AEGRO AND GENETIC RESERVE METHODOLOGIES: 2 - NATIONAL APPROACH

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Session Objectives

- National CWR strategy
- National approach to CWR *in situ* conservation: the model
- Portuguese CWR as a case-study
    - Inventory
    - Priorities
    - Ecogeographic survey
    - Genetic diversity
- Conclusions and relevant points
- Acknowledgments

Why a National CWR Strategy?

- CWR are a unique national resource
- CWR are becoming more **threatened** (human activities, climate change, etc) and therefore are suffering from genetic erosion

Why a National CWR Strategy?

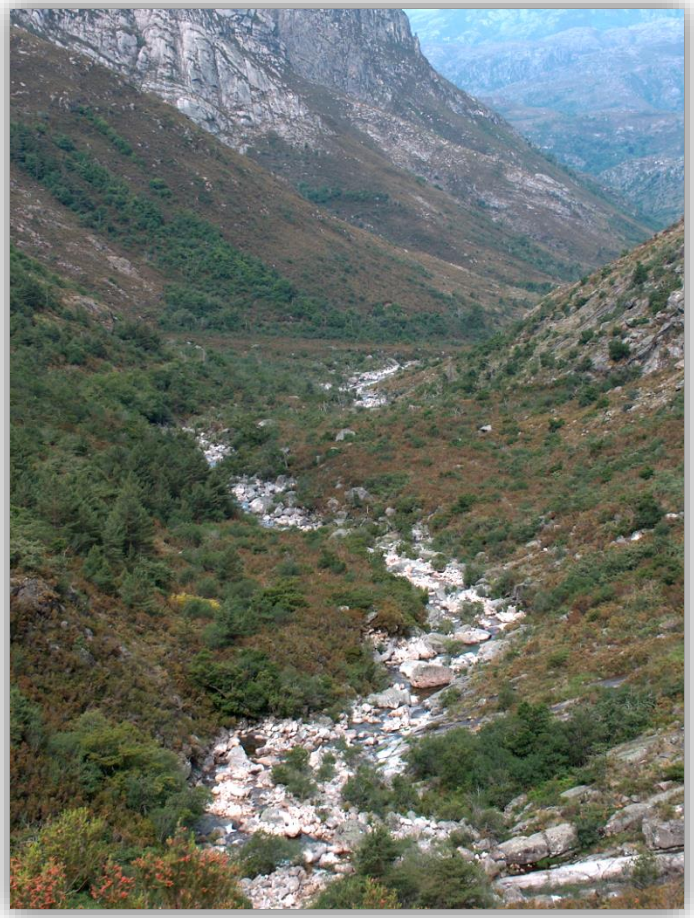
- Legislative requirement to conserve
- CWR require an integrated *in situ* / ex situ approach, best implemented via a National CWR Strategy
- No single method of generation

