New breeding techniques provide opportunities for more sustainable agriculture

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Products from new breeding techniques provide major opportunities for making agriculture more sustainable. This makes them a useful addition to common breeding practice, especially for crops where the desired variety improvements are currently very time-consuming, such as potatoes and apples. These findings are contained in a literature review

by Wageningen UR published in the renowned magazine *Trends in Plant Science*.

Scientific knowledge of genes and their functioning has increased considerably over recent years. To apply this knowledge in a useful way, new breeding techniques have been developed to achieve very specific results in the breeding process. For example, in rice, breeders have now switched off one particular gene via a specific targeted mutation so that the rice plant is no longer susceptible to a certain pathogen and requires less spraying with fungicides. The specific mutation is induced via a gene or protein which is temporarily inserted into the plant cell. This process is called gene editing.

Modern breeding techniques

The switching off of genes via mutation was until recently only possible in a non-targeted way. In addition to gene editing, other modern breeding techniques have now been developed to allow for more specific breeding. The first crops to benefit from these new techniques are currently being marketed outside of the Netherlands. Based on recent studies Wageningen scientists expect that breeders will be using the techniques over the coming years to develop varieties that are more resistant against various abiotic stress factors such as drought and heat, or that do not contain harmful allergens. Plant breeders are currently using the techniques to develop wheat, which is safe for patients with celiac disease, for instance.

GMO Directive

The status of the new breeding technology in relation to the GMO Directive will be important if breeders are to apply the techniques to varieties in Europe. The question is whether or not the use of a specific

new breeding technique results in a genetically modified organism, and, if so, whether the products of the technique will be exempt from the European GMO Directive. The European Commission has announced that it will establish a legal definition of the new breeding techniques within the framework of the GMO Directive in 2016.

More information: Jan G. Schaart et al, Opportunities for Products of New Plant Breeding Techniques, *Trends in Plant Science* (2015). DOI: 10.1016/j.tplants.2015.11.006

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