

Workshops

Attending a Workshop on Organic Plant
Breeding at SEKEM Farm Organized By EBDA







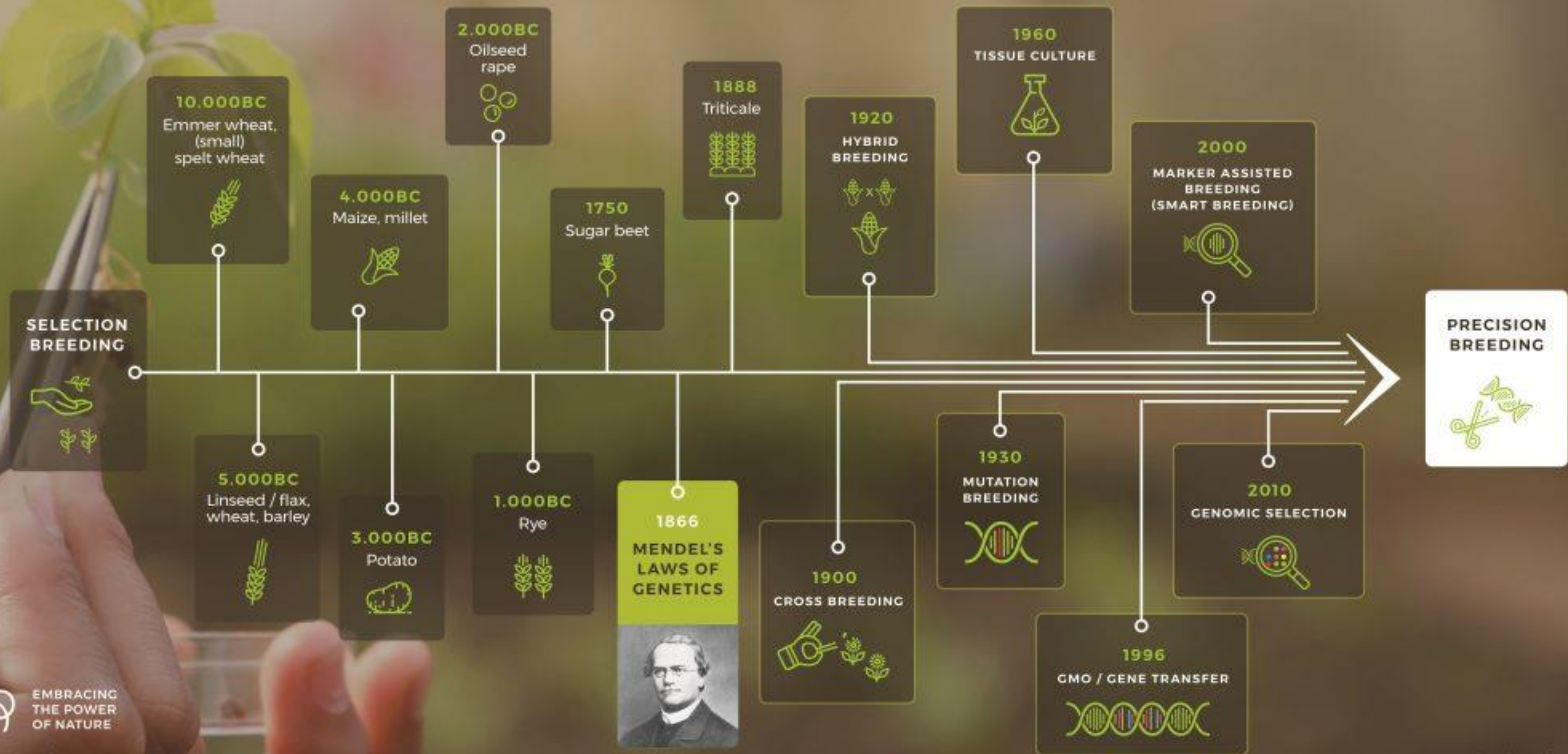
Modern Plant Breeding

How can we apply this to organic breeding?

