Showground	1 July
The Kids County Food and Farming Day aims to teach children where food comes from, and the importance of agriculture and the countryside, through interactive learning experiences. 6,000 children and their teachers are expected to attend.		



BECKY WARD

PRINCIPAL TECHNICAL OFFICER

## Bruchid beetle update

The last ten years have seen bruchid damage levels in field beans fluctuate in the UK from very high levels in 2006 and 2007, to somewhat lower levels in 2013 to 2015 (Figure 1). These fluctuations are largely attributable to changes in recommendations for control of the pest, combined with differences in peak temperatures during the critical period of first pod-set and early pod-fill stages of crop growth.



Fig. 1

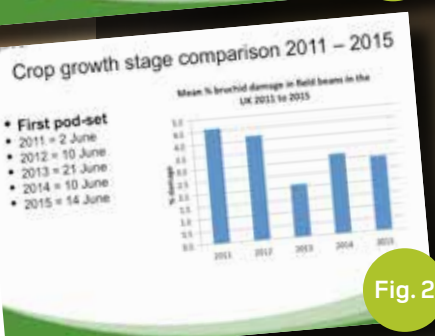


Fig. 2

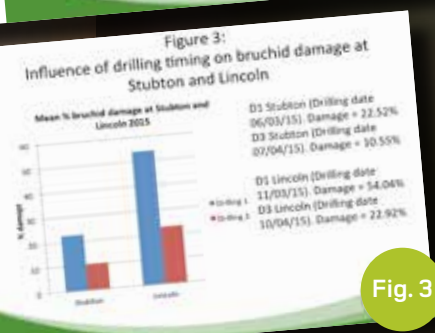


Fig. 3

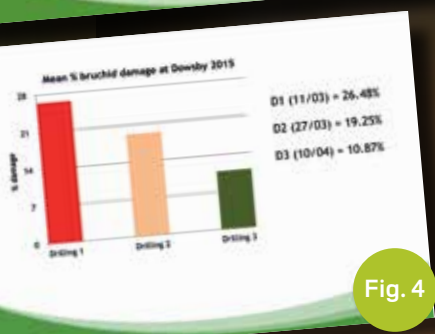


Fig. 4



Bruchid damage

Following the difficult years of 2006–2007 PGRO worked with a number of partners in a DEFRA funded project<sup>1</sup>, to develop a new approach to control. A prototype trap was developed to monitor field presence, spray technology was investigated to improve crop penetration of insecticides using angled nozzles, distribution of the pest was mapped, and a study was undertaken to determine whether there was any varietal tolerance to bruchids. This was followed by a series of trials co-funded by Innovate UK and industry<sup>2</sup> to develop a forecasting system combining the prototype trap developed in the previous project with an email alert for growers that predicts optimum spray timing (BruchidCast®). The recommendation for spray applications starting at first pod growth stage, when maximum daily temperatures had reached 20°C for two consecutive days was confirmed, and has helped to lower and stabilise UK levels of bruchid damage. A network of traps has been established across the UK to monitor activity of the pest, so please contact PGRO if you are interested in hosting a site in 2016.

Following this work, there were some preliminary indications that large differences in the timing of first pod-set in the period between 2011 and 2015 were leading to significant differences in overall levels of damage across the UK (Figure 2). PGRO subsequently used trials

established at different planting dates<sup>3</sup> to study the effects of pod-set timing on levels of bruchid damage.

Three sites were established at Stubton, Lincoln and Dowsby in Lincolnshire and samples were taken at harvest and assessed for bruchid damage.



At Stubton and Lincoln, the early spring beans were drilled in the first and second weeks of March 2015, and the late spring beans drilled in the first and second weeks of April. The results from these sites showed that delaying drilling by one month led to a delay in first pod set of about two weeks, from the middle of June to the end of June. As a consequence, levels of bruchid damage were halved when compared to the early-sown beans at both sites (Figure 3). At Dowsby a third sowing was sampled and results are shown in figure 4. Again there were significant differences in damage levels for each drilling, with the first drilling sustaining 26.48% damage, the second drilling 19.25% damage and the third drilling 10.87%.

