

SEEDING
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Keeping the Balance between Innovation and Precaution.

Plant breeding is facing revolutionary changes. New methods such as CRISPR/Cas have the potential to contribute significantly to the sustainable development of agriculture. However, it is still discussed whether regulatory restrictions should apply. In evaluating the new methods, a comprehensive assessment of opportunities and risks will be crucial, as is the case with any innovation. A balanced application of what is called the precautionary principle is also key.

With new methods such as CRISPR/Cas, plants can be bred much faster and more precisely than has been the case so far. Not only can large corporations apply the new methods relatively easily; small and mid-sized companies can too.

The new methods of genome editing have long since attracted the attention of politicians, the media, and the general public. The ongoing discussion centers on the opportunities and potential risks. The Member States of the EU play a central role in this debate. They decide on possible regulatory requirements in specific cases and set the direction for an assessment at a pan-European level.

The German federal government has recently specified its position on the new methods. It takes the stance that for the release and marketing of plants produced with new breeding methods such as CRISPR/Cas “in accordance with the precautionary principle and the innovation principle, a high level of safety is ensured.” The federal government also points to the assessments that are conducted on a case-by-case basis. In making such assessments – which can be carried out by the EU Member States – it depends on how the so-called precautionary principle is applied. This principle stipulates that new technologies can be prohibited if they could cause harm to humans or the environment.

The viewpoint of KWS SAAT SE is that the application of certain breeding methods does not pose a particular risk per se, whether the method is crossbreeding, mutation breeding, marker-assisted selection, or one of the new breeding methods. In this newsletter, we invite you to get some insight into our position and the advantages of a balanced application of the precautionary principle.



Precaution Is Better than a Cure.

The new methods enlarge the plant breeders' toolbox. With genome editing, breeding goals can be reached faster and more precisely, and genetic variation can be broadened for greater diversity of varieties.

The following, for example, can be achieved:

- Securing yield progress
- Improved plant resistance to diseases, pests, and abiotic stress
- High quality of seed and agricultural products
- Reducing the use of resources
- Increasing energy and nutrient content
- Breeding progress for orphan crops too or crops that can be bred conventionally only with extensive effort

A comparison shows what great opportunities genome editing offers: breeding a sunflower with certain traits takes at least seven plant generations in traditional crossbreeding and combination breeding. With the CRISPR/Cas method, only two generations are necessary.

To protect ecosystems and satisfy the nutritional needs of humankind, plant breeders need to rely on future-oriented innovations. It is clear, however, that progress at any cost cannot be accepted. It is important to take the possible risks of innovations into account. Every new technology could harbor unexpected effects on humans and the environment. It is the responsibility of humans to take precautions.

Making a Balanced Decision.



Focusing on Balance

The plough, Mendel's laws, crossbreeding, mutation breeding – agriculture has been benefiting from new insights for hundreds of years. There is no progress without innovation, and there are no answers to new challenges without progress. New technologies such as genome editing can contribute to more efficient breeding of plants and more sustainable use of farmland. In order to evaluate the methods appropriately, a balanced view of opportunities and risks is key.

Taking Risks into Account.

The idea of precaution is a central focus in the political and business spheres. Especially in environmental decision-making, the precautionary principle plays a central role as a guideline both nationally and internationally. The goal is to avoid possible damage to the environment and health. This is especially true in cases where it cannot be determined how probable it is and if possible negative effects could be reversed.

However, it is important to use the precautionary principle in a balanced way since, based on this guideline, legislators could restrict the use of new technologies. The prerequisite is a current scientific risk assessment composed of three parts: assessment of risks, development of a risk management strategy, and information on potential harm.

Sometimes, unproven scientific findings are considered sufficient to prohibit certain innovations. The abstract idea of a risk is enough; mere doubts suffice. This poses high expectations for researchers and inventors, who have to prove the absence of any hypothetical risk. Logically, this is impossible.

This is also true for the new methods of genome editing. There is no guarantee that all hypothetically conceivable risks can be ruled out. One thing is certain though: with particular genome editing methods, breeders can only produce plants that are identical to those that have developed spontaneously in nature or were conventionally bred. Therefore, no results other than those that can also occur in established and widely accepted conventional breeding need to be assumed.



