



POLICY PAPER

Co-existence of precision bred (PB) and other crops in England

Introduction

In the context of new legal provisions in England paving the way for plant breeders, crop growers, supply chains and consumers to access the potential benefits of new precision breeding techniques such as genome editing, establishing proportionate co-existence arrangements will enable primary producers to make a practical choice between growing different crop varieties, in response to (differentiated) market demand, and in accordance with legal requirements.

At the farm level and within the supply chain, the single overriding objective of co-existence arrangements is to minimise unwanted mixing of genetic material or harvested crops destined for different market outlets, so maintaining the integrity of raw material supply chains.

Continued access to innovation and new technology in agriculture is vital to deliver future improvements in production efficiency, climate resilience, food quality and sustainability. However, it is recognised that some parts of the food supply chain – notably the certified organic sector – may wish to avoid using precision bred material.

Effective co-existence provisions must seek to ensure a choice for those that wish to benefit from PB crops and those that do not wish to use PB crops, such as organic and other non-PB producers and their customers.

These arrangements 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.

Co-existence in practice

Many examples exist of farmers and supply chains successfully managing co-existence. These tend to focus critical control points at which the integrity or identity of a specific lot or consignments may be compromised, eg:

- Seed delivery, storage and handling
- Seed drilling operations, including cleaning
- Separation distances / buffer strips
- Field operations, including harvest preparation
- Harvesting operations, including cleaning
- Transport and storage of harvested crop
- Record keeping and onward transfer of information
- Post-harvest monitoring and management

At the farm level, for example, measures to support the production of certified seed include crop-specific thresholds for varietal purity and admixture; use of isolation distances and

buffer strips; staggered planting dates and selection of varieties with different flowering times; communication and co-operation between neighbouring growers; attention to machinery hygiene and careful sequencing of operations.

Similar measures are applied in other sectors, for example to segregate the production of sweetcorn and forage maize, and to keep food-grade oilseed rape varieties separate from industrial high erucic acid rape (HEAR), which is not suitable for human consumption.

Beyond the farm-gate, the commodity supply chain itself has become increasingly sophisticated in its response to customer demands, with computerised traceability, sampling and testing now in widespread use during handling, storage and onward distribution of crops post-harvest.

The supply chain also uses dedicated systems to segregate more sensitive or high-value material. Measures range from using physically separate storage and different coloured documentation to procuring grain only from a carefully selected grower base or region.

In each case, the level of differentiation in the market-place determines the nature - and cost - of the segregation processes applied.

Key principles

In developing proportionate, workable and effective co-existence arrangements to support the introduction of precision bred (PB) crops, a number of guiding principles must be observed at the farm level which reflect established practical and legal precedents, eg:

1. Co-existence is not about safety

Co-existence in relation to approved, commercially grown PB crops is above all a market-related issue. It is not concerned with issues of safety to health or the environment, which are addressed in law through the Genetic Technology (Precision Breeding) Act 2023 and associated food, environmental, plant variety and seeds marketing legislation.

Growing approved PB crops is a legitimate activity and, according to the rationale of the above-mentioned Precision Breeding Act, should not be treated differently from growing conventionally bred, non-PB crops.

2. The need for co-existence will be determined by (differentiated) market demand

Farmers in England will only choose to grow PB crops if it makes economic sense for them to do so – ie if there is market demand. Similarly, the need for co-existence measures will arise only if there is differentiated market demand for PB and non-PB crops. In each case, the level of market differentiation will determine the nature (and cost) of co-existence arrangements.

3. Co-existence is not a new concept

The UK crop production and supply chain has long-established practices enabling sexually compatible species to be planted, grown, harvested and delivered to meet the quality and purity specifications of a range of different end-markets. For example:

- Certified seed
- Sweetcorn and forage maize
- Industrial and food grade oilseed rape
- Feed wheat and breadmaking wheat

In each case, well-established practices are in place at the farm level to deliver co-existence, including neighbour to neighbour communication, separation distances between crops, good machinery hygiene and careful segregation and record-keeping during harvest, storage and transport.

