All-Party Parliamentary Group on
Science and Technology in Agriculture

PARLIAMENTARY BRIEFING

Draft Genetic Technology (Precision Breeding) Regulations 2025

Introduction
The All-Party Parliamentary Group on Science & Technology in Agriculture (APPGSTA) welcomes the introduction to Parliament of the draft **Genetic Technology (Precision Breeding) Regulations 2025** as the final stage in the legislative process required to implement the provisions of the Genetic Technology (Precision Breeding) Act 2023 as they apply to precision bred plants in England.

In 2020, APPGSTA members first led calls for regulatory divergence from the restrictive and over-precautionary rules we inherited from the EU, which classify all products of precision breeding as genetically modified organisms (GMOs).

The All-Party Group has strongly supported the passage of this legislation, which presents a unique opportunity to embrace a more proportionate and science-based approach to the regulation of genetic innovation in agriculture. It is the first time in more than 30 years that legislation has been brought forward in this country which seeks to enable, rather than to further restrict, the use of genetic innovation in agriculture.

Over the past five years, we have heard from experts in the field about the potential for precision breeding technologies to accelerate improvements in the productivity, resource use efficiency and climate resilience of our farming systems, to enhance food quality and nutrition, and to reduce food waste, at a time when such advances are urgently and increasingly needed.

A list of these experts is included within this briefing document, covering a range of topics including scientific research, plant breeding, seed production and plant variety testing, farming, regulatory affairs and supply chain issues. All have indicated that they would be willing to help answer any questions from MPs and Peers and/or their researchers in relation to the draft implementing regulations currently before Parliament.

The scientific evidence is clear that precision breeding techniques such as gene editing pose no greater risks than existing conventional breeding methods. Indeed, the Act's definition of a precision bred organism, or PBO, applies only where the DNA changes involved could have occurred naturally or through conventional breeding methods.

Through more progressive, risk-based regulation, focused on the characteristics of the end-product, we have also learned of the opportunities to democratise the process of genetic research and development, making these technologies and innovations much more accessible to public sector researchers, start-ups and SMEs.

We urge members of both Houses of Parliament to speak and vote in favour of the draft regulations. A positive vote will help to put England's scientists, plant breeders and farmers at the forefront of global innovation in agriculture.

About precision breeding
Precision breeding encompasses a range of new breeding technologies that allow breeders to make precise, targeted changes to the genetic code (DNA) of plants. It can be used to introduce beneficial new traits such as resistance to pests and diseases, improved nutritional value and climate resilience.

When discussing precision breeding, it is important to emphasise that this is not an alternative to conventional breeding. It should be viewed as another tool in the plant breeder's toolbox which allows one or more beneficial characteristics to be introduced alongside all the other components that new varieties need to succeed in the market.

What singles gene editing out as such a valuable new tool is the ability to introduce those desirable new traits much more quickly and efficiently, without the need for lengthy backcrossing and selection to remove unwanted characters. It allows plant breeders to achieve the same outcomes in around a quarter of the time.

The most commonly-used method of precision breeding is gene editing (also known as genome editing), of which CRISPR Cas-9 is the most familiar. This short video, made by the John Innes Centre at Norwich Research Park, explains what CRISPR is in simple terms, and gives an overview of how it compares to other plant breeding methods: What is CRISPR gene editing?

Multiple reviews of scientific evidence confirm that precision bred products are at least as safe as their conventionally bred counterparts.

For example:

- The UK's Advisory Committee on Releases to the Environment (ACRE) has concluded that precision bred organisms present *"no greater risk to health or the environment than traditionally bred counterparts"*

- The UK's Advisory Committee on Novel Foods and Processes (ACNFP) has concluded that there is *"no evidence that precision bred organisms are intrinsically more hazardous than traditionally bred organisms."*

- Health Canada has concluded that *"it is the scientific opinion of Health Canada that gene editing technologies do not present any unique or specifically identifiable food safety concerns as compared to other technologies of plant development. Therefore, gene-edited plant products should be regulated like all other products of plant breeding."*

- A Health Canada review of scientific literature also concluded that *"the unintentional effects of this technology have been established to be no different than those that occur through the use of conventional breeding technologies in regards to product safety."*

- This is consistent with a Scientific Opinion adopted by the European Food Safety Authority (EFSA) in November 2020 which also stated that *"genome editing techniques that modify the DNA of plants do not pose more hazards than conventional breeding."*

International perspective
Implementation of the Precision Breeding Act in England will align our rules with other countries such as Australia, Japan, Canada, Argentina, Brazil, Chile and the USA, which already regulate plant varieties developed using precision breeding techniques in a similar way to conventionally-bred varieties.

