



Wheat, a crop for a sustainable future

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Wheat is the most widely grown cereal crop in the world

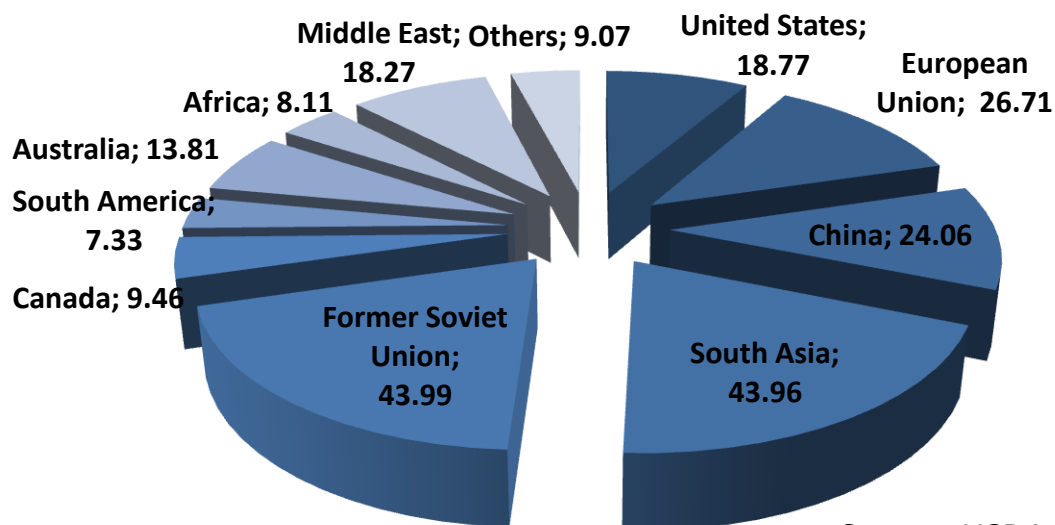
Staple food for more than one third of the global population

WORLD: 2015

223 million hectares

725 million tons

World wheat area (mill. ha)

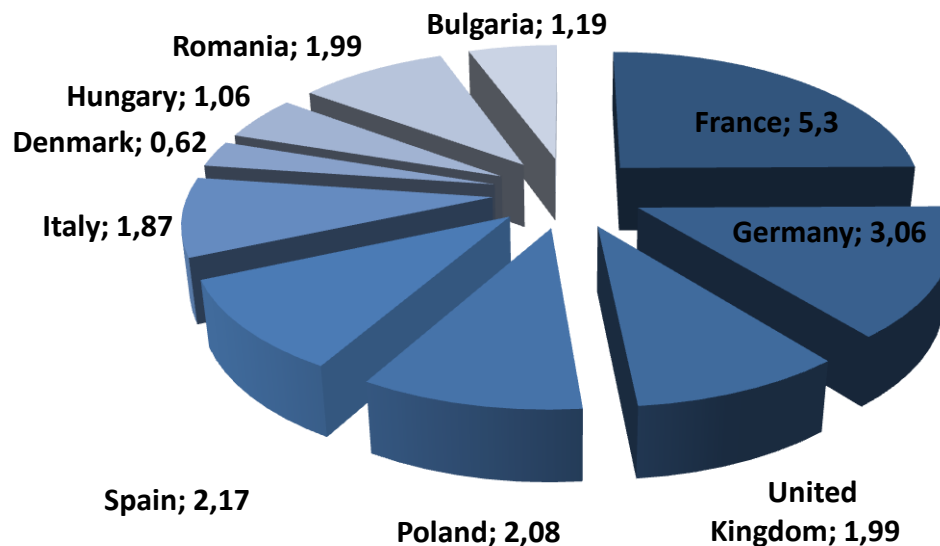


Source: USDA

EUROPE: 2015
26.71 million hectares
156 million tons



European wheat area (mill. ha)



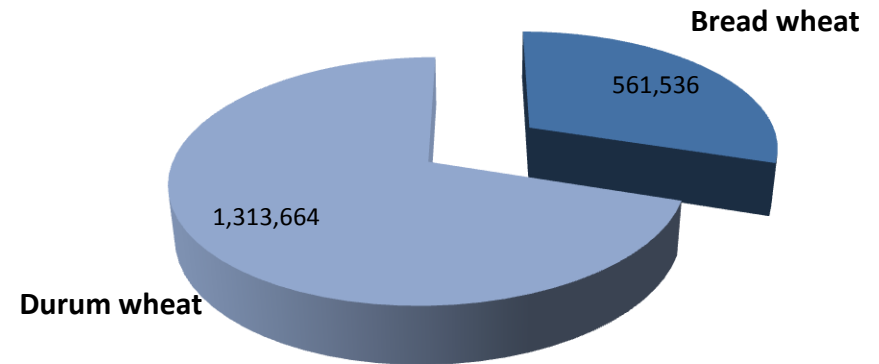
ITALY: 2015

1.87 million hectares

7.4 million tons



Italian wheat area (ha)



