



Gene editing: Is it time for full disclosure of all plant breeding methods?

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Plant breeder Nigel Moore notes that the public debate around gene editing has highlighted a worrying lack of awareness among consumers that none of our familiar food crops are ‘in their natural form’, and that all have been adapted and improved for society’s benefit by science-based plant breeding. Frustrated that the enormous contribution of genetic innovation in improving the quality, availability and affordability of our food supply is routinely overlooked or airbrushed out by the time products reach the supermarket shelves, he emphasises the breeding industry’s commitment to transparency, and asks if it is time for full disclosure of all plant breeding methods? Only by contextualising the way we currently improve our food crops, and by improving consumers’ access to information, can we hope to avoid a situation in which precision breeding is singled out as ‘different’ in an apparent vacuum of knowledge about other conventional breeding methods, he argues.

A recent [‘mythbusting’](#) article on the website of European organic body IFOAM makes clear that in addition to GMOs and gene edited crops, the EU organic sector also wants to exclude the use of crop varieties produced using radiation- and chemical-induced mutagenesis under EU organic standards.

IFOAM complain that the designation of these mutant varieties as exempt from GMO regulations in 1990 pre-dated the development of regulated organic standards, and that organic producers are unable to avoid such varieties because there is no statutory requirement to disclose the breeding method involved.

This is not strictly true, and it is certainly not an insurmountable issue.

Aside from the fact that most of these crop varieties – well over 3000 of them – are already listed publicly on a [‘Mutant Variety Database’](#) maintained by the International Atomic Energy Authority (IAEA), there are also successful precedents for the voluntary disclosure of breeding methods to accommodate specific exclusions under national organic standards.

In some European countries, for example, hybrid vegetable varieties developed using a conventional plant breeding technique known as cytoplasmic male sterility, or CMS for short, are prohibited under national organic rules. Compliance with these provisions in countries such as Germany, Austria, Switzerland and France is made possible by voluntary co-operation between the organic sector and national plant breeders' organisations to publish a [register of CMS-free varieties](#) which can be used by organic producers.

This mirrors a [commitment](#) by the British Society of Plant Breeders (BSPB) to support transparency and openness of information in the implementation of the Genetic Technology (Precision Breeding) Act. BSPB has undertaken to maintain a public register of crop varieties developed using precision breeding techniques such as CRISPR gene editing, in particular so that certified organic growers have the information they need to avoid them.

But organic lobbyists should be careful what they wish for in seeking to prohibit both targeted and random forms of mutagenesis in the development of improved plant varieties.

As others have [pointed out](#) before me, if the use of gene editing becomes widespread in conventional breeding, *“organic growers may be left with older genetics gradually becoming more and more outclassed, more prone to disease and pest infestation, further widening the productivity gap between organic and non-organic.”*

Similarly, the availability of organic food and drink products such as pasta, beer and vegetable oil may be jeopardised by banning older forms of mutagenesis, since most European varieties of durum wheat, malting barley and sunflowers are likely to have a radiation induced mutant at some point in their ancestry.

Many organic producers in Europe recognise the potential benefits of new genomic techniques for their farming systems, for example in delivering improved disease resistance and climate resilience. I genuinely hope the organic industry's leaders - in organisations such as IFOAM - will be more willing to listen to those viewpoints, and not close their minds.

As plant breeders, we have nothing to hide when it comes to the increasingly sophisticated techniques we use to deliver higher-yielding, tastier, healthier and more climate resilient crops.

Indeed, we would like people to understand more about the high-investment, research-intensive business of modern plant breeding, because it is so often taken for granted.

It is frustrating that the enormous contribution of crop genetic innovation in improving the quality, availability and affordability of our food supply is routinely overlooked or airbrushed out by the time products reach the supermarket shelves.

So, for example, it is not uncommon for fresh fruit and vegetables – where plant breeding innovation ensures that quality, taste, choice and convenience are constantly improving – to be presented as ‘carefully selected by growers’, ‘100% natural’, or simply ‘hand-picked’.

Against that background, it is hardly surprising that, when asked, consumers are hesitant or unsure about terms such as gene editing, genetic modification, and mutagenesis.

This was clearly demonstrated by [focus group research](#) commissioned by Food Standards Scotland in 2023, which found that consumers generally had a very low awareness and understanding not only of precision breeding techniques such as gene editing, but of plant breeding altogether, eg:

“I do wonder why we need to do this. Are fruit and plants not better in their natural form?”

“Why can’t we stick with natural growing.... what’s the need?”

Parallel [research](#) conducted by the Food Standards Agency in 2022 in England and Wales also found that:

“...consumers were surprised and sometimes felt uncomfortable about conventional breeding methods, having previously assumed that there was less human intervention in breeding for food production.”

Importantly, however, when consumers were provided with more information about precision breeding techniques, and the potential benefits on offer, a significant majority were in favour, with almost two-thirds indicating that they would be happy to choose gene edited food if, for example, it offered health benefits (65%), was better for the environment (64%), was safer for people with allergies (64%), tasted better (62%), was cheaper (61%) or more resilient to a changing climate (60%).

As the FSA research points out, *“this context is key when analysing participant reactions to precision breeding, as awareness of other breeding methods often shaped participants’ reactions to information about precision breeding.”*

The need to address clear gaps in public understanding of the science and business of plant breeding is why my own company, KWS, has started an initiative aimed at providing transparency of breeding method for all of our varieties, beginning with Germany but to be expanded worldwide. Other plant breeding companies are doing the same.

Only by contextualising the way we currently improve our food crops, and by improving consumers’ access to information, can we hope to avoid a situation in which precision breeding is singled out as ‘different’ in an apparent vacuum of knowledge about other conventional breeding methods.

I sincerely hope that others, including the UK Government and, crucially, the supermarkets, will recognise and support the need to improve consumers’ understanding that none of our familiar food crops are ‘in their natural form’, and that all have been improved for society’s benefit by the most amazing human ingenuity and scientific intervention.

The recent discussions at COP28 underlined the critical role of agricultural science and innovation in achieving food security and climate goals sustainably.

But having the social licence to apply those innovations is equally critical.

As Jack Bobo recently [observed](#): *“The acceptance and adoption of these innovations by society are paramount. If the public does not support the introduction of such technologies, even the most groundbreaking scientific solutions will remain*

underutilised. Science tells us what we can do, but, ultimately, it is the public that tells us what we should do. Therefore, engaging consumers in discussions about food production is essential.”

Nigel Moore is a plant scientist with formal education in plant physiology, genetics and agronomy. He has worked in private sector plant breeding research and seeds for over 35 years. Nigel is employed by the seed company KWS leading their Nutritional Food Ingredients global strategic focus area. He is a former chair of the British Society of Plant Breeders (BSPB) and past President of Euroseeds, the European plant breeding and seeds organisation. He is a member of the Science for Sustainable Agriculture advisory group.