INNOVATIVE SOLUTIONS FOR MORE SUSTAINABLE AGRICULTURE: NEW GENOMIC TECHNIQUES

CropLife EUROPE

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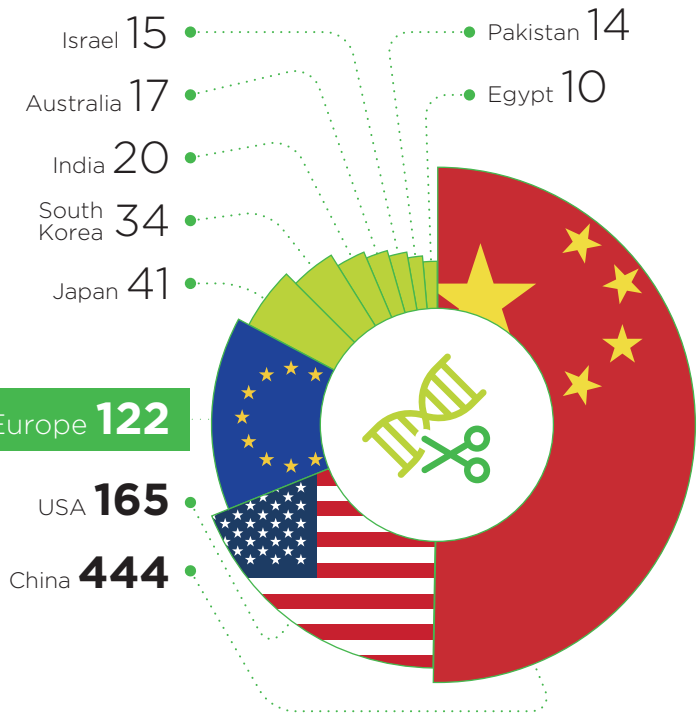
INNOVATIVE SOLUTIONS FOR MORE SUSTAINABLE AGRICULTURE

WHERE IS GENE-EDITING INNOVATION TAKING PLACE?*

In the list of countries where most gene-editing research on plant varieties is conducted –

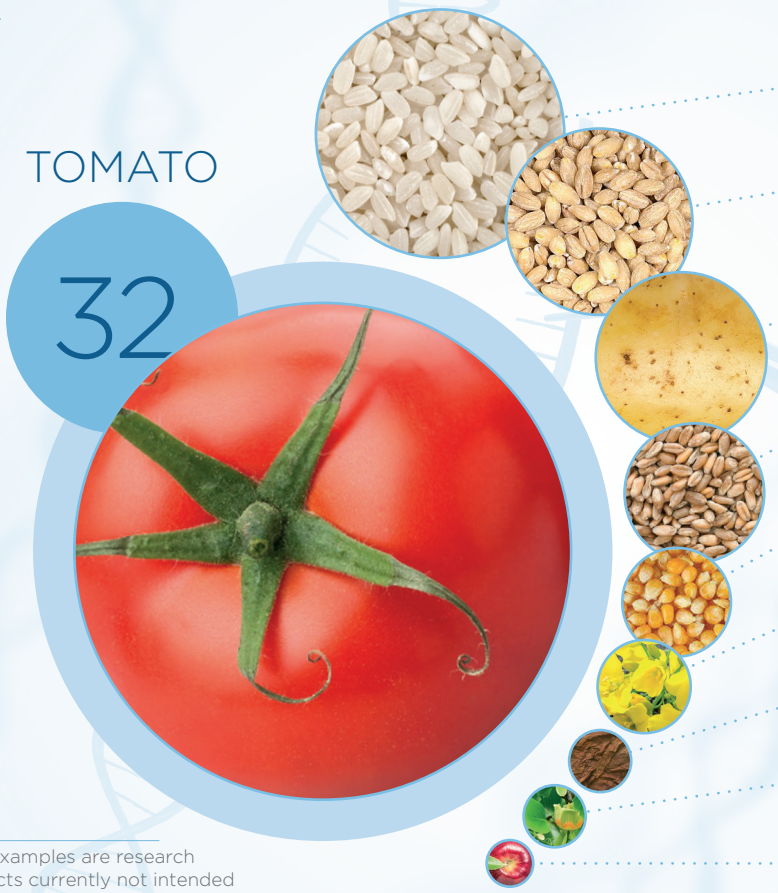
THE TOP 5 EUROPEAN COUNTRIES COMBINED (FR, DE, IT, BE, NL) PRODUCE LESS THAN 1/3 OF THE RESEARCH COMPARED WITH CHINA (93 VS. 444) AND SLIGHTLY MORE THAN HALF THAT OF THE USA (93 VS 165)

To ensure a resilient and competitive European agri-food sector, an enabling and science-based regulatory framework for NGTs is urgently needed to help translate innovative research into impactful commercial products.



