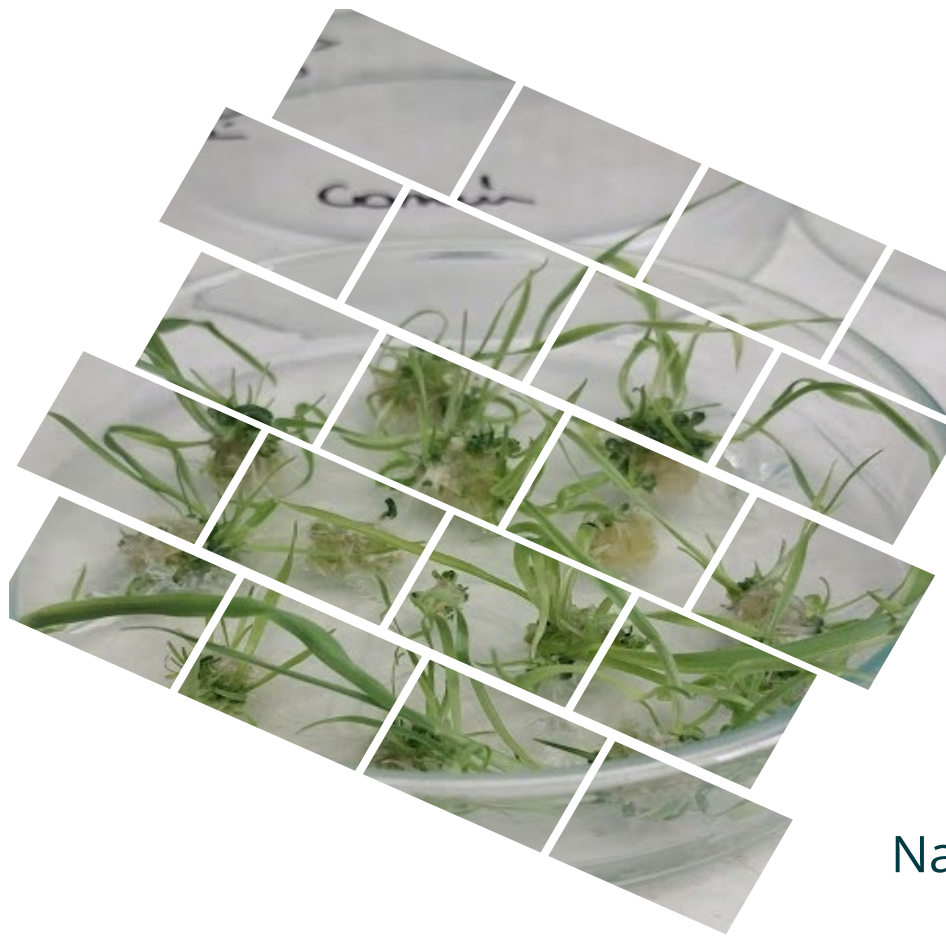


New Products:

From research & development to market



Seed Congress of the Americas



Dr. Ezequiel Bossio.

Coordinador de Área Genética Vegetal
Lab. de Modificación Genética Vegetal
Instituto de Genética
CICVyA-INTA

National Institute of Agricultural Technology (INTA)



