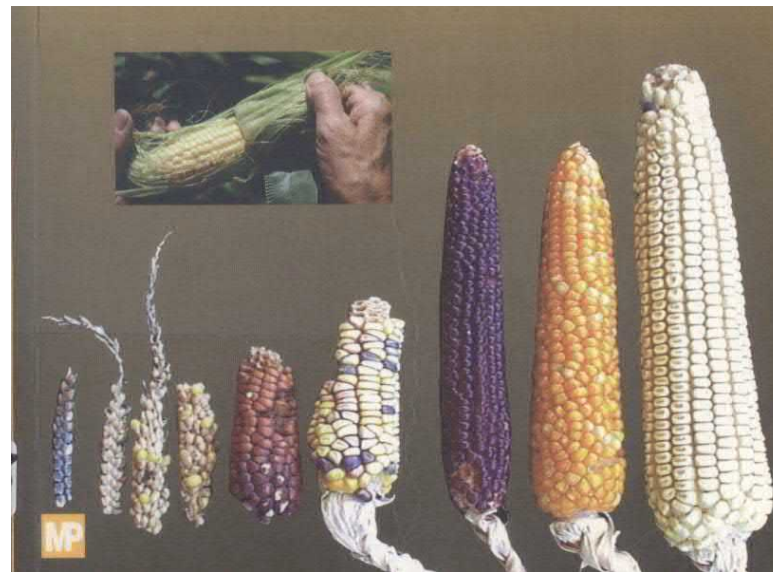




# SWOT analysis of the Maize Genetic Resources in Europe



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# The history begun in Russia

- Nicolai Vavilov awoke the interest for genetic resources one century ago
- He collected more than 50.000 accessions in 50 countries between 1920 and 1930
- Since then, too many samples have been collected in Europe
- Europe has been oversampled
- Most countries have their own collection with frequent duplications