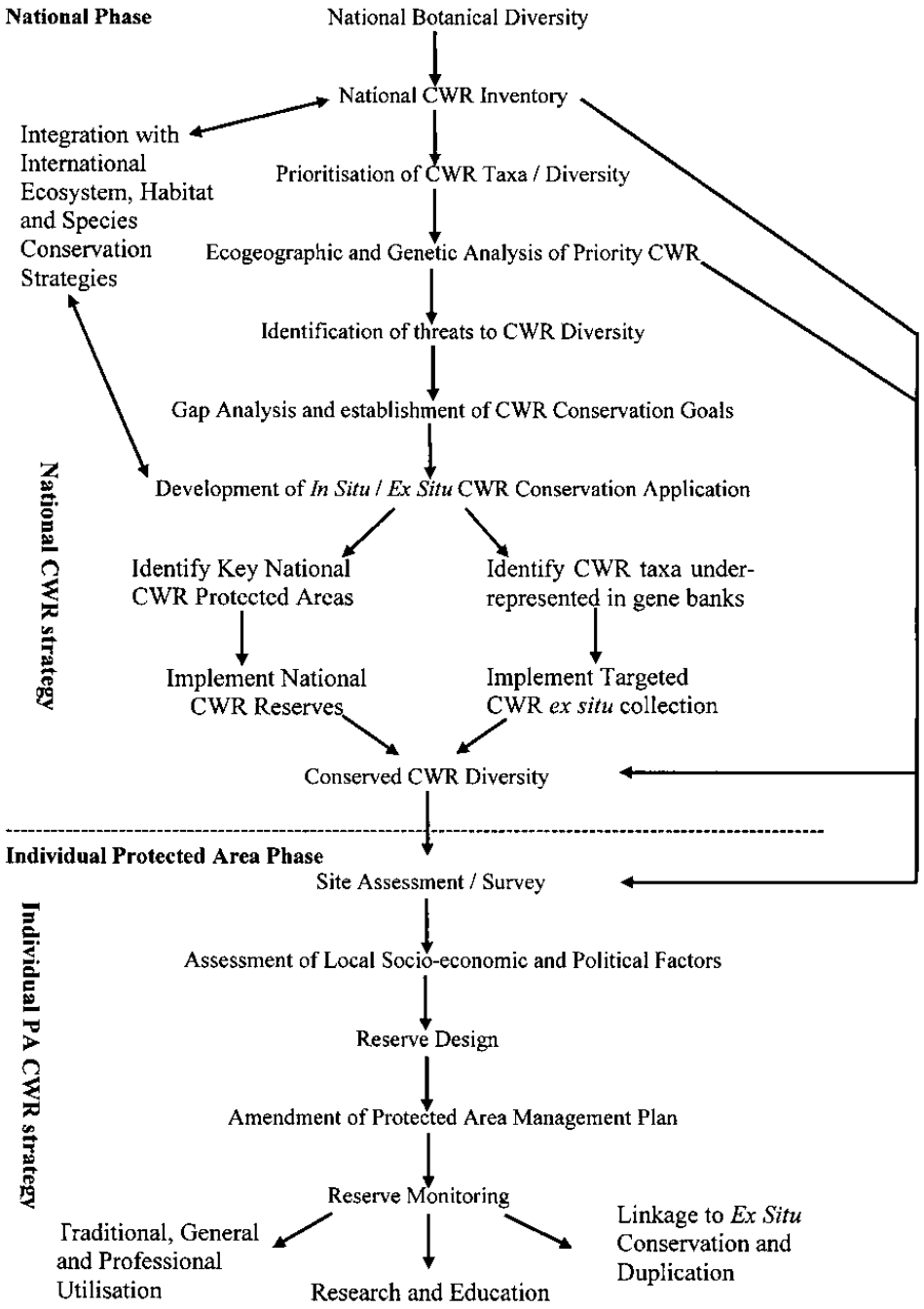
National CWR Strategy

Two levels of implementation:

1. Strategic / national
   - Important CWR Areas
   - Network of national CWR reserves

2. Practical / local
   - Individual national CWR reserves
   - CWR conservation in protected area





NATIONAL APPROACH TO CWR *IN SITU* CONSERVATION - MODEL

Focus on national flora, taxonomic and genetic diversity available in the country

PORTUGUESE NATIONAL CWR: CASE-STUDY

Main questions

What to conserve?

Do not know which CWR occur in Portugal!

NATIONAL INVENTORY OF CWR

Which CWR are more important?

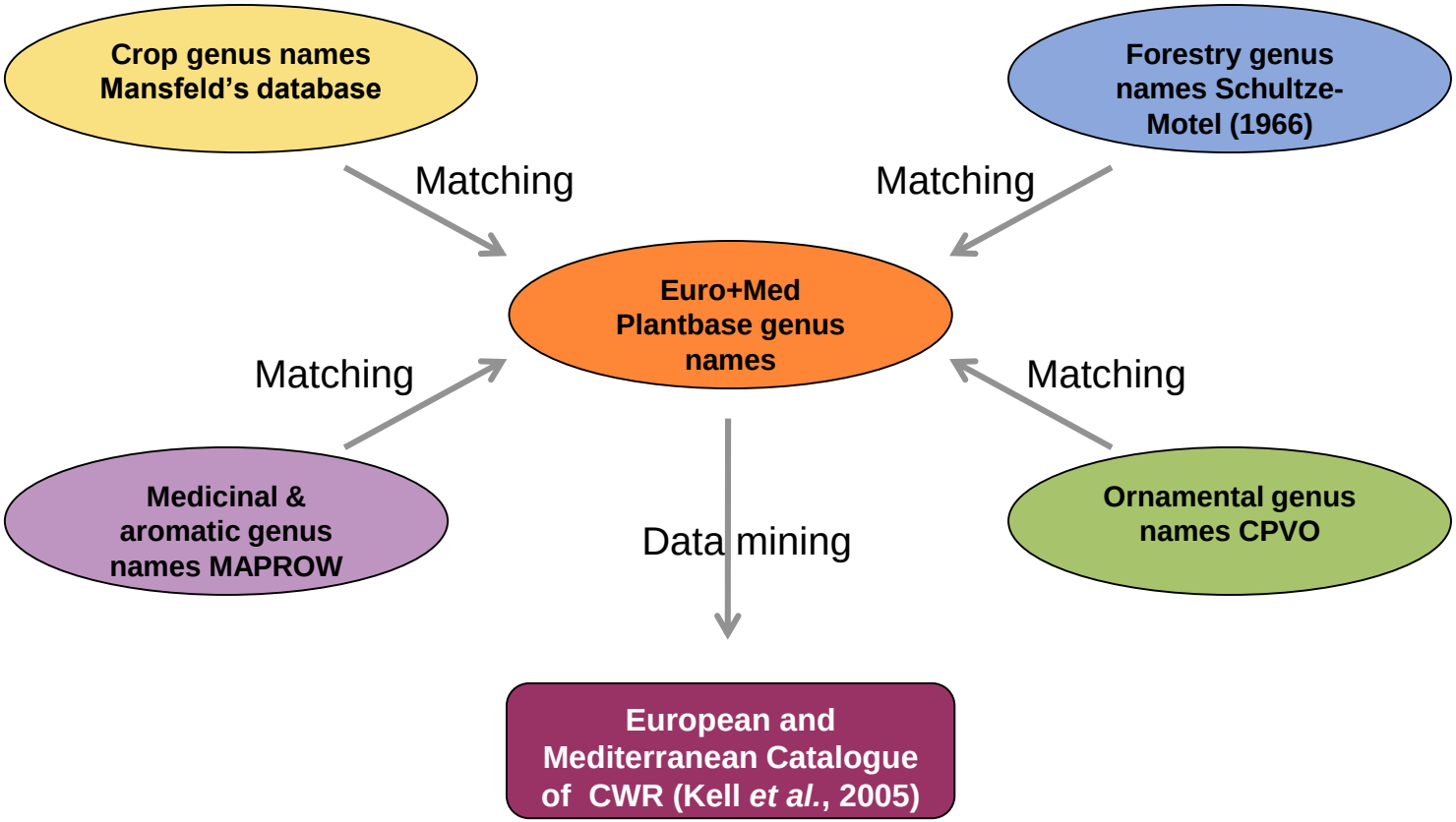
Do we need to conserve all populations?

