Workshop of the Documentation and Information Working Group

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Topic 2: European inventory of on-farm genetic diversity
Introductory presentation

- The European Search Catalogue for Plant Genetic Resources (EURISCO) https://eurisco.ipk-gatersleben.de/apex/eurisco_ws/r/eurisco/home provides information about more than 2 million accessions of crop plants and their wild relatives, preserved *ex situ* by about 400 institutes.
- It is based on a network of National Inventories of 43 member countries and represents an important effort for the preservation of world's agrobiological diversity by providing information about the large genetic diversity kept by the collaborating institutions.
- EURISCO contains both passport data and phenotypic data.
- The central goal of EURISCO is to provide an “one-stop-shop” for information for the scientific community and for plant breeders.
- In addition to *ex situ* data, in the frame of the project "Extension of EURISCO for Crop Wild Relatives (CWR) *in situ* data and preparation of pilot countries' data sets", the EURISCO infrastructure has recently been extended for the management of *in situ* CWR data. Some of the pilot countries involved in the project have already provided production data on *in situ* CWR populations for integration into EURISCO.

What about the "Extension of EURISCO for landraces on-farm data"?

Topic 2: European inventory of on-farm genetic diversity - Development of *in situ*/on-farm landrace inventories

Till now, few information on on-farm/in-garden conserved landraces was available (Veteläinen *et al.* 2009; 2012) that was gathered through activities carried out during EC funded projects:

- An Integrated European *In Situ* Management Work Plan: Implementing Genetic Reserves and On-Farm Concepts (AEGRO) http://aegro.julius-kuehn.de/aegro/,
- Novel characterization of crop wild relative and landrace resources as a basis for improved crop breeding http://vnr.unipg.it/PGRSecure/, and "Descriptors for web-enabled national *in situ* landrace inventories" (Negri *et al.* 2012) was developed for recording such data, (PGR SECURE project), https://www.pgrsecure.bham.ac.uk/sites/default/files/documents/helpdesk/LRDESCRIPTORS_PGRSECURE.pdf and
- by the On-Farm Conservation and Management Working Group of ECPGR across years.

Topic 2: European inventory of on-farm genetic diversity
Development of *in situ* landrace inventories

The Farmer's Pride project (Horizon 2020 EU Programme: http://www.farmerspride.eu/), among its different objectives, aimed at gaining a detailed view of landraces still maintained on-farm/in-garden in Europe, since no conservation and promotion of use can be carried out without knowing:

- where landraces are,
- which species they belong to,
- why and how they are still maintained.

In order to achieve this objective, the project activities initially focused:

- ✓ on the creation of a European inventory of on-farm conserved landraces, and
- ✓ on the collection of detailed information on landrace case studies across Europe.

A subset of the "fields" listed in the web-enabled template developed for collecting anonymous data on on-farm conserved landraces was produced. Only information on the country inventory, the taxon, the landrace (name, location and area) were asked. The idea of using only a subset of the total available fields was to maximize the possible number of answers (*i.e.* the number of recorded on-farm landraces) reducing the time needed by the respondents to fill in information.

