

# EU-Project PGR Secure

## **KBBE.2010.1.1-03:**

Novel characterisation of biodiversity resources for wild crop relatives as a basis for improved crop breeding

- Call: FP7-Food, Agriculture, Fisheries, Biotechnology  
KBBE-2010-4

Coordinator:

**Nigel Maxted, UOB**



# PGR Secure Workpackages

WP 1 Phenomics and Genomics (Brassica crops and insect resistance)  
(DLO,UOB, SXS, UNOTT)

WP 2 Informatics (web-based CWR/LT Trait Information Portal)

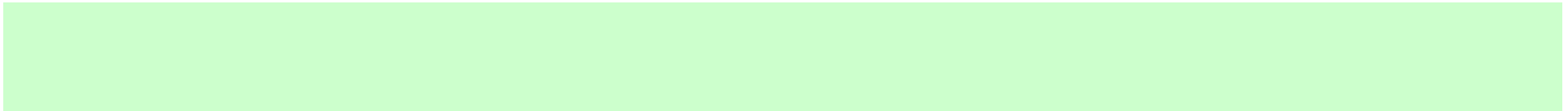
WP 3 Crop wild relative conservation (generate detailed national inventories, develop a European CWR conservation strategy)

WP 4 Landrace conservation (gain an understanding of diversity of LRs, development of a systematic European LR conservation strategy)

WP 5 Engaging the user community (SWOT, engaging the PGR user community to initiate networking according to the present European breeders and conservationists needs)

WP 6 Dissemination and training (web-based portal, conference (EU))

WP 7 Management



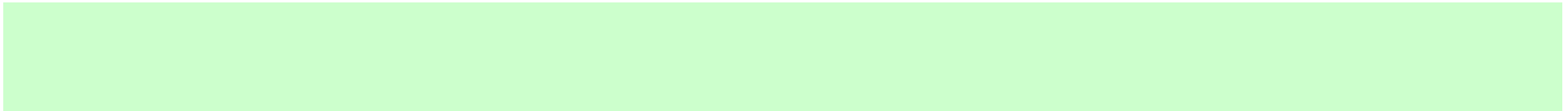
WP 5

# Engaging the user community



# Outline presentation

- Introduction
  - the WP5 team
  - WP5 financial/administrative matters
  - the problem
- WP5 goals
- Approaches
  - SWOT
  - pre-breeding