While it can be a higher risk strategy to delay drilling of spring beans into April, particularly if sowing is followed by

an extended dry period, the evidence strongly shows that in some regions this could be a helpful strategy to bring down bruchid damage levels. The data generated here will be incorporated into the newly developed OPTI-Bean tool at the next update, in order to calculate the impact that this will have on spring bean gross margins. As always in farming, many factors need to be balanced against each other to predict the benefits of different strategies on financial outputs. In this case, we need to balance the yield benefits of earlier spring bean sowing against the impact this has on premium losses caused by bruchid damage.

<sup>1</sup>DEFRA-Link: Integrated Control of Bean Seed Beetle. Project partners were PGRO, Rothamsted Research, Bayer Crop Science, Syngenta Crop Protection, Wherry and Sons Ltd., Oecos, Nickerson-Advanta, CPB-Twyford, Velcourt Ltd., Raynham farms Ltd., Frontier Agriculture.

<sup>2</sup>Innovate UK: A novel Monitoring and Forecasting System for the Integrated Management of Bean Seed Beetle *Bruchus rufimanus*. Project partners were PGRO, Rothamsted Research, Frontier Agriculture, Syngenta Crop Protection, Oecos.

<sup>3</sup>Innovate UK: Improving the Availability of UK sourced Protein Feed through New Faba Bean Varieties, Production and Utilisation Systems (OPTI-Bean). Project partners were Wherry and Sons, PGRO, NIAB TAG, Garford, North Energy, The Waitrose Producer Group and Aberystwyth University.



bean spraying with angled nozzles



Monitoring trap

# TENDER

adj. \'ten-der\' \'having a soft or yielding texture\'

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# Protyield – a collaborative project to investigate the relationship between protein content and yield in UK pulses



MARK WHITE

UK animal feeds are reliant upon soya imports, much of which is produced in South America. As global demand increases, large areas of primary rainforest and grassland are cleared to make way for soya plantations. Soya is an important ingredient in livestock feeds due to its lower price and ability to satisfy the dietary requirements of animals.

The EU is only 3% self-sufficient in high protein commodities, 30% self-sufficient in protein usage overall and is a high user of N fertiliser. Pulses currently occupy only 5% of UK arable land. Increasing the economic competitiveness of UK pulse crops will increase the proportion of UK arable land on which they are grown, or their frequency in rotation, reducing our dependence on imported protein and N fertilizer use.

If a more reliable supply could be guaranteed, animal producers would be more confident in changing to pea and faba bean protein sources and nutritionists could develop their knowledge base in order to increase levels included in feed. Legume growers need confidence that a market will be available at a price that generates profit, and that production systems are efficient, sustainable, and will result in a quality product meeting customer demands.

The Protyield project (or 'Protein content vs. yield in legumes: releasing the constraint', IUK: 101079) aimed to:

- Identify new varieties of peas that have improved feed qualities.
- Conduct animal feed trials (pig & poultry) to assess whether a diet with higher pea inclusion has any positive or negative effects upon the animals.

- Review and evaluate methods of protein measurement.

- Translate the same methods to faba bean.

The project has exploited a fast neutron population of 4000 peas and found seven new variants with major seed proteins removed, some of which are digestion inhibiting. The new lines have been bred with each other and a number of double, triple and quadruple combinations have been produced. It is hoped that other nutritionally beneficial amino acids will be expressed to a greater degree in response to the deletions and that in time a 'super' feed pea with a superior nutritional protein content will make it a more viable option for home grown pulses to be used in feed rations. Throughout this element of the project The John Innes Centre and IDna Genetics, a company based at JIC Norwich, have been working to help map the genes of the new pea lines.

William Thompson (York) Ltd, animal feed compounders, conducted two pig feed trials which took place at Bishop Burton College. The trial compared two different pea diets alongside a control diet when fed to finishing pigs. Daily live weight gain, feed intake and

feed conversion ratios were similar across all treatments. All pigs performed better than the industry average. One trial diet, whilst maintaining the same nutritional specification as the control diet, managed to reduce the soya inclusion by 56%.

A broiler growth experiment was undertaken by IBERS, Aberystwyth University. Three different pea-based feeds were tested in starter, grower and finisher broiler diets. The grower diets used a pea inclusion rate that almost completely replaced soya and in the finisher diets 89% peas were included which replaced soya completely. The birds grew well on all diets and were healthy at the end of the experiment. Although the birds on the control diet ended up slightly heavier than those fed on the pea-based diets, the feed conversion ratios were similar and within acceptable industry expectations. All of the birds fed on the pea diets gained an attractive yellow hue to their skin compared to the control diet.