These same practices are equally applicable in the context of PB crop production to maintain segregated supply chains as necessary in response to market demand.

4. Zero presence is not achievable, but practical tolerance thresholds work

No sector of agriculture operates to, or can claim, 100% purity. In every crop sector, from certified seed to mainstream commodity production, practical tolerance levels are applied to define a crop's end-use quality and value according, for example, to its varietal purity or freedom from unwanted material.

In relation to this point, it is worth noting that the European Parliament Environment Committee agreed an amendment to the Commission's proposed NGT regulations specifying that adventitious presence of NGTs in organic production should not constitute a non-compliance of the EU Organic Regulation.

5. Co-existence is a two-way street

Since farming takes place in the open air, co-existence involves mutual co-operation and communication between farmers who share a vested interest in delivering products to meet their customers' requirements.

6. Good neighbourliness is essential for effective co-existence, but PB growers cannot reasonably be expected to bear responsibility for the self-imposed marketing standards of others

In cases of dispute, relevant legal precedents have established that where niche or premium operators are required to meet self-imposed standards which go above and beyond the legal norm, they must bear the primary responsibility for ensuring the necessary co-existence measures are followed.

In practice, this means that if practical co-existence measures are required – eg separation distances, buffer strips, delayed planting etc – the responsibility cannot reasonably be expected to lie with the PB grower.

This is the situation, for example, in respect of certified seed growers, who must observe statutory separation distances from neighbouring crops of the same species to achieve the required levels of varietal purity and integrity. These separation distances are not the responsibility of neighbouring non-seed growers, and yet certified seed production successfully covers an estimated 8-9% of the UK arable area.

This is primarily because, as with other routine examples of co-existence, there is an established tradition and expectation within the crop production sector of due diligence and reasonableness between growers, eg in terms of good neighbourliness, communication, timely exchange of information regarding cropping intentions etc.

It may be worth exploring whether this 'duty of care' on the part of all growers could or should be built into existing codes of practice and assurance schemes, such as Red Tractor.

Importantly, the use of precision breeding may also lead to the development of specialist, high value crops, whose market premium will depend on preventing unwanted mixing with

non-PB material. In this instance, of course, the primary responsibility for observing co-existence requirements will lie with the PB grower.

7. PB crops introduce no new or unique liability issues

Once PB crops are approved as safe for commercial release and marketing, there are no legal grounds to suggest they should be treated differently—in liability terms—from other equivalent, conventionally bred products.

Crop-specific co-existence measures

In considering the development of appropriate and proportionate co-existence arrangements for the introduction of PB crops, it is important to focus on realistic case studies of products most likely to reach the market in England.

In each case this should address the reproductive biology of the crop species, the production system (eg indoor/outdoor), and the anticipated scale of cropping under organic/'non-PB' production. This will help determine the likelihood and extent of co-existence arrangements being required at all.

Some examples of early PB products in the pipeline where specific co-existence requirements would be unlikely due to their production system include:

Mustard greens – edited for reduced bitterness would be produced commercially under contained (glasshouse) conditions, and in any case are harvested in their vegetative phase pre-flowering and seed-set;

Strawberries – edited for three-times longer-fruiting would be produced commercially under contained conditions (an estimated 90% of English strawberries are grown in polytunnels or glasshouses);

Tomatoes – edited for enhanced pro-vitamin D3 content would be produced commercially under contained (glasshouse) conditions.

Other examples of early PB crops in the pipeline include:

Sugar beet – edited for resistance to virus yellows disease

Sugar beet is a biennial crop which needs vernalisation (exposure to cold) in order to flower.

If allowed to flower (bolt), sugar beet can cross by wind pollination with other flowering beet varieties (eg fodder beet).

To minimise bolters, current good agricultural practice requires sugar beet growers not to sow prior to recommended dates, to monitor and control bolters before flowering to prevent pollen release or seed set, and to control volunteer plants in subsequent seasons.