Instituto de **Genética Ewald A. Favret**

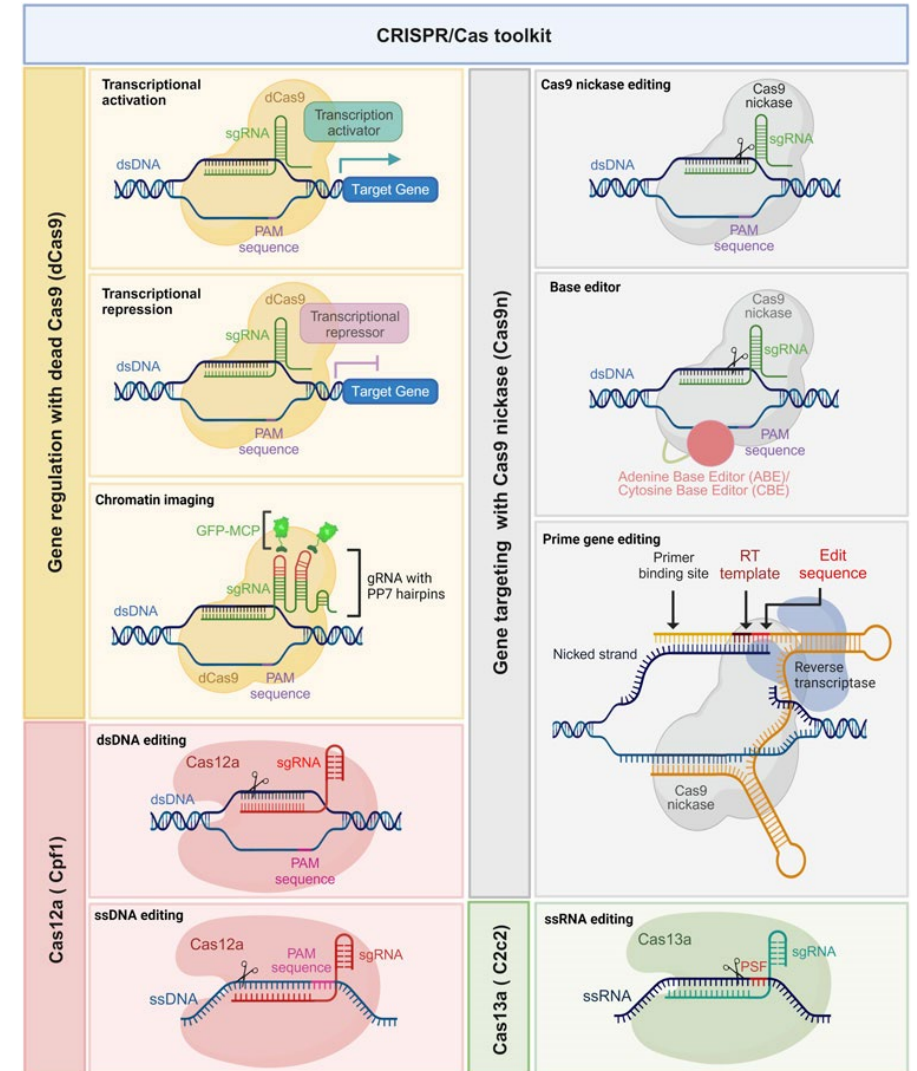
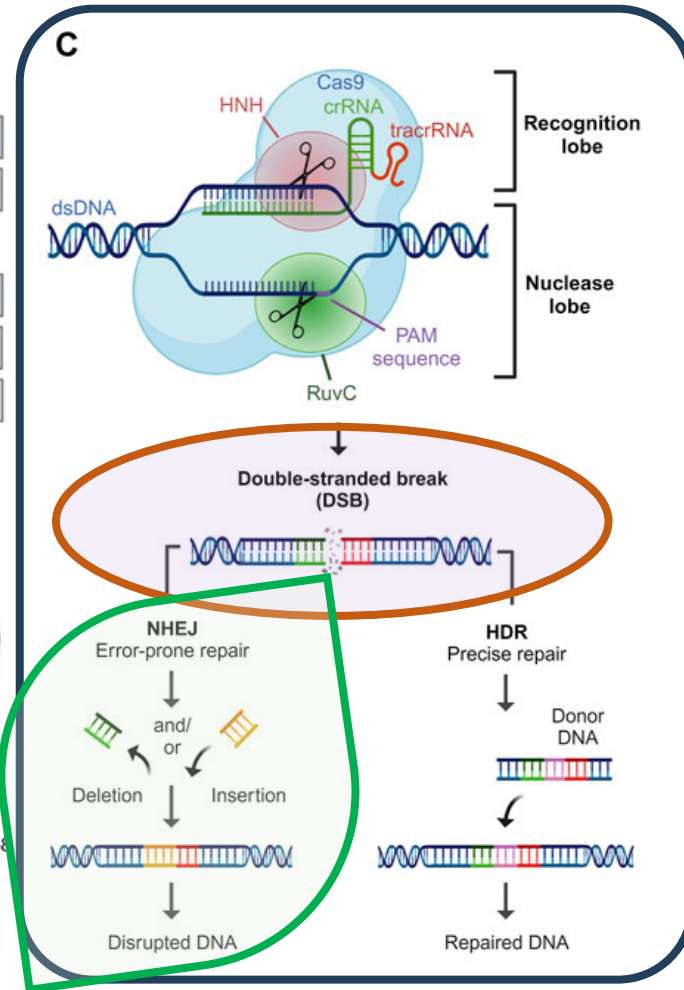
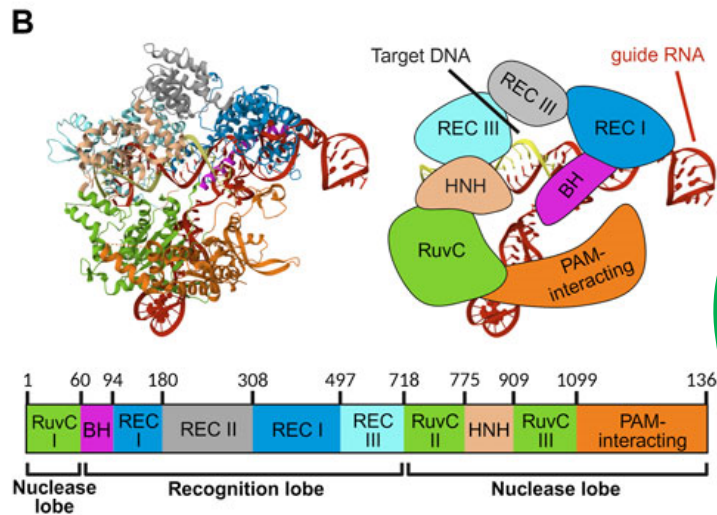


New Products: From research & development to market

Plant Genome Editing Using CRISPR-Cas9

A

		Subtypes (#)	Cas endonuclease (target cleavage)	Target
Class 1	Type I	A-F, U (8)	Cas3	DNA
	Type III	A-D (5)	Cas10	DNA / RNA
	Type IV	(2)		
Class 2	Type II	A-C (4)	Cas9	DNA
	Type V	A-E, U (10)	Cas12	DNA / RNA
	Type VI	A-C (4)	Cas13	RNA



New Products: From research & development to market



A

• Bioinformatic

B

• vectors

C

• transformation

D

• genome editing

E

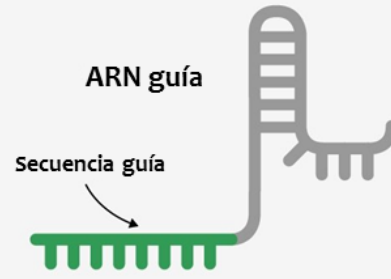
• selection

F

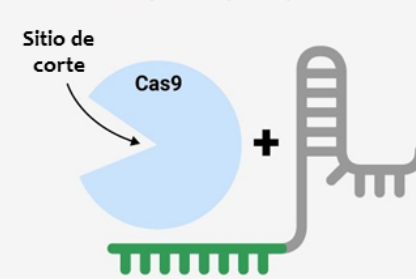
• segregation



1 Los científicos crean una secuencia genética, llamada "ARN guía", que coincide con la pieza de ADN que desean modificar.