Fera measured the variability in total seed protein content for a range of peas and also set out to determine the amino acid profiles -



4000 Pea plants – inset 4000 Pea Seedlings





Broiler chicks

important for the dietary requirements of the animals - of pea lines differing in protein content and yield properties. The technique adopted by much of the industry - benchtop NIR (Near Infrared Spectroscopy) - was evaluated alongside handheld NIR and a wet chemistry method which calculated total protein through the quantification of amino acids. Data acquired throughout the project showed no significant differences between the total protein values determined by either method (NIR and wet chemistry). Measured by either method, the protein concentrations of six of the seven new pea lines were between 23-27% (current recommended varieties = c.22-26%), however, one was measured at approximately 30% protein.

These early results show promise for the expansion of home grown pulses for use in UK and EU animal feeds. The current economic climate and changes to the environmental focus area rules, which encourage pulse production, mean the project's outcomes could have greater impact. Continued work following the project end will be undertaken by the project lead Wherry & Sons, along with other partners.













Wherry & Sons, IDna Genetics Ltd, William Thompson (York) Ltd, Marks & Spencer and PGRO working with The John Innes Centre (JIC), Fera Science Limited and Aberystwyth University; and co-funded by Innovate UK, the UK's Innovation Agency in partnership with the Biotechnology and Biological Sciences Research Council (BBSRC) and Defra.

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BEN LANG

## Peas: Many different crops

Ben Lang, Principal Research Associate, Rural Business Unit,  
University of Cambridge

**INTRODUCTION** - The pea and bean harvest marks the end of the working year for many farms, but for Farm Business Survey researchers at the Rural Business Research, this is only the start of their work to analyse the financial and physical performance of farm businesses across the country. We publish detailed, independent and accurate analysis of both farm businesses and individual crop performance. In this article, we take a look at the 2014 harvest.

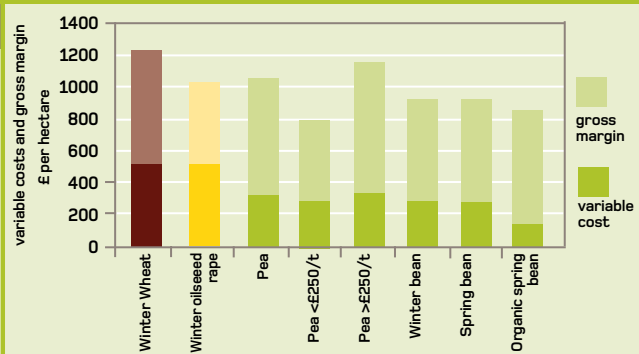
### STRONG PERFORMANCE OF THE PEA

**CROP IN 2014** - In three of the last six years, the average gross margin of the pea crop exceeded the oilseed rape gross margin, and in two of those years it also exceeded the winter wheat gross margin. In the context of greatly reduced prices for oilseeds, the five year average pea gross margin was

87 per cent of the winter wheat gross margin. The chart shows the close competition between combinable crop gross margins in 2014.

At £704 per hectare, the 2014 pea gross margin exceeded the five year average and was £6 higher than the winter wheat gross margin. Yields were eight per cent down on the five year average, at 3.3 tonne per hectare, possibly due to difficult growing conditions resulting from the prevalence of foot rot, and the presence of aphids and thrips in crops from April. The average price achieved across all pea crops was £314 per tonne, however this average describes a wide range of different pea crops.

VARIABLE COSTS & GROSS MARGINS FOR SELECTED CROPS, 2014



With only limited requirement for fertiliser, pulse crops have avoided recent annual fertiliser price gains. Although crop protection costs increased by nine per cent, at £350 per hectare overall variable costs were similar to the previous year.

**PEAS: MANY DIFFERENT CROPS** - An important consideration when analysing the pea crop is that growers produce a range of crops for





different markets. Whilst we would like to explore the economics of all of these crops within the FBS, in reality this is not feasible due to constraints of time and cost. However, we can make a reasonable estimate of margins for both feed and premium pea crops on the basis of the price achieved for the crop. This exercise carries the risk that input costs for some crops grown for a premium market, but subsequently failing to meet the required quality standard, are included in the pea analysis having achieved a lower than expected price.