Hend Elsawey

08.05.2025

Milestones in Plant Breeding



Benefits of Modern Breeding

- Faster development of resilient crops.
- Reduced pesticide use.
- Enhanced nutrition.
- Addressing climate change.





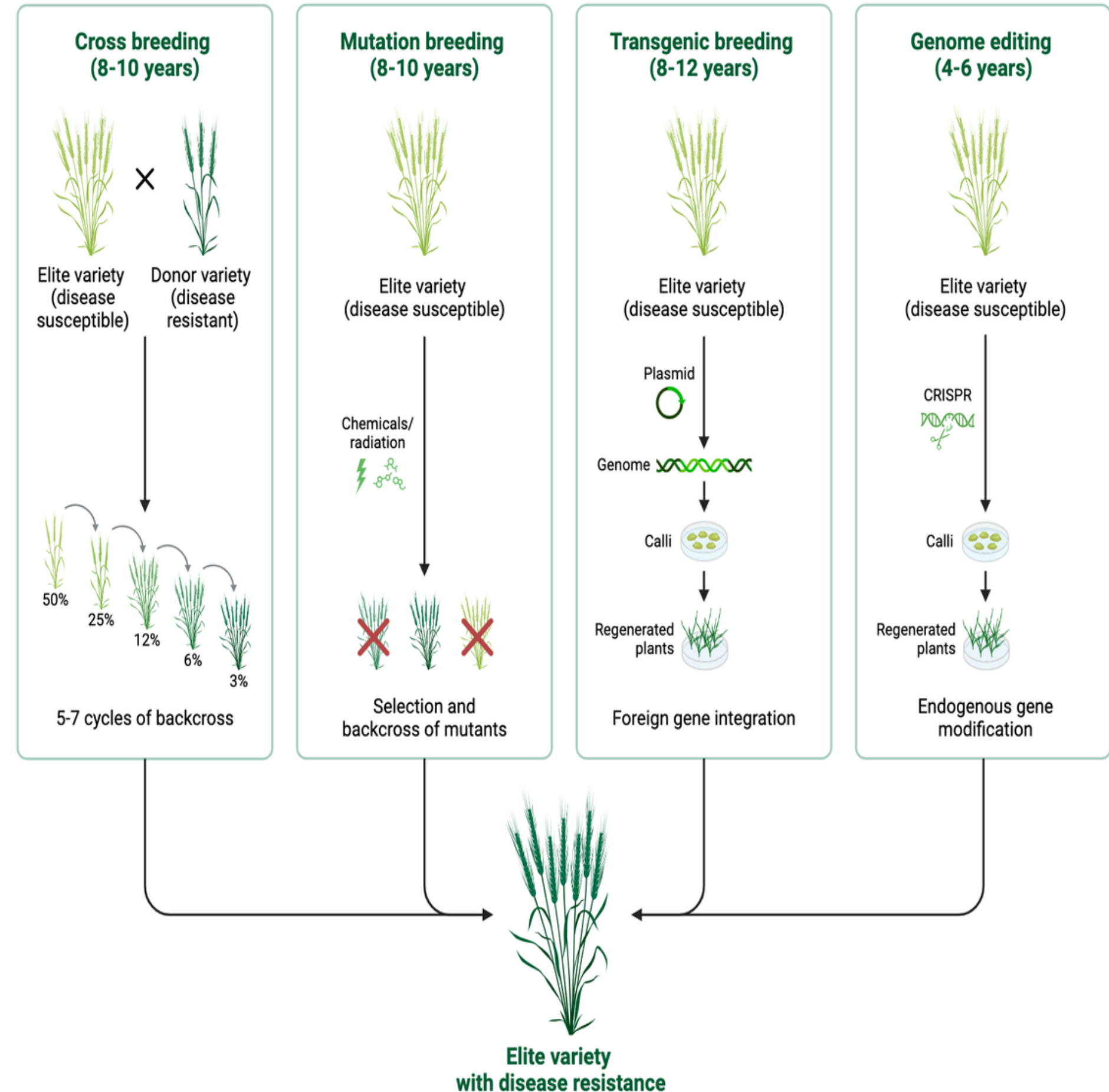
Traditional vs. Modern Breeding

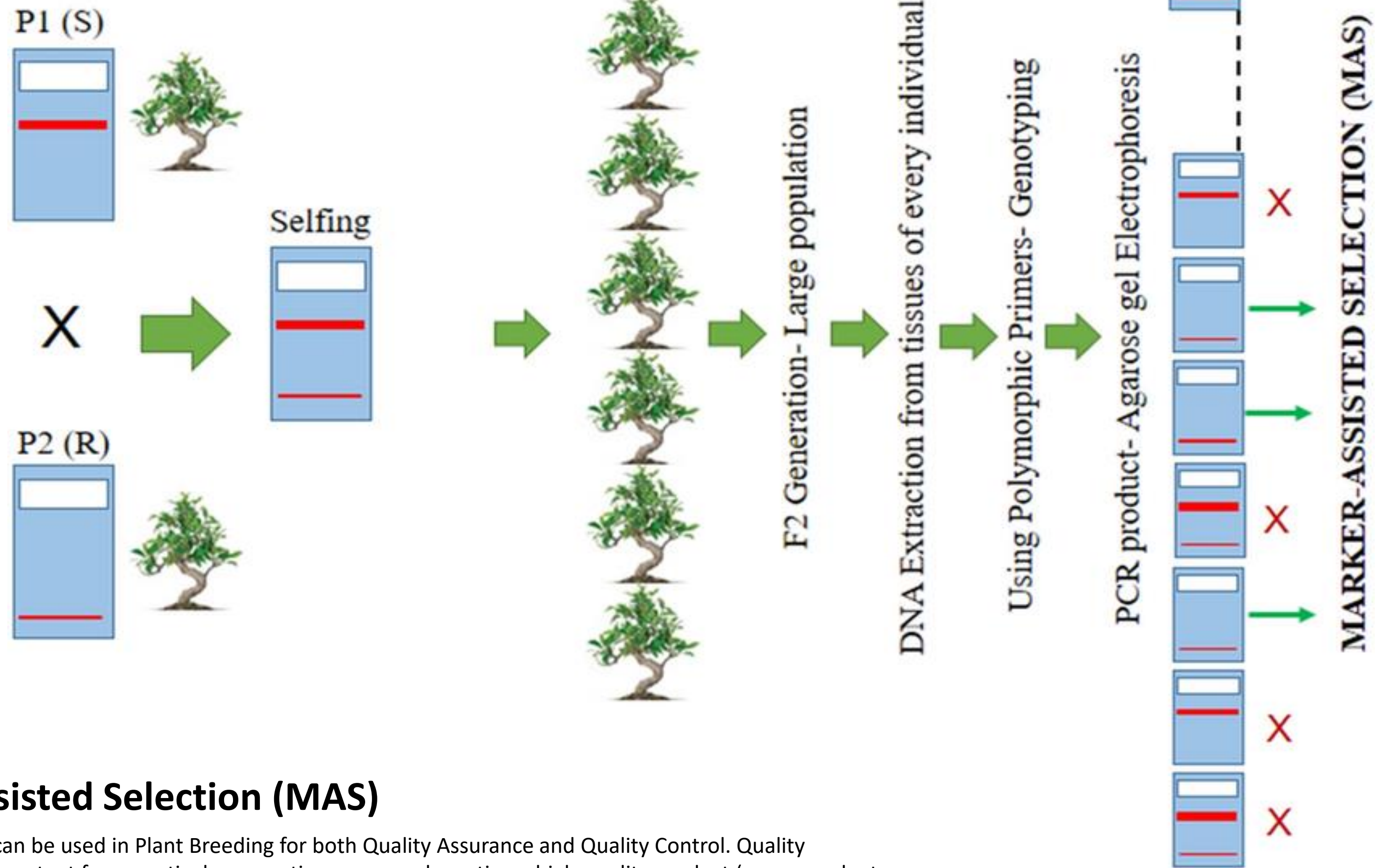
Feature	Traditional Breeding	Modern Breeding
Time	Decades	Years
Accuracy	Low	High
Tools	Cross-pollination	Genomics, CRISPR