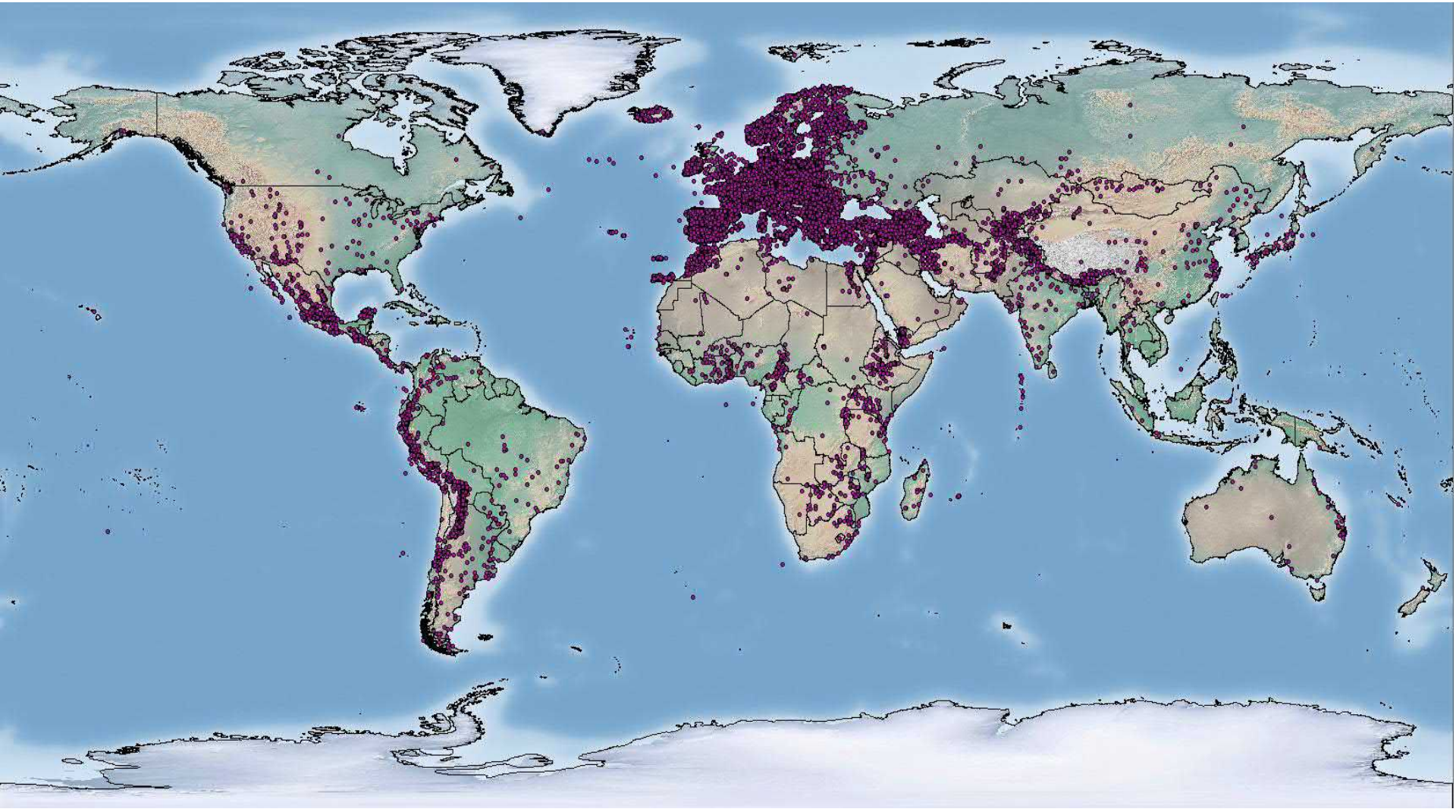
# The ECPGR *Maize* Database

## Maize Research Institute "Zemun Polje"

### Institutions contributing to the European Maize Database

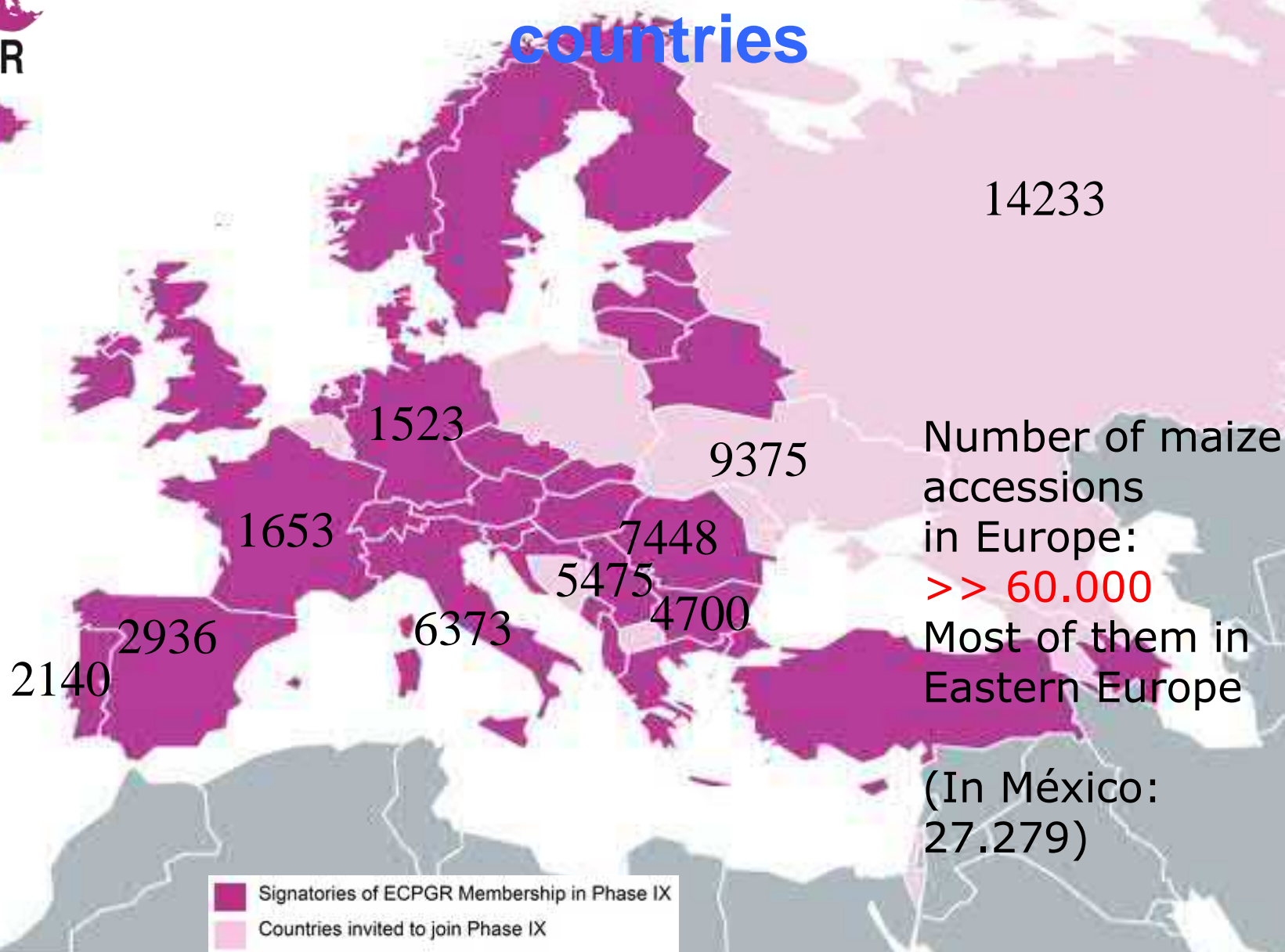
<b>Institution</b>	<b>Country</b>	<b>Number of accessions</b>
Bundesamt für Agrarbiologie	Austria	23
Institute of Plant Genetic Resources "K.Malkov"	Bulgaria	464
Genebank Institute for Crop Production	Czech Republic	914
Institut National de la Recherche Agronomique	France	272
Institut für Pflanzengenetik und Kulturpflanzenforschung	Germany	15
Cereal Institute - National Agricultural Research Foundation	Greece	201
Istituto Sperimentale per la Cerealicoltura	Italy	562
Banco Portugues de Germoplasma Vegetal	Portugal	900
ZeaInvent	Slovakia	135
Centro de Investigaciones Agrarias de Mabegondo	Spain	731
Estacion Experimental de Aula Dei	Spain	88
Mision Biologica de Galicia	Spain	129
Centre for Genetic Resources (CPRO-DLO)	The Netherlands	488
Aegean Agricultural Research Institute	Turkey	1506
Maize Research Institute "Zemun Polje"	Serbia	5437
	<b>Total:</b>	<b>11865</b>