Italy: historic trend of wheat growing area and yield

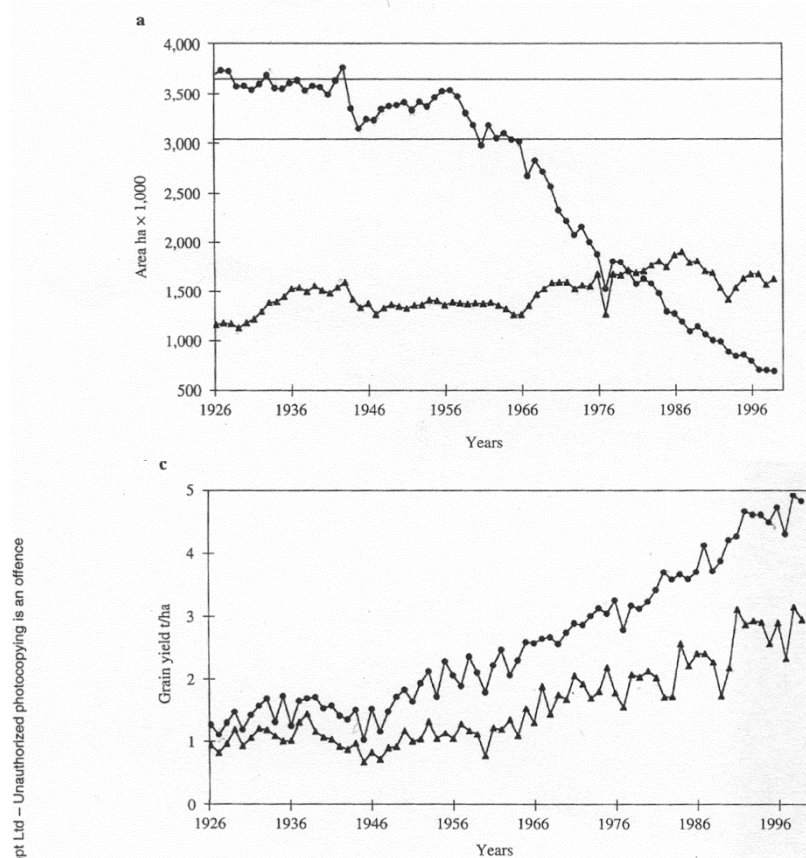
