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The Future of Sugar Beet in Europe

The role of plant breeding innovation in the sugar beet value chain

- Innovation in plant breeding has helped farmers for centuries to plant resilient, nutritious and high-yielding crops. Today the increased understanding of plant genetics allows us to more efficiently improve plant phenotype and performance and breed varieties that require reduced amounts of fertilisers, pesticides or water.
- With fewer agricultural inputs and better quality sugar beet, European farmers and the sugar beet value chain will improve their global competitiveness and support the growing European bio-economy.
- In considering the regulatory approach to some of the recent plant breeding methods, policymakers should rely on scientifically sound understanding of their benefits and specifics. If a plant variety obtained by one of the latest methods is identical to a variety derived from an earlier breeding method, or could occur naturally, it should not be subject to different or additional regulatory oversight.
- The sugar beet value chain wishes to cooperate with the European Commission and the EU Member States to apply a proportionate, non-discriminatory and enforceable classification of the latest plant breeding methods that stimulates the development of a more sustainable agriculture in Europe.

Relevance of plant breeding innovation for European agriculture

Europeans have been cultivating sugar beet for over 200 years, relentlessly seeking ways to improve the sustainable production of sugar and ensure reliable supply of this natural product. Plant breeders are the first link in a European sugar value chain which counts some 140,000 farms in 21 countries and that provides for over 80% of the EU's domestic sugar¹. The crop also serves as animal feed as well as raw material for the production of bioenergy and bioplastics for a sustainable EU economy.

Today the agricultural sector is looking to further reduce its environmental footprint. Scientific progress is invaluable in the search for solutions across the whole production chain, starting with innovation to improve the seeds. For centuries farmers have relied on plant breeding innovation for planting more resistant, nutritious and high-yielding crops. Our growing understanding of plant genetics and how genes govern certain traits allow us to more efficiently improve the plant phenotype and performance. The latest breeding methods such as genome editing make it possible to achieve the desired changes within the seed with more precision and fewer breeding cycles. Most of these changes could also be achieved with conventional plant breeding or could spontaneously occur in nature, and therefore the genetic makeup or properties of such genome-edited plants do not differentiate from conventionally bred plants.

¹ Self Sufficiency rate of EU-28 in 2015/16 according to [EU Sugar Balance](#) (December 2016 update); CIBE

Unlocking the potential of sugar beet

Continuous innovation in plant breeding unlocks the potential of sugar beet and adapts the crop to the needs of farmers, the environment and the bio-economy. The stable integration of genetic information between related sugar beet plants through conventional backcrossing takes at least four years, while innovative methods can achieve targeted integration of desired traits in two years. Research in cell biology and the identification of relevant genes, also in wild relatives of beet, foster the robustness and precision of plant breeding by generating new genetic variability that can significantly speed up the development of new, well-adapted, stable, healthier high-yielding sugar beet varieties.

Targeted trait improvement has some very important practical applications:

- ***Fight pests and diseases:*** Many insect pests and diseases in sugar beet, such as aphids or Cercospora leaf spot, can only be controlled by the use of chemicals or by variety selection. The only way to manage the disease Rhizomania is by building genetic resistances. With fewer chemical options expected to be available in the future, plant breeding innovation can ensure an extensive use of the plant's own genetic variation to ward off harmful insects and diseases. Faster identification and recombination of resistance genes will enable the development of new sustainable resistance within the crop.
- ***Mitigate climate change effects in agriculture:*** Strengthened plant resilience to diseases, drought or other abiotic stresses, and to soil degradation triggered by climate change, will help the sugar sector value chain ensure stable supplies despite shifting environmental conditions. Sugar beet that is inherently resistant to external threats will also require reduced use of water, pesticides and fertilisers.
- ***Sustain farmers' livelihood:*** European farmers who grow improved sugar beet of higher yield and quality can use fewer agricultural inputs and produce more efficiently. This will improve their competitiveness with sugar cane producers or alternative sugar sources from overseas. This is critical for sugar beet growers and the processing industry trading sugar and by-products of beet in an increasingly volatile globalised market environment.
- ***Create new opportunities for the bio-economy:*** The uses of sugar beet and its by-products in the growing European bio-economy are numerous. Improved sugar beet could be further diversified through local production of specialty beets, for example, with enhanced fibre content or sugar profile. This will expand the role of farming in renewable raw material production and optimise the sugar business chain by extending its product portfolio.
- ***Put the EU's policy priority of jobs, growth and investment into practice:*** Biotechnology, and hence modern plant breeding, is one out of six Key Enabling Technologies that have been identified to offer huge potential for providing benefits to society and sustain significant growth and employment in the EU, where SMEs are expected to play an important part.

The future of plant breeding and seed production in Europe

Today new plant varieties are subject to variety registration and seed certification, as set out in 12 different EU Directives. These are complemented by the principles and requirements according to the General Food Law and the legislation on plant protection products, ensuring a high level of safety of all new plant varieties. The EU GMO legislation provides additional regulatory oversight of those plants where genes or gene sequences from foreign species have been deliberately transferred. Even though existing legislation already ensures a high level of protection, European regulators have been reluctant to provide clarity under these frameworks for the latest plant breeding methods.

This persistent uncertainty discourages investment in R&D by the seed sector in the long-run and could hinder the sugar beet value chain from achieving its sustainability goals and meeting societal

expectations. In 2012 the value of the EU seed market represented 20% of the global share and the sector strives to maintain its competitiveness with other markets.²

Towards a consistent and scientifically sound understanding

The sugar beet value chain wishes to cooperate with the European Commission and the EU Member States to foster a scientifically sound understanding of the benefits and specifics of the latest breeding methods such as genome editing. These methods need to be judged in a differentiated manner when evaluating if any of the resulting products require additional regulatory oversight. If a plant variety obtained by one of the latest methods is identical to a variety derived from an earlier breeding method, or could occur naturally, it should also be regulated like the variety obtained by the earlier method. Therefore, products obtained through the use of the latest plant breeding methods are not covered by the EU legislation on GMOs and do not require an additional level of scrutiny.

Building on the available comprehensive scientific expertise, such as the explanatory note provided by EU's own Scientific Advice Mechanism³, the Commission and Member States should provide certainty and predictability for Europe's plant breeders and their downstream customers when addressing the regulatory frame. This will result in an appropriate classification of products derived from the most recent breeding methods: one that is proportionate, non-discriminatory and enforceable, and that stimulates the development of a more sustainable agriculture in Europe along the value chain.

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² [European Parliament - Overview of the agricultural inputs sector in the EU](#) (July 2015)

³ Science Advice Mechanism [New techniques in Agricultural Biotechnology](#) (February 2017)