# the WP 5 team



Gert Poulsen,  
NordGen



Lothar Frese, JKI



Chris Kik, CGN  
coordinator



Gisela Neuhaus,  
JKI

# WP5: financial/administrative matters

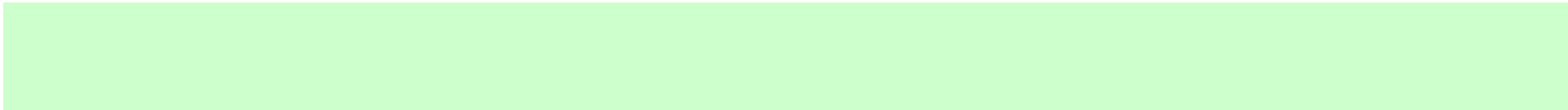
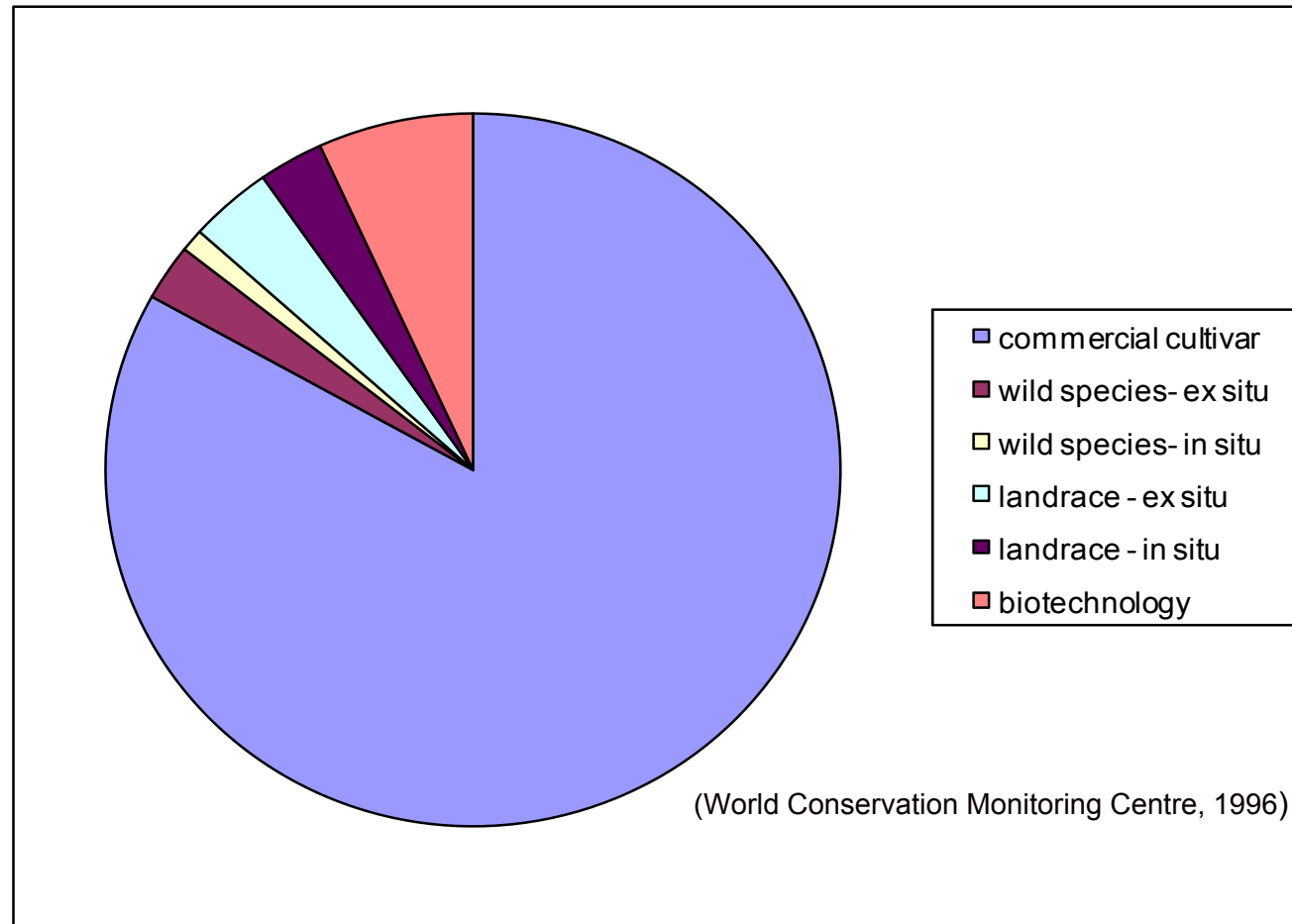
- Total WP budget 780 k€ (668 k€ EU)
  - personnel input (NordGen 7 months, CGN 9 months, JKI 4.5 + 24 months)
  - workshops/meetings
  - consultants
  - travel

# The problem



- CWR and LR stored by genebanks are not used optimally by breeders, public research institutes and agro NGOs.
- Why?
- Differences between countries?

# Source of germplasm used for development of new varieties





# Access and Use of CWRs

**Table 1** Use of crop wild relatives in the past 20 years in released cultivars of 13 crops of international importance<sup>a</sup>

Crop	Pest and disease resistance	Abiotic stress	Yield	Quality	Male sterility or fertility restoration	Total number of contributed traits
Cassava	+	-	-	+	-	3
Wheat	+++++	-	+	+	-	9
Millet	+	-	-	-	+	3
Rice	+++++	+++	+	-	+	12
Maize	+	-	-	-	-	2
Sunflower	+++	+	-	-	+	7
Lettuce	+++	-	-	-	-	2
Banana	++	-	-	-	-	2
Potato	+++++	-	-	-	-	12
Groundnut	+	-	-	-	-	1
Tomato	+++++	++	-	++	-	55
Barley	-	+	-	-	-	1
Chickpea	-	+	-	-	-	2