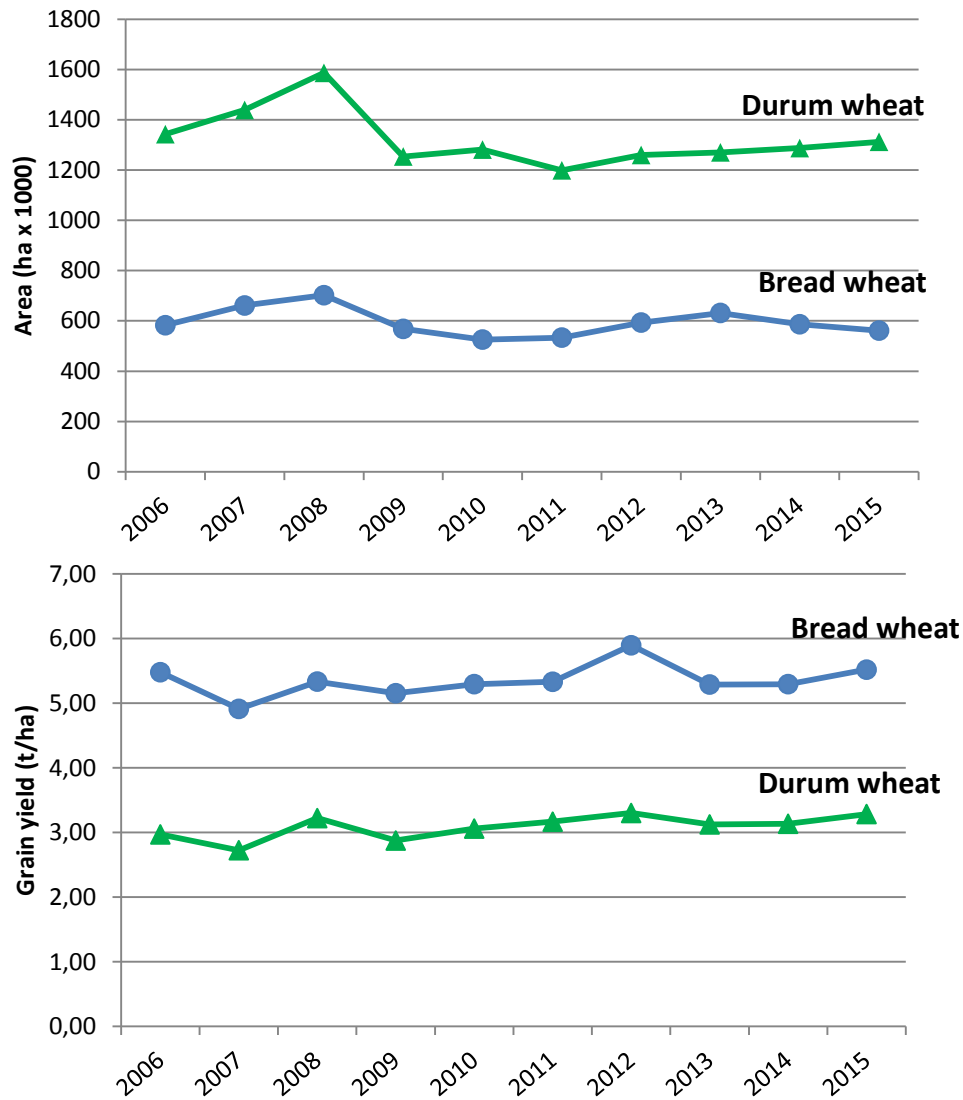
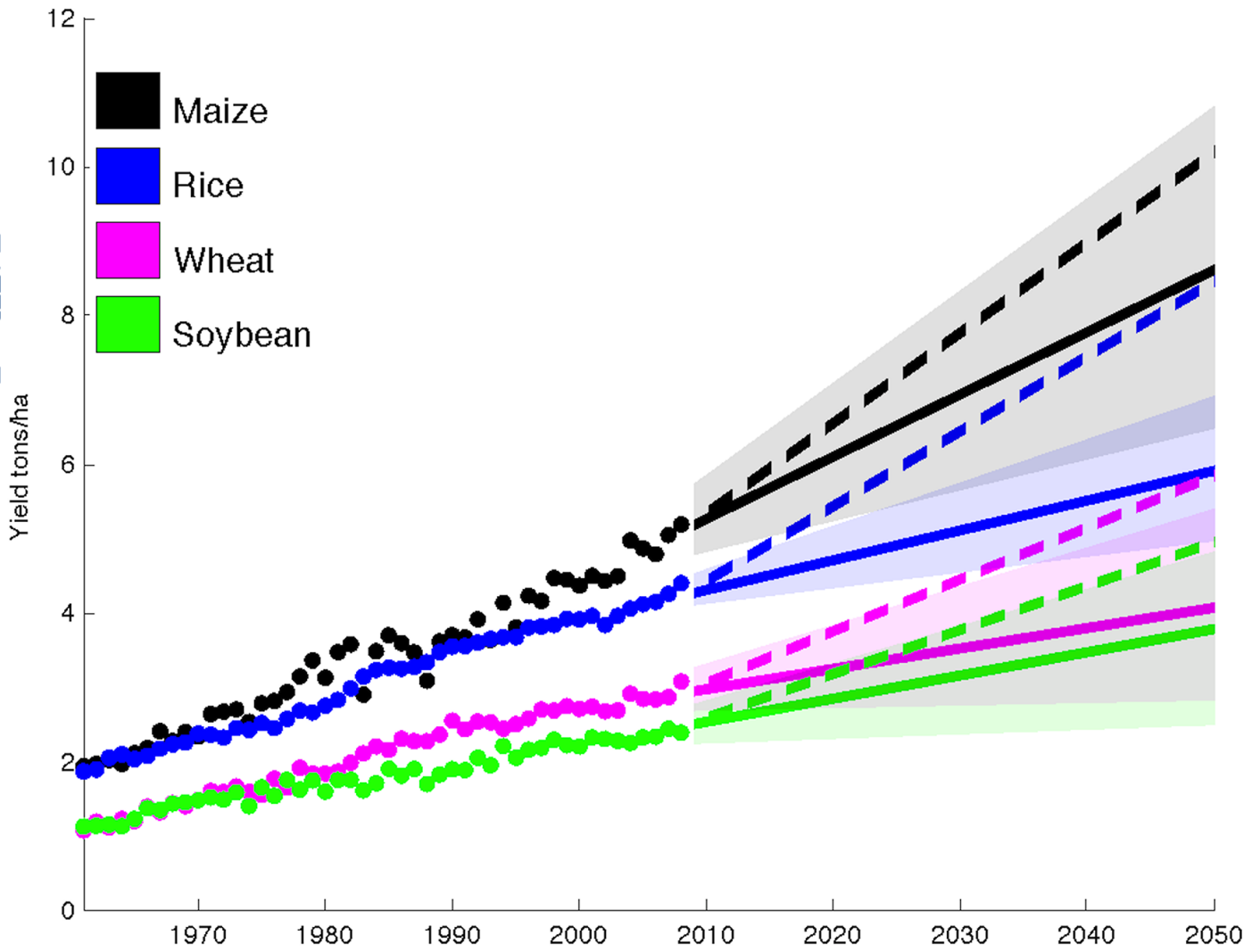


