

Ontologies for Agrobiodiversity conservation and use: a further step in Plant Genetic Resources in Europe

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Novel characterization of crop wild relative and landrace resources as a basis for improved crop breeding

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Introduction to PGR Secure

The goal of agrobiodiversity conservation, unlike other forms of conservation, is not only the conservation of species and intra-specific genetic diversity related to agriculture, but also to promote its sustainable use in stabilizing agricultural production. Although significant progress has been made in the conservation and management of plant genetic resources for food and agriculture (PGRFA) globally and in Europe, there remain two critical areas where progress has been limited: (a) the use of conserved agrobiodiversity by breeders and (b) the systematic conservation of crop wild relative (CWR) and landrace (LR) diversity. Specifically for breeders and CWR / LR diversity conservation, the status quo is no longer an option as human-induced climate change is threatening the maintenance of the very diversity breeders require to mitigate the adverse impact of climate change. Conventionally, breeders have used their own lines and stocks to generate novel crop varieties, but these materials are relatively genetically uniform and it is now increasingly recognized that CWR and LR offer the breadth of genetic diversity required by breeders to meet the novel challenges of climate change and rapidly changing consumer demands.

The aim of PGR Secure is therefore to research novel characterization techniques and conservation strategies for European crop wild relative and landrace diversity, and further, to enhance crop improvement by breeders, as a means of underpinning European food security in the face of climate change. To achieve these goals, PGR Secure has four research themes:

1. Investigation of novel characterization techniques, including: (1a) Genomics, phenotyping and metabolomics, (1b) Transcriptomics, (1c) Focused Identification of Genoplasm Strategy.
2. CWR and LR conservation, including: (2a) Europe-wide CWR Inventory, (2b) Exemplar national CWR Inventories, (2c) European CWR Strategy, (2d) Europe-wide LR Inventory, (2e) Exemplar national LR Inventories, (2f) European LR Strategy.
3. Facilitating breeders' CWR and LR use, including: (3a) Identifying breeders' needs, (3b) Meeting breeders' needs, (3c) Integration of conservation and user communities, (3d) Pre-breeding – channeling potential interesting genoplasm into conventional breeding programmes.
4. Informatics development, including: (4a) CWR and LR Inventory Information web availability, (4b)



Aegilops cylindrica © Paul Blaf



PGR Secure “Novel characterization of crop wild relative and landrace resources as a basis for improved crop breeding”
<http://www.pgrsecure.org/>



About Releases Search Links

About EURISCO



The EURISCO web catalogue receives data from the National inventories, and provides access to all ex situ PGR information in Europe. [More]

Search the Database



Quick Search
Make a search using key criteria

Advanced Search
Use various criteria to search in the database

News

31 July 2012: EURISCO e-bulletin July 2012 has been released.

30 July 2012: RSS-feed is now available in the EURISCO website.

28 June 2012 - 1st Mediterranean Symposium on Medicinal and Aromatic Plants (MESMAP- 17-20 April 2013)

Training

Contacts

Documents

Tools

Intranet

Sitemap

EURISCO is a web-based catalogue that provides information on more than 1.1M accessions of *ex situ* plant collections maintained in Europe.

http://eurisco.ecpgr.org/home_page.html



Work packages

PGR Secure is implemented through six scientific work packages:

WP1: Phenomics and genomics

WP2: Informatics

WP3: Crop wild relative conservation

WP4: Landrace conservation

WP5: Engaging the user community

WP6: Dissemination and training

Management of the project is implemented through WP7 (Lead Partner: UoB).

Work package 2: Informatics

Lead partner: BIOVER.; all partners involved .