The All-Party Group has heard perspectives from international developers with experience of dealing with similar regulations around the world. They have welcomed the Precision Breeding Act as one of the most progressive and science-based approval processes for gene edited crops because it provides a coherent, joined-up approach within a single piece of legislation, and because the implementing rules genuinely reflect the scientific evidence that precision bred crops pose no new or additional risks compared to their conventionally bred counterparts.

In the face of growing climate pressures and heightened geopolitical uncertainty, a number of countries previously cautious in their attitude to innovations such as gene editing in agriculture are now moving to embrace them to bolster their food security and reduce their climate impact.

Among them are the 27 member states of the European Union, whose governments recently reached agreement on the way forward for previously stalled proposals on the regulation of New Genomic Techniques (NGTs), paving the way for tripartite negotiations with the European Parliament and Commission.

The EU Commission's recent Vision for Agriculture and Food communication has emphasised the importance of plant breeding innovations to safeguarding the EU's food security and sovereignty, by *"accelerating the development of climate-change resilient, resource-saving, nutritious and high-yielding varieties."*

The EU has also highlighted the importance of moving at pace to align its rules with other countries around the world:

"To reap the benefits of these innovations, an enabling regulatory framework in the EU is needed. This also ensures a level playing-field with an increasing number of third countries, which are in the process of adapting their legislation or have done so already. It is therefore particularly important to complete the legislative procedure for the Commission's NGT proposal and to implement the legislation fast. The Commission is committed to working in close cooperation with the Council and the European Parliament to find a forward-looking compromise in the near future."

New Zealand is another country which has historically been cautious about the use of biotechnology in agriculture, but whose coalition government recently introduced a new Gene Technology Bill which, according to Science Minister Judith Collins, will end New Zealand's *"nearly 30-year ban on gene technology outside the lab in a move which will bring health, productivity and climate gains for New Zealanders"*.

Early applications of precision breeding
Examples of precision bred crops in the pipeline demonstrate that making these tools more readily available will accelerate the development of higher-yielding crop varieties with greater climate resilience, more durable disease resistance, reduced environmental impact, and with improved end-use quality and nutritional properties.

Since simplified arrangements for outdoor trials of precision bred crops were introduced in England three years ago, 25 separate trials have been notified, across a range of crops, traits and potential benefits. Here are some examples:

Crop	Trait	Benefit
Camelina	Omega-3 oils	Healthy eating
Tomato	Pro-vitamin D3	Healthy eating
Wheat	Ultra-low asparagine	Improved food safety
Barley	High lipid content	Reduced livestock methane emissions
Potato	Non-browning	Reduced food waste
Potato	Disease resistance	Reduced pesticide use
Tomato	Jointless trait	Improved harvestability
Oilseed rape	Pod shatter resistance	Reduced harvest losses

In addition, the All-Party Group has received presentations from companies planning to submit applications to market precision bred crops in England, including strawberries which fruit for three times longer with improved shelf-life, baby potatoes with a bunched tuber set requiring two thirds less farmland, and non-browning, longer-shelf-life bananas to reduce food waste.

Democratising science
The All-Party Group has also received evidence of how the adoption of more proportionate, science-based regulations can help to democratise the process of scientific research and innovation, making these technologies more accessible to public sector researchers, smaller companies and start-ups, and not the exclusive preserve of large multinational companies.

This is certainly the experience of Argentina, where a 2020 study by Martin Lema *et al* showed that regulating gene edited crops in a similar way to conventionally bred varieties, rather than as GMOs, has boosted investment and R&D activity, involving a more diverse range of organisations in both public and private sector, and across a much broader range of crops and traits.

A similar pattern appears to be emerging here. As discussed above, since a simplified process for notifying field trials of precision bred plants was introduced in England in March 2022, more than 20 trials have been notified, virtually all involving public sector institutes, start-up companies and SMEs, across six different crops, and covering a wide range of applications, from improved crop performance and ease of harvest to enhanced food safety and nutrition, and reduced climate and environmental impact.

