Parliamentary Briefing – House of Lords

Precision Breeding Amendment to Agriculture Bill

Expected in Committee Tuesday 14 July or Thursday 16 July

After Clause 42
Sponsors: Lord Cameron of Dillington, Lord Krebs, Baroness Hayman and Lord Rooker

Insert the following new Clause—
Agricultural research
(1) The Secretary of State may by regulations modify the definitions contained in Part VI of the Environmental Protection Act 1990 in relation to products of breeding techniques for agricultural purposes where nucleic acid changes could have occurred naturally or through traditional breeding methods.
(2) Regulations under subsection (1) may only be made after the Secretary of State has held a public consultation on any proposed modifications to the definitions.
(3) Regulations under subsection (1) may only be made in relation to England.
(4) Regulations under subsection (1) are subject to the affirmative resolution procedure."

Member's explanatory statement
To enable the Secretary of State to make changes to the Environmental Protection Act 1990, as it applies in England, in relation to breeding techniques after the UK leaves the EU. This would allow for regulation of new precision breeding techniques compatible with international definitions.

Summary

The Earlham Institute, the Quadram Institute, The Sainsbury Institute and the Norwich Research Park support the precision breeding amendment after Clause 42 of the Agriculture Bill, sponsored by Lord Cameron of Dillington, Lord Krebs, Baroness Hayman and Lord Rooker. The proposed amendment would provide new powers for the Secretary of State to consult on and, if appropriate, make a simple change to the Environmental Protection Act 1990 giving scientists, farmers and breeders access to novel gene editing technologies.

We ask members of the House of Lords to amend the Agriculture Bill to facilitate bespoke regulation for gene edited organisms, whose DNA changes would occur naturally or through conventional breeding methods. Accepting this amendment on to the face of the Bill would bring England into line with the approach taken by most other countries outside the EU that have developed regulatory arrangements in this area, many of which are compatible with the internationally recognised Cartagena Protocol.

Allowing gene editing to take place safely in England will enable improved crops to be developed in response to contemporary concerns such as nutritional need, climate change, resource scarcity, pollution and food security. It would help to democratise agri-tech innovation and give British SMEs, smaller research institutes, universities, start-ups and spin-outs, more opportunities to develop products and diversify the market. Maintaining the EU restrictions on gene editing would continue to favour only the multinational pharma giants who develop their products outside the EU and already dominate global markets.

This regulatory change would enable the UK's food industry and science sector to develop breakthroughs in plant nutrition and disease resistance, thereby generating much needed international R&D investment at a time when the coronavirus and Brexit jeopardise its future public funding.

There are indications that EU regulators would respond to our leadership in this regard by reviewing the efficacy of its own restrictive regulation on gene editing. In November last year the European Council approved the Finnish Presidency's proposal to conduct and submit a study by the end of April 2021, clarifying the status of novel genomic techniques for plants under EU law, including any recommendations for new legislative proposals. This decision was welcomed by the new EU Health Commissioner, Stella Kyriakides. The study is widely seen as a potential first step towards changing the EU's onerously restrictive regulation on gene editing. Even the German Green Party is considering a revision to its previous policy and may decide to support gene editing.

Background

The Earlham Institute (EI) brings together multidisciplinary expertise in biosciences, bioinformatics high performance computing and statistics to understand complex biological systems in relation to pathogens, plants and animals and their interaction with the environment. EI's research is enabled uniquely by core national capabilities in advanced genomics, single cell analysis and computational platforms.

The Quadram Institute (QI) is an interdisciplinary organisation creating new interfaces between food science, gut biology, human health and disease. Scientists and clinicians work to ensure the translation of QIB's fundamental science to benefit patients, consumers and the wider society. From plants to food to digestion to health, QIB investigates how food and microbes interact to promote health and prevent disease.

The Sainsbury Laboratory (TSL) is a world-leading research institute working on the science of plant-microbe interactions. TSL has developed an enviable reputation for the quality of its fundamental scientific research but is also committed to delivering science solutions that reduce crop losses to important diseases.