Where are they located?

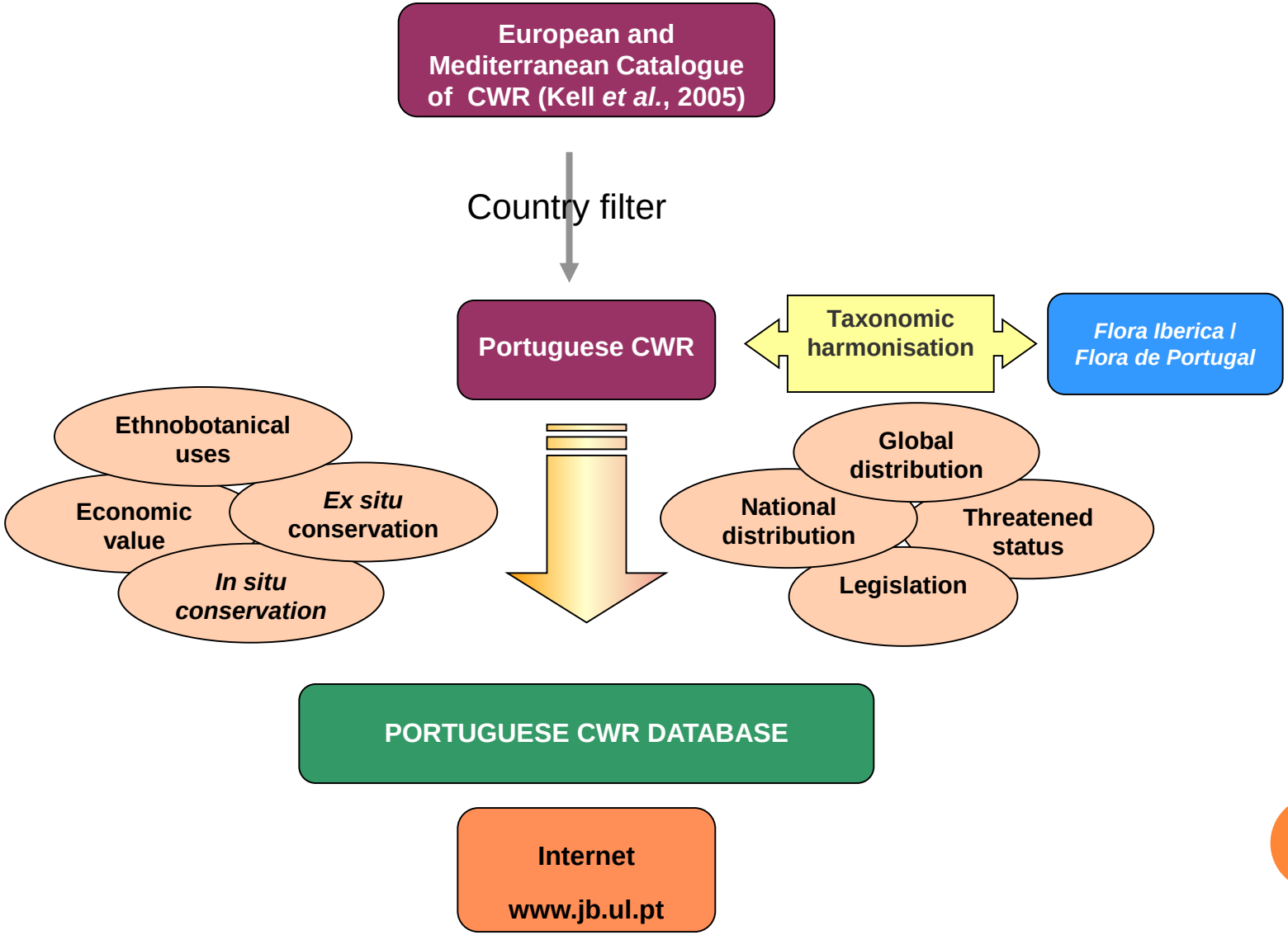
Question: Which CWR exist in Portugal mainland?

Portuguese CWR inventory

Methodology



Methodology

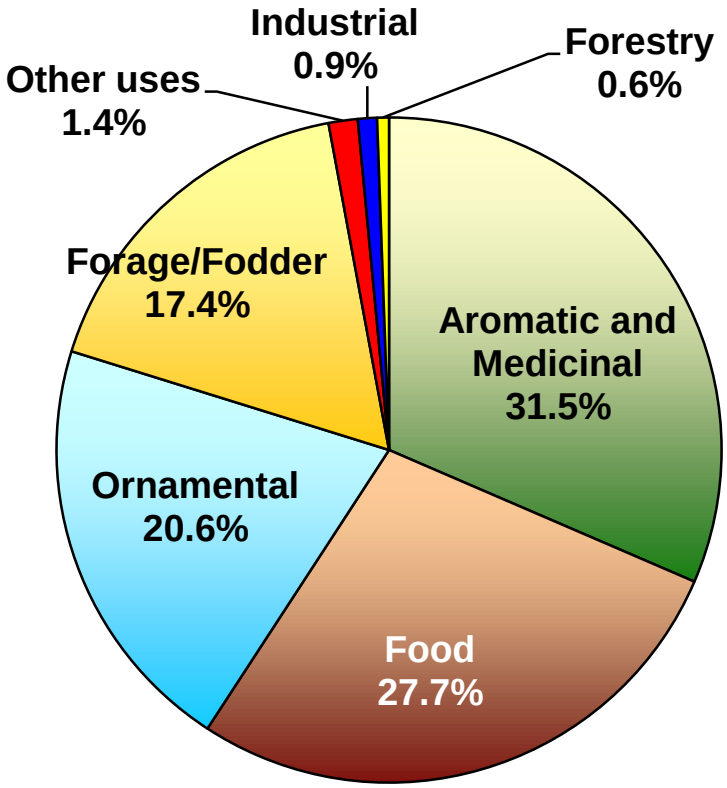


Main results

CWR: 2262 taxa

(109 families, 471 genera)