Talking points
The House of Lords Secondary Legislation Scrutiny Committee (SLSC) recently published a report on the draft regulations. This appears to have been based exclusively on submissions from a small number of campaigning NGOs and organic bodies opposed to the use of precision breeding techniques.

Disappointingly, the Committee did not consult or seek counterbalancing evidence from the plant science community, plant breeders, farmers or agri-food chain operators.

The issues raised in the SLSC report, most of which have already been debated and voted on by both Houses of Parliament during the passage of the primary legislation, are discussed below:

Labelling and traceability
Parliament decided against mandatory labelling of precision bred products during the passage of the Act.

The purpose of mandatory labelling is to protect consumers, for example in relation to nutrition or the presence of allergens, not to flag a specific production or breeding method.

The Food Standards Agency has confirmed that there is no basis to require mandatory labelling of precision bred products because there would be no safety justification for doing so.

For the same reasons, other countries with a similar regulatory approach do not require labelling of food or feed products containing precision bred material.

Such a requirement would discriminate unfairly against precision bred products by imposing additional costs of mandatory labelling which do not currently apply to the products of other conventional breeding methods.

A commitment to full transparency of information in relation to individual plant varieties will, however, facilitate non-statutory approaches to providing information about the use of precision breeding where there is clear consumer demand, and a willingness to pay the extra costs of differentiation.

The British Society of Plant Breeders (BSPB) has committed to maintain a public register of precision bred varieties. Defra has indicated that a statutory, England-only National List of precision bred varieties will also be available.

This transparency of information will ensure that the agri-food supply chain is able to provide the requested segregation, traceability and consumer information on a non-statutory basis.

Lack of a detection method
There are no reliable testing methods currently available to differentiate between precision-bred and conventionally-bred products, or to confirm whether specific genetic changes resulted from the use of precision breeding or conventional breeding practices.

This reflects the underlying rationale of the Act that genetic changes introduced through precision breeding could equally have occurred naturally or as a result of conventional breeding.

Lack of full risk assessment
The central objective of the Precision Breeding Act is to remove precision bred plants from the scope of restrictive and burdensome GMO regulations, and to regulate them in a similar way to conventionally bred plants. This reflects the overwhelming scientific evidence that the risks associated with precision breeding are no greater than with conventional breeding.

However, this does not mean that precision bred plants are unregulated. All plant varieties must undergo rigorous statutory testing and evaluation prior to marketing over a period of at least two years, and all plant breeding activity is subject to the requirements of general food law and environmental protection regulations.

Impact on organic producers – co-existence
The All-Party Group has issued a policy paper dealing with the issue of farm-level co-existence of precision bred (PB) and non-PB crops.

The policy paper makes clear that farm-to-farm co-existence is not a new concept in British agriculture, and that any practical co-existence arrangements, eg between neighbouring PB and organic growers, should seek to build on existing examples of farmers and supply chains successfully managing co-existence to meet both statutory and commercial specifications, for example in the production of certified seed, the segregation of food grade and non-food crops, and the delivery of variety-specific consignments to meet customer demands.

The policy paper also examines the potential co-existence implications of eight case studies of early PB products in the pipeline likely to reach the market in England, in each case considering the reproductive biology of the crop species, the production system (eg indoor/outdoor), and the anticipated scale of cropping under organic or 'non-PB' production, to help determine the likelihood and extent of co-existence arrangements.

This sets the scale of potential issues into a practical context, and seriously questions whether any such arrangements would be required at all.

Finally, the policy paper discusses specific considerations for registered organic producers, including the widespread use of emergency derogations to plant non-organic seed instead of organically produced seed, and whether alternative arrangements and incentives are needed to support the development of a sustainable market for organically produced seed.

Impact on trade with the EU and devolved UK regions
The agri-food supply chain is accustomed to dealing with the trading implications of international regulatory divergence on a daily basis.

The development and commercialisation of precision bred products in England will respond to market conditions and customer demand. England-only supply chains already exist for products such as tomatoes, strawberries and potatoes, which are likely to be among the first precision bred crops to market.

It is an obvious point to make, but farmers and growers in England will not choose precision bred varieties without buyers for their harvested products.

However, as previously discussed, other countries including the EU are now moving rapidly to adopt similar approaches to regulating the products of precision breeding techniques. Over time this is likely to reduce the scope for regulatory divergence.

