



Extension of EURISCO for Crop Wild Relatives (CWR) *in situ* data and preparation of pilot countries' data sets

GenR 2021-1



Progress report for the period from
15 November 2021 to 31 May 2023

by Lorenzo Maggioni, ECPGR Secretary

1. Introduction

The project proposal 'Extension of EURISCO for Crop Wild Relatives (CWR) *in situ* data and preparation of pilot countries' data sets' was submitted for funding to the Federal Ministry of Food and Agriculture in October 2021 and was approved with a budget of Euro 247,318 and a grant duration from 15 November 2021 until 31 December 2023.

This project intends to improve the documentation of *in situ* CWR in Europe, at the service of their conservation and use, creating the conditions for a permanent flow of data related to CWR *in situ* populations, from national inventories to the central catalogue EURISCO. This responds to the needs recognized by the Convention on Biological Diversity (CBD), the Second Global Plan of Action (GPA) for Plant Genetic Resources for Food and Agriculture and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), among other important instruments and plans.

The project also builds on recommendations made by the ECPGR Working Group on Documentation and Information (2014), the 'ECPGR Concept for *in situ* conservation of crop wild relatives in Europe' (2015), the EURISCO Advisory Committee (2021) and the Plant Genetic Resources Strategy for Europe (2021).

More specifically, the project intends to promote the definition of the scope of the type of *in situ* CWR data that it would be beneficial to include in EURISCO. The proposed scope should then be agreed upon within the ECPGR community, including the definition of the data exchange standard to be adopted at ECPGR level. The project also intends to establish an agreed mechanism for data flow from national inventories to EURISCO, either through the existing National Inventory Focal Points or through a newly created network of specific CWR Focal Points.

The EURISCO catalogue will also be extended and prepared to host and make the *in situ* CWR data provided by the European countries publicly available. In parallel, a group of pilot countries will be supported in organizing their internal data flow and data gathering mechanisms, and in preparing their *in situ* CWR data according to the standard and requirements defined in this project. The provision of data from these pilot countries will populate the new EURISCO extensions and offer examples for all other countries to follow.

Overall, the implementation of this project will endow the European region with a centralized, public and web-searchable inventory of *in situ* CWR priority populations' passport data and with a fine-tuned data flow mechanism utilizing an internationally agreed data exchange standard. An initial set of data from a few pilot countries will also be made available. The extension of EURISCO to *in situ* data will create a link with the existing *ex situ* data and thus improve the *ex situ/in situ* conservation interface. The implementation of international commitments defined by the CBD, GPA and ITPGRFA, as well as by the PGR Strategy, will make a significant step forward.

Due to lower costs than expected for the EURISCO development component of the project, a no cost budget revision was requested to the donor and granted in September 2022. In this way, part of the funds originally dedicated to the IPK bioinformatician will be used to contribute to data preparation at country level and upload to EURISCO, extending the list from seven to eleven pilot countries.

2. Objectives of the project

- a) Definition and agreement on the scope of EURISCO in terms of *in situ* CWR data (type and requirements of populations to be inventoried)
- b) Agreement at ECPGR level on the principles and mechanisms for inclusion of *in situ* CWR data in EURISCO
- c) Extension of EURISCO to enable hosting and public display of passport data of European *in situ* CWR populations
- d) Preparation and inclusion in EURISCO of datasets from seven pilot countries

3. Progress on planned activities

3.1 Preparation of draft proposal setting the principles for the inclusion of CWR data into EURISCO

In March 2022, a consultancy was assigned to and completed by two members of the EURISCO Advisory Committee (the Chair Theo van Hintum, CGN, Wageningen, The Netherlands, and the *in situ* CWR expert José Iriondo, URJC, Madrid, Spain). They drafted a proposal which was eventually finalized through various iterations involving all the project partners, the EURISCO Advisory Committee, the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture, the ECPGR Secretariat and another invited member of the Crop Wild Relatives Working Group. The proposal, including principles and requirements for data inclusion, definition of a data flow mechanism and the proposed data exchange standard (CWR passport descriptors), was approved by all the above entities and published on the ECPGR website (Hintum and Iriondo, 2022):

<https://www.ecpgr.cgiar.org/resources/ecpgr-publications/publication/principles-for-the-inclusion-of-cwr-data-in-eurisco-2022>

The document *Principles for the Inclusion of CWR Data in EURISCO* intends to: 1. Support the development of CWR National Inventories (NI) providing information on the CWR taxa and occurrence of CWR populations, their conservation status and availability; 2. Organize a mechanism to feed EURISCO with information on selected CWR populations, i.e. those that are 'actively conserved' and might potentially be made available to users.