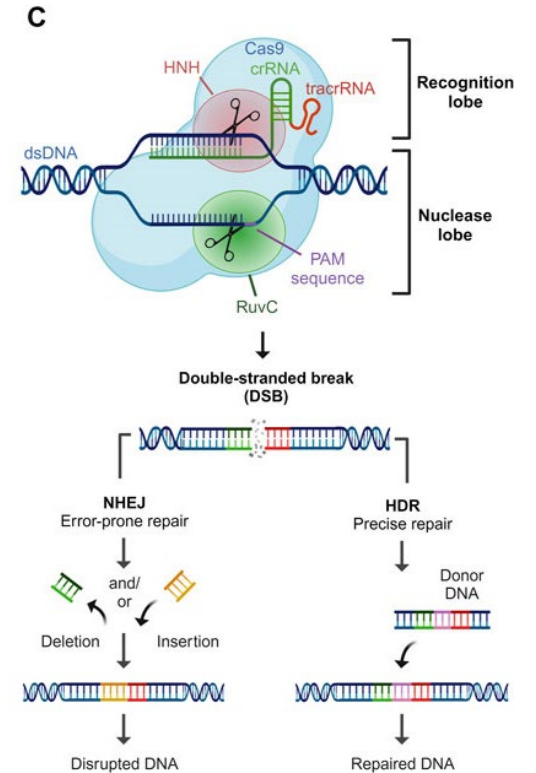


2 Esta secuencia se añade a una célula junto con una proteína llamada Cas9, y actúan como un par de tijeras que cortan el ADN.