# Regions of origin of the accessions conserved in EURISCO





# Maize populations in some European countries



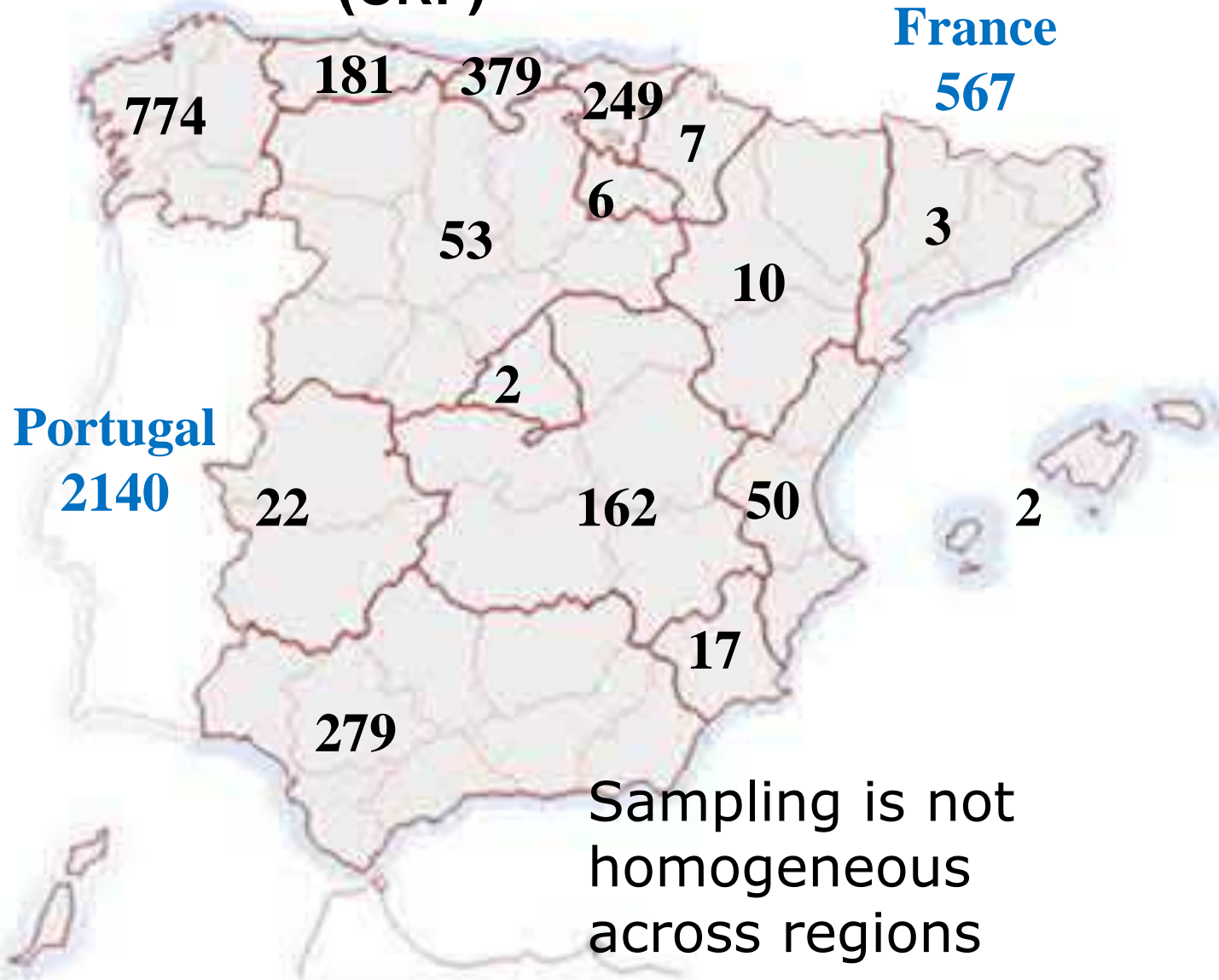
# European Union Maize Landrace Core Collection

96 populations



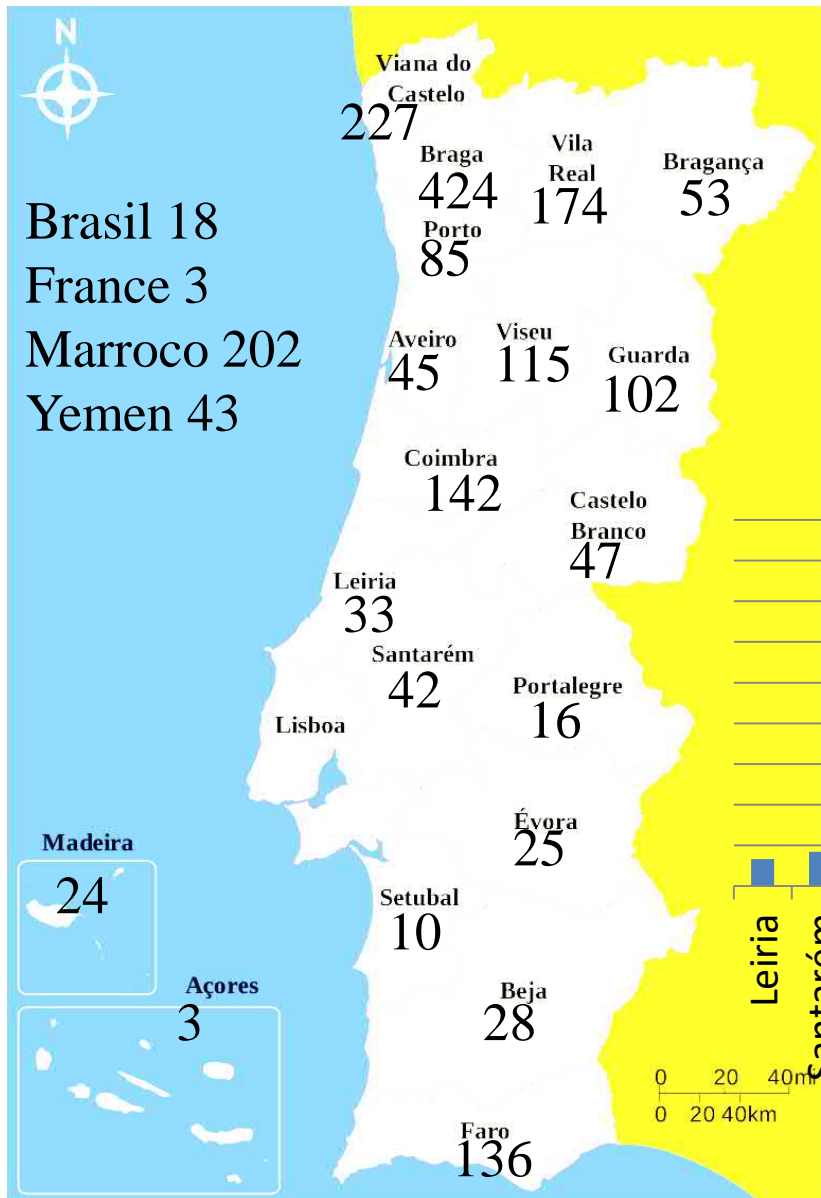
# Maize populations in the Spanish National Bank (CRF)