Recommendations are made that the most relevant CWR populations to be considered as *in situ* accessions in the NI will be those whose current presence and precise location are known, are being actively conserved to guarantee their long-term persistence, and are available for access under the Multilateral System of the ITPGRFA. Criteria defining 'active conservation' should not be too strict. They may include populations that are likely to exist at the present time, whose location is known, where the land management is compatible with the persistence

of the population, and where there is a management institution or person that can be approached that is likely to facilitate access to the material.

The document describes the structure of information shared between the CWR-NI and EURISCO, the necessary steps to upload CWR-NI elements into EURISCO and the required changes in EURISCO. Two annexes containing 'Descriptors recommended for the generation of a National Inventory of *in situ* Crop Wild Relatives' and 'Descriptors for uploading passport data of *in situ* CWR to EURISCO' complete the document.

The approach suggested is based on various existing documents and discussions held on various platforms. Its implementation will enable countries to comply with the recommendations of international plans, treaties and conventions, including the Plant Genetic Resources Strategy for Europe.

3.2 Coordination of steps required to reach ECPGR agreement on the principles and mechanisms

The finalized document, accepted by the project partners and the EURISCO Steering Committee, will be used as such by the pilot countries. At the same time, the Chairs of the ECPGR Working Groups on Documentation and Information and on Crop Wild relatives (former Wild Species in Genetic Reserves) have been invited to circulate the document within their Working Groups and collect comments. The ECPGR Steering Committee has also been informed about the document at its 16th meeting in Malmö/Alnarp, Sweden, June 2022 and at the 17th meeting in Oeiras, Portugal, May-June 2023. The document has also been broadly presented at the Fifth meeting of the FAO/ITPGRFA Scientific Advisory Committee on the Global Information System of Article 17 in Rome, Italy, May 2023. Given the highly technical nature of the document, the need for a formal step of endorsement by the Steering Committee will be evaluated in consultation with the ECPGR Executive Committee.

3.3 Coordination of steps required to set up the *in situ* CWR data flow mechanism

The document *Principles for the Inclusion of CWR Data in EURISCO* indicates that the upload of data from the CWR-National Inventories should be done by a focal point authorized by the ECPGR National Inventory, but it could also be someone else, possibly closer to the CWR-National Inventory. The ECPGR Secretariat will consequently make sure that these CWR-National Inventory Focal Points are identified and registered on the ECPGR website. A call to ECPGR National Coordinators to identify “*in situ* CWR National Inventory Focal Points” is in preparation, in coordination with the opening of EURISCO to receive the first data sets.

3.4 Support of pilot countries in their preparation and delivery of *in situ* CWR data to EURISCO

The original group of seven pilot countries identified during the stages of preparation of this project (Cyprus, Czech Republic, Germany, Lithuania, Portugal, Spain and UK) was extended after the approved budget revision, to involve also Albania, Bulgaria, Italy and the Netherlands. Greece and Türkiye were also approached, but preferred not to get involved at this stage and remained very interested to monitor further developments of the project. Contractual agreements were made between ECPGR and ten out of eleven pilot countries (while Germany is participating in the project at no cost). Through these agreements, the contracted institutions, on behalf of their respective countries, committed towards identifying priority taxa and populations, preparing the national database structure, organizing the network of data providers, collecting and organizing the data according to the agreed principles and data exchange format, and eventually providing the data to EURISCO.