Figure 1 ■ Trend of bread and durum wheat in Italy.

● Bread ▲ Durum

a = areas, b = total production, c = grain yield.

Food production must increase by an estimated 70% by 2050



Ray DK et al PLoS ONE 8(6): e66428 doi:10.1371/journal.pone.0066428
<http://127.0.0.1:8081/plosone/article?id=info:doi/10.1371/journal.pone.0066428>

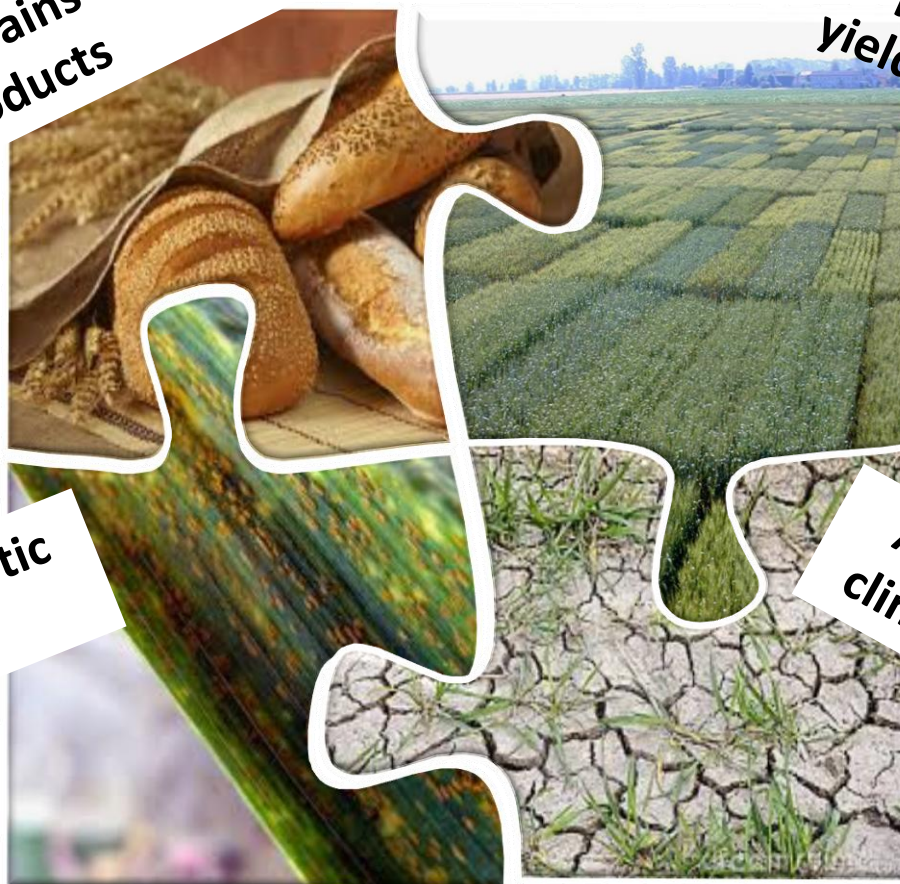
Main targets of wheat improvement

Quality of grains and co-products

Yield potential and yield stability

Resistance to biotic stresses

Adaptation to climate changes



THE APPROACH WE FOLLOWED WAS

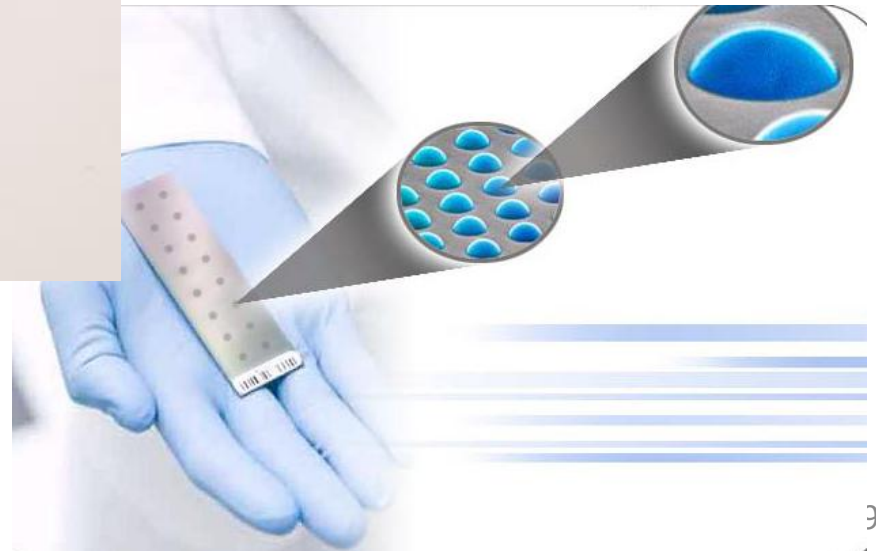
Exploitation of genetic diversity ...



....coupled with modern molecular tools

High-throughput marker platforms

Infinium 90k SNPs array (Illumina)



...in order to identify significant associations between a phenotypic trait and molecular markers based on Linkage Disequilibrium



IMMAGINE gwas

A set of 226 bread wheat varieties representative of wheat breeding in Italy from the beginning of XX century up to date was assembled from CREA-SCV germplasm bank

Materials were GROWN

3 years field (non replicated 1 m rows)

