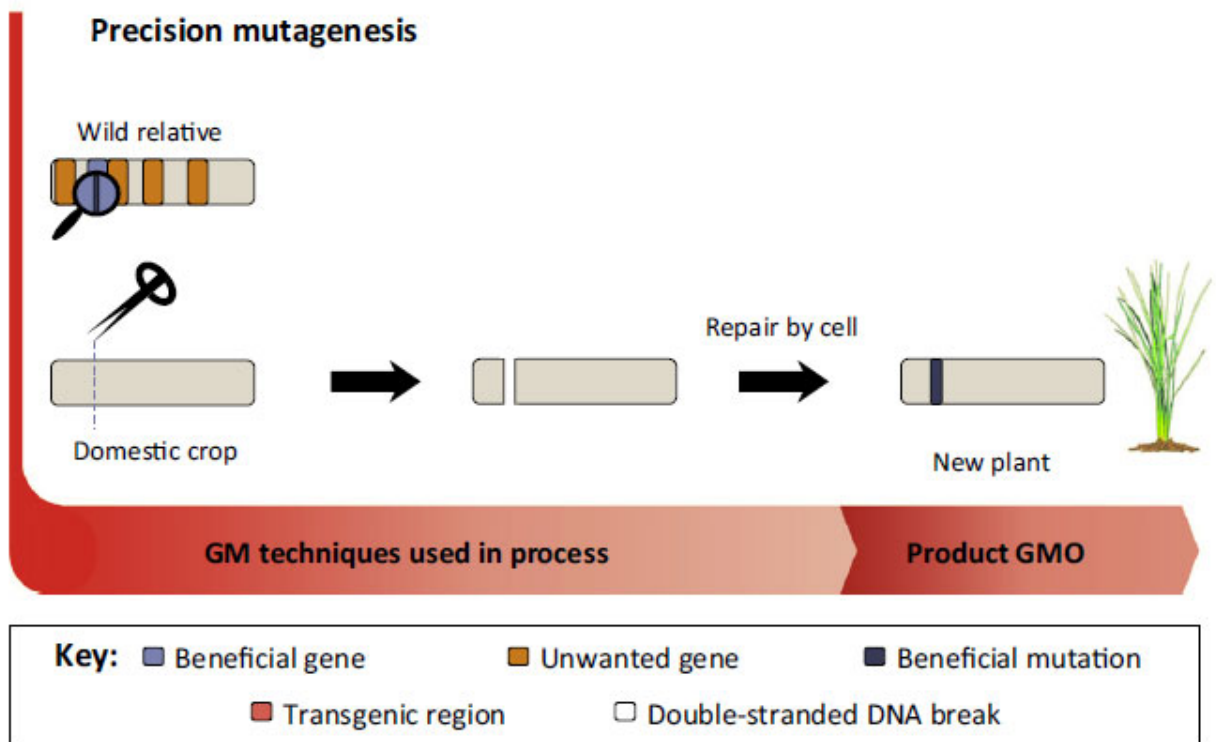


Scientists see a natural place for 'rewilded' plants in organic farming

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Precision breeding, also called "genome editing," is a new technique in plant breeding that offers even greater precision than cisgenesis. Products are currently considered GMOs by the European Union. Credit: Andersen et al./*Trends in Plant Science* 2015

One of the key elements of organic agriculture, as defined by the International Federation of Organic Agriculture Movements (IFOAM),

is that it rejects unpredictable technologies, such as genetic engineering. But what if adding a gene from undomesticated plants to bring back a natural trait isn't unpredictable, argue Danish scientists, ethicists, and legal experts in a review published May 28 in *Trends in Plant Science*. They present a case for using precise genetic engineering technologies to "rewild" crops in a way that would make organic farming more efficient, and thus more profitable.

The concept behind "rewilding" is that grocery-brand fruits and vegetables have been made weak by generations of breeding for traits that yield the best harvest, and so a way to toughen them up would be to add genes found in their wild cousins, which are less bountiful but more resilient to pests, drought, and other challenges.

"The corn we eat does not live in nature anymore," says senior author Michael Palmgren, a plant and environmental scientist at University of Copenhagen. "It's like how we turned a wolf into a poodle. During breeding you select for specific characteristics, but then you risk losing others because you're not selecting for them. If you wanted to strengthen a dog, you would breed it with a wolf."

Theoretically, corn-strengthening mutations could occur naturally through long-term breeding programs, and so the question for debate is whether hastening the process through [genetic engineering](#), ethically and legally, would be able to benefit organic farmers who are not allowed to use the pesticides, weed-killers, and fertilizers that define conventional agriculture.

While no "rewilded" crops have yet been created by inserting a trait, a 2014 Nature Biotechnology paper (10.1038/nbt.2969) showed that it is possible to make bread wheat crop resistant to mildew by removing DNA from three locations, thereby allowing offspring of this plant to pass on this benefit. This product could have been made through

traditional breeding, so it challenges the unpredictability that is currently associated with genetic engineering.

"In current legislations, a plant is considered natural if it's mutated by chemicals and radiation—that happens in nature," Palmgren says. "If you can make a precise mutation that has the same effect and you don't introduce new material, then this type of plant should also be an exception."

He specifically collaborated with ethicists and [legal experts](#) to determine that yes, this type of precise "rewilding" is in accordance with values of [organic agriculture](#). They believe that, at least outside of the European Union where there are fewer restrictions on [genetically modified organisms](#) (GMOs), it would be legally compatible to introduce this technology without labeling the plants as GMOs.

"Originally, when the whole idea of transgenic [plants](#) came up—that you can take a gene from a bacteria or a fish and put it in a corn—we as plant scientists were excited about the technology and didn't understand the objections," Palmgren says. "This is a new program, and I've learned to have discussions and debates with people in other fields from the beginning so that we do not repeat past mistakes that affected public opinion."

More information: *Trends in Plant Science*, Andersen et al.:
"Feasibility of new breeding techniques for organic farming"
[dx.doi.org/10.1016/j.tplants.2015.04.011](https://doi.org/10.1016/j.tplants.2015.04.011)

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