<sup>a</sup> Plus signs indicate number of wild relatives that have contributed beneficial traits to crop varieties in each category of traits. Minus sign indicates wild relatives have not contributed beneficial traits in that category. Total number of individual traits obtained from wild species are indicated in the last column for each crop

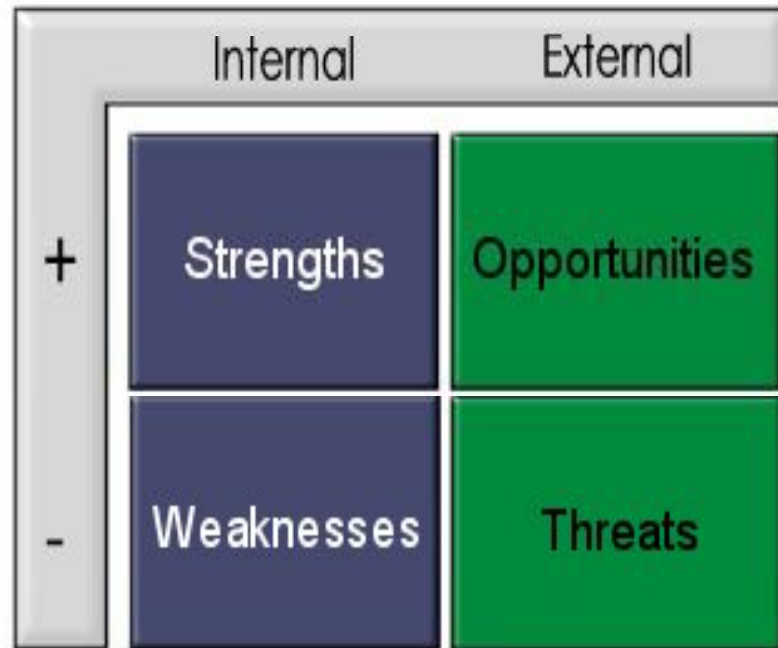
# Goals of WP5

- To promote the sustainable access and use of CWR and LR in Europe via a twofold approach
  1. to analyse the relationships between the four CWR/LR stakeholders in three regions in Europe via a questionnaire – based SWOT analyses and identify the actions needed  
(task 5.1–5.3)
  2. to promote and facilitate the flow of pre-breeding material and accession information gained in this project to the stakeholders concerned  
(task 5.4)

# Approach 1

- Establish a network of country key persons
- Establish lists of four main stakeholder groups
  - Conservation, Breeders, Agro-NGOs, Scientists
- Interviews with representative stakeholders
- Web based questionnaire
- Preliminary SWOT analysis as input to regional and european workshops
- Writing final SWOT
- Facilitate development of new partnerships