List of fields used for on-farm landraces data recording

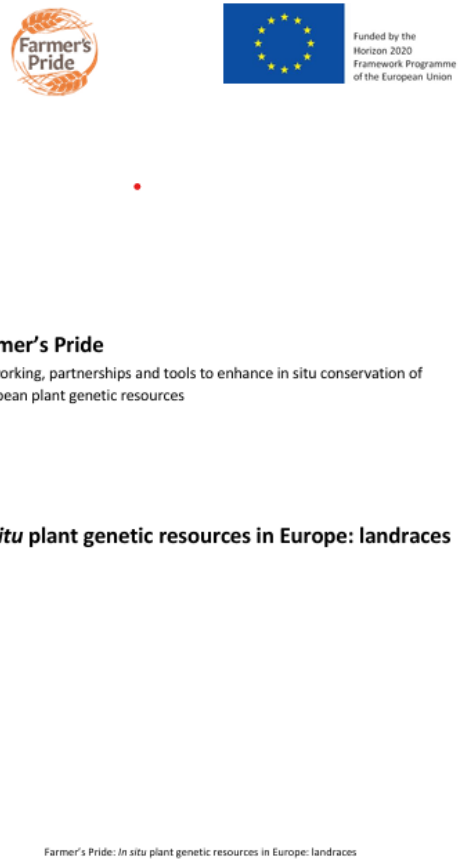
FIELD	ACRONYM	COLUMN
0. Progressive Number*	**PN**	**A**
1. INVENTORY IDENTIFICATION		
1.1. National Inventory code (NICODE) * Country code identifying the National in situ LR Inventory; the code of the country preparing the National Inventory. For country codes use the three-letter ISO 3166-1 (see: http://unstats.un.org/unsd/methods/m49/m49alpha.htm) *Example: NLD*	**NICODE**	**B**
2. TAXON IDENTIFICATION		
2.1. Genus (GENUS) * Genus name for taxon, in Latin. Initial uppercase letter required. *Example 1: Vigna* *Example 2: Vicia*	**GENUS**	**C**
2.2. Species (SPECIES) * Specific epithet portion of the scientific name, in Latin, in lower case letters. *Example 1: unguiculata* *Example 2: faba*	**SPECIES**	**D**
2.4. Subtaxa (SUBTAXA) This field can be used to store any additional taxonomic identifier (in Latin, in lower case letters) preceded by the rank (for example: subspecies, convariety, variety, form, cultivar group). The following abbreviations are foreseen for the rank: 'subsp.' (for subspecies); 'convar.' (for convariety); 'var.' (for variety); 'f.' (for form), 'Group' (for cultivar group). *Example 1: subsp. sesquipedalis* *Example 2: subsp. faba var. minuta*	**SUBTAXA**	**E**
2.7. Common crop name (CROPNAME) Name of the crop in colloquial language, preferably English if any. *Example1: yard–long-bean* *Example2: tick-bean*	**CROPNAME**	**F**
3. LANDRACE/POPULATION IDENTIFICATION		
3.3. Landrace local name/s (LRNAME) * Local name/s of the LR in the colloquial language of the farm. Free text. *Example: fagiolina, cornetti, fagiolino dall'occhio*	**LRNAME**	**G**

List of fields used for on-farm landraces data recording

4. SITE/LOCATION IDENTIFICATION		
4.1. Farm location: primary administrative subdivision of the country where farm is located (FARMFIRSTADMIN) Name of the primary administrative subdivision of the country where the farm is located for the most part of its extension. Free text. *Example: Umbria Region*	**FARMFIRSTADMIN**	**H**
4.2. Farm location: secondary administrative subdivision (FARMSECONDADMIN) Name of the secondary administrative subdivision (within the primary administrative subdivision) of the country where the farm is located.	**FARMSECONDADMIN**	**I**
4.7.1. Latitude of LR site (LRSLATDMS) Degrees (2 digits) minutes (2 digits), and seconds (2 digits) followed by N (North) or S (South).	**LRSLATDMS**	**J**
4.7.1.BIS Latitude of LR site (LRSLATDD) * Latitude expressed in decimal degrees.	**LRSLATDD**	**K**
4.7.2. Longitude of LR site (LRSLONGDMS) Degrees (3 digits), minutes (2 digits), and seconds (2 digits) followed by E (East) or W (West)	**LRSLONGDMS**	**L**
4.7.2. BIS Longitude of LR site (LRSLONGITUDEDD) * Longitude expressed in decimal degrees.	**LRSLONGITUDEDD**	**M**
4.8. Elevation of LR site (LRSELEVATION) * Elevation of LR site expressed in meters above sea level. Negative values are allowed.	**LRSELEVATION**	**N**
6. THE LANDRACE		
6.1. Landrace total area (LRTOTAREA) The total area (ha) cultivated under the inventoried LR on that farm as from farmer statement.	**LRTOTAREA**	**O**
8. REMARKS The remarks field is used to add notes or to elaborate on descriptors with value 99 or 999 (=Other). Prefix remarks with the field name they refer to and make them follow by a colon (:). Distinct remarks referring to different fields are separated by semicolons (;) without space. Examples: The farmer often observes flower colour instability; PRODUCTUSE: chaff also used for fuel pellet and pillow filling; LRMARKTDEMAND: falling locally but growing in the district nearby.	**REMARKS**	**P**