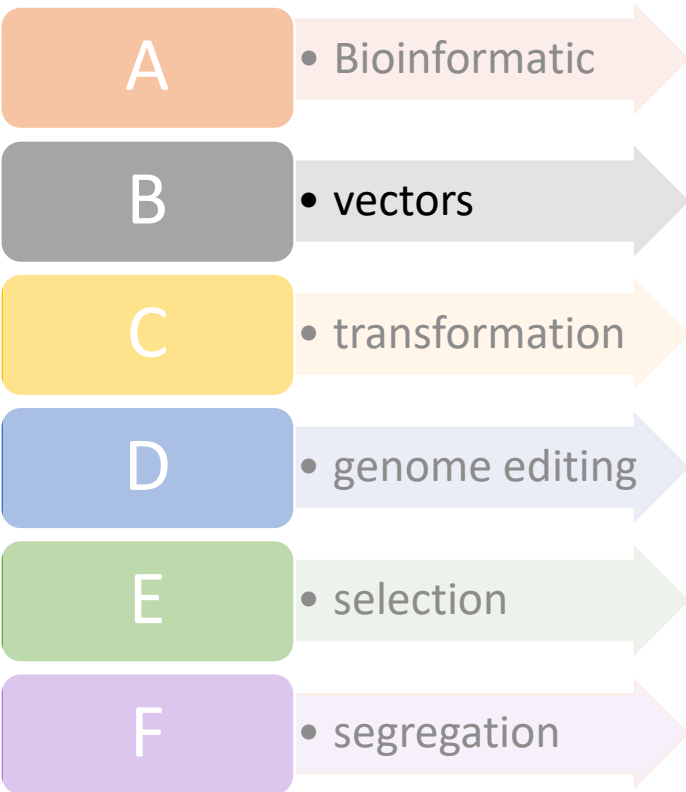


A – Bioinformatic

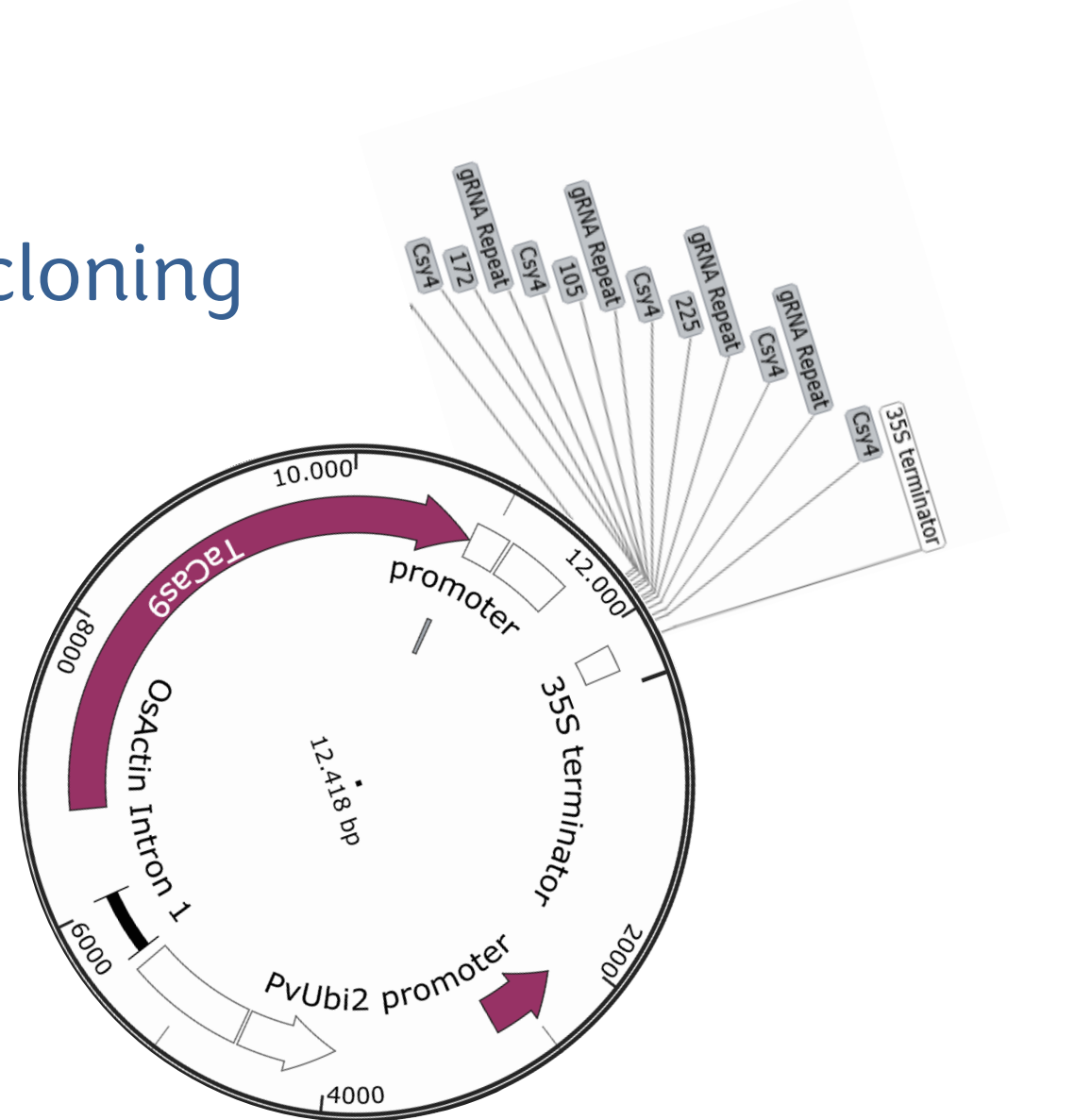
- Search and analysis of sequences in GenBank database.
- Design of oligonucleotides, amplification, and sequencing of alleles to be edited from selected genotypes.
- Design of the optimal molecular strategy for gene editing.
- Design and synthesis of guides corresponding to the obtained sequences.



New Products: From research & development to market

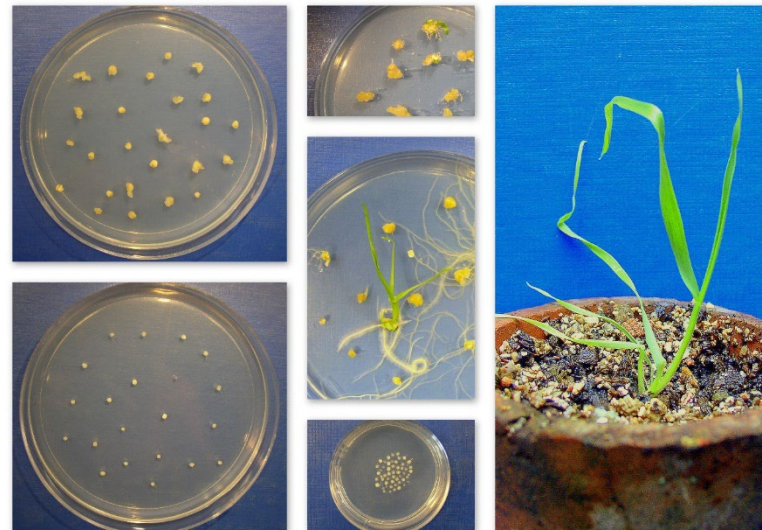


Molecular cloning

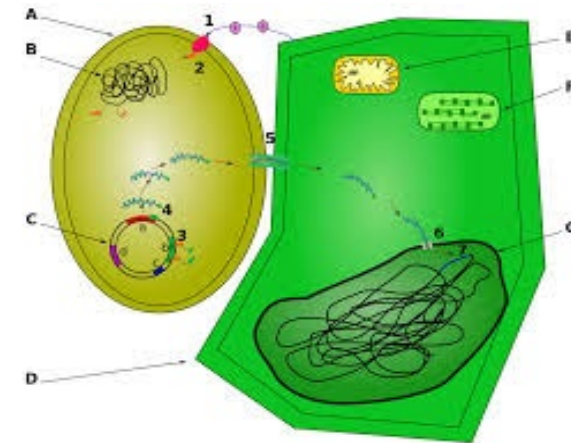


New Products: From research & development to market

- A • Bioinformatic
- B • vectors
- C • transformation
- D • genome editing
- E • selection
- F • segregation



