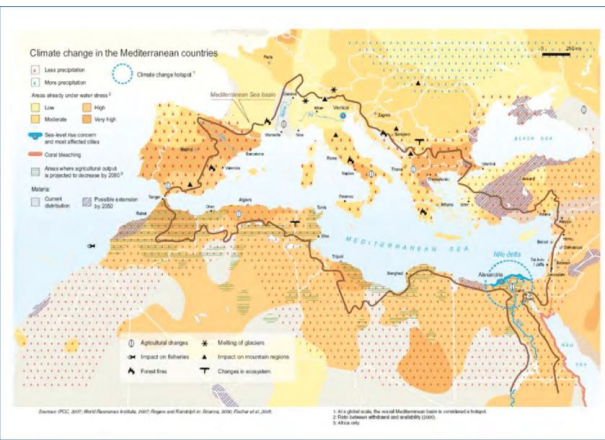


# Capitalization of Mediterranean maize germplasm for improving stress tolerance (DROMAMED)

## Expected results



# PRIMA Project

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# Participants



# WP1: Collections of maize varieties

1. Panel 858 inbred lines

2. Populations:

- Europe
- Africa
- Turkey

3. Improved varieties

- Hybrids
- Improved landraces
- Population x inbred crosses



## WP2. Support Innovative Farming Systems

✓ Information: Surveys among farmers

✓ Agronomic methods

- Priming with salicylic acid
- Ridge planting
- Organic fertilizers



✓ Stakeholders:

- Small companies
- Associations of farmers
- Exhibitions and living labs





# WP3. Genetics of adaptation to drought and heat

- ✓ Information about QTL
  - ✓ Panel of inbred lines
  - ✓ Collections of populations
  - ✓ Mapping populations
    - RILs: 2
    - MAGIC: 450 RIL
- ✓ Candidate genes



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Root System Architecture: Shallow (S) and Deep (D) in a panel of about 600 inbred lines



**Fig.2.** Range of shapes of RSA detected in the rhizotrones study in plantlets grown for one week.



**Fig. 3.** Example of hybrids RSA in the field in control conditions: left SxS, right DxD crosses



## WP4. Biochemical, physiological and morphological mechanisms of stress tolerance

- ✓ Task 4.1. Water use efficiency under drought
- ✓ Task 4.2. Cell wall strengthening
- ✓ Task 4.3. Antioxidant contents
  - Anthocyanins
  - Carotenoids
- ✓ Task 4.4. In deep characterization of inbred lines under control and drought





# Evaluation for tolerance to heat and drought stress under controlled conditions



- Traits as selection criteria
- Molecular markers (QTL) associated with to different traits
- Candidate genes
- Promising varieties



**Best hybrids.** Mean yield (Mg/ha) across four Spanish environments (Pontevedra, Leon, Vitoria, Córdoba) 2023

## Experimental hybrids

EPFUM8 x EPFUM9 (resistant to mycotoxins): 13.6

LH202 x EP147 (ExpVVP x Canarian): 12.8

LH202 x EP148 (ExpVVP x Canarian): 14.2

PH207 x EP148 (ExpVVP x Canarian): 14.1

## Hybrids Checks

PO725: 13.8

RGTHuxxo: 14.2

# Best varieties.

Yield per plant (g) across four Tunisian environments  
(Mornag: irrigated and stress, Sousse: optimum, Gabes: stress)

Population	Yield/plant
Landes 3 (France)	968.1
Landes 4 (France)	926.2
Rojo Pequeño de Bernedo (Spain)	803.1
Primitivo (Italy)	758.4
Parleboscq (France)	726.5
Labastide de Boussignac (France)	719.5
Tondela (Portugal)	715.4
Moncassin (France)	699.9
Ruffec (France)	686.1
Hybrid checks	Yield/plant
Agrister	280.1
Fandari	250.0
Sansia	286.8

# Breeding programs for drought and heat tolerance based on physiology

## 1. Breeding for tolerance to drought:

- Yield
- Conductance

## 2. Breeding for antioxidant pigments:

- Carotenoids
- Anthocyanins

## 3. Breeding for Water Use Efficiency

## 4. Breeding for efficiency of the photosystem