Topic 2: European inventory of on-farm genetic diversity - Building a first European inventory of *in situ* landraces

- As a deliverable of the Farmer's Pride project, the largest ever produced database of *in situ* maintained landraces was created (Raggi *et al*., 2022). It has a total of 19,335 records, including forages, cereals, pulses, garden crops and fruit trees of 14 European countries https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/06/D1.2_in_situ_PGR_in_Europe_landraces.pdf.
  - As the first example of an inventory for an entire region of the world, it can serve to better plan landrace conservation and

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Research paper

Analysis of landrace cultivation in Europe: A means to support *in situ* conservation of crop diversity

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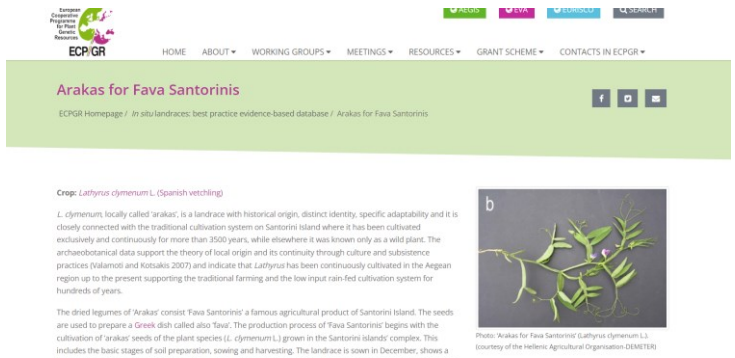
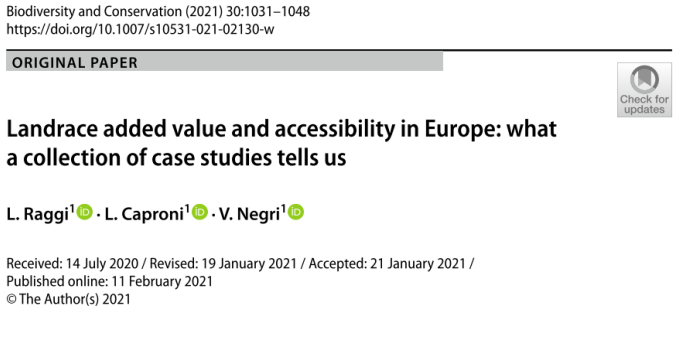
Topic 2: European inventory of on-farm genetic diversity
In situ landraces: best practice evidence-based database

https://www.ecpgr.org/in-situ-landraces-best-practice-evidence-based-database

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ORIGINAL PAPER

Landrace added value and accessibility in Europe: what a collection of case studies tells us

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- This tool (product of the Farmer's Pride project) is for landrace maintainers.
- Provides access to evidence-based information on the benefits, opportunities and practices of landrace cultivation to help in decision-making and to promote their *in situ* maintenance as a means of conserving and diversifying plant genetic resources (PGR) for food, nutrition and livelihood security.
- Includes examples of *in situ* management practices and of adding value to landraces for different crops and socio-cultural, environmental and economic contexts (Raggi *et al*., 2021).

The information includes:

- Crop (general information and historic data, type, name, breeding system, description)
- Landrace (name, country, description, cultivation system, geographical information, farmers description, propagation system, multiplication procedures and consequences on landrace diversity, added value, external support given to the landrace and implication for on-farm conservation, accessibility).

Topic 2: European inventory of on-farm genetic diversity – Other projects

- **Inwheatory** Inventorying wheat on-farm diversity (ECPGR activity grant scheme). This activity started with an agreement among the partners on the use of appropriate templates to collect data recording *in situ* occurrences of wheat landraces and case studies of successful examples of wheat landrace cultivation and use.
- **Pro-Grace** Promoting a Plant Genetic Resource Community for Europe TOPIC: Research infrastructure concept development (HORIZON-INFRA-2022-DEV-01-01) https://www.grace-ri.eu/pro-grace/about/objectives
  - **WP1: Plant genetic resources inventory and information systems** aims at further strengthening EURISCO as a central European catalogue for European PGR, by:
    - developing standards for decentralized databases and their interfacing with EURISCO,
    - generating a harmonized system of standards and descriptors for collecting and displaying phenotypic data and images, and
    - developing methods and standards for passport description, inventorying, and population management of PGR maintained *in situ*/on-farm.