Modern Techniques

- Marker-Assisted Selection (MAS) ✓
- Genetic Engineering
- CRISPR/Cas9 Genome Editing ✓
- Genomic Selection ✓

Plant Breeding Techniques

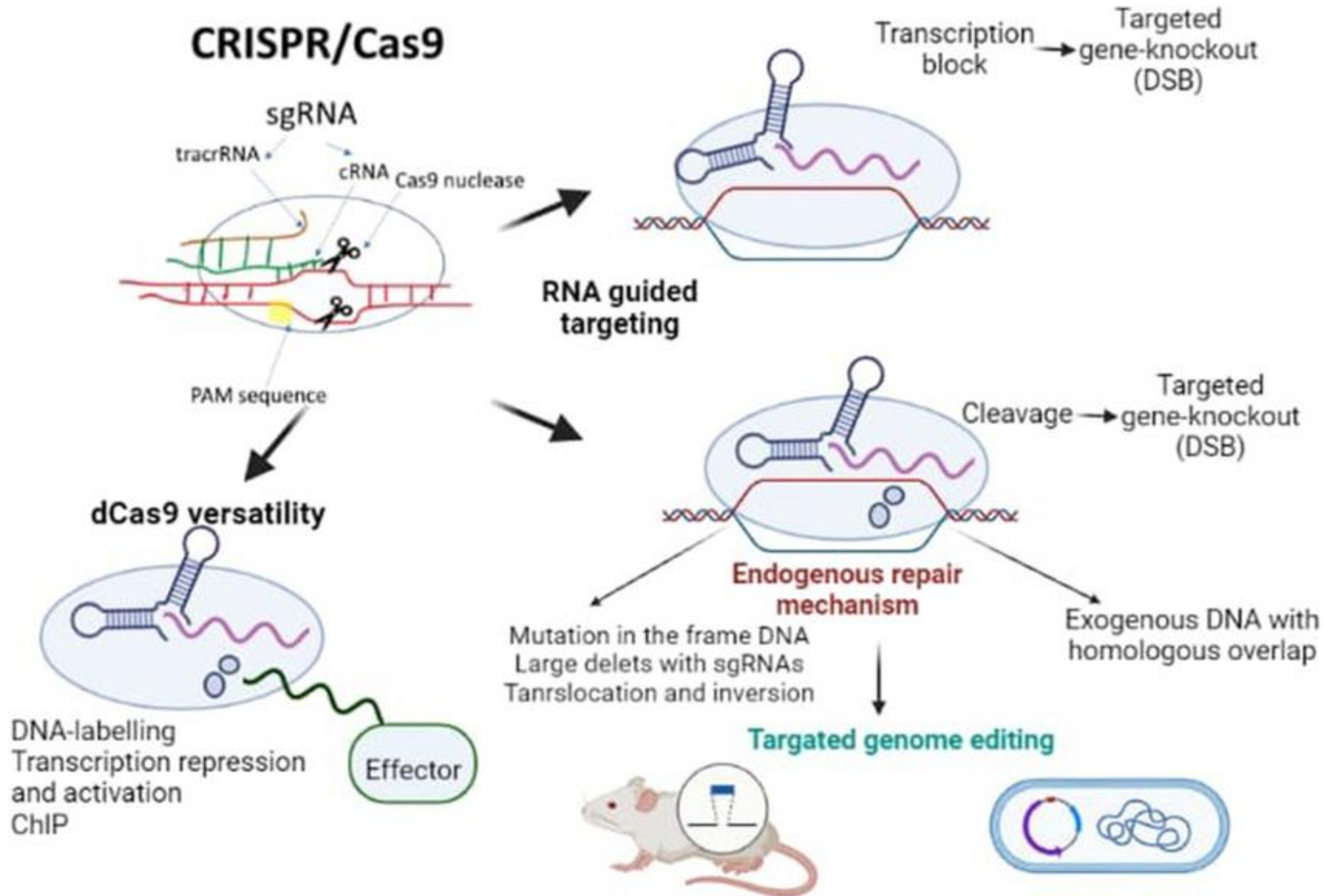




Marker-Assisted Selection (MAS)

Molecular markers can be used in Plant Breeding for both Quality Assurance and Quality Control. Quality Assurance (QA) is important for proactively preventing errors and creating a high-quality product (e.g. new plant variety) while Quality Control (QC) is targeted towards identifying defects or errors in the product.

