FAIR PLAY campaign – ten years on

Since the FAIR PLAY campaign on farm-saved seed (FSS) was launched by BSPB and the UK farming unions in 2005, the contribution of farm-saved seed payments to plant breeders’ income has more than doubled from around £4.5m in 2005 to £10.1m in 2014. Marking ten years of FAIR PLAY, Plant Breeding Matters reviews key developments in the campaign, and highlights some of the breeding advances safeguarded by the drive to reduce FSS evasion.

A joint initiative between BSPB and the major UK farming unions (NFU, NFUS and UFU), the FAIR PLAY campaign was established in 2005 to address concerns that evasion of farm-saved seed payments was draining vital income away from investment in UK-based plant breeding. The central objective of the FAIR PLAY campaign is to create a level playing-field in which all farmers contribute fairly for the benefits of using farm-saved seed, so safeguarding future investment in the development of improved varieties, adapted to the needs of UK farmers and their customers.

Over the past ten years, compliance levels have improved significantly. Farm-saved seed collections have more than doubled, and FSS payments now account for around a third of the total income available to support UK breeding programmes.

Communication has been at the heart of the FAIR PLAY campaign, focused on raising awareness of the benefits of continued investment in plant breeding, while also ensuring farmers are clear about their legal responsibilities on FSS use, declaration and payment. These messages have been delivered through a range of channels, including BSPB’s Plant Breeding Matters newsletter, web-based activity, direct mail and media communications, as well as the distribution of FAIR PLAY posters and explanatory leaflets at industry events and conferences.

BSPB has also taken steps to make the FSS declaration and payment process more straightforward for farmers, including simpler forms, more ways to declare (post, email, online, fax, phone), and removing the need for farmers to calculate their own farm-saved seed payments.

Continued overleaf
In addition, a number of practical measures have been taken to strengthen the farm-saved seed payment system, including additional staff resources, major investment in a new farmer database and better intelligence about seed and variety use allowing more targeted enforcement action. The system now covers many more farmers than before, which has vastly improved its ability to identify and tackle non-compliance.

The following list highlights just some of the breeding advances in combinable crops over the past ten years which the FAIR PLAY campaign has helped safeguard by tackling the gap in FSS payments:

- HOLL oilseed rape varieties now top-yielding
- Development of non-GN spring malting barleys
- Semi-dwarf oilseed rape
- First oilseed rape varieties with resistance to Turnip Yellows Virus
- Herbicide tolerant oilseed rape
- Quality wheat yields now matching feed varieties
- Dwarf husked and naked oats
- High oil naked oats
- Low vicine/covicine quality in spring beans
- Better standing ability in field peas
- Better colour retention in large blue and marrowfat peas
- Pale hilum winter bean yields now matching black hilum types

Welcoming the progress made through FAIR PLAY in protecting future breeding innovation, BSPB chairman Dr Richard Summers said:

“Over the past ten years, the FAIR PLAY campaign has promoted a collaborative, industry-wide approach to safeguarding investment in the new varieties farmers depend on for improved yields, quality and disease resistance, and to cope with future challenges such as climate change and the loss of key crop protection tools.

“BSPB would like to say a big thank you, not only to the farming unions for their support in delivering the FAIR PLAY campaign, but also to the many thousands of farmers who recognise the benefits of continued investment in improved varieties.

“Despite improvements in FSS compliance levels across virtually all crops, it’s important to emphasise the ongoing need for the FAIR PLAY campaign. There is still work to do to deliver 100% compliance, with communication and enforcement activity now more intelligence-led and targeted on specific crops, regions and farmer types,” added Dr Summers.

### Variety trials and evaluation

Data from independent variety trials provide a vital platform to drive progress in UK crop production, underpinning not only the statutory process of National Listing, but also the Recommended and Descriptive Lists on which most commercial cropping decisions are based. BSPB plays a key role in the organisation and delivery of UK variety trials, as BSPB’s Technical Manager Jeremy Widdowson explains.

Continued progress in plant breeding is essential to keep UK agriculture competitive, and the industry is keen to adopt new crop varieties with higher yields, improved quality, better disease resistance and agronomic traits. Access to high quality, reliable, independent trials data is therefore essential to help farmers and their advisors make informed variety choices to drive on-farm productivity, profitability and competitiveness.