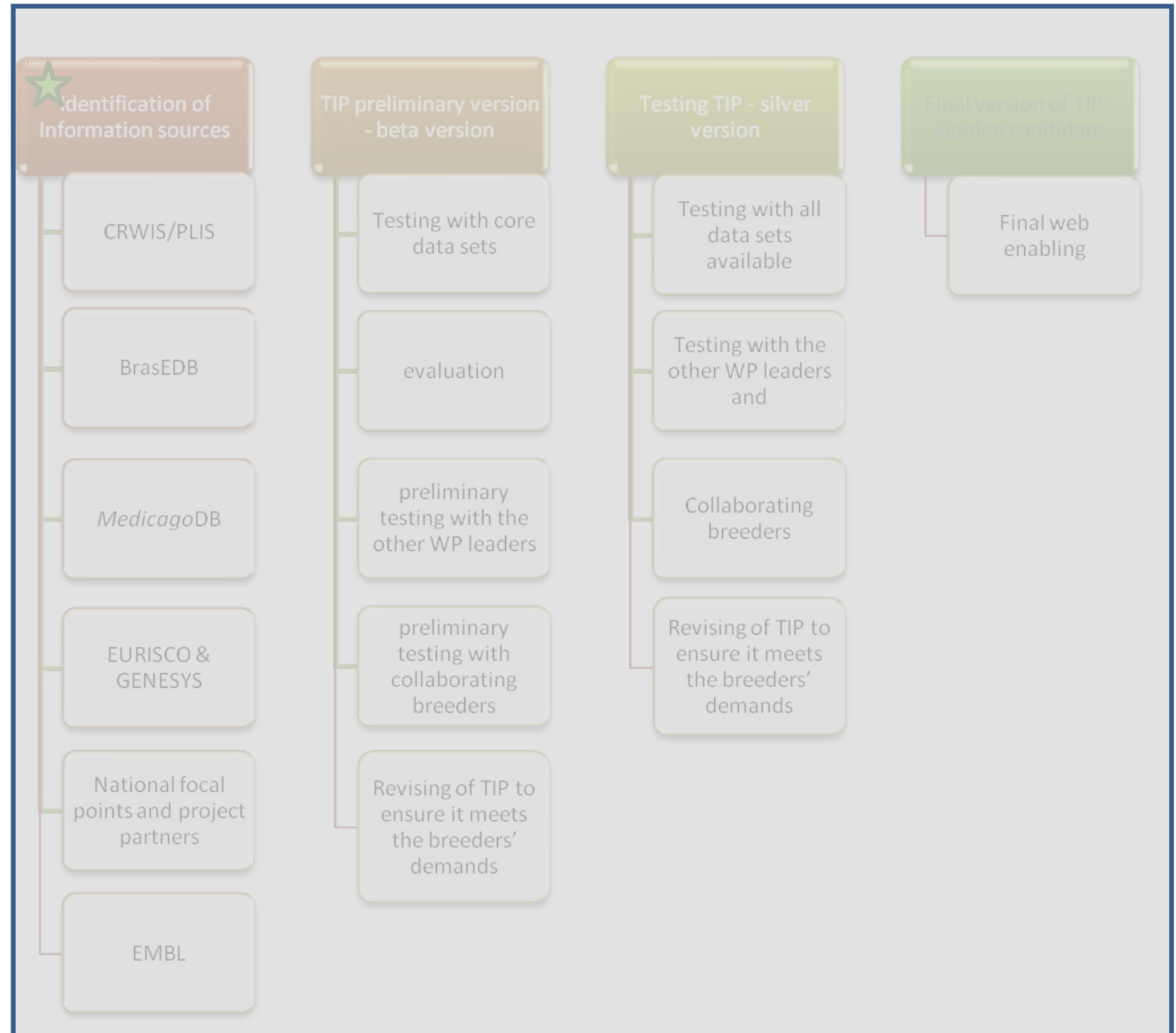
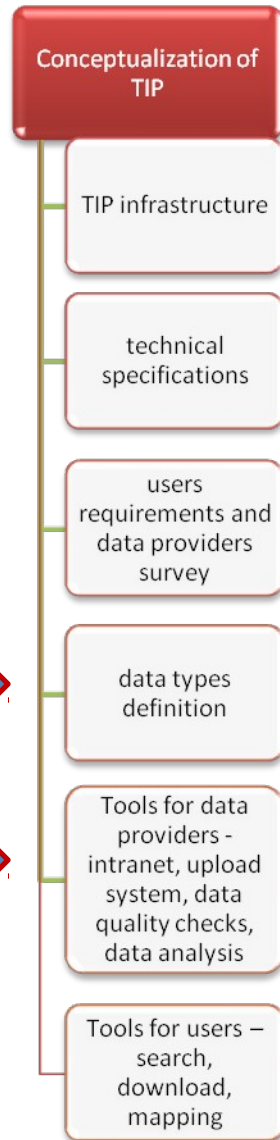
The main objectives of this work package are to:

To produce ***a web-based crop wild relative (CWR) and landrace (LR) Trait Information Portal (TIP)*** building on existing databases that will: (a) provide useful trait information (phenomics, genomics and transcriptomics data) on European CWR and LR diversity, particularly **for the case study genera, *Avena*, *Beta*, *Brassica* and *Medicago***; (b) provide baseline biodiversity information on CWR and LR diversity and its conservation; (c) establish links with related existing information systems regarding genomic characterization (e.g., EMBL Nucleotide Sequence Database) and ensure integration with other relevant plant genetic resources for food and.....

What do we need?

- Develop a controlled vocabulary (ontology) that describes the crops, themes, traits, anatomical and morphological structures and growth and developmental stages, etc.
- To establish a semantic framework for meaningful cross-species queries across crops, inventories and traits (genotyping and phenotype datasets).
- Describe crops, CWR and LR structures and entities and the relationships between them.