~ 75% of Portuguese Flora



Main results

- Leguminosae, Compositae, Poaceae – higher number of CWR;
- ~ 92% are native;
- ~ 6.2% are endemic to Portugal, 11.5% are endemic to Iberian Peninsula;
- Only 12.2% are currently conserved in Genebanks;
- Only 0.5% are actively conserved *in situ;*
- ~ 6.0% are under any kind of national/international legislation.

Main questions

What to conserve?

√ NATIONAL INVENTORY OF CWR

Do we need to conserve all populations?

Which CWR are more important?

PRIORITISE CWR AT NATIONAL LEVEL

Do not know which species are more important…

Where are they located?

Question: Which species are more important to conserve?

Setting conservation priorities for the conservation of CWR in Portugal

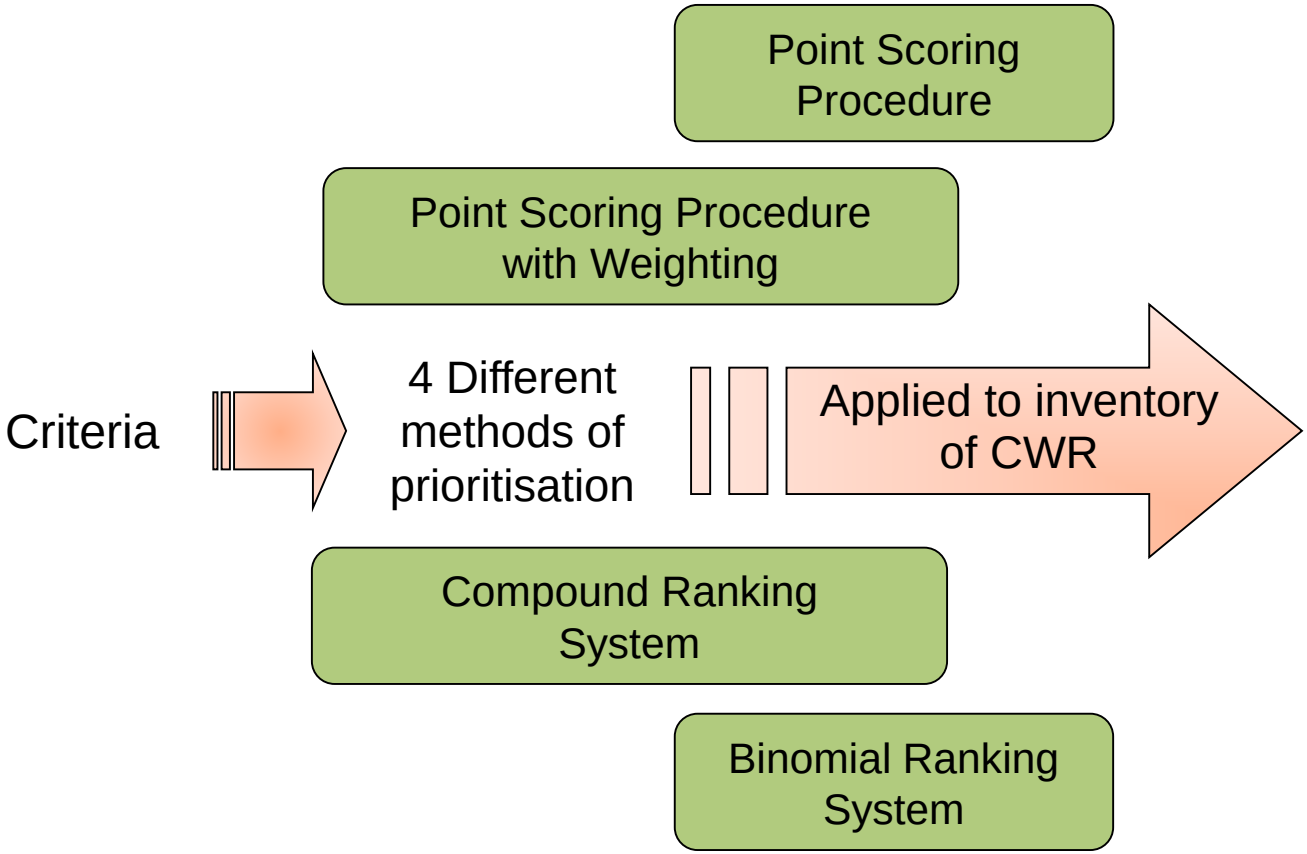
Methodology

1. Criteria used

- Native status
- Threatened status (e.g. IUCN Red List Criteria)
- Economic value
- Ethnobotanical value
- Current *in situ* and *ex situ* conservation status
- National and international legislation
- Global distribution
- National distribution

Methodology

2. Prioritising – final procedure



PRIORITY SPECIES:
those belonging to the top 50 species of each method and that occur in more number of methods

Results

SPECIES NAME	SPECIES NAME
Allium pruinatum	*Leuzea longifolia*
A. schmitzii	*Narcissus fernandesii*
A. victorialis	*N. scaberulus*
Daucus halophilus	*Plantago algarbiensis*
Dianthus cintranus subp. *barbatus*	*P. almogravensis*
D. cintranus subsp. *cintranus*	*Quercus canariensis*
D. laricifolius subsp. *marizii*	*Trifolium arvense* subsp. *gracile*
Epilobium angustifolium	*Ulex densus*
Festuca brigantina	*Vicia bithynica*
F. henriquesii	*V. onobrychioides*
Herniaria algarvica	*V. orobus*

22 PRIORITY SPECIES

Main questions

What to conserve?