Of the 48 pea crops in the 2014 FBS sample we identified higher value and lower value crops; 20 sold their crop for less than £250 per tonne (averaging £224 per tonne) and 25 sold their crop for more than £250 per tonne (average £344 per tonne) implying that they achieved a premium for their crop. It is likely that premium priced blue peas and marrowfats were among the higher priced crops. The results are shown in the table.

The average scale of the high value pea production was larger at 44 hectares, in comparison with 14 hectares for the lower value crops. The high value crops were grown as expected with higher expenditure on seed and crop protection at £156 and £128 per hectare, reflecting seed quality and the market requirement

#### GROSS MARGIN FOR PEAS IN ENGLAND, 2014, ON THE BASIS OF SALE PRICE

		Peas < £250 per tonne	Peas £250 per tonne
Yield	t /ha	3.5	3.3
Price	£ /t	224	344
OUTPUT	£ /ha	783	1,120
Seed	£ /ha	128	156
Fertiliser	£ /ha	42	28
Crop protection	£ /ha	134	158
Other costs	£ /ha	15	17
TOTAL VARIABLE COSTS	£ /ha	322	361
GROSS MARGIN	£ /ha	477	772

for undamaged and unblemished peas. The lower value peas were grown at a cost of £128 and £134 respectively for seed and fertiliser.

More recently, as the prices of all commodities have fallen, the highest prices have been available to producers of top quality and volume.

**THE FUTURE** - Our 2015 analysis will include more detail about the performance of pulse crops, reflecting the increased number of farms growing nitrogen fixing crops to meet Basic Payment greening requirements. We are currently working on gross margin analysis of conventional peas harvested dry, vining peas, winter bean and spring bean crops, as well as organic spring bean crops.

## The Farm Business Survey

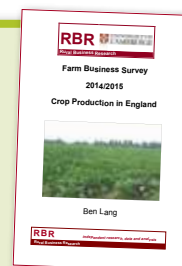
This article is based on information about pea and bean crops that can be found in Crop Production in England 2014 /2015

(Rural Business Unit at the University of Cambridge, 19 Silver Street, Cambridge CB3 9EP and 01223 337166 £20).

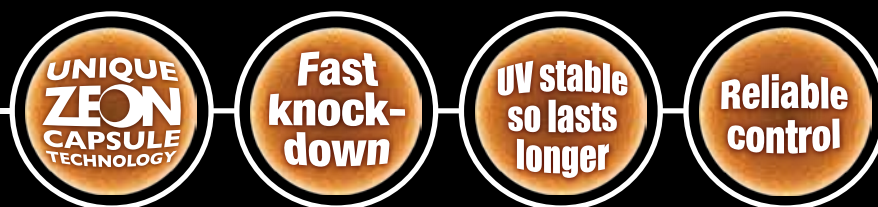
You can also find region reports, FBS farm business benchmarking, projection Calculator and databuilder at

[www.farmbusinesssurvey.co.uk](http://www.farmbusinesssurvey.co.uk)

The Farm Business Survey is a national survey of approaching 1,900 farms in England, including 199 pea and bean crops in 2014. It is carried out by the Rural Business Research (RBR) grouping of universities and colleges. The identity of participating businesses is confidential but the research is commissioned by Defra to ensure that policy decisions are made on the basis of good evidence. The results from the FBS are weighted to represent national production and can be compared directly with Defra's published survey findings.



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The Pulse Magazine is the official journal of the PGRO and is produced three times a year in Summer, Winter and Spring. It is widely circulated around the farming community and agricultural trade and reports on the PGRO's R&D work on pulse varieties, pests, diseases and crop protection - as well as general agronomy issues - and on pulse markets in the UK and around the world.

Growers of peas and beans qualify for membership of the PGRO by virtue of the small voluntary levy on produce sold through the merchant trade.

## Grower membership of the PGRO has the following benefits:

- ✓ Full access to the **PGRO** website ([www.pgro.org](http://www.pgro.org)) and to all the updates, technical information and associated services provided there.
- ✓ Access to the new **PGRO** online discussion forum where topical updates are aired and experiences of fellow pulse growers shared.
- ✓ The **PGRO** is accessible for two-way communication via social media on [twitter@pgroresearch](https://twitter.com/pgroresearch).
- ✓ Short and succinct **PGRO** Crop Updates emailed throughout the growing season highlight topical issues as and when appropriate.
- ✓ Pulse Market Updates are published and circulated on a monthly basis to registered members.
- ✓ Advice from the **PGRO** team is only a phone call away.



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