According to the OrganicXSeeds database, organically produced sugar beet seed is not available to purchase in the UK, and sugar beet is not grown organically on a commercial scale in England. Fodder beet is grown by organic livestock producers, however the majority are unlikely to be located in sugar beet growing areas.

Oilseed rape – edited for pod shatter resistance

Oilseed rape is largely (60-70%) self-pollinating, but can be cross-pollinated, mainly by insects, with other varieties of winter or spring oilseed rape. In field conditions, OSR does not readily cross with other species.

Current good agricultural practice in place to minimise unwanted mixing of food grade and industrial (HEAR) oilseed rape varieties requires a separation distance of 5 metres. To minimise the potential for volunteers, growers of HEAR are also advised to leave a two-year gap between growing a HEAR crop and a subsequent food grade OSR variety.

According to the OrganicXSeeds database, organically produced seed of oilseed rape is not available to purchase in the UK, and oilseed rape is not widely grown on registered organic farms in England. The latest available Defra statistics group oilseeds with maize and protein crops, together totalling 1,000 hectares.

Baby potatoes – edited for high tuber set and more concentrated yield

A native of South America, the potato crop is a perennial that is grown annually from vegetative tubers (known as seed tubers) that are not true seeds. These seed tubers produce a harvest of additional large tubers that are harvested as the crop.

The potential for adventitious presence of PB potato in a non-PB crop arises through mechanical mixing, and any isolation distance requirement between the two crop types would be very small, for machinery handling purposes.

According to the most recent Defra statistics for organic farming in the UK, the organic potato crop accounts for 1.4% (1,700 hectares) of the total UK potato area.

Wheat – edited for low acrylamide production

Wheat is self-pollinating, with plants usually fertilising themselves with their own pollen before the flowers even open. Cross-pollination with neighbouring wheat plants can occur at very low rates depending on genotype and climatic conditions, however the distance of wind dissemination of viable (and heavy) wheat pollen is very limited.

This low risk of out-crossing in wheat is reflected in current statutory protocols for certified seed production, which require physical separation of only a few metres.

“The seed crops of self-fertilising species shall be isolated from other cereal crops by a definite barrier or a space sufficient to prevent mixture during harvest.” [OECD, 2022](#).

Sensitivity to frost and low competitiveness among wild vegetation also limits wheat's chances of survival in non-cultivated areas. Wheat has not been known to become domesticated in the wild.

On this basis it is considered that effective co-existence of PB and non-PB varieties of wheat is unlikely to present major difficulties at the field level, with the major potential for unwanted presence arising through mechanical mixing. As with potatoes, any isolation distance

requirement between the two crop types would be very small, for machinery handling purposes.

According to the most recent Defra statistics for organic farming in the UK, the organic wheat crop accounts for 0.7% (17,100 hectares) of the total UK wheat area.

Barley – edited for high lipid content

Like wheat, barley is a self-fertilising crop. Cross-pollination with neighbouring barley plants can occur at very low rates depending on genotype and climatic conditions, however the very low risk of out-crossing in barley is reflected in current statutory protocols for certified seed production, which require physical separation of only a few metres.

“The seed crops of self-fertilising species shall be isolated from other cereal crops by a definite barrier or a space sufficient to prevent mixture during harvest.” [OECD, 2022](#).

On this basis it is considered that effective co-existence of PB and non-PB varieties of barley is unlikely to present major difficulties at the field level, with the major potential for unwanted presence arising through mechanical mixing. As with potatoes and wheat, therefore, any isolation distance requirement between the PB and non-PB barley crops would be very small, for machinery handling purposes.

According to the most recent Defra statistics for organic farming in the UK, the organic wheat crop accounts for 0.7% (17,100 hectares) of the total UK wheat area.

Seed considerations

Register of PB varieties

The British Society of Plant Breeders (BSPB) has committed to maintain a public register of registered crop varieties developed using PB techniques (including those with PB varieties in their heritage).