Spain: 2936  
(37 unallocated)  
Cyprus: 192  
Hungary: 1  
Peru: 2  
Portugal: 46  
Russia: 4  
USA: 5

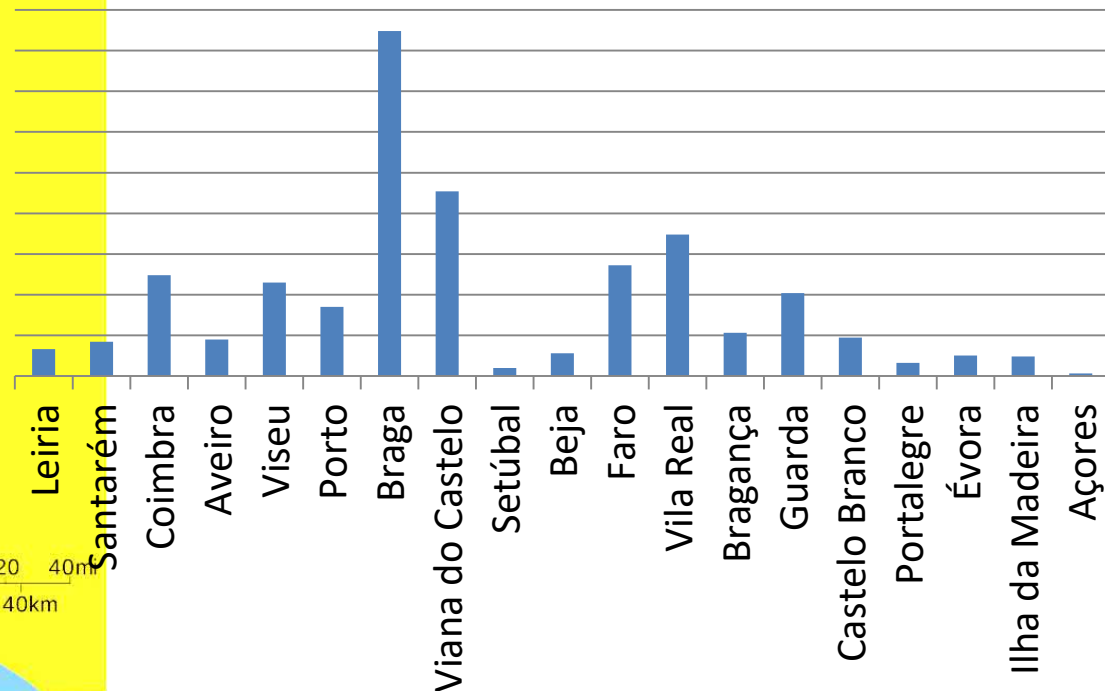


# Portugal

## Maize Populations in EURISCO



- Throughout sampling of the country
- Too many samples
- Heterogeneous across regions







## France

INRA Montpellier is holding a Maize Genetic Resource Center (GRC). They maintain 3 collections:

1. French National Collection of Maize: 453 accessions
  - 374 landraces (108 landraces from Guadeloupe)
  - 15 inbred lines
  - 8 pools
  - 56 synthetics
2. Network Collection includes > 1200 populations from all over the world
3. INRA private collection > 2300 lines and breeding materials (drought tolerance, cell wall digestibility, analysis of populations diversity and origin of introduction in Europe...)