Within the National List (NL) system, BSPB has a central role in delivering variety trials data, operating under official supervision by the national authorities. BSPB also works in partnership with the levy bodies providing Recommended and Descriptive Lists of varieties. This has helped strengthened the technical relevance of NL protocols and their compatibility with industry-based variety evaluation systems – it has also helped improve the overall efficiency of the trials system by removing duplication, cost and unnecessary red tape.

The NL trials process

Before a new variety can be marketed, it must undergo a statutory evaluation process. National List testing is rigorous and ensures that a variety can only be brought to market if it is deemed to be genuinely distinct from other varieties and represents a significant improvement over what is currently available in terms of yield, disease resistance, agronomy and end-use quality.

Meeting the requirements of National Listing involves testing that a variety is Distinct, Uniform and Stable (DUS), and that it offers Value for Cultivation and Use (VCU).

BSPB organises National List VCU trials for all crop species except potatoes. Trials are either conducted by BSPB members or carried out under contract by third party organisations such as NIAB and SRUC. All trials are grown to official protocols and subject to independent scrutiny by the national authorities.

Variety trials are grown in most cases
for a minimum of two years, across a range of geographical locations, with many different characters assessed to check in-field performance and end-use quality against benchmark varieties.

The evaluation process is demanding – in winter wheat, for example, more than 30 individual characters are assessed and only around 25% of varieties entered make it onto the NL.

In addition to VCU trials coordinated by BSPB, DUS testing is contracted directly by the national authorities to trials organisations such as NIAB, SASA and AFBI. For some crop species, DUS testing may be carried out in another EU Member State.

Recommended and Descriptive Lists
The data generated from National List trials also form a vital component of industry-led variety evaluation systems.

In cereals and oilseeds, for example, NL data supplied by BSPB provide the basis on which Recommended List candidates are selected, and account for around half the data requirements to determine which varieties ultimately gain Recommended status.

BSPB works in partnership with the levy bodies and other industry organisations through collaboration agreements to produce the annual Recommended and Descriptive Lists of varieties: with HGCA, nabim and MAGB for cereals and oilseeds; with BBRO for sugar beet; and with AHDB and HCC for herbage. It also produces Descriptive Lists of independent comparative trials data for forage maize and turf grasses.

Since National Listing is operated on a full cost-recovery system, funded by breeders, BSPB’s in-kind contribution to the HGCA Recommended List for Cereals and Oilseeds in preliminary data, personnel and expertise is valued at £2.15 million per year. This underlines the importance attached by UK plant breeders to the process of variety evaluation, and its role in ensuring farmers receive a guarantee of variety identity and performance and that their decisions are based on high quality, commercially and technically relevant data, tailored to their farming needs and the demands of their customers.

In 2014 BSPB organised tests and trials of 3,616 candidate varieties of 21 different crops at a total cost to the plant breeding industry of £7.7 million.

RL trial grower – sugar beet case study
The success of sugar beet breeding in the UK is built on reliable trials to tune genetic selections to our unique maritime environment. The ability to deliver consistent, replicable trials data is only possible with the support and collaboration of host growers. Their farming experience and local knowledge are essential elements that all breeders rely on, yet their contribution is often overlooked. Hosting trials can involve extra work and disruption to normal farming activities. It can also require patience for host growers dealing with plant breeders and trials contractors. So why do growers host trials?

Hugh and Moira Reeve farm sugar beet, cereals and oilseed rape in partnership with their son, Thomas, at Walsham Le Willows, Suffolk. They have been hosting trials for sugar beet breeder SESVANDERHAVE for almost 30 years.

“We started hosting sugar beet trials in 1986, when harvested beet was shipped to the continent in bags for analysis. Since then yields have advanced as has the ability to deliver greater accuracy in the trials, helped by the use of new technology such as GPS guided drills and harvesters. Like new varieties, we see these innovations first within the trials and then adopted across the wider commercial crop over time,” comments Hugh.