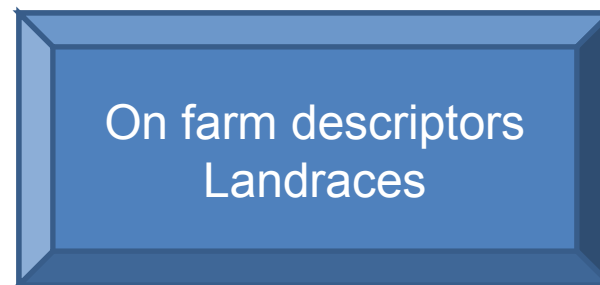
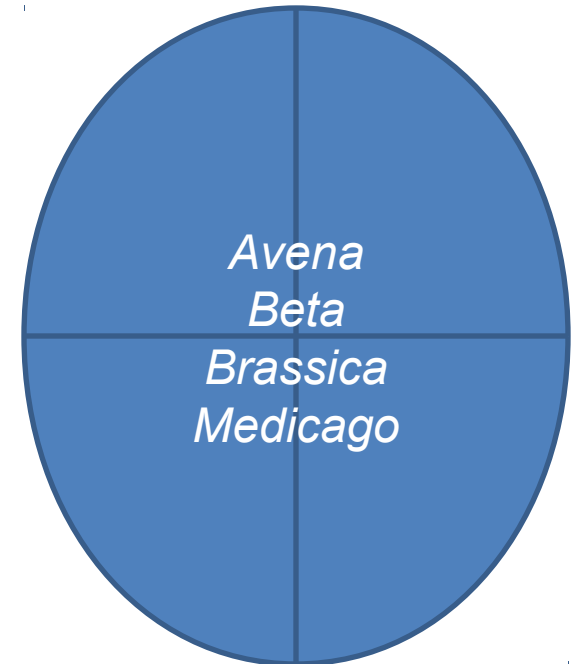
STEPS



From descriptor to ontologies

Four project model crops

EURISCO DESCRIPTORS	
0. National inventory code Code identifying the National Inventory, the code of the country preparing the National Inventory. Exceptions are possible, if agreed with EURISCO such as NGB. Example: NL11	(NICODE)
1. Institute code FAO Institute Code of the institute where the accession is maintained. Example: ILL037	(INSTCODE)
2. Accession number This number serves as a unique identifier for accessions within a genebank collection, and is assigned when a sample is entered into the genebank collection. Example: CGR00254	(ACCENUMB)
3. Collecting number Original number assigned by the collector(s) of the sample, normally composed of the name or initials of the collector(s) followed by a number. This number is essential for identifying duplicates held in different collections. Example: P&90-110	(COLLNUMB)
4. Collecting institute code Code of the Institute collecting the sample. If the holding institute has collected the material, the collecting institute code (COLLCODE) should be the same as the holding institute code (INSTCODE). Example: ILL037	(COLLCODE)