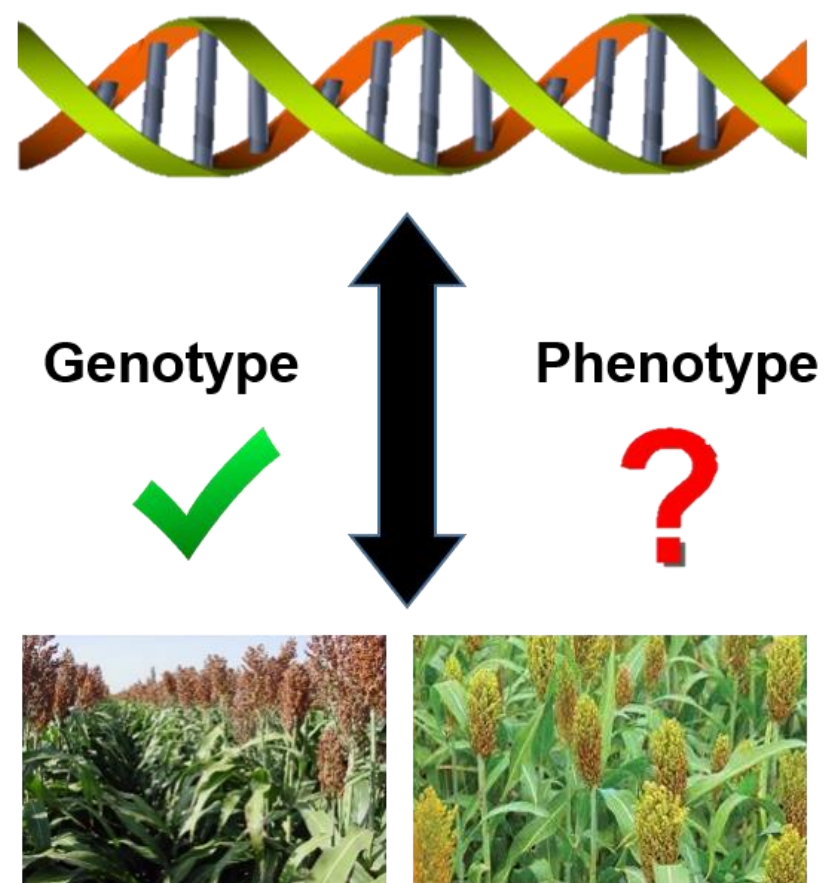
CRISPR/Cas9



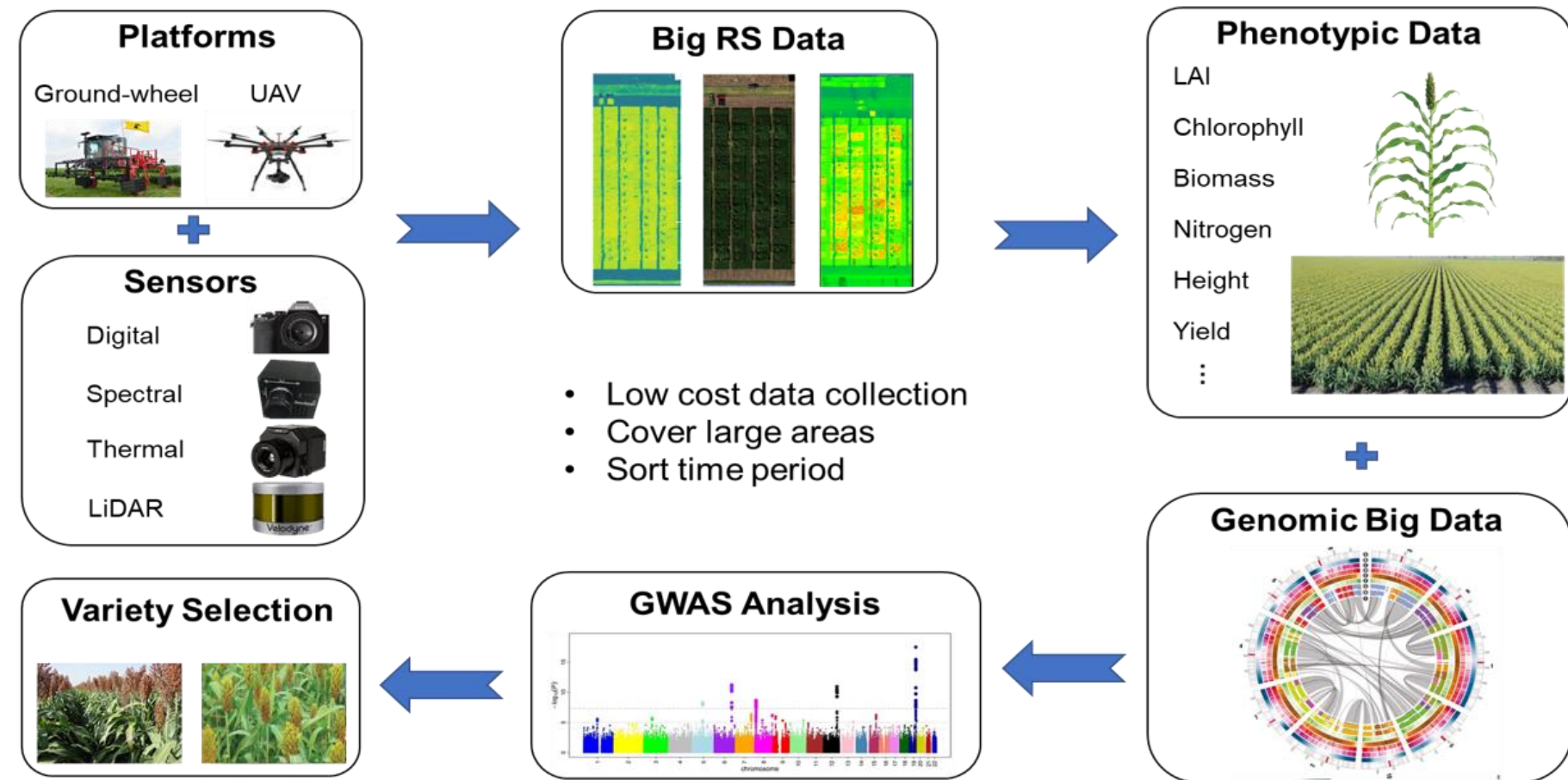
CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)