Focusing on Innovation

The more the idea of innovation is prioritized, the higher the probability becomes that sight is lost of potential risks and harm is done to humans and the environment.



Focusing on Precaution

The greater the focus on precaution, the higher the probability becomes that opportunities are missed because of hypothetical risks, thus missing the chance for sustainable development for the benefit of humans and the environment.

Innovation Enables Precaution.

Plant breeding looks back on a long tradition that started with crossing and selection. Later, new methods allowed for more effective plant breeding and for adapting varieties to the requirements of farmers or consumers and to climatic conditions. From this long experience, careful observation, and new scientific research, we know this: no specific risk results from the use of a particular breeding method, be it crossing, mutation breeding or marker-assisted selection.

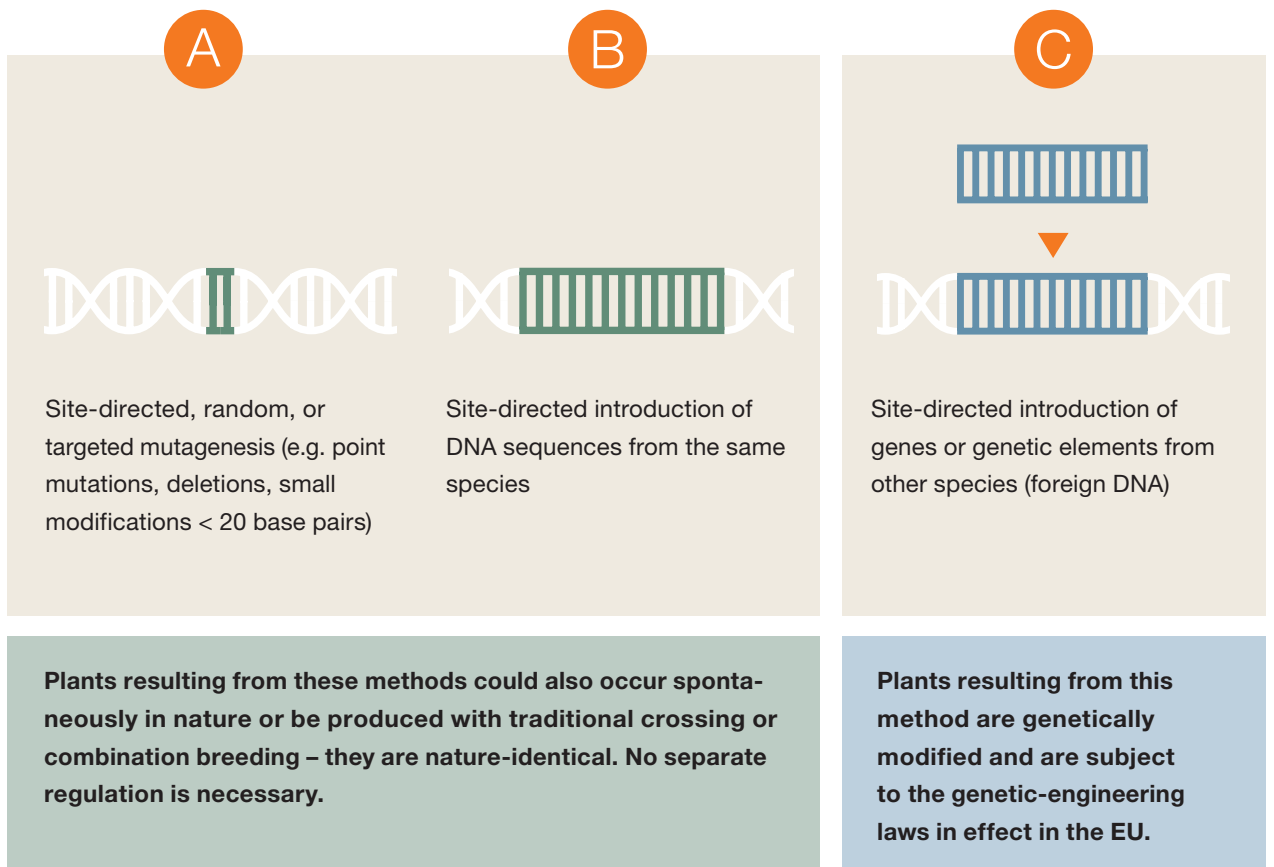
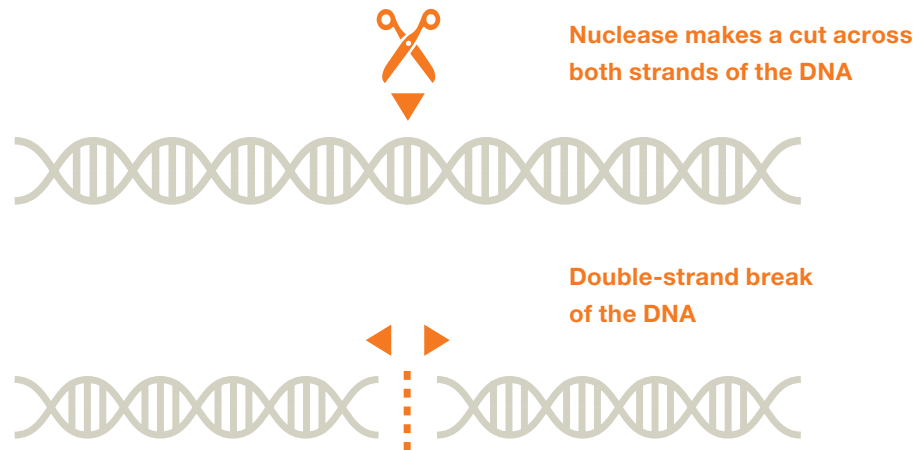
Experts conclude that many of the new breeding technologies complement established and traditional breeding methods. Statements made by the German Federal Office of Consumer Protection and Food Safety (BVL) show that plants produced using certain new breeding methods are to be viewed in the same way as conventionally bred plants. Competent authorities in other EU Member States, such as Sweden, Finland, Ireland, the UK, and Spain,