The Scottish and Welsh governments have both indicated that they prefer to remain aligned with the EU on this issue, which over time should also reduce the scope for intra-UK trading issues.

So-called 'off-target' effects

Some NGOs opposed to these technologies have suggested that the term 'precision breeding' is inappropriate because there remains the potential for unexpected or so-called 'off target' effects to occur as a result of techniques such as gene editing.

From a scientific perspective, there is no doubt that technologies such as gene editing are much, much more precise than any breeding methods that have gone before, resulting in far fewer 'off-target' effects compared to conventional breeding.

For example, the European Food Safety Authority (EFSA) has advised that "*off-target changes induced by the application of SDN-3 approaches are fewer than those occurring with conventional mutagenesis techniques that have been used previously and have a long history of safe use,"* and that *"because off-target effects in SDN- and ODM-based approaches is negligible compared to conventional plant breeding, the GMO Panel considers that the analysis of potential off targets would be of very limited value."*

When compared with other crop improvement techniques, gene editing involves a few targeted genes compared with the random re-combination of literally hundreds of thousands of genes which routinely happens in conventional plant breeding.

It is equally misleading to imply that conventional plant breeding to date has been confined to 'natural reproduction' – in other words simply crossing sexually compatible plants and selecting the most promising offspring. Again, the reality is very different, as so much of the success of modern plant breeding is based on invasive, laboratory-based techniques, such as tissue culture, protoplast fusion, embryo rescue, doubled haploidy, somaclonal variation, and both chemical and radiation-induced mutagenesis.

A celebrated example is the barley variety Golden Promise, which has been a mainstay of the organic brewing sector, bred in the 1960s by bombarding seeds with gamma rays in a nuclear reactor to induce entirely random mutations, then growing on and selecting seeds with desirable characters.

Expert contact list
The All-Party Group has established a list of expert contacts on precision breeding who have either presented directly to the Group or shared their expertise with us in other ways.

They cover a range of expertise including scientific research, plant breeding, seed production and plant variety testing, farming, regulatory affairs and supply chain issues.

All have indicated that they would be willing to help answer any questions from MPs and Peers and/or their researchers in relation to the draft implementing regulations.

If you have a specific question or would like to be put in touch with one of our experts, please do not hesitate to contact the All-Party Group's co-ordinator Daniel Pearsall, who will be pleased to help:

E-mail: daniel.pearsall@frontfoot.uk.com Tel: 07770 875455

Name	Expertise	Affiliation
Professor Mario Caccamo	Applied crop research/ plant variety testing/seed certification	NIAB
Dr Anthony Hopkins	Plant breeding (policy)	British Society of Plant Breeders (BSPB)
Nigel Moore	Plant breeding (cereals, arable crops)	KWS / Euroseeds
Dr Frances Gawthrop	Plant breeding (vegetables)	Tozer Seeds
Ian Munnery	Plant breeding (sugar beet)	SESVanderHave
Paul Temple	Arable farming	Mixed Farmer
David Hill	Arable farming / seed production	Arable farmer
Ed Barker	Farm supply chain - seed/inputs/grain/feed	Agricultural Industries Confederation
Karen Holt	Regulatory affairs	Independent regulatory consultant
Dr Helen Ferrier	Scientific & regulatory affairs	NFU
Dr Petra Jorasch	EU policy & regulatory affairs	Euroseeds
Professor Sir David Baulcombe FRS	Plant genetic science	University of Cambridge
Dr Penny Hundleby	Plant genetic science	John Innes Centre
Professor Graham Moore FRS	Plant genetic science (cereals)	John Innes Centre
Professor Jonathan Jones FRS	Plant genetics (disease resistance)	The Sainsbury Laboratory (Norwich)
Professor Johnathan Napier	Plant genetic science (oilseeds)	Rothamsted Research

Further reading
In recent months, Science for Sustainable Agriculture has also published the following commentaries from leading experts.

Precision Breeding Act: It's time to move on from the divisions of the past
Baroness Helene Hayman

Gene edited crops: coming soon to England's fields and glasshouses
Professor Mario Caccamo

Now Britain can show international leadership on precision breeding in agriculture
Professor Tina Barsby OBE & Professor Helen Sang OBE FRSE FRSB

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