“As a commercial grower I have two objectives: to support the development of new varieties and also to understand how to get the best from them so I can increase my profits. Supporting trials helps achieve both objectives. Regular dialogue with the breeding team means we’re constantly up to date with new products, pests, diseases and techniques to optimise our production.”

“In addition to hosting breeding trials, we host one of the four BBRO/BSPB yield trials managed by SESVANDERHAVE.
We also benefit from access to the commercial control plots, which provides a useful field check on every seed lot supplied by British Sugar and helps us relate directly to our own commercial lots and treatment combinations,” explains Hugh.

The BSPB/BBRO Recommended and National List trials are carefully designed to provide a direct comparison between the 120 or so sugar beet varieties under test. The system seeks to eliminate as many variables as possible, for example:

- trials are gapped to ensure a consistent number of plants per plot – the aim is to judge the difference in genetic potential not the physical seed quality or seed treatment;
- indicator strips of a Rhizomania susceptible variety are sown to highlight if Rhizomania is present in the trial field. Soil samples from trial sites are also tested for BCN;
- seed treatment is standardised to poncho beta and seed is pelleted with the standard Germains “plus” pellet on their R&D line, as often early generation material may not be available at a commercial scale for processing;
- also, unlike the commercial crop, none of the trials seed is primed as this would introduce another variable on small trials lots.

SESVANDERHAVE’s Trials & Research Manager Richard Robinson emphasised the vital role of trial growers in supporting continued breeding advances:

“Hugh, Moira and Tom have become an extension of our R&D family. For us it means we have experts on the ground who know their fields, soils and local environment – there’s no substitute for that. When you’re managing a trials programme on a national scale it’s vital to receive local advice and experience. Without the commitment of professional trial growers providing good quality, reliable data we would not have witnessed the same degree of varietal improvement in recent years, and the whole industry owes a debt of gratitude for their continued support.”

Hugh helps to harvest a sugar beet trial on his farm into a modern mobile tarehouse

Genome sequencing
The wheat genome is massive and complex – comprising more than 120,000 genes it is five times larger than the human genome. Despite its complexity, however, a first draft sequence of the wheat genome was released in June 2014, with a fully completed sequence expected within the next two to three years. Once in place, this will provide a wealth of information about the number, location and function of wheat genes, unlocking new opportunities for targeted wheat improvement.

Markers and genomic selection
Marker-assisted selection is now routinely used in most commercial breeding programmes, enabling plants to be screened prior to field testing using genetic markers associated with key traits. The use of genomic selection, however, already widely used in modern livestock breeding, is a relatively new development for plant breeders. Rather than using genetic markers for a few specific traits, genomic selection uses many markers dispersed across the whole genome to predict the breeding value of individual plants, and promises to drive up the speed and accuracy of varietal improvement.

GM and genome-editing
The role of GM wheat in new approaches to biocontrol was recently trialled at Rothamsted Research, using GM wheat

Innovations in wheat genetics – coming shortly to a field near you?

Global concerns over food security and climate change have brought a new focus in public sector R&D funding on more applied and translational research objectives such as crop improvement. Genetic progress in wheat, as the UK’s most significant arable crop, has benefited particularly. Guest contributor Dr Phil Howell, who leads the wheat pre-breeding team at NIAB, provides his assessment of the developments in wheat genetics likely to make the biggest contribution to improved varieties over the next few years.
plants modified to express an aphid-repelling pheromone. We should expect to see more UK-based field testing, although commercial GM wheat varieties may remain some years away.

A raft of new techniques, collectively referred to as 'genome editing', are becoming commonplace in the laboratory, offering more precise and targeted changes than established GM methods. For example, Chinese scientists recently used genome editing to alter the wheat *TaMLO* gene, successfully turning mildew susceptibility into resistance without changing any other attributes. Although crop varieties developed using genome editing are not considered to be GMOs in the US, it remains unclear how the EU will regulate these emerging technologies.

**Pre-breeding**

Pre-breeding transfers the findings of fundamental research into material usable by commercial breeders. The BBSRC-sponsored Wheat Improvement Strategic Programme (WISP; [www.wheatisp.org](http://www.wheatisp.org)) brings together several leading academic teams to increase the genetic diversity available to UK breeders. Many breeding companies now also employ ‘research breeders’ to integrate the best leads from public research collaborations into their commercial programmes.