At the occasion of an ECPGR ad hoc meeting of the ECPGR Crop Wild Relatives Working Group, held in Thessaloniki, Greece, in December 2022, the afternoon of 15 December was dedicated to a separate session where partners in this project shared and discussed their progress made. Agenda, list of participants, presentations given and minutes of the meeting are available from the ECPGR web site at:

<https://www.ecpgr.cgiar.org/working-groups/crop-wild-relatives/ad-hoc-crop-wild-relatives-working-group-meeting-2022>

Progress made by each individual country is summarized below:

Albania: The Agricultural University of Tirana started the collaboration with this project in November 2022. A draft checklist of 472 CWR priority taxa from 86 genera was created, taxonomically based on the Flora of Albania and on a filtered version of the Crop Wild Relative Catalogue for Europe and the Mediterranean, including only taxa reported from Albania. A national database structure is in preparation, with a list of prioritized descriptors. Actors for a network of data providers have been identified and the national focal point for data provision needs to be nominated.

Bulgaria: The Institute of Plant Genetic Resources, Sadovo, started its activities for the project in November 2022. A Bulgarian database of population occurrences is being used to extract suitable data related to CWR populations, which will be filtered and curated. Passport data of populations for which an *ex situ* sample has been deposited in the Bulgarian genebank will be sent to EURISCO. A first prioritization includes 26 genera of mainly forage grasses and legumes, also with aromatic and ornamental plants, umbellifers, allium and cereal CWRs. Contacts have been established with the responsible authorities from the Ministry of Environment for providing information about CWRs with protected status.

Cyprus: The involvement of Cyprus (Agricultural Research Institute, Ministry of Agriculture, Rural Development and Environment, Athalassa) has started a bit later than the other countries, but sufficiently in time to participate in the discussion of the 'Principles' document. A formal agreement with Cyprus started in October 2022. Based on previous work, 178 CWR taxa were selected and will be used for the purposes of the current project. Existing data at population level started to be revised and updated with information from the local gene banks, herbariums and local experts. In addition, meetings with *in situ* stakeholders have been planned to inform about the project and to share views.

Czech Republic: The Genebank, Crop Research Institute, Prague (CRI), is basing its activity on a national strategy for conservation of CWR, compiled and published in 2017, with 204 priority species defined and the most important areas for *in situ* CWR conservation identified. Selection of CWR species and populations for *in situ* conservation was made, preferably in the category of endangered species. Monitoring of selected populations has been going on for several years. The GRIN Czech information system was revised to identify minimum descriptors required to upload *in situ* data to EURISCO and the system is currently able to accommodate such *in situ* data. With the collaboration of crop curators from responsible partner National Programme institutions and the Agency for Nature and Landscape Conservation (AOPK, Ministry of Environment), a number of *in situ* populations that are candidates for inclusion in EURISCO have been selected. Written agreements with the owners of the populations will be a requirement to enable the inclusion of data in EURISCO. The concept of 'donor plots' is applied for seed collecting in the buffer area/surroundings of botanically rich zones of national parks (NP) and landscape protected areas (PLA). The original collected seeds can be deposited in the genebank as a liaison institution and made available. Two sites (donor plots) were selected as initial case study within the PLA Bílé Karpaty: Medlánky and Čertoryje. Bílé Karpaty (White Carpathians) in South-East Moravia belongs to the most important hot spots selected in the Conservation Strategy of CWR for the Czech Republic. Both sites are monitored and phytosociological relevés are available. Species of agricultural interest in these two sites have been identified. These will be prioritized according to the Czech Strategy. The final selection will be done during field evaluation during the vegetation period 2023. Seeds will be collected for backup in the genebank.

Lithuania: The Nature Research Centre, Vilnius, has identified priority taxa and populations comprising 42 genera of food and forage crops, based on Annex 1 of ITPGRFA, the Lithuanian national plant variety lists and species of socio-economic importance. A tentative checklist of 100 CWR priority species was generated. Subsequently, a reiteration of CWR prioritization