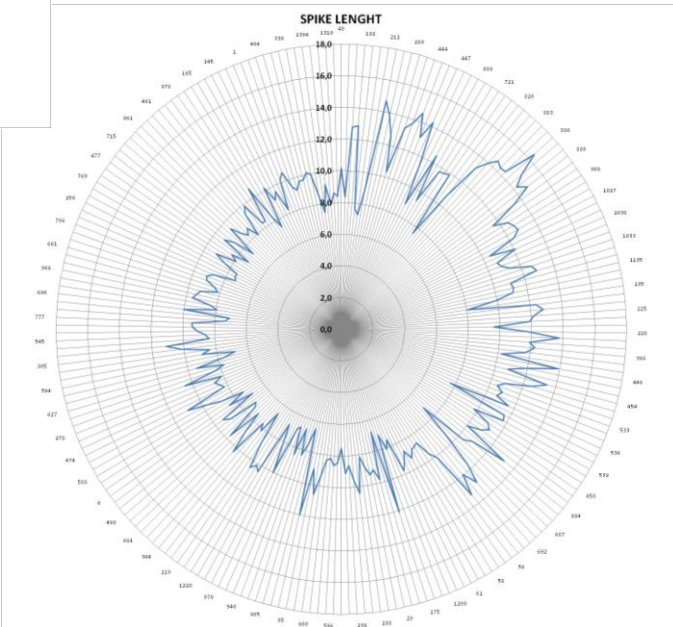
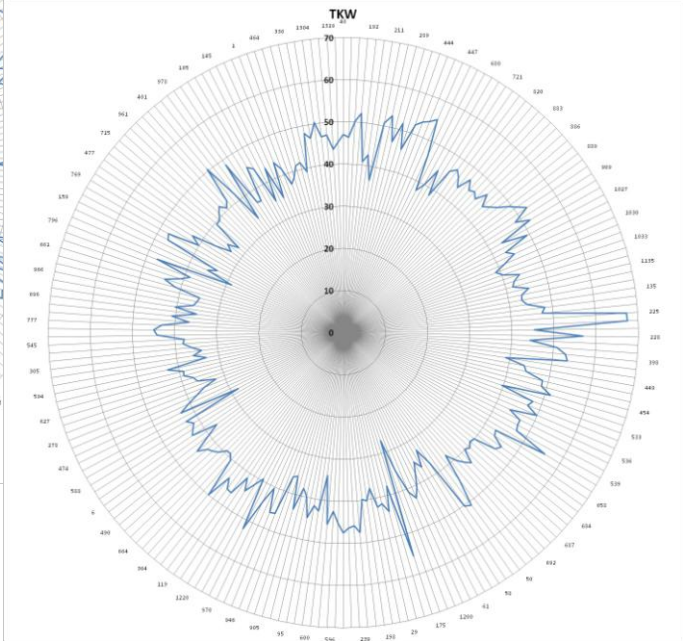
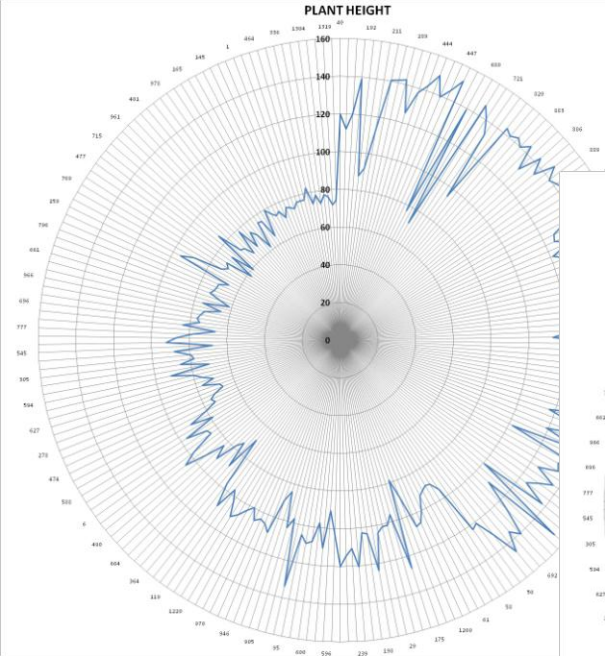
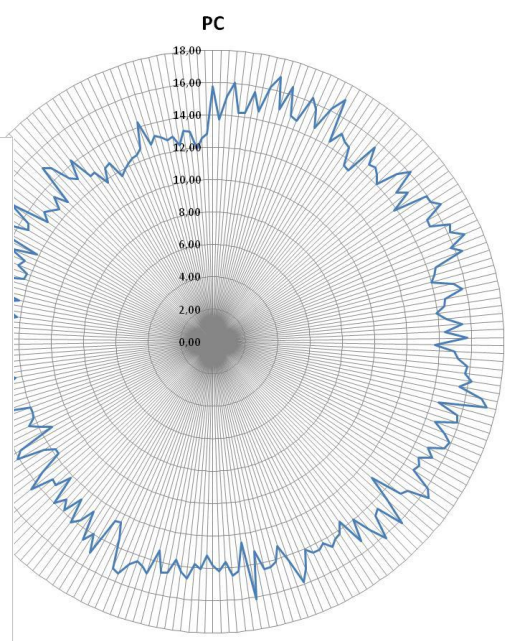