**Wide crossing and resynthesis**

Crosses between wheat and its relatives have been very important to UK wheat breeding. The close relative Emmer Wheat (*Triticum dicoccoides*) has been a valuable source of genetic diversity. Work begun over 30 years ago ultimately led to Gatsby, Glasgow, Robigus, Shamrock, Stigg and Timber – the parents or grandparents of over half the current UK Recommended List. The *Pch1* gene from Barbed Goatgrass (*Aegilops ventricosa*) has been the leading source of eyespot resistance in UK varieties from Rendezvous in the 1990s through to Skyfall, Revelation and Grafton today.

Wheat resynthesis repeats the naturally-occurring wide cross that led to the domestication of wheat 10,000 years ago. NIAB’s pre-breeding programme has exploited resynthesis, firstly using material developed at CIMMYT in Mexico, and latterly through its own programme of resynthesis, leading to the development of pre-breeding lines showing appreciable yield increases and other potentially valuable agronomic traits.

**Remote sensing and high-throughput phenotyping**

Remote sensing, whether through aerial drones or ground-based platforms, can be used to map field effects and crop development on a farm scale, while special research glasshouses such as the National Plant Phenomics Centre at Aberystwyth track the development of individual plants by recording tiny changes on a daily basis.

F1 hybrids

Hybrid wheat has of course been tried before, but recent advances in genetics have provided new tools to overcome the problems of hybrid breeding in wheat, and we are likely to see commercially successful F1 hybrid varieties within the next decade. Hybrids should bring greater yield potential and increased yield stability than inbred varieties, with this improvement generally exaggerated under lower inputs or in conditions of stress such as heat, drought or waterlogging.
Farm-Saved Seed FAQs

Members of the BSPB farm-saved seed team at Ely are on hand to help with any queries on seed use and the FSS declaration process. In 2013, BSPB issued a briefing note responding to some of the questions most frequently asked by farmers and their advisers. This is available on the farm-saved seed section of the BSPB website. Some more recent queries received from farmers are answered below.

Q. Where can I find the payment rates for eligible varieties?

BSPB does not publish payment rates for FSS potatoes, which are determined by breeders individually and independently for each eligible variety. Email emma@bspb.co.uk or call BSPB on 01353 653200 if you wish to know the payment rates for the potato varieties you are growing.

Q. Why do you send out two declaration forms per year?
A. The farm-saved seed payment requirement is triggered when use is made of an eligible variety, i.e. when it is used for sowing. BSPB collects farm-saved seed payments twice a year to capture payments from the two sowing seasons, autumn and spring.

Q. I have started contract farming a neighbour’s land. I have a profit share in the final crop – why can I not use my farm-saved seed on this land?
A. It is against the law to transfer farm-saved seed from one holding to another for sowing. Any transaction – whether free, bartered or charged – constitutes a transfer of ownership and is against the law.

Q. I want to try growing a cover crop. Can I get some pea seed from the farmer next door? It is not going to produce a harvested crop.
A. No. Regardless of whether a crop is taken to harvest, the seeds regulations and farm-saved seed rules apply. You must use either certified seed purchased from a licensed seed merchant or farm-saved seed produced on your own holding. In the case of farm-saved seed, if you are using an eligible variety the FSS payment will be due on sowing regardless of whether the crop is taken to harvest.

Q. I want to declare farm-saved seed but can’t find the name of the variety that I have used on the list of eligible varieties. What should I do?
A. First check whether the full name of the variety that you want to declare has a prefix, e.g. KWS Santiago, NFC Tipple, SY Venture, ES Astrid. Varieties are shown on the list in alphabetical order, including the prefix so you need to look for KWS Cassia and not ‘Cassia’. The full variety name will be on the bag label and invoice of the original certified seed stock used to produce the farm-saved seed. If you still cannot find the variety please contact the FSS team on 01353 653209 or email fss@bspb.co.uk.

Q. Why do I keep getting reminder letters from BSPB with red ink on them?
A. The regulations allow 28 days for the return of information from our first request. When your declaration is three months overdue we will politely remind you of this with a letter, using red ink to draw your attention to the request for outstanding information.

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