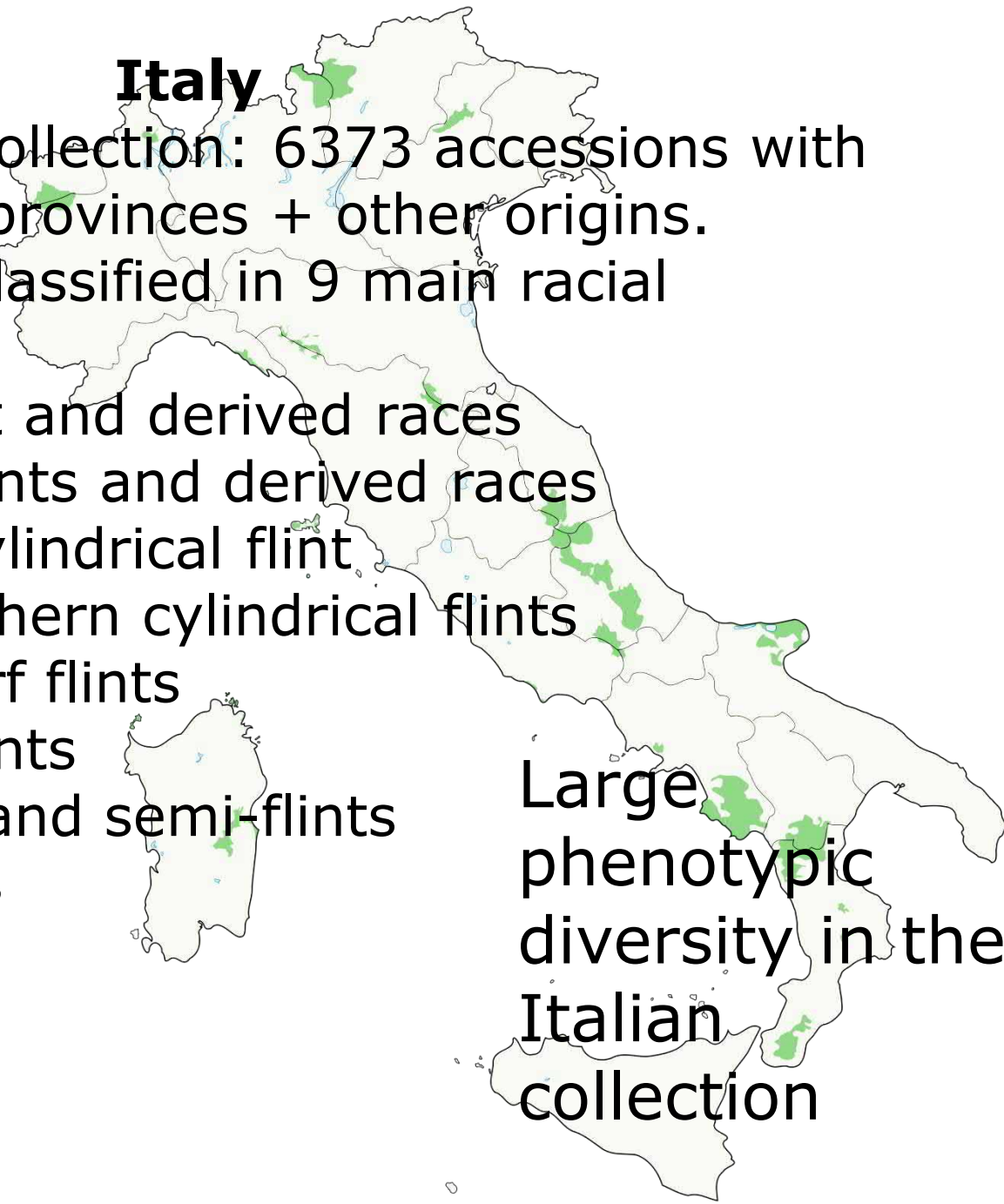
# Italy

Maize germplasm collection: 6373 accessions with landraces from 65 provinces + other origins.

