

**Notes of the seventh Annual General Meeting held on Tuesday 19 July 2016,
Committee Room 21, Palace of Westminster**

Harnessing the opportunities of New Breeding Techniques

Present:

Members

Mark Spencer MP
Julian Sturdy MP
Angela Smith MP
Bill Wiggin MP
Earl of Selborne
Earl of Lindsay
Lord Cameron of Dillington
Duke of Montrose

Guest Speakers

Professor Helen Sang, The Roslin Institute, University of Edinburgh
Dr Louise Ball, EU Crops and GM Policy Team, Defra
Dr Penny Maplestone, Chief Executive, British Society of Plant Breeders
Helen Munday, Chief Scientific Officer, Food & Drink Federation

Stakeholders

Tracey Jewitt, BBSRC; Marco Winters, AHDB; James Wallace, IAR Agri Ltd; Ellie Marshall, AHDB; Mark Culloden, British Sugar plc; Emma Wallington, NIAB; Firth Piracha, FSA; Jaine Chisholm-Caunt, GAFTA; Sabrina Roberts, FSA; Stephen Johnson, FSA; Mark Buckingham, Monsanto; Moya Woolley, NFU; Tori Morgan, NFU; Raoul Bhambral, GM Freeze; Chris Atkinson, NRI; Aneke Schwager, KWS; Chris Danks, KTN-UK; Harriet Bunday, BRC; Malcolm Hawkesford, Rothamsted Research; Jim Dunwell, Univ of Reading; Ian Munnery, SESVanderHave; Rachael Mann, Royal Society; Zoe Davies, nabim; John Walsh, Univ of Warwick; Alice Turnbull, Bayer; Martin Savage, nabim; Graham Jellis, BCPC; Matthew Corby, abc; Stephanie Mathisen, Sense About Science; Georgina Gomez Mazo, Sense About Science; Martin Grantley-Smith, AHDB; Steve Knight, US Embassy; Daniel Pearsall, Group Co-ordinator

1. Annual General Meeting

1a. Welcome

Mark Spencer (MS) welcomed Members and stakeholders to the meeting, and opened by explaining that his recent appointment as a Government Whip meant that he was required to stand down as chair of the Group. He thanked stakeholders from across industry and the science base for their support, and recognised in particular the contribution of the Group's co-ordinator, Daniel Pearsall. By providing a forum for Parliamentarians to engage with leading figures from across the agri-science sector, MS noted that the Group had become established as one of the most active and influential All-Party Groups in Parliament.

1b. Election of Chair and Officers

The nomination of Julian Sturdy MP to serve as Chair of the Group was approved with the agreement of all Members present.

Nominations for the Earl of Selborne, Lord Haskins, the Earl of Lindsay and Angela Smith MP to continue as Vice-Chairs of the Group were approved with the agreement of all Members present.

An income and expenditure statement for the Group (attached as an appendix) covering the period 6 July 2015 to 5 July 2016 was approved with the agreement of all Members present.

Members also welcomed and approved the publication of the All-Party Group's Annual Report for 2015/16.

2. Introduction

In his role as newly-elected chair, Julian Sturdy (JS) thanked Mark Spencer for his contribution in taking the All-Party Group forward over the past two years.

JS briefly introduced the topic for discussion, '*Harnessing the opportunities of new breeding techniques*', noting that while a new generation of gene-editing techniques was emerging with significant potential to enhance the speed, precision and efficiency of crop and livestock breeding, their introduction had also sparked a political debate over whether they should be regulated as conventional breeding methods or as GMOs. He suggested that the outcome of those deliberations could open up or deny major opportunities to improve the resilience and competitiveness of UK agriculture.

3. Guest speakers

[Please note that all speakers' slide presentations are available to download via the meetings section of the All-Party Group web-site at www.appg-agscience.org.uk]

Professor Helen Sang, The Roslin Institute, University of Edinburgh

Helen Sang (HS) opened by providing a basic explanation of genome editing and its use, noting that the technology was still at a relatively early stage of development and application in both crop and livestock improvement.