√ NATIONAL INVENTORY OF CWR

Which CWR are more important?

√ PRIORITY SPECIES FOR CONSERVATION

Do we need to conserve all populations?

Where are they located?

ECOGEOGRAPHIC SURVEY

Question: Where are the priority species located?

Ecogeographic survey of priority species for conservation

Methodology

1 - Herbaria survey

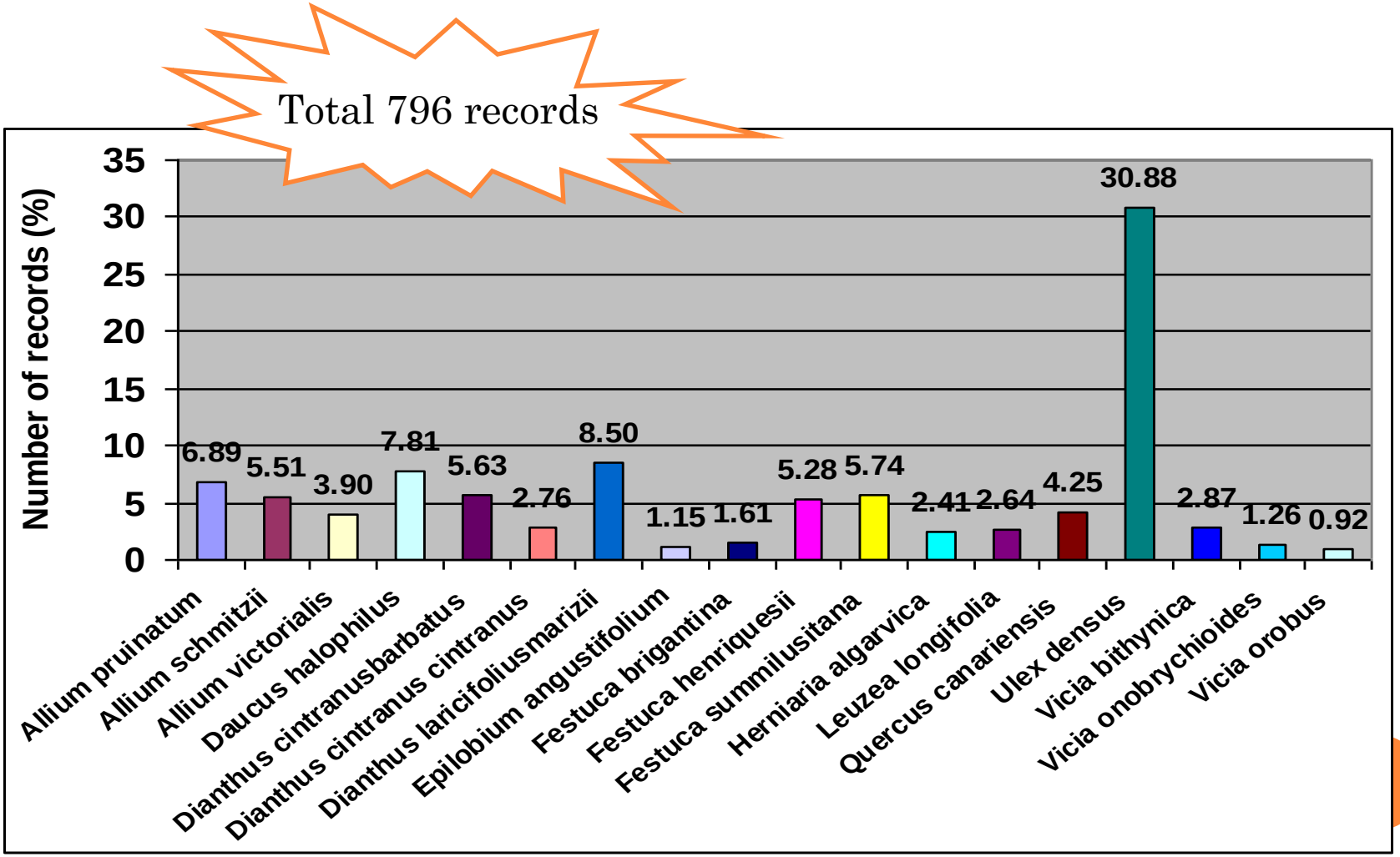
- 10 Portuguese herbaria and 1 Spanish herbarium
- 3 online herbaria

Methodology

2 - Genebank survey

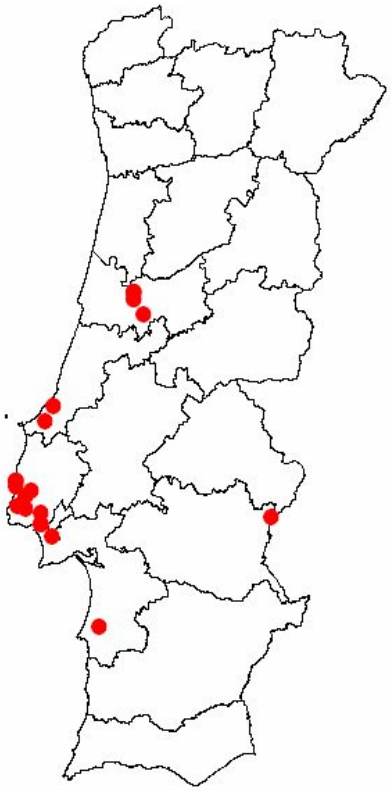
- 5 Portuguese genebanks
- 10 online genebanks

Some results



Some results

Vicia bithynica (L.) L.