have issued similar statements. KWS SAAT SE concurs with this view and recommends a differentiated evaluation and responsible use of the new methods.

Innovation and precaution go hand in hand. Therefore, it is important to maintain a sound balance of progress and precaution when assessing new technologies and not to focus more on one of these guidelines than another. A balanced evaluation of opportunities and risks is key. An unbalanced approach could inhibit innovations and thus hamper the technological progress we need for solving current problems. Ultimately, the precautionary principle could undermine itself in preventing innovative technologies that allow for precaution in the first place.

One Method. Many Possibilities.

The application of the new genome editing methods can, from the regulatory point of view, produce plants that are nature-identical (example A and B) or genetically engineered (example C).



As a result, the different genome editing methods should be regarded on a differentiated basis.

Engaging in Open and Transparent Dialogue.

Plant breeding companies have a responsibility to take reservations and concerns seriously. As with all new technologies, it is important to be open to questions. That is why KWS stands for an open and transparent dialogue. We offer information and discourse on the new breeding methods and their

benefits for sustainable agriculture. We advocate a balanced approach to innovation and precaution and place great importance on constructive exchange in order to create a climate of understanding – in the interest of humans and the environment.

KWS SAAT SE*

KWS SAAT SE is a plant breeding company headquartered in Einbeck, Germany, with 4,850 employees in 70 countries. A company with a tradition of family ownership, KWS has operated independently for more than 160 years. It focuses on plant breeding and the production and sale of seed for corn, sugar beet, cereals, rapeseed, and sunflowers. KWS uses leading-edge plant breeding methods to continuously improve yield and resistance to diseases, pests, and abiotic stress. To that end, the company invested €182 million in the fiscal year 2015/16 in research and development, 17 percent of its net sales.

* All figures exclude the companies AgReliant Genetics, LLC, AgReliant Genetics, Inc., and KENFENG – KWS SEEDS CO., LTD., which are carried at equity

Would you like to participate
in active dialogue with us?
Go ahead – we are here for you.

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