Ontologies for PGRSecure

Triontology

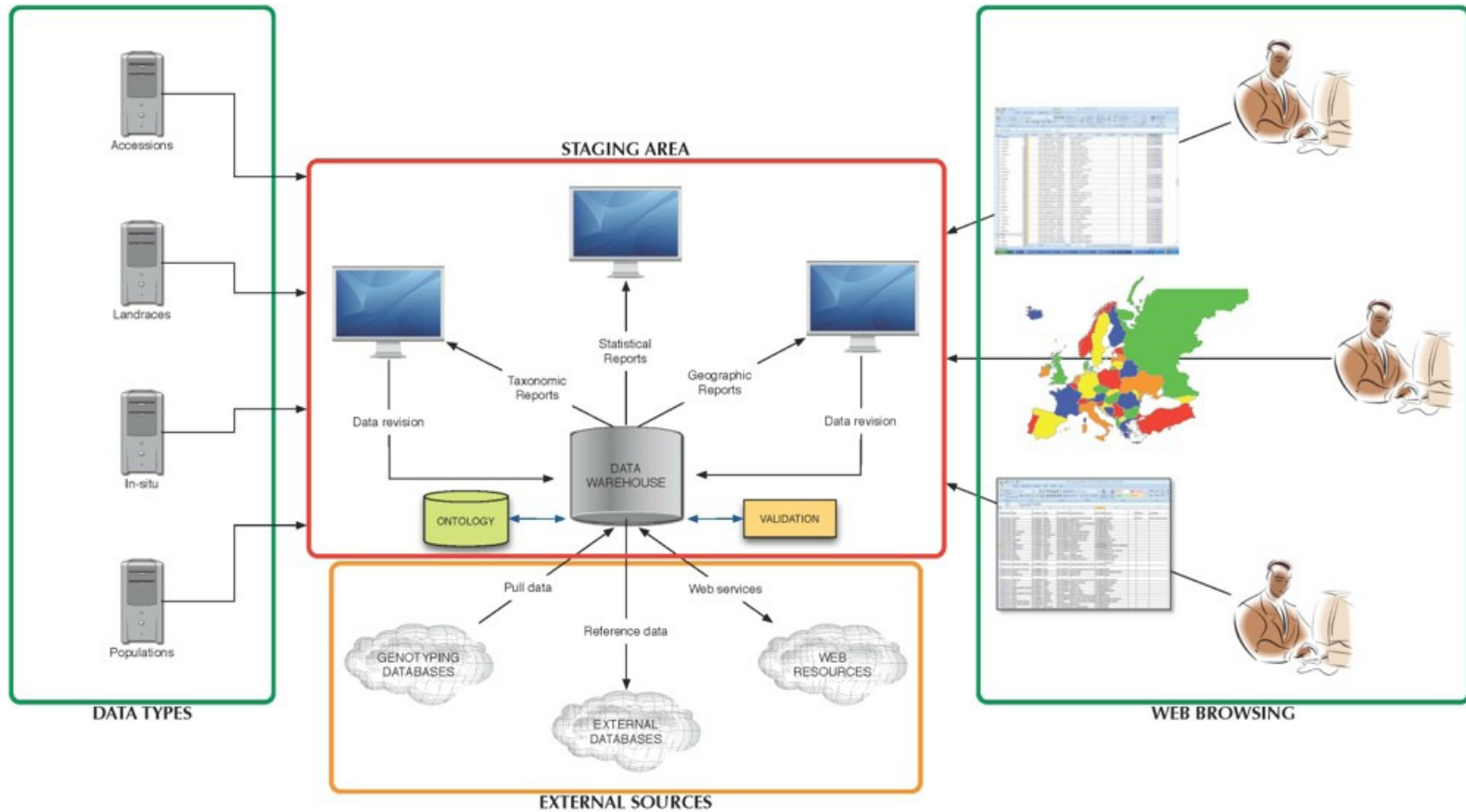


- A CWR ontology
 - If needed work on the existing CWR Ontology defining the CWR inventory
- LR ontology
 - Ontology defining the LR inventory
- CROP ontologies –Trait ontology
 - *Avena* ontology
 - *Beta* ontology
 - *Brassica* ontology
 - *Medicago* ontology



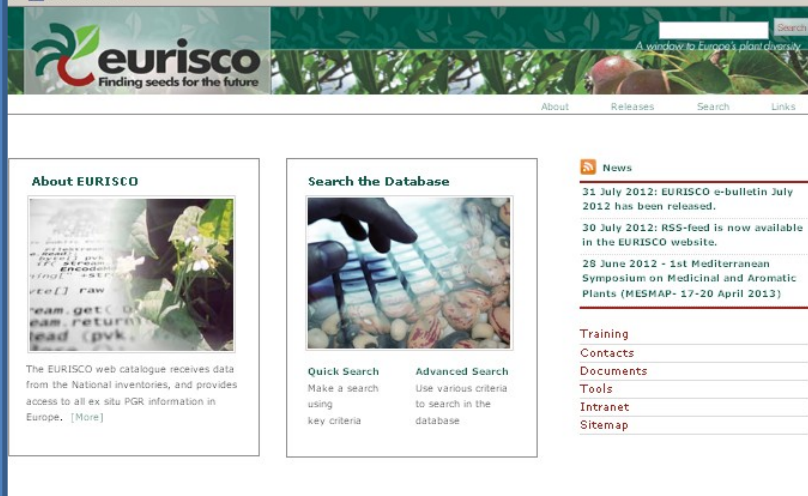
Trait Information Portal

TIP platform architecture



http://eurisco.ecpgr.org/home_page.html

Ex situ



What are we doing

- Developing a staging area for inclusion of characterization and evaluation data – using ontologies

Up-grading staging for passport data

Next...relevance to science!



But also linking with other external initiatives

- Collaboration for integration of other ontologies
- Contribute to existing ontologies i.e. CO, TO, GO....
- Analysis tools
- Visualization for cross –species/domain search

Contributors

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Development has been following Project partners :

- 1 The University of Birmingham (UOB), United Kingdom**
- 2 Stichting Dienst Landbouwkundig Onderzoek (DLO), The Netherlands**
- 3 Bioversity International (BIOVER), Italy**
- 4 Università Degli Studi Di Perugia (UNIPG), Italy**
- 5 Julius Kühn Institut Bundesforschungsinstitut für Kulturpflanzen (JKI), Germany**
- 6 Nordiskt Genresurscenter (NordGen), Sweden**
- 7 Maa-ja Elintarviketalouden Tutkimuskeskus (MTT), Finland**
- 8 Universidad Rey Juan Carlos (URJC), Spain**
- 9 ServiceXS BV (SXS), The Netherlands**
- 10 University of Nottingham (UNOTT), United Kingdom**
- 11 European Association for Research on Plant Breeding (EUCARPIA), Hungary**