- **Related crop:** faba beans (food, forage/fodder)
- **Habitat:** cereal fields, margins of pathes
- **Global distribution:** S, W Europe until Middle East, NW Africa and Azores
- **National distribution:** 4 provinces
- ***In situ* conservation:** not active and only 2 known populations are inside a conservation area
- ***Ex situ* conservation:** 3 samples
- **Legislation:** none
- **IUCN category (2001):** Vulnerable (VU)
- **Threats:** invasive species (*Carpobrotus edulis*), building, trampling.

Main questions

What to conserve?

√ NATIONAL INVENTORY OF CWR

Which CWR are more important?

√ PRIORITY SPECIES FOR CONSERVATION

Do we need to conserve all populations?

GENETIC DIVERSITY

Where are they located?

√ ECOGEOGRAPHIC SURVEY

Question: Do we need to conserve all the populations?

Genetic diversity study for the target species

Methodology

1 - Species selection

- from the 22 priority species, those ones occurring in single locations, with taxonomic issues or already being studied were excluded; left with **9 species**

2 - Collecting mission

- for the 9 target species, locations with a wide range of environments and ecogeographic conditions were chosen
- only **5 species** were found in the field!

Methodology

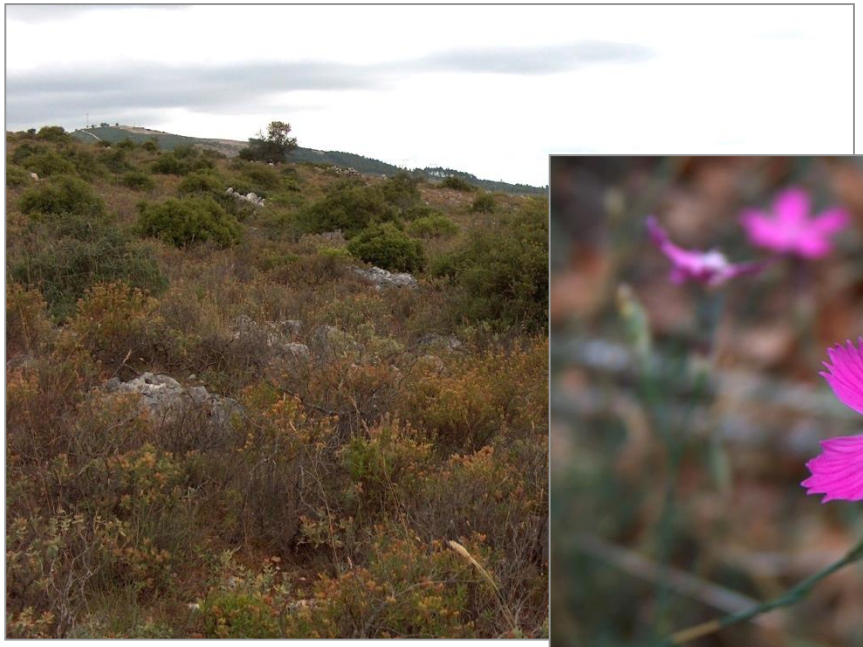
2 - Collecting mission (cont.)

Allium victorialis L.

Methodology

2 - Collecting mission (cont.)

Dianthus cintranus Boiss. & Reut. subp. *barbatus* R. Fern. & Franco



Methodology

2 - Collecting mission (cont.)