These life science research institutes are located together on the Norwich Research Park sharing the same extended campus as the University of East Anglia and the Norfolk and Norwich University Hospital. When it comes to agricultural technology, we also share the same objectives; responsible leadership to generate knowledge and innovate solutions to some of the world's most urgent challenges.

Why change the regulations to enable gene editing?

The UK currently follows EU regulations, which requires all plants with edited genes to pass through the same slow and expensive regulatory process – even when they do not contain any new DNA. Gene editing is being used in plants as a new breeding technique for accelerated crop improvement and, outside of the EU, those crops are already reaching the market with no safety concerns.

In the early 1990s, the UK was considered a global leader in crop biotechnology but the EU's regulations halted this progress because they make no distinction between GM crops that contain inserted DNA and gene edited crops which may only have a single letter of DNA deleted. The latter are far more similar to crops bred using long-established and widely accepted technologies known as mutagenesis, which are not regulated in this way.

The implementation of the EU regulations meant that seed and breeding companies, put off by the additional cost and time for product development, left the EU. Many of the promising steps taken by UK plant scientists were stopped in their tracks because there was no clear path to translation. Meanwhile other countries such as US, Canada, Japan and Australia, have reaped the scientific, social and economic benefits of a more flexible approach.

Today, few GM crops are developed or grown within the EU but outside of Europe, GM crops are widely grown, and many GM products are imported by the EU for food and feed. As a global leader in research and development, the UK is primed to apply precision breeding technology to its crops, improving the sustainability and profitability of agriculture.

Environmental and health benefits of gene editing

Gene editing provides a pathway for agronomic traits without the insertion of foreign DNA. Pest-resistant crops require reduced pesticide applications leading to a recovery of biodiversity. Crops that are more drought tolerant require less irrigation and therefore reduced abstraction in river catchments with further knock-on biodiversity benefits. Using gene editing to increasing crop yields, reducing crop losses and reducing the agrochemicals and water applied to farmland reduces the environmental impact of farming.

There are also many opportunities for consumer traits in plants to reduce food waste and improve nutrition. The products closest to market are soybeans with healthier oil profiles,

tomatoes with enhanced flavour qualities, non-browning apples, potatoes, and mushrooms, and the removal of antinutrients (compounds that interfere with the absorption of nutrients).

Leading plant and food scientists like those based at the Earlham and Quadram Institutes would like to use gene editing to innovate tomorrow's crops, rather than using mutagens such as chemicals or UV light to select desirable traits. Gene editing makes it possible to make small, specific genetic changes in target genes using modern tools including CRISPR-Cas9. The results, variations in DNA sequence, are comparable to those obtained by breeders since the dawn of civilization but quicker, more precise and therefore more efficient. Gene editing crops would enable plant scientists to advance lab-based research rapidly through field-trials to partnerships with crop breeders and farmers.

Scientists based at the NRP are exploring the links between food and health. For example, gene editing can be used to improve oil and carbohydrate profiles to make healthier foods and to increase the concentration of fibre and valuable phytonutrients associated with health benefits. Some NRP scientists are working to understand how new variation in wheat starch genes affects starch digestibility, in order to design new wheat varieties with slowly-digested and resistant starches. It is hoped that this research will deliver future foods that benefit consumers and reduce the burden on healthcare providers.

Conclusion

The regulatory system must be updated and future-proofed to apply more appropriate gene editing regulations to allow the UK bioscience community to improve agriculture, reduce pesticide use, enhance global food security and add millions of pounds to the UK economy.

By accepting this amendment to the Agriculture Bill, the House of Lords has an immediate opportunity to facilitate a fit for purpose regulatory framework to enable gene editing research and farming practice. The scientific, environmental, health, trade and economic advantages that this change will precipitate must not denied. As British farmers look to a new future post-Brexit, gene editing will help to modernise the agriculture and food industry and reinvigorate investment in safe, nutritious and profitable food production.