

GENE EDITING

Learning Lessons from Nature

Modern society is built on a system of agriculture made possible by the cultivation of plants. Those plants have physical characteristics determined by their genetic structure. In other words, their insides determine their outsides.

Close Observation

Throughout history, humans have observed plant characteristics—features like how well they withstood weather and pests, appearance of leaves and flowers, quality of fruit—to decide which we preferred to plant again.

Following Nature's Example

Similar to natural selection, mankind has made decisions about which plants to cultivate, seeking crops that will best adapt to their environment. Studying and assisting nature's process has also helped us reduce our environmental impact over time.

AN INTRODUCTION

to Gene Editing

As our understanding of genetics has evolved, so has our ability to make improvements to plants. We are now able to base those decisions on what we see inside the plant, as well as what we see on the outside. One of the tools that enables this is gene editing, which allows plant scientists to make precise improvements within a plant's DNA.

Gene editing can be used to make three kinds of changes

Deactivate an unfavorable characteristic (such as disease vulnerability)

Enable a beneficial characteristic (such as drought tolerance or improved nutrition)

Break genetic linkages between genes conferring positive traits (like disease resistance) and those conferring less desirable traits (like drought sensitivity), generating plant varieties with the most desirable combinations of traits.

Why It Matters

Provides greater precision

Capable of enabling improvements not achievable with previous methods

Uses genetic material from within the plant's own family

Highly accessible tool which will encourage broad discovery across public and private research teams

WHO COULD BENEFIT?

Consumers

A system of agriculture that meets society's needs—like food variety and supply—while minimizing environmental impact

Farmers

Another tool that improves the pace and scope of innovation to deliver better seed products

The Planet

Farming solutions that allow for smarter use of inputs like pesticides, and natural resources like water, energy and land

THINKING LONG TERM

Our research partners are focused on one end goal: agricultural products that help ensure access to food with a minimal impact on the environment.

ACADEMIC RESEARCHERS

AGRICULTURE COMPANIES

Looking Toward THE FUTURE

Though agriculture products enabled by gene editing are still early in development, academics, industry researchers and regulatory agencies are already discussing how these tools will be reviewed to ensure their safe and responsible use.

Monsanto's research is always focused on delivering products that solve real problems for farmers, ultimately helping to meet the needs of a growing society while protecting the environment. We're committed to helping farmers, regulators and consumers feel confident in the sound science that supports the safety of our products.

To learn more about our research, visit Monsanto.com/Innovations.