Essentially genome editing involved the use of 'molecular scissors' to identify a specified gene sequence at a predetermined site on the genome and make precise changes by cutting and repairing or replacing short segments of DNA to induce desired traits.

Such changes could occur through natural mutation although techniques such as CRISPR – the most recently developed and highly efficient gene-editing method – greatly improved the precision and speed of the conventional breeding process.

HS described a range of current applications of gene editing techniques to improve crop and livestock performance, including:

- US-based research to induce mutation of a target gene required for the infection of pigs by Porcine Reproductive & Respiratory Syndrome (PRRS) – a major viral disease of pigs – resulting in genetic resistance;
- Research at the John Innes Centre to create a single base change mutation in a model brassica species to prevent pod shatter at or prior to harvest, potentially paving the way to improve yields and reduce seed losses by introducing a similar mutation in oilseed rape;
- Use of gene-editing to breed dairy cattle without horns, replicating a natural mutation found in beef cattle and avoiding the need to remove horns in dairy calves;

- Ongoing research at the Roslin Institute to move genetic variation between species – in this instance between wild warthogs and Eurasian pigs – to provide a new source of genetic resistance to the African Swine Fever virus;
- Genetic alteration of Camelina oilseed crops by scientists at Rothamsted Research to provide a sustainable, plant-based source of Omega-3 fatty acids as an alternative feed for aquaculture production;
- Research at the John Innes Centre to improve genetic understanding of the nitrogen fixing mechanism in legume crops and use new genome-editing tools to develop cereal crops capable of fixing their own nitrogen.

HS summarised the key benefits of new molecular breeding techniques in terms of the ability not only to improve the speed and precision of existing breeding processes, but also to move desired gene variants between species – such as the introduction of potato blight resistance from wild relatives into commercial varieties - and ultimately to introduce more complex gene sequences and novel genetic pathways in parallel with improved scientific understanding of gene function in crops and livestock. These advances in turn would open up new opportunities for step-change improvements in the productivity, quality and resilience of future farming and food production systems.

Dr Penny Maplestone, Chief Executive, British Society of Plant Breeders

Penny Maplestone (PM) noted that uncertainty was a major problem for the plant breeding industry in relation to novel breeding techniques. She highlighted the competitive and research-intensive nature of the commercial plant breeding sector, and the need for continued access to innovation not only to succeed in the market place, but also to respond to the global challenges of food security, climate change and sustainable development.

Using the example of developing a strategy to breed for brown rust resistance in wheat – a key priority in the face of changing disease pressures and the loss of chemical controls – PM described three different options available to plant breeders.

The first option included a range of conventional breeding approaches in regular use, such as crossing and selection, introducing new genes from heritage varieties or wild relatives, radiation or chemical induced mutagenesis, marker assisted selection, and breeding tools such as tilling that combine chemical mutagenesis with DNA screening to identify potentially beneficial mutations in specific genes.

PM explained that these conventional approaches were regulated through a variety registration process requiring a minimum of two years' field testing and designed to provide an assurance of uniqueness, stability, quality and improved performance for each new crop variety – a proven framework of proportionate consumer protection legislation.

The second option – transgenic or GM technology – offered potential advantages over conventional techniques but the prohibitive cost and unpredictability of a hostile EU regulatory system meant this was not currently a viable option.

The third option involved the use of new breeding techniques such as genome editing, which offered major opportunities to enhance the scope, accuracy and speed of the breeding process but represented too significant a commercial risk until their regulatory status – ie whether they would be classified as conventional or GM techniques – was determined, and even then would require significant upfront investment in terms of research, breeding and IP arrangements.

Against this background, PM highlighted the overriding need for continued innovation in plant breeding and access to the full range of tools and technologies to keep pace with demands for increased productivity, more durable pest and disease resistance, improved nutrition and resilience to climate change.

This would require a proportionate and enabling approach to regulation of NBTs, based on science and providing consistency at an international level.