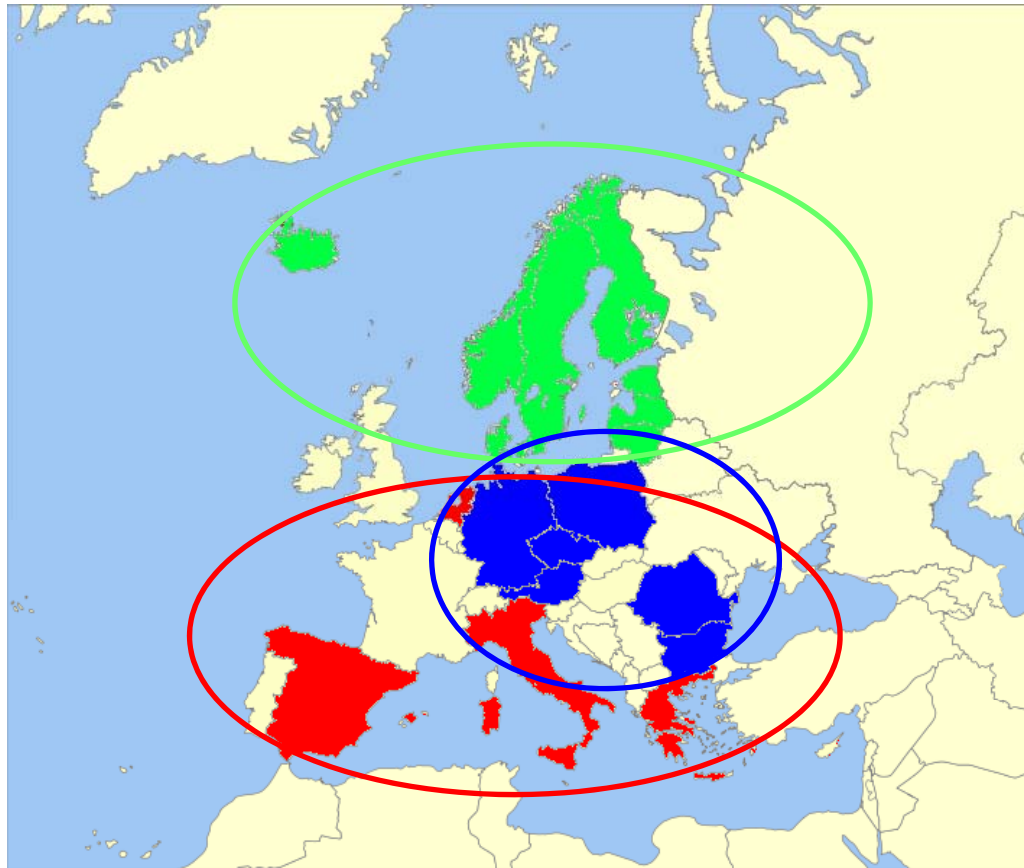
# SWOT analysis of European CWR/LR stakeholders



- ✓ genebanks
- ✓ breeding companies
- ✓ public research
- ✓ NGOs

- Identify constraints for use of CWR/LR
- Who decides to use CWR/LR in breeding programs
- Propose ways for enhanced use of CWR/LR in crop improvement

# SWOT CWR/LR analysis



- Northern Countries: green
- Eastern European countries: blue
- Southern European countries: red

# Approach 2

## To promote the flow of pre-breeding material

- Two routes to transfer germplasm into commercial breeding programmes
  - fundamental pre-breeding route (WP1)
    - transfer (18 months): *Brassica* germplasm resistant to cabbage whitefly and cabbage aphid to breeders
    - transfer (40 months) of molecular markers linked to resistances to breeders
  - applied pre-breeding route
    - screening *Avena* and *Beta* international DBs for agronomically interesting traits (*Beta*: resistance to BNYVV, *Rhizoctonia*, etc.; *Avena*: resistance to *Fusarium*, cold tolerance, etc.) → transfer knowledge/seed to companies → evaluation at companies

# WP 1 Phenomics, Genomics, Transcriptomics

Wild Brassica accessions (*B. oleracea* complex and *B. fruticulosa*) and landraces included in the European Brassica db.



Species Total (BrasEDB)

- B. bourgeauii* 5
- B. cretica* 45
- B. fruticulosa* 17
- B. hilarionis* 4
- B. incana* 37
- B. insularis* 29
- B. macrocarpa* 7
- B. montana* 44
- B. oleracea* 3486
- B. rupestris* 22
- B. villosa* 21

**Total 3717**



Identification of resistance factors against the cabbage aphid (*Brevicoryne brassicae*) and the cabbage whitefly (*Aleyrodes proletella*)

350 accessions phenotyped,

125 accessions metabolomics techniques/EPG,

15 accessions of Brassica CWR and LR in next generation sequencing (5,99-8,68 × 10<sup>8</sup> bp),

data implementation into a web-based TIP (Trait Information Portal, WP2)

# WP5: Engaging the user community

Thank you for your interest !

