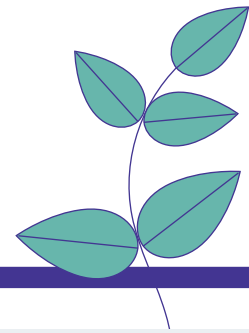


Appendix V

FEED YOUR MIND

GENOME EDITING: AN EVOLUTION IN PLANT BREEDING



Genome editing is a tool that plant breeders can use to introduce new traits into crops.

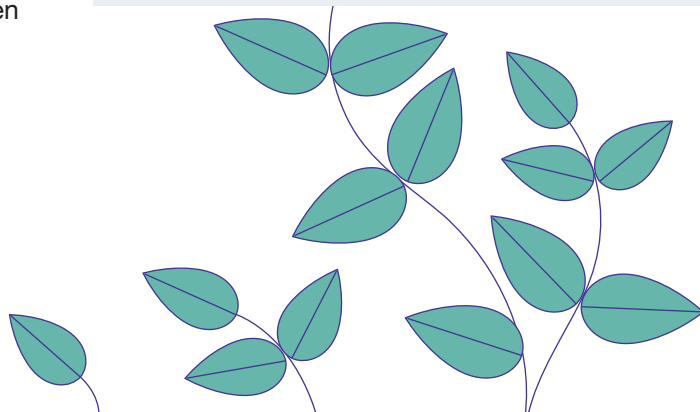
How Does It Work?

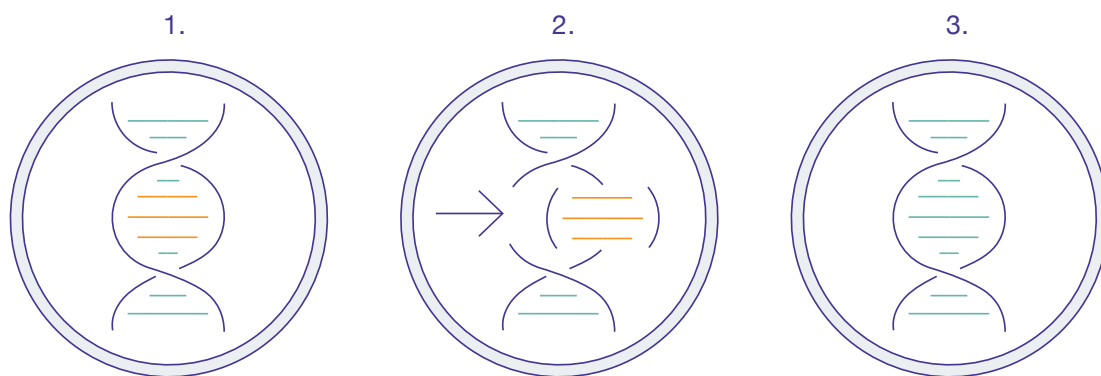
Genome editing allows plant breeders to make changes to plants more quickly and more precisely than through traditional plant breeding methods. It can take plant breeders decades to introduce a new trait into a crop through traditional breeding methods, while genome editing has the potential to shorten that timing to a few years.

Genome editing can be used to add, remove, or alter DNA in the plant genome.

Did you know?

A **genome** is the complete set of DNA (genetic material) in an organism, such as a plant or animal. **DNA** is the molecule inside cells that carries genetic information.





One example of genome editing is removing an unwanted gene.

How Is Genome Editing Different Than Other Biotechnology Tools?

Genome editing allows plant breeders to make very precise changes to DNA compared to other biotechnology tools. Genome editing can be used to make changes to a plant or other organism by targeting a specific location in a gene within the DNA. There are other genetic engineering techniques that can be used to make genetic changes to DNA at a specific site, but they are much less efficient than genome editing.

Tools for Genome Editing

There are several genome editing tools that scientists can use. CRISPR is a genome editing tool that you may have heard of. The scientists

who developed CRISPR received a Nobel Prize for their work. Other genome editing tools, such as ZFNs and TALENs, remain important tools for plant breeding. For example, TALENs were used to develop the first genome-edited plant to be commercially grown in the United States and sold as a food product: soybeans that produce high oleic, low linolenic oil that is a healthier alternative to partially hydrogenated oils.

Why Use Genome Editing?

Plant breeders are using genome editing to develop food crops to address the needs of a growing global population and to develop plants that can handle changing environmental conditions, such as varieties of disease-resistant cacao for more sustainable chocolate production and tomato plants that are better suited for indoor and urban farms.

Get more information about GMOs at
www.fda.gov/feedyourmind.



Sources: <https://link.springer.com/article/10.1007%2Fs00424-020-02497-9>

<https://www.frontiersin.org/articles/10.3389/fsufs.2021.685801/full>

<https://www.eurekalert.org/news-releases/731483>, <https://www.eurekalert.org/news-releases/830995>