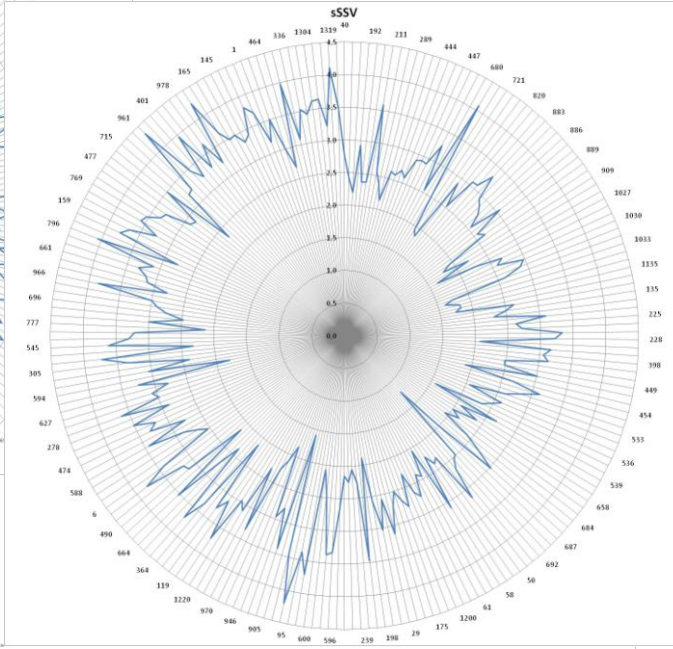
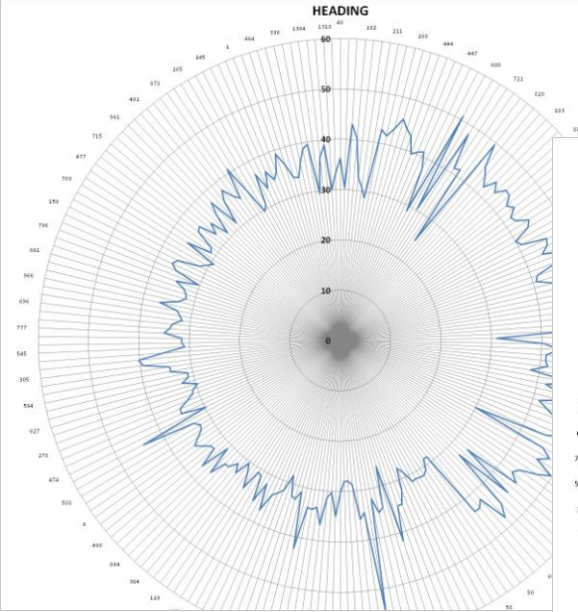
2 years field (RCB design with 3 reps of 1 m² plots)