Landraces can be classified in 9 main racial complexes:

1. Eight-rowed flint and derived races
2. Conical-eared flints and derived races
3. Late southern cylindrical flint
4. Mid-season southern cylindrical flints
5. Extra-early dwarf flints
6. Micro-sperma flints
7. Insubrian flints and semi-flints
8. Pearl white flints
9. White dents

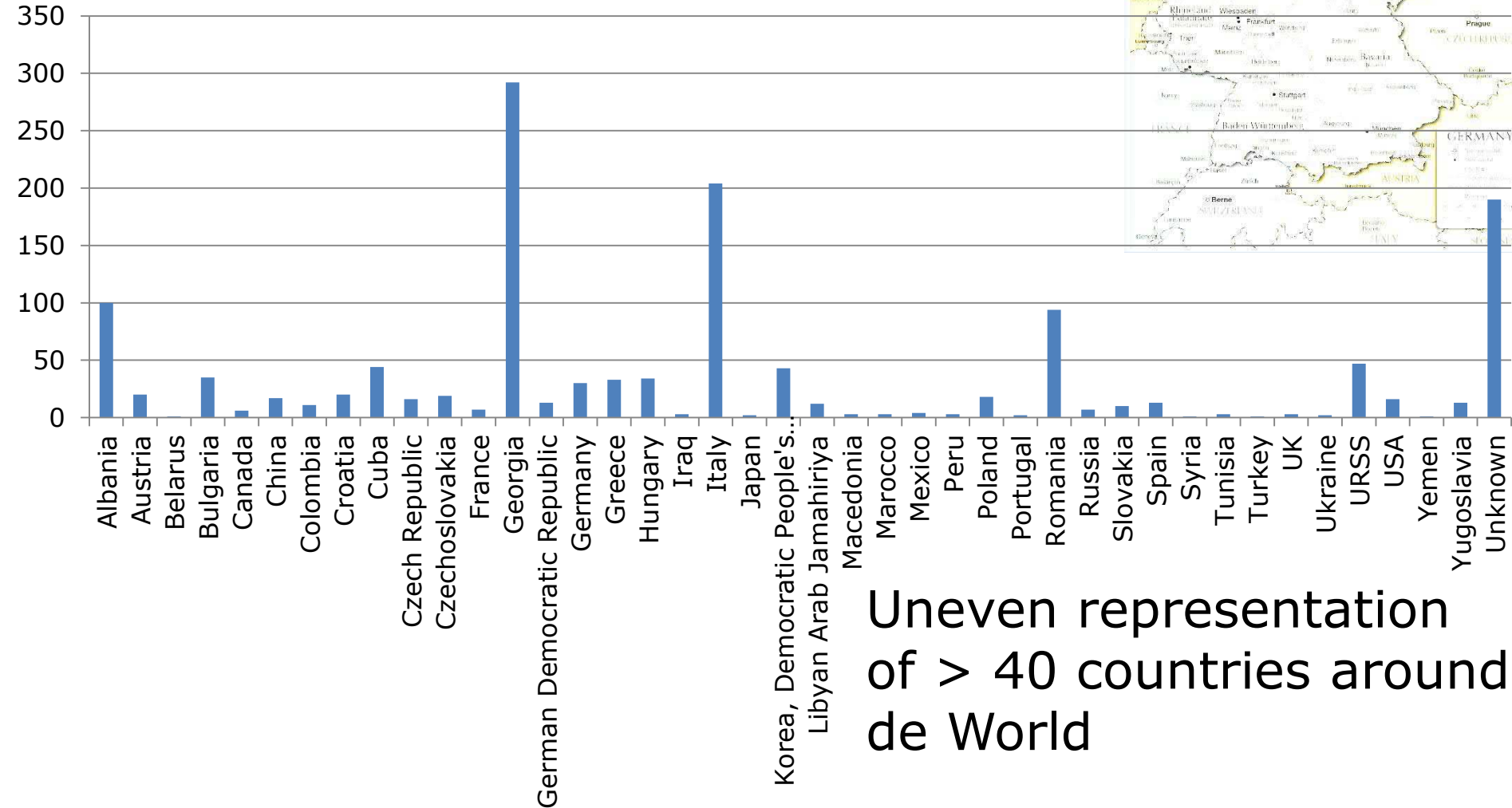
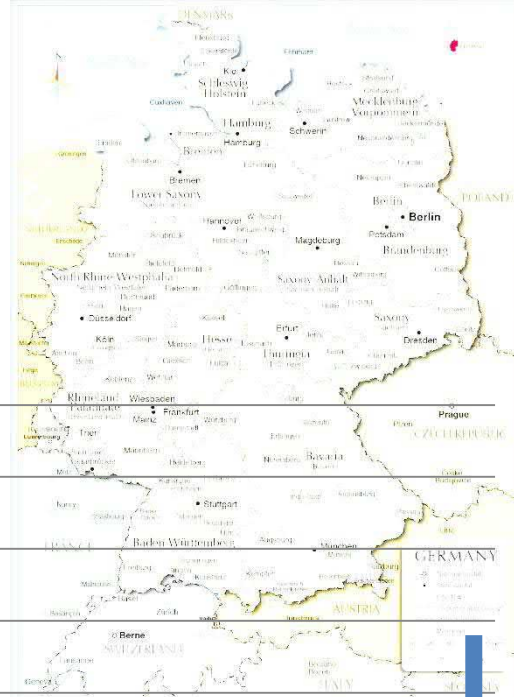
450 inbred lines