was carried out, and a new list of 135 CWR priority species was established representing 49 genera of food and forage crops belonging to 12 families. Seven potential genetic reserve sites of CWR populations have been initially identified. Subsequently, fifteen new sites were investigated for CWR abundance, increasing the total number of potential genetic reserve sites of multispecies CWR populations to 22. The backbone structure of the CWR National Inventory database has been created containing (1) information at the taxon level used for the generation of the checklist, and (2) information at the population level that will provide specific details about each population. The descriptors corresponding to the international standards are mostly used as recommended by Hintum and Iriondo (2022) for a National Inventory of *in situ* CWR. The total number of occurrence records of CWR priority species may range up to 20,000 depending on the final number of the prioritized species and the data collected during the current season. The structure of the network of data providers is being organized. The Nature Research Centre (NRC) and State Forest Service will cooperate in organizing and making operational the network of data providers. It is expected that the individual NRC researchers or their groups will play a significant role in providing data through their own research projects. The Global Biodiversity Facility (GBIF) is seen as promising regular data provider. Protected area managers and farmers may provide data on project/program and contract basis, respectively. A contribution from local communities and social networking groups, including Facebook and iNaturalist, is expected as well.

Germany: Germany maintains a list of crop and CWR species in Germany available online here: <https://pgrdeu.genres.de/en/list-of-crop-and-crop-wild-relative-species-in-germany/>. A working list of priority CWR species was established in 2018. For several species, some population data have been or are being collected in the framework of projects. Priority populations have for example been identified for four wild celery species, for wild grapevine, for grassland communities (in one region) and are being identified for arnica (in one region). Currently, a second national survey on wild grapevine individuals is underway.

The national database structure has been established and was operating already before the project started. An online search is available within the *in situ* section of the national PGR inventory PGRDEU, where data on CWR populations and genetic reserves are being published when they become available.

Currently, the main data providers for occurrence data on CWR populations are project managers who carry out projects on CWR funded by the Federal Ministry for Food and Agriculture, and the institutions managing the CWR-specific networks of genetic reserves. Data for wild celery species and wild grapevine is available. Arnica genetic reserves are in the process of being established, and data from the Arnica reserves will be added after it will have been made available to the PGRDEU administrator.

The agreed principles and data exchange format mostly coincide with the national data format. A first mapping between the EURISCO CWR data exchange format and the national data format has taken place, using the Excel sheet provided by EURISCO.

Italy: Three institutions will collaborate in Italy for this pilot project, working on three different areas as exemplary cases, based on the advanced status of previous studies, i.e. *Vicia* spp. in Apulia and Basilicata regions, *Brassica* spp. in Central Italy and *Lactuca alpina* in Trentino Autonomous Province. The preparation of the national database structure with the definition of fields for which information will be supplied is in progress. The organization of an initial network of data providers is planned for summer 2023 and by the end of 2023, information on CWR accessions present in Italy and accessible through official contacts, thanks to specific agreements, will be made available in EURISCO.

The Netherlands: The Centre for Genetic Resources, The Netherlands has been very productive in the preparation of the CWR-NI for The Netherlands. A first draft is ready containing 1912 records including 298 threatened populations, identified based on niche analysis using two climate change scenarios, and 1614 occurrences of common species distributed in all of 14 'flora districts'. In the approach followed by CGN, the organization of the

network of data providers was not necessary. However, in parallel to the project other CGN projects have elements in which nature conservation organisations are approached to raise awareness about CWR and formulate agreements regarding back-up of the populations and possibly access and potential use of the material.

On the basis of the prepared CWR-NI, a file is created in Excel that complies to the specifications of the EURISCO upload format. As such, CGN is available for testing the upload interface as soon as it becomes available.

Portugal: INIAV-BPGV, Braga, started efforts to implement the *in situ* CWR National Inventory in Portugal. The *in situ* CWR National Inventory is based on the compilation of a national flora list, supported by existing published articles and a database – Flora-On (<https://flora-on.pt/>), an information repository coordinated by the Portuguese Botany Society (<http://spbotanica.pt>), which aims to systematize photographic, geographic, morphological, phenological and ecological information from all native or naturalized vascular plant species in Portugal. The data present in Flora-On were a key part of the assessment of the risk of extinction of plants on the Red List of the Vascular Flora of Mainland Portugal, and will continue to be so in future updates. It is planned to undertake the following steps: 1) identify and select the CWR of interest in the country; 2) identify the populations of the wild species that occur in the country, belonging to the same genera of selected crops; 3) consolidate the prioritization, based on Magos Brehm et al. (2017). The creation of the CWR National Inventory will require testing of the current GRIN Global system, which is adopted in Portugal, to verify the possibility of directly uploading information on EURISCO from there, especially at the population level. High priority has recently been given to CWR *Daucus carota*, *Malus sylvestris*, *Medicago sativa* and *Pisum sativum*, while other priorities are *Lathyrus sylvestris* and *Lens nigricans*. A genetic reserve has been established for *Beta patula* in the Madeira islands.