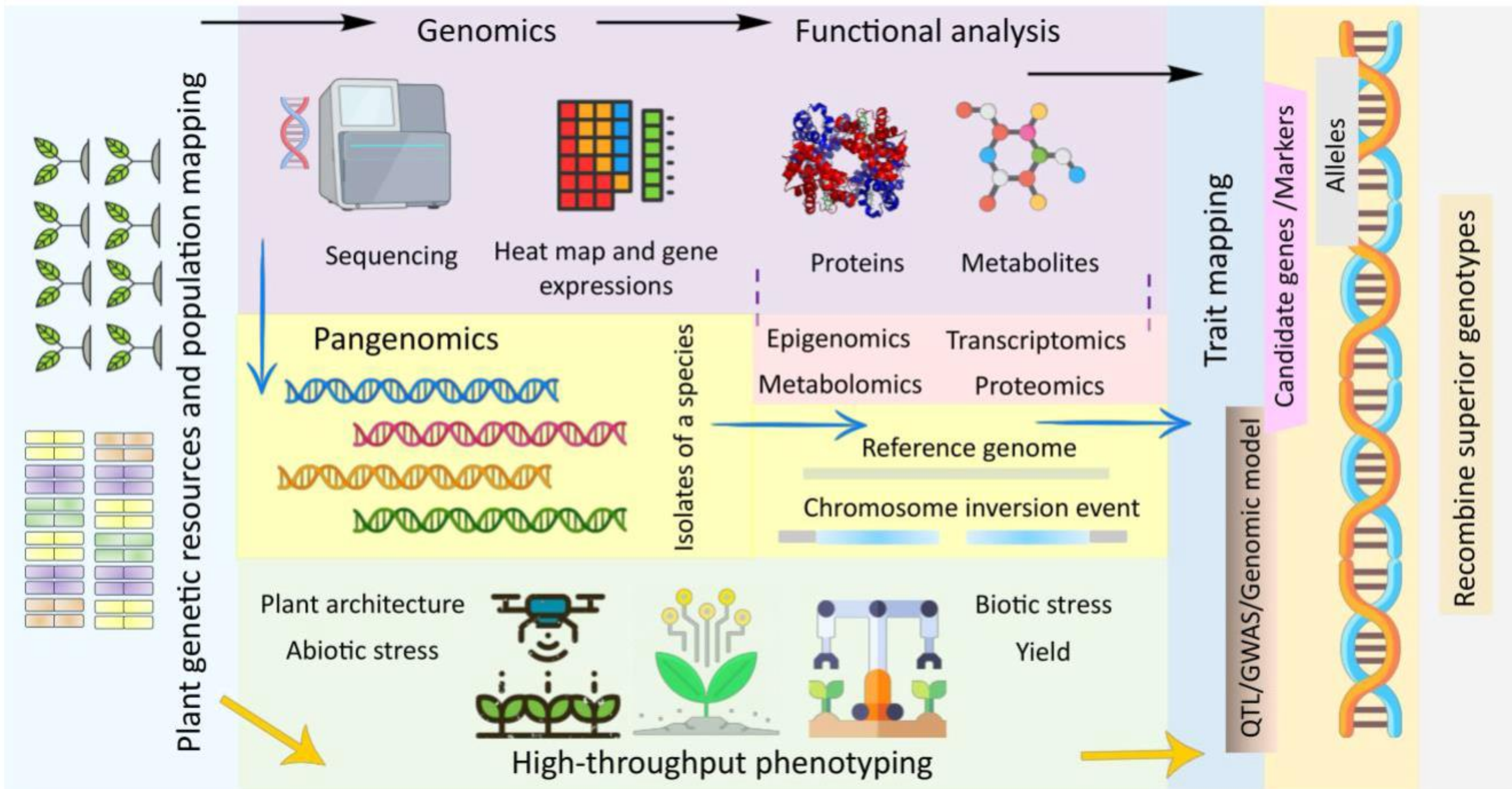
Traditional plant phenotyping



Genotype-to-Phenotype



High throughput phenotyping and genomic selection



Applying Modern Breeding in Organic Agriculture

- **Marker-Assisted Selection (MAS):**
Used to develop varieties resistant to pests and diseases without genetic modification—ideal for organic systems.
- **Genomic Selection:**
Accelerates identification of organic-suitable traits (e.g., weed competitiveness, nutrient efficiency).
- **Participatory Breeding:**
Farmers and breeders collaborate to tailor crops for organic environments.



Q & A

Open discussion

- **How can organic breeding effectively innovate when the use of certain modern technologies (e.g. CRISPR) is restricted**
- **What make the method prohibit in organic breeding?**
- **How can we shorten the process of producing new varieties using modern plant breeding**
- **How can organic breeders maintain and expand genetic diversity in the absence of GMOs?**
- **What are the challenges in developing regionally adapted organic varieties for diverse climates and soils?**

Thank you





Hend El Sawy <hend.elsawy@hu.edu.eg>

Fwd: Breeding Workshop

Angela Hofmann <Angela.Hofmann@sekem.com>

Sun, May 4, 2025 at 2:41 PM

To: Ayman Hafiz Eissa <ayman.hafez@hu.edu.eg>, Marwa Mokhtar Abdalgeleel Khairallah <marwa.mokhtar@hu.edu.eg>, Hend El Sawy <hend.elsawy@hu.edu.eg>

Dear all

We invite Dr.Marwa Mokhtar and eng.Hend ElSawy to the breeding workshop which will take place at sekem farm from Wednesday 7. until Saturday 10.5. Please check for details below.

Thank you and best regards

Angela

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