Particle inflow Gun

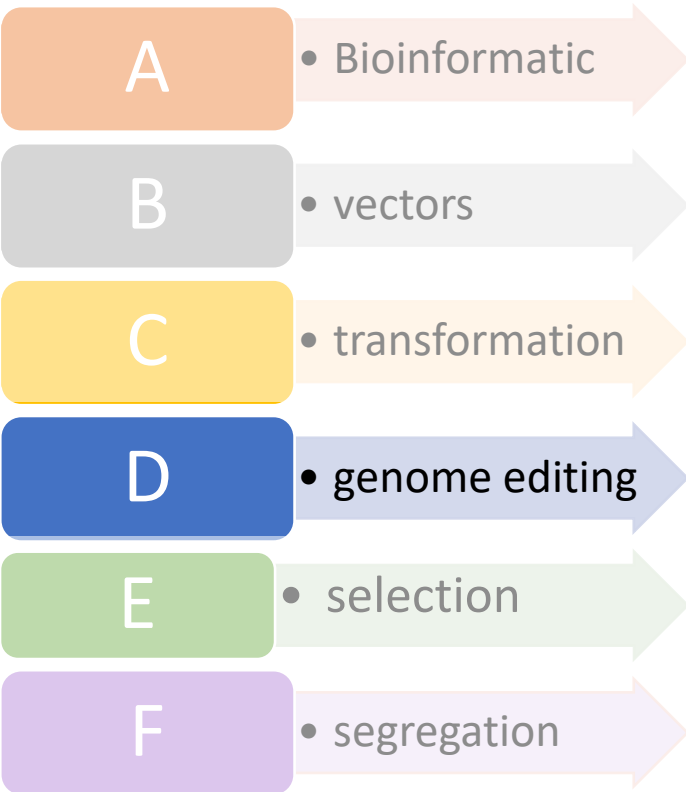


Agrobacterium tumefaciens

optimization of *in vitro* culture protocol

- Research model germplasm
- Elite germplasm

New Products: From research & development to market



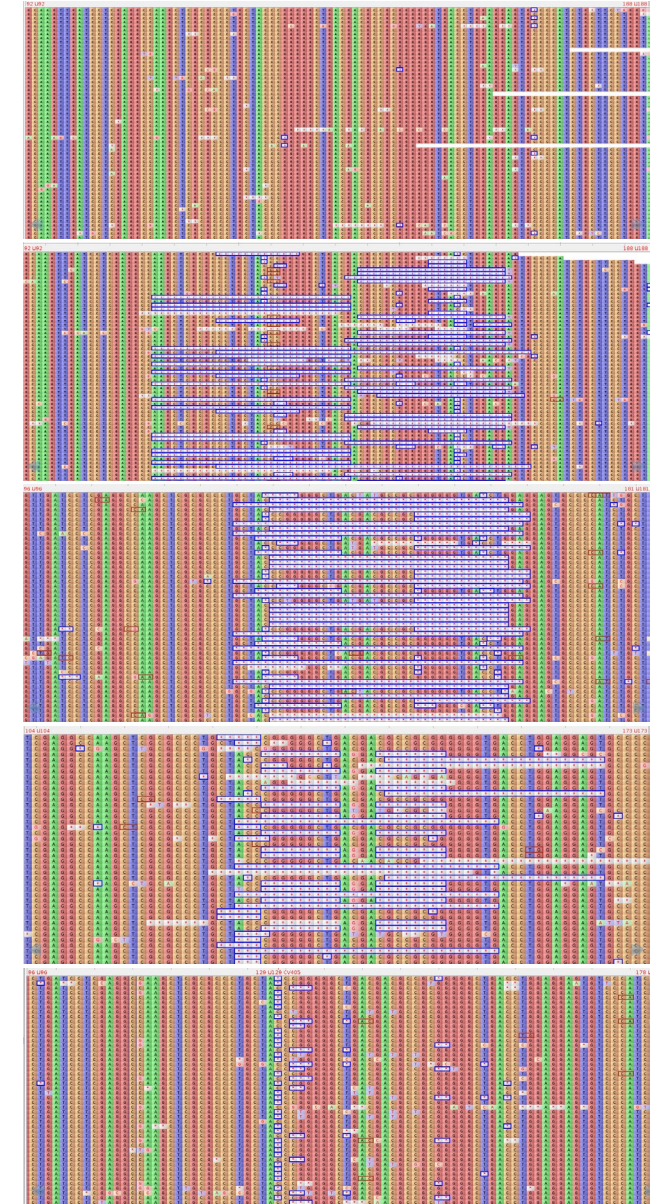