Spain: Since the start of the project, the Rey Juan Carlos University, Madrid, has established a working team based on five members who have previous experience in CWR conservation. Four additional persons have been added to the team, including an interuniversity Master's degree student, focusing on the development of the national database of CWR in Spain and the identification of the most appropriate wild populations of CWR for the establishment of genetic reserves.

The Spanish CWR/WFP priority list contains 521 taxa, selected from the very recently published Spanish National Strategy for the Conservation and Use of Crop Wild Relatives and Wild Food Plants. The national database structure is being prepared for both CWR population occurrence and populations selected for *in situ* conservation. Seventy-four descriptors have been selected out of those suggested in this project and with the addition of other GBIF descriptors. Preliminary data have been gathered for most descriptors corresponding to the taxon level, while population-level data were gathered from GBIF and these data have been filtered by quality of geographic coordinates. Population identifiers have been assigned. This exercise resulted in a dataset with ca. 2 million records, corresponding to 632,210 populations. Updating data for GENEPOL and LEGSTATUS is ongoing. Future activities include GIS and complementarity analyses to select the 'most appropriate CWR populations'. For genetic reserves, information is being gathered on legally protected threatened CWR and candidate populations for *in situ* conservation. Further discussion will take place on the selection of records to be sent to EURISCO (e.g. populations of threatened CWR protected by law may not be sent). It will be made sure that the mandatory descriptors are completed for the selected records.

The identification of stakeholders for a network of collaborators and data providers has been finalized obtaining a list with 172 contacts. 47% have already confirmed their willingness to collaborate in CWR/WFP conservation related activities.

United Kingdom: Under the leadership of the University of Birmingham, a previous UK checklist and prioritized inventory generated in 2015 and containing 223 taxa was evaluated. Data sources for updating the UK priority inventory and updating the taxonomy were collated and a

new inventory was generated with updated data. The NBN Atlas (www.NBNAtlas.org) was identified as the primary data source for population-level data and a data collection strategy was defined. Population-level data were filtered to remove records that are not verified or with insufficient coordinate precision and to keep only recent records in case of common taxa with a large distribution.

The completed dataset with all UK priority taxa was overlaid with protected areas using GIS software. Populations that are inside protected areas form a separate dataset, named 'Passively Conserved UK Priority CWR Populations'. This dataset includes over 155,000 records for 196 species and will be the basis of the UK National Inventory. This will also inform the SITEPROT descriptor of the EURISCO dataset. Known locations of landowner-managed sites where CWR are included in conservation plans will also be added. The UK National Inventory will include all verified and clean records in the UK, regardless of conservation status. For upload to EURISCO, the records within the top 13 National Nature Reserves will initially be used. These amount to 5492 records for 117 species. Natural England is managing all the sites and this will make liaison and potential use much easier than disparate sites managed by many landowners.

A database structure in Microsoft Excel was generated for CWR-NI at taxonomic and population level, using descriptors outlined in Annex 1 of the *Principles for the Inclusion of CWR Data in EURISCO* document (van Hintum and Iriondo, 2022). To enable upload to EURISCO, the database will be converted to the already-made EURISCO database structure with appropriate descriptors in place. Persistent unique identifiers, liaison institute codes, etc. will be generated. The database will be formatted to be suitable to upload.

3.5 Preparation of EURISCO extension to *in situ* CWR data

Based on the agreed 'Principles' document, IPK evaluated that the necessary EURISCO extensions will need to be somewhat less extensive than originally assumed, therefore the costs will be lower than expected and this was the basis for a budget revision that was accepted in September 2022.