PM highlighted the International Seed Federation's proposal for a set of consistent criteria to be applied by national or regional authorities when deciding how to regulate NBTs. ISF were suggesting that plant varieties should not be regulated as GMOs if they were similar to or indistinguishable from varieties produced using conventional methods, and specifically if:

1. There is no novel recombination of genetic material or
2. The final plant product solely contains the stable insertion of inherited genetic material from sexually compatible species or
3. The genetic variation is the result of mutagenesis – spontaneous, induced or targeted

In conclusion, PM cautioned against repeating the mistakes of GM with countries and regions operating very different regulatory systems, and urged the UK to show international leadership on NBTs by adopting the ISF proposals and sending a strong signal to researchers and plant breeders that the UK is committed to science and innovation and is a good place to invest post-Brexit.

Dr Louise Ball, EU Crops and GM Policy Team, Defra

Highlighting the need for regulatory clarity in determining whether (or which) NBTs were captured by existing GMO regulations, Louise Ball (LB) also noted that the regulatory trigger would apply equally to GM crops, animals, microbes and medical applications.

While the EU regulatory regime for GM crops was clearly dysfunctional having cleared just one crop for cultivation since the late 1990s, the regulation of contained use and medical applications did operate effectively.

LB also noted that while most GM regulatory systems around the world were process-based, Canada operated a product-based regulatory system which determined the requirement for regulation by the changes made and the novelty to the plant, although this also captured crops and breeding techniques not regulated elsewhere as GMOs.

LB emphasised that the EU definition of a GMO was open to legal uncertainty and different interpretation, as evidenced by the delay in determining the status of NBTs under existing EU legislation.

Six EU member states (UK, Germany, Ireland, Finland, Spain and Sweden) had all reached the opinion that field trial applications for herbicide tolerant oilseed rape produced using one particular NBT, known as oligonucleotide directed mutagenesis (ODM), did not require GM regulation.

Tabling a list of the NBTs currently awaiting clarification of regulatory status within the EU under existing GM rules, LB noted that a legal opinion from the EU Commission was not expected until the end of 2016. While this would represent a significant milestone after more than eight years' uncertainty, in LB's view it would not represent a definitive ruling and subsequent legal challenges in relation to specific NBT applications could not be ruled out.

LB noted that some non-EU countries were more advanced in their decision-making over the status of NBTs, although for the most part these related to individual products rather than

establishing clear legal principles – most regulatory systems had regulatory triggers with a process-based component and a consequent need for case by case interpretation. Canada was the exception.

LB also noted that the UK vote to leave the EU presented opportunities to reflect on the problems of current regulatory approaches and to start thinking about solutions which would put the UK in a stronger position to harness and exploit the potential of novel breeding techniques. She indicated that Defra was open to new thinking and suggestions, such as the ISF proposal, of how future regulatory systems might operate.

Helen Munday, Chief Scientific Officer, Food & Drink Federation

Helen Munday (HM) opened by explaining the threefold objectives of FDF's food safety and science activities in a UK food and drink supply chain worth £90bn, with food and drink manufacturers employing 400,000 people across more than 6,600 businesses and accounting for 16% of the UK's total manufacturing base by turnover.

Firstly, to maintain consumer confidence in the safety and integrity of the food supply chain.

Secondly, to work for a proportionate and evidence-based regulatory and policy environment in which the sector operates, to the mutual benefit of consumers and the industry.

And thirdly, to support the industry's approach and response to scientific and regulatory issues by providing timely information and advice to members.

While the regulatory status of NBTs was not currently front of mind for FDF members, HM acknowledged that the global food supply and demand balance was becoming ever more precarious, and that access to technologies offering long-term improvements in food security was of critical importance.

HM indicated that potential benefits of NBTs for the food and drink sector and its customers ranged from improved security and sustainability of raw material supplies – whether through increased yields, reduced pest and disease losses, improved storage and reduced wastage, as well as a shorter time to market for breeding improvements – through to the opportunities to reduce food prices, to enhance the nutritional properties and improve the quality and functionality of crop-derived raw materials, and to support quicker progress in food and drink reformulation, particularly with increased pressure on food producers to provide healthier options.

HM acknowledged that the global regulatory situation in relation to NBTs was uncertain. While other countries around the world were making progress with regulatory decisions on NBTs and approving products to enter the global supply chain, the EU position remained unclear and there was a serious risk that a situation analogous to GM could occur, although she cautioned that pressing for a quick decision may not result in a proportionate or evidence-based outcome.