Dianthus cintranus Boiss. & Reut. subsp. *cintranus*

Methodology

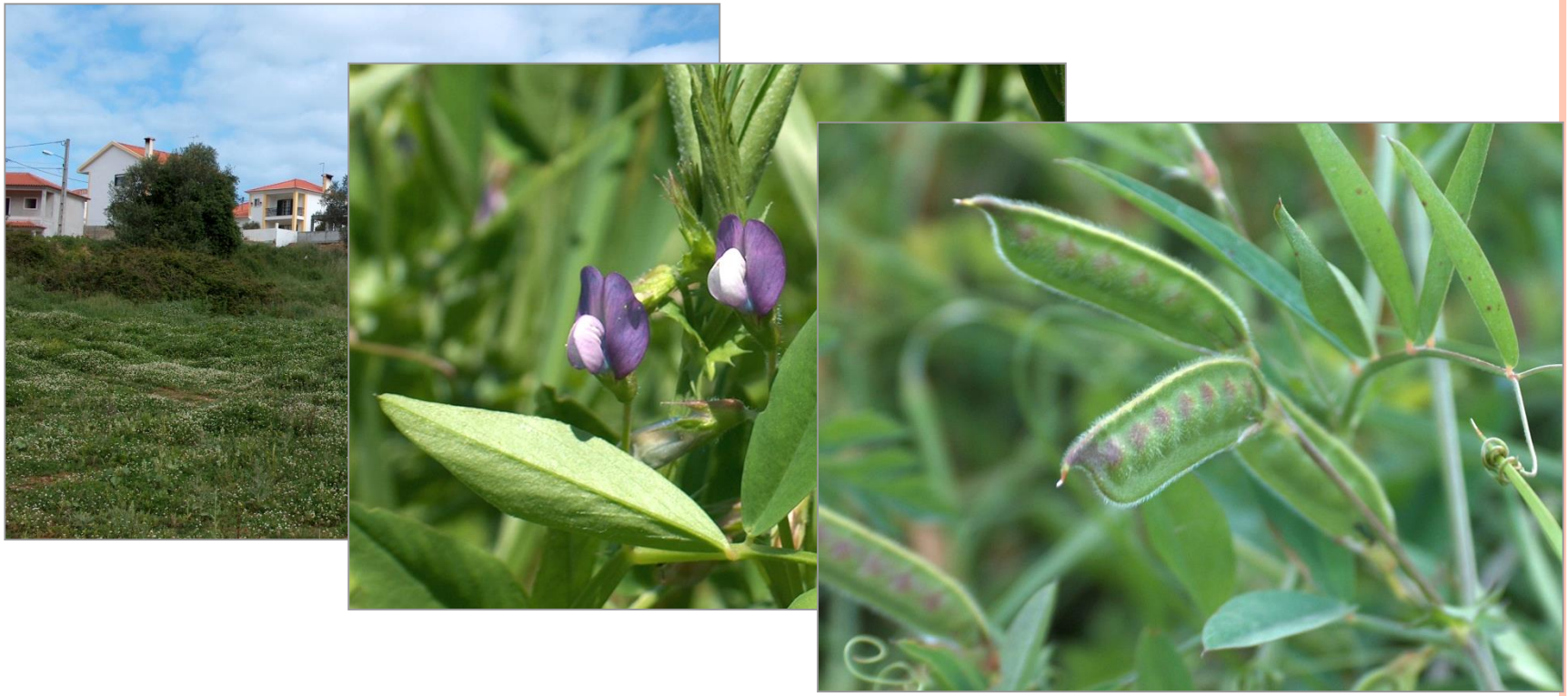
2 - Collecting mission (cont.)

Dianthus laricifolius Boiss. & Reut. subsp. *marizii* (Samp.) Franco

Methodology

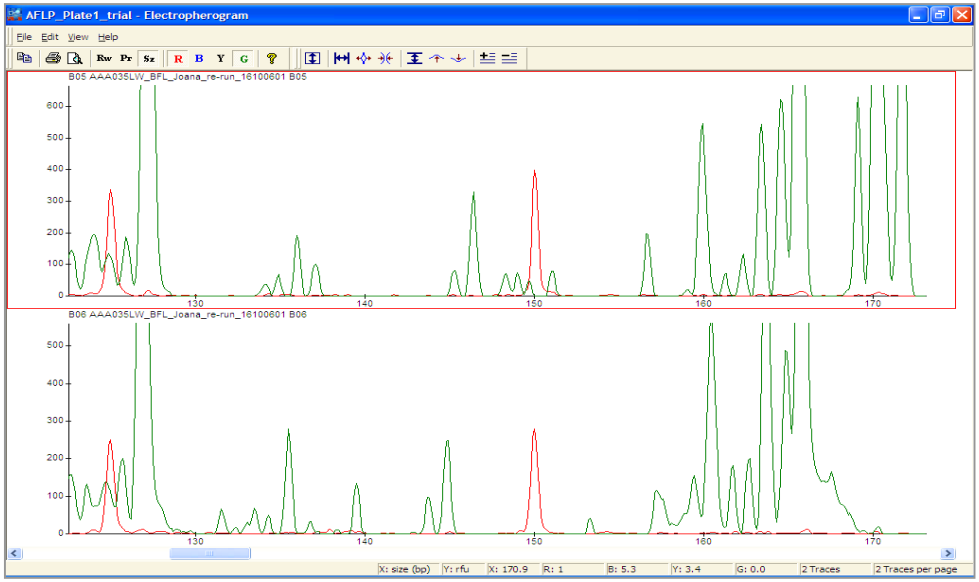
2 - Collecting mission (cont.)

Vicia bithynica (L.) L.



Methodology

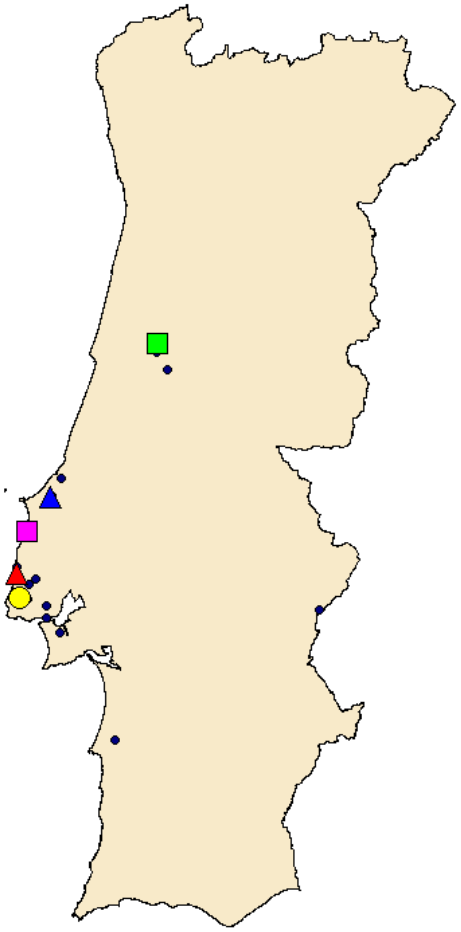
4 - Amplified Fragment Lenght Polymorphism (AFLP)