T-DNA
insertion



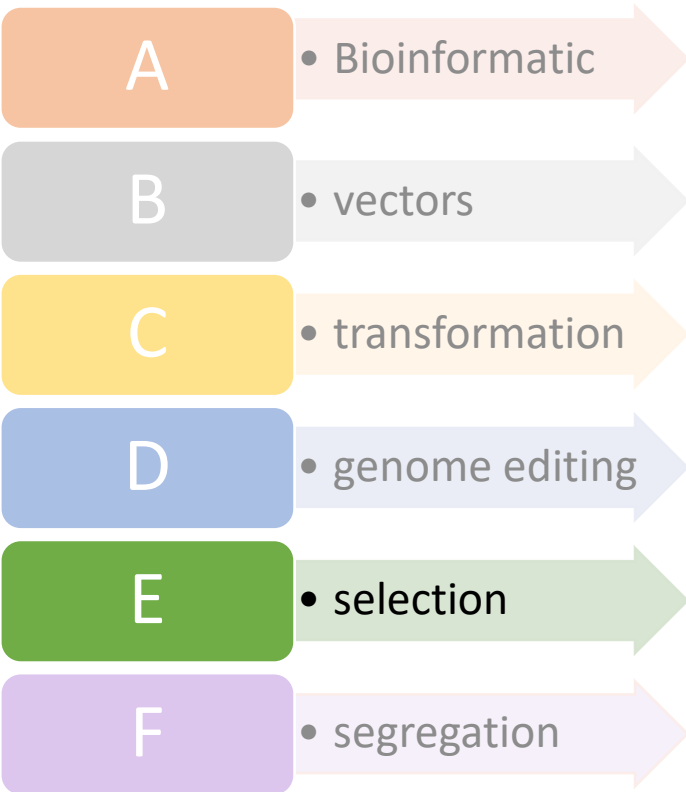
Target
DNA editing

Transgenic
Transgenic free

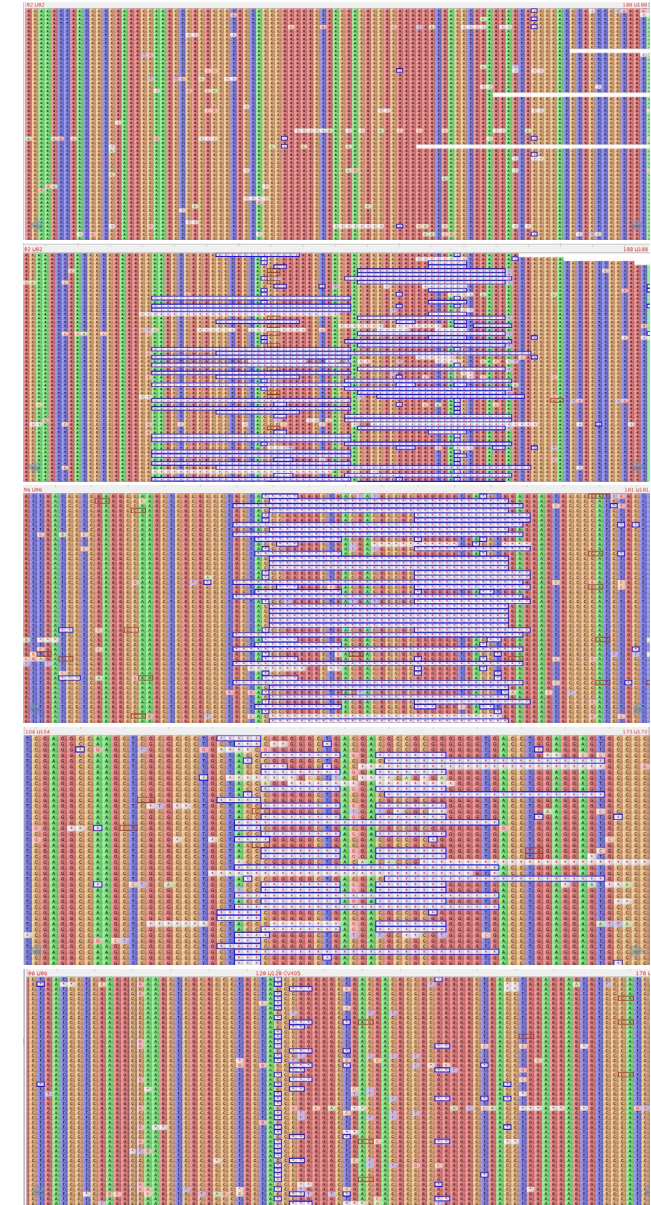
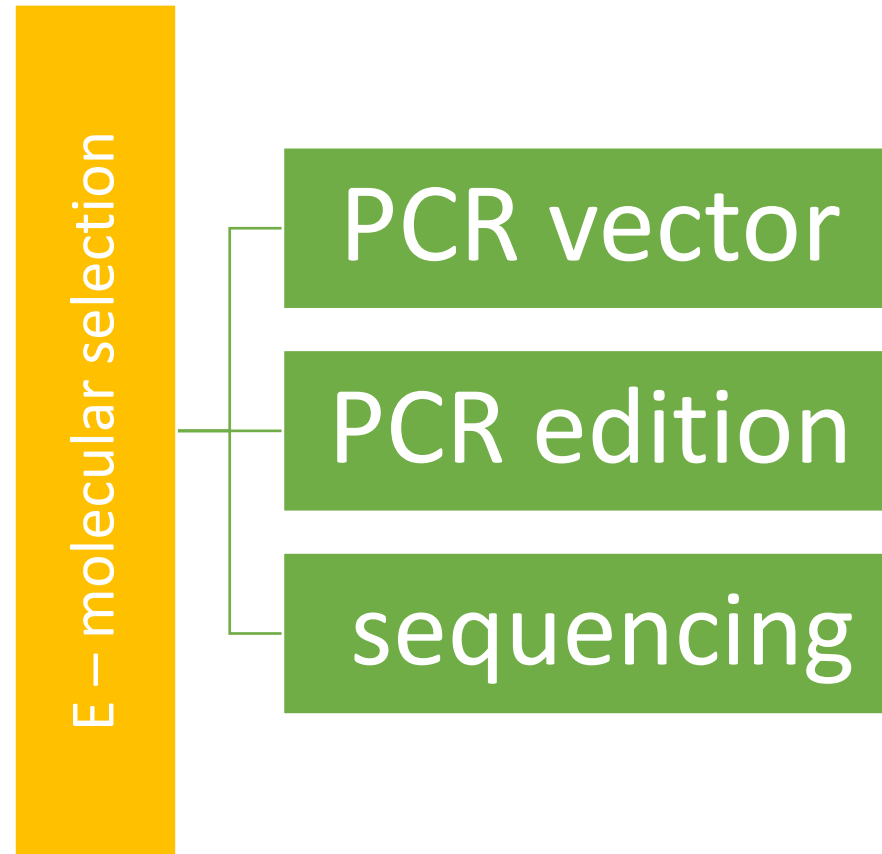
Alleles
Wild type
Gene edited
Homozygous
Heterozygous