In particular, HM warned that if NBT-derived products were regulated as GM, this would impose additional costs on the supply chain through mandatory traceability and labelling requirements. Testing and segregation would be complicated by the lack of effective detection methods to distinguish between NBT-derived and conventional varieties, leading to a burdensome and costly paper trail to comply with traceability requirements.

HM also cautioned that international differences in the regulatory status of NBT-derived material would exacerbate the potential for trade disruption, while classification of NBTs under GM legislation could also lead to barriers of acceptance by consumers.

Questions and discussion

The following key points arose during discussion:

Members and stakeholders expressed strong support for the UK to exploit post-Brexit opportunities to establish and operate a more enabling, science-based regulatory framework for NBTs and other technologies, both to drive progress and innovation in UK agriculture and to unlock the potential export and inward investment opportunities for the UK science base.

At the same time, there was a recognition of the limited UK market opportunities given the scale of investment required to bring products to market, and the overriding need to ensure future arrangements with the EU - eg in relation to movement of seed and IP protection - did not pose additional barriers to existing trade given the pan-European basis of commercial activities such as plant breeding and seed production.

Attendees also stressed the urgent need for clarity over the UK's relationship with the EU in relation to scientific collaboration, access to R&D funding and movement of researchers. It was noted that a lack of certainty over the UK's future position in relation to EU R&D funding programmes such as Horizon 2020 was already beginning to damage prospects for UK researchers, with reports of UK research teams being side-lined as partners in current EU programmes, and being withdrawn as potential partners in prospective bids for EU research funding, particularly as project leaders.

The importance of international harmonisation of rules governing NBTs to avoid potential trade disruption, and the opportunities to apply these techniques to improve food and nutrition security in developing regions of the world, were highlighted.

The challenge of overcoming the tarnished reputation of GMOs, and of differentiating the products of NBTs from a consumer perspective was emphasised. Some scepticism was expressed over the actual level of rejection of GM products among today's consumers, since no genuine choice between GM and non-GM alternatives was currently being provided, although there was strong agreement that more positive communication of the consumer-facing benefits of NBTs, such as improved health and nutrition, would be essential to secure market acceptance. However, this was not viewed as the responsibility of government alone, but would require the re-engagement of the food and drink industry, including retailers, as trusted partners to provide factual public information.

Further to the discussion, Members supported a proposal that the Group should write to new Defra Secretary Angela Leadsom MP, highlighting the potential benefits of NBTs for the future productivity, resilience and competitiveness of UK agriculture and food production, and urging the post-Brexit UK Government to show international leadership on the issue, including support for a global regulatory approach based on common, science-based principles, along the lines proposed by the International Seed Federation.

Concluding the meeting, JS thanked speakers and attendees for their contribution to a lively, informative and thought-provoking session.

DRAFT INCOME AND EXPENDITURE STATEMENT

Name of group: All-Party Parliamentary Group on Science & Technology in Agriculture

Period covered by this statement: 6 July 2015 to 5 July 2016

Income and Expenditure

The group receives no direct income from membership subscriptions, monetary donations, trading income or interest and therefore incurred no direct expenditure over the course of the year.

Value of benefits in kind

Source	Description	Value £s	Received
Front Foot Communications Ltd	<p>Front Foot Communications Ltd provides the secretariat to the APPG: primarily this involves organising meetings, liaising and corresponding on behalf of the group, producing the group's annual report and maintaining the group's web-site.</p> <p>Front Foot Communications Ltd is paid by the following organisations to act as the APPG's secretariat: National Farmers Union, National Institute of Agricultural Botany, National Association of British and Irish Millers; Fera Science Ltd; British Society of Plant Breeders, British Growers Association, Agricultural Biotechnology Council, Crop Protection Association, Agricultural Industries Confederation</p>	16,501-18,000	06/07/2015 – 05/07/2016
Agricultural Biotechnology Council	Breakfast at launch of <i>Going against the Grain</i> report	Up to 1500	29/10/2015