Topic 2: European inventory of on-farm genetic diversity - Conservation varieties catalogues

Conservation varieties registration into the EU Catalogue

- Directive 2010/60/EU

Derogations for marketing fodder plant seed mixtures for use in preservation of the environment.

- Directive 2009/145/EC

Derogations for accepting vegetable landraces and varieties traditionally grown in certain regions, threatened by genetic erosion and varieties with no intrinsic value for commercial production but developed growing under particular conditions, marketing of their seed.

- Directive 2008/62/EC

Derogations for agricultural landraces and varieties naturally adapted to local conditions, threatened by genetic erosion; marketing their seed and seed potatoes.

Since the implementation of the European Commission Directives several countries have registered various landraces as conservation varieties (more than 400 of agricultural plant species and almost 200 for the varieties of vegetable species). The number of conservation varieties of agricultural plant species and vegetable species registered in the Common Catalogue is reported in the EUPVP.

Recent reviews on achievements on landraces *in situ* (on-farm) conservation in Europe and on landrace legislation in the world with emphasis in EU system are available in Raggi *et al.*, 2024 and Thanopoulos *et al.*, 2024.

https://food.ec.europa.eu/plants/plant-reproductive-material/plant-variety-catalogues-databases-information-systems_en

Topic 2: European inventory of on-farm genetic diversity
Conclusions

Despite the work that has been done already and the information gathered…

- Landraces adoption can be a dynamic process
- A high number of records will be included
- Complex stakeholder community is included (e.g. farmers, NGOs, research bodies)

A European inventory of *in situ* maintained landraces is still lacking

Limited and scattered information in Europe exist on:

- Where landraces are grown
- Which species they belong to
- Why and how are they still maintained

- This limits the possibility of setting up and promoting coordination actions aimed at improving the landraces conservation and use (Hammer, 1990; Maxted *et al.*, 2009) to the benefit of the present and future agriculture.

However, landraces still widely grown in different European countries and biogeographic regions and inventories are required because, without knowing the extant, it is rather difficult for governments to properly plan and implement the systematic conservation and use of landraces. In addition, countries that ratified the ITPGRFA are required to “survey and inventory PGRFA” (Art. 5.a) (FAO, 2001).

Suggestions

- As highlighted in Article 5 of the International Treaty (ITPGRFA) the Rational conservation of PGRFA (*in situ* and *ex situ*) begins with surveys and inventories.
- The help of EURISCO is needed in keeping trace of landraces and cultivation sites in comparison with the landraces conserved *ex situ* to the fulfilment of the objectives of ECPGR and to the benefit of plant genetic resources conservation.

Similarly with the actions described for the inclusion of *in situ* data in EURISCO the following steps could be taken:

  - Extension of EURISCO to enable hosting and public display of passport data of European landraces conserved on-farm.
  - Preparation and inclusion in EURISCO of initial sets of data from few pilot countries. Provision of data from these pilot countries will populate the new EURISCO extensions and offer examples for all other countries to follow.
  - Development of import tools for on-farm data.
  - Development of procedures for data integrity checks and data integration.
    - The descriptors for on-farm inventories and the results produced in the framework of other projects could help as a starting point for data exchange, and/or a new agreement for the type and requirements of populations to be inventoried should be made.
    - The link of the on-farm data with the existing *ex situ* data in EURISCO (with the necessary developments and extensions) will improve the *ex situ*/on-farm conservation interface.

- For the preparation and inclusion of the on-farm inventory in EURISCO a close collaboration with ECPGR members of the relevant Working Groups, the EURISCO Coordinator and the National Focal Points is needed.
- Moreover, a strong network with non-ECPGR members (farmers, NGOs, local authorities and communities), will enhance the relationships and the collaboration between the PGR conservation actors and help the data flow.

Thank you for your attention!!!