New Products: From research & development to market

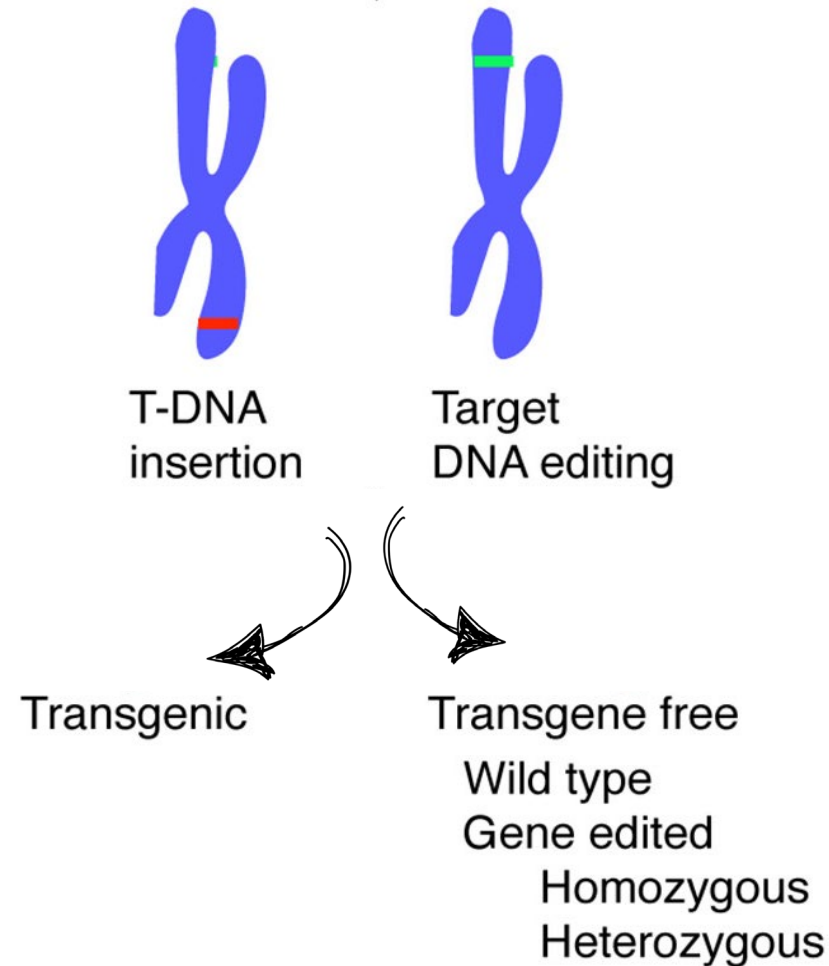
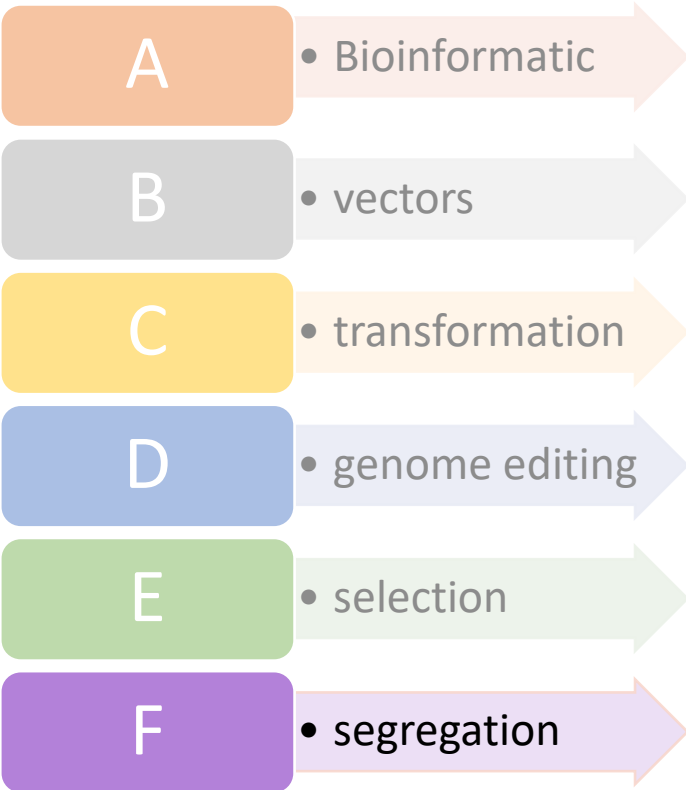