In addition, because the current variety registration and National Listing process is governed by UK legislation, Defra is developing arrangements for an England-only National List, which will include information about which listed varieties are PB.

Together, these publicly available sources will provide comprehensive information enabling growers wishing to avoid the use of approved PB varieties to do so.

Organically produced seed

Concerns have been raised by organic sector representatives that current derogations from the certification standards allowing the emergency use of non-organic seed may give rise to unintentional use of PB varieties by organic growers.

The BSPB register and England-only National List referred to above should in themselves be sufficient to guard against the unwitting or unintentional use of PB varieties.

However, this issue raises wider questions about the production and availability of organically produced seed, and whether a fresh approach is needed to ensure a reliable

supply of certified organic seed, not only to safeguard the integrity of organic production and maintain the confidence of organic consumers, but also to prevent unfair competition with conventional growers.

Concerns over this issue have previously been raised by the All-Party Group following reports that organic growers participating in OSR trials in Scotland using non-organic F1 hybrid oilseed rape seed were receiving premiums over conventional in excess of £500 per tonne. At the time, APPG chair Julian Sturdy MP [described](#) the reports as “a kick in the teeth for conventional oil seed rape growers struggling with pest-ravaged crops following the loss of neonic seed treatments.

As part of the PB co-existence discussions, therefore, it is timely for Defra to review arrangements for the authorisation of non-organic seed use, including whether, after 20 years of operation, the Defra-funded [OrganicXSeeds](#) database is delivering on its [stated aim](#) to ‘help operators to find organic seed and seed potatoes’, and whether alternative arrangements and incentives may prove more effective in supporting the development of a sustainable market for organically produced seed.

Consequential amendments to UK organic regulations

While preparations are in hand to introduce secondary legislation which will bring other relevant legislation into line with the Precision Breeding Act, the All-Party Group understands that these plans do not currently extend to the UK organic regulations, presumably due to the complications which will arise because these regulations are UK-wide (and therefore also apply to Scotland and Wales, which have not adopted the Precision Breeding Act).

The UK organic sector is governed by EU Reg 2007/834 Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products. This is now “assimilated law” – formerly known as retained EU law. Rather than include its own definition of a GMO, this Regulation adopts the definition contained in Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms.

This creates potential legal uncertainty surrounding the interpretation or definition of PBOs within the UK organic regulations, and organic representatives have indicated their understanding that PBOs must be regulated in the same way as GMOs under organic rules.

Legal advice obtained by the APPG has confirmed that, while until recently domestic law had to be interpreted in such a manner as to be consistent with EU law so far as it was possible, the EU Law (Revocation and Reform) Act 2023 abolished the principle of supremacy of EU law. The position now is that any provision in retained EU Direct Legislation should “*be read and given effect in a way which is compatible with all domestic enactments*”. The Directive itself is not EU Direct Legislation (so it is not itself assimilated law), but the Regulation is and adopts the definition, and the Regulation itself now has to be read and given effect in a way which is compatible with domestic law – ie reflecting the changes to the definition of a GMO in England as contained in the Precision Breeding Act.

It is therefore arguable that the Organic Regulation must now be read in a manner which is compatible with **all** domestic law. Under domestic law, once the 2023 Act is fully in force, PBOs will no longer be regarded as GMOs because of the 2023 Act, so the Regulation should be read and given effect in a manner which is consistent with that.

However, since the reversal of supremacy is a relatively recent development, there is little experience of how this works in practice. Also, it is the Courts which have the role of

interpreting legislation, so in the absence of any legal case/government decision, it is unclear how this would apply in practice.

If Defra were to amend the legislation, this would remove the scope for debate about the position, and make it expressly clear what the legal position is.

Importantly, bringing the organic regulation into line with the Precision Breeding Act, in terms of the definition of a GMO, would not mean that organic certification bodies would be required to amend their rules to permit the use of PB crops or feed containing PBOs, but it would help to provide legal clarity, certainty and consistency.

APPGSTA, May 2024