



Dossier Biotechnology



New breeding techniques

New varieties of agricultural and horticultural crops contribute to major societal objectives such as food security, food quality and sustainability. Innovation in plant breeding is continuously needed in order to ensure swift and effective development of new varieties. New breeding techniques provide extra opportunities in this respect.

These techniques allow for more focused crop improvement, enabling inclusion of traits such as disease resistances also if this is not possible or difficult using the classical breeding methods.

In Europe, the extent of regulating these new breeding techniques is currently under review. One of the key factors in the assessment is the question whether the new breeding technique falls within the definition of GMO (Genetically Modified Organism) in scientific and legal terms. If the new breeding techniques are comparable with the classical breeding methods and/or lead to plants without any foreign DNA, regulation should not be required. Plantum feels that unnecessary regulatory pressure on new breeding techniques should be prevented, as this may form an impediment to innovation.

Innovation is essential

Innovation in plant breeding is essential in order to fulfil increasing demands for better varieties and to respond to the challenges in the area of food security, food quality and sustainability. In classical breeding methods, creating a new variety takes seven to twenty years. New breeding techniques provide the plant breeders with faster methods for accurately and efficiently working on increasing food production and improvement of food quality thanks to a more specific and more focused approach. The new breeding techniques also enable responding quicker to changing priorities of both growers and consumers. In this respect, plant breeding has achieved spectacular progress, both in the private sector and public research.

Assessing new breeding methods

Eight new breeding techniques have been defined at present, for which it has to be determined if and how they should be regulated. The EU compares the new breeding techniques with the methods already assessed in the context of current regulations (2001/18/EC) in order to make a decision on whether or not to classify the new techniques as a genetically modifying technique.

One of the key factors assessed is the question if the new breeding technique falls within the definition of GMO (Genetically Modified Organism) in scientific and legal terms, and if these are associated with any additional food safety risks and environmental risks in comparison with conventionally breeding products.

Risk profiles

De European Food Safety Authority (EFSA) assessed that the methods Cisgenesis and Zinc Finger have a risk profile similar to the products of classical breeding methods. The EU has not yet had the other six new breeding techniques assessed yet. The expectation is that the review of these techniques will provide a similar assessment from EFSA.

Legal analysis

A legal analysis of the status of plants developed using the new breeding techniques was prepared by the New Breeding Technologies (NBT) platform. Plantum supports this analysis.

The report shows that, in principle, the eight new breeding methods do not fall under the legal definition of GMO because these fulfil one of the following two criteria:

1. The technique is comparable to the methods already exempt from regulation;
2. The technique leads to plants without any foreign DNA.

No unnecessary regulations

The complexity and costs resulting from the GMO regulations are so high that they can be borne only by the largest

of companies, and then only for the largest crops worldwide, such as maize, soy and rice. If these regulations will also be applied to the new breeding techniques, the current commercial sector (mostly small and medium enterprises) will not be able to make use of them. This means that society will be deprived of innovative new species in a large number of crops that could be developed using these techniques.

Plantum states that if new breeding techniques are just as safe as classical breeding methods, such new techniques should not be regulated any further, and should be made available to all crops and companies.

New breeding techniques

- Oligonucleotide directed mutagenesis (ODM)
- Zinc finger nuclease technology
- Cisgenesis and intragenesis
- Grafting non-GM scion on GM rootstock
- Agro-infiltration
- RNA-dependent DNA methylation
- Reverse breeding
- Synthetic genomics