E – Molecular plant selection



New Products: From research & development to market

F – transgene segregation



New Products: From research & development to market

F – transgene segregation

A

• Bioinformatic

B

• vectors

C

• transformation

D

• genome editing

E

• selection

F

• segregation



Speed breeding to accelerate generation time

New Products: From research & development to market

in ARGENTINA

77 GM crops approved for commercial use

Fuente: SAByDP



1
event



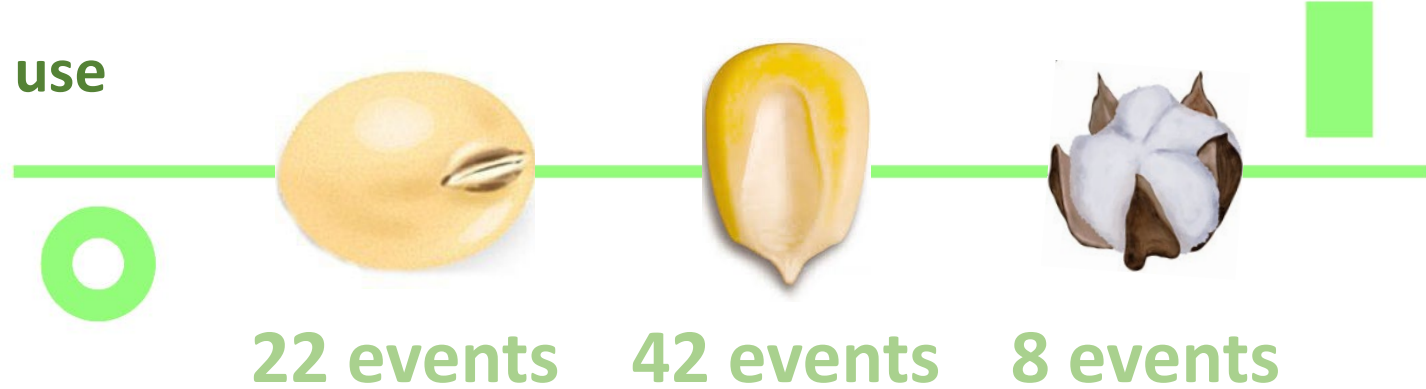
1
event



2
events



1
event

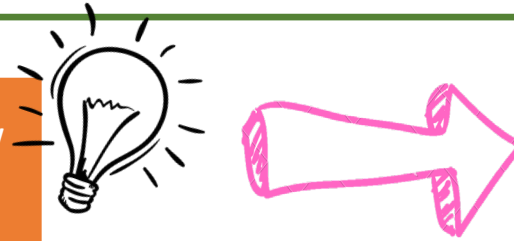


New Products: From research & development to market

Genome editing
(CRISPR-Cas9)
techniques

NBT Regulatory
Framework

ADDRESSING NEW
IDEAS



tackle new lines
of research



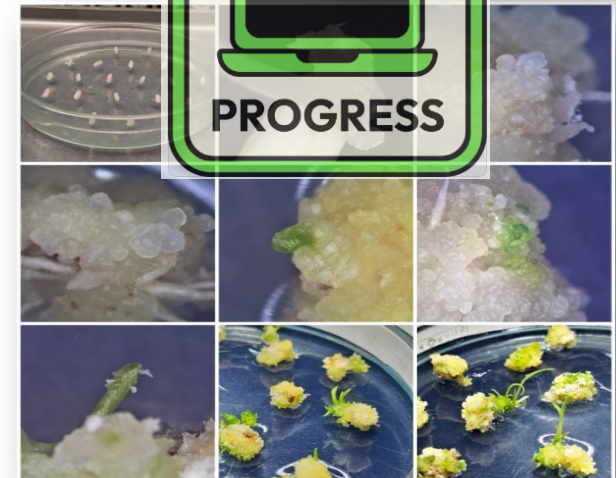
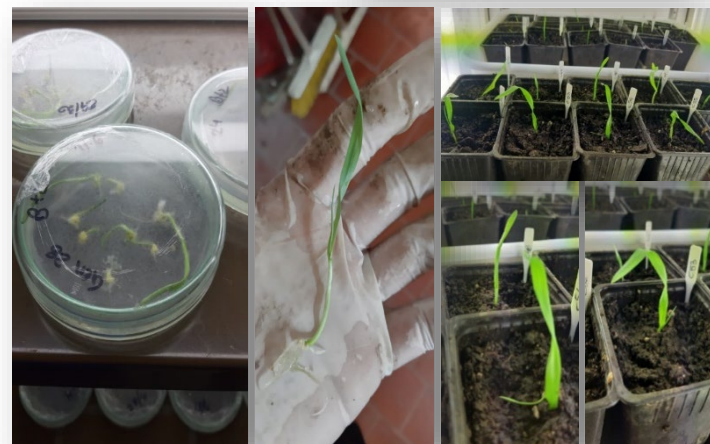
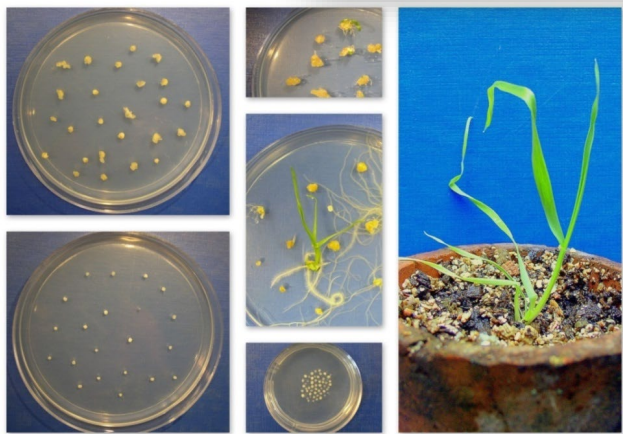
wheat



barley

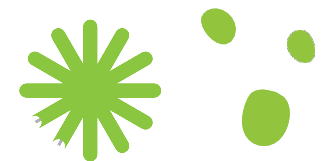


rice



CONCLUSIONS

- Simplicity, efficiency, low cost, and the ability to target multiple genes allow for faster genetic modification compared to other techniques.
- **Gene editing and NBT regulations** offer a new landscape for the application of modern biotechnology to previously orphan crops
- Possibility to choose targets: biotechnological developments in response to local needs.





Gracias por
la atención!

Thank you for
your attention!



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