IPK, Gatersleben dedicated bioinformatician work, starting in the last quarter of 2022, to carry out the following assignments:

- Finalize EURISCO-*in situ* CWR data standard;
- Modify/extend the EURISCO database schema;
- Implement upload/update mechanism for *in situ* CWR data;
- Implement intranet interface for *in situ* CWR-NFPs and embed upload/update mechanism;
- Extend the public EURISCO web interface for users of *in situ* CWR data.

The EURISCO-*in situ* CWR data standard was finalised and an Excel template for data collection was developed and uploaded on the project web site at: <https://www.ecpgr.cgiar.org/working-groups/crop-wild-relatives/cwr-in-eurisco>

A web-based upload mechanism was implemented and extensively tested. The interface is visually similar to the one used for uploading *ex situ* data. Data integrity checks have been completed using PL/SQL packages; the development of the necessary update processes has also been completed. The necessary modifications/extensions of the EURISCO database schema for *in situ* CWR data are in progress, as well as the extension of the web frontend.

3.6 Training of Focal Points

Necessary training of country Focal Points in charge of transferring *in situ* CWR data to EURISCO will be carried out by the EURISCO Coordination, together with the help-desk function, starting in the second part of 2023, after completion of the intranet interface for *in situ* CWR data.

3.7 Public awareness products to publicize extension of CWR in EURISCO

A project website has been prepared by the ECPGR Secretariat on the ECPGR web environment (<https://www.ecpgr.cgiar.org/working-groups/crop-wild-relatives/cwr-in-eurisco>).

Related web news items were published by ECPGR in [February 2022](#) and [May 2022](#).

Short updates were regularly included in the ECPGR information bulletins (<https://www.ecpgr.cgiar.org/resources/ecpgr-information-bulletin>) and in the ECPGR Annual reports 2021 and 2022 (<https://www.ecpgr.cgiar.org/resources/ecpgr-publications/annual-reports>).

The project activities were presented at various ECPGR and other international meetings, as follows:

- Sixteenth ECPGR Steering Committee meeting, Alnarp/Malmo, Sweden, June 2022
- Eighth ECPGR Allium Working Group meeting, Skierniewice, Poland, October 2022
- Ad hoc meeting of the ECPGR CWR Working Group, Thessaloniki, Greece, December 2022.
- Fifth meeting of the scientific advisory committee on the global information system (GLIS-SAC-5) at FAO, Rome, Italy, May 2023
- Seventeenth ECPGR Steering Committee meeting, Oeiras, Portugal, May-June 2023

Additional appropriate public awareness products (articles, flyers, posters, web information campaign, etc.) will be prepared in line with the progress of the project.

4. Preliminary progress towards expected outcomes and challenges

- a) Policy and technical document defining the principles and requirements for the inclusion of *in situ* CWR data in EURISCO

The document [Principles for the Inclusion of CWR Data in EURISCO](#) was prepared by consultants van Hintum and Iriondo, initially as a draft proposal, which was eventually discussed, revised and agreed by project partners and the EURISCO Advisory Committee, and published by ECPGR in May 2022.

- b) Endorsement of the *in situ* CWR data policy and technical document by the ECPGR Steering Committee

A formal endorsement of the above document by the ECPGR Steering Committee has not been requested, but the Steering Committee has been made aware of the project and of the specific document. Given the highly technical nature of the document, the need for a formal step of endorsement by the Steering Committee will be evaluated in consultation with the ECPGR Executive Committee.

- c) *In situ* CWR data flow mechanism established in Europe with responsibilities assigned at country level and Focal Points trained

The data flow principles have been established. Assignment of responsibilities to specific national Focal Points and their training is planned for the second half of 2023.

- d) Extension of EURISCO to receive *in situ* CWR data completed (database structure, import tool, data integrity procedures and web interface)

Database structure, import tool and data integrity procedures have been completed. The web interface preparation is in progress.

- e) *In situ* CWR data from seven countries included in EURISCO

Completion of this outcome is expected by the end of 2023.