* This infographic aims to provide a comprehensive yet easy to navigate overview of the status of plants, traits and overall diversity of New Genomic Techniques (NGTs). The data was collected on 9 January 2024 from the EU-SAGE database, a network representing plant scientists at 134 European plant science institutions.

TOP 10 CROPS WITH INNOVATIVE SOLUTIONS THROUGH NEW GENOMIC TECHNIQUES IN EUROPE*



- 16 RICE
- 12 BARLEY
- 11 POTATO
- 9 WHEAT
- 7 MAIZE
- 6 CANOLA
- 4 TOBACCO
- 4 POPLAR
- 3 APPLE

* The examples are research projects currently not intended for commercial use

IN EUROPE, NGT-RELATED RESEARCH IS FOCUSED ON TOMATO PLANT VARIETIES

Historically, tomatoes have had a "narrow genetic base" meaning that it's challenging to develop new traits

With the advent of **CRISPR technology**, more efficient breeding of numerous traits has become possible, such as:

- Characteristics of leaf, stem, and flower to increase yield, size of fruit, and reproductive qualities of plants
- Faster fruit ripening, quality and nutritional content

TOP 8 GENE-EDITED TRAITS IN EUROPEAN RESEARCH:

1. BIOTIC STRESS TOLERANCE
2. PLANT YIELD AND GROWTH
3. IMPROVED FOOD AND FEED QUALITY
4. INDUSTRIAL USE
5. PRODUCT COLOUR /FLAVOUR
6. STORAGE PERFORMANCE
7. ABIOTIC STRESS TOLERANCE
8. HERBICIDE TOLERANCE

While **HERBICIDE TOLERANCE** is frequently emphasized as a primary motive for employing New Genetic Technologies in crop development, European data reveals that **it ranks eighth** among the most prevalent gene-edited traits in the region.

LEARN MORE ABOUT THE 4 MOST POPULAR TRAITS AND HOW THEY CONTRIBUTE TO A MORE SUSTAINABLE FOOD SYSTEM

1 BIOTIC STRESS TOLERANCE

Resistance to malnutrition in cherry tomato (FR)

Increasing the resistance of cherry tomato varieties to pathogens helps reduce the use of pesticides during cultivation.

2 PLANT YIELD AND GROWTH

Increased fruit size and fruit number per tomato plant (DE, FR)

Crops with higher yield and faster growth are pivotal to a more sustainable agricultural system. The input requirements, ranging from land-, water- and herbicide-use are substantially lowered, while the plant variety itself can be made to produce additional and larger edible parts.

Of the 179 peer-reviewed articles on traits related to increased plant yield and growth, 151 are from China. This highlights the massive concentration of innovative research on sustainable agriculture that is happening outside of Europe.

3 IMPROVED FOOD AND FEED QUALITY

Removing allergens in Mustard plants to tackle food allergies (DE)

Gene editing techniques have shown to be successful in reducing the effect of allergenic components in several plant varieties. This allows citizens to enjoy food they otherwise would not be able to consume.

4 INDUSTRIAL USE

Jointless tomatoes (FR, BE)

In tomato, floral stems that remain attached to harvested fruits during picking mechanically damage the fruits during transportation. A French research institute aims to provide tomato varieties without floral stems, to minimise loss and food waste.

THE MOST COMMON GENE-EDITING TECHNIQUE AND ITS RELEVANCE TO THE EUROPEAN UNION REGULATION FOR PLANTS OBTAINED BY CERTAIN NEW GENOMIC TECHNIQUES: **CRISPR-Cas9**

A powerful Nobel-Prize awarded technology that enables the editing of parts of a genome by removing, adding or altering sections of the DNA sequence. It is currently the simplest, most versatile, and precise method of plant breeding.

Gene-editing, through the use of CRISPR, enables scientists and plant breeders to introduce desired properties into crop plants in a much more targeted and faster manner. Depending on the type of crop and trait, the breeding cycle can be shortened. For example for apples, the breeding cycle can be reduced from 15-50 years to 5-8 years.*

Gene-editing can help to generate climate adapted and other beneficial crops in a more efficient manner. This is important in view of the current climate crisis and the need to protect our environment and support biodiversity.

* https://data.consilium.europa.eu/doc/document/ST-11710-2023-INIT/en/pdf

CROPLIFE EUROPE CALLS ON EUROPEAN LEGISLATORS TO TAKE QUICK ACTION AND DRIVE FORWARD AN ENABLING AND SCIENCE-BASED REGULATORY FRAMEWORK FOR PLANTS DEVELOPED THROUGH NGTS.

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