2 years green-house (RCB design with 5 reps of single plants)

... and PHENOTYPED for

- ✓ morphological
- ✓ agronomic
- ✓ qualitative traits

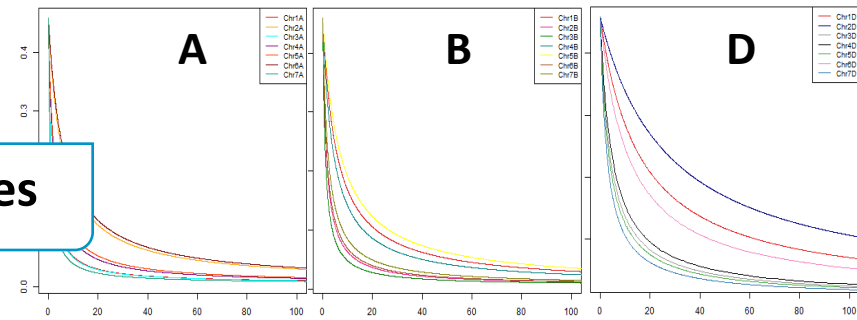
TITOLO



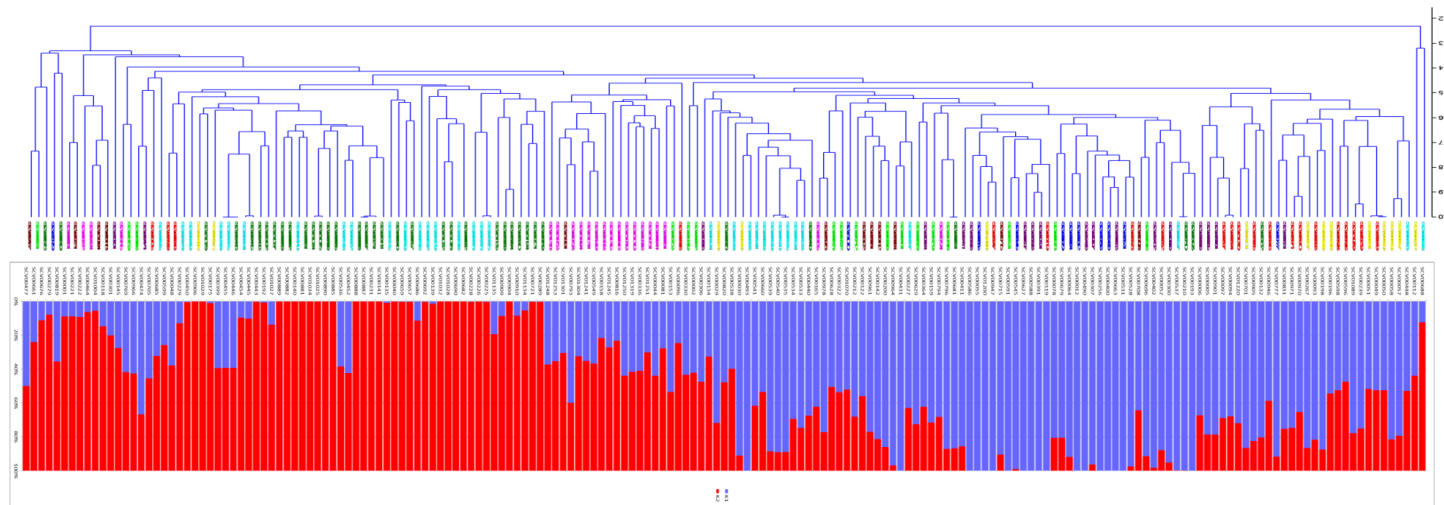
The data deriving from GENOTYPING were subjected to:

