

# Plant Breeding across times:

*- challenges and achievements*



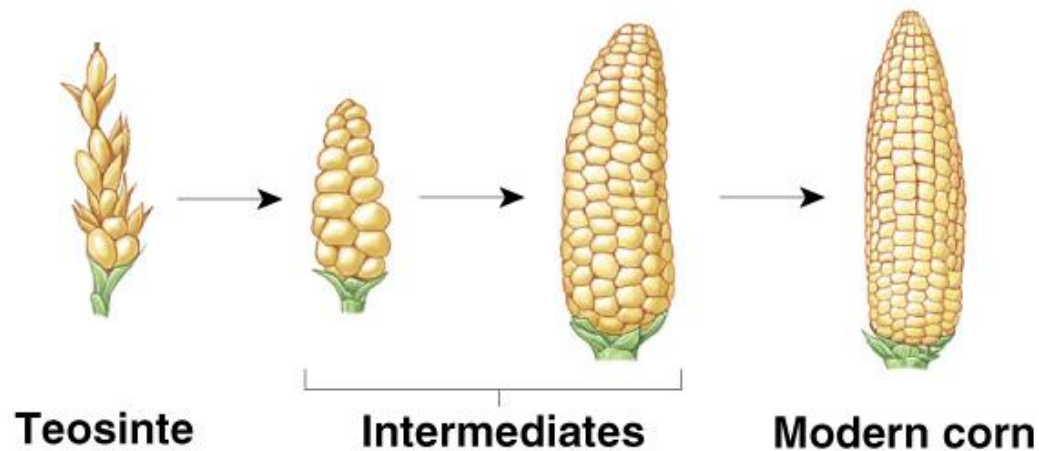
# Plant Breeding Concept



- **Plant breeding** is the process by which humans change certain aspects of plants over time in order **to introduce desired characteristics**



**Increase crop productivity**



# Domestication

- Plant Breeding activities began at least 10.000 years ago in the Fertile Crescent with plant **domestication**

**Challenges:** transition from nomadic to a sedentary lifestyle



**Increase plant yield**

**Increase number of edible plants**  
(reduce toxicity)



# Landmarks in Plant Breeding



1694

**Camerarius**  
crossing as a method  
to obtain new plant  
types

**Mendel**  
Empirical evidence  
on heredity

1866



1923

**Wallace**  
First commercial  
hybrid corn

**Watson, Crick,  
Wilkins &  
Rosalind Franklin**  
model for DNA  
structure

1953



# “The Green Revolution” (1960)



Norman Borlaug

**Challenge:** improve wheat and maize to meet the production needs of developing countries



**High yielding** semi-dwarf, lodging resistant **wheat** varieties

# Plant Breeding Methods



## Conventional breeding

- Mutation or crossing to introduce variability
- Selection based on morphological characteres
- Growth of selected seeds



**Challenge:** reduce the time needed to complete a breeding program

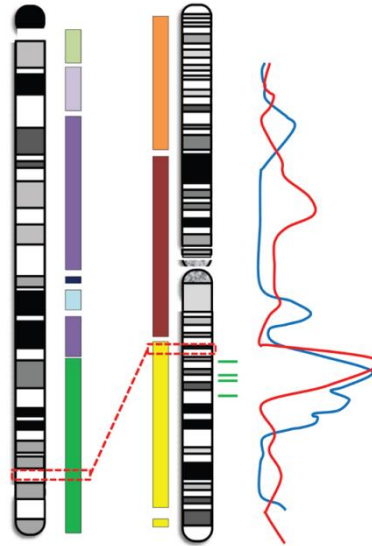
# Modern Breeding Tools



*In vitro* culture



Genomic tools



Genomic engineering



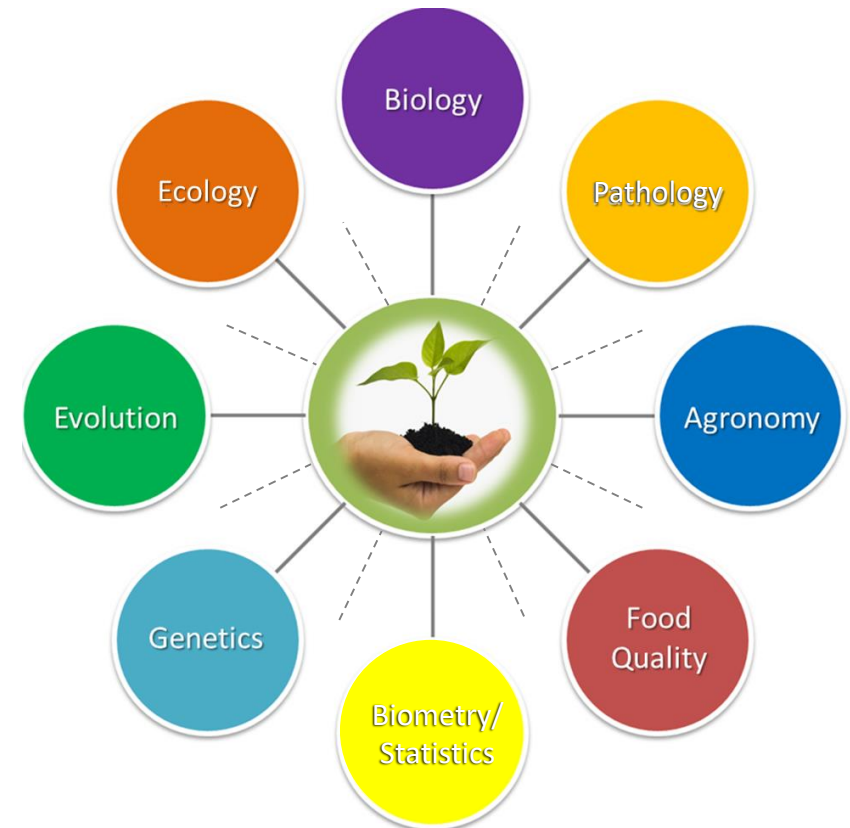
Increase of breeding **effectiveness** and **efficiency**

# Future Challenges



**Challenge:** Increase of human population by 60-80%, requiring to nearly double the global food production

## Multidisciplinary Field





# Take-Home Message



Research Institutes, Universities, Governmental Services, Private Companies, Non-Governmental Organizations, Breeders, Farmers...

....are **working hard** to breed plants for a better agriculture with less environmental impacts



# References

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