Large phenotypic diversity in the Italian collection

# Germany

## Origin of 1523 maize populations (IPK)



Uneven representation  
of > 40 countries around  
de World

# European Union Maize Landrace Core Collection

96 populations





# SWOT analyses of European maize germplasm system



# SWOT Strengths

- High human capacities
- Intensive sampling of territory
- Reliable facilities for conservation
- Active breeders' collections



# SWOT Weaknesses

- Limited genetic variation
- Excessive and irregular sampling
- Difficult access to collections
- Doubts about seed quality
- Poor coordination



# SWOT Opportunities

- High social consciousness of biodiversity value
- Increasing concern of climate challenges
- Rising emphasis on food quality and security





# SWOT Threats

- Budget cuts
- Increasing nationalisms
- Decreasing interest in agriculture



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MISIÓN BIOLÓGICA DE GALICIA

# Plan of action for European maize germplasm system



# Plan of action strengths

## Strengths:

- High human capacities
- Intensive sampling of territory
- Reliable facilities for conservation
- Active breeders' collections

## Capitalize strengths:

- Cooperate among countries
- Optimize the use of facilities
- Valorize genetic resources for breeding



# Plan of action weaknesses

## Weaknesses:

- Limited genetic variation
- Excessive and irregular sampling
- Difficult access to collections
- Doubts about seed quality
- Poor coordination

## Cope with weaknesses:

- Introduce exotic germplasm
- Make a complete core collection
- Share genetic resources and information
- Coordinate bank curators and breeders



# Plan of action Opportunities

## Opportunities:

- High social consciousness on biodiversity value
- Increasing concern of climate challenges
- Rising emphasis on food quality and security

## Benefit from opportunities:

- Increase communications in mass media
- Make international projects
- Adapt objectives to social demands



# Plan of action Threats

## Threats:

- Budget cuts
- Increasing nationalisms
- Decreasing interest on agriculture

## Avoid threats:

- Search international and private funding
- Increase meetings and exchanges
- Increase communication in mass media

# A global proposal

## **Bottom – up:**

- The WG as open place for participants' needs and offers on:
  - Resources
  - Expertise
  - Facilities
- Identify curators
- Share information about state and availability of collections
- Exchange people for training stages

## **Top – down:**

- Make an executive committee for the WG
- Complete the European Core Collection
- Promote participatory breeding for in situ conservation
- Design international projects for:
  - Characterization (molecular analyses) and evaluation
  - Breeding
- Develop a training program for sharing PhD students (Marie Curie program)



**Thanks for your  
attention**