Filtering and mapping

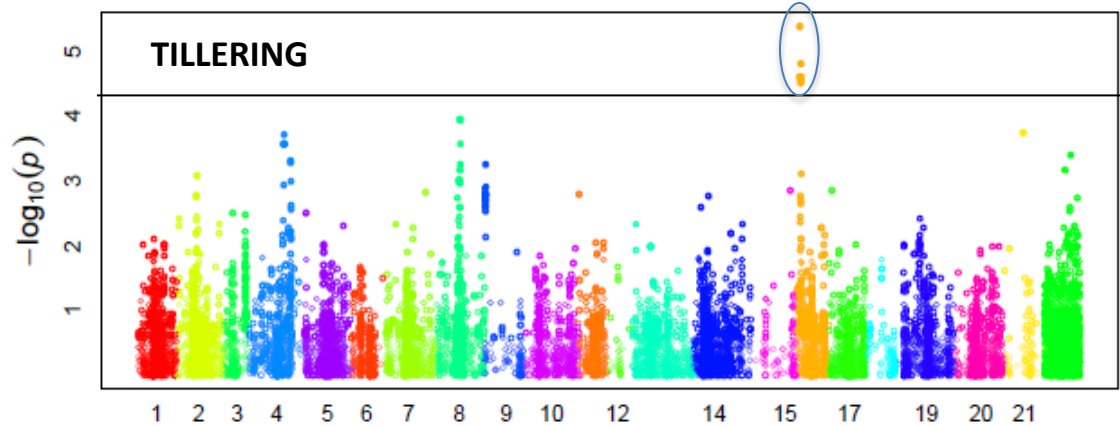
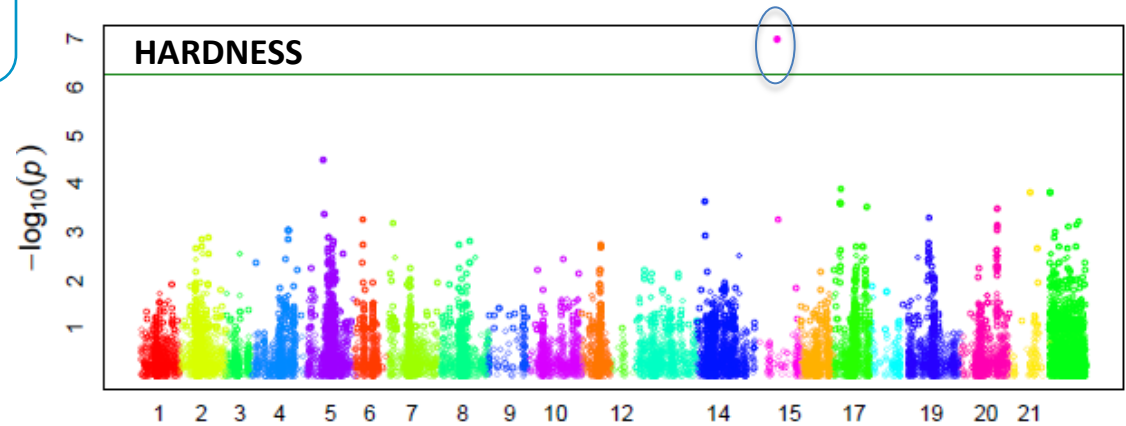
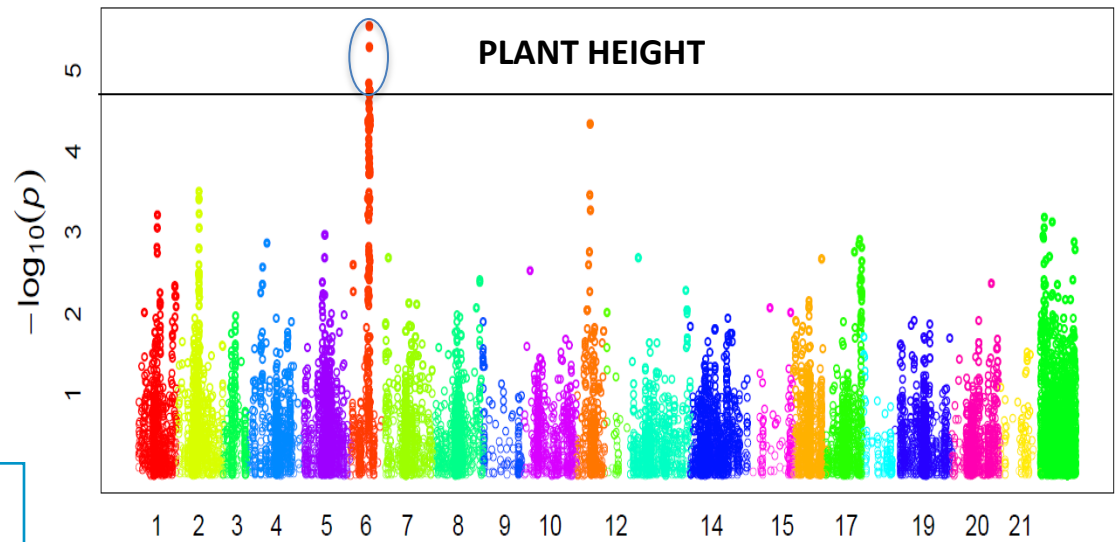
Linkage Disequilibrium studies



Population structure studies



Genome Wide Association Study (GWAS)



Direct application of available informations

TILLERING CAPACITY



Information from phenotyping

Agro-technical practices



FIELD

Inserire foto campo di Massimo

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