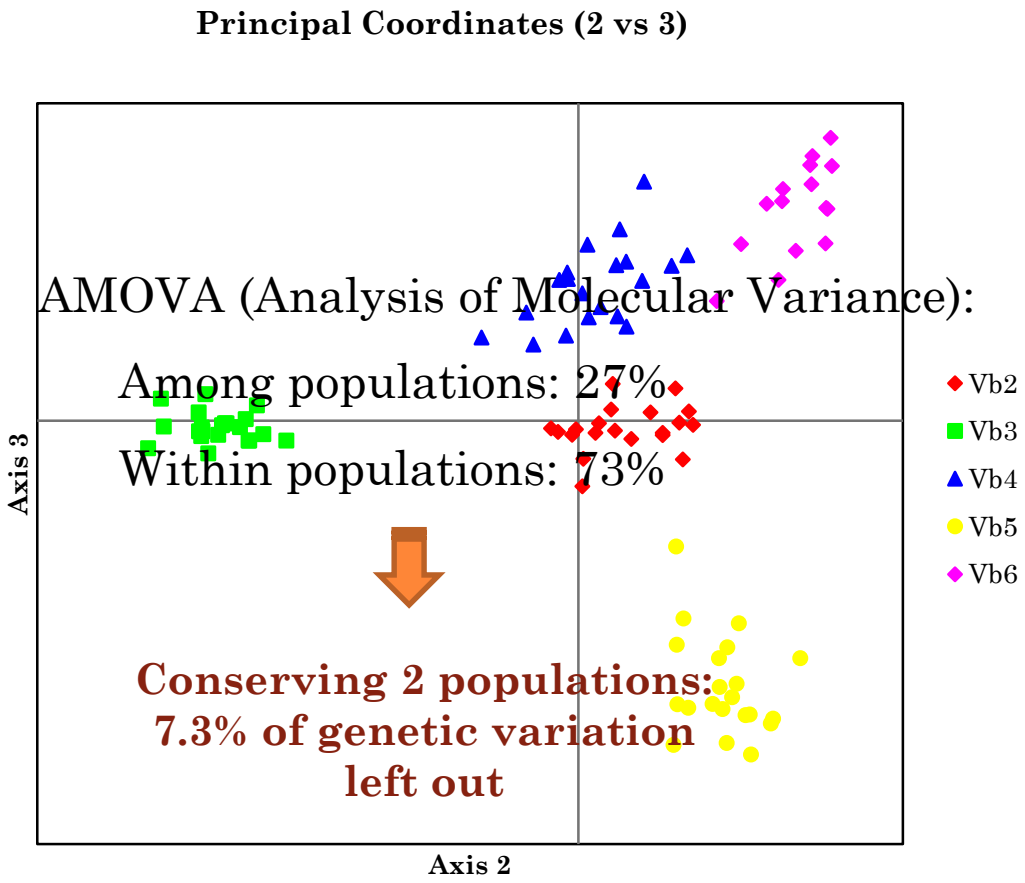


- F-statistics
- Genetic distance
- AMOVA
- regression analysis with ecological variables

Some results

Vicia bithynica (L.) L.





AMOVA (Analysis of Molecular Variance):

Among populations: 27%

Within populations: 73%

Conserving 2 populations: 7.3% of genetic variation left out

F_{st} = 0,171 => populations are different!

Main questions

What to conserve?

√ NATIONAL INVENTORY OF CWR

Which CWR are more important?

√ PRIORITY SPECIES FOR CONSERVATION

Do we need to conserve all populations?

√ AFLP ANALYSIS

Where are they located?

√ ECOGEOGRAPHIC SURVEY

Conclusions and Relevant points

1 . CWR Inventory

- Time-consuming but then it only needs an update
- Problem of country with poorly known flora
- 'Standard route' = Flora to crops to CWR inventory (semi-automated)
- 'Alternative route' = Crops to flora to CWR inventory (via workshop)

Conclusions and Relevant points

2 . Prioritising CWR taxa / diversity

- Limited conservation resources
- Broad CWR definition with generic limit = relative large number of taxa
- Other factors should be considered: genetic distinctiveness, biological importance, cost, sustainability, ethical and aesthetic considerations, and priorities of the conservation agency.
- No single method: it depends on the information available and the priorities of each country

Conclusions and Relevant points

3 . Ecogeographic survey

- Data might be dispersed and not easily accessible
- GIS software might not be easy to use
- It is an important tool:

  To plan further field work/collecting missions

  To understand the distribution and ecological characteristics of taxa

  To help in developing prediction of distribution models

Conclusions and Relevant points

4 . Genetic diversity

- Can be expensive
- Requires specific molecular technology and equipment
- Allows to know the genetic diversity available in the species distribution range
- Helps to decide which populations are priorities to conserve

Acknowledgments

- Shelagh Kell (University of Birmingham, UK)
- Maria Scholten (University of Birmingham, UK)
- Eliseu Bettencourt (EAN, Portugal)
- Pedro Ivo Arriegas (ICN, Portugal)
- António Flôr (PNSAC, Portugal)
- Fundação para a Ciência e Tecnologia (FCT, Portugal)
- all curators of herbaria and genebanks

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